HYDRAULIC MOTORS
LD | MD | HD

HYDRAULIC MOTOR | BRAKE UNITS

STEERING UNITS

HYDRAULIC BRAKES

HYDRAULIC PUMPS

FLOW DIVIDERS

HYDRAULIC MOTORS

Medium Duty Series

Delivering The Power To Get Work Done

WHITE DRIVE PRODUCTS

WHITE DRIVE PRODUCTS

TABLE OF CONTENTS

TABLE OF CONTENTS

OPERATING RECOMMENDATIONS

OIL TYPE

Hydraulic oils with anti-wear, anti-foam and demulsifiers are recommended for systems incorporating White Drive Products motors. Straight oils can be used but may require VI (viscosity index) improvers depending on the operating temperature range of the system. Other water based and environmentally friendly oils may be used, but service life of the motor and other components in the system may be significantly shortened. Before using any type of fluid, consult the fluid requirements for all components in the system for compatibility. Testing under actual operating conditions is the only way to determine if acceptable service life will be achieved.

FLUID VISCOSITY & FILTRATION

Fluids with a viscosity between 20 - 43 cSt [100 - 200 S.U.S.] at operating temperature is recommended. Fluid temperature should also be maintained below 85°C [180° F]. It is also suggested that the type of pump and its operating specifications be taken into account when choosing a fluid for the system. Fluids with high viscosity can cause cavitation at the inlet side of the pump. Systems that operate over a wide range of temperatures may require viscosity improvers to provide acceptable fluid performance.

White Drive Products recommends maintaining an oil cleanliness level of ISO 17-14 or better.

INSTALLATION & START-UP

When installing a White Drive Products motor it is important that the mounting flange of the motor makes full contact with the mounting surface of the application. Mounting hardware of the appropriate grade and size must be used. Hubs, pulleys, sprockets and couplings must be properly aligned to avoid inducing excessive thrust or radial loads. Although the output device must fit the shaft snug, a hammer should never be used to install any type of output device onto the shaft. The port plugs should only be removed from the motor when the system connections are ready to be made. To avoid contamination, remove all matter from around the ports of the motor and the threads of the fittings. Once all system connections are made, it is recommended that the motor be run-in for 15-30 minutes at no load and half speed to remove air from the hydraulic system.

MOTOR PROTECTION

Over-pressurization of a motor is one of the primary causes of motor failure. To prevent these situations, it is necessary to provide adequate relief protection for a motor based on the pressure ratings for that particular model. For systems that may experience overrunning conditions, special precautions must be taken. In an overrunning condition, the motor functions as a pump and attempts to convert kinetic energy into hydraulic energy. Unless the system is properly configured for this condition, damage to the motor or system can occur. To protect against this condition a counterbalance valve or relief cartridge must be incorporated into the circuit to reduce the risk of overpressurization. If a relief cartridge is used, it must be installed upline of the motor, if not in the motor, to relieve the pressure created by the over-running motor. To provide proper motor protection for an over-running load application, the pressure setting of the pressure relief valve must not exceed the intermittent rating of the motor.

HYDRAULIC MOTOR SAFETY PRECAUTION

A hydraulic motor must not be used to hold a suspended load. Due to the necessary internal tolerances, all hydraulic motors will experience some degree of creep when a load induced torque is applied to a motor at rest. All applications that require a load to be held must use some form of mechanical brake designed for that purpose.

MOTOR/BRAKE PRECAUTION

Caution! - White Drive Products' motors/brakes are intended to operate as static or parking brakes. System circuitry must be designed to bring the load to a stop before applying the brake.

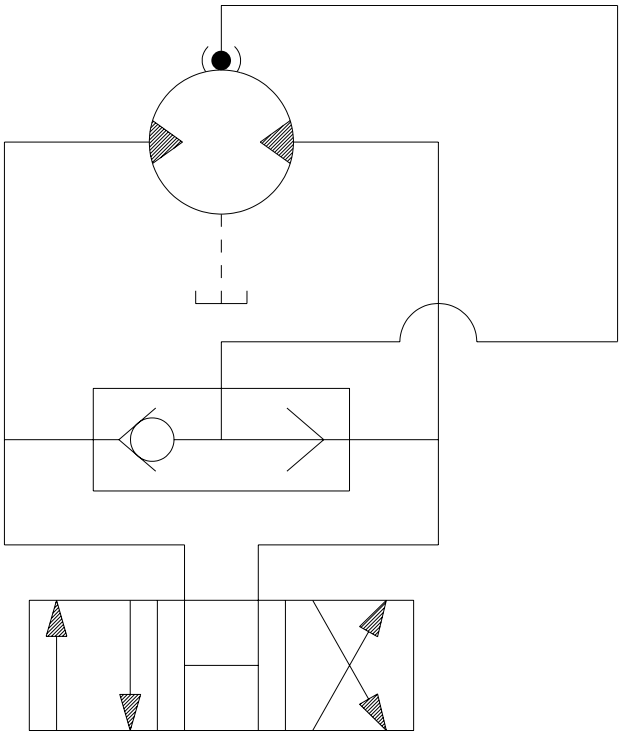
Caution! - Because it is possible for some large displacement motors to overpower the brake, it is critical that the maximum system pressure be limited for these applications. Failure to do so could cause serious injury or death. When choosing a motor/brake for an application, consult the performance chart for the series and displacement chosen for the application to verify that the maximum operating pressure of the system will not allow the motor to produce more torque than the maximum rating of the brake. Also, it is vital that the system relief be set low enough to insure that the motor is not able to overpower the brake.

To ensure proper operation of the brake, a separate case drain back to tank must be used. Use of the internal drain option is not recommended due to the possibility of return line pressure spikes. A simple schematic of a system utilizing a motor/brake is shown on page 4. Although maximum brake release pressure may be used for an application, a 34 bar [500 psi] pressure reducing valve is recommended to promote maximum life for the brake release piston seals. However, if a pressure reducing valve is used in a system which has case drain back pressure, the pressure reducing valve should be set to 34 bar [500 psi] over the expected case pressure to ensure full brake release. To achieve proper brake release operation, it is necessary to bleed out any trapped air and fill brake release cavity and hoses before all connections are tightened. To facilitate this operation, all motor/brakes feature two release ports. One or

OPERATING RECOMMENDATIONS & MOTOR CONNECTIONS

MOTOR/BRAKE PRECAUTION (continued)

both of these ports may be used to release the brake in the unit. Motor/brakes should be configured so that the release ports are near the top of the unit in the installed position.



TYPICAL MOTOR/BRAKE SCHEMATIC

Once all system connections are made, one release port must be opened to atmosphere and the brake release line carefully charged with fluid until all air is removed from the line and motor/brake release cavity. When this has been accomplished the port plug or secondary release line must be reinstalled. In the event of a pump or battery failure, an external pressure source may be connected to the brake release port to release the brake, allowing the machine to be moved.

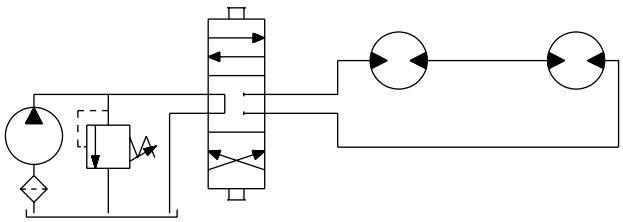
▶ NOTE: It is vital that all operating recommendations be followed. Failure to do so could result in injury or death.

MOTOR CIRCUITS

There are two common types of circuits used for connecting multiple numbers of motors – series connection and parallel connection.

SERIES CONNECTION

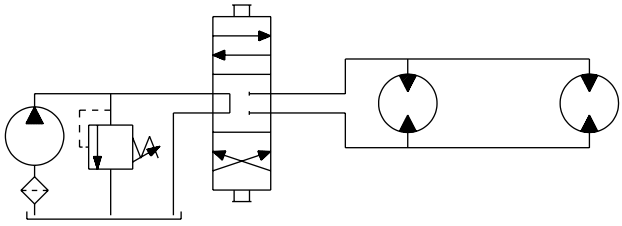
When motors are connected in series, the outlet of one motor is connected to the inlet of the next motor. This allows the full pump flow to go through each motor and provide maximum speed. Pressure and torque are distributed between the motors based on the load each motor is subjected to. The maximum system pressure must be no greater than the maximum inlet pressure of the first motor. The allowable back pressure rating for a motor must also be considered. In some series circuits the motors must have an external case drain connected. A series connection is desirable when it is important for all the motors to run the same speed such as on a long line conveyor.



SERIES CIRCUIT

PARALLEL CONNECTION

In a parallel connection all of the motor inlets are connected. This makes the maximum system pressure available to each motor allowing each motor to produce full torque at that pressure. The pump flow is split between the individual motors according to their loads and displacements. If one motor has no load, the oil will take the path of least resistance and all the flow will go to that one motor. The others will not turn. If this condition can occur, a flow divider is recommended to distribute the oil and act as a differential.

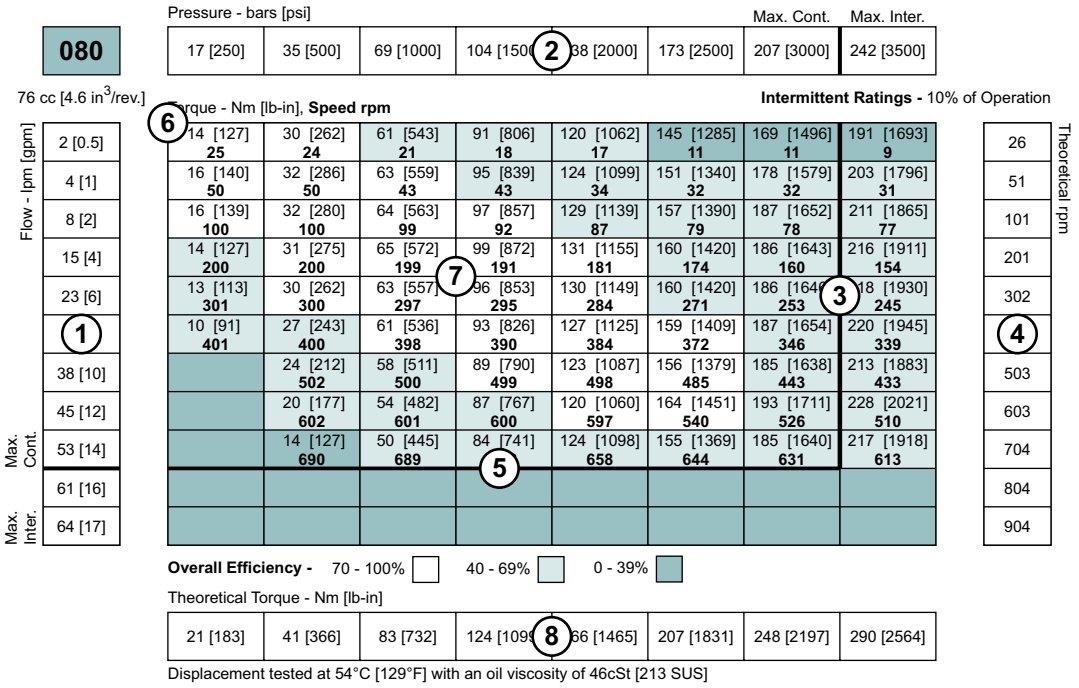


SERIES CIRCUIT

▶ NOTE: The motor circuits shown above are for illustration purposes only. Components and circuitry for actual applications may vary greatly and should be chosen based on the application.

PRODUCT TESTING

Performance testing is the critical measure of a motor's ability to convert flow and pressure into speed and torque. All product testing is conducted using White Drive Products' state of the art test facility. This facility utilizes fully automated test equipment and custom designed software to provide accurate, reliable test data. Test routines are standardized, including test stand calibration and stabilization of fluid temperature and viscosity, to provide consistent data. The example below provides an explanation of the values pertaining to each heading on the performance chart.



1. Flow represents the amount of fluid passing through the motor during each minute of the test.

2. Pressure refers to the measured pressure differential between the inlet and return ports of the motor during the test.

3. The maximum continuous pressure rating and maximum intermittent pressure rating of the motor are separated by the dark lines on the chart.

4. Theoretical RPM represents the RPM that the motor would produce if it were 100% volumetrically efficient. Measured RPM divided by the theoretical RPM give the actual volumetric efficiency of the motor.

5. The maximum continuous flow rating and maximum intermittent flow rating of the motor are separated by the dark line on the chart.

6. Performance numbers represent the actual torque and speed generated by the motor based on the corresponding input pressure and flow. The numbers on the top row indicate torque as measured in Nm [lb-in], while the bottom number represents the speed of the output shaft.

7. Areas within the white shading represent maximum motor efficiencies.

8. Theoretical Torque represents the torque that the motor would produce if it were 100% mechanically efficient. Actual torque divided by the theoretical torque gives the actual mechanical efficiency of the motor.

ALLOWABLE BEARING & SHAFT LOADING

This catalog provides curves showing allowable radial loads at points along the longitudinal axis of the motor. They are dimensioned from the mounting flange. Two capacity curves for the shaft and bearings are shown. A vertical line through the centerline of the load drawn to intersect the x-axis intersects the curves at the load capacity of the shaft and of the bearing.

In the example below the maximum radial load bearing rating is between the internal roller bearings illustrated with a solid line. The allowable shaft rating is shown with a dotted line.

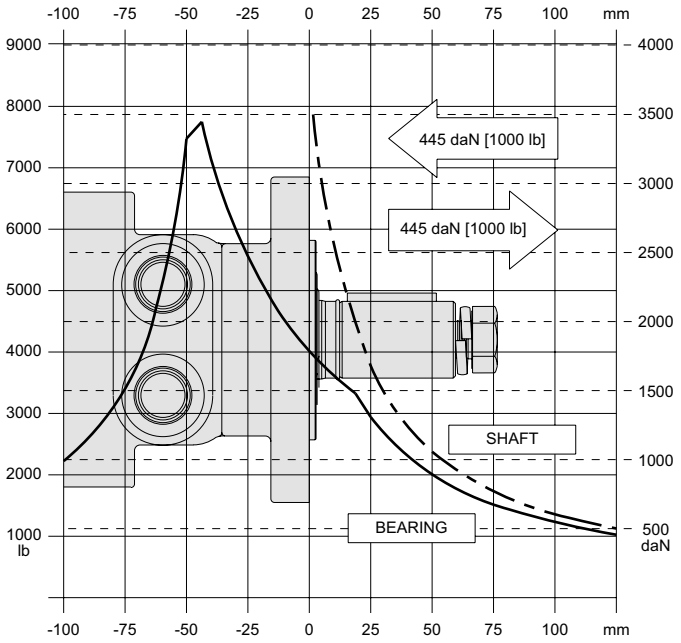
The bearing curves for each model are based on labratory analysis and testing results constructed at White Drive Products. The shaft loading is based on a 3:1 safety factor and 330 Kpsi tensile strength. The allowable load is the lower of the curves at a given point. For instance, one inch in front of the mounting flange the bearing capacity is lower than the shaft capacity. In this case, the bearing is the limiting load. The motor user needs to determine which series of motor to use based on their application knowledge.

ISO 281 RATINGS VS. MANUFACTURERS RATINGS

Published bearing curves can come from more than one type of analysis. The ISO 281 bearing rating is an international standard for the dynamic load rating of roller bearings. The rating is for a set load at a speed of 33 1/3 RPM for 500 hours (1 million revolutions). The standard was established to allow consistent comparisons of similar bearings between manufacturers. The ISO 281 bearing ratings are based solely on the physical characteristics of the bearings, removing any manufacturers specific safety factors or empirical data that influences the ratings.

Manufacturers' ratings are adjusted by diverse and systematic laboratory investigations, checked constantly with feedback from practical experience. Factors taken into account that affect bearing life are material, lubrication, cleanliness of the lubrication, speed, temperature, magnitude of the load and the bearing type.

The operating life of a bearing is the actual life achieved by the bearing and can be significantly different from the calculated life. Comparison with similar applications is the most accurate method for bearing life estimations.



EXAMPLE LOAD RATING FOR MECHANICALLY RETAINED NEEDLE ROLLER BEARINGS

Bearing Life L_{10} = $(C/P)^p$ [10^6 revolutions]

L_{10} = nominal rating life

C = dynamic load rating

P = equivalent dynamic load

Life Exponent p = 10/3 for needle bearings

BEARING LOAD MULTIPLICATION FACTOR TABLE

RPM	FACTOR	RPM	FACTOR
50	1.23	**500**	0.62
100	1.00	**600**	0.58
200	0.81	**700**	0.56
300	0.72	**800**	0.50
400	0.66		

VEHICLE DRIVE CALCULATIONS

When selecting a wheel drive motor for a mobile vehicle, a number of factors concerning the vehicle must be taken into consideration to determine the required maximum motor RPM, the maximum torque required and the maximum load each motor must support. The following sections contain the necessary equations to determine this criteria. An example is provided to illustrate the process.

Sample application (vehicle design criteria)

vehicle description ..... 4 wheel vehicle
vehicle drive ..... 2 wheel drive
GVW ..... 1,500 lbs.
weight over each drive wheel ..... 425 lbs.
rolling radius of tires ..... 16 in.
desired acceleration ..... 0-5 mph in 10 sec.
top speed ..... 5 mph
gradability 20%
worst working surface ..... poor asphalt

To determine maximum motor speed

$$RPM = \frac{2.65 \times KPH \times G}{rm} \qquad RPM = \frac{168 \times MPH \times G}{ri}$$

Where:
MPH = max. vehicle speed (miles/hr)
KPH = max. vehicle speed (kilometers/hr)
ri = rolling radius of tire (inches)
G = gear reduction ratio (if none, G = 1)
rm = rolling radius of tire (meters)

Example $RPM = \frac{168 \times 5 \times 1}{16} = 52.5$

To determine maximum torque requirement of motor

To choose a motor(s) capable of producing enough torque to propel the vehicle, it is necessary to determine the Total Tractive Effort (TE) requirement for the vehicle. To determine the total tractive effort, the following equation must be used:

TE = RR + GR + FA + DP (lbs or N)

Where:
TE = Total tractive effort
RR = Force necessary to overcome rolling resistance
GR = Force required to climb a grade
FA = Force required to accelerate
DP = Drawbar pull required

The components for this equation may be determined using the following steps:

Step One: Determine Rolling Resistance

Rolling Resistance (RR) is the force necessary to propel a vehicle over a particular surface. It is recommended that the worst possible surface type to be encountered by the vehicle be factored into the equation.

$$RR = \frac{GVW}{1000} \times R \text{ (lb or N)}$$

Where:
GVW = gross (loaded) vehicle weight (lb or kg)
R = surface friction (value from Table 1)

Example $RR = \frac{1500}{1000} \times 22 \text{ lbs} = 33 \text{ lbs}$

Table 1

Rolling Resistance	
Concrete (excellent)	10
Concrete (good)	15
Concrete (poor)	20
Asphalt (good)	12
Asphalt (fair)	17
Asphalt (poor)	22
Macadam (good)	15
Macadam (fair)	22
Macadam (poor)	37
Cobbles (ordinary)	55
Cobbles (poor)	37
Snow (2 inch)	25
Snow (4 inch)	37
Dirt (smooth)	25
Dirt (sandy)	37
Mud	37 to 150
Sand (soft)	60 to 150
Sand (dune)	160 to 300

Step Two: Determine Grade Resistance

Grade Resistance (GR) is the amount of force necessary to move a vehicle up a hill or “grade.” This calculation must be made using the maximum grade the vehicle will be expected to climb in normal operation.

To convert incline degrees to % Grade:
% Grade = [tan of angle (degrees)] x 100

$$GR = \frac{\%\ Grade}{100} \times GVW \text{ (lb or N)}$$

Example $GR = \frac{20}{100} \times 1500 \text{ lbs} = 300 \text{ lbs}$

VEHICLE DRIVE CALCULATIONS

Step Three: Determine Acceleration Force

Acceleration Force (FA) is the force necessary to accelerate from a stop to maximum speed in a desired time.

$$FA = \frac{MPH \times GVW\ (lb)}{22 \times t} \qquad FA = \frac{KPH \times GVW\ (N)}{35.32 \times t}$$

Where:

t = time to maximum speed (seconds)

Example $FA = \frac{5 \times 1500\ lbs}{22 \times 10} = 34\ lbs$

Step Four: Determine Drawbar Pull

Drawbar Pull (DP) is the additional force, if any, the vehicle will be required to generate if it is to be used to tow other equipment. If additional towing capacity is required for the equipment, repeat steps one through three for the towable equipment and sum the totals to determine DP.

Step Five: Determine Total Tractive Effort

The Tractive Effort (TE) is the sum of the forces calculated in steps one through three above. On low speed vehicles, wind resistance can typically be neglected. However, friction in drive components may warrant the addition of 10% to the total tractive effort to insure acceptable vehicle performance.

TE = RR + GR + FA + DP (lb or N)

Example TE = 33 + 300 + 34 + 0 (lbs) = 367 lbs

Step Six: Determine Motor Torque

The Motor Torque (T) required per motor is the Total Tractive Effort divided by the number of motors used on the machine. Gear reduction is also factored into account in this equation.

$$T = \frac{TE \times ri}{M \times G}\ lb\text{-}in\ per\ motor \qquad T = \frac{TE \times rm}{M \times G}\ Nm\ per\ motor$$

Where:

M = number of driving motors

Example $T = \frac{367 \times 16}{2 \times 1}$ lb-in/motor = 2936 lb-in

Step Seven: Determine Wheel Slip

To verify that the vehicle will perform as designed in regards to tractive effort and acceleration, it is necessary to calculate wheel slip (TS) for the vehicle. In special cases, wheel slip may actually be desirable to prevent hydraulic system overheating and component breakage should the vehicle become stalled.

$$TS = \frac{W \times f \times ri}{G}\ (lb\text{-}in\ per\ motor) \qquad TS = \frac{W \times f \times rm}{G}\ (N\text{-}m\ per\ motor)$$

Where:

f = coefficient of friction (see table 2)

W = loaded vehicle weight over driven wheel (lb or N)

Example $TS = \frac{425 \times .06 \times 16}{1}$ lb-in/motor = 4080 lbs

Table 2

Coefficient of friction (f)	
Steel on steel	0.3
Rubber tire on dirt	0.5
Rubber tire on a hard surface	0.6 - 0.8
Rubber tire on cement	0.7

To determine radial load capacity requirement of motor

When a motor used to drive a vehicle has the wheel or hub attached directly to the motor shaft, it is critical that the radial load capabilities of the motor are sufficient to support the vehicle. After calculating the Total Radial Load (RL) acting on the motors, the result must be compared to the bearing/shaft load charts for the chosen motor to determine if the motor will provide acceptable load capacity and life.

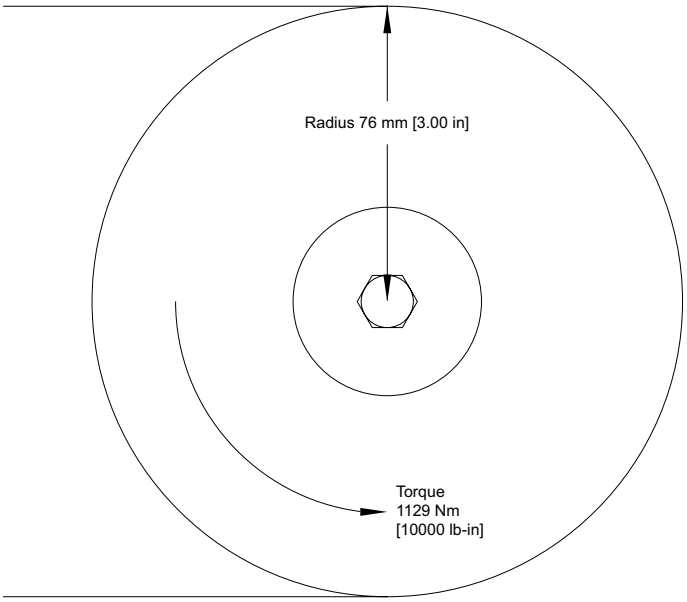
$$RL = \sqrt{W^2 + \left(\frac{T}{ri}\right)^2}\ lb \qquad RL = \sqrt{W^2 + \left(\frac{T}{rm}\right)^2}\ kg$$

Example $RL = \sqrt{425^2 + \left(\frac{2936}{16}\right)^2} = 463$ lbs

Once the maximum motor RPM, maximum torque requirement, and the maximum load each motor must support have been determined, these figures may then be compared to the motor performance charts and to the bearing load curves to choose a series and displacement to fulfill the motor requirements for the application.

INDUCED SIDE LOAD

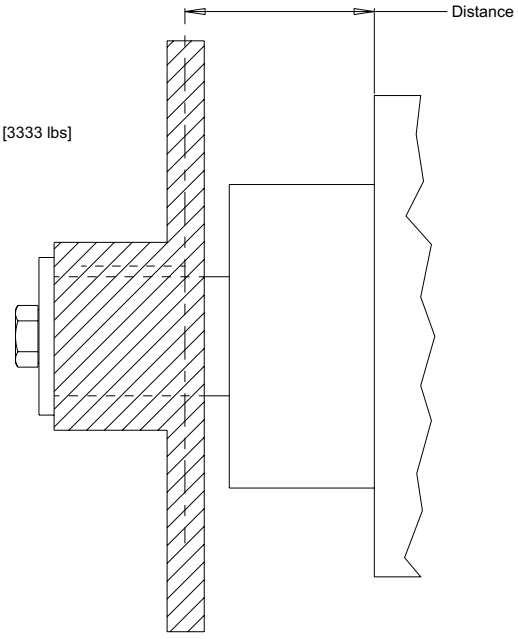
In many cases, pulleys or sprockets may be used to transmit the torque produced by the motor. Use of these components will create a torque induced side load on the motor shaft and bearings. It is important that this load be taken into consideration when choosing a motor with sufficient bearing and shaft capacity for the application.



To determine the side load, the motor torque and pulley or sprocket radius must be known. Side load may be calculated using the formula below. The distance from the pulley/sprocket centerline to the mounting flange of the motor must also be determined. These two figures may then be compared to the bearing and shaft load curve of the desired motor to determine if the side load falls within acceptable load ranges.

$$\text{Side Load} = \frac{\text{Torque}}{\text{Radius}}$$

Side Load = 14855 Nm [3333 lbs]



HYDRAULIC EQUATIONS

Multiplication Factor	Abbrev.	Prefix
10^{12}	T	tera
10^{9}	G	giga
10^{6}	M	mega
10^{3}	K	kilo
10^{2}	h	hecto
10^{1}	da	deka
10^{-1}	d	deci
10^{-2}	c	centi
10^{-3}	m	milli
10^{-6}	u	micro
10^{-9}	n	nano
10^{-12}	p	pico
10^{-15}	f	femto
10^{-18}	a	atto

Theo. Speed (RPM) =

$$\frac{1000 \times \text{LPM}}{\text{Displacement (cm}^3\text{/rev)}} \quad \text{or} \quad \frac{231 \times \text{GPM}}{\text{Displacement (in}^3\text{/rev)}}$$

Theo. Torque (lb-in) =

$$\frac{\text{Bar x Disp. (cm}^3\text{/rev)}}{20\ \text{pi}} \quad \text{or} \quad \frac{\text{PSI x Displacement (in}^3\text{/rev)}}{6.28}$$

Power In (HP) =

$$\frac{\text{Bar x LPM}}{600} \quad \text{or} \quad \frac{\text{PSI x GPM}}{1714}$$

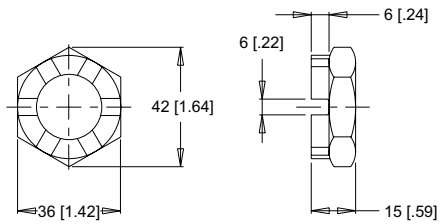
Power Out (HP) =

$$\frac{\text{Torque (Nm) x RPM}}{9543} \quad \text{or} \quad \frac{\text{Torque (lb-in) x RPM}}{63024}$$

SHAFT NUT INFORMATION

35MM TAPERED SHAFTS
M24 x 1.5 Thread

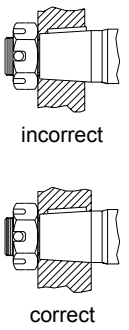
A Slotted Nut



Torque Specifications: 32.5 daNm [240 ft.lb.]

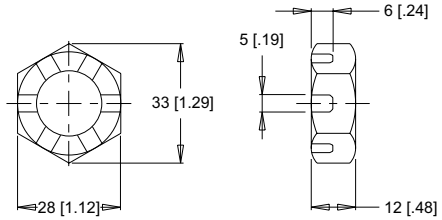
PRECAUTION

The tightening torques listed with each nut should only be used as a guideline. Hubs may require higher or lower tightening torque depending on the material. Consult the hub manufacturer to obtain recommended tightening torque. To maximize torque transfer from the shaft to the hub, and to minimize the potential for shaft breakage, a hub with sufficient thickness must fully engage the taper length of the shaft.



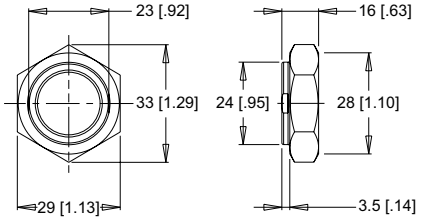
1" TAPERED SHAFTS
3/4-28 Thread

A Slotted Nut



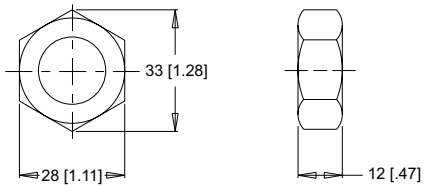
Torque Specifications: 20 - 23 daNm [150 - 170 ft.lb.]

B Lock Nut



Torque Specifications: 24 - 27 daNm [180 - 200 ft.lb.]

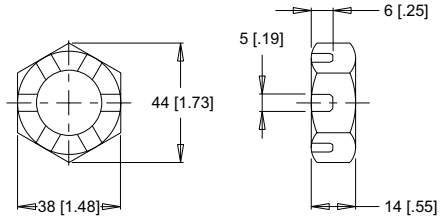
C Solid Nut



Torque Specifications: 20 - 23 daNm [150 - 170 ft.lb.]

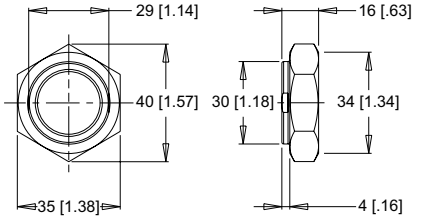
1-1/4" TAPERED SHAFTS
1-20 Thread

A Slotted Nut



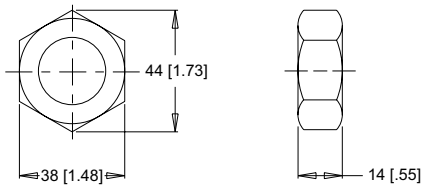
Torque Specifications: 38 daNm [280 ft.lb.] Max.

B Lock Nut



Torque Specifications: 33 - 42 daNm [240 - 310 ft.lb.]

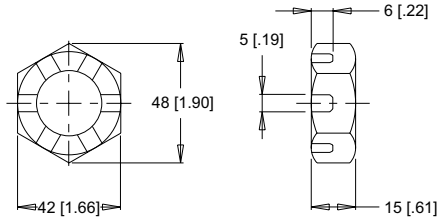
C Solid Nut



Torque Specifications: 38 daNm [280 ft.lb.] Max.

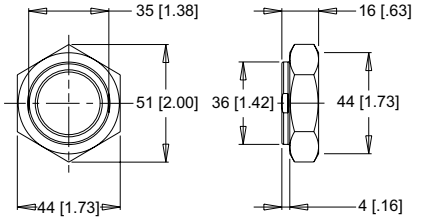
1-3/8" & 1-1/2" TAPERED SHAFTS
1 1/8-18 Thread

A Slotted Nut



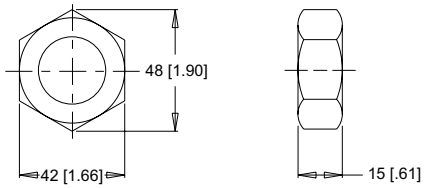
Torque Specifications: 41 - 54 daNm [300 - 400 ft.lb.]

B Lock Nut



Torque Specifications: 34 - 48 daNm [250 - 350 ft.lb.]

C Solid Nut



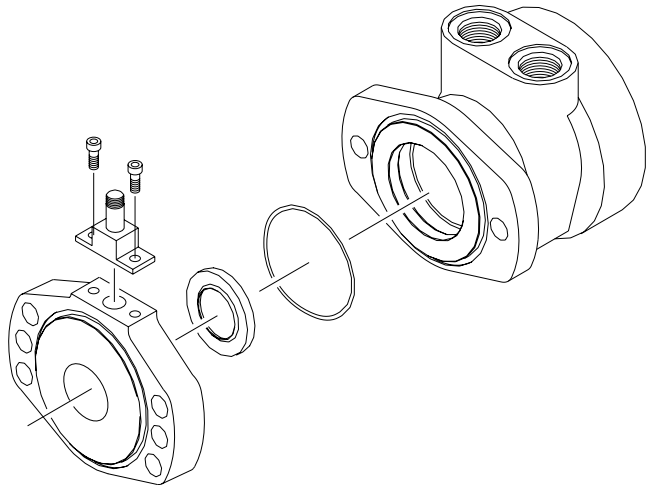
Torque Specifications: 41 - 54 daNm [300 - 400 ft.lb.]

SPEED SENSORS

White Drive Products offers both single and dual element speed sensor options providing a number of benefits to users by incorporating the latest advancements in sensing technology and materials. The 700 & 800 series motors single element sensors provide 60 pulses per revolution with the dual element providing 120 pulses per revolution, with all other series providing 50 & 100 pulses respectively. Higher resolution is especially beneficial for slow speed applications, where more information is needed for smooth and accurate control. The dual sensor option also provides a direction signal allowing end-users to monitor the direction of shaft rotation .

Unlike competitive designs that breach the high pressure area of the motor to add the sensor, the White Drive Products speed sensor option utilizes an add-on flange to locate all sensor components outside the high pressure operating environment. This eliminates the potential leak point common to competitive designs. Many improvements were made to the sensor flange including changing the material from cast iron to acetal resin, incorporating a Buna-N shaft seal internal to the flange, and providing a grease zerk, which allows the user to fill the sensor cavity with grease. These improvements enable the flange to withstand the rigors of harsh environments.

Another important feature of the new sensor flange is that it is self-centering, which allows it to remain concentric to the magnet rotor. This produces a consistent mounting location



for the new sensor module, eliminating the need to adjust the air gap between the sensor and magnet rotor. The o-ring sealed sensor module attaches to the sensor flange with two small screws, allowing the sensor to be serviced or upgraded in the field in under one minute. This feature is especially valuable for mobile applications where machine downtime is costly. The sensor may also be serviced without exposing the hydraulic circuit to the atmosphere. Another advantage of the self-centering flange is that it allows users to rotate the sensor to a location best suited to their application. This feature is not available on competitive designs, which fix the sensor in one location in relationship to the motor mounting flange.

FEATURES / BENEFITS

- Grease fitting allows sensor cavity to be filled with grease for additional protection.
- Internal extruder seal protects against environmental elements.
- M12 or weatherpack connectors provide installation flexibility.
- Dual element sensor provides up to 120 pulses per revolution and directional sensing.
- Modular sensor allows quick and easy servicing.
- Acetal resin flange is resistant to moisture, chemicals, oils, solvents and greases.
- Self-centering design eliminates need to set magnet-to-sensor air gap.
- Protection circuitry

SENSOR OPTIONS

Z - 4-pin M12 male connector
This option has 50 pulses per revolution on all series except the DT which has 60 pulses per revolution. This option will not detect direction.

Y - 3-pin male weatherpack connector*
This option has 50 pulses per revolution on all series except the DT which has 60 pulses per revolution. This option will not detect direction.

X - 4-pin M12 male connector
This option has 100 pulses per revolution on all series except the DT which has 120 pulses per revolution. This option will detect direction.

W - 4-pin male weatherpack connector*
This option has 100 pulses per revolution on all series except the DT which has 120 pulses per revolution. This option will detect direction.

*These options include a 610mm [2 ft] cable.

SPEED SENSORS

SINGLE ELEMENT SENSOR - Y & Z

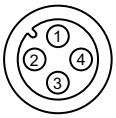
Supply voltages ..... 7.5-24 Vdc
Maximum output off voltage ..... 24 V
Maximum continuous output current ..... < 25 ma
Signal levels (low, high) ..... 0.8 to supply voltage
Operating Temp .....-30°C to 83°C [-22°F to 181°F]

DUAL ELEMENT SENSOR - X & W

Supply voltages ..... 7.5-18 Vdc
Maximum output off voltage ..... 18 V
Maximum continuous output current ..... < 20 ma
Signal levels (low, high) ..... 0.8 to supply voltage
Operating Temp .....-30°C to 83°C [-22°F to 181°F]

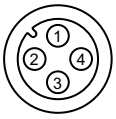
SENSOR CONNECTORS

Z Option



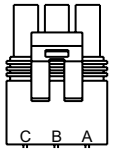
PIN		
1	positive	brown or red
2	n/a	white
3	negative	blue
4	pulse out	black

X Option



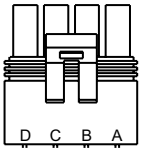
PIN		
1	positive	brown or red
2	direction out	white
3	negative	blue
4	pulse out	black

Y Option



PIN		
A	positive	brown or red
B	negative	blue
C	pulse out	black
D	n/a	white

W Option



PIN		
A	positive	brown or red
B	negative	blue
C	pulse out	black
D	direction out	white

PROTECTION CIRCUITRY

The single element sensor has been improved and incorporates protection circuitry to avoid electrical damage caused by:

- reverse battery protection
- overvoltage due to power supply spikes and surges (60 Vdc max.)
- power applied to the output lead

The protection circuit feature will help “save” the sensor from damage mentioned above caused by:

- faulty installation wiring or system repair
- wiring harness shorts/opens due to equipment failure or harness damage resulting from accidental conditions (i.e. severed or grounded wire, ice, etc.)
- power supply spikes and surges caused by other electrical/electronic components that may be intermittent or damaged and “loading down” the system.

While no protection circuit can guarantee against any and all fault conditions. The single element sensor from White Drive Products with protection circuitry is designed to handle potential hazards commonly seen in real world applications.

Unprotected versions are also available for operation at lower voltages down to 4.5V.

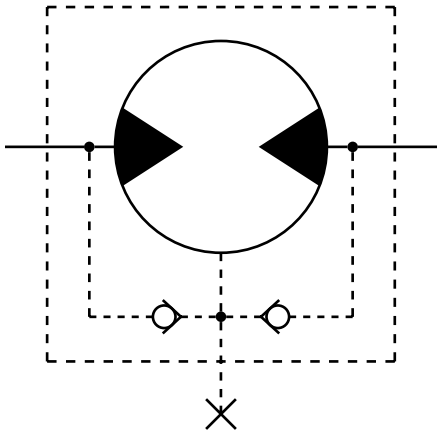
FREE TURNING ROTOR

The ‘AC’ option or “Free turning” option refers to a specially prepared rotor assembly. This rotor assembly has increased clearance between the rotor tips and rollers allowing it to turn more freely than a standard rotor assembly. For spool valve motors, additional clearance is also provided between the shaft and housing bore. The ‘AC’ option is available for all motor series and displacements.

There are several applications and duty cycle conditions where ‘AC’ option performance characteristics can be beneficial. In continuous duty applications that require high flow/high rpm operation, the benefits are twofold. The additional clearance helps to minimize internal pressure drop at high flows. This clearance also provides a thicker oil film at metal to metal contact areas and can help extend the life of the motor in high rpm or even over speed conditions. The ‘AC’ option should be considered for applications that require continuous operation above 57 LPM [15 GPM] and/or 300 rpm. Applications that are subject to pressure spikes due to frequent reversals or shock loads can also benefit by specifying the ‘AC’ option. The additional clearance serves to act as a buffer against spikes, allowing them to be bypassed through the motor rather than being absorbed and transmitted through the drive link to the output shaft. The trade-off for achieving these benefits is a slight loss of volumetric efficiency at high pressures.

INTERNAL DRAIN

The internal drain is an option available on all HB, DR, and DT Series motors, and is standard on all WP, WR, WS, and D9 series motors. Typically, a separate drain line must be installed to direct case leakage of the motor back to the reservoir when using a HB, DR, or DT Series motor. However, the internal drain option eliminates the need for a separate drain line through the installation of two check valves in the motor endcover. This simplifies plumbing requirements for the motor.

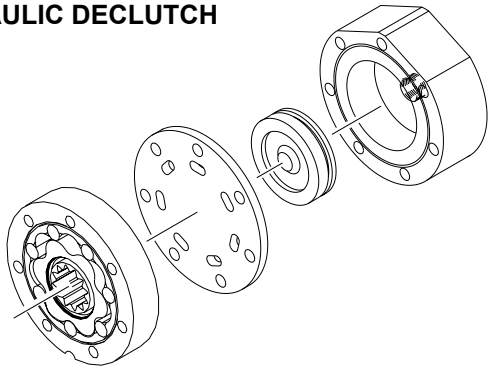


The two check valves connect the case area of the motor to each port of the endcover. During normal motor operation, pressure in the input and return lines of the motor close the check valves. However, when the pressure in the case of the motor is greater than that of the return line, the check valve between the case and low pressure line opens, allowing the case leakage to flow into the return line. Since the operation of the check valves is dependent upon a pressure differential, the internal drain option operates in either direction of motor rotation.

Although this option can simplify many motor installations, precautions must be taken to insure that return line pressure remains below allowable levels (see table below) to insure proper motor operation and life. If return line pressure is higher than allowable, or experiences pressure spikes, this pressure may feed back into the motor, possibly causing catastrophic seal failure. Installing motors with internal drains in series is not recommended unless overall pressure drop over all motors is below the maximum allowable backpressure as listed in the chart below. If in doubt, contact your authorized White Drive Products representative.

MAXIMUM ALLOWABLE BACK PRESSURE		
Series	**Cont. bar [psi]**	**Inter. bar [psi]**
HB	69 [1000]	103 [1500]
DR	69 [1000]	103 [1500]
DT	21 [300]	34 [500]
D9	21 [300]	21 [300]
Brakes	34 [500]	34 [500]

HYDRAULIC DECLUTCH

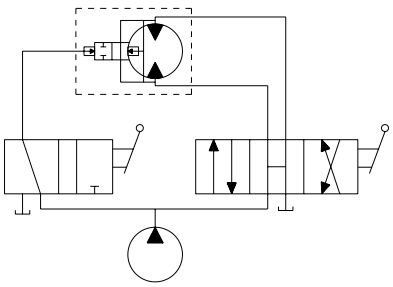


The declutch or 'AE' option, available on the RE and CE Series motors, has been specifically designed for applications requiring the motor to have the ability to "freewheel" when not pressurized. By making minor changes to internal components, the torque required to turn the output shaft is minimal. Selection of this option allows freewheeling speeds up to 1,000 RPM* depending on the displacement of the motor and duty cycle of the application.

To enable the motor to perform this function, the standard rotor assembly is replaced with a freeturn rotor assembly. Next, the standard balance plate and endcover is replaced with a special wear plate and ported endcover. The wear plate features seven holes that connect the stator pockets to each other. The ported endcover features a movable piston capable of sealing the seven holes in the wear plate.

When standard motor function is required, pressure is supplied to the endcover port, moving the piston against the wear plate. This action seals the seven holes allowing the motor to function as normal. However, when pressure is removed from the endcover port, the pressure created by the turning rotor assembly pushes the piston away from the wear plate, opening the rotor pockets to each other. In this condition, oil may circulate freely within the rotor and endcover assemblies, allowing the rotor assembly to rotate freely within the motor.

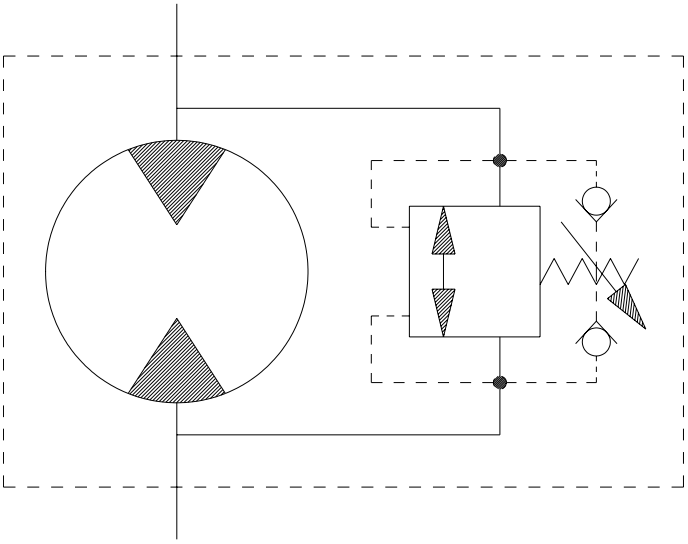
This option is especially useful in applications ranging from winch drives to towable wheel drives. Depending on the valves and hydraulic circuitry, operation of the freewheel function may be manually or automatically selected. A basic schematic is shown to the right.



▶ The 1,000 RPM rating was based on smaller displacement options with forced flow flushing through the motor to provide cooling.

VALVE CAVITY

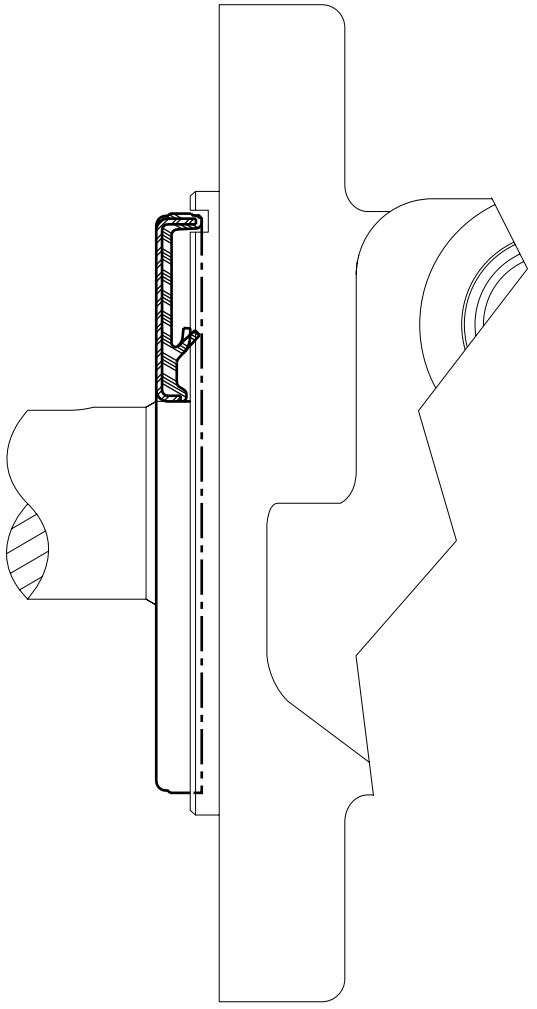
The valve cavity option provides a cost effective way to incorporate a variety of cartridge valves integral to the motor. The valve cavity is a standard 10 series (12 series on the 800 series motor) 2-way cavity that accepts numerous cartridge valves, including overrunning check valves, relief cartridges, flow control valves, pilot operated check fuses, and high pressure shuttle valves. Installation of a relief cartridge into the cavity provides an extra margin of safety for applications encountering frequent pressure spikes. Relief cartridges from 69 to 207 bar [1000 to 3000 psi] may also be factory installed.



For basic systems with fixed displacement pumps, either manual or motorized flow control valves may be installed into the valve cavity to provide a simple method for controlling motor speed. It is also possible to incorporate the speed sensor option and a programmable logic controller with a motorized flow control valve to create a closed loop, fully automated speed control system. For motors with internal brakes, a shuttle valve cartridge may be installed into the cavity to provide a simple, fully integrated method for supplying release pressure to the pilot line to actuate an integral brake. To discuss other alternatives for the valve cavity option, contact an authorized White Drive Products distributor.

SLINGER SEAL

Slinger seals are available on select series offered by White Drive Products. Slinger seals offer extendes shaft/shaft seal protection by prevented a buildup of material around the circumference of the shaft which can lead to premature shaft seal failures. The White Drive slinger seals are designed to be larger in diameter than competitive products, providing greater surface speed and ‘slinging action’.



Slinger seals are also available on 4-hole flange mounts on select series. Contact a White Drive Products Customer Service Representative for additional information.

OVERVIEW

The White Drive Products tradition of providing motors that excel in demanding applications continues with the WG series. WG motors provide an exceptionally solid platform for any light-duty application where sideload may present a concern. The WG incorporates our Roller Stator® design which reduces friction and extends motor life. With displacements ranging from 41 - 404 cm^3 [2.5 - 24.4 in^3] per revolution and a choice of mounting, shaft, and port options, this motor is made to satisfy a variety of applications. The WG is a perfect fit when you require improved performance and long motor life at an affordable price.

FEATURES / BENEFITS

- Needle Roller Bearing is in optimum location to allow load to be placed as close to the center line of bearing as possible.
- High Pressure Buna® Shaft Seal offers superior seal life and performance and eliminates the need for a case drain.
- Heavy-Duty Drive Link receives full flow lubrication to provide long life.
- Roller Stator® Motor Design increases efficiency and life by using roller contact versus solid, sliding contact design.
- Rubber Energized Steel Face Seal does not extrude or melt under high pressure or high temperature.

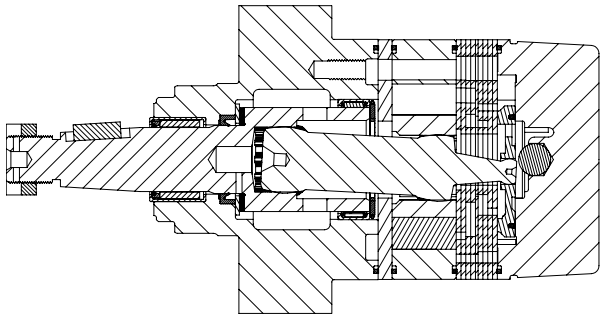
TYPICAL APPLICATIONS

conveyors, carwashes, positioners, light to medium-duty wheel drives, sweepers, grain augers, spreaders, feed rollers, screw drives, brush drives and more

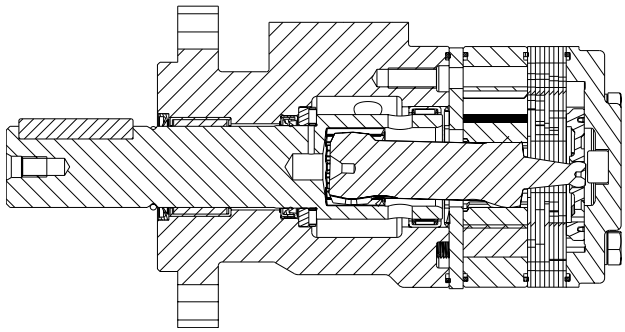
SERIES DESCRIPTIONS

275/276 - Hydraulic Motor
Standard

277/278 - Hydraulic Motor
Modified Port Locations



280/281 - Hydraulic Motor
With Larger Dia. Shafts



SPECIFICATIONS

CODE	Displacement cm^3 [in^3/rev]	Max. Speed rpm		Max. Flow lpm [gpm]		Max. Torque Nm [lb-in]		Max. Pressure bar [psi]		
		cont.	inter.	cont.	inter.	cont.	inter.	cont.	inter.	peak
040	41 [2.5]	830	1020	34 [9]	42 [11]	71 [630]	100 [870]	138 [2000]	190 [2750]	207 [3000]
045	44 [2.7]	770	940	34 [9]	42 [11]	78 [685]	108 [955]	138 [2000]	190 [2750]	207 [3000]
060	60 [3.6]	760	950	45 [12]	57 [15]	107 [950]	150 [1320]	138 [2000]	190 [2750]	207 [3000]
070	70 [4.3]	650	810	45 [12]	57 [15]	127 [1120]	176 [1560]	138 [2000]	190 [2750]	207 [3000]
090	88 [5.4]	520	650	45 [12]	57 [15]	162 [1430]	224 [1985]	138 [2000]	190 [2750]	207 [3000]
100	100 [6.1]	450	570	45 [12]	57 [15]	185 [1640]	257 [2275]	138 [2000]	190 [2750]	207 [3000]
130	129 [7.9]	350	440	45 [12]	57 [15]	241 [2135]	334 [2960]	138 [2000]	190 [2750]	207 [3000]
160	161 [9.8]	280	350	45 [12]	57 [15]	304 [2690]	421 [3730]	138 [2000]	190 [2750]	207 [3000]
200	200 [12.2]	220	280	45 [12]	57 [15]	379 [3350]	525 [4650]	138 [2000]	190 [2750]	207 [3000]
230	231 [14.1]	240	330	57 [15]	76 [20]	380 [3380]	529 [4680]	121 [1750]	165 [2400]	200 [2900]
320	322 [19.7]	175	235	57 [15]	76 [20]	458 [4050]	600 [5300]	103 [1500]	134 [1950]	169 [2450]
400	404 [24.4]	140	185	57 [15]	76 [20]	548 [4850]	758 [6710]	100 [1450]	135 [1960]	170 [2460]

▶ Performance data is typical. Performance of production units varies slightly from one motor to another. Running at intermittent ratings should not exceed 10% of every minute of operation.

DISPLACEMENT PERFORMANCE

040

41 cm³ [2.5 in³] / rev

Flow - lpm [gpm]	Pressure - bar [psi] 35 [500]	69 [1000]	104 [1500]	Max. Cont. 138 [2000]	Max. Inter. 190 [2750]	Theoretical rpm
	Torque - Nm [lb-in], **Speed rpm**					
2 [0.5]	13 [117] **37**	29 [259] **25**	45 [401] **4**			47
4 [1]	14 [126] **85**	31 [276] **72**	48 [427] **51**	65 [577] **21**		93
8 [2]	15 [134] **179**	33 [293] **166**	51 [453] **144**	69 [612] **113**	96 [852] **49**	186
11 [3]	15 [136] **273**	34 [299] **260**	52 [462] **237**	71 [625] **205**	98 [869] **138**	279
15 [4]	15 [136] **368**	34 [300] **354**	52 [464] **330**	71 [628] **296**	99 [874] **227**	372
19 [5]	15 [134] **462**	34 [298] **448**	52 [462] **423**	71 [626] **388**	98 [872] **316**	464
27 [7]	15 [129] **650**	33 [291] **636**	51 [454] **609**	70 [617] **572**	97 [861] **493**	650
Max. Cont. 34 [9]	14 [122] **835**	32 [283] **824**	50 [445] **796**	69 [607] **755**	96 [849] **671**	835
Max. Inter. 42 [11]	13 [115] **1021**	31 [276] **1012**	49 [437] **982**	68 [599] **939**		1021

Intermittent Ratings - 10% of Operation

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width	Theoretical Torque - Nm [lb-in]				
8.1 [.317] mm [in]	22 [198]	45 [396]	67 [595]	90 [793]	123 [1090]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

045

44 cm³ [2.7 in³] / rev

Flow - lpm [gpm]	Pressure - bar [psi] 35 [500]	69 [1000]	104 [1500]	Max. Cont. 138 [2000]	Max. Inter. 190 [2750]	Theoretical rpm
	Torque - Nm [lb-in], **Speed rpm**					
2 [0.5]	15 [131] **34**	32 [285] **23**	50 [438] **4**			43
4 [1]	16 [140] **78**	34 [303] **66**	53 [467] **47**	71 [631] **19**		86
8 [2]	17 [148] **165**	36 [322] **153**	56 [496] **133**	76 [669] **104**	105 [930] **45**	172
11 [3]	17 [151] **252**	37 [328] **240**	57 [506] **219**	77 [683] **189**	107 [950] **127**	257
15 [4]	17 [150] **339**	37 [329] **326**	57 [508] **304**	78 [687] **273**	108 [955] **209**	343
19 [5]	17 [147] **426**	37 [326] **413**	57 [505] **390**	77 [685] **358**	108 [953] **291**	428
27 [7]	16 [140] **599**	36 [318] **586**	56 [496] **562**	76 [674] **527**	106 [942] **455**	599
Max. Cont. 34 [9]	15 [131] **770**	35 [308] **760**	55 [485] **734**	75 [662] **696**	105 [928] **619**	770
Max. Inter. 42 [11]	14 [121] **942**	34 [298] **933**	54 [475] **906**	74 [652] **866**		942

Intermittent Ratings - 10% of Operation

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width	Theoretical Torque - Nm [lb-in]				
8.7 [.344] mm [in]	24 [215]	49 [430]	73 [645]	97 [860]	134 [1182]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

► Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

DISPLACEMENT PERFORMANCE

060

60 cm³ [3.6 in³] / rev

Pressure - bar [psi]

35 [500]	69 [1000]	104 [1500]	138 [2000]	190 [2750]
			Max. Cont.	Max. Inter.

Intermittent Ratings - 10% of Operation

Torque - Nm [lb-in], **Speed rpm**

Flow - lpm [gpm]						Theoretical rpm
	2 [0.5]	22 [191] **26**	45 [400] **17**	69 [608] **3**			32
	4 [1]	23 [203] **58**	48 [425] **49**	73 [648] **35**	98 [870] **14**		64
	8 [2]	24 [213] **122**	51 [450] **113**	78 [687] **98**	104 [924] **77**	145 [1280] **34**	127
	11 [3]	24 [214] **187**	52 [458] **178**	79 [702] **162**	107 [945] **140**	148 [1310] **94**	191
	15 [4]	24 [211] **251**	52 [458] **242**	80 [704] **226**	107 [950] **203**	149 [1320] **155**	254
	19 [5]	23 [205] **316**	51 [453] **306**	79 [700] **289**	107 [948] **265**	149 [1319] **216**	318
	27 [7]	21 [190] **445**	49 [437] **435**	77 [685] **417**	105 [932] **391**	147 [1304] **337**	445
	34 [9]	19 [170] **572**	47 [417] **563**	75 [664] **544**	103 [912] **517**	145 [1282] **459**	572
Max. Max. Inter. Cont.	45 [12]	15 [136] **762**	43 [384] **756**	71 [632] **735**	99 [879] **705**	141 [1251] **641**	762
	57 [15]	11 [98] **952**	39 [349] **949**	68 [599] **926**	96 [850] **893**		952

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width

Theoretical Torque - Nm [lb-in]

11.8 [.463] mm [in]	33 [292]	65 [580]	98 [869]	131 [1159]	180 [1594]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

070

70 cm³ [4.3 in³] / rev

Pressure - bar [psi]

35 [500]	69 [1000]	104 [1500]	138 [2000]	190 [2750]
			Max. Cont.	Max. Inter.

Intermittent Ratings - 10% of Operation

Torque - Nm [lb-in], **Speed rpm**

Flow - lpm [gpm]						Theoretical rpm
	2 [0.5]	26 [231] **22**	54 [474] **15**	81 [718] **2**			28
	4 [1]	28 [244] **50**	57 [504] **42**	86 [765] **30**	116 [1025] **12**		55
	8 [2]	29 [255] **105**	60 [534] **97**	92 [812] **84**	123 [1090] **66**	170 [1507] **29**	109
	11 [3]	29 [256] **160**	61 [542] **152**	94 [829] **139**	126 [1115] **120**	175 [1544] **81**	164
	15 [4]	28 [251] **215**	61 [541] **207**	94 [831] **193**	127 [1121] **174**	176 [1557] **133**	218
	19 [5]	27 [243] **271**	60 [535] **262**	93 [827] **248**	126 [1119] **227**	176 [1556] **185**	272
	27 [7]	25 [222] **381**	58 [514] **372**	91 [807] **357**	124 [1100] **335**	174 [1539] **289**	381
	34 [9]	22 [196] **490**	55 [488] **483**	88 [781] **466**	121 [1073] **442**	171 [1512] **393**	490
Max. Max. Inter. Cont.	45 [12]	17 [149] **653**	50 [443] **648**	83 [736] **630**	116 [1030] **604**	166 [1470] **549**	653
	57 [15]	11 [96] **816**	44 [393] **813**	78 [690] **793**	111 [986] **765**		816

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width

Theoretical Torque - Nm [lb-in]

13.8 [.542] mm [in]	38 [338]	76 [667]	115 [1015]	153 [1354]	210 [1861]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

► Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

DISPLACEMENT PERFORMANCE

090

88 cm³ [5.4 in³] / rev

Flow - lpm [gpm]	Pressure - bar [psi] 35 [500]	69 [1000]	104 [1500]	138 [2000] (Max. Cont.)	190 [2750] (Max. Inter.)	Theoretical rpm
2 [0.5]	34 [301] **17**	69 [609] **12**	104 [917] **2**			22
4 [1]	36 [318] **39**	73 [647] **33**	110 [967] **24**	147 [1305] **10**		44
8 [2]	37 [331] **83**	77 [684] **77**	117 [1036] **67**	157 [1388] **52**	217 [1917] **23**	87
11 [3]	37 [331] **127**	78 [694] **121**	120 [1058] **110**	161 [1421] **95**	222 [1966] **64**	130
15 [4]	37 [323] **171**	78 [692] **165**	120 [1061] **154**	162 [1430] **138**	224 [1984] **106**	173
19 [5]	35 [312] **215**	77 [683] **208**	119 [1055] **197**	161 [1427] **181**	224 [1984] **147**	216
27 [7]	32 [280] **303**	74 [654] **296**	116 [1028] **284**	158 [1402] **266**	222 [1962] **230**	303
34 [9]	27 [242] **389**	70 [616] **383**	112 [990] **370**	154 [1365] **351**	218 [1926] **312**	389
45 [12] (Max. Inter.)	20 [173] **519**	62 [549] **515**	105 [925] **500**	147 [1301] **480**	211 [1864] **436**	519
57 [15] (Max. Cont.)	11 [94] **648**	53 [473] **646**	96 [853] **630**	139 [1232] **608**		648

Torque - Nm [lb-in], **Speed rpm**

Intermittent Ratings - 10% of Operation

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width	Theoretical Torque - Nm [lb-in]
17.3 [.682] mm [in]	48 [426] / 96 [852] / 144 [1278] / 193 [1704] / 265 [2343]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

100

100 cm³ [6.1 in³] / rev

Flow - lpm [gpm]	Pressure - bar [psi] 35 [500]	69 [1000]	104 [1500]	138 [2000] (Max. Cont.)	190 [2750] (Max. Inter.)	Theoretical rpm
2 [0.5]	40 [350] **15**	79 [701] **10**	119 [1052] **2**			19
4 [1]	42 [369] **35**	84 [744] **29**	128 [1120] **21**	169 [1496] **9**		38
8 [2]	43 [383] **73**	89 [786] **68**	134 [1189] **59**	180 [1592] **46**	248 [2196] **20**	76
11 [3]	43 [382] **112**	90 [798] **106**	137 [1214] **97**	184 [1630] **83**	255 [2254] **56**	114
15 [4]	42 [372] **150**	90 [795] **144**	138 [1218] **135**	185 [1641] **121**	257 [2275] **93**	152
19 [5]	40 [358] **189**	89 [784] **183**	137 [1211] **173**	185 [1637] **158**	257 [2276] **129**	190
27 [7]	36 [320] **266**	85 [749] **260**	133 [1178] **249**	182 [1607] **233**	254 [2251] **201**	266
34 [9]	31 [273] **341**	79 [703] **336**	128 [1133] **325**	177 [1564] **308**	250 [2209] **274**	341
45 [12] (Max. Inter.)	21 [190] **455**	70 [622] **451**	119 [1053] **439**	168 [1485] **421**	241 [2133] **383**	455
57 [15] (Max. Cont.)	10 [93] **569**	60 [528] **566**	109 [964] **553**	158 [1399] **533**		569

Torque - Nm [lb-in], **Speed rpm**

Intermittent Ratings - 10% of Operation

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width	Theoretical Torque - Nm [lb-in]
19.7 [.777] mm [in]	55 [486] / 110 [971] / 165 [1457] / 220 [1943] / 302 [2671]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

► Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

DISPLACEMENT PERFORMANCE

130

129 cm³ [7.9 in³] / rev

Pressure - bar [psi]

35 [500]	69 [1000]	104 [1500]	138 [2000]	190 [2750]
			Max. Cont.	Max. Inter.

Intermittent Ratings - 10% of Operation

Torque - Nm [lb-in], **Speed rpm**

Flow - lpm [gpm]						Theoretical rpm
	2 [0.5]	52 [463] **12**	104 [917] **8**	155 [1370] **1**			15
	4 [1]	55 [487] **27**	110 [972] **23**	165 [1458] **16**	220 [1943] **7**		30
	8 [2]	57 [505] **57**	116 [1026] **53**	175 [1548] **46**	234 [2069] **36**	322 [2851] **16**	59
	11 [3]	57 [502] **87**	118 [1041] **82**	179 [1580] **75**	240 [2120] **65**	331 [2929] **44**	89
	15 [4]	55 [488] **116**	117 [1037] **112**	179 [1586] **105**	241 [2134] **94**	334 [2958] **72**	118
	19 [5]	53 [413] **146**	115 [1021] **142**	178 [1576] **134**	241 [2130] **123**	335 [2961] **100**	147
	27 [7]	47 [413] **206**	110 [972] **201**	173 [1531] **193**	239 [2091] **181**	331 [2929] **156**	206
	34 [9]	39 [347] **265**	103 [908] **261**	166 [1469] **252**	229 [2030] **239**	325 [2872] **213**	265
Max. Max. Inter. Cont.	45 [12]	26 [228] **353**	89 [792] **350**	153 [1355] **341**	217 [1919] **326**	312 [2764] **297**	353
	57 [15]	10 [89] **441**	74 [657] **440**	138 [1224] **429**	202 [1792] **414**		441

Overall Efficiency - 70 - 100% 40 - 69% 0 - 39%

Rotor Width

Theoretical Torque - Nm [lb-in]

25.4 [1.002]	71 [626]	141 [1252]	212 [1877]	283 [2503]	389 [3442]
mm [in]					

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

160

161 cm³ [9.8 in³] / rev

Pressure - bar [psi]

35 [500]	69 [1000]	104 [1500]	138 [2000]	190 [2750]
			Max. Cont.	Max. Inter.

Intermittent Ratings - 10% of Operation

Torque - Nm [lb-in], **Speed rpm**

Flow - lpm [gpm]						Theoretical rpm
	2 [0.5]	67 [590] **9**	131 [1158] **6**	195 [1726] **1**			12
	4 [1]	70 [620] **21**	139 [1228] **18**	207 [1836] **13**	276 [2445] **5**		24
	8 [2]	72 [641] **45**	146 [1295] **42**	220 [1949] **36**	294 [2604] **29**	405 [3585] **12**	47
	11 [3]	72 [636] **69**	148 [1313] **66**	225 [1991] **60**	301 [2668] **52**	416 [3684] **35**	71
	15 [4]	70 [617] **93**	148 [1307] **90**	226 [1997] **84**	304 [2687] **75**	421 [3722] **57**	94
	19 [5]	67 [590] **117**	145 [1287] **113**	224 [1984] **107**	303 [2682] **98**	421 [3728] **80**	118
	27 [7]	59 [518] **165**	138 [1222] **161**	218 [1927] **154**	297 [2631] **145**	417 [3688] **125**	165
	34 [9]	49 [429] **212**	128 [1137] **209**	208 [1845] **202**	288 [2552] **191**	408 [3614] **170**	212
Max. Max. Inter. Cont.	45 [12]	31 [271] **282**	111 [982] **280**	191 [1693] **272**	272 [2404] **261**	392 [3471] **237**	282
	57 [15]	10 [85] **353**	90 [800] **351**	171 [1516] **343**	252 [2231] **331**		353

Overall Efficiency - 70 - 100% 40 - 69% 0 - 39%

Rotor Width

Theoretical Torque - Nm [lb-in]

31.8 [1.252]	88 [783]	177 [1565]	265 [2348]	354 [3131]	486 [4305]
mm [in]					

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

► Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

DISPLACEMENT PERFORMANCE

200 — 200 cm³ [12.2 in³] / rev

Flow - lpm [gpm]	Pressure - bar [psi]: 35 [500]	69 [1000]	104 [1500]	138 [2000] (Max. Cont.)	190 [2750] (Max. Inter.)	Theoretical rpm
	Torque - Nm [lb-in], **Speed rpm**				**Intermittent Ratings -** 10% of Operation	
2 [0.5]	84 [742] **8**	164 [1447] **5**	243 [2152] **1**			10
4 [1]	88 [778] **17**	173 [1534] **15**	259 [2289] **10**	344 [3045] **4**		19
8 [2]	91 [804] **37**	183 [1617] **34**	275 [2430] **29**	367 [3244] **23**	504 [4464] **10**	38
11 [3]	90 [796] **56**	185 [1639] **53**	280 [2482] **48**	376 [3325] **42**	519 [4589] **28**	57
15 [4]	87 [772] **75**	184 [1631] **72**	281 [2490] **67**	378 [3349] **61**	524 [4638] **46**	76
19 [5]	83 [736] **94**	181 [1605] **91**	280 [2474] **86**	378 [3343] **79**	525 [4646] **64**	95
27 [7]	73 [643] **133**	172 [1522] **130**	271 [2400] **124**	371 [3279] **117**	519 [4597] **101**	133
34 [9]	60 [528] **171**	159 [1411] **168**	259 [2295] **163**	359 [3178] **154**	509 [4503] **137**	171
Max. Max. Inter. Cont. 45 [12]	36 [322] **228**	137 [1210] **226**	237 [2098] **220**	337 [2985] **210**	488 [4317] **192**	228
57 [15]	9 [80] **285**	110 [973] **283**	211 [1865] **277**	312 [2758] **267**		285

Overall Efficiency - 70 - 100% 40 - 69% 0 - 39%

Rotor Width	Theoretical Torque - Nm [lb-in]					
39.4 [1.552]	110 [971]	219 [1941]	329 [2912]	439 [3882]	603 [5338]	

mm [in]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

230 — 231 cm³ [14.1 in³] / rev

Flow - lpm [gpm]	Pressure - bar [psi]: 35 [500]	69 [1000]	104 [1500]	121 [1750] (Max. Cont.)	138 [2000] (Max. Inter.)	166 [2400]	Theoretical rpm
	Torque - Nm [lb-in], **Speed rpm**				**Intermittent Ratings -** 10% of Operation		
2 [0.5]	98 [864] **7**	190 [1678] **4**	282 [2493] **1**				9
4 [1]	102 [905] **15**	201 [1779] **13**	300 [2652] **9**	349 [3089] **7**	398 [3526] **4**		17
8 [2]	106 [934] **32**	212 [1875] **29**	318 [2816] **25**	371 [3286] **23**	425 [3757] **20**	510 [4509] **14**	33
11 [3]	104 [925] **48**	215 [1900] **46**	325 [2876] **42**	380 [3363] **39**	435 [3851] **36**	523 [4631] **30**	50
15 [4]	101 [895] **65**	214 [1890] **63**	326 [2885] **58**	382 [3382] **56**	438 [3880] **52**	528 [4675] **46**	66
19 [5]	96 [853] **82**	210 [1860] **79**	324 [2866] **75**	381 [3369] **72**	438 [3872] **69**	529 [4677] **62**	83
27 [7]	84 [743] **115**	199 [1761] **112**	314 [2780] **108**	372 [3289] **105**	429 [3798] **101**	521 [4612] **94**	115
34 [9]	69 [607] **148**	184 [1631] **146**	300 [2655] **141**	358 [3167] **137**	416 [3679] **134**	508 [4498] **126**	148
Max. Max. Inter. Cont. 45 [12]	41 [364] **197**	157 [1393] **196**	274 [2422] **190**	332 [2936] **186**	390 [3451] **182**	483 [4274] **174**	197
57 [15]	9 [76] **247**	125 [1111] **245**	242 [2145] **240**	301 [2662] **236**	359 [3180] **231**	453 [4007] **222**	247
76 [20]		62 [551] **328**	181 [1600] **322**	240 [2124] **317**			329

Overall Efficiency - 70 - 100% 40 - 69% 0 - 39%

Rotor Width	Theoretical Torque - Nm [lb-in]					
45.5 [1.791]	127 [1121]	253 [2242]	380 [3363]	443 [3924]	507 [4484]	608 [5381]

mm [in]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

► Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

DISPLACEMENT PERFORMANCE

320

322 cm³ [19.7 in³] / rev

Flow - lpm [gpm]	Pressure - bar [psi] 35 [500]	69 [1000]	Max. Cont. 104 [1500]	Max. Inter. 134 [1950]	Theoretical rpm
	Torque - Nm [lb-in], **Speed rpm**			**Intermittent Ratings** 10% of Operation	
4 [1]	145 [1280] **11**	283 [2501] **9**			12
8 [2]	149 [1319] **23**	298 [2635] **21**	447 [3951] **18**	580 [5136] **15**	24
11 [3]	147 [1304] **35**	302 [2670] **33**	456 [4036] **30**	595 [5265] **26**	36
15 [4]	142 [1260] **47**	300 [2654] **45**	457 [4049] **42**	599 [5303] **38**	48
19 [5]	135 [1199] **59**	295 [2610] **57**	454 [4021] **54**	598 [5291] **50**	59
27 [7]	117 [1039] **82**	279 [2468] **81**	440 [3897] **77**	586 [5184] **73**	83
34 [9]	95 [841] **106**	258 [2279] **104**	420 [3717] **101**	566 [5012] **96**	106
45 [12]	55 [485] **142**	218 [1931] **140**	382 [3377] **136**	529 [4678] **131**	142
Max. Inter. 57 [15]	7 [64] **177**	171 [1517] **176**	336 [2970] **172**	483 [4277] **166**	177
Max. Cont. 76 [20]		78 [692] **235**	244 [2160] **231**		236

Overall Efficiency - 70 - 100% 40 - 69% 0 - 39%

Rotor Width	Theoretical Torque - Nm [lb-in]			
63.5 [2.501] mm [in]	177 [1564]	354 [3129]	530 [4693]	689 [6102]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

400

404 cm³ [24.4 in³] / rev

Flow - lpm [gpm]	Pressure - bar [psi] 35 [500]	69 [1000]	Max. Cont. 104 [1500]	Max. Inter. 134 [1950]	Theoretical rpm
	Torque - Nm [lb-in], **Speed rpm**			**Intermittent Ratings** 10% of Operation	
2 [0.5]	171 [1513] **3**	341 [3018] **3**			5
4 [1]	210 [1858] **12**	353 [3124] **11**	537 [4752] **7**	687 [6080] **5**	12
8 [2]	211 [1867] **22**	373 [3301] **18**	548 [4850] **16**	693 [6133] **13**	25
11 [3]	207 [1832] **34**	386 [3416] **32**	546 [4832] **28**	732 [6478] **24**	37
15 [4]	192 [1699] **45**	377 [3336] **44**	531 [4699] **37**	753 [6664] **29**	50
19 [5]	188 [1664] **60**	370 [3274] **55**	545 [4823] **45**	758 [6708] **36**	62
27 [7]	176 [1558] **71**	365 [3230] **69**	534 [4726] **58**	737 [6522] **49**	74
34 [9]	144 [1274] **95**	327 [2894] **91**	513 [4540] **86**	719 [6363] **79**	99
Max. Inter. 45 [12]	112 [991] **119**	293 [2593] **117**	476 [4212] **112**	688 [6088] **109**	124
Max. Cont. 57 [15]	85 [752] **139**	266 [2354] **138**	433 [3832] **135**	643 [5690] **133**	141
76 [20]	11 [97] **186**	180 [1593] **184**	337 [2982] **183**		186

Overall Efficiency - 70 - 100% 40 - 69% 0 - 39%

Rotor Width	Theoretical Torque - Nm [lb-in]			
63.5 [2.501] mm [in]	225 [1991]	450 [3982]	643 [5690]	868 [7681]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

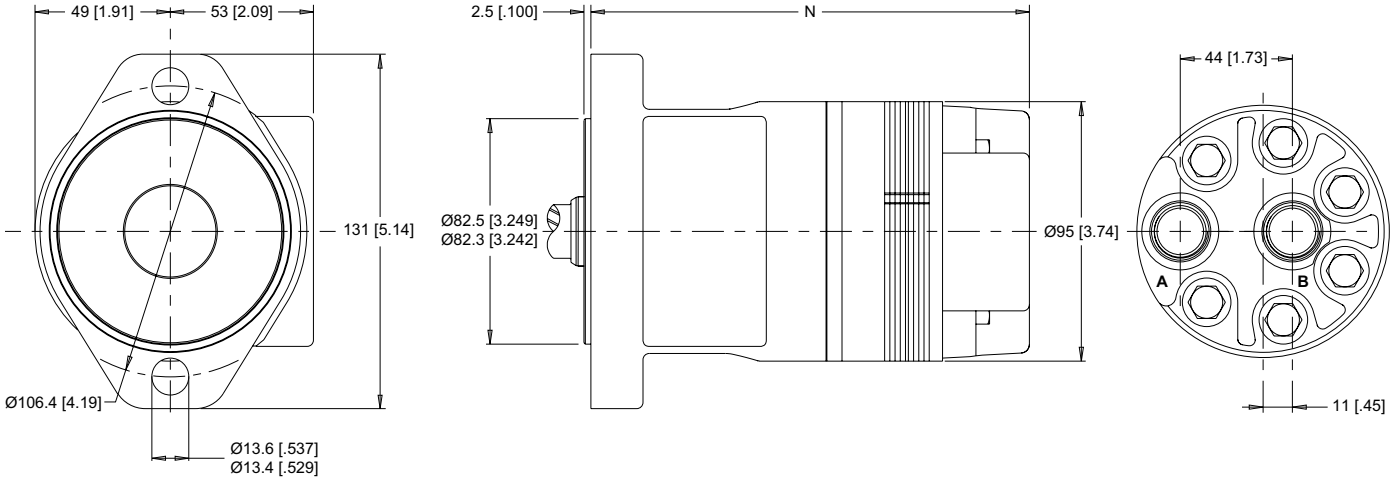
► Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

HOUSINGS

▶ Dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

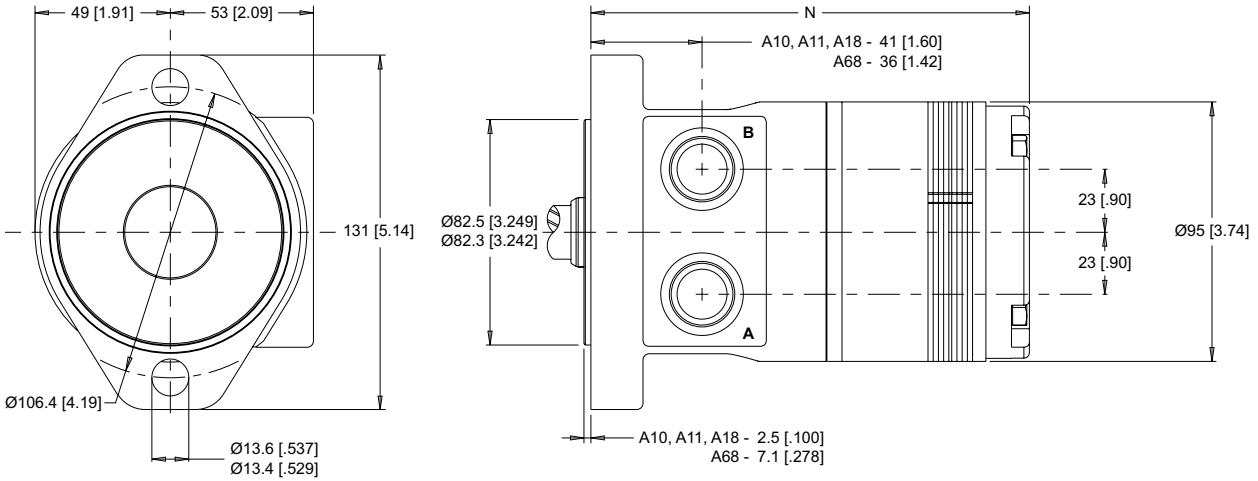
2-HOLE, SAE A MOUNT, ALIGNED END PORTS

A06 3/4-16 UNF **A0B** G 3/8



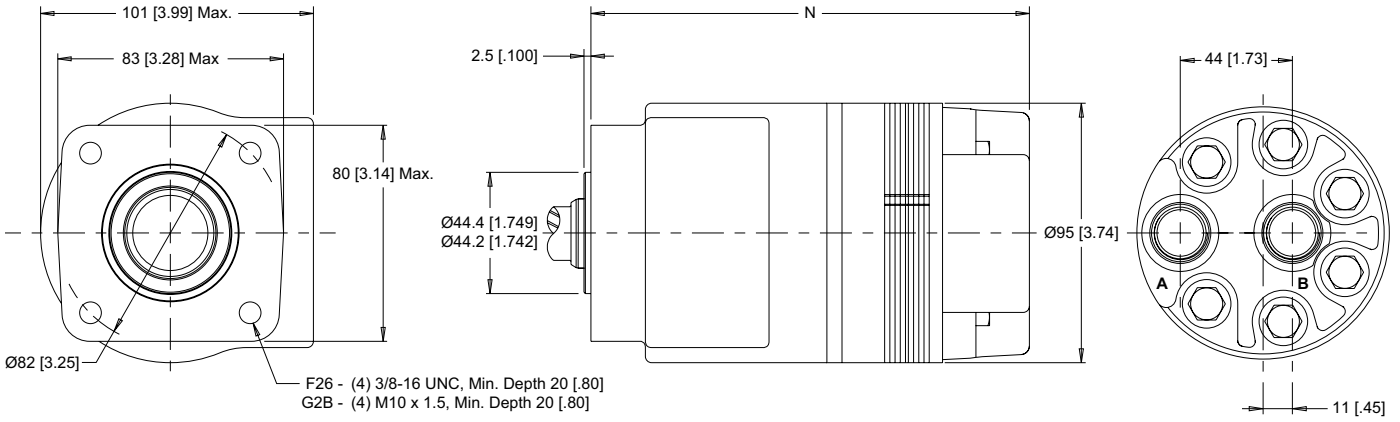
2-HOLE, SAE A MOUNT, ALIGNED PORTS

A10 1/2-14 NPT **A11** 7/8-14 UNF **A18** G 1/2 **A68** G 1/2 (TP)



4-HOLE, SQUARE MOUNT, ALIGNED END PORTS

F26 3/4-16 UNF **G2B** G 3/8



▶ Dimension N is charted on page 26.

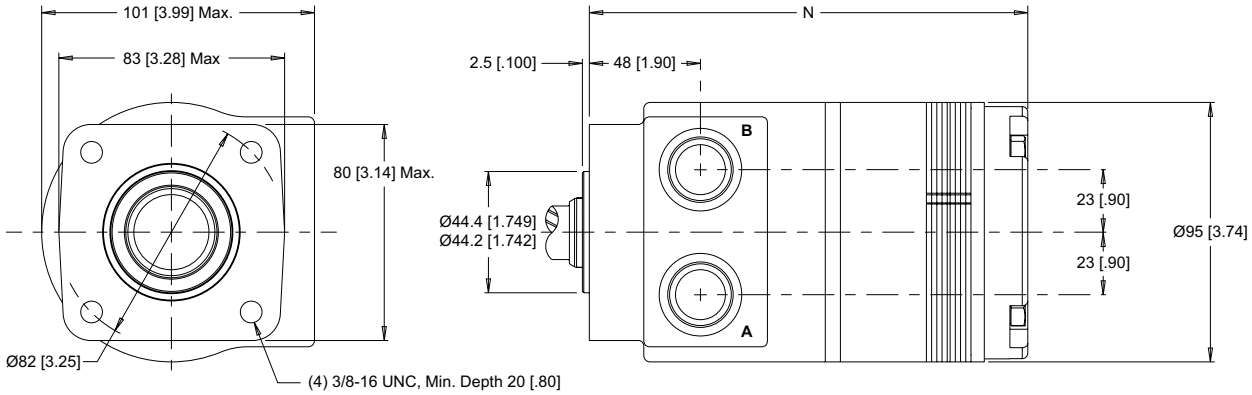
▶ (TP) - Taller Pilot Height. Refer to detailed drawing for dimensional differences.

HOUSINGS

▶ Dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

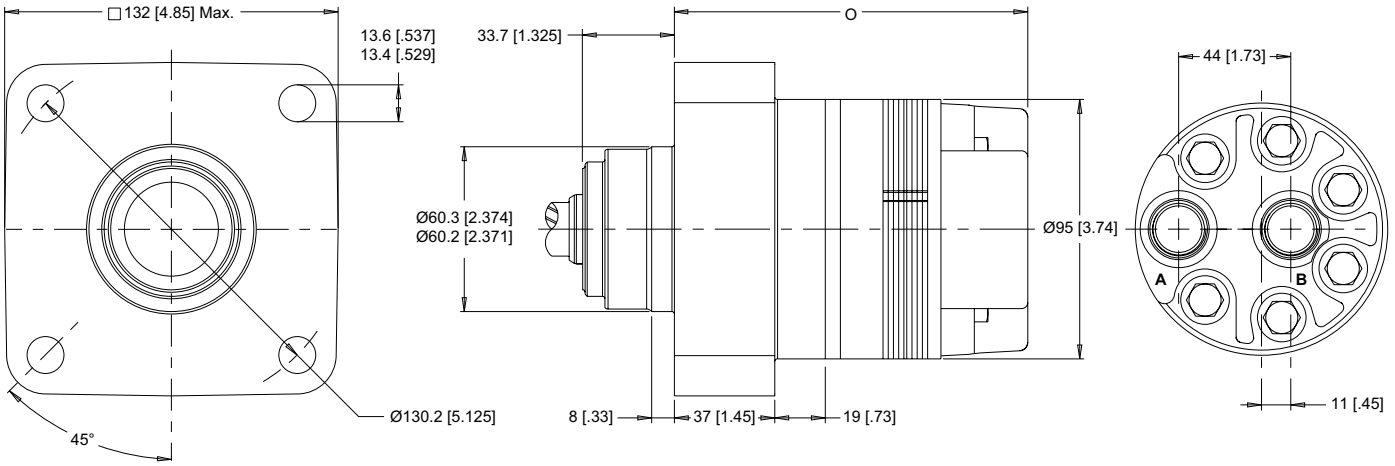
4-HOLE, SQUARE MOUNT, ALIGNED PORTS

F30 1/2-14 NPT **F31** 7/8-14 UNF **F38** G 1/2



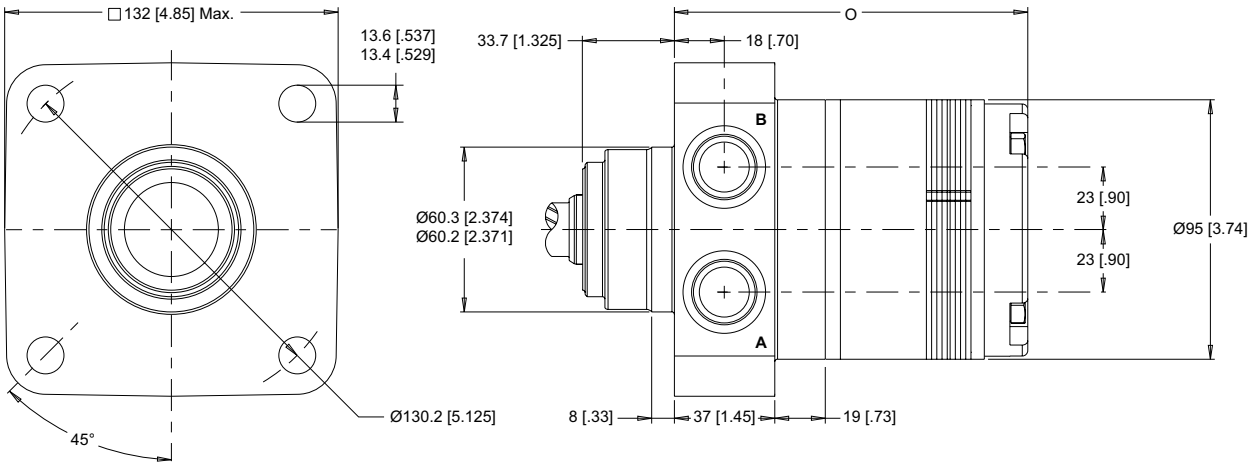
4-HOLE, WHEEL MOUNT, ALIGNED END PORTS

W26 3/4-16 UNF **W2B** G 3/8



4-HOLE, WHEEL MOUNT, ALIGNED PORTS

W30 1/2-14 NPT **W31** 7/8-14 UNF **W38** G 1/2



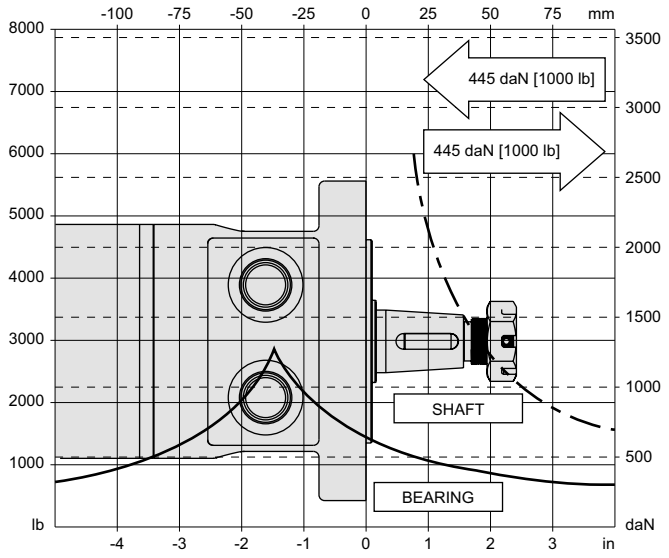
▶ Dimensions N & O are charted on page 26.

TECHNICAL INFORMATION

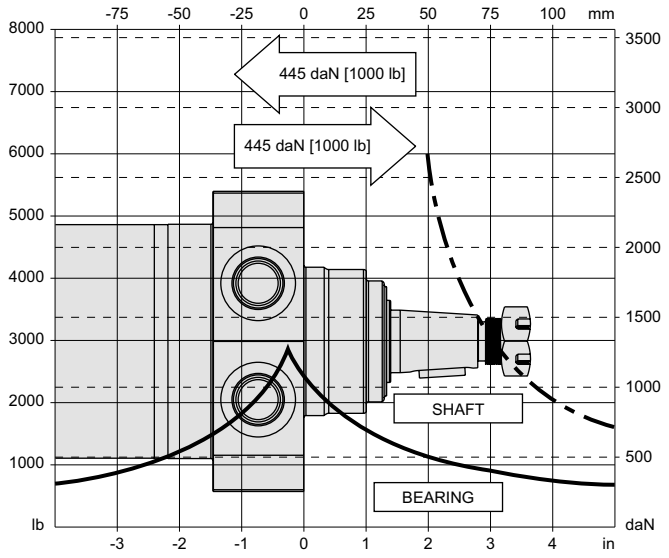
ALLOWABLE SHAFT LOAD / BEARING CURVE

The bearing curve represents allowable bearing loads based on ISO 281 bearing capacity for an L_{10} life of 2,000 hours at 100 rpm. Radial loads for speeds other than 100 rpm may be calculated using the multiplication factor table on page 8.

SAE A & SQUARE MOUNTS



WHEEL MOUNTS



LENGTH & WEIGHT CHART

Dimension N is the overall motor length from the rear of the motor to the mounting flange surface and is referenced on detailed housing drawings listed on pages 24-25.

N	Side Ports	End Ports	Weight
#	mm [in]	mm [in]	kg [lb]
040	137 [5.39]	156 [6.16]	7.3 [15.9]
045	138 [5.43]	157 [6.19]	7.3 [16.0]
060	141 [5.55]	160 [6.31]	7.4 [16.3]
070	143 [5.63]	162 [6.38]	7.5 [16.4]
090	147 [5.79]	166 [6.52]	7.6 [16.8]
100	149 [5.87]	168 [6.62]	7.7 [17.0]
130	155 [6.10]	174 [6.84]	8.0 [17.5]
160	161 [6.34]	180 [7.09]	8.2 [18.0]
200	169 [6.65]	188 [7.39]	8.5 [18.7]
230	175 [6.89]	194 [7.63]	8.7 [19.2]
320	193 [7.60]	212 [8.34]	9.5 [20.8]
400	193 [7.60]	212 [8.34]	9.5 [20.8]

▶ If figuring dimension N and using an A68 housing, substract 4.5 [.178] from the dimension.

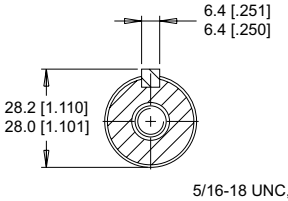
Dimension O is the overall motor length from the rear of the motor to the mounting flange surface and is referenced on detailed housing drawings listed on page 25.

O	Side Ports	End Ports	Weight
#	mm [in]	mm [in]	kg [lb]
040	106 [4.17]	125 [4.93]	7.6 [16.7]
045	106 [4.17]	125 [4.95]	7.6 [16.8]
060	110 [4.33]	129 [5.07]	7.7 [17.0]
070	112 [4.41]	131 [5.15]	7.8 [17.2]
090	115 [4.53]	134 [5.29]	8.0 [17.5]
100	118 [4.65]	137 [5.39]	8.0 [17.7]
130	123 [4.84]	142 [5.61]	8.3 [18.2]
160	130 [5.12]	149 [5.86]	8.5 [18.8]
200	137 [5.39]	156 [6.16]	8.9 [19.5]
230	144 [5.67]	163 [6.40]	9.1 [20.0]
320	162 [6.38]	181 [7.11]	9.8 [21.6]
400	162 [6.38]	181 [7.11]	9.8 [21.6]

▶ The overall motor weights listed in both charts above are referencing the end ported options, which are the heavier of the two. 275 & 276 series motor weights can vary ± .5 kg [1 lb] depending on model configurations such as housing, shaft, endcover, options etc.

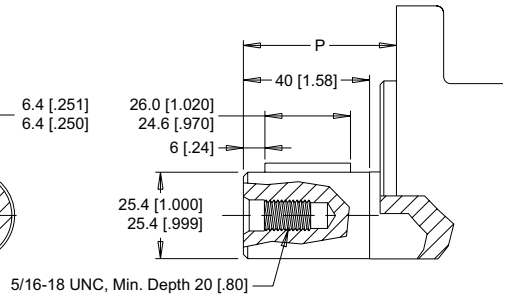
SHAFTS

10 1" Straight

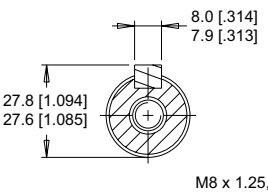


Max. Torque: 655 Nm [5800 lb-in]

15 1" Straight Extended

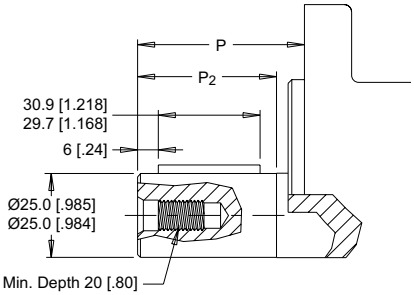


12 25mm Straight

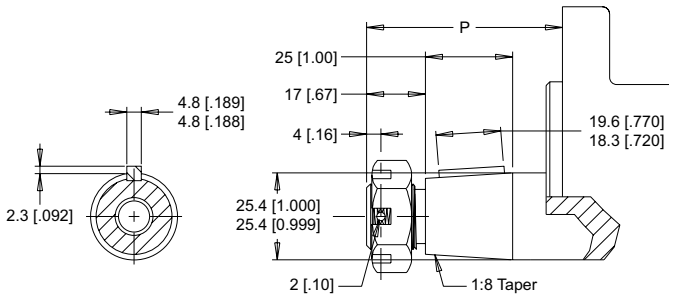


Max. Torque: 678 Nm [6000 lb-in]

89 25mm Straight Stepdown



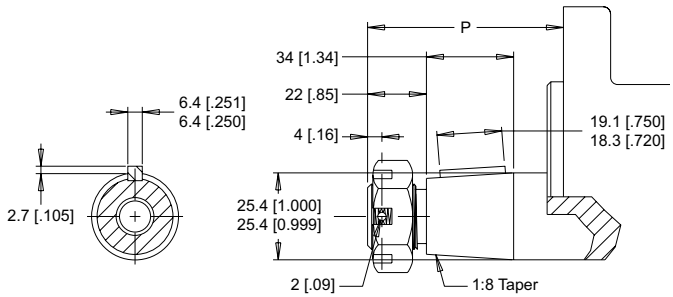
13 1" Tapered



▶ A slotted hex nut is standard on this shaft.

Max. Torque: 655 Nm [5800 lb-in]

14 1" Tapered (SAE Standard)



▶ A slotted hex nut is standard on this shaft.

Max. Torque: 655 Nm [5800 lb-in]

MOUNTING / SHAFT LENGTH CHART

Dimension P is the overall distance from the motor mounting surface to the end of the shaft.

Additional shaft length information, if necessary, is noted as P_2 and does not increase or decrease the listed P dimensions in this chart. The overall shaft lengths are already factored into the overall distance from the mounting surface to the end of the shaft.

P	Square & A Mounts	Wheel Mounts	P_2
#	mm [in]	mm [in]	mm [in]
10	45 [1.77]	76 [2.99]	N/A
12	49 [1.94]	80 [3.16]	43 [1.70]
13	56 [2.21]	87 [3.43]	N/A
14	61 [2.41]	92 [3.63]	N/A
15	64 [2.50]	95 [3.77]	N/A
89	51 [2.00]	82 [3.22]	45 [1.78]

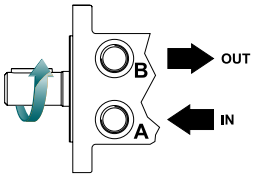
▶ Add 4.5 [.178] to shaft dimension P when a A68 housing is used.

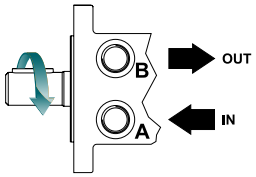
ORDERING INFORMATION

1	2	3	4	5	6	7	8

1. CHOOSE SERIES DESIGNATION

275	Reverse Rotation
276	Standard Rotation





▶ The 275 & 276 series are bi-directional. For applications requiring the motor to rotate in only one direction, shaft seal life may be prolonged by pressurizing the A port of the motor.

2. SELECT A DISPLACEMENT OPTION

040	41 cm^3/rev	[2.5 in^3/rev]	**130**	129 cm^3/rev	[7.9 in^3/rev]
045	44 cm^3/rev	[2.7 in^3/rev]	**160**	161 cm^3/rev	[9.8 in^3/rev]
060	60 cm^3/rev	[3.6 in^3/rev]	**200**	200 cm^3/rev	[12.2 in^3/rev]
070	70 cm^3/rev	[4.3 in^3/rev]	**230**	231 cm^3/rev	[14.1 in^3/rev]
090	88 cm^3/rev	[5.4 in^3/rev]	**320**	322 cm^3/rev	[19.7 in^3/rev]
100	100 cm^3/rev	[6.1 in^3/rev]	**400**	404 cm^3/rev	[24.4 in^3/rev]

3. SELECT A MOUNT & PORT OPTION

A06	2-Hole, SAE A Mount, Aligned End Ports, 3/4-16 UNF
A10	2-Hole, SAE A Mount, Aligned Ports, 1/2-14 NPT
A11	2-Hole, SAE A Mount, Aligned Ports, 7/8-14 UNF
A18	2-Hole, SAE A Mount, Aligned Ports, G 1/2
A68	2-Hole, SAE A Mount, Aligned Ports, G 1/2 (TP)
F26	4-Hole, Square Mount, Aligned End Ports, 3/4-16 UNF
F30	4-Hole, Square Mount, Aligned Ports, 1/2-14 NPT
F31	4-Hole, Square Mount, Aligned Ports, 7/8-14 UNF
F38	4-Hole, Square Mount, Aligned Ports, G 1/2

▶ (TP) - Tall pilot. The speed sensor option is not available on tall pilot or wheel mount housings.

3. SELECT A MOUNT & PORT OPTION

W26	4-Hole, Wheel Mount, Aligned End Ports, 3/4-16 UNF
W30	2-Hole, Wheel Mount, Aligned Ports, 1/2-14 NPT
W31	2-Hole, Wheel Mount, Aligned Ports, 7/8-14 UNF
W38	2-Hole, Wheel Mount, Aligned Ports, G 1/2

4. SELECT A SHAFT OPTION

10	1” Straight	**14**	1” Tapered (SAE Standard)
12	25mm Straight	**15**	1” Straight Extended
13	1” Tapered	**89**	25mm Straight Stepdown

▶ The 15 extended shaft is designed for use with one of the speed sensor options listed in STEP 7.

5. SELECT A PAINT OPTION

A	Black
B	Black, Unpainted Mounting Surface

6. SELECT A VALVE CAVITY / CARTRIDGE OPTION

A	None

7. SELECT AN ADD-ON OPTION

A	Standard
B	Lock Nut
C	Solid Hex Nut
W	Speed Sensor, Dual, 4-Pin Male Weatherpack Connector
X	Speed Sensor, Dual, 4-Pin M12 Male Connector
Y	Speed Sensor, Single, 3-Pin Male Weatherpack Connector
Z	Speed Sensor, Single, 4-Pin M12 Male Connector

8. SELECT A MISCELLANEOUS OPTION

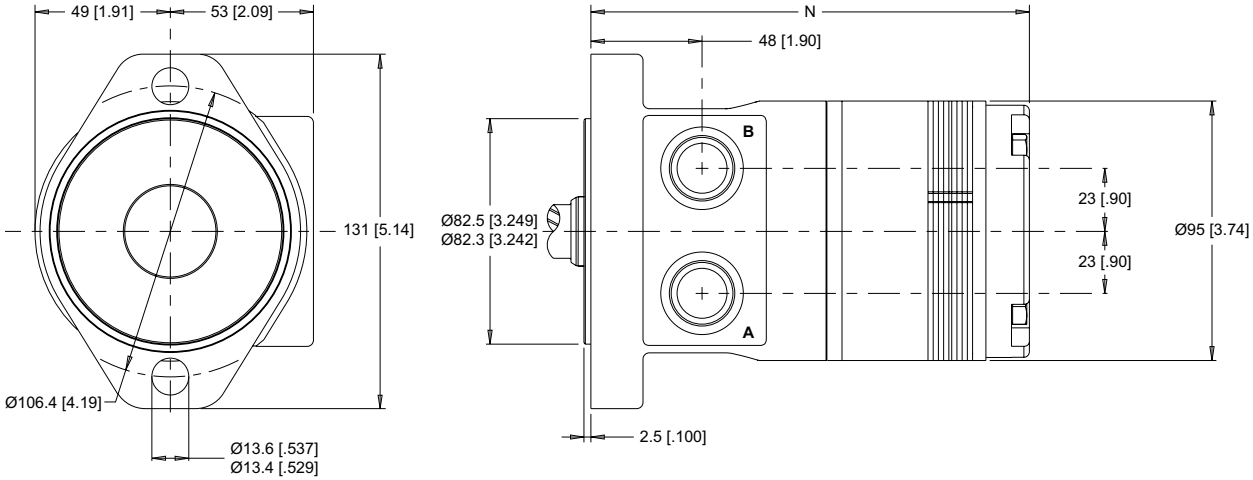
AA	None
AC	Freeturning Rotor

HOUSINGS

▶ Dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

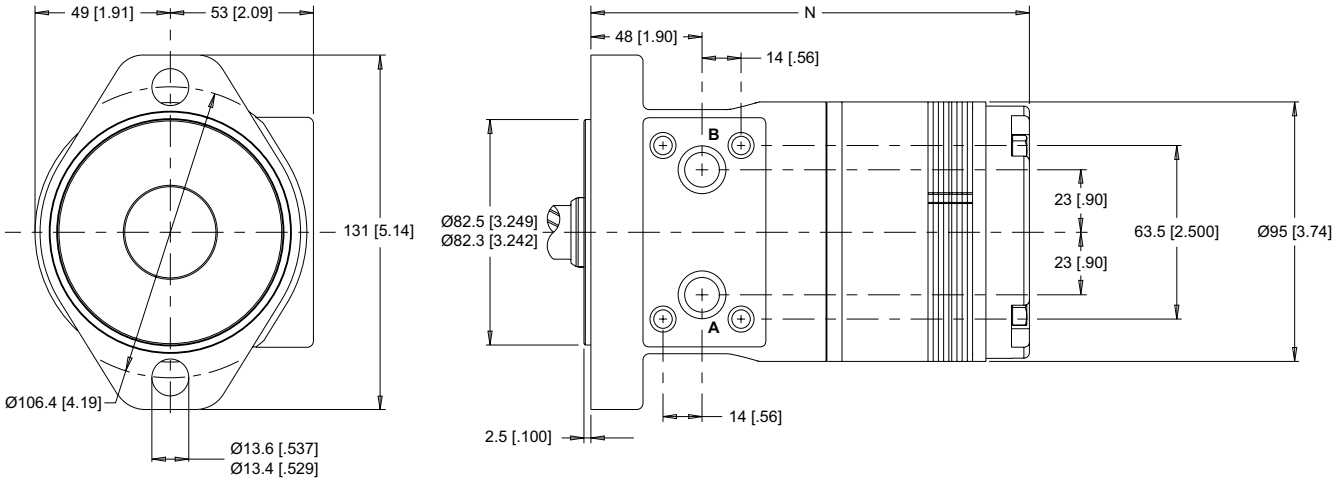
2-HOLE, SAE A MOUNT, ALIGNED END PORTS

A10 1/2-14 NPT **A11** 7/8-14 UNF



2-HOLE, SAE A MOUNT, ALIGNED MANIFOLD PORTS

A17 1/2" Drilled



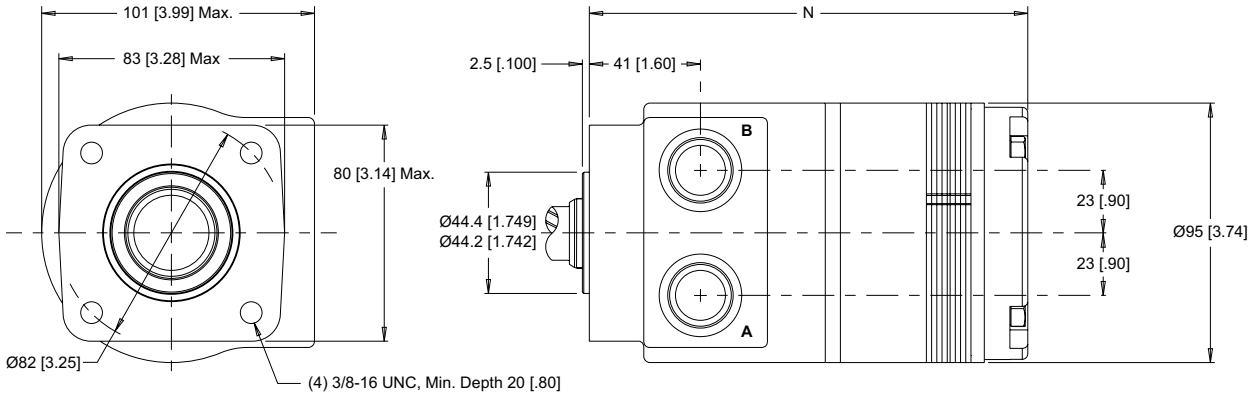
▶ Dimension N and allowable sideload information is found on page 26.

HOUSINGS

▶ Dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

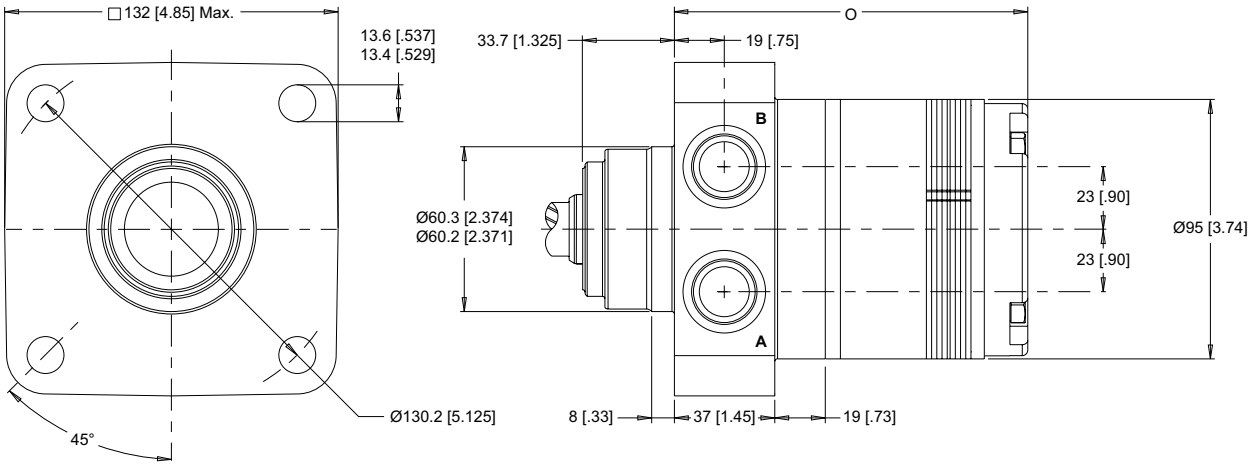
4-HOLE, SQUARE MOUNT, ALIGNED PORTS

F30 1/2-14 NPT **F31** 7/8-14 UNF



4-HOLE, WHEEL MOUNT, ALIGNED PORTS

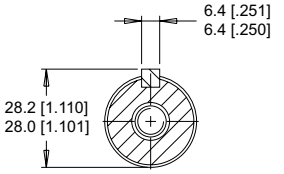
W30 1/2-14 NPT



▶ Dimensions N & O and allowable sideload information is found on page 26.

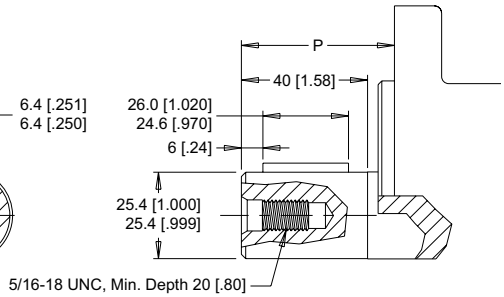
SHAFTS

10 1" Straight

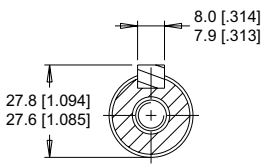


Max. Torque: 655 Nm [5800 lb-in]

15 1" Straight Extended

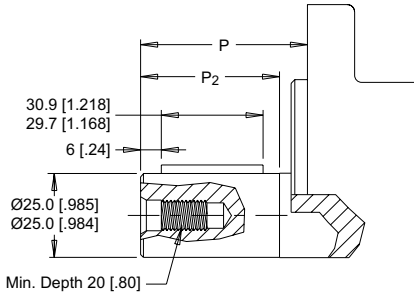


12 25mm Straight

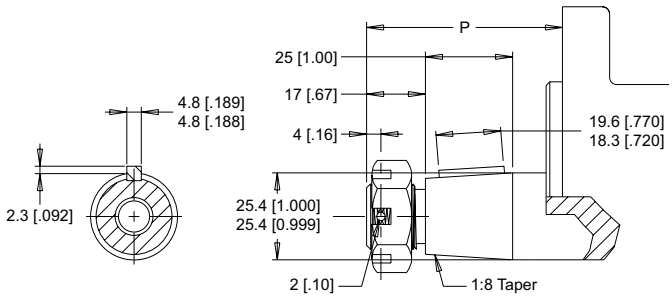


Max. Torque: 678 Nm [6000 lb-in]

89 25mm Straight Stepdown



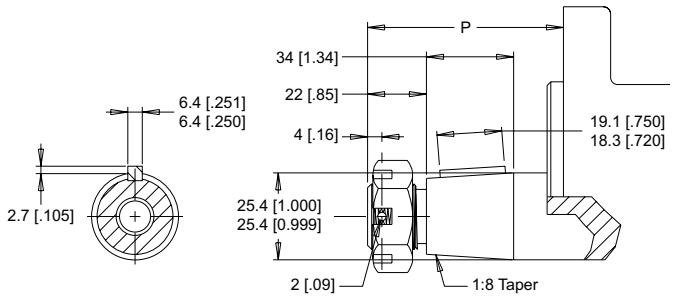
13 1" Tapered



▶ A slotted hex nut is standard on this shaft.

Max. Torque: 655 Nm [5800 lb-in]

14 1" Tapered (SAE Standard)



▶ A slotted hex nut is standard on this shaft.

Max. Torque: 655 Nm [5800 lb-in]

MOUNTING / SHAFT LENGTH CHART

Dimension P is the overall distance from the motor mounting surface to the end of the shaft.

Additional shaft length information, if necessary, is noted as P_2 and does not increase or decrease the listed P dimensions in this chart. The overall shaft lengths are already factored into the overall distance from the mounting surface to the end of the shaft.

P	Square & A Mounts	Wheel Mounts	P_2
#	mm [in]	mm [in]	mm [in]
10	45 [1.77]	76 [2.99]	N/A
12	49 [1.94]	80 [3.16]	43 [1.70]
13	56 [2.21]	87 [3.43]	N/A
14	61 [2.41]	92 [3.63]	N/A
15	64 [2.50]	95 [3.77]	N/A
89	51 [2.00]	82 [3.22]	45 [1.78]

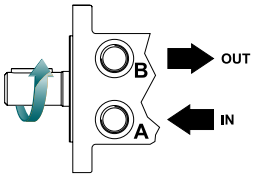
ORDERING INFORMATION

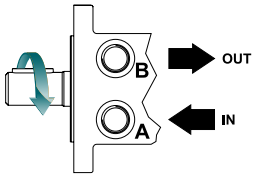
□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □

1 2 3 4 5 6 7 8

1. CHOOSE SERIES DESIGNATION

277	Reverse Rotation
278	Standard Rotation





▶ The 277 & 278 series are bi-directional. For applications requiring the motor to rotate in only one direction, shaft seal life may be prolonged by pressurizing the A port of the motor.

2. SELECT A DISPLACEMENT OPTION

040	41 cm^3/rev	[2.5 in^3/rev]	**130**	129 cm^3/rev	[7.9 in^3/rev]
045	44 cm^3/rev	[2.7 in^3/rev]	**160**	161 cm^3/rev	[9.8 in^3/rev]
060	60 cm^3/rev	[3.6 in^3/rev]	**200**	200 cm^3/rev	[12.2 in^3/rev]
070	70 cm^3/rev	[4.3 in^3/rev]	**230**	231 cm^3/rev	[14.1 in^3/rev]
090	88 cm^3/rev	[5.4 in^3/rev]	**320**	322 cm^3/rev	[19.7 in^3/rev]
100	100 cm^3/rev	[6.1 in^3/rev]	**400**	404 cm^3/rev	[24.4 in^3/rev]

3. SELECT A MOUNT & PORT OPTION

A10	2-Hole, SAE A Mount, Aligned Ports, 1/2-14 NPT
A11	2-Hole, SAE A Mount, Aligned Ports, 7/8-14 UNF
A17	2-Hole, SAE A Mount, Aligned Manifold Ports, 1/2” Drilled
F30	4-Hole, Square Mount, Aligned Ports, 1/2-14 NPT
F31	4-Hole, Square Mount, Aligned Ports, 7/8-14 UNF
W31	4-Hole, Wheel Mount, Aligned Ports, 7/8-14 UNF

▶ The speed sensor option is not available on wheel mount housings.

4. SELECT A SHAFT OPTION

10	1” Straight	**13**	1” Tapered (SAE Standard)
12	25mm Straight	**15**	1” Straight Extended
13	1” Tapered	**89**	25mm Straight Stepdown

▶ The 15 extended shaft is designed for use with one of the speed sensor options listed in STEP 7.

5. SELECT A PAINT OPTION

A	Black
B	Black, Unpainted Mounting Surface

6. SELECT A VALVE CAVITY / CARTRIDGE OPTION

A	None

7. SELECT AN ADD-ON OPTION

A	Standard
B	Lock Nut
C	Solid Hex Nut
W	Speed Sensor, Dual, 4-Pin Male Weatherpack Connector
X	Speed Sensor, Dual, 4-Pin M12 Male Connector
Y	Speed Sensor, Single, 3-Pin Male Weatherpack Connector
Z	Speed Sensor, Single, 4-Pin M12 Male Connector

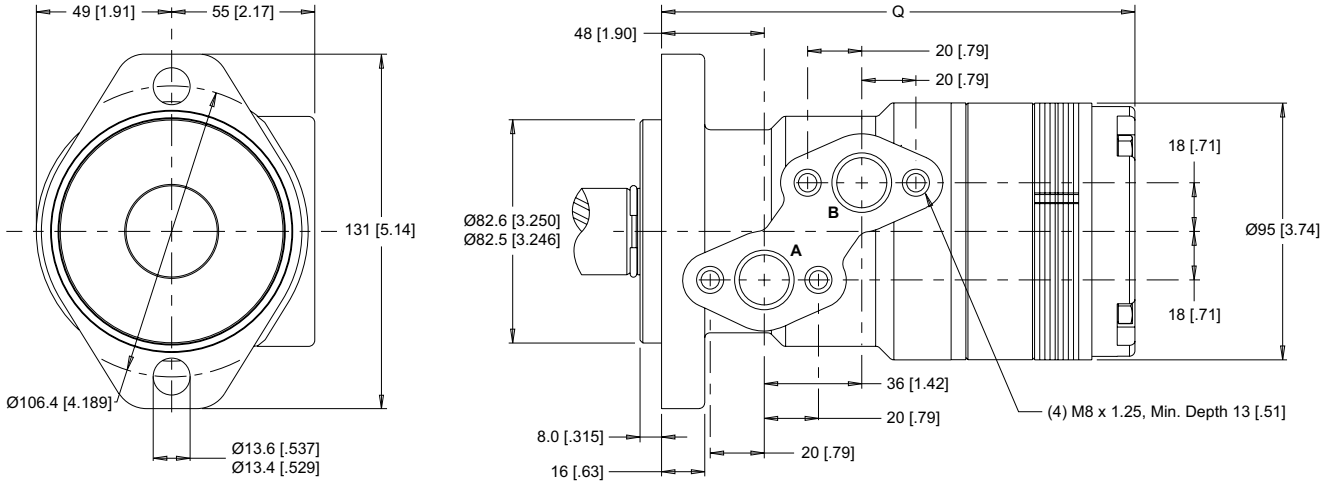
8. SELECT A MISCELLANEOUS OPTION

AA	None
AC	Freeturning Rotor

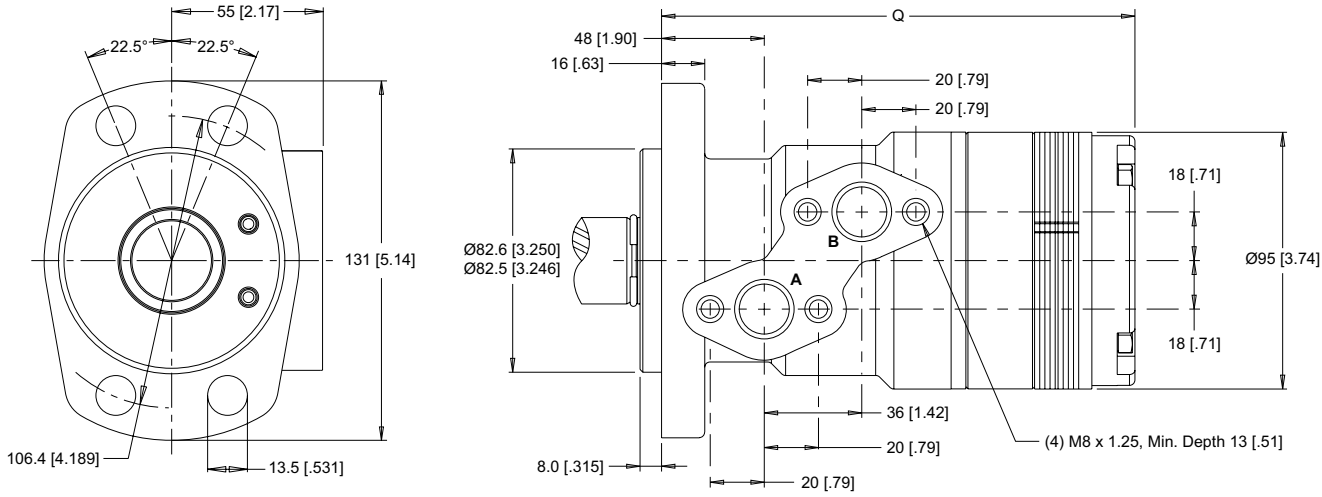
HOUSINGS

▶ Dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

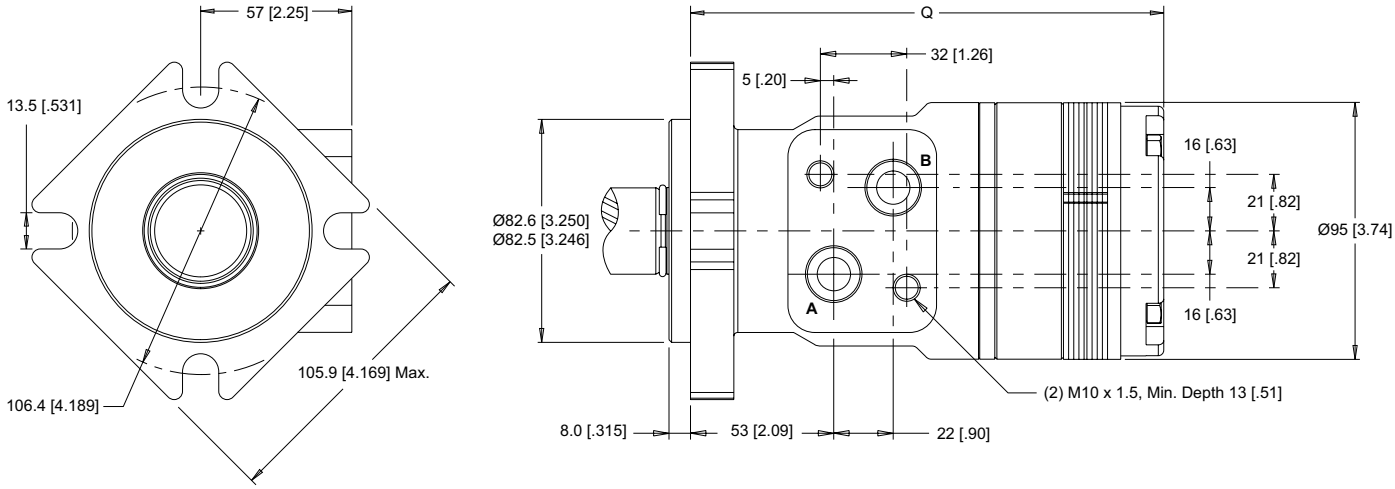
2-HOLE, SAE A MOUNT, OFFSET MANIFOLD PORTS — A63 G 1/2



4-HOLE, MAGNETO MOUNT, OFFSET MANIFOLD PORTS — AC3 G 1/2



4-HOLE, SAE A MOUNT, OFFSET MANIFOLD PORTS — AG3 G 1/2



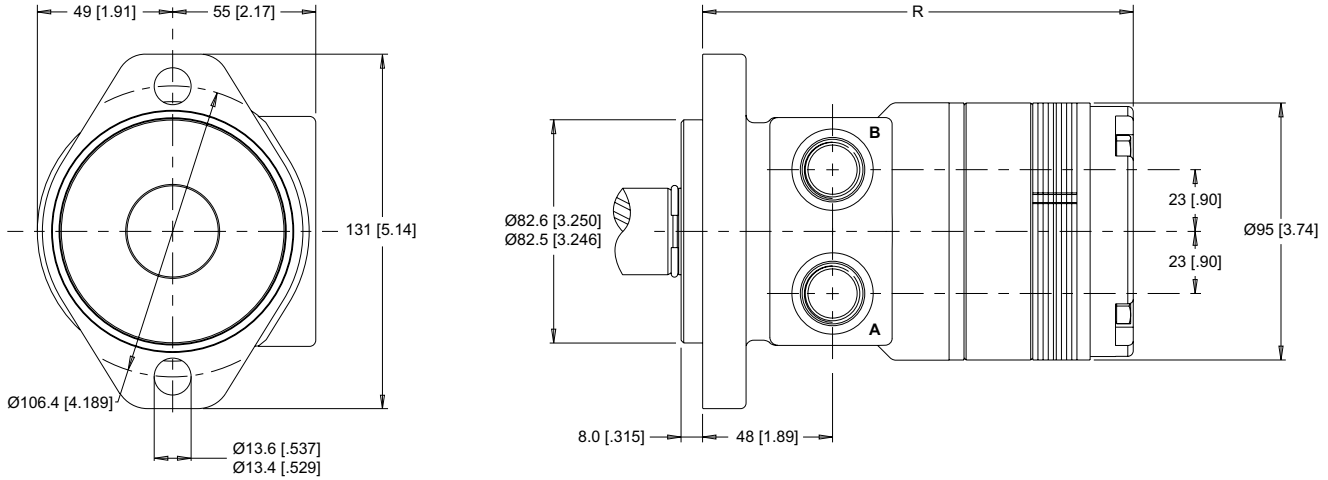
▶ Dimension Q is found on page 35.

HOUSINGS

▶ Dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

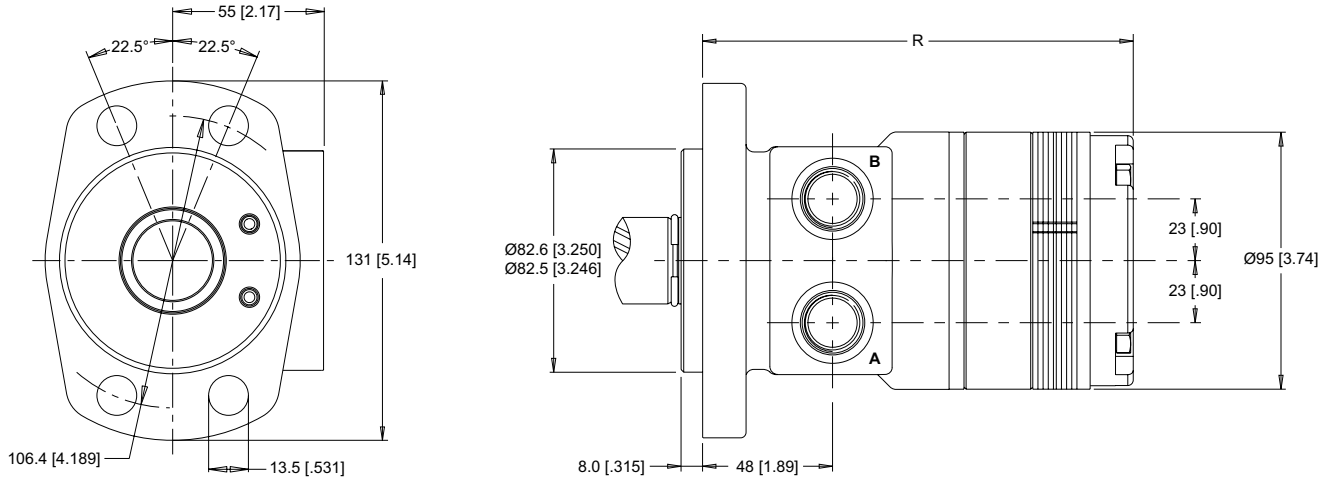
2-HOLE, SAE A MOUNT, ALIGNED PORTS

A68 G 1/2



4-HOLE, MAGNETO MOUNT, ALIGNED PORTS

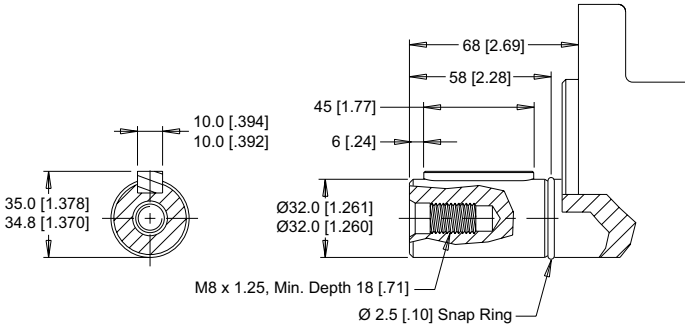
AC8 G 1/2



▶ Dimension R is found on page 35.

SHAFTS

21 32mm Straight



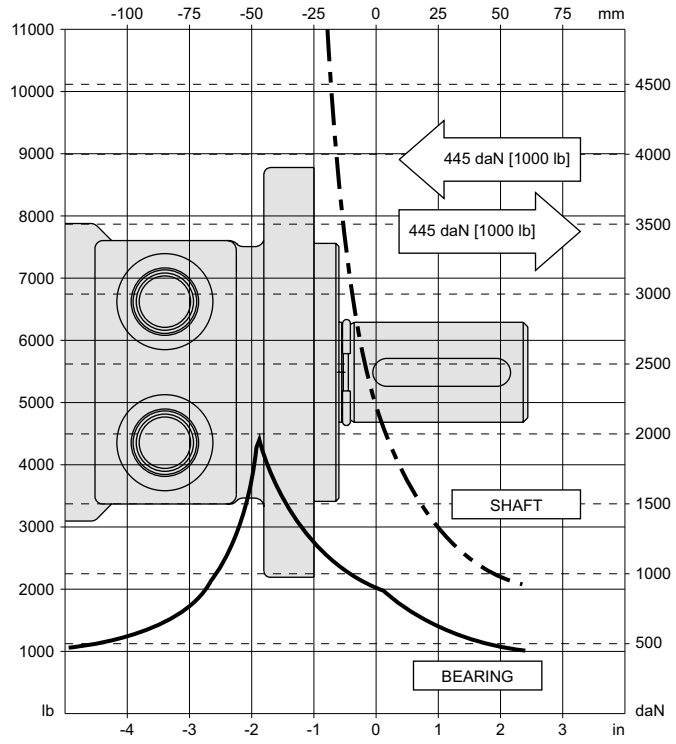
Max. Torque: 882 Nm [7804 lb-in]

TECHNICAL INFORMATION

ALLOWABLE SHAFT LOAD / BEARING CURVE

The bearing curve represents allowable bearing loads based on ISO 281 bearing capacity for an L_{10} life of 2,000 hours at 100 rpm. Radial loads for speeds other than 100 rpm may be calculated using the multiplication factor table on page 8.

ALL 280 & 281 SERIES MOUNTS



LENGTH & WEIGHT CHART

Dimension Q is the overall motor length from the rear of the motor to the mounting flange surface and is referenced on detailed housing drawings listed on page 33.

Q	Length	A63 & AC3 Weight	AG3 Weight
#	mm [in]	kg [lb]	kg [lb]
040	157 [6.18]	6.1 [13.4]	6.4 [14.1]
045	158 [6.22]	6.2 [13.6]	6.4 [14.1]
060	161 [6.34]	6.3 [13.9]	6.6 [14.5]
070	163 [6.42]	6.4 [14.1]	6.7 [14.7]
090	166 [6.54]	6.6 [14.5]	6.9 [15.2]
100	169 [6.65]	6.7 [14.7]	7.0 [15.4]
130	175 [6.89]	7.0 [15.4]	7.2 [15.8]
160	181 [7.13]	7.3 [16.1]	7.5 [16.5]
200	189 [7.44]	7.6 [16.7]	7.9 [17.4]
230	195 [7.68]	7.9 [17.4]	8.2 [18.0]
320	213 [8.39]	8.6 [18.9]	9.0 [19.8]
400	213 [8.39]	8.6 [18.9]	9.0 [19.8]

Dimension R is the overall motor length from the rear of the motor to the mounting flange surface and is referenced on detailed housing drawings listed on page 34.

R	Length	Weight
#	mm [in]	kg [lb]
040	141 [5.55]	5.6 [12.3]
045	142 [5.59]	5.6 [12.3]
060	145 [5.71]	5.8 [12.8]
070	147 [5.79]	5.9 [13.0]
090	150 [5.91]	6.1 [13.4]
100	153 [6.02]	6.2 [13.6]
130	159 [6.26]	6.5 [14.3]
160	165 [6.50]	6.8 [15.0]
200	173 [6.81]	7.1 [15.6]
230	179 [7.05]	7.4 [16.3]
320	197 [7.76]	8.2 [18.0]
400	197 [7.76]	8.2 [18.0]

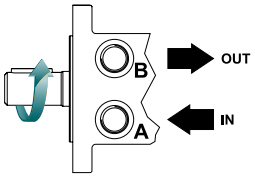
▶ 280 & 281 series motor weights can vary ± .5 kg [1 lb] depending on model configurations such as housing, shaft, endcover, options etc.

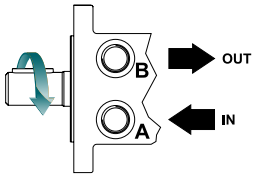
ORDERING INFORMATION

1	2	3	4	5	6	7	8

1. CHOOSE SERIES DESIGNATION

280	Reverse Rotation
281	Standard Rotation





▶ The 280 & 281 series are bi-directional. For applications requiring the motor to rotate in only one direction, shaft seal life may be prolonged by pressurizing the A port of the motor.

2. SELECT A DISPLACEMENT OPTION

040	41 cm^3/rev	[2.5 in^3/rev]	**130**	129 cm^3/rev	[7.9 in^3/rev]
045	44 cm^3/rev	[2.7 in^3/rev]	**160**	161 cm^3/rev	[9.8 in^3/rev]
060	60 cm^3/rev	[3.6 in^3/rev]	**200**	200 cm^3/rev	[12.2 in^3/rev]
070	70 cm^3/rev	[4.3 in^3/rev]	**230**	231 cm^3/rev	[14.1 in^3/rev]
090	88 cm^3/rev	[5.4 in^3/rev]	**320**	322 cm^3/rev	[19.7 in^3/rev]
100	100 cm^3/rev	[6.1 in^3/rev]	**400**	404 cm^3/rev	[24.4 in^3/rev]

3. SELECT A MOUNT & PORT OPTION

A63	2-Hole, SAE A Mount, Offset Manifold Ports, G 1/2
A68	2-Hole, SAE A Mount, Aligned Ports, G 1/2
AC3	4-Hole, Magneto Mount, Offset Manifold Ports, G 1/2
AC8	4-Hole, Magneto Mount, Aligned Ports, G 1/2
AG3	4-Hole, SAE A Mount, Offset Manifold Ports, G 1/2

4. SELECT A SHAFT OPTION

21	32mm Straight

5. SELECT A PAINT OPTION

A	Black
B	Black, Unpainted Mounting Surface

6. SELECT A VALVE CAVITY / CARTRIDGE OPTION

A	None

7. SELECT AN ADD-ON OPTION

A	Standard

8. SELECT A MISCELLANEOUS OPTION

AA	None
AC	Freeturning Rotor

OVERVIEW

The HB Series motor is the leader in its class, offering high efficiency and durability. The three-zone orbiting valve, laminated manifold and Roller Stator® motor work harmoniously to produce high overall efficiencies over a wide range of operating conditions. The standard case drain increases shaft seal life by reducing internal pressures experienced by the seal. Case oil leakage is also directed across all driveline components, increasing motor life. An internal drain option is also available. At the heart of the motor is a heavy-duty drivelink, offering 30% more torque capacity than competitive designs. These features make the HB Series motor the preferred choice for applications requiring peak efficiency for continuous operation.

FEATURES / BENEFITS

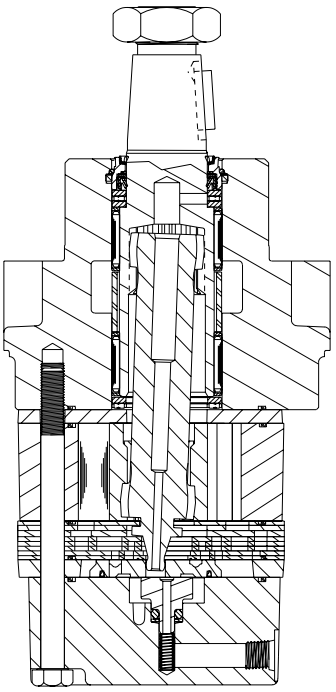
- Forced Drive Link Lubrication reduces wear and promotes longer life from motor.
- Heavy-Duty Drive Link is up to 30% stronger than competitive designs for longer life.
- Three-Zone Orbiting Valve precisely meters oil to produce exceptional volumetric efficiency.
- Rubber Energized Steel Face Seal does not extrude or melt under high pressure or high temperature.
- Standard Case Drain increases shaft seal life by reducing pressure on seal.

TYPICAL APPLICATIONS

conveyors, carwashes, positioners, light-duty wheel drives, sweepers, machine tool indexers, grain augers, spreaders, feed rollers, screw drives, brush drives and more

SERIES DESCRIPTIONS

300 - Hydraulic Motor
Standard



SPECIFICATIONS

CODE	Displacement cm³ [in³/rev]	Max. Speed rpm		Max. Flow lpm [gpm]		Max. Torque Nm [lb-in]		Max. Pressure bar [psi]		
		cont.	inter.	cont.	inter.	cont.	inter.	cont.	inter.	peak
050	52 [3.2]	680	830	38 [10]	45 [12]	135 [1200]	158 [1400]	207 [3000]	242 [3500]	276 [4000]
080	76 [4.6]	800	950	53 [14]	64 [17]	191 [1700]	222 [1975]	207 [3000]	242 [3500]	276 [4000]
090	89 [5.4]	680	840	61 [16]	76 [20]	225 [2000]	270 [2400]	207 [3000]	242 [3500]	276 [4000]
110	111 [6.8]	680	850	76 [20]	95 [25]	298 [2650]	349 [3100]	207 [3000]	242 [3500]	276 [4000]
125	127 [7.7]	580	740	76 [20]	95 [25]	338 [3000]	394 [3500]	207 [3000]	242 [3500]	276 [4000]
160	164 [10.0]	460	580	76 [20]	95 [25]	448 [3975]	512 [4550]	207 [3000]	242 [3500]	276 [4000]
200	205 [12.5]	370	460	76 [20]	95 [25]	569 [5050]	653 [5800]	207 [3000]	242 [3500]	276 [4000]
250	254 [15.5]	290	370	76 [20]	95 [25]	704 [6250]	799 [7100]	207 [3000]	242 [3500]	276 [4000]
300	293 [17.9]	250	320	76 [20]	95 [25]	811 [7200]	929 [8250]	207 [3000]	242 [3500]	276 [4000]
400	409 [24.9]	180	230	76 [20]	95 [25]	946 [8400]	1019 [9050]	173 [2500]	189 [2750]	207 [3000]

▶ Performance data is typical. Performance of production units varies slightly from one motor to another. Running at intermittent ratings should not exceed 10% of every minute of operation.

DISPLACEMENT PERFORMANCE

050

52 cm³ [3.2 in³] / rev

Flow - lpm [gpm]	Pressure - bar [psi] 17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	Max. Cont. 207 [3000]	Max. Inter. 242 [3500]	Theoretical rpm
	Torque - Nm [lb-in], **Speed rpm**						**Intermittent Ratings -** 10% of Operation		
2 [0.5]	7 [66] **36**	18 [158] **31**	38 [314] **26**	51 [447] **21**	66 [587] **9**				37
4 [1]	9 [77] **72**	19 [164] **69**	38 [335] **65**	57 [505] **63**	71 [631] **33**	87 [772] **32**	98 [866] **9**		73
8 [2]	9 [75] **142**	19 [164] **140**	39 [342] **135**	59 [521] **133**	78 [690] **122**	95 [840] **102**	109 [964] **77**	123 [1086] **57**	145
15 [4]	8 [68] **288**	19 [164] **286**	38 [340] **285**	57 [507] **284**	78 [688] **265**	99 [872] **245**	112 [993] **211**	129 [1145] **189**	289
23 [6]			36 [319] **431**	56 [492] **427**	76 [669] **416**	97 [859] **396**	114 [1009] **347**	134 [1182] **321**	434
30 [8]			34 [304] **577**	53 [467] **572**	73 [646] **568**	95 [841] **543**	113 [1001] **488**	134 [1183] **463**	578
38 [10] Max. Cont.				51 [451] **699**	71 [628] **683**	92 [810] **665**	111 [978] **634**	133 [1174] **604**	722
45 [12] Max. Inter.				48 [427] **847**	68 [606] **825**	88 [781] **798**	111 [980] **770**		867

Overall Efficiency - 70 - 100% 40 - 69% 0 - 39%

Rotor Width	Theoretical Torque - Nm [lb-in]							
8.0 [.316] mm [in]	14 [127]	29 [255]	58 [510]	86 [764]	115 [1019]	144 [1274]	173 [1529]	202 [1783]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

080

76 cm³ [4.6 in³] / rev

Flow - lpm [gpm]	Pressure - bar [psi] 17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	Max. Cont. 207 [3000]	Max. Inter. 242 [3500]	Theoretical rpm
	Torque - Nm [lb-in], **Speed rpm**						**Intermittent Ratings -** 10% of Operation		
2 [0.5]	14 [127] **25**	30 [262] **24**	61 [543] **21**	91 [806] **18**	120 [1062] **17**	145 [1285] **11**	169 [1496] **11**	191 [1693] **9**	26
4 [1]	16 [140] **50**	32 [286] **50**	63 [559] **43**	95 [839] **43**	124 [1099] **34**	151 [1340] **32**	178 [1579] **32**	203 [1796] **31**	51
8 [2]	16 [139] **100**	32 [280] **100**	64 [563] **99**	97 [857] **92**	129 [1139] **87**	157 [1390] **79**	187 [1652] **78**	211 [1865] **77**	101
15 [4]	14 [127] **200**	31 [275] **200**	65 [572] **199**	99 [872] **191**	131 [1155] **181**	160 [1420] **174**	186 [1643] **160**	216 [1911] **154**	201
23 [6]	13 [113] **301**	30 [262] **300**	63 [557] **297**	96 [853] **295**	130 [1149] **284**	160 [1420] **271**	186 [1646] **253**	218 [1930] **245**	302
30 [8]	10 [91] **401**	27 [243] **400**	61 [536] **398**	93 [826] **390**	127 [1125] **384**	159 [1409] **372**	187 [1654] **346**	220 [1945] **339**	402
38 [10]		24 [212] **502**	58 [511] **500**	89 [790] **499**	123 [1087] **498**	156 [1379] **485**	185 [1638] **443**	213 [1883] **433**	503
45 [12]		20 [177] **602**	54 [482] **601**	87 [767] **600**	120 [1060] **597**	164 [1451] **540**	193 [1711] **526**	228 [2021] **510**	603
53 [14] Max. Cont.		14 [127] **690**	50 [445] **689**	84 [741] **688**	124 [1098] **658**	155 [1369] **644**	185 [1640] **631**	217 [1918] **613**	704
61 [16]									804
64 [17] Max. Inter.									904

Overall Efficiency - 70 - 100% 40 - 69% 0 - 39%

Rotor Width	Theoretical Torque - Nm [lb-in]							
11.7 [.462] mm [in]	21 [183]	41 [366]	83 [732]	124 [1099]	166 [1465]	207 [1831]	248 [2197]	290 [2564]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

► Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

DISPLACEMENT PERFORMANCE

090

89 cm³ [5.4 in³] / rev

Pressure - bar [psi]

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	242 [3500] Max. Inter.

Torque - Nm [lb-in], **Speed rpm**

Intermittent Ratings - 10% of Operation

Flow - lpm [gpm]	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	242 [3500] Max. Inter.	Theoretical rpm
2 [0.5]	12 [106] **21**	26 [231] **19**	69 [609] **17**	100 [889] **15**	142 [1259] **13**	174 [1537] **10**	206 [1826] **7**	232 [2049] **5**	22
4 [1]		30 [264] **41**	68 [605] **38**	107 [947] **34**	146 [1296] **30**	180 [1596] **27**	212 [1875] **26**	242 [2142] **23**	43
8 [2]		33 [291] **84**	71 [629] **79**	108 [958] **73**	149 [1323] **67**	183 [1620] **66**	221 [1956] **60**	251 [2223] **59**	86
15 [4]			72 [636] **167**	113 [1003] **158**	153 [1351] **149**	188 [1664] **143**	225 [1990] **141**	260 [2300] **135**	172
23 [6]			72 [633] **252**	112 [995] **243**	151 [1340] **233**	187 [1654] **227**	226 [1996] **222**	260 [2304] **218**	257
30 [8]			68 [598] **339**	109 [960] **331**	151 [1340] **317**	188 [1660] **309**	227 [2012] **301**	263 [2326] **300**	343
38 [10]				108 [959] **416**	150 [1328] **403**	188 [1667] **391**	229 [2024] **381**	270 [2393] **370**	428
45 [12]				109 [961] **505**	153 [1356] **490**	195 [1728] **475**	232 [2049] **462**	271 [2398] **448**	514
53 [14]				145 [1287] **590**	190 [1678] **578**	213 [1886] **558**	241 [2135] **544**	282 [2495] **530**	599
61 [16] Max. Cont.				134 [1190] **677**	187 [1654] **660**	192 [1701] **644**	227 [2007] **629**	269 [2384] **610**	685
68 [18]					136 [1201] **748**	189 [1675] **729**	240 [2122] **719**		770
76 [20] Max. Inter.					136 [1205] **835**	174 [1536] **819**	216 [1916] **806**		856

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width

13.7 [.541] mm [in]

Theoretical Torque - Nm [lb-in]

24 [215]	49 [430]	97 [860]	146 [1290]	194 [1720]	243 [2150]	291 [2580]	340 [3010]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

110

111 cm³ [6.8 in³] / rev

Pressure - bar [psi]

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	242 [3500] Max. Inter.

Torque - Nm [lb-in], **Speed rpm**

Intermittent Ratings - 10% of Operation

Flow - lpm [gpm]	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	242 [3500] Max. Inter.	Theoretical rpm
2 [0.5]	12 [106] **16**	39 [347] **16**	88 [777] **14**	135 [1199] **11**	182 1609] **9**	223 [1977] **8**	273 [2420] **6**	304 [2690] **5**	17
4 [1]	16 [142] **33**	42 [374] **33**	97 [857] **31**	146 [1290] **27**	199 [1763] **21**	246 [2179] **19**	293 [2592] **18**	329 [2916] **16**	34
8 [2]		42 [372] **67**	98 [866] **64**	148 [1313] **59**	201 [1782] **49**	249 [2204] **46**	297 [2629] **44**	345 [3050] **43**	68
15 [4]			94 [835] **134**	149 [1320] **126**	201 [1777] **117**	251 [2223] **110**	302 [2674] **104**	348 [3083] **104**	136
23 [6]			93 [819] **202**	148 [1312] **196**	201 [1775] **186**	250 [2215] **177**	302 [2671] **167**	348 [3078] **163**	204
30 [8]			89 [785] **269**	145 [1287] **267**	199 [1760] **258**	249 [2204] **247**	299 [2648] **267**	352 [3114] **229**	272
38 [10]			83 [738] **339**	139 [1232] **336**	194 [1718] **327**	244 [2163] **315**	296 [2617] **304**	349 [3086] **292**	340
45 [12]			82 [723] **407**	145 [1281] **406**	209 [1853] **397**	291 [2578] **386**	315 [2786] **368**	343 [3031] **360**	408
53 [14]			74 [654] **475**	129 [1143] **473**	183 [1621] **466**	238 [2103] **451**	287 [2539] **441**	349 [3085] **426**	476
61 [16]				143 [1261] **542**	199 [1763] **536**	251 [2224] **523**	301 [2666] **510**	363 [3213] **492**	544
68 [18]				120 [1059] **609**	179 [1586] **603**	233 [2058] **593**	284 [2510] **580**	347 [3071] **561**	612
76 [20] Max. Cont.				107 [944] **678**	160 [1419] **677**	217 [1918] **661**	268 [2374] **645**	327 [2896] **627**	680
83 [22]				93 [824] **746**	157 [1393] **743**	206 [1823] **735**	257 [2271] **714**		748
91 [24]				86 [762] **813**	139 [1234] **810**	197 [1744] **803**	250 [2214] **783**		816
95 [25] Max. Inter.				77 [678] **847**	132 [1171] **844**	191 [1694] **835**	243 [2154] **828**		850

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width

17.3 [.681] mm [in]

Theoretical Torque - Nm [lb-in]

31 [271]	61 [541]	122 [1083]	184 [1624]	245 [2166]	306 [2707]	367 [3248]	428 [3790]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

► Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

DISPLACEMENT PERFORMANCE

125

127 cm³ [7.7 in³] / rev

Pressure - bar [psi]

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	242 [3500] Max. Inter.

Intermittent Ratings - 10% of Operation

Torque - Nm [lb-in], **Speed rpm**

Flow - lpm [gpm]	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	242 [3500] Max. Inter.	Theoretical rpm
2 [0.5]	14 [127] **14**	44 [394] **14**	109 [961] **13**	159 [1408] **13**	217 [1922] **12**	267 [2364] **10**	313 [2766] **9**	355 [3146] **7**	15
4 [1]	16 [138] **29**	45 [401] **29**	108 [952] **29**	167 [1475] **27**	226 [2004] **25**	278 [2459] **23**	332 [2936] **21**	367 [3245] **19**	30
8 [2]		49 [432] **59**	108 [953] **59**	165 [1462] **57**	231 [2046] **54**	286 [2528] **48**	332 [2941] **48**	387 [3421] **45**	60
15 [4]		49 [430] **119**	107 [949] **119**	167 [1479] **118**	229 [2024] **113**	284 [2513] **108**	342 [3023] **102**	392 [3467] **98**	120
23 [6]			102 [902] **179**	166 [1473] **177**	223 [1973] **173**	279 [2473] **169**	337 [2985] **163**	393 [3477] **157**	180
30 [8]			100 [888] **239**	160 [1420] **239**	222 [1968] **235**	287 [2541] **235**	337 [2987] **221**	391 [3459] **214**	240
38 [10]			95 [841] **299**	154 [1359] **298**	217 [1919] **298**	273 [2413] **292**	332 [2940] **281**	387 [3428] **273**	300
45 [12]			83 [738] **359**	147 [1304] **358**	207 [1831] **357**	267 [2361] **350**	329 [2914] **342**	406 [3590] **308**	360
53 [14]			82 [727] **419**	146 [1293] **418**	204 [1801] **417**	268 [2375] **413**	332 [2935] **402**	419 [3704] **340**	420
61 [16]			69 [608] **473**	168 [1484] **463**	198 [1756] **440**	258 [2287] **415**	327 [2895] **384**	386 [3419] **341**	480
68 [18]				193 [1704] **517**	214 [1894] **498**	278 [2460] **472**	360 [3188] **438**	386 [3412] **384**	540
76 [20] Max. Cont.				205 [1815] **577**	245 [2164] **561**	290 [2567] **537**	344 [3040] **505**	408 [3606] **453**	600
83 [22]				151 [1336] **640**	201 [1781] **623**	260 [2298] **597**	320 [2832] **563**		660
91 [24]				85 [751] **705**	151 [1334] **686**	218 [1930] **662**	284 [2516] **621**		720
95 [25] Max. Inter.				79 [697] **736**	139 [1227] **723**	209 [1853] **694**	270 [2387] **669**		750

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width 19.7 [.776] mm [in]

Theoretical Torque - Nm [lb-in]

35 [307]	69 [613]	139 [1226]	208 [1839]	277 [2452]	346 [3065]	416 [3678]	485 [4291]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

160

164 cm³ [10.0 in³] / rev

Pressure - bar [psi]

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	242 [3500] Max. Inter.

Intermittent Ratings - 10% of Operation

Torque - Nm [lb-in], **Speed rpm**

Flow - lpm [gpm]	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	242 [3500] Max. Inter.	Theoretical rpm
2 [0.5]	24 [216] **11**	61 [538] **11**	143 [1267] **10**	213 [1881] **9**	287 [2536] **8**	351 [3106] **7**	411 [3640] **5**	470 [4159] **4**	12
4 [1]	28 [244] **23**	67 [596] **22**	145 [1287] **21**	215 [1899] **18**	291 [2578] **16**	355 [3145] **14**	425 [3758] **13**	493 [4366] **11**	24
8 [2]		66 [588] **46**	148 [1306] **44**	224 [1983] **39**	301 [2666] **34**	366 [3241] **32**	441 [3904] **30**	508 [4493] **28**	47
15 [4]		66 [584] **92**	146 [1291] **91**	226 [2002] **87**	313 [2769] **80**	375 [3318] **71**	451 [3990] **67**	516 [4569] **66**	93
23 [6]		62 [551] **137**	146 [1295] **136**	224 [1986] **134**	307 [2718] **125**	379 [3358] **119**	449 [3975] **108**	515 [4553] **106**	139
30 [8]			142 [1258] **184**	221 [1954] **182**	299 [2644] **172**	376 [3329] **161**	447 [3952] **152**	520 [4603] **146**	185
38 [10]			132 [1169] **230**	216 [1909] **229**	289 [2558] **222**	371 [3282] **211**	448 [3961] **195**	520 [4598] **190**	231
45 [12]			129 [1144] **277**	208 [1842] **275**	284 [2510] **270**	357 [3161] **261**	436 [3862] **239**	512 [4529] **228**	278
53 [14]			117 [1040] **323**	202 [1788] **320**	275 [2438] **316**	353 [3124] **305**	427 [3781] **291**	509 [4508] **279**	324
61 [16]			103 [913] **369**	187 [1659] **367**	275 [2431] **364**	338 [2994] **356**	418 [3698] **341**	496 [4392] **325**	370
68 [18]			91 [803] **415**	175 [1553] **413**	257 [2278] **4110**	325 [2874] **403**	405 [3587] **389**	480 [4246] **376**	416
76 [20] Max. Cont.				169 [1499] **461**	246 [2176] **459**	328 [2906] **447**	397 [3514] **438**	477 [4223] **422**	462
83 [22]				147 [1297] **507**	232 [2049] **504**	315 [2792] **498**	385 [3411] **487**		509
91 [24]				131 [1157] **553**	218 [1928] **550**	300 [2655] **546**	378 [3344] **531**		555
95 [25] Max. Inter.				121 [1073] **577**	208 [1844] **573**	291 [2577] **571**	365 [3229] **557**		578

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width 25.4 [1.000] mm [in]

Theoretical Torque - Nm [lb-in]

45 [398]	90 [796]	180 [1592]	270 [2389]	360 [3185]	450 [3981]	540 [4777]	630 [5573]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

► Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

DISPLACEMENT PERFORMANCE

200

205 cm³ [12.5 in³] / rev

Pressure - bar [psi] | Max. Cont. | Max. Inter.

Torque - Nm [lb-in], **Speed rpm**

Intermittent Ratings - 10% of Operation

Flow - lpm [gpm]	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	242 [3500]	Theoretical rpm
2 [0.5]	35 [314] **9**	83 [734] **9**	179 [1581] **8**	267 [2365] **7**	353 [3121] **6**	443 [3921] **5**	505 [4469] **4**	579 [5120] **3**	10
4 [1]	37 [325] **18**	81 [721] **18**	186 [1642] **17**	287 [2536] **14**	301 [2665] **13**	452 [4004] **11**	540 [4777] **9**	611 [5406] **8**	19
8 [2]	39 [349] **36**	89 [790] **36**	199 [1759] **35**	295 [2610] **31**	386 [3412] **27**	473 [4185] **24**	554 [4904] **21**	643 [5687] **20**	37
15 [4]	38 [338] **73**	87 [766] **73**	191 [1689] **72**	292 [2586] **68**	386 [3417] **61**	480 [4252] **53**	574 [5077] **49**	661 [5849] **46**	74
23 [6]		84 [742] **110**	185 [1635] **109**	287 [2542] **106**	382 [3380] **98**	480 [4247] **89**	570 [5046] **81**	657 [5817] **74**	111
30 [8]			176 [1556] **147**	279 [2468] **144**	376 [3327] **136**	479 [4243] **123**	571 [5051] **112**	658 [5827] **104**	148
38 [10]			166 [1471] **184**	268 [2374] **182**	368 [3256] **173**	467 [4131] **162**	556 [4923] **151**	651 [5761] **141**	185
45 [12]			154 [1361] **221**	257 [2275] **219**	360 [3185] **214**	460 [4069] **200**	558 [4939] **187**	650 [5751] **176**	222
53 [14]			147 [1304] **258**	245 [2165] **256**	355 [3141] **250**	441 [3906] **238**	539 [4773] **224**	640 [5666] **213**	259
61 [16]			123 [1089] **295**	235 [2083] **290**	333 [2949] **286**	429 [3797] **277**	523 [4628] **264**	624 [5519] **242**	296
68 [18]			112 [993] **331**	220 [1943] **327**	302 [2669] **323**	414 [3665] **319**	527 [4659] **303**	616 [5451] **289**	333
Max. Cont. 76 [20]				197 [1745] **369**	310 [2740] **365**	395 [3499] **360**	492 [4353] **343**	596 [5273] **331**	370
83 [22]				172 [1525] **405**	282 [2496] **401**	386 [3420] **395**	480 [4252] **382**		407
91 [24]				157 [1390] **442**	265 [2341] **441**	369 [3269] **438**	453 [4005] **425**		444
Max. Inter. 95 [25]				139 [1229] **460**	252 [2234] **458**	349 [3087] **456**	447 [3955] **444**		462

Overall Efficiency - 70 - 100% | 40 - 69% | 0 - 39%

Rotor Width	Theoretical Torque - Nm [lb-in]							
31.8 [1.251]	56 [498]	112 [995]	225 [1990]	337 [2986]	450 [3981]	562 [4976]	675 [5971]	787 [6967]

mm [in]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

250

254 cm³ [15.5 in³] / rev

Pressure - bar [psi] | Max. Cont. | Max. Inter.

Torque - Nm [lb-in], **Speed rpm**

Intermittent Ratings - 10% of Operation

Flow - lpm [gpm]	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	242 [3500]	Theoretical rpm
2 [0.5]	43 [381] **7**	104 [924] **6**	221 [1955] **6**	339 [3001] **5**	449 [3974] **3**	551 [4872] **1**			8
4 [1]	50 [439] **14**	115 [1014] **14**	240 [2128] **13**	361 [3196] **11**	466 [4128] **9**	574 [5080] **7**	668 [5907] **4**		15
8 [2]	51 [455] **29**	115 [1014] **29**	245 [2167] **28**	369 [3262] **26**	479 [4236] **22**	604 [5342] **17**	712 [6303] **13**	800 [7082] **9**	30
15 [4]	48 [428] **59**	105 [930] **58**	242 [2145] **57**	371 [3286] **56**	493 [4363] **51**	619 [5480] **41**	741 [6555] **33**	847 [7496] **25**	60
23 [6]	42 [368] **89**	110 [969] **88**	234 [2069] **88**	367 [3252] **87**	487 [4313] **82**	626 [5542] **69**	747 [6611] **58**	847 [7492] **48**	90
30 [8]		92 [818] **119**	223 [1978] **118**	357 [3159] **117**	490 [4332] **115**	622 [5508] **101**	744 [6587] **87**	846 [7490] **76**	120
38 [10]		80 [712] **149**	209 [1849] **148**	342 [3025] **147**	472 [4176] **141**	605 [5353] **129**	717 [6345] **114**	844 [7472] **104**	150
45 [12]			199 [1757] **178**	329 [2915] **176**	455 [4022] **174**	581 [5142] **165**	703 [6225] **147**	833 [7375] **127**	179
53 [14]			182 [1640] **208**	310 [2743] **206**	443 [3919] **205**	567 [5017] **197**	711 [6296] **176**	817 [7227] **158**	209
61 [16]			164 [1456] **238**	294 [2603] **235**	438 [3873] **233**	552 [4886] **227**	674 [5960] **205**	804 [7114] **191**	239
68 [18]			145 [1285] **268**	270 [2393] **266**	402 [3560] **263**	530 [4694] **259**	661 [5846] **245**	784 [6939] **222**	269
Max. Cont. 76 [20]			122 [1083] **298**	255 [2256] **295**	380 [3359] **292**	511 [4519] **289**	627 [5547] **277**	757 [6697] **252**	299
83 [22]				221 [1955] **326**	353 [3124] **323**	484 [4279] **319**	607 [5368] **307**		328
91 [24]				201 [1775] **357**	336 [2973] **355**	461 [4082] **353**	599 [5297] **342**		358
Max. Inter. 95 [25]				184 [1627] **371**	313 [2768] **368**	442 [3915] **365**	575 [5088] **360**		373

Overall Efficiency - 70 - 100% | 40 - 69% | 0 - 39%

Rotor Width	Theoretical Torque - Nm [lb-in]							
39.4 [1.551]	70 [617]	139 [1234]	279 [2468]	418 [3702]	558 [4936]	697 [6170]	837 [7404]	976 [8639]

mm [in]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

▶ Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

DISPLACEMENT PERFORMANCE

300

293 cm³ [17.9 in³] / rev

Pressure - bar [psi]	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	Max. Cont. 207 [3000]	Max. Inter. 242 [3500]
Flow - lpm [gpm] / Torque - Nm [lb-in], **Speed rpm**								
2 [0.5]	61 [543] **6**	118 [1044] **5**	261 [2311] **5**	388 [3433] **4**				
4 [1]	59 [521] **12**	140 [1237] **12**	271 [2397] **11**	414 [3666] **11**	546 [4833] **8**	681 [6025] **5**		
8 [2]	61 [541] **25**	128 [1134] **25**	281 [2490] **24**	425 [3761] **23**	562 [4970] **19**	693 [6128] **14**	820 [7259] **10**	915 [8095] **4**
15 [4]	52 [461] **51**	128 [1130] **51**	275 [2436] **50**	427 [3782] **50**	578 [5119] **44**	715 [6327] **32**	827 [7317] **25**	956 [8457] **19**
23 [6]		115 [1017] **77**	266 [2351] **76**	406 [3592] **75**	557 [4931] **70**	706 [6250] **55**	840 [7435] **43**	945 [8361] **37**
30 [8]		107 [951] **103**	251 [2223] **102**	407 [3598] **101**	538 [4759] **96**	691 [6117] **82**	832 [7359] **66**	948 [8393] **52**
38 [10]		88 [779] **129**	229 [2026] **127**	393 [3475] **126**	528 [4672] **122**	672 [5950] **109**	826 [7307] **90**	959 [8487] **74**
45 [12]			217 [1923] **154**	368 [3256] **153**	504 [4457] **150**	663 [5864] **133**	800 [7076] **112**	931 [8239] **97**
53 [14]			201 [1782] **180**	347 [3067] **178**	510 [4513] **173**	646 [5713] **161**	798 [7060] **140**	921 [8149] **114**
61 [16]			168 [1491] **206**	324 [2865] **204**	472 [4180] **201**	621 [5492] **188**	764 [6765] **171**	917 [8112] **142**
68 [18]			143 [1266] **232**	298 [2638] **230**	427 [3783] **227**	591 [5234] **220**	745 [6591] **198**	878 [7773] **176**
76 [20] Max. Cont.			114 [1013] **258**	283 [2501] **256**	443 [3916] **254**	597 [5284] **247**	717 [6344] **227**	849 [7512] **206**
83 [22]				246 [2179] **282**	397 [3512] **280**	559 [4943] **274**	681 [6023] **257**	
91 [24]				181 [1601] **309**	357 [3159] **306**	502 [4442] **304**	642 [5684] **294**	
95 [25] Max. Inter.				166 [1466] **321**	323 [2858] **319**	491 [4347] **318**	630 [5577] **300**	

Theoretical rpm: 7 | 13 | 26 | 52 | 78 | 104 | 130 | 155 | 181 | 207 | 233 | 259 | 284 | 310 | 323

Intermittent Ratings - 10% of Operation

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width	Theoretical Torque - Nm [lb-in]							
45.5 [1.790] mm [in]	81 [713]	161 [1425]	322 [2850]	483 [4275]	644 [5701]	805 [7126]	966 [8551]	1127 [9976]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

400

409 cm³ [24.9 in³] / rev

Pressure - bar [psi]	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	Max. Cont. 173 [2500]	Peak 207 [3000]
Flow - lpm [gpm] / Torque - Nm [lb-in], **Speed rpm**							
2 [0.5]	85 [757] **4**	193 [1710] **4**	367 [3248] **3**	534 [4721] **2**			
4 [1]	88 [776] **9**	185 [1640] **8**	383 [3386] **8**	580 [5129] **6**	745 [6590] **4**	899 [7954] **1**	
8 [2]	86 [762] **18**	196 [1734] **18**	394 [3487] **17**	586 [5184] **15**	764 [6763] **11**	927 [8204] **5**	
15 [4]	85 [749] **37**	188 [1661] **36**	404 [3571] **35**	602 [5325] **32**	796 [7047] **24**	962 [8517] **18**	1108 [9804] **9**
23 [6]	71 [629] **55**	180 [1593] **55**	387 [3428] **54**	596 [5274] **49**	787 [6969] **39**	978 [8653] **28**	1141 [10094] **20**
30 [8]		165 [1462] **74**	373 [3299] **73**	595 [5264] **69**	792 [7010] **58**	966 [8552] **44**	1149 [10167] **31**
38 [10]		143 [1269] **92**	356 [3150] **90**	581 [5144] **88**	782 [6923] **79**	974 [8617] **62**	1156 [10231] **45**
45 [12]		122 [1076] **111**	333 [2950] **109**	545 [4823] **107**	749 [6624] **98**	957 [8470] **83**	1143 [10116] **61**
53 [14]		95 [842] **129**	313 [2774] **128**	521 [4607] **126**	717 [6344] **117**	931 [8235] **103**	1131 [10007] **78**
61 [16]			282 [2493] **147**	496 [4385] **145**	685 [6063] **141**	919 [8131] **121**	1100 [9733] **100**
68 [18]			244 [2156] **166**	453 [4009] **165**	681 [6023] **158**	871 [7708] **142**	1071 [9478] **121**
76 [20] Max. Cont.			197 [1741] **185**	420 [3713] **183**	650 [5756] **179**	838 [7417] **166**	1051 [9302] **145**
83 [22]			164 [1448] **203**	378 [3344] **201**	588 [5200] **198**	810 [7171] **186**	
91 [24]				333 [2947] **222**	559 [4945] **220**	750 [6640] **211**	
95 [25] Max. Inter.				303 [2682] **231**	539 [4773] **228**	764 [6760] **221**	

Theoretical rpm: 5 | 10 | 19 | 38 | 56 | 75 | 93 | 112 | 130 | 149 | 167 | 186 | 205 | 223 | 232

Intermittent Ratings - 10% of Operation

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width	Theoretical Torque - Nm [lb-in]						
63.5 [2.500] mm [in]	112 [991]	224 [1982]	448 [3965]	672 [5947]	896 [7930]	1120 [9912]	1344 [11895]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

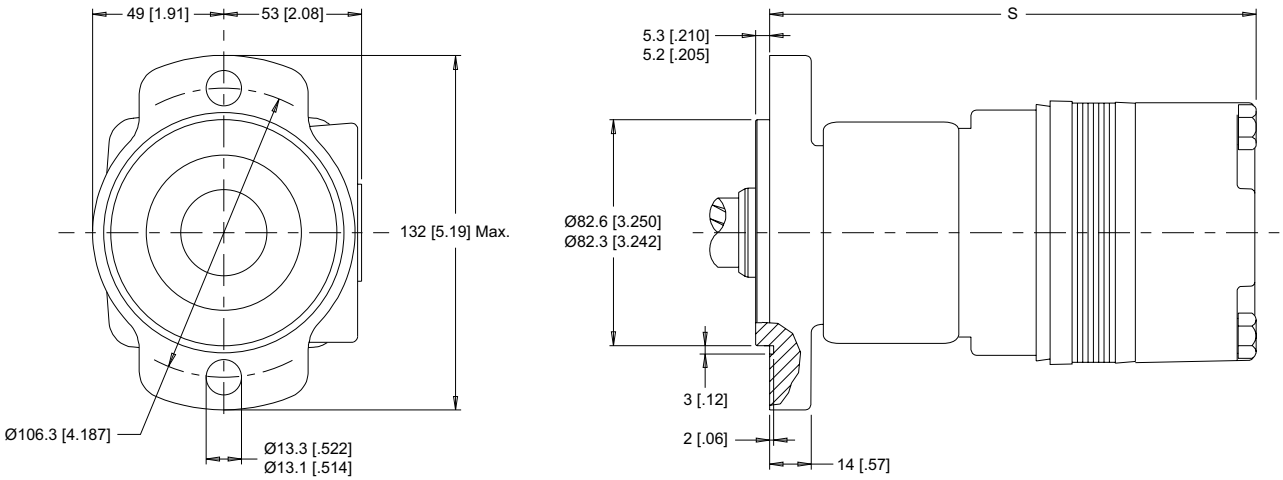
► Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

HOUSINGS

▶ Dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

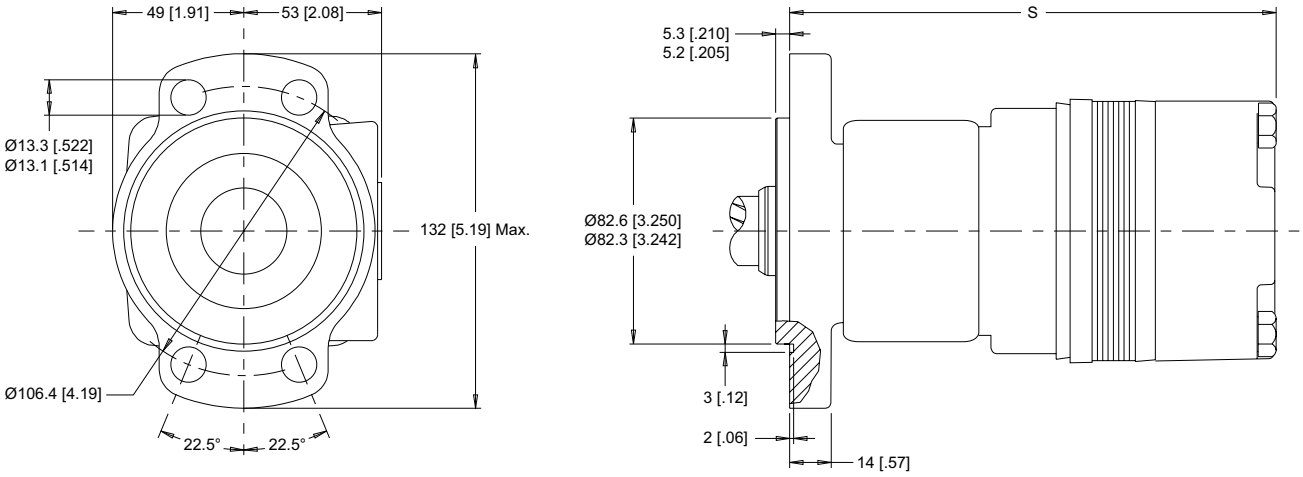
2-HOLE, SAE A MOUNT

A0 End Ports **A7** Side Ports



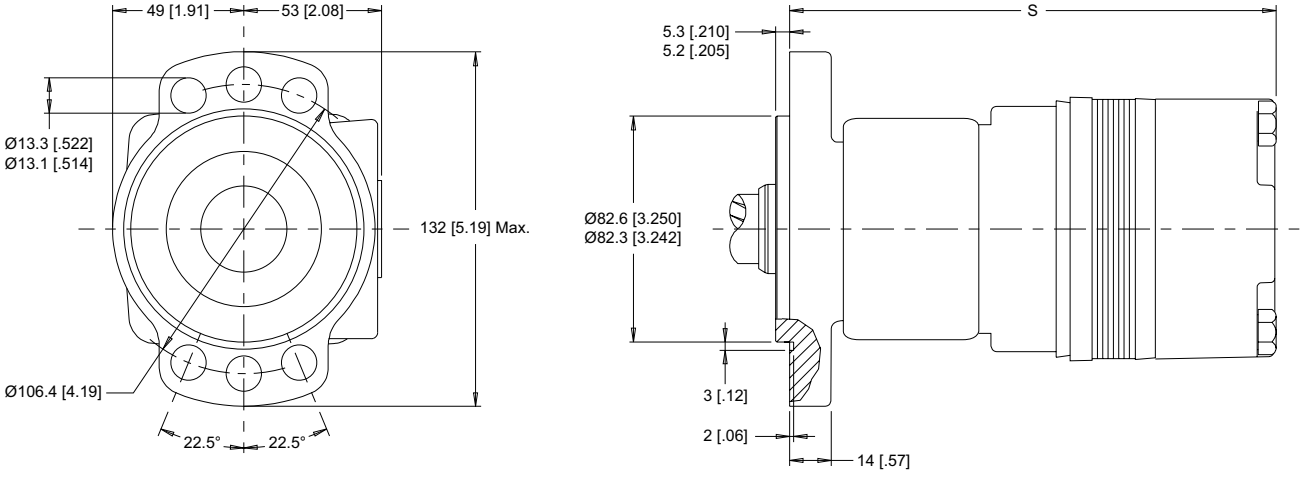
4-HOLE, MAGNETO MOUNT

A2 End Ports **A8** Side Ports



6-HOLE, SAE A MOUNT

A4 End Ports **A9** Side Ports



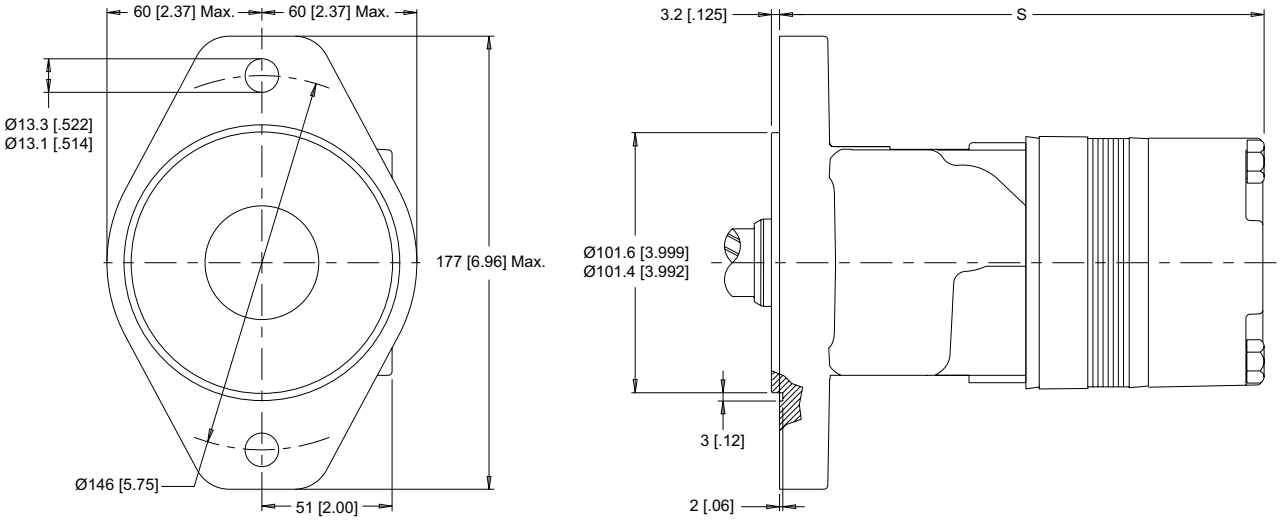
▶ Dimension S is charted on page 45.

HOUSINGS

▶ Dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

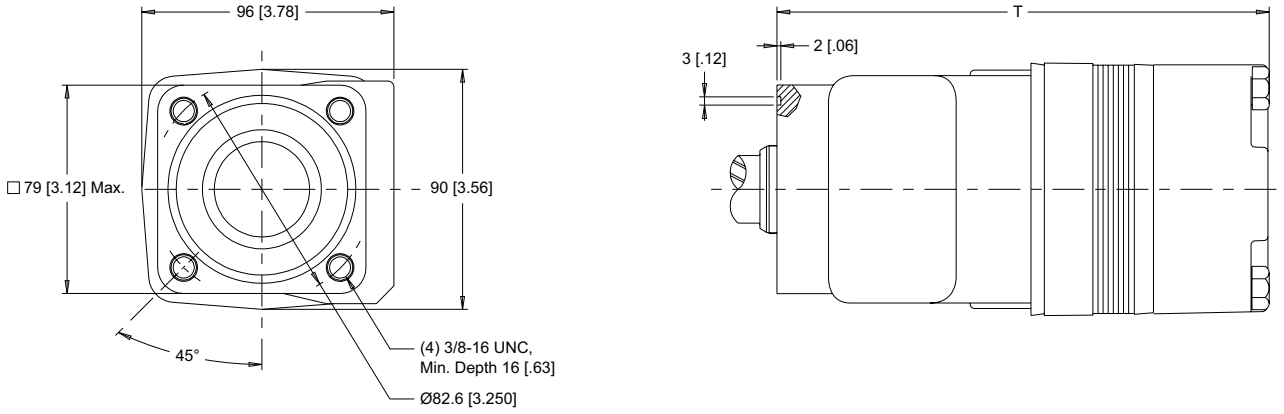
2-HOLE, SAE B MOUNT

B0 End Ports **B7** Side Ports



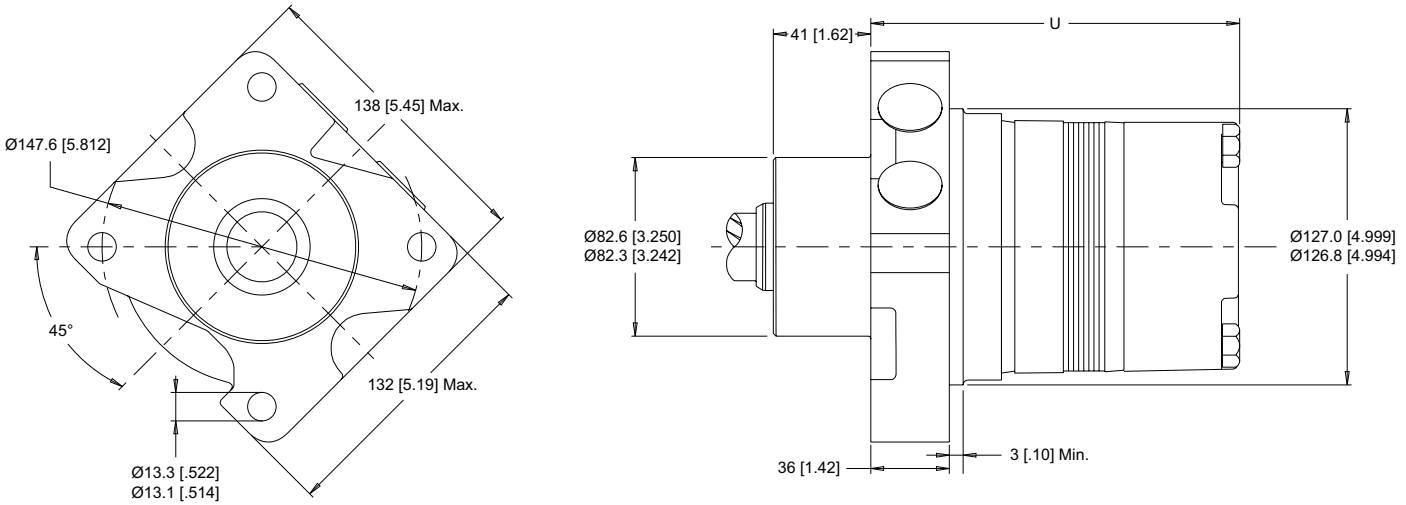
4-HOLE, SQUARE MOUNT

F2 End Ports **F8** Side Ports



4-HOLE, WHEEL MOUNT

W2 End Ports **W8** Side Ports



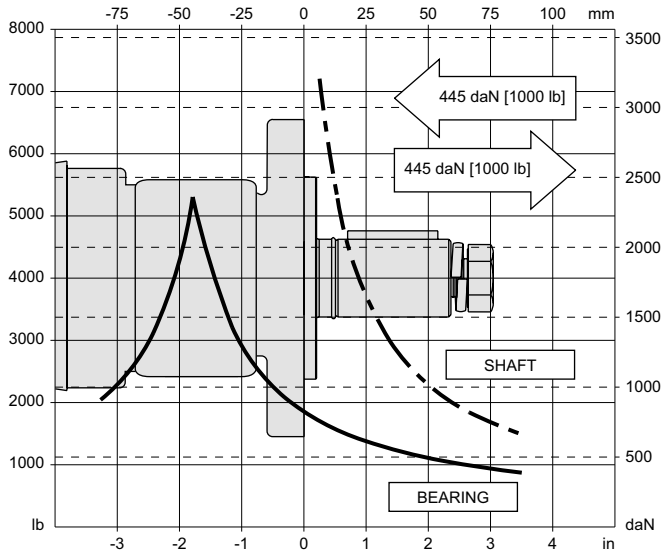
▶ Dimensions S & T are charted on page 45. Dimension U is charted on page 46.

TECHNICAL INFORMATION

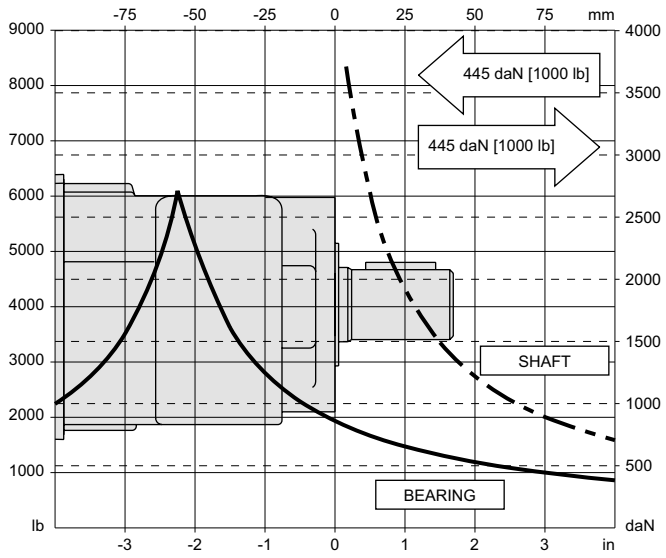
ALLOWABLE SHAFT LOAD / BEARING CURVE

The bearing curve represents allowable bearing loads based on ISO 281 bearing capacity for an L_{10} life of 2,000 hours at 100 rpm. Radial loads for speeds other than 100 rpm may be calculated using the multiplication factor table on page 8.

SAE A & B MOUNTS



4-HOLE SQUARE MOUNTS



LENGTH & WEIGHT CHART

Dimension S is the overall motor length from the rear of the motor to the mounting flange surface and is referenced on detailed housing drawings listed on pages 43 & 44.

S	Endcovers on pg. 47	Endcovers on pg. 48	Weight
#	mm [in]	mm [in]	kg [lb]
050	177 [6.97]	195 [7.68]	8.8 [19.5]
080	181 [7.11]	199 [7.82]	9.1 [20.0]
090	183 [7.19]	201 [7.90]	9.2 [20.2]
110	186 [7.33]	204 [8.04]	9.4 [20.7]
125	189 [7.43]	207 [8.14]	9.5 [21.0]
160	194 [7.65]	212 [8.36]	9.8 [21.7]
200	201 [7.90]	219 [8.61]	10.2 [22.5]
250	208 [8.20]	226 [8.91]	10.6 [23.4]
300	214 [8.44]	232 [9.15]	11.0 [24.3]
400	233 [9.15]	251 [9.86]	12.0 [26.4]

▶ Add 1.2 kg [2.7 lb] to the weight listed to the right for SAE B mount housings.

Dimension T is the overall motor length from the rear of the motor to the mounting flange surface and is referenced on detailed housing drawings listed on page 44.

T	Endcovers on pg. 47	Endcovers on pg. 48	Weight
#	mm [in]	mm [in]	kg [lb]
050	180 [7.09]	198 [7.80]	8.3 [18.4]
080	184 [7.23]	202 [7.94]	8.6 [18.9]
090	186 [7.31]	204 [8.02]	8.7 [19.1]
110	189 [7.45]	207 [8.16]	8.9 [19.6]
125	192 [7.55]	210 [8.26]	9.0 [19.9]
160	197 [7.77]	215 [8.48]	9.3 [20.6]
200	204 [8.02]	222 [8.73]	9.7 [21.4]
250	211 [8.32]	229 [9.03]	10.1 [22.3]
300	218 [8.56]	236 [9.27]	10.5 [23.2]
400	236 [9.27]	254 [9.98]	11.5 [25.3]

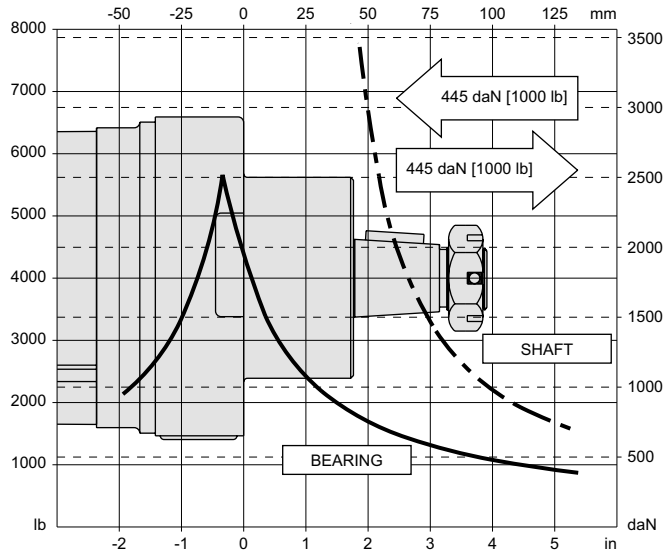
▶ 300 series motor weights can vary ± 1kg [2 lb] depending on model configurations such as housing, shaft, endcover, options etc.

TECHNICAL INFORMATION

ALLOWABLE SHAFT LOAD / BEARING CURVE

The bearing curve represents allowable bearing loads based on ISO 281 bearing capacity for an L_{10} life of 2,000 hours at 100 rpm. Radial loads for speeds other than 100 rpm may be calculated using the multiplication factor table on page 8.

WHEEL MOUNTS



LENGTH & WEIGHT CHART

Dimension U is the overall motor length from the rear of the motor to the mounting flange surface and is referenced on detailed housing drawings listed on page 44.

U	Endcovers on pg. 47	Endcovers on pg. 48	Weight
#	mm [in]	mm [in]	kg [lb]
050	140 [5.51]	158 [6.22]	11.5 [25.3]
080	144 [5.65]	162 [6.36]	11.7 [25.7]
090	145 [5.70]	163 [6.41]	11.8 [25.9]
110	148 [5.84]	166 [6.55]	12.0 [26.5]
125	151 [5.93]	169 [6.64]	12.1 [26.7]
160	156 [6.16]	174 [6.87]	12.4 [27.4]
200	163 [6.41]	181 [7.12]	12.8 [28.3]
250	170 [6.71]	188 [7.42]	13.2 [29.7]
300	177 [6.95]	195 [7.66]	13.6 [30.0]
400	195 [7.61]	213 [8.37]	14.6 [32.1]

▶ 300 series motor weights can vary ± 1kg [2 lb] depending on model configurations such as housing, shaft, endcover, options etc.

MOUNTING / SHAFT LENGTH CHART

Dimension V is the overall distance from the motor mounting surface to the end of the shaft and is referenced on detailed shaft drawings listed on page 49.

V	SAE A & B Mounts	Wheel Mounts	Square Mounts
#	mm [in]	mm [in]	mm [in]
01	44 [1.75]	82 [3.21]	41 [1.63]
02	49 [1.93]	86 [3.39]	46 [1.81]
07	81 [3.18]	118 [4.65]	78 [3.07]
08	81 [3.18]	118 [4.65]	78 [3.07]
10	49 [1.93]	86 [3.39]	46 [1.81]
12	55 [2.17]	92 [3.63]	52 [2.05]
15	69 [2.73]	106 [4.19]	66 [2.61]
20	61 [2.40]	99 [3.87]	58 [2.29]
21	61 [2.40]	98 [3.87]	58 [2.29]
22	66 [2.58]	103 [4.04]	63 [2.46]
23	57 [2.23]	94 [3.69]	54 [2.11]

PORTING

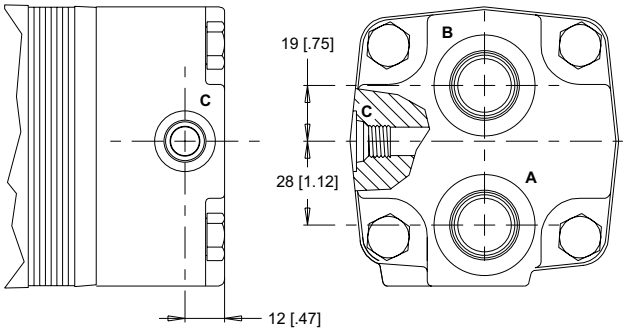
▶ Dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

END PORTED - ALIGNED

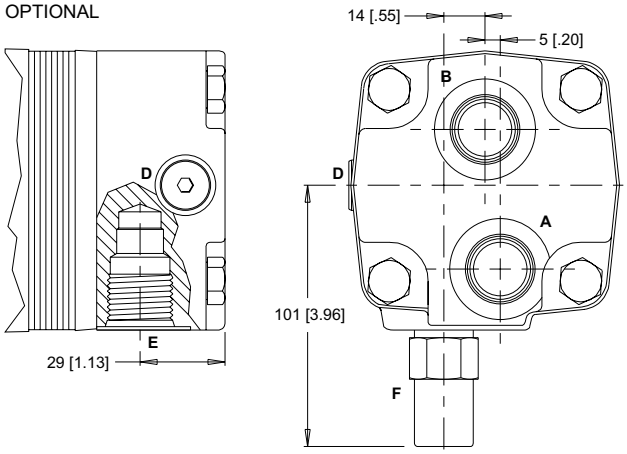
1 Main Ports **A, B**: 7/8-14 UNF
Drain Port **C**: 7/16-20 UNF

2 Main Ports **A, B**: G 1/2
Drain Port **C**: G 1/4

STANDARD



OPTIONAL



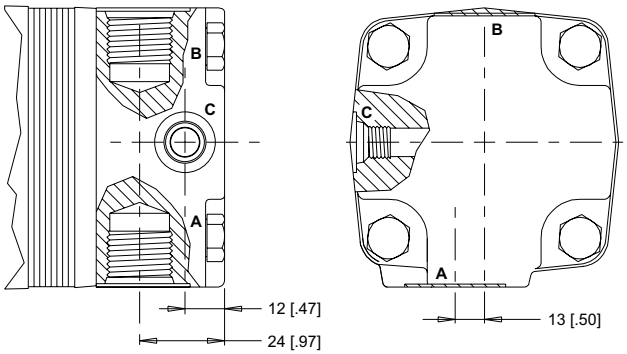
D: Internal Drain **E**: 10 Series/2-Way Valve Cavity 7/8-14 UNF **F**: Valve Cartridge Installed

SIDE PORTED - 180° OPPOSED

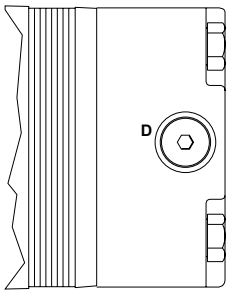
6 Main Ports **A, B**: 1 1/16-12 UN
Drain Port **C**: 7/16-20 UNF

7 Main Ports **A, B**: G 1/2
Drain Port **C**: G 1/4

STANDARD



OPTIONAL

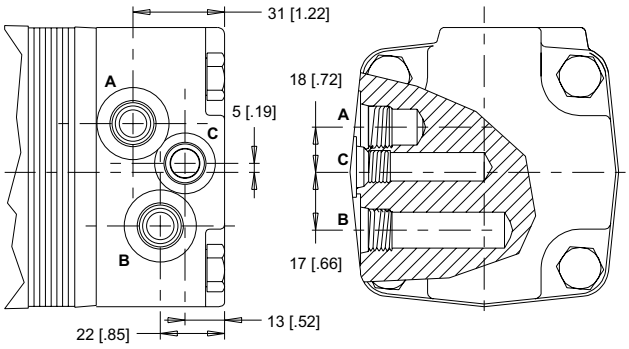


D: Internal Drain

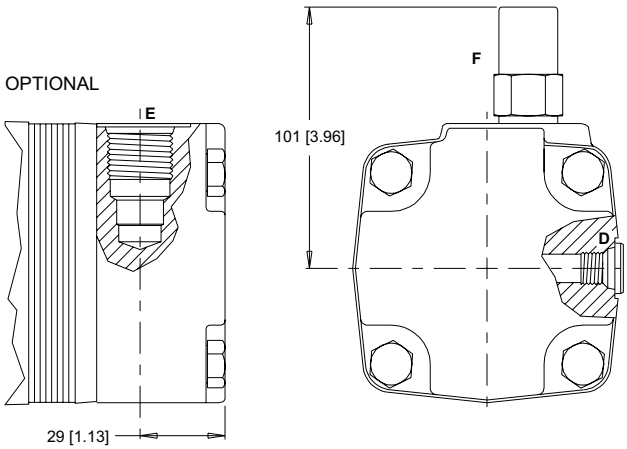
SIDE PORTED - OFFSET

5 Main Ports **A, B**: 9/16-18 UNF
Drain Port **C**: 7/16-20 UNF

STANDARD



OPTIONAL



D: Internal Drain **E**: 10 Series/2-Way Valve Cavity 7/8-14 UNF **F**: Valve Cartridge Installed

PORTING

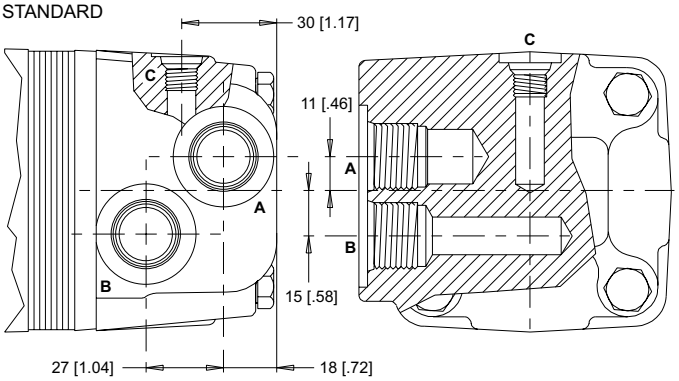
▶ Dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

SIDE PORTED - OFFSET

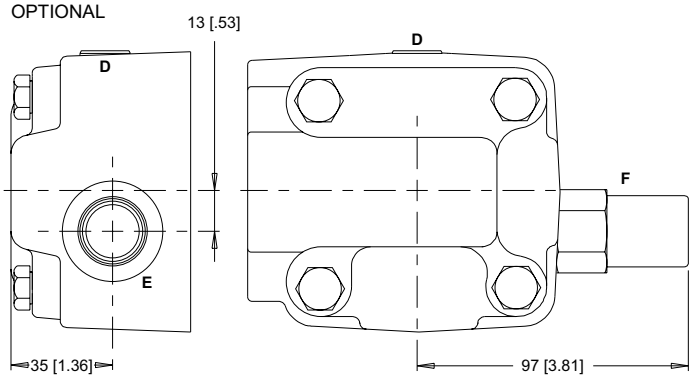
1 Main Ports **A, B**: 7/8-14 UNF
Drain Port **C**: 7/16-20 UNF

2 Main Ports **A, B**: G 1/2
Drain Port **C**: G 1/4

STANDARD



OPTIONAL

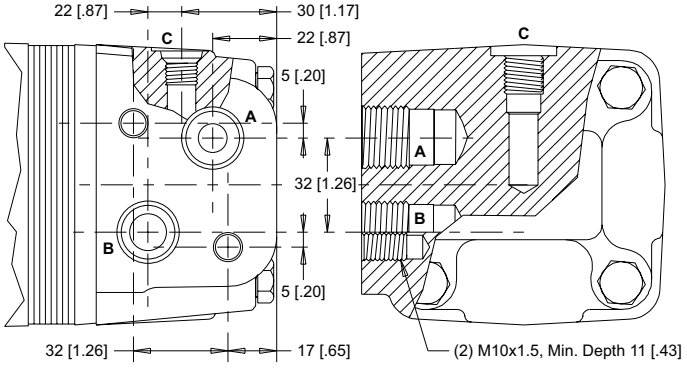


D: Internal Drain **E**: 10 Series/2-Way Valve Cavity 7/8-14 UNF **F**: Valve Cartridge Installed

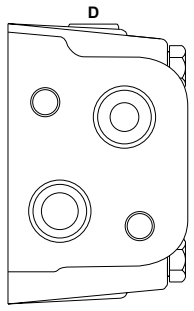
SIDE PORTED - OFFSET MANIFOLD

3 Main Ports **A, B**: G 1/2
Drain Port **C**: G 1/4

STANDARD



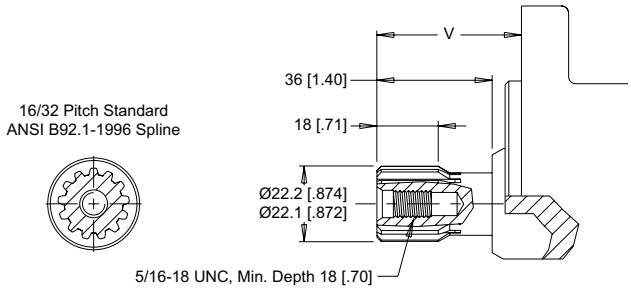
OPTIONAL



D: Internal Drain

SHAFTS

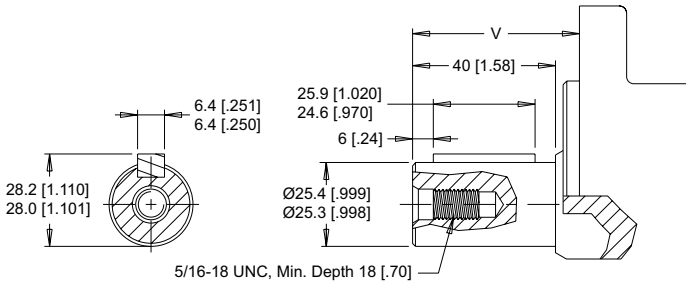
01 7/8” 13 Tooth Spline



Max. Torque: 170 Nm [1500 lb-in]

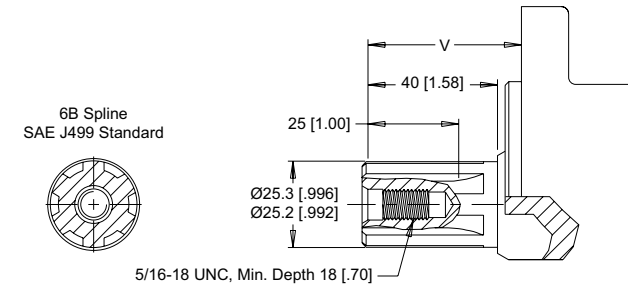
10 1” Straight

15 1” Straight Extended



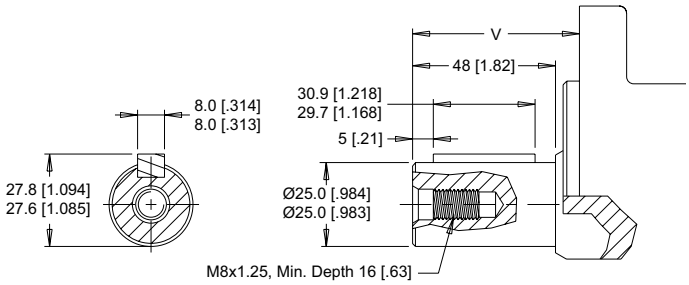
Max. Torque: 655 Nm [5800 lb-in]

02 1” 6B Spline



Max. Torque: 678 Nm [6000 lb-in]

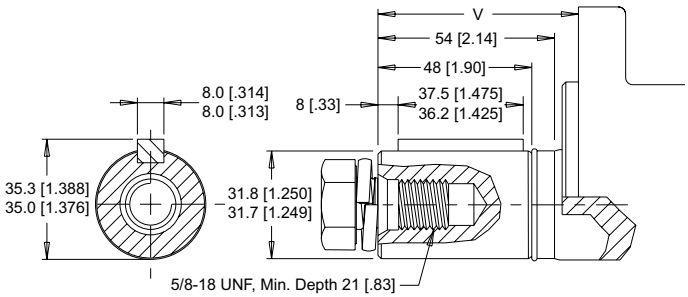
12 25mm Straight



Max. Torque: 678 Nm [6000 lb-in]

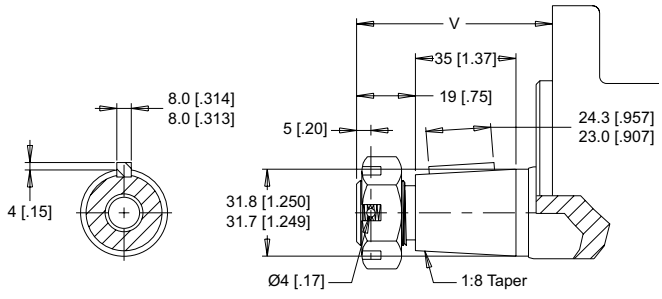
07 1-1/4” Straight Extended

20 1-1/4” Straight



Max. Torque: 882 Nm [7804 lb-in]

22 1-1/4” Tapered

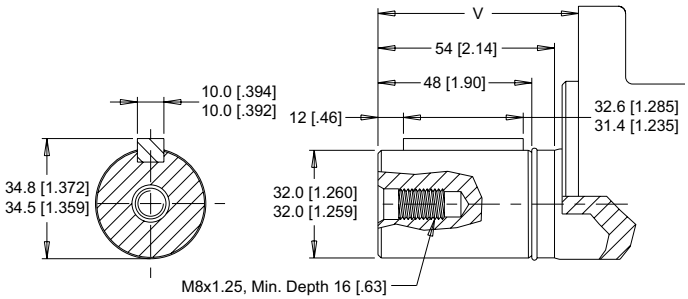


▶ A slotted hex nut is standard on this shaft.

Max. Torque: 882 Nm [7804 lb-in]

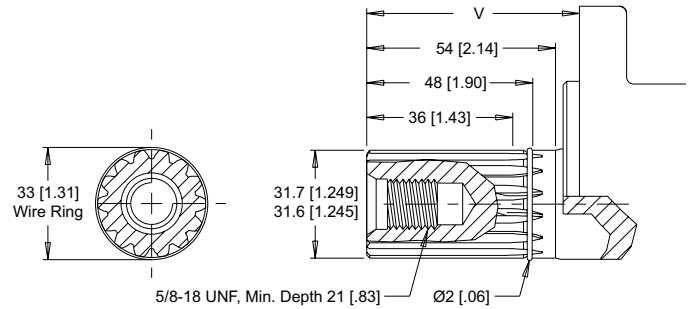
08 32mm Straight Extended

21 32mm Straight



Max. Torque: 882 Nm [7804 lb-in]

23 14 Tooth Spline



Max. Torque: 882 Nm [7804 lb-in]

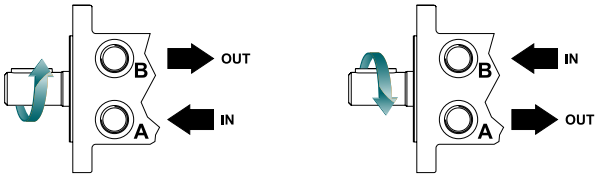
▶ Dimension V is charted on page 46.

ORDERING INFORMATION

1			2			3a		3b		4		5	6	7	8

1. CHOOSE SERIES DESIGNATION

300	Standard Motor



▶ The 300 series is bi-directional.

2. SELECT A DISPLACEMENT OPTION

050	52 cm^3/rev	[3.2 in^3/rev]	**160**	164 cm^3/rev	[10.0 in^3/rev]
080	76 cm^3/rev	[4.6 in^3/rev]	**200**	205 cm^3/rev	[12.5 in^3/rev]
090	89 cm^3/rev	[5.4 in^3/rev]	**250**	254 cm^3/rev	[15.5 in^3/rev]
110	111 cm^3/rev	[6.8 in^3/rev]	**300**	293 cm^3/rev	[17.9 in^3/rev]
125	127 cm^3/rev	[7.7 in^3/rev]	**400**	409 cm^3/rev	[24.9 in^3/rev]

3a. SELECT MOUNT TYPE

▼ **END MOUNTS**

A0	2-Hole, SAE A Mount
A2	4-Hole, Magneto Mount
A4	6-Hole, SAE A Mount
B0	2-Hole, SAE B Mount
F2	4-Hole, Square Mount
W2	4-Hole, Wheel Mount

▼ **SIDE MOUNTS**

A7	2-Hole, SAE A Mount
A8	4-Hole, Magneto Mount
A9	6-Hole, SAE A Mount
B7	2-Hole, SAE B Mount
F8	4-Hole, Square Mount
W8	4-Hole, Wheel Mount

3b. SELECT PORT SIZE

▼ **END PORT OPTIONS**

1	7/8-14 UNF Aligned
2	G 1/2 Aligned

▼ **SIDE PORT OPTIONS**

1	7/8-14 UNF, Offset
2	G 1/2, Offset
3	G 1/2, Offset Manifold
5	9/16-18 UNF Offset
6	1 1/16-12 UN, 180° Opposed
7	G 1/2, 180° Opposed

▶ Speed sensor option is not available on wheel mounts.

4. SELECT A SHAFT OPTION

01	7/8” 13 Tooth Spline	**15**	1” Straight Extended
02	1” 6B Spline	**20**	1-1/4” Straight
07	1-1/4” Straight Extended	**21**	32mm Straight
08	32mm Straight Extended	**22**	1-1/4” Tapered
10	1” Straight	**23**	14 Tooth Spline
12	25mm Straight		

▶ The 07, 08 & 15 extended shafts are designed for use with one of the speed sensor options listed in STEP 7.

5. SELECT A PAINT OPTION

A	Black
B	Black, Unpainted Mounting Surface
Z	No Paint

6. SELECT A VALVE CAVITY / CARTRIDGE OPTION

A	None	**F**	121 bar [1750 psi] Relief
B	Valve Cavity Only	**G**	138 bar [2000 psi] Relief
C	69 bar [1000 psi] Relief	**J**	173 bar [2500 psi] Relief
D	86 bar [1250 psi] Relief	**L**	207 bar [3000 psi] Relief
E	104 bar [1500 psi] Relief		

▶ Valve cavity is only available on side ports 1, 2 & 5 and end ports 1 & 2.

7. SELECT AN ADD-ON OPTION

A	Standard
B	Lock Nut
C	Solid Hex Nut
W	Speed Sensor, Dual, 4-Pin Male Weatherpack Connector
X	Speed Sensor, Dual, 4-Pin M12 Male Connector
Y	Speed Sensor, Single, 3-Pin Male Weatherpack Connector
Z	Speed Sensor, Single, 4-Pin M12 Male Connector

8. SELECT A MISCELLANEOUS OPTION

AA	None
AB	Internal Drain
AC	Freeturning Rotor
AD	Internal Drain & Freeturning Rotor

OVERVIEW

The combination of compact size, light weight and low speed efficiency make the CE motor the best wheel drive motor available. To reduce overall motor length and weight, all unnecessary material was removed from the housing and the valve was placed in the face of the rotor. The pressure-compensated balance plate allows the motor to maintain high volumetric efficiences at startup and high mechanical efficiencies during running conditions. All of these features unite to make the CE Series motor 10-25% lighter and more compact than competitive designs, making it perfect for applications with strict weight and size requirements.

FEATURES / BENEFITS

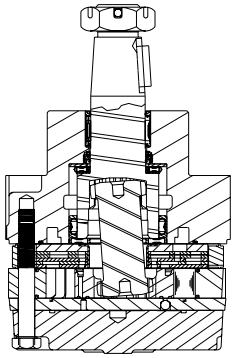
- Needle Roller Bearing is in optimum location to allow load to be placed as close to center line of bearing as possible.
- Three Bearing Options allow load carrying capability of motor to be matched to application.
- Valve-In-Rotor Design provides cost effective, efficient distribution of oil and reduces overall motor length.
- Pressure-Compensated Balance Plate improves volumetric efficiency at low flows and high pressure.

TYPICAL APPLICATIONS

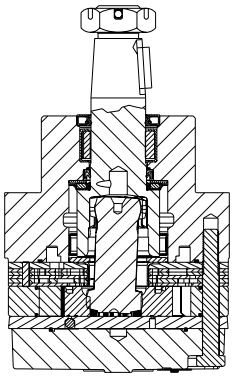
Medium-duty wheel drives, grapple heads, feed rollers, broom drives and more

SERIES DESCRIPTIONS

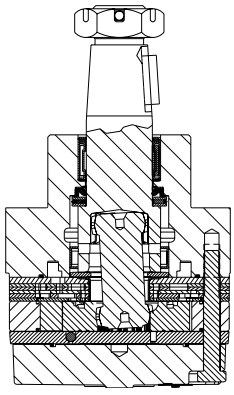
400/401 - Hydraulic Motor
Standard



420/421 - Hydraulic Motor
With Medium Duty Bearing



430/431 - Hydraulic Motor
With Heavy Duty Bearing



SPECIFICATIONS

CODE	Displacement cm^3 [in^3/rev]	Max. Speed rpm		Max. Flow lpm [gpm]		Max. Torque Nm [lb-in]		Max. Pressure bar [psi]		
		cont.	inter.	cont.	inter.	cont.	inter.	cont.	inter.	peak
120	121 [7.4]	360	490	45 [12]	61 [16]	322 [2850]	356 [3150]	207 [3000]	224 [3250]	241 [3500]
160	162 [9.9]	370	470	61 [16]	76 [20]	424 [3750]	501 [4430]	207 [3000]	224 [3250]	241 [3500]
200	204 [12.4]	300	370	61 [16]	76 [20]	525 [4650]	593 [5250]	207 [3000]	224 [3250]	241 [3500]
230	232 [14.2]	260	320	61 [16]	76 [20]	559 [4950]	646 [5720]	207 [3000]	224 [3250]	241 [3500]
260	261 [15.9]	260	350	68 [18]	91 [24]	706 [6250]	760 [6730]	207 [3000]	224 [3250]	241 [3500]
300	300 [18.3]	250	320	76 [20]	95 [25]	802 [7100]	862 [7630]	207 [3000]	224 [3250]	241 [3500]
350	348 [21.2]	220	270	76 [20]	95 [25]	904 [8000]	1017 [9000]	207 [3000]	224 [3250]	241 [3500]
375	375 [22.8]	200	250	76 [20]	95 [25]	972 [8600]	1040 [9200]	207 [3000]	224 [3250]	241 [3500]
470	465 [28.3]	160	200	76 [20]	95 [25]	1040 [9200]	1153 [10200]	172 [2500]	189 [2750]	207 [3000]
540	536 [32.7]	140	170	76 [20]	95 [25]	1003 [8875]	1209 [10700]	138 [2000]	172 [2500]	207 [3000]
750	748 [45.6]	100	130	76 [20]	95 [25]	1082 [9575]	1237 [10950]	103 [1500]	121 [1750]	138 [2000]

▶ Performance data is typical. Performance of production units varies slightly from one motor to another. Running at intermittent ratings should not exceed 10% of every minute of operation.

DISPLACEMENT PERFORMANCE

120

121 cm³ [7.4 in³] / rev

Flow - lpm [gpm]	Pressure - bar [psi] 17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	Max. Cont. 207 [3000]	Peak 241 [3500]	Theoretical rpm
	Torque - Nm [lb-in], **Speed rpm**						**Intermittent Ratings -** 10% of Operation		
2 [0.5]	21 [184] **14**	47 [418] **13**	84 [745] **10**	114 [1008] **7**					16
4 [1]	26 [226] **26**	52 [459] **26**	109 [969] **23**	157 [1387] **21**	203 [1793] **18**	260 [2305] **13**	290 [2566] **10**	281 [2490] **7**	32
8 [2]		52 [456] **58**	110 [977] **56**	161 [1424] **51**	208 [1845] **47**	269 [2382] **33**	310 [2746] **29**	347 [3066] **25**	63
15 [4]		48 [422] **119**	110 [975] **112**	169 [1497] **103**	225 [1992] **95**	271 [2399] **91**	327 [2896] **83**	369 [3269] **82**	125
23 [6]		46 [409] **187**	106 [934] **182**	158 [1402] **177**	204 [1803] **173**	248 [2199] **168**	297 [2630] **160**	372 [3290] **143**	188
30 [8]			99 [876] **248**	157 [1389] **244**	207 [1829] **240**	253 [2241] **233**	323 [2857] **205**	371 [3282] **201**	250
38 [10]			96 [853] **306**	156 [1379] **298**	207 [1834] **293**	257 [2278] **286**	297 [2633] **279**	359 [3178] **269**	313
45 [12]			85 [749] **371**	151 [1337] **360**	206 [1823] **352**	256 [2267] **345**	305 [2695] **341**	344 [3042] **335**	375
53 [14]			77 [684] **437**	137 [1215] **428**	197 [1745] **418**	251 [2222] **409**	296 [2618] **404**		438
61 [16]			71 [633] **499**	135 [1191] **490**	194 [1717] **482**	244 [2163] **467**	304 [2687] **454**		500

Max. Cont. / Max. Inter.

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width	Theoretical Torque - Nm [lb-in]							
13.8 [.542]	33 [295]	67 [589]	133 [1178]	200 [1768]	266 [2357]	333 [2946]	399 [3535]	466 [4124]

mm [in]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

160

162 cm³ [9.9 in³] / rev

Flow - lpm [gpm]	Pressure - bar [psi] 17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	Max. Cont. 207 [3000]	Peak 241 [3500]	Theoretical rpm
	Torque - Nm [lb-in], **Speed rpm**						**Intermittent Ratings -** 10% of Operation		
2 [0.5]	32 [287] **11**	72 [634] **11**	152 [1341] **10**	215 [1906] **9**	282 [2493] **8**	326 [2888] **6**	366 [3238] **4**	412 [3643] **1**	12
4 [1]	36 [318] **22**	78 [690] **21**	145 [1287] **20**	225 [1991] **19**	290 [2567] **16**	346 [3060] **14**	366 [3236] **8**	416 [3680] **7**	24
8 [2]	33 [296] **45**	73 [649] **44**	145 [1287] **43**	227 [2010] **40**	292 [2586] **36**	357 [3156] **33**	413 [3654] **31**	464 [4108] **28**	47
15 [4]	44 [386] **92**	71 [630] **91**	146 [1296] **88**	226 [2000] **86**	299 [2646] **79**	364 [3226] **74**	426 [3768] **71**	485 [4289] **66**	94
23 [6]		70 [623] **133**	146 [1294] **131**	225 [1991] **128**	296 [2617] **122**	365 [3232] **117**	428 [3786] **115**	492 [4352] **111**	140
30 [8]		66 [583] **181**	141 [1251] **177**	216 [1916] **175**	286 [2533] **171**	350 [3102] **165**	414 [3663] **159**	476 [4210] **152**	187
38 [10]		61 [537] **224**	138 [1224] **223**	212 [1873] **219**	282 [2497] **213**	347 [3072] **211**	411 [3641] **204**	473 [4183] **196**	234
45 [12]		56 [495] **272**	130 [1150] **265**	207 [1829] **264**	279 [2465] **262**	344 [3046] **256**	407 [3603] **249**	470 [4157] **242**	280
53 [14]			123 [1088] **318**	196 [1737] **313**	269 [2384] **306**	332 [2939] **297**	400 [3540] **295**	464 [4111] **284**	327
61 [16]			114 [1010] **362**	187 [1659] **356**	263 [2327] **351**	329 [2910] **344**	395 [3499] **334**	458 [4053] **330**	374
68 [18]			102 [903] **410**	180 [1593] **407**	250 [2209] **401**	319 [2822] **385**	389 [3438] **382**		420
76 [20]			96 [846] **455**	174 [1536] **448**	248 [2193] **438**	316 [2798] **430**	379 [3353] **423**		467

Max. Cont. / Max. Inter.

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width	Theoretical Torque - Nm [lb-in]							
13.8 [.542]	45 [394]	89 [788]	178 [1576]	267 [2365]	356 [3153]	445 [3941]	534 [4729]	623 [5518]

mm [in]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

► Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

DISPLACEMENT PERFORMANCE

200

204 cm³ [12.4 in³] / rev

Flow - lpm [gpm]	Pressure - bar [psi] 17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	Max. Cont. 207 [3000]	Peak 241 [3500]	Theoretical rpm
	Torque - Nm [lb-in], **Speed rpm**						**Intermittent Ratings -** 10% of Operation		
2 [0.5]	40 [358] **8**	92 [817] **8**	180 [1596] **8**	269 [2378] **7**	348 [3083] **6**				10
4 [1]	46 [409] **17**	89 [787] **15**	180 [1597] **15**	276 [2440] **12**	359 [3177] **11**	427 [3782] **9**	489 [4328] **8**		19
8 [2]	45 [395] **36**	91 [807] **34**	190 [1684] **32**	284 [2509] **31**	369 [3268] **28**	451 [3989] **25**	523 [4630] **23**	586 [5189] **19**	38
15 [4]	40 [358] **73**	92 [817] **72**	188 [1662] **69**	284 [2492] **67**	373 [3303] **63**	453 [4006] **60**	530 [4693] **56**	607 [5371] **51**	75
23 [6]		86 [760] **111**	181 [1600] **107**	278 [2457] **104**	365 [3228] **100**	451 [3989] **95**	524 [4636] **90**	605 [5353] **85**	112
30 [8]		75 [663] **148**	174 [1539] **145**	267 [2363] **142**	359 [3176] **137**	441 [3905] **132**	518 [4584] **125**	597 [5286] **120**	150
38 [10]		62 [549] **185**	162 [1430] **184**	257 [2272] **181**	347 [3072] **177**	429 [3798] **171**	507 [4488] **164**	587 [5198] **157**	187
45 [12]			146 [1290] **222**	244 [2159] **217**	339 [2996] **213**	429 [3798] **204**	506 [4476] **198**	583 [5161] **193**	224
53 [14]			129 [1145] **259**	227 [2005] **256**	328 [2905] **250**	410 [3628] **244**	492 [4354] **236**	571 [5049] **226**	261
Max. Cont. 61 [16]			112 [994] **298**	208 [1842] **297**	316 [2795] **284**	399 [3534] **281**	484 [4285] **273**	562 [4971] **266**	299
68 [18]			90 [799] **334**	207 [1833] **330**	304 [2689] **327**	395 [3493] **320**	481 [4260] **316**		336
Max. Inter. 76 [20]			75 [665] **366**	178 [1576] **365**	282 [2495] **361**	372 [3288] **361**	465 [4115] **351**		373

Overall Efficiency - 70 - 100% □ 40 - 69% ▒ 0 - 39% ■

Rotor Width	Theoretical Torque - Nm [lb-in]							
17.3 [.682] mm [in]	56 [494]	112 [987]	223 [1975]	335 [2962]	446 [3949]	558 [4936]	669 [5924]	781 [6911]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

230

233 cm³ [14.2 in³] / rev

Flow - lpm [gpm]	Pressure - bar [psi] 17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	Max. Cont. 207 [3000]	Peak 241 [3500]	Theoretical rpm
	Torque - Nm [lb-in], **Speed rpm**						**Intermittent Ratings -** 10% of Operation		
2 [0.5]	46 [406] **7**	98 [866] **7**	209 [1849] **6**	300 [2659] **5**	380 [3367] **2**				9
4 [1]	49 [435] **14**	105 [925] **13**	215 [1903] **12**	321 [2839] **11**	413 [3651] **8**	488 [4315] **6**	543 [4808] **3**		17
8 [2]	50 [438] **30**	107 [945] **28**	221 [1954] **26**	329 [2909] **26**	430 [3803] **22**	520 [4599] **18**	594 [5260] **13**	662 [5856] **9**	33
15 [4]	45 [401] **62**	102 [900] **61**	214 [1895] **59**	325 [2872] **57**	426 [3773] **53**	522 [4623] **47**	610 [5395] **41**	683 [6045] **34**	66
23 [6]	39 [342] **96**	92 [812] **96**	203 [1801] **93**	317 [2808] **91**	412 [3645] **87**	486 [4304] **80**	560 [4953] **72**	642 [5678] **66**	98
30 [8]		84 [743] **128**	197 [1739] **125**	304 [2691] **122**	410 [3627] **119**	506 [4479] **112**	600 [5313] **103**	647 [5728] **95**	131
38 [10]		72 [634] **162**	186 [1650] **159**	292 [2585] **156**	402 [3556] **153**	493 [4363] **146**	584 [5169] **136**	634 [5613] **126**	163
45 [12]			167 [1477] **192**	282 [2494] **191**	393 [3479] **185**	491 [4349] **178**	576 [5094] **167**	658 [5822] **155**	196
53 [14]			152 [1343] **225**	260 [2301] **225**	374 [3310] **220**	470 [4160] **208**	555 [4910] **201**	657 [5818] **186**	228
Max. Cont. 61 [16]			135 [1198] **259**	250 [2209] **259**	362 [3207] **253**	464 [4110] **244**	553 [4895] **232**	637 [5637] **220**	261
68 [18]			115 [1021] **291**	231 [2044] **289**	344 [3042] **286**	447 [3956] **279**	540 [4777] **266**		293
Max. Inter. 76 [20]			93 [822] **325**	210 [1859] **323**	327 [2898] **319**	432 [3825] **311**	529 [4677] **299**		326

Overall Efficiency - 70 - 100% □ 40 - 69% ▒ 0 - 39% ■

Rotor Width	Theoretical Torque - Nm [lb-in]							
19.7 [.777] mm [in]	64 [565]	128 [1131]	256 [2261]	383 [3392]	511 [4522]	639 [5653]	767 [6783]	894 [7914]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

► Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

DISPLACEMENT PERFORMANCE

260

261 cm³ [15.9 in³] / rev

Flow - lpm [gpm]	Pressure - bar [psi] 17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	Max. Cont. 207 [3000]	Peak 241 [3500]	Theoretical rpm
	Torque - Nm [lb-in], **Speed rpm**						**Intermittent Ratings -** 10% of Operation		
2 [0.5]	58 [514] **6**	127 [1120] **5**	242 [2140] **4**	347 [3068] **3**	425 [3759] **1**				8
4 [1]	62 [547] **12**	124 [1097] **10**	248 [2191] **9**	354 [3133] **8**	446 [3950] **6**	495 [4377] **2**			15
8 [2]	61 [543] **26**	130 [1150] **23**	249 [2200] **20**	372 [3295] **20**	478 [4234] **17**	562 [4972] **13**	633 [5599] **7**		30
15 [4]	61 [536] **54**	125 [1109] **51**	258 [2284] **48**	377 [3339] **46**	501 [4436] **42**	600 [5306] **36**	700 [6192] **30**	781 [6915] **21**	59
23 [6]	57 [500] **84**	121 [1067] **81**	245 [2169] **74**	376 [3326] **74**	498 [4406] **69**	609 [5391] **60**	713 [6309] **53**	815 [7214] **45**	88
30 [8]		111 [981] **113**	242 [2143] **107**	369 [3268] **105**	489 [4327] **100**	607 [5374] **89**	711 [6290] **81**	810 [7167] **71**	117
38 [10]		103 [909] **142**	230 [2034] **137**	357 [3161] **134**	483 [4273] **128**	595 [5267] **119**	700 [6198] **109**	762 [6740] **98**	146
45 [12]		87 [771] **173**	216 [1915] **169**	345 [3057] **166**	452 [4002] **161**	578 [5111] **152**	645 [5708] **143**	741 [6557] **129**	175
53 [14]		75 [664] **203**	202 [1786] **201**	331 [2928] **195**	434 [3841] **191**	553 [4897] **183**	657 [5811] **170**	759 [6718] **157**	204
61 [16]		61 [538] **232**	191 [1687] **131**	313 [2769] **226**	435 [3847] **220**	553 [4892] **210**	656 [5803] **199**	746 [6601] **189**	233
68 [18] Max. Cont.			168 [1486] **258**	295 [2614] **255**	414 [3664] **248**	526 [4652] **242**	638 [5642] **229**	742 [6567] **215**	262
76 [20]			152 [1345] **287**	277 [1455] **286**	403 [3570] **281**	520 [4598] **271**	631 [5585] **257**		291
83 [22]			129 [1143] **319**	249 [2208] **319**	381 [3372] **312**	493 [4365] **299**	620 [5489] **287**		320
91 [24] Max. Inter.			104 [924] **348**	233 [2063] **346**	358 [3166] **335**	471 [4168] **333**	551 [4875] **332**		349

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width	Theoretical Torque - Nm [lb-in] 72 [633]	143 [1266]	286 [2532]	429 [3798]	572 [5064]	715 [6330]	858 [7596]	1001 [8861]
22.1 [.872] mm [in]	Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]							

300

300 cm³ [18.3 in³] / rev

Flow - lpm [gpm]	Pressure - bar [psi] 17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	Max. Cont. 207 [3000]	Peak 241 [3500]	Theoretical rpm
	Torque - Nm [lb-in], **Speed rpm**						**Intermittent Ratings -** 10% of Operation		
2 [0.5]	63 [559] **5**	136 [1202] **4**	285 [2518] **3**	413 [3656] **3**	513 [4537] **2**	580 [5129] **1**			7
4 [1]	56 [493] **12**	139 [1230] **10**	272 [2410] **10**	386 [3418] **8**	483 [4272] **6**	546 [4834] **4**			13
8 [2]	59 [522] **23**	134 [1185] **21**	302 [2676] **19**	427 [3781] **19**	521 [4611] **16**	587 [5196] **14**	673 [5952] **10**	743 [6572] **5**	26
15 [4]	57 [503] **47**	134 [1189] **44**	296 [2620] **40**	407 [3602] **38**	497 [4398] **37**	602 [5324] **34**	696 [6161] **29**	774 [6852] **23**	51
23 [6]	50 [447] **73**	125 [1109] **70**	286 [2534] **64**	439 [3886] **62**	559 [4946] **61**	677 [5992] **55**	789 [6978] **48**	877 [7762] **43**	76
30 [8]		111 [986] **97**	279 [2468] **93**	424 [3752] **92**	567 [5020] **86**	685 [6059] **77**	807 [7142] **72**	920 [8139] **64**	101
38 [10]		96 [853] **126**	261 [2306] **121**	417 [3687] **118**	532 [4712] **112**	659 [5832] **104**	805 [7121] **95**	903 [7994] **86**	127
45 [12]		78 [689] **150**	228 [2013] **149**	367 [3252] **146**	501 [4434] **140**	643 [5694] **130**	766 [6781] **121**	890 [7875] **109**	152
53 [14]		59 [525] **176**	213 [1889] **174**	385 [3410] **171**	495 [4383] **166**	623 [5509] **155**	748 [6618] **143**	812 [7186] **136**	177
61 [16]			181 [1603] **200**	349 [3085] **196**	474 [4195] **194**	620 [5484] **181**	731 [6471] **172**	850 [7519] **157**	202
68 [18]			159 [1405] **227**	319 [2823] **225**	479 [4241] **219**	578 [5112] **212**	718 [6356] **196**	830 [7348] **186**	228
76 [20] Max. Cont.			126 [1115] **252**	289 [2560] **251**	418 [3703] **248**	561 [4962] **240**	703 [6221] **225**	811 [7180] **207**	253
83 [22]			104 [919] **277**	261 [2309] **276**	390 [3454] **274**	555 [4907] **263**	679 [6011] **252**		278
91 [24]			67 [590] **302**	218 [1925] **301**	389 [3441] **299**	530 [4686] **293**	652 [5766] **282**		303
95 [25] Max. Inter.			56 [496] **314**	197 [1740] **313**	364 [3225] **310**	484 [4281] **309**	632 [5594] **298**		316

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width	Theoretical Torque - Nm [lb-in] 82 [729]	165 [1457]	329 [2914]	494 [4371]	659 [5828]	823 [7285]	988 [8742]	1152 [10199]
25.4 [1.000] mm [in]	Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]							

► Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

DISPLACEMENT PERFORMANCE

350

348 cm³ [21.2 in³] / rev

Pressure - bar [psi]

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	241 [3500] Peak

Torque - Nm [lb-in], **Speed rpm**

Intermittent Ratings - 10% of Operation

Flow - lpm [gpm]	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	241 [3500]	Theoretical rpm
2 [0.5]	70 [617] **5**	147 [1297] **5**	269 [2383] **4**						6
4 [1]	73 [649] **10**	149 [1318] **10**	291 [2580] **10**	412 [3647] **9**					11
8 [2]	76 [670] **21**	159 [1403] **21**	313 [2767] **21**	453 [4007] **20**	557 [4927] **18**	668 [5915] **16**	782 [6919] **13**		22
15 [4]	69 [609] **43**	159 [1409] **42**	324 [2868] **42**	463 [4101] **40**	596 [5273] **37**	714 [6316] **36**	820 [7261] **32**	927 [8204] **25**	44
23 [6]	62 [544] **65**	149 [1319] **65**	321 [2837] **64**	478 [4228] **31**	606 [5363] **57**	736 [6514] **53**	845 [7475] **52**	950 [8410] **43**	66
30 [8]	45 [395] **87**	128 [1134] **86**	304 [2693] **85**	467 [4134] **84**	622 [5502] **80**	776 [6870] **75**	906 [8022] **67**	987 [8734] **61**	88
38 [10]		109 [962] **108**	288 [2550] **107**	455 [4027] **106**	621 [5500] **100**	754 [6670] **94**	907 [8028] **85**	1029 [9105] **77**	109
45 [12]		94 [833] **130**	268 [2376] **129**	439 [3889] **128**	588 [5205] **124**	758 [6712] **115**	901 [7970] **104**	1031 [9120] **94**	131
53 [14]		65 [575] **152**	244 [2162] **151**	409 [3619] **150**	572 [5059] **148**	727 [6433] **137**	879 [7777] **127**	1025 [9070] **117**	153
61 [16]			220 [1947] **174**	385 [3406] **173**	549 [4855] **171**	697 [6172] **163**	855 [7570] **152**	1000 [8853] **139**	175
68 [18]			186 [1644] **196**	361 [3195] **194**	520 [4599] **192**	685 [6062] **187**	825 [7297] **177**	967 [8555] **165**	197
Max. Cont. 76 [20]			147 [1301] **216**	324 [2863] **213**	483 [4275] **212**	637 [5634] **209**	790 [6993] **194**	944 [8357] **183**	218
83 [22]			109 [960] **239**	289 [2560] **237**	443 [3921] **234**	605 [5357] **232**	770 [6814] **223**		240
91 [24]			77 [684] **261**	251 [2225] **258**	431 [3814] **257**	588 [5207] **256**	733 [6488] **248**		262
Max. Inter. 95 [25]			56 [493] **272**	226 [2004] **270**	409 [3621] **264**	570 [5048] **261**	727 [6435] **259**		273

Overall Efficiency - 70 - 100% 40 - 69% 0 - 39%

Rotor Width

39.4 [1.553] mm [in]

Theoretical Torque - Nm [lb-in]

95 [844]	191 [1688]	381 [3376]	572 [5064]	763 [6752]	954 [8439]	1144 [10127]	1335 [11815]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

375

375 cm³ [22.8 in³] / rev

Pressure - bar [psi]

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	241 [3500] Peak

Torque - Nm [lb-in], **Speed rpm**

Intermittent Ratings - 10% of Operation

Flow - lpm [gpm]	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	241 [3500]	Theoretical rpm
2 [0.5]	78 [687] **4**	162 [1438] **4**	321 [2840] **4**	447 [3958] **3**	592 [5237] **2**				6
4 [1]	78 [694] **9**	163 [1443] **8**	333 [2951] **8**	474 [4193] **7**	606 [5366] **6**	730 [6457] **4**			11
8 [2]	81 [721] **19**	169 [1495] **18**	339 [3001] **17**	485 [4288] **16**	625 [5533] **15**	756 [6692] **13**	851 [7532] **9**		21
15 [4]	74 [651] **39**	166 [1470] **38**	321 [2837] **36**	465 [4117] **36**	611 [5404] **33**	748 [6624] **29**	876 [7754] **26**	991 [8766] **25**	41
23 [6]	62 [547] **60**	155 [1372] **59**	341 [3015] **58**	515 [4557] **56**	670 [5931] **51**	785 [6946] **44**	884 [7825] **40**	1005 [8896] **43**	61
30 [8]	47 [412] **81**	138 [1223] **80**	320 [2836] **77**	503 [4453] **76**	664 [5880] **71**	834 [7385] **63**	976 [8633] **55**	1067 [9442] **61**	82
38 [10]		118 [1048] **101**	303 [2684] **99**	495 [4382] **97**	647 [5726] **92**	801 [7090] **83**	922 [8161] **74**	1058 [9364] **77**	102
45 [12]		98 [870] **121**	288 [2547] **119**	469 [4147] **117**	635 [5620] **112**	804 [7115] **107**	972 [8605] **93**	1121 [9920] **94**	122
53 [14]		71 [625] **141**	261 [2308] **140**	435 [3849] **139**	603 [5337] **135**	786 [6953] **126**	938 [8298] **114**	1104 [9771] **117**	142
61 [16]		55 [487] **162**	241 [2134] **161**	423 [3744] **160**	593 [5248] **155**	758 [6706] **147**	922 [8160] **135**	1086 [9614] **139**	163
68 [18]			204 [1805] **182**	391 [3461] **181**	564 [4988] **177**	723 [6402] **168**	893 [7899] **164**	1053 [9320] **165**	183
Max. Cont. 76 [20]			219 [1942] **201**	365 [3231] **200**	533 [4714] **198**	662 [5860] **193**	864 [7643] **178**	1030 [9112] **183**	203
83 [22]			132 [1173] **222**	316 [2795] **220**	514 [4552] **219**	675 [5970] **210**	807 [7141] **203**		223
91 [24]			100 [881] **243**	290 [2567] **242**	475 [4202] **241**	640 [5667] **232**	792 [7012] **220**		244
Max. Inter. 95 [25]			80 [711] **253**	261 [2313] **251**	465 [4113] **250**	616 [5454] **242**	779 [6891] **235**		254

Overall Efficiency - 70 - 100% 40 - 69% 0 - 39%

Rotor Width

31.8 [1.252] mm [in]

Theoretical Torque - Nm [lb-in]

103 [908]	205 [1815]	410 [3631]	615 [5446]	821 [7261]	1026 [9076]	1231 [10892]	1436 [12707]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

► Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

DISPLACEMENT PERFORMANCE

470

465 cm³ [28.3 in³] / rev

Pressure - bar [psi]

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	Max. Cont. 173 [2500]	Peak 207 [3000]

Intermittent Ratings - 10% of Operation

Torque - Nm [lb-in], **Speed rpm**

Flow - lpm [gpm]								Theoretical rpm
	2 [0.5]	99 [878] **4**	210 [1862] **3**	420 [3713] **3**				5
	4 [1]	102 [899] **8**	210 [1856] **7**	424 [3748] **7**	597 [5285] **7**	774 [6847] **6**		9
	8 [2]	102 [906] **16**	222 [1968] **15**	438 [3875] **15**	620 [5488] **14**	782 [6922] **13**	957 [8470] **11**	1106 [9788] **9**	17
	15 [4]	95 [836] **32**	208 [1837] **31**	407 [3600] **30**	605 [5351] **28**	782 [6922] **25**	961 [8504] **23**	1143 [10118] **20**	33
	23 [6]	79 [700] **48**	196 [1736] **48**	426 [3772] **46**	620 [5483] **44**	814 [7204] **41**	969 [8580] **36**	1149 [10172] **31**	49
	30 [8]	61 [544] **65**	179 [1588] **65**	411 [3638] **63**	630 [5578] **61**	847 [7498] **57**	1046 [9253] **48**	1191 [10541] **44**	66
	38 [10]	40 [352] **81**	159 [1405] **80**	387 [3429] **80**	618 [5471] **77**	825 [7301] **73**	1036 [9167] **67**	1245 [11019] **55**	82
	45 [12]		125 [1105] **97**	367 [3245] **96**	587 [5197] **94**	800 [7076] **90**	1005 [8891] **82**	1232 [10898] **72**	98
	53 [14]		103 [912] **113**	340 [3007] **113**	572 [5066] **111**	767 [6787] **106**	985 [8720] **100**	1208 [10688] **91**	115
	61 [16]		63 [557] **130**	306 [2712] **129**	527 [4662] **128**	744 [6581] **124**	955 [8451] **116**	1162 [10285] **105**	131
	68 [18]			260 [2298] **146**	494 [4370] **145**	708 [6262] **142**	921 [8148] **135**	1149 [10169] **126**	147
Max. Cont.	76 [20]			219 [1941] **163**	456 [4035] **163**	673 [5954] **158**	883 [7815] **151**	1090 [9647] **140**	164
	83 [22]			174 [1542] **179**	417 [3687] **178**	634 [5612] **176**	847 [7496] **168**		180
	91 [24]			138 [1225] **195**	373 [3302] **194**	605 [5354] **193**	808 [7147] **186**		196
Max. Inter.	95 [25]				348 [3079] **204**	552 [4885] **203**	769 [6808] **197**		205

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width

39.4 [1.553] mm [in]

Theoretical Torque - Nm [lb-in]

127 [1127]	255 [2253]	509 [4506]	764 [6760]	1018 [9013]	1273 [11266]	1528 [13519]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

540

536 cm³ [32.7 in³] / rev

Pressure - bar [psi]

17 [250]	35 [500]	69 [1000]	104 [1500]	Max. Cont. 138 [2000]	Max. Inter 172 [2500]

Intermittent Ratings - 10% of Operation

Torque - Nm [lb-in], **Speed rpm**

Flow - lpm [gpm]								Theoretical rpm
	2 [0.5]	106 [940] **3**	230 [2035] **2**					4
	4 [1]	105 [927] **6**	223 [1975] **6**	455 [4023] **6**	655 [5797] **5**	868 [7684] **3**		8
	8 [2]	112 [991] **13**	237 [2100] **13**	488 [4321] **12**	719 [6358] **10**	911 [8065] **8**	1087 [9617] **3**	15
	15 [4]	107 [944] **27**	246 [2174] **26**	503 [4455] **25**	745 [6593] **24**	952 [8426] **21**	1131 [10005] **16**	29
	23 [6]	96 [854] **42**	230 [2033] **41**	516 [4571] **40**	756 [6686] **40**	1007 [8911] **36**	1233 [10911] **30**	43
	30 [8]	69 [613] **56**	208 [1843] **56**	476 [4214] **54**	760 [6724] **54**	993 [8787] **49**	1206 [10676] **42**	57
	38 [10]	59 [521] **70**	184 [1631] **70**	456 [4035] **69**	720 [6367] **67**	968 [8568] **64**	1223 [10821] **56**	71
	45 [12]	30 [264] **84**	155 [1376] **83**	418 [3702] **83**	688 [6089] **83**	926 [8195] **78**	1205 [10668] **69**	85
	53 [14]		123 [1089] **98**	391 [3456] **98**	630 [5576] **97**	892 [7896] **95**	1149 [10165] **88**	99
	61 [16]		90 [793] **113**	361 [3197] **113**	635 [5622] **112**	896 [7925] **109**	1137 [10061] **106**	114
	68 [18]		51 [452] **127**	328 [2901] **126**	592 [5238] **125**	862 [7632] **124**	1116 [9873] **118**	128
Max. Cont.	76 [20]			278 [2460] **141**	550 [4869] **140**	816 [7222] **140**	1076 [9526] **132**	142
	83 [22]			224 [1980] **154**	447 [3954] **153**	720 [6369] **151**		156
	91 [24]			180 [1590] **169**	449 [3971] **168**	754 [6673] **167**		170
Max. Inter.	95 [25]			153 [1358] **176**	426 [3768] **174**	689 [6095] **173**		177

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width

45.5 [1.791] mm [in]

Theoretical Torque - Nm [lb-in]

147 [1302]	294 [2604]	588 [5207]	883 [7811]	1177 [10414]	1471 [13018]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

► Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

DISPLACEMENT PERFORMANCE

750

748 cm³ [45.6 in³] / rev

Pressure - bar [psi] | Max. Cont. | Peak

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]

Intermittent Ratings - 10% of Operation

Torque - Nm [lb-in], **Speed rpm**

Flow - lpm [gpm]							Theoretical rpm
	2 [0.5]	108 [957] **2**	231 [2041] **1**				3
	4 [1]	174 [1540] **4**	340 [3010] **4**	651 [5760] **4**	950 [8408] **4**	1233 [10916] **3**	6
	8 [2]	166 [1467] **9**	367 [3246] **9**	695 [6154] **9**	1020 [9024] **9**	1302 [11518] **7**	11
	15 [4]	170 [1501] **19**	359 [3181] **19**	719 [6366] **19**	1086 [9607] **18**	1325 [11729] **16**	21
	23 [6]	167 [1477] **29**	344 [3048] **29**	699 [6190] **28**	1015 [8979] **27**	1346 [11916] **25**	31
	30 [8]	129 [1142] **40**	324 [2866] **39**	700 [6191] **38**	1053 [9316] **37**	1345 [11898] **35**	41
	38 [10]	111 [979] **50**	295 [2606] **49**	656 [5809] **48**	1039 [9191] **47**	1390 [12305] **44**	51
	45 [12]	69 [614] **60**	254 [2246] **59**	631 [5586] **58**	987 [8736] **57**	1365 [12079] **56**	61
	53 [14]	47 [413] **69**	227 [2009] **68**	591 [5232] **66**	957 [8469] **65**	1346 [11913] **64**	71
	61 [16]		198 [1756] **80**	555 [4909] **79**	931 [8243] **77**	1294 [11455] **74**	82
	68 [18]		136 [1203] **91**	517 [4571] **90**	879 [7778] **90**	1230 [10884] **87**	92
Max. Cont.	76 [20]		93 [827] **100**	453 [4010] **99**	820 [7257] **98**	1191 [10540] **97**	102
	83 [22]			409 [3620] **109**	786 [6958] **108**		112
	91 [24]			340 [3010] **120**	747 [6609] **119**		122
Max. Inter.	95 [25]			318 [2810] **126**	693 [6130] **125**		127

Overall Efficiency - 70 - 100% | 40 - 69% | 0 - 39%

Rotor Width	Theoretical Torque - Nm [lb-in]				
63.5 [2.501]	205 [1815]	410 [3631]	821 [7261]	1231 [10892]	1641 [14522]

mm [in]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

► Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

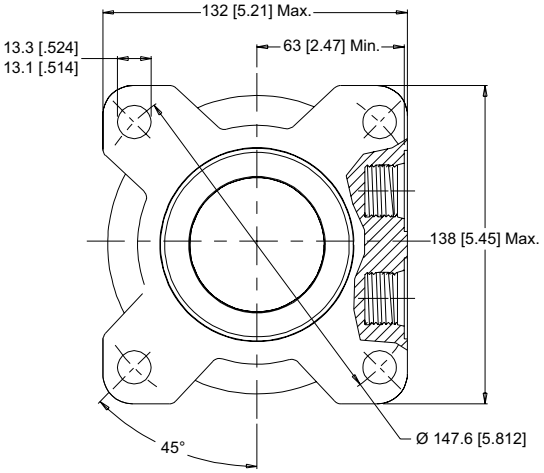
HOUSINGS

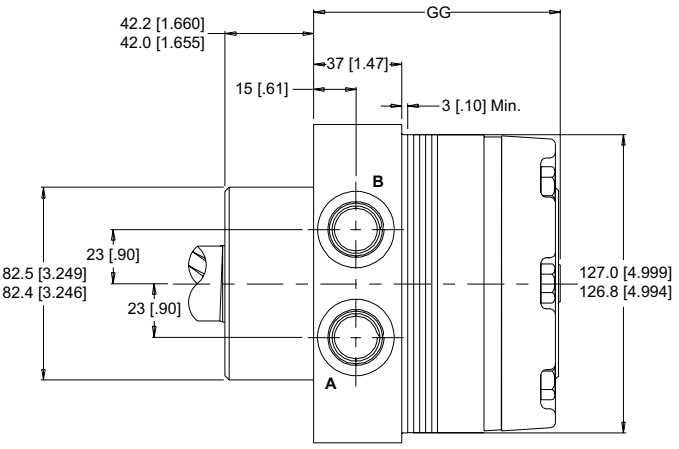
▶ Dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

4-HOLE, WHEEL MOUNT, ALIGNED PORTS

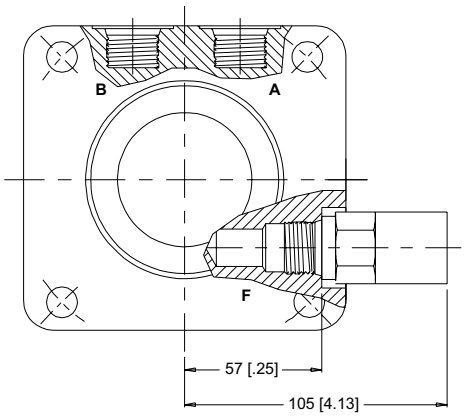
W31 7/8-14 UNF **W38** G 1/2

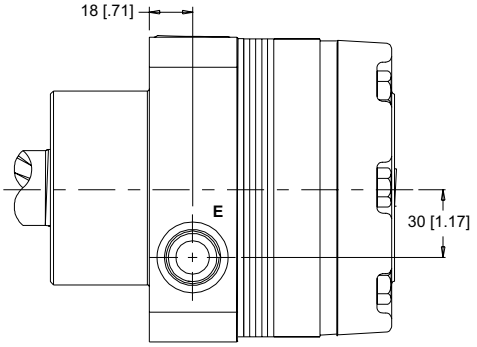
STANDARD





OPTIONAL VALVE CAVITY





E: 10 Series/2-Way Valve Cavity 7/8-14 UNF **F**: Valve Cartridge Installed

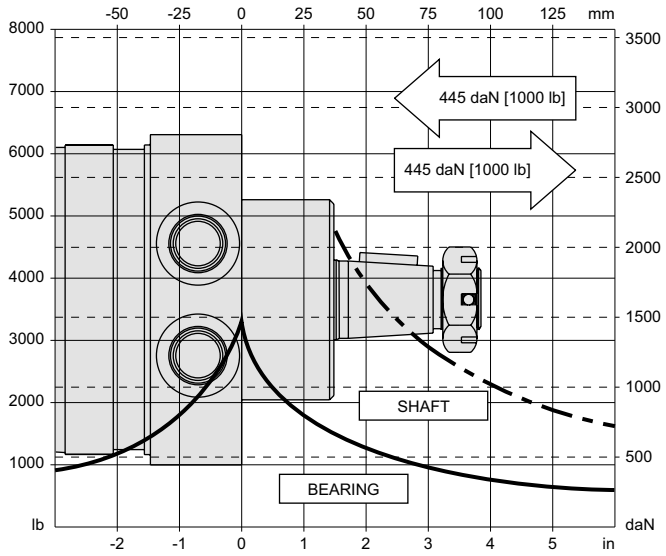
▶ Dimension GG is charted on page 59.

TECHNICAL INFORMATION

ALLOWABLE SHAFT LOAD / BEARING CURVE

The bearing curve represents allowable bearing loads based on ISO 281 bearing capacity for an L_{10} life of 2,000 hours at 100 rpm. Radial loads for speeds other than 100 rpm may be calculated using the multiplication factor table on page 8.

WHEEL MOUNTS



LENGTH & WEIGHT CHART

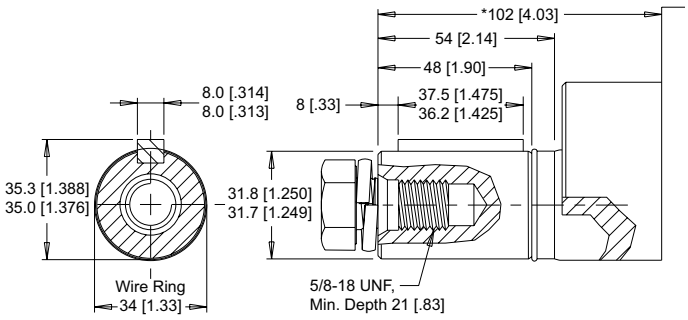
Dimension GG is the overall motor length from the rear of the motor to the mounting flange surface and is referenced on detailed housing drawings listed on pages 58, 61 & 64.

GG	Length	Weight
#	mm [in]	kg [lb]
120	99 [3.91]	10.9 [24.1]
160	99 [3.91]	10.9 [24.1]
200	103 [4.05]	11.3 [24.8]
230	105 [4.15]	11.4 [25.2]
260	108 [4.24]	11.6 [25.6]
300	111 [4.37]	11.9 [26.3]
350	125 [4.92]	13.1 [28.8]
375	117 [4.62]	12.4 [27.4]
470	125 [4.92]	13.1 [28.8]
540	131 [5.16]	13.6 [30.0]
750	149 [5.87]	15.0 [33.1]

▶ All CE series motor weights can vary ± 0.5 kg [1 lb] depending on model configurations such as housing, shaft, endcover, options etc.

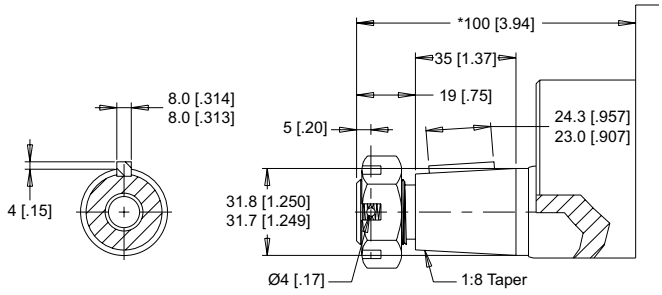
SHAFTS

20 1-1/4" Straight



Max. Torque: 1200 Nm [10600 lb-in]

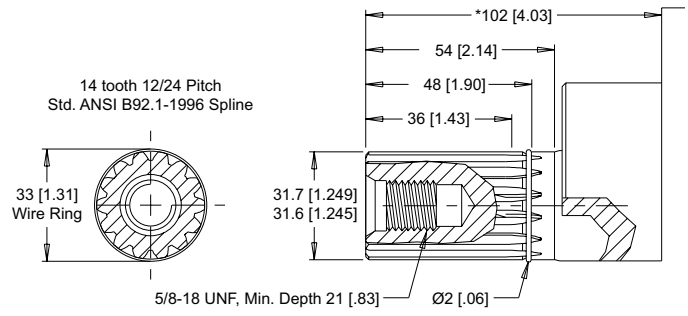
22 1-1/4" Tapered



▶ A slotted hex nut is standard on this shaft.

Max. Torque: 1200 Nm [10600 lb-in]

23 14 Tooth Spline



Max. Torque: 1200 Nm [10600 lb-in]

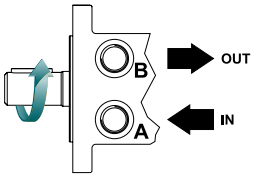
ORDERING INFORMATION

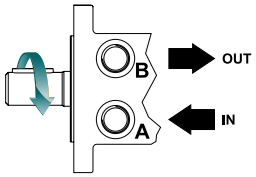
□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □

1 2 3 4 5 6 7 8

1. CHOOSE SERIES DESIGNATION

400	Standard Rotation
401	Reverse Rotation





▶ The 400 & 401 series are bi-directional. For applications requiring the motor to rotate in only one direction, shaft seal life may be prolonged by pressurizing the A port of the motor.

2. SELECT A DISPLACEMENT OPTION

120	121 cm^3/rev [7.4 in^3/rev]	**350**	348 cm^3/rev [21.2 in^3/rev]
160	162 cm^3/rev [9.9 in^3/rev]	**375**	375 cm^3/rev [22.8 in^3/rev]
200	204 cm^3/rev [12.4 in^3/rev]	**470**	465 cm^3/rev [28.3 in^3/rev]
230	232 cm^3/rev [14.2 in^3/rev]	**540**	536 cm^3/rev [32.7 in^3/rev]
260	261 cm^3/rev [15.9 in^3/rev]	**750**	748 cm^3/rev [45.6 in^3/rev]
300	300 cm^3/rev [18.3 in^3/rev]		

3. SELECT A MOUNT & PORT OPTION

W31	4-Hole, Wheel Mount, Aligned Ports, 7/8-14 UNF
W38	4-Hole, Wheel Mount, Aligned Ports, G 1/2

4. SELECT A SHAFT OPTION

20	1-1/4” Straight	**23**	14 Tooth Spline
22	1-1/4” Tapered		

5. SELECT A PAINT OPTION

A	Black
B	Black, Unpainted Mounting Surface
Z	No Paint

6. SELECT A VALVE CAVITY / CARTRIDGE OPTION

A	None	**E**	104 bar [1500 psi] Relief
B	Valve Cavity Only	**F**	121 bar [1750 psi] Relief
C	69 bar [1000 psi] Relief	**G**	138 bar [2000 psi] Relief
D	86 bar [1250 psi] Relief		

7. SELECT AN ADD-ON OPTION

A	Standard
B	Lock Nut
C	Solid Hex Nut

8. SELECT A MISCELLANEOUS OPTION

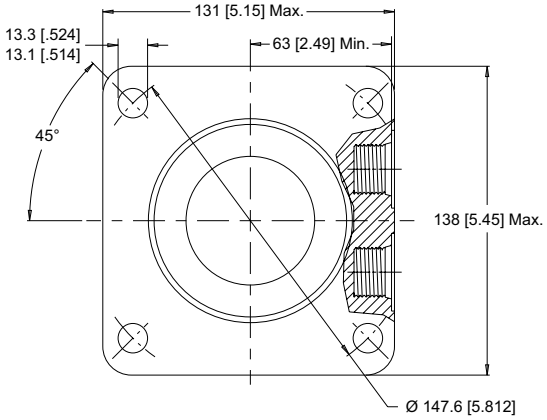
AA	None
AC	Freeturning Rotor
AE	Hydraulic Declutch With Freeturning Rotor

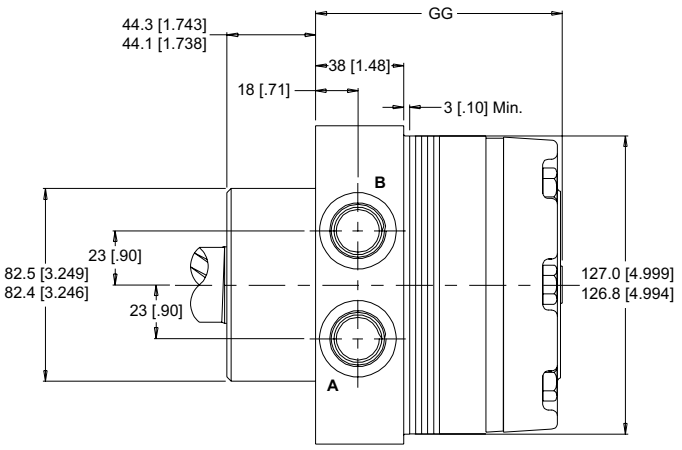
HOUSINGS

▶ Dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

4-HOLE, 3.25" PILOT WHEEL MOUNT, ALIGNED PORTS

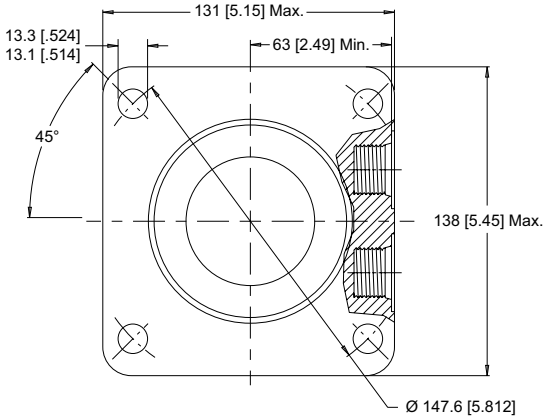
P31 7/8-14 UNF **P38** G 1/2

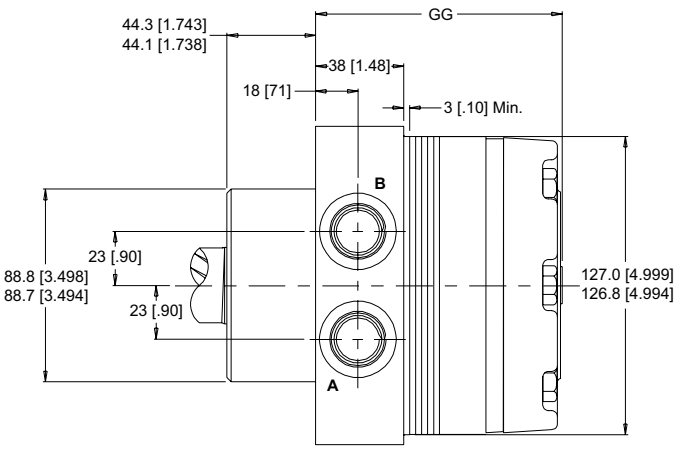




4-HOLE, 3.50" PILOT WHEEL MOUNT, ALIGNED PORTS

W31 7/8-14 UNF **W35** 9/16-18 UNF **W38** G 1/2





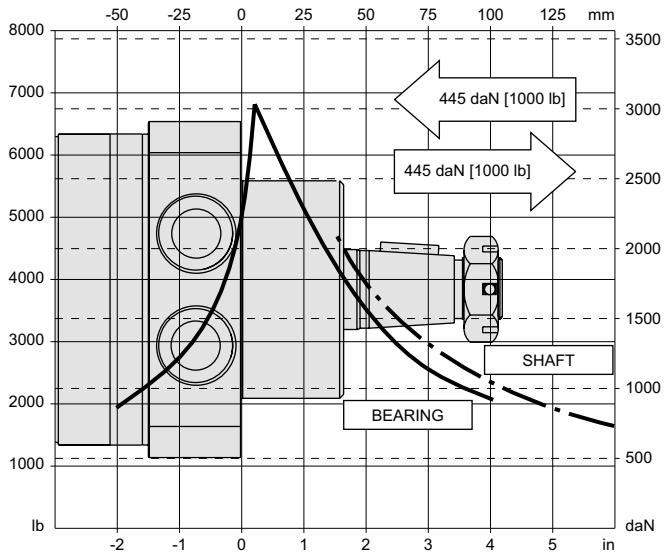
▶ Dimension GG is charted on page 59.

TECHNICAL INFORMATION

ALLOWABLE SHAFT LOAD / BEARING CURVE

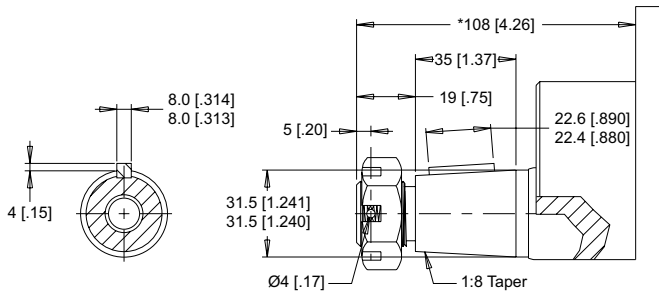
The bearing curve represents allowable bearing loads based on ISO 281 bearing capacity for an L_{10} life of 2,000 hours at 100 rpm. Radial loads for speeds other than 100 rpm may be calculated using the multiplication factor table on page 8.

WHEEL MOUNTS



SHAFTS

22 1-1/4" Tapered



▶ A slotted hex nut is standard on this shaft.

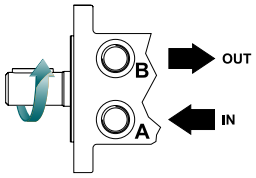
Max. Torque: 1200 Nm [10600 lb-in]

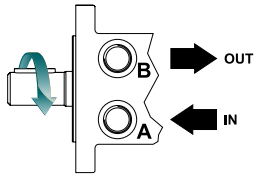
ORDERING INFORMATION

1	2	3	4	5	6	7	8

1. CHOOSE SERIES DESIGNATION

420	Standard Rotation	**421**	Reverse Rotation





▶ The 420 & 421 series are bi-directional. For applications requiring the motor to rotate in only one direction, shaft seal life may be prolonged by pressurizing the A port of the motor.

2. SELECT A DISPLACEMENT OPTION

120	121 cm^3/rev [7.4 in^3/rev]	**350**	348 cm^3/rev [21.2 in^3/rev]
160	162 cm^3/rev [9.9 in^3/rev]	**375**	375 cm^3/rev [22.8 in^3/rev]
200	204 cm^3/rev [12.4 in^3/rev]	**470**	465 cm^3/rev [28.3 in^3/rev]
230	232 cm^3/rev [14.2 in^3/rev]	**540**	536 cm^3/rev [32.7 in^3/rev]
260	261 cm^3/rev [15.9 in^3/rev]	**750**	748 cm^3/rev [45.6 in^3/rev]
300	300 cm^3/rev [18.3 in^3/rev]		

3. SELECT A MOUNT & PORT OPTION

P31	4-Hole, 3.25” Pilot Wheel Mount, Aligned Ports, 7/8-14 UNF
P38	4-Hole, 3.25” Pilot Wheel Mount, Aligned Ports, G 1/2
W31	4-Hole, 3.50” Pilot Wheel Mount, Aligned Ports, 7/8-14 UNF
W35	4-Hole, 3.50” Pilot Wheel Mount, Aligned Ports, 9/16-18 UNF
W38	4-Hole, 3.50” Pilot Wheel Mount, Aligned Ports, G 1/2

4. SELECT A SHAFT OPTION

22	1-1/4” Tapered

5. SELECT A PAINT OPTION

A	Black
B	Black, Unpainted Mounting Surface
Z	No Paint

6. SELECT A VALVE CAVITY / CARTRIDGE OPTION

A	None

7. SELECT AN ADD-ON OPTION

A	Standard
B	Lock Nut
C	Solid Hex Nut

8. SELECT A MISCELLANEOUS OPTION

AA	None
AC	Freeturning Rotor
AE	Hydraulic Declutch With Freeturning Rotor

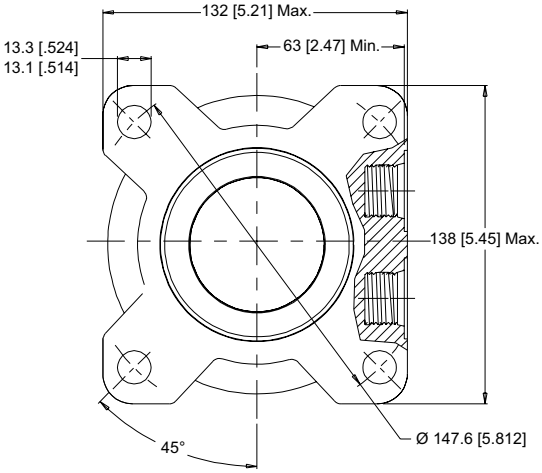
HOUSINGS

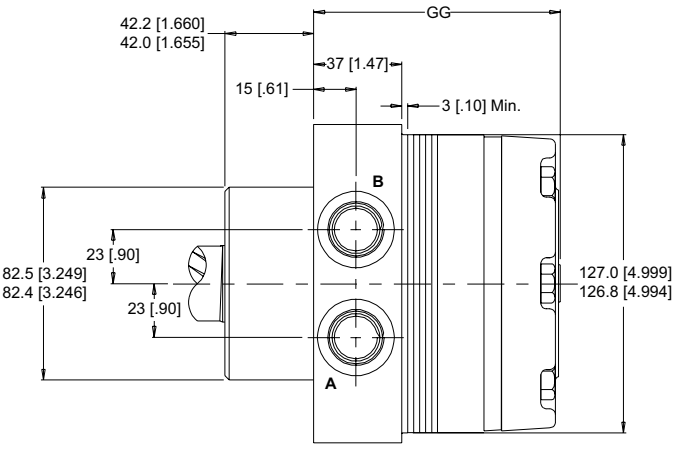
▶ Dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

4-HOLE, WHEEL MOUNT, ALIGNED PORTS

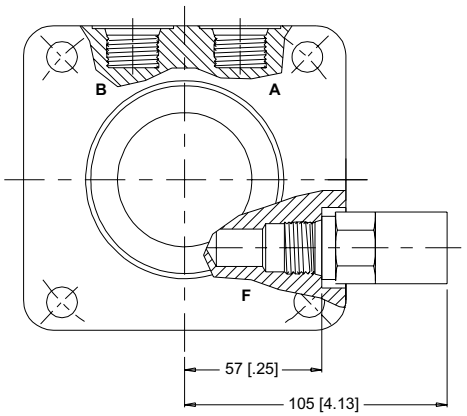
W31 7/8-14 UNF **W38** G 1/2

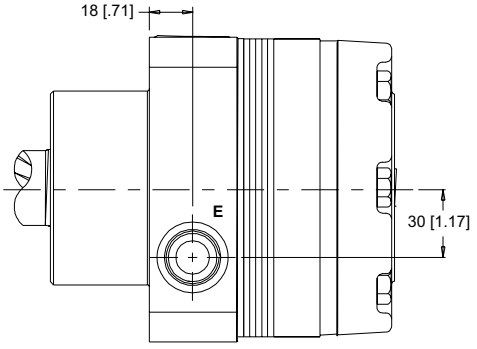
STANDARD





OPTIONAL VALVE CAVITY





E: 10 Series/2-Way Valve Cavity 7/8-14 UNF **F**: Valve Cartridge Installed

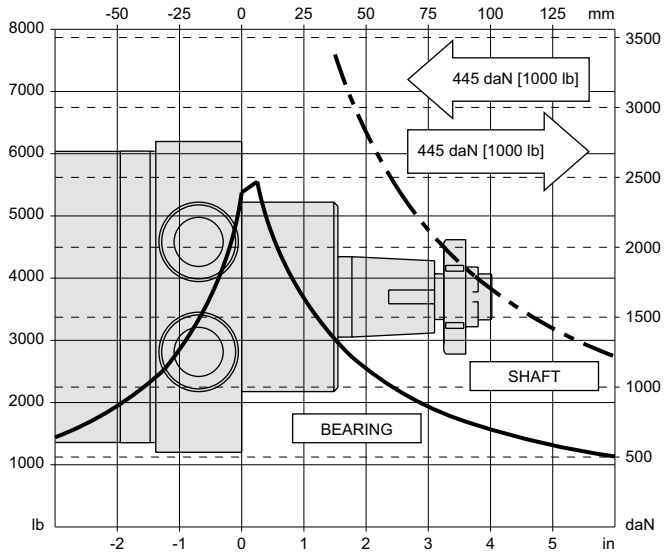
▶ Dimension GG is charted on page 59.

TECHNICAL INFORMATION

ALLOWABLE SHAFT LOAD / BEARING CURVE

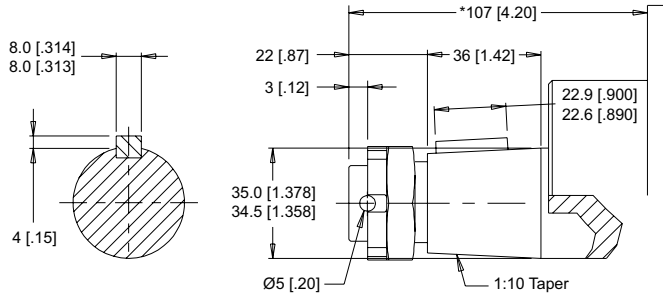
The bearing curve represents allowable bearing loads based on ISO 281 bearing capacity for an L_{10} life of 2,000 hours at 100 rpm. Radial loads for speeds other than 100 rpm may be calculated using the multiplication factor table on page 8.

WHEEL MOUNTS



SHAFTS

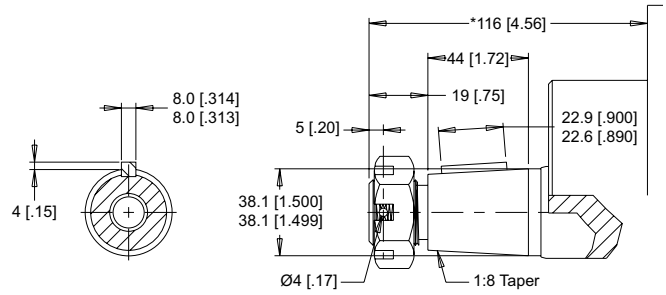
28 35mm Tapered



▶ A slotted hex nut is standard on this shaft.

Max. Torque: 1200 Nm [10600 lb-in]

31 1-1/2" Tapered



▶ A slotted hex nut is standard on this shaft.

Max. Torque: 1200 Nm [10600 lb-in]

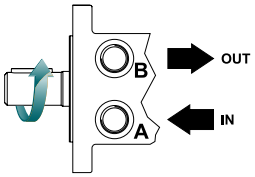
* Mounting flange length may vary by ± .8 [.030].

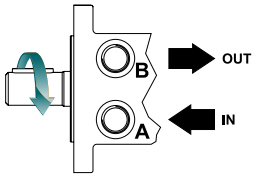
ORDERING INFORMATION

1	2	3	4	5	6	7	8

1. CHOOSE SERIES DESIGNATION

430	Standard Rotation
431	Reverse Rotation





▶ The 430 & 431 series are bi-directional. For applications requiring the motor to rotate in only one direction, shaft seal life may be prolonged by pressurizing the A port of the motor.

2. SELECT A DISPLACEMENT OPTION

120	121 cm^3/rev [7.4 in^3/rev]	**350**	348 cm^3/rev [21.2 in^3/rev]
160	162 cm^3/rev [9.9 in^3/rev]	**375**	375 cm^3/rev [22.8 in^3/rev]
200	204 cm^3/rev [12.4 in^3/rev]	**470**	465 cm^3/rev [28.3 in^3/rev]
230	232 cm^3/rev [14.2 in^3/rev]	**540**	536 cm^3/rev [32.7 in^3/rev]
260	261 cm^3/rev [15.9 in^3/rev]	**750**	748 cm^3/rev [45.6 in^3/rev]
300	300 cm^3/rev [18.3 in^3/rev]		

3. SELECT A MOUNT & PORT OPTION

W31	4-Hole, Wheel Mount, Aligned Ports, 7/8-14 UNF
W38	4-Hole, Wheel Mount, Aligned Ports, G 1/2

4. SELECT A SHAFT OPTION

28	35mm Tapered	**31**	1-1/2” Tapered

5. SELECT A PAINT OPTION

A	Black
B	Black, Unpainted Mounting Surface
Z	No Paint

6. SELECT A VALVE CAVITY / CARTRIDGE OPTION

A	None	**E**	104 bar [1500 psi] Relief
B	Valve Cavity Only	**F**	121 bar [1750 psi] Relief
C	69 bar [1000 psi] Relief	**G**	138 bar [2000 psi] Relief
D	86 bar [1250 psi] Relief		

7. SELECT AN ADD-ON OPTION

A	Standard
B	Lock Nut
C	Solid Hex Nut

8. SELECT A MISCELLANEOUS OPTION

AA	None
AC	Freeturning Rotor
AE	Hydraulic Declutch With Freeturning Rotor

OVERVIEW

RE Series motors offer the perfect compromise between price and performance by producing work horse power at a reasonable cost. Although these motors perform well in a wide range of applications, they are especially suited for low flow, high pressure applications. During startup, pressure causes the balance plate to flex toward the rotor, vastly improving volumetric efficiency. As the motor reaches operating pressure, the balance plate relaxes, allowing the rotor to turn freely which translates into higher mechanical efficiencies. Transmitting this power to the output shaft is the most durable drive link in its class. Four bearing options, combined with standard mounting flanges and output shafts, allow the motor to be configured to suit nearly any application.

FEATURES / BENEFITS

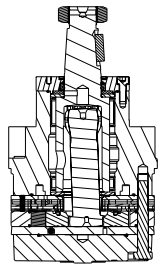
- High Pressure Shaft Seal offers superior seal life and performance and eliminates need for case drain.
- Three Bearing Options allow load carrying capability of motor to be matched to application.
- Heavy-Duty Drive Link is the most durable in its class and receives full flow lubrication to provide long life.
- Valve-In-Rotor Design provides cost effective, efficient distribution of oil and reduces overall motor length.
- Pressure-Compensated Balance Plate improves volumetric efficiency at low flows and high pressure.

TYPICAL APPLICATIONS

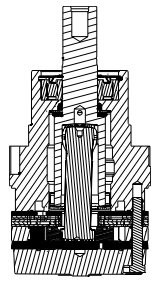
Medium-duty wheel drives, augers, mixers, winch drives, swing drives, grapple heads, feed rollers, broom drives and more

SERIES DESCRIPTIONS

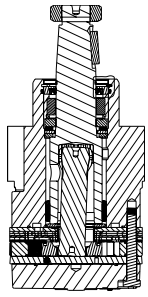
505/506 - Hydraulic Motor
Standard



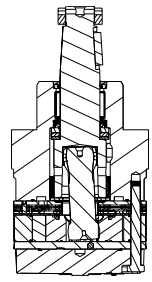
520/521 - Hydraulic Motor
With Medium Duty Bearing



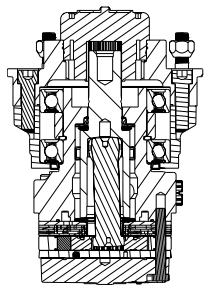
530/531 - Hydraulic Motor
With Heavy Duty Bearing



535/536 - Hydraulic Motor
Compact, Heavy Duty Bearing



540/541 - Hydraulic Motor
With Wheel Hub



SPECIFICATIONS

CODE	Displacement cm^3 [in^3/rev]	Max. Speed rpm		Max. Flow lpm [gpm]		Max. Torque Nm [lb-in]		Max. Pressure bar [psi]		
		cont.	inter.	cont.	inter.	cont.	inter.	cont.	inter.	peak
120	121 [7.4]	360	490	45 [12]	61 [16]	327 [2900]	383 [3400]	207 [3000]	241 [3500]	276 [4000]
160	162 [9.9]	370	470	61 [16]	76 [20]	475 [4200]	542 [4800]	207 [3000]	241 [3500]	276 [4000]
200	204 [12.4]	300	370	68 [18]	83 [22]	542 [4800]	633 [5600]	207 [3000]	241 [3500]	276 [4000]
230	232 [14.2]	260	320	68 [18]	83 [22]	644 [5700]	712 [6300]	207 [3000]	241 [3500]	276 [4000]
260	261 [15.9]	260	350	76 [20]	91 [24]	712 [6300]	791 [7000]	207 [3000]	241 [3500]	276 [4000]
300	300 [18.3]	250	320	83 [22]	95 [25]	825 [7300]	938 [8300]	207 [3000]	241 [3500]	276 [4000]
350	348 [21.2]	220	270	83 [22]	95 [25]	921 [8150]	1045 [9250]	207 [3000]	241 [3500]	276 [4000]
375	375 [22.8]	200	250	76 [20]	91 [24]	1006 [8900]	1158 [10250]	207 [3000]	241 [3500]	276 [4000]
470	465 [28.3]	160	200	76 [20]	91 [24]	1096 [9700]	1184 [10475]	172 [2500]	189 [2750]	207 [3000]
540	536 [32.7]	140	170	76 [20]	91 [24]	983 [8700]	1243 [11000]	138 [2000]	173 [2500]	207 [3000]
620	631 [38.5]	120	150	76 [20]	91 [24]	1014 [8976]	1291 [11421]	121 [1750]	155 [2250]	173 [2500]
750	748 [45.6]	100	130	76 [20]	91 [24]	1062 [9400]	1237 [10950]	103 [1500]	121 [1750]	138 [2000]

▶ Performance data is typical. Performance of production units varies slightly from one motor to another. Running at intermittent ratings should not exceed 10% of every minute of operation.

DISPLACEMENT PERFORMANCE

120

121 cm³ [7.4 in³] / rev

Pressure - bar [psi]

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	241 [3500] Max. Inter.

Torque - Nm [lb-in], **Speed rpm**

Intermittent Ratings - 10% of Operation

Flow - lpm [gpm]	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	241 [3500]	Theoretical rpm
2 [0.5]	21 [187] **14**	51 [448] **13**	97 [859] **11**	140 [1239] **8**					16
4 [1]	24 [215] **26**	54 [474] **25**	111 [986] **25**	162 [1429] **20**	225 [1991] **13**				32
8 [2]		57 [500] **58**	118 [1043] **53**	176 [1554] **51**	226 [1997] **44**	271 [2400] **40**	302 [2673] **35**	343 [3036] **27**	63
15 [4]		54 [479] **111**	116 [1030] **106**	186 [1642] **97**	237 [2094] **93**	278 [2459] **89**	335 [2964] **85**	359 [3179] **79**	125
23 [6]		49 [433] **174**	116 [1023] **167**	168 [1483] **155**	232 [2051] **150**	279 [2467] **144**	328 [2903] **139**	360 [3185] **137**	188
30 [8]			111 [984] **245**	169 [1497] **214**	223 [1973] **205**	283 [2505] **200**	326 [2884] **197**	385 [3404] **188**	250
38 [10]			104 [923] **294**	166 [1469] **281**	218 [1930] **269**	272 [2411] **261**	325 [2878] **250**	385 [3404] **242**	313
45 [12] Max. Cont.			99 [872] **358**	161 [1428] **344**	217 [1918] **331**	276 [2444] **326**	321 [2839] **321**	385 [3403] **304**	375
53 [14]			91 [807] **415**	155 [1372] **413**	208 [1845] **398**	267 [2363] **391**	338 [2992] **369**		438
61 [16] Max. Inter.			84 [745] **487**	145 [1283] **475**	211 [1864] **457**	272 [2403] **447**	327 [2897] **427**		500

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ■

Rotor Width	Theoretical Torque - Nm [lb-in]							
13.8 [.542] mm [in]	33 [295]	67 [589]	133 [1178]	200 [1768]	266 [2357]	333 [2946]	399 [3535]	466 [4124]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

160

162 cm³ [9.9 in³] / rev

Pressure - bar [psi]

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	241 [3500] Max. Inter.

Torque - Nm [lb-in], **Speed rpm**

Intermittent Ratings - 10% of Operation

Flow - lpm [gpm]	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	241 [3500]	Theoretical rpm
2 [0.5]	37 [326] **7**	77 [685] **3**	149 [1323] **3**	223 [1977] **3**	310 [2741] **2**	349 [3088] **1**			12
4 [1]	30 [264] **21**	80 [704] **18**	164 [1448] **17**	244 [2158] **16**	324 [2865] **14**	378 [3344] **13**	442 [3909] **9**		24
8 [2]	36 [317] **45**	80 [711] **43**	161 [1423] **41**	242 [2143] **39**	316 [2792] **37**	379 [3350] **35**	481 [4258] **32**	551 [4880] **28**	47
15 [4]	39 [342] **92**	75 [664] **90**	171 [1510] **86**	253 [2241] **84**	321 [2838] **82**	379 [3351] **80**	451 [3992] **76**	516 [4569] **72**	94
23 [6]		71 [631] **138**	158 [1395] **134**	235 [2078] **131**	317 [2806] **127**	389 [3447] **122**	462 [4088] **121**	518 [4586] **118**	140
30 [8]		67 [596] **186**	164 [1449] **182**	236 [2090] **179**	312 [2760] **173**	385 [3411] **170**	456 [4033] **167**	513 [4537] **163**	187
38 [10]		72 [640] **232**	149 [1323] **230**	234 [2074] **229**	309 [2736] **222**	376 [3329] **220**	455 [4022] **213**	522 [4623] **207**	234
45 [12]		67 [596] **279**	144 [1275] **279**	226 [1998] **272**	304 [2689] **270**	369 [3270] **264**	440 [3890] **255**	497 [4397] **247**	280
53 [14]			135 [1190] **326**	228 [2022] **323**	310 [2739] **317**	375 [3317] **311**	457 [4040] **304**	541 [4789] **299**	327
61 [16] Max. Cont.			123 [1087] **372**	213 [1889] **372**	298 [2634] **364**	368 [3253] **361**	435 [3847] **357**	502 [4439] **350**	374
68 [18]			108 [952] **419**	199 [1764] **417**	283 [2501] **416**	362 [3201] **407**	419 [3708] **401**		420
76 [20] Max. Inter.			105 [929] **466**	195 [1726] **465**	280 [2476] **462**	349 [3092] **453**	453 [4008] **443**		467

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ■

Rotor Width	Theoretical Torque - Nm [lb-in]							
13.8 [.542] mm [in]	45 [394]	89 [788]	178 [1576]	267 [2365]	356 [3153]	445 [3941]	534 [4729]	623 [5518]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

► Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

DISPLACEMENT PERFORMANCE

200

204 cm³ [12.4 in³] / rev

Pressure - bar [psi]

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	241 [3500] Max. Inter.

Torque - Nm [lb-in], **Speed rpm**

Intermittent Ratings - 10% of Operation

Flow - lpm [gpm]	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	241 [3500] Max. Inter.	Theoretical rpm
2 [0.5]	40 [358] **7**	91 [808] **4**	133 [1181] **4**	294 [2602] **4**	375 [3323] **3**				10
4 [1]	43 [376] **16**	85 [753] **13**	200 [1769] **12**	276 [2442] **11**	373 [3304] **10**	442 [3915] **9**	526 [4656] **6**		19
8 [2]	44 [385] **34**	93 [851] **31**	195 [1727] **29**	299 [2646] **27**	374 [3311] **27**	461 [4079] **25**	542 [4792] **23**	616 [5451] **20**	38
15 [4]	39 [347] **72**	94 [834] **69**	198 [1752] **67**	305 [2701] **63**	401 [3549] **60**	477 [4222] **58**	544 [4818] **55**	629 [5568] **51**	75
23 [6]		82 [724] **111**	191 [1694] **109**	284 [2518] **107**	389 [3446] **103**	463 [4098] **100**	553 [4894] **99**	636 [5628] **90**	112
30 [8]		80 [704] **148**	188 [1661] **145**	285 [2518] **141**	402 [3556] **136**	458 [4053] **134**	543 [4802] **130**	628 [5554] **124**	150
38 [10]		66 [581] **185**	180 [1592] **181**	276 [2445] **176**	364 [3224] **173**	458 [4051] **170**	535 [4737] **164**	615 [5441] **160**	187
45 [12]			165 [1462] **221**	261 [2312] **214**	362 [3200] **210**	450 [3982] **207**	535 [4731] **198**	618 [5471] **196**	224
53 [14]			150 [1328] **257**	273 [2413] **256**	368 [3253] **247**	449 [3975] **244**	558 [4936] **241**	602 [5328] **235**	261
61 [16]			134 [1183] **296**	253 [2242] **292**	335 [2969] **284**	435 [3850] **277**	524 [4639] **273**	598 [5292] **269**	299
68 [18] Max. Cont.			121 [1068] **334**	232 [2056] **330**	339 [3003] **327**	416 [3686] **320**	512 [4532] **313**	599 [5299] **308**	336
76 [20]			110 [970] **372**	206 [1823] **372**	308 [2725] **365**	401 [3552] **357**	507 [4484] **352**		373
83 [22] Max. Inter.				191 [1689] **407**	285 [2520] **403**	379 [3353] **397**	486 [4303] **388**		410

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width	Theoretical Torque - Nm [lb-in]							
17.3 [.682] mm [in]	56 [494]	112 [987]	223 [1975]	335 [2962]	446 [3949]	558 [4936]	669 [5924]	781 [6911]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

230

233 cm³ [14.2 in³] / rev

Pressure - bar [psi]

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	241 [3500] Max. Inter.

Torque - Nm [lb-in], **Speed rpm**

Intermittent Ratings - 10% of Operation

Flow - lpm [gpm]	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	241 [3500] Max. Inter.	Theoretical rpm
2 [0.5]	45 [397] **6**	92 [813] **4**	184 [1628] **3**	293 [2590] **2**	375 [3323] **1**				9
4 [1]	48 [429] **14**	101 [890] **12**	223 [1972] **11**	316 [2793] **11**	414 [3660] **9**	493 [4366] **7**	560 [4955] **4**		17
8 [2]	51 [453] **30**	105 [926] **27**	215 [1899] **25**	329 [2911] **25**	425 [3760] **23**	524 [4637] **20**	618 [5468] **17**	710 [6286] **12**	33
15 [4]	43 [384] **63**	108 [960] **59**	209 [1851] **55**	326 [2884] **54**	435 [3846] **52**	539 [4771] **47**	655 [5799] **42**	721 [6381] **39**	66
23 [6]		102 [603] **93**	213 [1889] **88**	339 [3001] **85**	428 [3789] **82**	536 [4747] **77**	628 [5559] **73**	718 [6355] **69**	98
30 [8]		89 [789] **127**	207 [1830] **122**	316 [2793] **120**	425 [3762] **115**	521 [4612] **110**	639 [5653] **107**	717 [6341] **98**	131
38 [10]		78 [690] **161**	198 [1750] **157**	311 [2752] **151**	436 [3856] **148**	527 [4660] **143**	612 [5420] **140**	703 [6218] **132**	163
45 [12]			189 [1669] **191**	296 [2624] **186**	425 [3764] **182**	510 [4517] **176**	599 [5304] **170**	689 [6098] **163**	196
53 [14]			177 [1565] **224**	293 [2596] **216**	388 [3434] **214**	495 [4384] **208**	587 [5197] **205**	680 [6017] **198**	228
61 [16]			150 [1326] **256**	272 [2408] **255**	397 [3509] **249**	484 [4280] **245**	574 [5077] **237**	669 [5925] **227**	261
68 [18] Max. Cont.			142 [1261] **292**	264 [2333] **286**	355 [3140] **282**	493 [4366] **276**	569 [5032] **274**	655 [5799] **259**	293
76 [20]			122 [1083] **324**	237 [2096] **321**	347 [3068] **316**	453 [4009] **309**	571 [5057] **305**		326
83 [22] Max. Inter.				210 [1855] **357**	338 [2987] **351**	464 [4104] **345**	550 [4864] **339**		358

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width	Theoretical Torque - Nm [lb-in]							
19.7 [.777] mm [in]	64 [565]	128 [1131]	256 [2261]	383 [3392]	511 [4522]	639 [5653]	767 [6783]	894 [7914]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

► Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

DISPLACEMENT PERFORMANCE

260

261 cm³ [15.9 in³] / rev

Pressure - bar [psi]

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	241 [3500] Max. Inter.

Torque - Nm [lb-in], **Speed rpm**

Intermittent Ratings - 10% of Operation

Flow - lpm [gpm]	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	241 [3500] Max. Inter.	Theoretical rpm
2 [0.5]	49 [432] **5**	112 [989] **2**							8
4 [1]	54 [475] **12**	113 [998] **11**	240 [2125] **10**	365 [3230] **9**	478 [4227] **8**	578 [5112] **7**	648 [5736] **5**		15
8 [2]	54 [474] **27**	115 [1021] **25**	247 [2184] **24**	367 [3244] **22**	488 [4318] **21**	591 [5230] **19**	703 [6223] **16**		30
15 [4]	49 [429] **57**	114 [1010] **55**	261 [2307] **51**	363 [3214] **51**	486 [4300] **48**	595 [5268] **46**	697 [6171] **43**	807 [7143] **39**	59
23 [6]	45 [397] **86**	115 [1016] **83**	236 [2090] **80**	364 [3221] **78**	497 [4398] **76**	590 [5225] **71**	721 [6379] **68**	802 [7096] **63**	88
30 [8]		94 [833] **114**	227 [2008] **109**	348 [3078] **109**	477 [4224] **105**	592 [5239] **101**	692 [6128] **96**	794 [7027] **88**	117
38 [10]		85 [752] **145**	231 [2044] **144**	340 [3013] **141**	470 [4155] **138**	585 [5180] **133**	685 [6063] **127**	796 [7048] **119**	146
45 [12]		78 [692] **173**	217 [1919] **173**	354 [3135] **168**	464 [4108] **166**	567 [5018] **161**	672 [5945] **153**	802 [7095] **144**	175
53 [14]		64 [563] **202**	198 [1754] **202**	326 [2886] **200**	445 [3941] **196**	568 [5026] **184**	668 [5908] **181**	765 [6771] **176**	204
61 [16]			182 [1608] **231**	299 [2644] **229**	448 [3965] **221**	552 [4884] **219**	651 [5763] **216**	752 [6659] **209**	233
68 [18]			160 [1417] **261**	304 [2693] **261**	417 [3690] **256**	550 [4870] **247**	643 [5689] **240**	740 [6551] **232**	262
76 [20] Max. Cont.			136 [1204] **290**	278 [2460] **289**	391 [3464] **285**	521 [4614] **277**	636 [5628] **274**	736 [6516] **263**	291
83 [22]			132 [1168] **319**	263 [2325] **319**	374 [3314] **315**	512 [4535] **311**	615 [5442] **301**		320
91 [24] Max. Inter.			82 [722] **348**	227 [2009] **347**	361 [3190] **345**	496 [4386] **340**			349

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width	Theoretical Torque - Nm [lb-in]							
22.1 [.872] mm [in]	72 [633]	143 [1266]	286 [2532]	429 [3798]	572 [5064]	715 [6330]	858 [7596]	1001 [8861]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

300

300 cm³ [18.3 in³] / rev

Pressure - bar [psi]

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	241 [3500] Max. Inter.

Torque - Nm [lb-in], **Speed rpm**

Intermittent Ratings - 10% of Operation

Flow - lpm [gpm]	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	241 [3500] Max. Inter.	Theoretical rpm
2 [0.5]	51 [452] **3**	95 [839] **1**							7
4 [1]	63 [557] **11**	145 [1282] **10**	302 [2675] **9**	433 [3829] **8**	510 [4513] **7**	627 [5552] **4**			13
8 [2]	62 [551] **22**	158 [1400] **20**	308 [2722] **19**	437 [3866] **19**	571 [5056] **16**	679 [6011] **13**	768 [6796] **9**	830 [7346] **5**	26
15 [4]	66 [588] **48**	145 [1281] **47**	316 [2793] **45**	430 [3805] **43**	577 [5107] **38**	680 [6015] **33**	820 [7258] **28**	908 [8040] **21**	51
23 [6]	58 [511] **75**	140 [1241] **75**	290 [2566] **72**	424 [3755] **69**	546 [4830] **65**	690 [6105] **57**	801 [7088] **49**	946 [8372] **40**	76
30 [8]	46 [405] **100**	128 [1136] **100**	305 [2699] **99**	391 [3460] **96**	571 [5056] **87**	700 [6199] **82**	826 [7313] **71**	930 [8233] **62**	101
38 [10]		111 [981] **125**	282 [2493] **124**	409 [3623] **121**	503 [4447] **115**	683 [6043] **106**	794 [7028] **98**	919 [8131] **88**	127
45 [12]		92 [814] **150**	261 [2313] **150**	388 [3435] **148**	472 [4177] **143**	641 [5676] **133**	783 [6927] **122**	881 [7794] **113**	152
53 [14]		77 [684] **176**	245 [2165] **175**	391 [3464] **175**	530 [4687] **173**	661 [5848] **163**	809 [7157] **151**	949 [8398] **138**	177
61 [16]		63 [553] **201**	224 [1983] **201**	366 [3243] **199**	508 [4498] **192**	633 [5599] **187**	796 [7044] **173**	916 [8103] **163**	202
68 [18]			201 [1780] **225**	339 [2999] **225**	467 [4135] **222**	666 [5898] **211**	804 [7115] **199**	899 [7955] **194**	228
76 [20] Max. Cont.			172 [1522] **251**	327 [2895] **251**	480 [4247] **247**	611 [5410] **240**	745 [6596] **232**	910 [8051] **217**	253
83 [22]			144 [1276] **277**	321 [2836] **276**	466 [4127] **269**	575 [5084] **263**	732 [6474] **254**		278
91 [24]			119 [1049] **302**	281 [2483] **301**	435 [3853] **300**	559 [4943] **291**	703 [6223] **280**		303
95 [25] Max. Inter.			105 [928] **315**	262 [2319] **314**	434 [3838] **311**	553 [4894] **307**	707 [6257] **294**		316

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width	Theoretical Torque - Nm [lb-in]							
25.4 [1.000] mm [in]	82 [729]	165 [1457]	329 [2914]	494 [4371]	659 [5828]	823 [7285]	988 [8742]	1152 [10199]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

► Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

DISPLACEMENT PERFORMANCE

350

348 cm³ [21.2 in³] / rev

Pressure - bar [psi]

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	241 [3500] Max. Inter.

Torque - Nm [lb-in], **Speed rpm**

Intermittent Ratings - 10% of Operation

Flow - lpm [gpm]	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	241 [3500] Max. Inter.	Theoretical rpm
2 [0.5]	64 [566] **4**	134 [1183] **4**	272 [2404] **3**	399 [3532] **2**					6
4 [1]	64 [570] **10**	134 [1189] **9**	296 [2619] **8**	437 [3869] **8**					11
8 [2]	69 [607] **21**	145 [1285] **20**	312 [2764] **19**	462 [4092] **18**	600 [5308] **18**	742 [6571] **17**	855 [7569] **14**		22
15 [4]	71 [627] **42**	151 [1340] **41**	313 [2767] **40**	471 [4169] **39**	630 [5577] **37**	772 [6834] **35**	889 [7869] **34**	993 [8785] **28**	44
23 [6]	62 [549] **64**	149 [1618] **63**	315 [2788] **62**	474 [4191] **60**	630 [5577] **57**	768 [6796] **54**	925 [8182] **51**	1032 [9137] **45**	66
30 [8]	53 [472] **86**	139 [1233] **85**	307 [2713] **84**	459 [4058] **82**	626 [5537] **79**	768 [6793] **75**	928 [8210] **69**	1051 [9300] **65**	88
38 [10]		113 [1004] **108**	298 [2639] **108**	431 [3814] **108**	601 [5317] **102**	745 [6593] **100**	910 [8056] **93**	1062 [9399] **87**	109
45 [12]		98 [869] **130**	265 [2346] **129**	445 [3936] **128**	581 [5144] **125**	740 [6552] **117**	891 [7889] **109**	1044 [9237] **104**	131
53 [14]		86 [758] **152**	252 [2226] **151**	422 [3738] **150**	570 [5044] **147**	723 [6398] **139**	881 [7794] **133**	1031 [9126] **120**	153
61 [16]		63 [560] **173**	235 [2079] **173**	409 [3619] **172**	549 [4859] **170**	720 [6375] **163**	850 [7522] **155**	1012 [8952] **147**	175
68 [18]			220 [1948] **195**	394 [3490] **194**	571 [5054] **190**	693 [6134] **187**	839 [7428] **175**	986 [8727] **164**	197
76 [20] Max. Cont.			208 [1843] **217**	375 [3320] **216**	513 [4544] **214**	683 [6044] **213**	835 [7385] **195**	975 [8632] **188**	218
83 [22]			179 [1583] **239**	352 [3112] **239**	554 [4906] **238**	685 [6064] **233**	813 [7198] **221**	958 [8482] **215**	240
91 [24]			172 [1526] **261**	360 [3186] **261**	534 [4724] **260**	666 [5890] **256**			262
95 [25] Max. Inter.				369 [3264] **271**	529 [4682] **270**	647 [5730] **265**			273

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width

Theoretical Torque - Nm [lb-in]

39.4 [1.553] mm [in]	95 [844]	191 [1688]	381 [3376]	572 [5064]	763 [6752]	954 [8439]	1144 [10127]	1335 [11815]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

375

375 cm³ [22.8 in³] / rev

Pressure - bar [psi]

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	241 [3500] Max. Inter.

Torque - Nm [lb-in], **Speed rpm**

Intermittent Ratings - 10% of Operation

Flow - lpm [gpm]	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000] Max. Cont.	241 [3500] Max. Inter.	Theoretical rpm
2 [0.5]	76 [674] **3**								6
4 [1]	84 [745] **8**	162 [1432] **7**	329 [2911] **6**	490 [4337] **6**	639 [5652] **5**	763 [6756] **3**			11
8 [2]	82 [724] **18**	171 [1510] **17**	361 [[3196] **16**	537 [4754] **16**	689 [6095] **14**	836 [7399] **12**	955 [8449] **9**		21
15 [4]	77 [680] **39**	163 [1439] **37**	358 [3164] **37**	537 [4756] **36**	695 [6151] **32**	857 [7587] **29**	989 [8750] **25**	1121 [9923] **20**	41
23 [6]	67 [595] **60**	158 [1398] **59**	354 [3130] **56**	527 [4661] **56**	695 [6155] **52**	864 [7642] **47**	1011 [8951] **40**	1168 [10334] **36**	61
30 [8]	57 [508] **80**	149 [1321] **80**	340 [3010] **78**	510 [4512] **77**	695 [6154] **71**	845 [7476] **65**	1009 [8930] **60**	1156 [10229] **51**	82
38 [10]		134 [1187] **100**	322 [2849] **99**	495 [4383] **96**	681 [6024] **93**	836 [7399] **87**	1007 [8913] **80**	1157 [10235] **71**	102
45 [12]		115 [1013] **121**	301 [2661] **120**	480 [4249] **118**	645 [5711] **113**	809 [7159] **108**	980 [8674] **98**	1141 [10098] **92**	122
53 [14]		93 [819] **141**	280 [2475] **140**	477 [4218] **138**	633 [5602] **134**	795 [7036] **128**	949 [8402] **120**	1117 [9887] **105**	142
61 [16]		73 [646] **161**	261 [2314] **161**	429 [3797] **160**	598 [5296] **155**	770 [6817] **151**	934 [8267] **141**	1085 [9605] **130**	163
68 [18]			236 [2091] **181**	434 [3843] **181**	597 [5282] **177**	765 [6771] **168**	907 [8026] **161**	1080 [9554] **150**	183
76 [20] Max. Cont.			209 [1851] **202**	384 [3396] **201**	561 [4969] **198**	740 [6549] **191**	877 [7764] **183**	1027 [9091] **168**	203
83 [22]			178 [1576] **222**	374 [3309] **221**	530 [4694] **218**	696 [6160] **213**	840 [7431] **205**		223
91 [24] Max. Inter.			141 [1246] **242**	319 [2822] **241**	511 [4523] **239**	662 [5860] **233**			244

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width

Theoretical Torque - Nm [lb-in]

31.8 [1.252] mm [in]	103 [908]	205 [1815]	410 [3631]	615 [5446]	821 [7261]	1026 [9076]	1231 [10892]	1436 [12707]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

▶ Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

DISPLACEMENT PERFORMANCE

470

465 cm³ [28.3 in³] / rev

Pressure - bar [psi] — Max. Cont. — Peak

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]

Torque - Nm [lb-in], **Speed rpm** — **Intermittent Ratings -** 10% of Operation

Flow - lpm [gpm]	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	Theoretical rpm
2 [0.5]	93 [823] **2**	185 [1635] **1**						5
4 [1]	97 [857] **7**	203 [1794] **5**	409 [3618] **5**	610 [5402] **5**	815 [7209] **4**			9
8 [2]	98 [865] **15**	209 [1845] **14**	435 [3851] **13**	659 [5836] **13**	855 [7563] **12**	1025 [9071] **11**	1196 [10586] **9**	17
15 [4]	94 [834] **31**	200 [1774] **30**	444 [3932] **28**	659 [5829] **28**	886 [7836] **26**	1066 [9434] **23**	1250 [11062] **21**	33
23 [6]	86 [759] **48**	193 [1704] **47**	438 [3880] **44**	673 [5955] **44**	872 [7715] **41**	1073 [9499] **37**	1258 [11128] **32**	49
30 [8]	73 [643] **64**	179 [1587] **63**	424 [3752] **60**	663 [5863] **60**	857 [7586] **57**	1098 [9718] **50**	1279 [11317] **43**	66
38 [10]	52 [464] **81**	164 [1455] **80**	407 [3597] **78**	627 [5550] **78**	851 [7533] **75**	1067 [9444] **68**	1276 [11288] **61**	82
45 [12]		141 [1248] **97**	379 [3350] **94**	630 [5575] **93**	832 [7363] **90**	1067 [9441] **83**	1273 [11264] **76**	98
53 [14]		114 [1006] **113**	350 [3094] **112**	580 [5133] **111**	802 [7101] **108**	1013 [8964] **102**	1222 [10817] **94**	115
61 [16]		83 [736] **130**	322 [2846] **129**	545 [4819] **127**	796 [7040] **123**	965 [8538] **119**	1190 [10528] **113**	131
68 [18]		56 [497] **146**	275 [2434] **145**	526 [4657] **145**	737 [6519] **142**	956 [8464] **138**	1166 [10317] **128**	147
Max. Cont. 76 [20]			235 [2078] **162**	479 [4239] **161**	706 [6249] **158**	917 [8117] **154**	1122 [9933] **143**	164
83 [22]			202 [1790] **179**	460 [4075] **178**	669 [5920] **176**	883 [7811] **170**		180
Max. Inter. 91 [24]			157 [1392] **195**	385 [3410] **194**	620 [5484] **190**	843 [7464] **186**		196

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width — Theoretical Torque - Nm [lb-in]

39.4 [1.553] mm [in]	127 [1127]	255 [2253]	509 [4506]	764 [6760]	1018 [9013]	1273 [11266]	1528 [13519]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

540

536 cm³ [32.7 in³] / rev

Pressure - bar [psi] — Max. Cont. — Max. Inter.

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]

Torque - Nm [lb-in], **Speed rpm** — **Intermittent Ratings -** 10% of Operation

Flow - lpm [gpm]	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	Theoretical rpm
2 [0.5]	104 [921] **2**	197 [1748] **2**					4
4 [1]	126 [1111] **6**	230 [2031] **5**	467 [4136] **5**	699 [6183] **5**	939 [8310] **5**	1149 [10165] **4**	8
8 [2]	134 [1189] **13**	240 [2120] **13**	501 [4436] **12**	755 [6679] **12**	977 [8646] **11**	1185 [10484] **10**	15
15 [4]	120 [1058] **27**	232 [2055] **27**	510 [4510] **26**	757 [6697] **26**	988 [8740] **24**	1223 [10827] **23**	29
23 [6]	97 [859] **41**	224 [1984] **41**	505 [4469] **40**	783 [6930] **40**	993 [8787] **38**	1225 [10838] **34**	43
30 [8]	78 [692] **56**	213 [1887] **56**	484 [4285] **55**	750 [6635] **54**	983 [8698] **53**	1251 [11075] **48**	57
38 [10]	59 [523] **70**	190 [1678] **70**	455 [4026] **69**	728 [6445] **69**	959 [8487] **67**	1244 [11008] **62**	71
45 [12]		176 [1554] **84**	438 [3879] **83**	719 [6360] **83**	945 [8360] **80**	1203 [10646] **77**	85
53 [14]		139 [1233] **98**	418 [3703] **97**	682 [6035] **96**	952 [8421] **94**	1183 [10467] **91**	99
61 [16]		109 [963] **112**	385 [3407] **111**	668 [5908] **111**	899 [7957] **110**	1163 [10290] **105**	114
68 [18]		83 [736] **126**	356 [3154] **126**	612 [5417] **125**	869 [7694] **124**	1116 [9876] **123**	128
Max. Cont. 76 [20]			323 [2861] **140**	603 [5333] **139**	829 [7335] **138**	1109 [9816] **134**	142
83 [22]			297 [2629] **154**	537 [4753] **153**	792 [7011] **152**		156
Max. Inter. 91 [24]			215 [1905] **169**	491 [4349] **168**	750 [6639] **168**		170

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width — Theoretical Torque - Nm [lb-in]

45.5 [1.791] mm [in]	147 [1302]	294 [2604]	588 [5207]	883 [7811]	1177 [10414]	1471 [13018]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

► Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

DISPLACEMENT PERFORMANCE

620

631 cm³ [38.5 in³] / rev

Flow - lpm [gpm]	Pressure - bar [psi] 17 [250]	35 [500]	69 [1000]	104 [1500]	121 [1750] Max. Cont.	155 [2250] Max. Inter.	Theoretical rpm
	Torque - Nm [lb-in], **Speed rpm**				**Intermittent Ratings -** 10% of Operation		
2 [0.5]	120 [1060] **2**	228 [2021] **1**					3
4 [1]	136 [1202] **5**	264 [2332] **5**	535 [4733] **5**	796 [7048] **4**	935 [8275] **3**		6
8 [2]	142 [1256] **11**	276 [2445] **11**	571 [5055] **11**	853 [7550] **10**	985 [8717] **9**	1256 [11117] **7**	12
15 [4]	131 [1159] **23**	269 [2379] **23**	581 [5141] **23**	870 [7696] **22**	1008 [8920] **21**	1279 [11320] **17**	24
23 [6]	111 [982] **35**	260 [2300] **35**	575 [5087] **34**	883 [7811] **34**	1014 [8976] **33**	1285 [11368] **29**	36
30 [8]	91 [809] **47**	247 [2184] **47**	555 [4914] **46**	855 [7570] **45**	1000 [8853] **44**	1291 [11421] **40**	48
38 [10]	67 [595] **59**	220 [1943] **58**	526 [4655] **58**	833 [7372] **57**	972 [8602] **56**	1268 [11225] **52**	60
45 [12]		203 [1794] **71**	504 [4456] **70**	815 [7208] **70**	953 [8437] **69**	1240 [10977] **65**	72
53 [14]		160 [1419] **83**	476 [4213] **81**	778 [6888] **80**	930 [8233] **79**	1225 [10843] **78**	84
61 [16]		124 [1095] **95**	439 [3885] **94**	753 [6666] **93**	895 [7917] **92**	1187 [10509] **90**	96
68 [18]		91 [801] **107**	407 [3599] **107**	703 [6223] **106**	852 [7537] **105**	1147 [10147] **104**	108
76 [20] Max. Cont.			358 [3172] **119**	675 [5974] **118**	815 [7215] **117**	1100 [9736] **115**	120
83 [22]			328 [2901] **131**	614 [5431] **131**	759 [6715] **130**		132
91 [24] Max. Inter.			247 [2185] **143**	556 [4922] **142**	706 [6249] **141**		144

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width	Theoretical Torque - Nm [lb-in] 173 [1532]	346 [3064]	692 [6127]	1039 [9191]	1212 [10729]	1559 [13794]
54.0 [2.125] mm [in]	Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]					

750

748 cm³ [45.6 in³] / rev

Flow - lpm [gpm]	Pressure - bar [psi] 17 [250]	35 [500]	69 [1000]	104 [1500] Max. Cont.	138 [2000] Peak	Theoretical rpm
	Torque - Nm [lb-in], **Speed rpm**			**Intermittent Ratings -** 10% of Operation		
2 [0.5]	147 [1299] **2**	281 [2487] **1**				3
4 [1]	156 [1379] **4**	322 [2852] **4**	652 [5768] **4**	967 [8554] **3**	1308 [11571] **3**	6
8 [2]	158 [1403] **9**	339 [3003] **9**	693 [6134] **9**	1027 [9088] **8**	1360 [12033] **7**	11
15 [4]	153 [1350] **19**	331 [2933] **19**	705 [6241] **19**	1064 [9419] **18**	1416 [12534] **16**	21
23 [6]	135 [1194] **29**	321 [2840] **29**	697 [6166] **28**	1059 [9373] **28**	1408 [12462] **26**	31
30 [8]	114 [1008] **40**	304 [2690] **40**	678 [6002] **39**	1039 [9197] **38**	1421 [12573] **34**	41
38 [10]	82 [722] **50**	271 [2395] **49**	648 [5733] **49**	1015 [8980] **48**	1371 [12130] **47**	51
45 [12]	54 [477] **60**	249 [2207] **60**	616 [5452] **59**	983 [8699] **59**	1345 [11902] **56**	61
53 [14]		197 [1739] **70**	577 [5104] **69**	946 [8372] **68**	1311 [11600] **67**	71
61 [16]		150 [1325] **80**	533 [4718] **79**	905 [8008] **78**	1271 [11249] **76**	82
68 [18]		105 [927] **90**	494 [4374] **90**	860 [7614] **89**	1225 [10843] **88**	92
76 [20] Max. Cont.		62 [552] **100**	423 [3741] **100**	805 [7123] **99**	1173 [10385] **98**	102
83 [22]			385 [3404] **110**	747 [6608] **110**		112
91 [24] Max. Inter.			302 [2669] **121**	670 [5932] **120**		122

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Rotor Width	Theoretical Torque - Nm [lb-in] 205 [1815]	410 [3631]	821 [7261]	1231 [10892]	1641 [14522]
63.5 [2.501] mm [in]	Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]				

▶ Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 7.

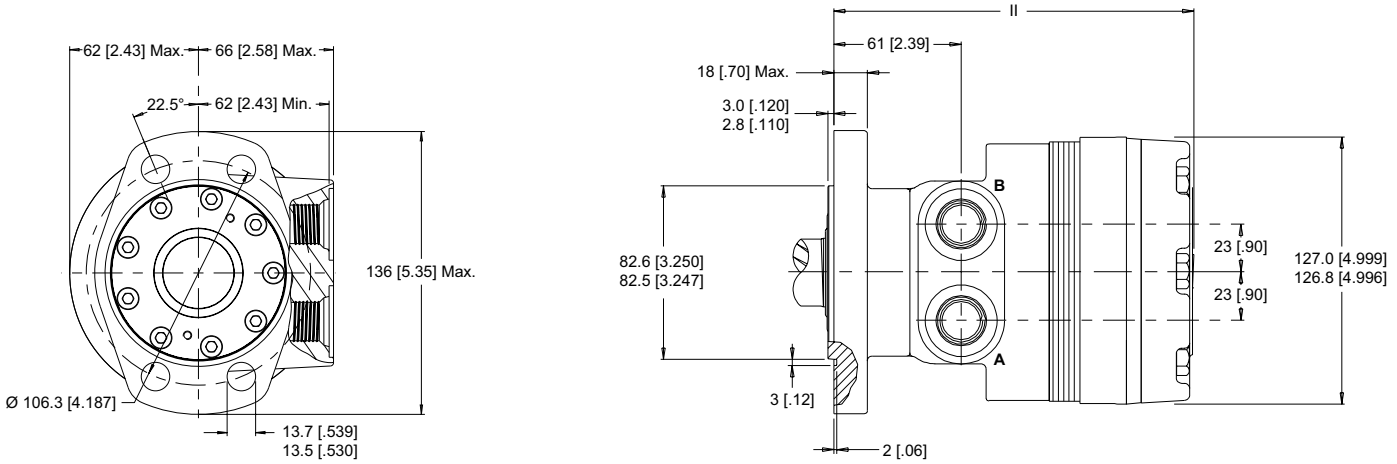
HOUSINGS

▶ Dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

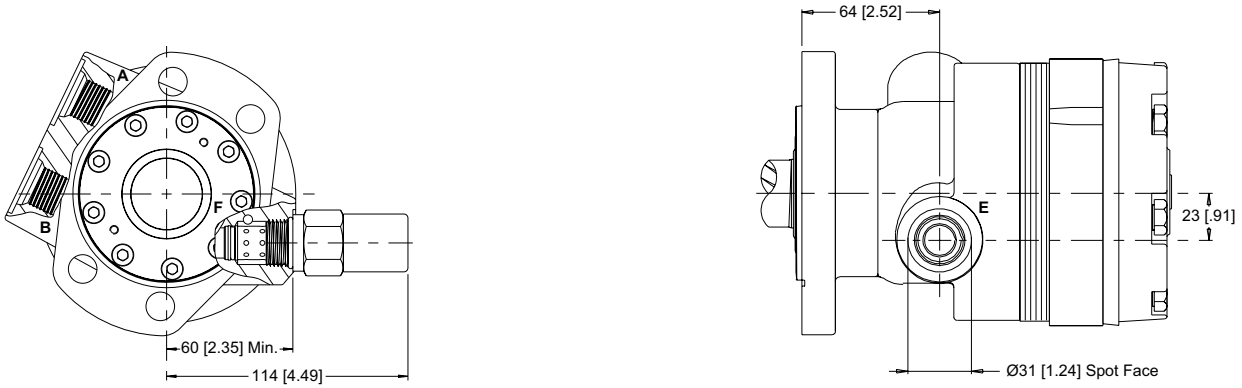
4-HOLE, MAGNETO MOUNT, ALIGNED PORTS

A31 7/8-14 UNF **A38** G 1/2

STANDARD



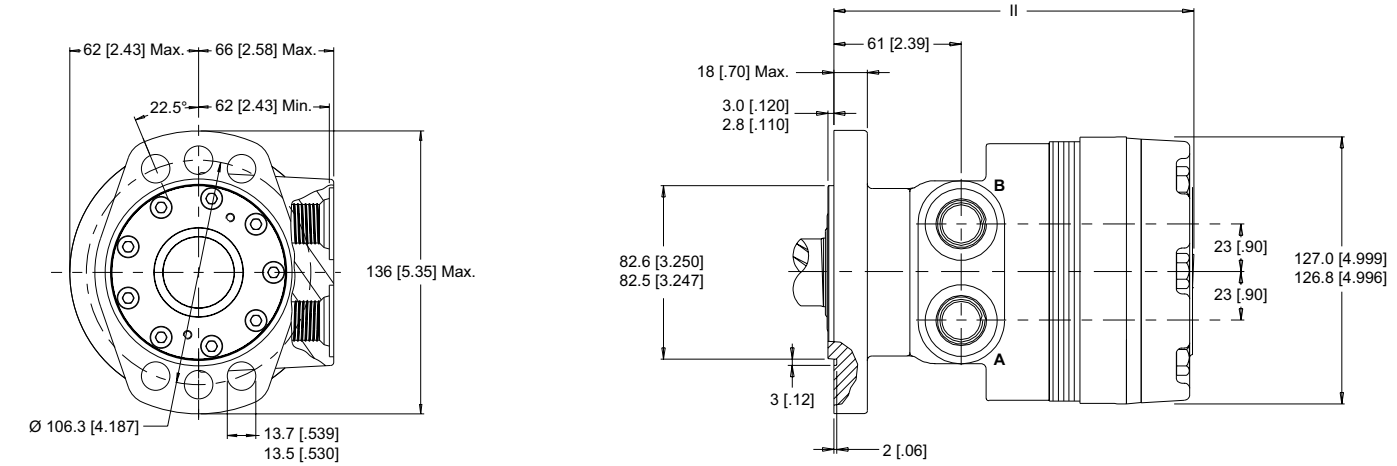
OPTIONAL VALVE CAVITY



E: 10 Series/2-Way Valve Cavity 7/8-14 UNF **F**: Valve Cartridge Installed

6-HOLE, SAE A MOUNT, ALIGNED PORTS

A51 7/8-14 UNF **A58** G 1/2



▶ Dimension II is charted on page 76.

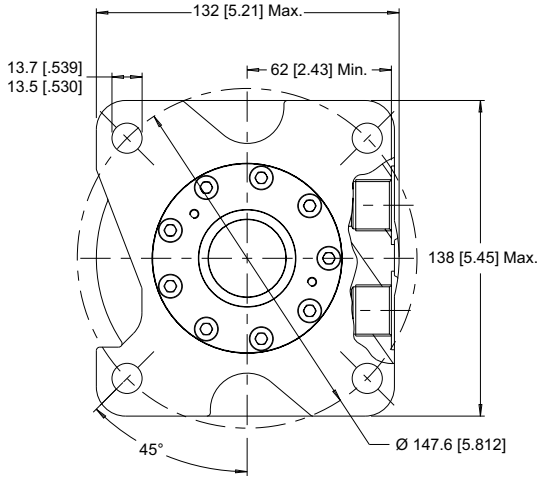
HOUSINGS

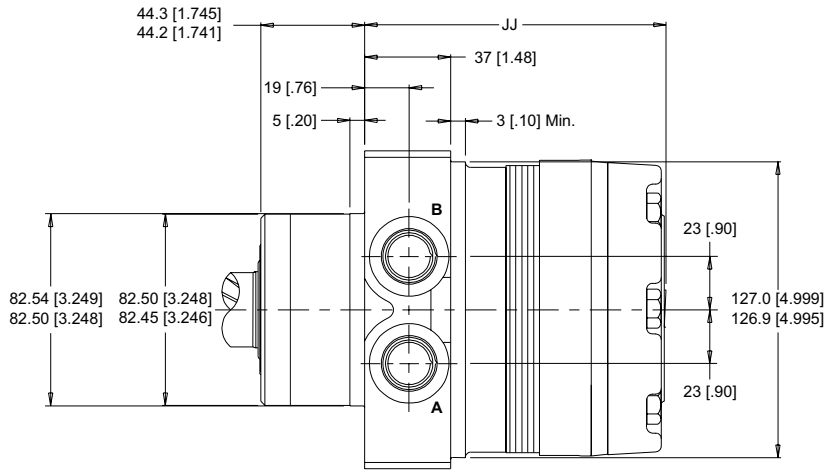
▶ Dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

4-HOLE, WHEEL MOUNT, ALIGNED PORTS

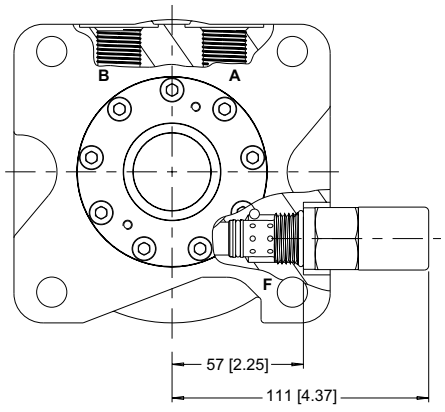
W31 7/8-14 UNF **W38** G 1/2

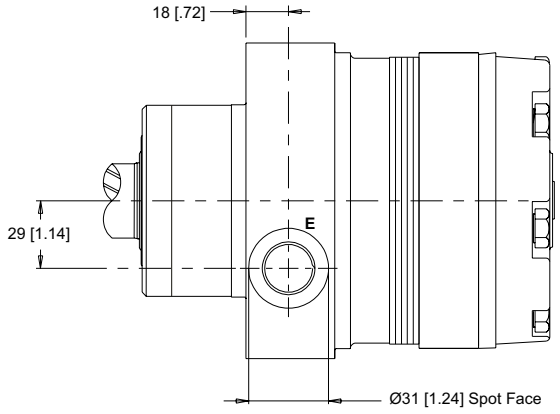
STANDARD





OPTIONAL VALVE CAVITY





E: 10 Series/2-Way Valve Cavity 7/8-14 UNF **F**: Valve Cartridge Installed

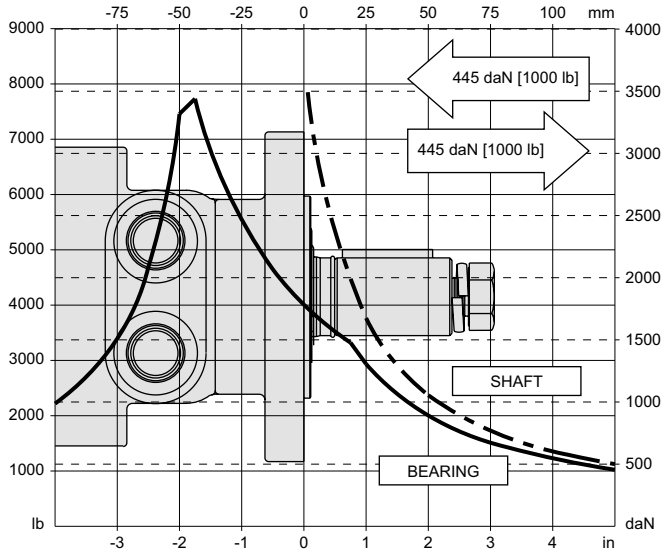
▶ Dimension JJ is charted on page 76.

TECHNICAL INFORMATION

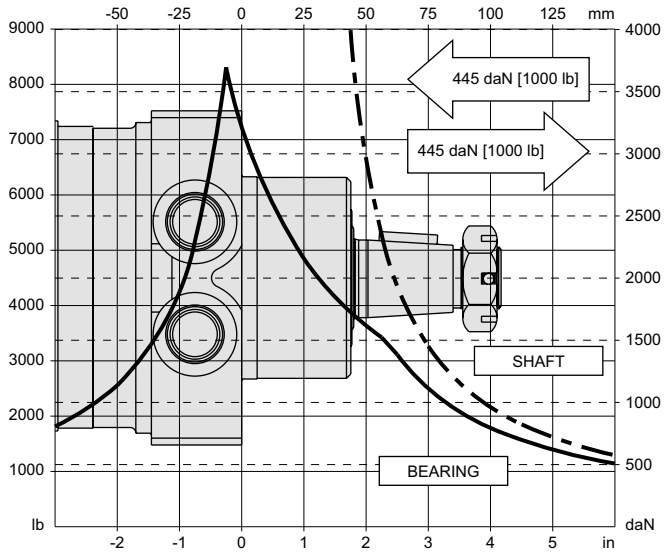
ALLOWABLE SHAFT LOAD / BEARING CURVE

The bearing curve represents allowable bearing loads based on ISO 281 bearing capacity for an L_{10} life of 2,000 hours at 100 rpm. Radial loads for speeds other than 100 rpm may be calculated using the multiplication factor table on page 8.

MAGNETO & SAE A MOUNTS



WHEEL MOUNTS



LENGTH & WEIGHT CHART

Dimensions II & JJ are the overall motor lengths from the rear of the motor to the mounting flange surface and are referenced on detailed housing drawings listed on pages 74 & 75.

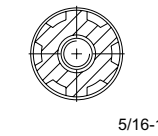
II	Length	Weight
#	mm [in]	kg [lb]
120	162 [6.37]	10.6 [23.4]
160	162 [6.37]	10.6 [23.4]
200	165 [6.51]	11.0 [24.2]
230	168 [6.61]	11.1 [24.4]
260	170 [6.70]	11.3 [25.0]
300	174 [6.83]	11.7 [25.8]
350	187 [7.38]	12.8 [28.2]
375	180 [7.08]	12.2 [27.0]
470	187 [7.38]	12.8 [28.2]
540	194 [7.62]	13.3 [29.4]
620	202 [7.95]	14.1 [30.9]
750	212 [8.33]	14.8 [32.5]

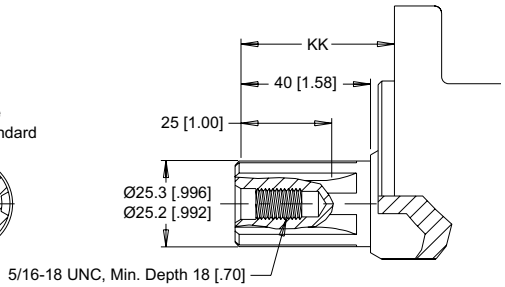
JJ	Length	Weight
#	mm [in]	kg [lb]
120	120 [4.72]	11.7 [25.8]
160	120 [4.72]	11.7 [25.8]
200	123 [4.86]	12.1 [26.6]
230	126 [4.95]	12.2 [26.8]
260	128 [5.05]	12.4 [27.4]
300	132 [5.18]	12.8 [28.2]
350	146 [5.73]	13.9 [30.6]
375	138 [5.43]	13.3 [29.4]
470	146 [5.73]	13.9 [30.6]
540	152 [5.97]	14.4 [31.8]
620	161 [6.35]	15.1 [33.4]
750	170 [6.68]	15.8 [34.9]

▶ All RE series motor weights can vary ± 0.5 kg [1 lb] depending on model configurations such as housing, shaft, endcover, options etc.

SHAFTS

02 1" 6B Spline



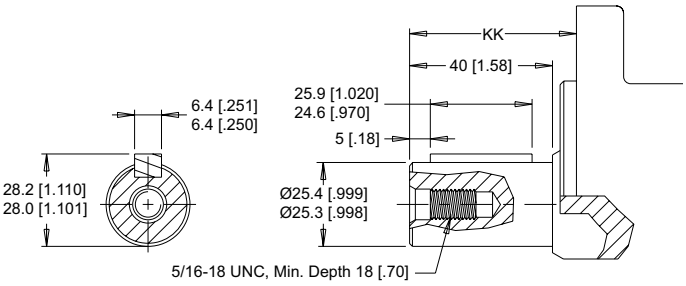


Max. Torque: 678 Nm [6000 lb-in]

03 1" 6B Spline Extended

Max. Torque: 678 Nm [6000 lb-in]

10 1" Straight

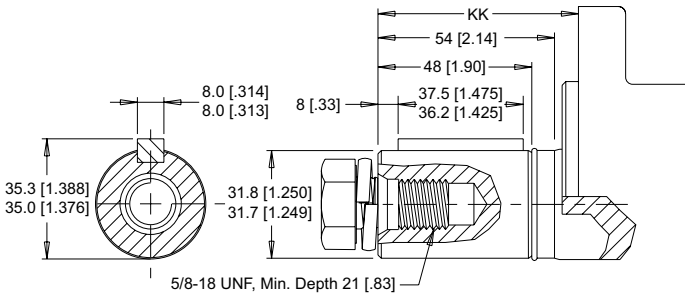


Max. Torque: 655 Nm [5800 lb-in]

15 1" Straight Extended

Max. Torque: 655 Nm [5800 lb-in]

07 1-1/4" Straight Extended

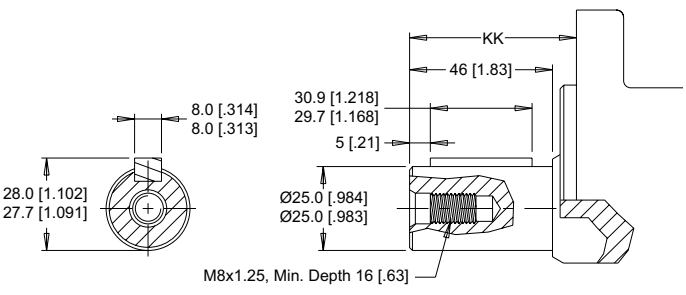


Max. Torque: 1200 Nm [10600 lb-in]

20 1-1/4" Straight

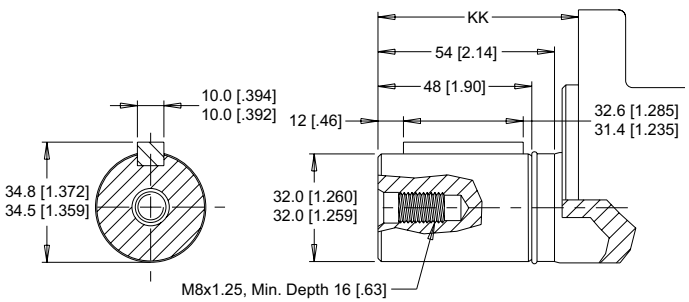
Max. Torque: 1200 Nm [10600 lb-in]

12 25mm Straight



Max. Torque: 678 Nm [6000 lb-in]

08 32mm Straight Extended

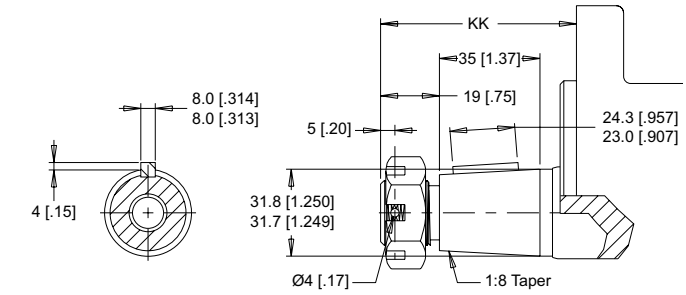


Max. Torque: 1200 Nm [10600 lb-in]

21 32mm Straight

Max. Torque: 1200 Nm [10600 lb-in]

22 1-1/4" Tapered



▶ A slotted hex nut is standard on this shaft.

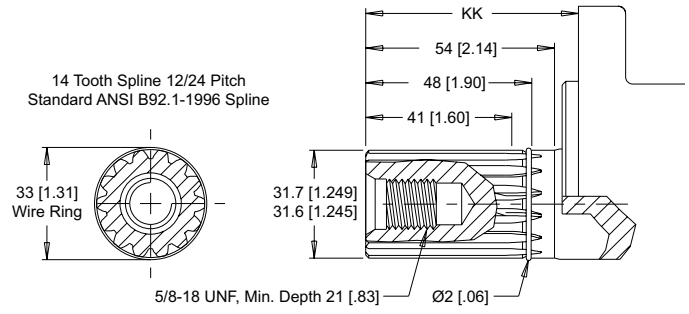
Max. Torque: 1200 Nm [10600 lb-in]

25 1-1/4" Tapered Extended

▶ A slotted hex nut is standard on this shaft.

Max. Torque: 1200 Nm [10600 lb-in]

09 14 Tooth Spline Extended



Max. Torque: 1200 Nm [10600 lb-in]

23 14 Tooth Spline

Max. Torque: 1200 Nm [10600 lb-in]

MOUNTING / SHAFT LENGTH CHART

Dimension KK is the overall distance from the motor mounting surface to the end of the shaft and is referenced on detailed shaft drawings above.

KK	Magneto & A Mounts	Wheel Mounts
#	mm [in]	mm [in]
02	50 [1.97]	91 [3.60]
03	76 [3.01]	118 [4.64]
07	88 [3.45]	129 [5.09]
08	88 [3.45]	129 [5.09]
09	88 [3.45]	129 [5.09]
10	50 [1.97]	91 [3.60]
12	56 [2.21]	98 [3.84]
15	76 [3.01]	118 [4.64]
20	61 [2.41]	103 [4.05]
21	61 [2.41]	103 [4.05]
22	66 [2.58]	107 [4.22]
23	61 [2.41]	103 [4.05]
25	92 [3.62]	134 [5.26]

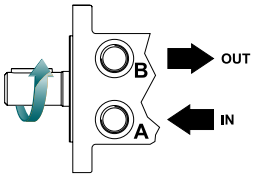
▶ Shaft lengths vary ± 0.8 mm [.030 in.]

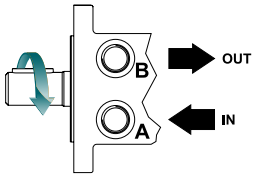
ORDERING INFORMATION

1	2	3	4	5	6	7	8

1. CHOOSE SERIES DESIGNATION

505	Standard Rotation
506	Reverse Rotation





▶ The 505 & 506 series are bi-directional. For applications requiring the motor to rotate in only one direction, shaft seal life may be prolonged by pressurizing the A port of the motor.

2. SELECT A DISPLACEMENT OPTION

120	121 cm^3/rev [7.4 in^3/rev]	**350**	348 cm^3/rev [21.2 in^3/rev]
160	162 cm^3/rev [9.9 in^3/rev]	**375**	375 cm^3/rev [22.8 in^3/rev]
200	204 cm^3/rev [12.4 in^3/rev]	**470**	465 cm^3/rev [28.3 in^3/rev]
230	232 cm^3/rev [14.2 in^3/rev]	**540**	536 cm^3/rev [32.7 in^3/rev]
260	261 cm^3/rev [15.9 in^3/rev]	**620**	631 cm^3/rev [38.5 in^3/rev]
300	300 cm^3/rev [18.3 in^3/rev]	**750**	748 cm^3/rev [45.6 in^3/rev]

3. SELECT A MOUNT & PORT OPTION

A31	4-Hole, Magneto Mount, Aligned Ports, 7/8-14 UNF
A38	4-Hole, Magneto Mount, Aligned Ports, G 1/2
A51	6-Hole, SAE A Mount, Aligned Ports, 7/8-14 UNF
A58	6-Hole, SAE A Mount, Aligned Ports, G 1/2
W31	4-Hole, Wheel Mount, Aligned Ports, 7/8-14 UNF
W38	4-Hole, Wheel Mount, Aligned Ports, G 1/2

▶ Speed sensor option is not available with wheel mounts

4. SELECT A SHAFT OPTION

02	1” 6B Spline	**15**	1” Straight Extended
03	1” 6B Spline Extended	**20**	1-1/4” Straight
07	1-1/4” Straight Extended	**21**	32mm Straight
08	32mm Straight Extended	**22**	1-1/4” Tapered
09	14 Tooth Spline Extended	**23**	14 Tooth Spline
10	1” Straight	**25**	1-1/4” Tapered Extended
12	25mm Straight		

▶ Extended shafts are designed for use with one of the speed sensor options listed in STEP 7.

5. SELECT A PAINT OPTION

A	Black
B	Black, Unpainted Mounting Surface
Z	No Paint

6. SELECT A VALVE CAVITY / CARTRIDGE OPTION

A	None	**E**	104 bar [1500 psi] Relief
B	Valve Cavity Only	**F**	121 bar [1750 psi] Relief
C	69 bar [1000 psi] Relief	**G**	138 bar [2000 psi] Relief
D	86 bar [1250 psi] Relief		

▶ Valve cavity is not available on the A51 & A58 housings.

7. SELECT AN ADD-ON OPTION

A	Standard
B	Lock Nut
C	Solid Hex Nut
W	Speed Sensor, Dual, 4-Pin Male Weatherpack Connector
X	Speed Sensor, Dual, 4-Pin M12 Male Connector
Y	Speed Sensor, Single, 3-Pin Male Weatherpack Connector
Z	Speed Sensor, Single, 4-Pin M12 Male Connector

8. SELECT A MISCELLANEOUS OPTION

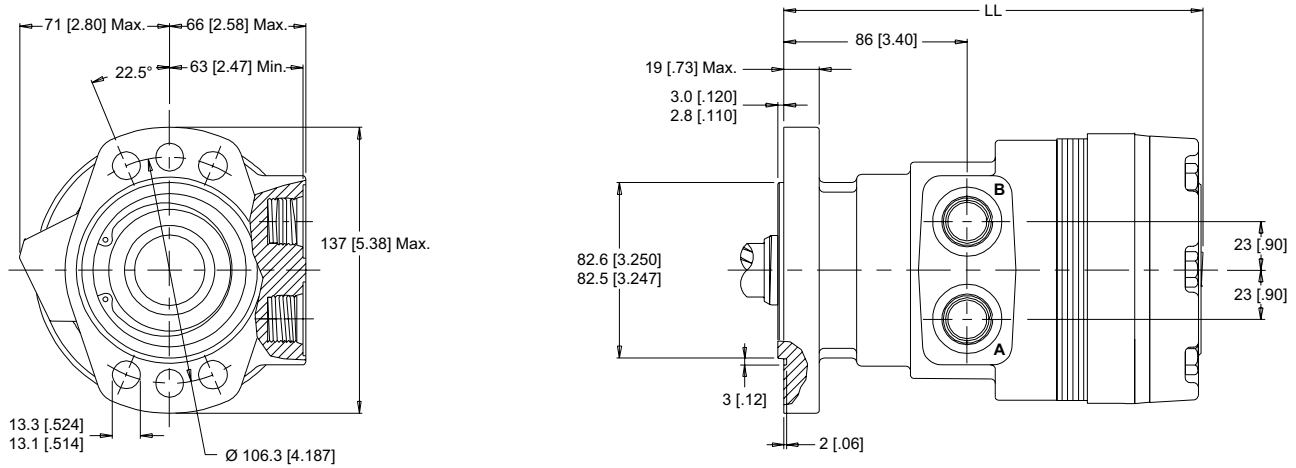
AA	None
AC	Freeturning Rotor
AE	Hydraulic Declutch With Freeturning Rotor

HOUSINGS

▶ Dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

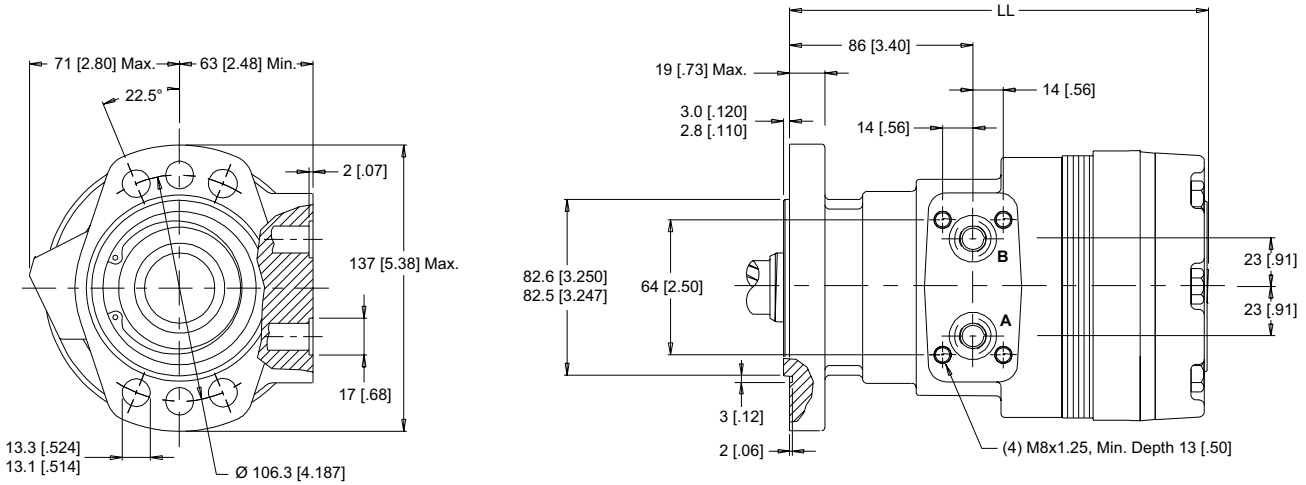
6-HOLE, SAE A MOUNT, ALIGNED PORTS

A51 7/8-14 UNF **A58** G 1/2



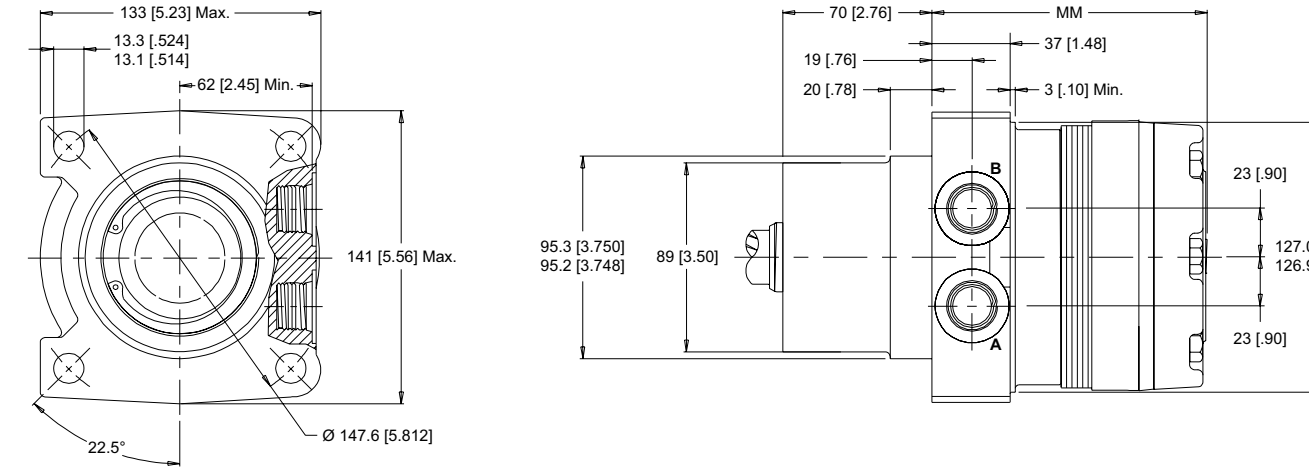
6-HOLE, SAE A MOUNT, ALIGNED MANIFOLD PORTS

A57 1/2" Drilled



4-HOLE, WHEEL MOUNT, ALIGNED PORTS

W31 7/8-14 UNF **W38** G 1/2



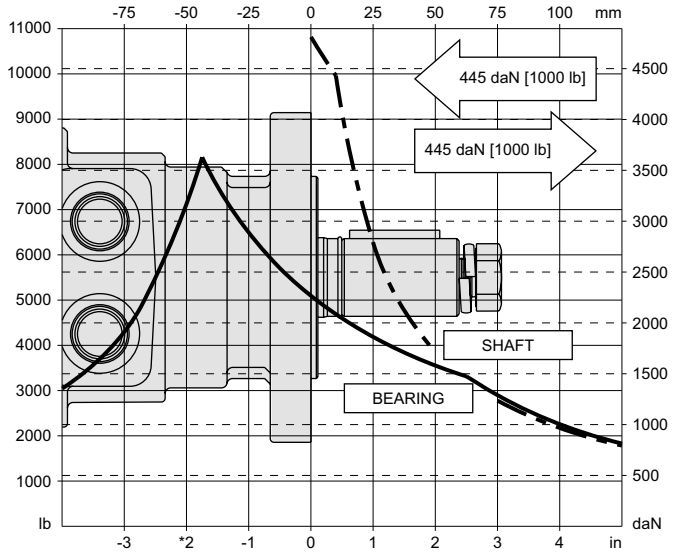
▶ Dimensions LL & MM are charted on page 80.

TECHNICAL INFORMATION

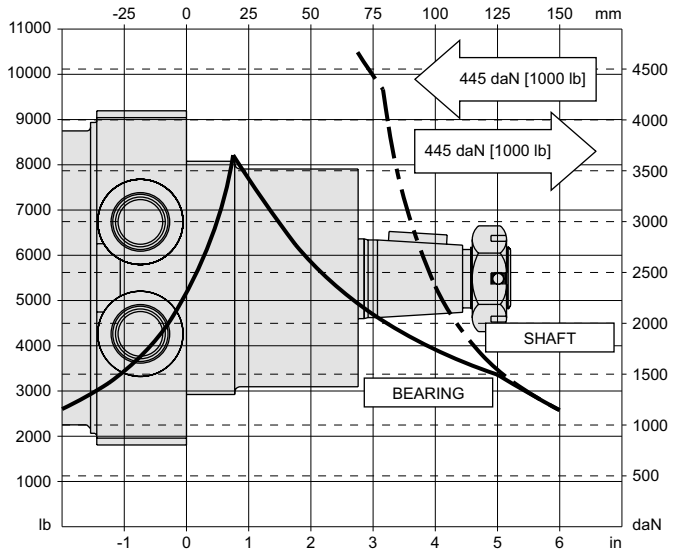
ALLOWABLE SHAFT LOAD / BEARING CURVE

The bearing curve represents allowable bearing loads based on ISO 281 bearing capacity for an L_{10} life of 2,000 hours at 100 rpm. Radial loads for speeds other than 100 rpm may be calculated using the multiplication factor table on page 8.

SAE A MOUNTS



WHEEL MOUNTS



LENGTH & WEIGHT CHART

Dimensions LL & MM are the overall motor lengths from the rear of the motor to the mounting flange surface and are referenced on detailed housing drawings listed on page 79.

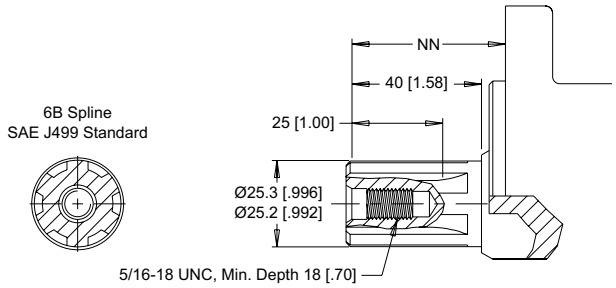
LL	Length	Weight
#	mm [in]	kg [lb]
120	187 [7.37]	13.3 [29.4]
160	187 [7.37]	13.3 [29.4]
200	191 [7.51]	13.7 [30.2]
230	193 [7.61]	13.8 [30.4]
260	196 [7.70]	14.1 [31.0]
300	199 [7.83]	14.4 [31.8]
350	213 [8.38]	15.5 [34.2]
375	205 [8.08]	15.0 [33.0]
470	213 [8.38]	15.5 [34.2]
540	219 [8.62]	16.1 [35.4]
620	227 [8.95]	16.8 [36.9]
750	237 [9.33]	17.5 [38.5]

MM	Length	Weight
#	mm [in]	kg [lb]
120	120 [4.72]	12.9 [28.4]
160	120 [4.72]	12.9 [28.4]
200	123 [4.86]	13.2 [29.2]
230	126 [4.95]	13.3 [29.4]
260	128 [5.05]	13.6 [30.0]
300	132 [5.18]	14.0 [30.8]
350	146 [5.73]	15.1 [33.2]
375	138 [5.43]	14.5 [32.0]
470	146 [5.73]	15.1 [33.2]
540	152 [5.97]	15.6 [34.4]
620	160 [6.30]	16.3 [35.9]
750	170 [6.68]	17.0 [37.5]

▶ All RE series motor weights can vary ± 0.5 kg [1 lb] depending on model configurations such as housing, shaft, endcover, options etc.

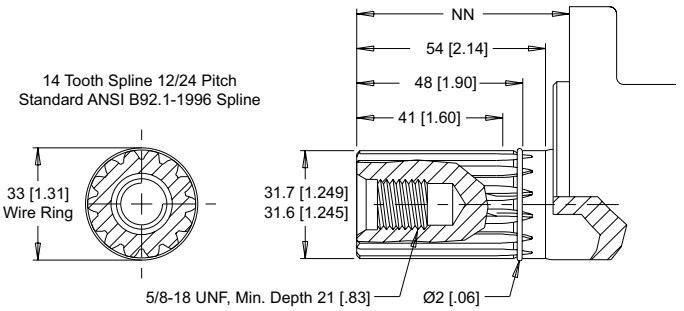
SHAFTS

03 1" 6B Spline



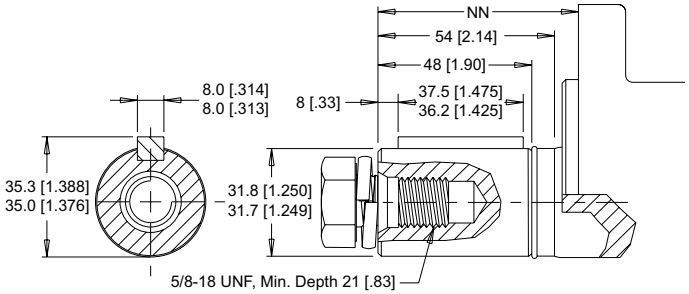
Max. Torque: 678 Nm [6000 lb-in]

09 14 Tooth Spline



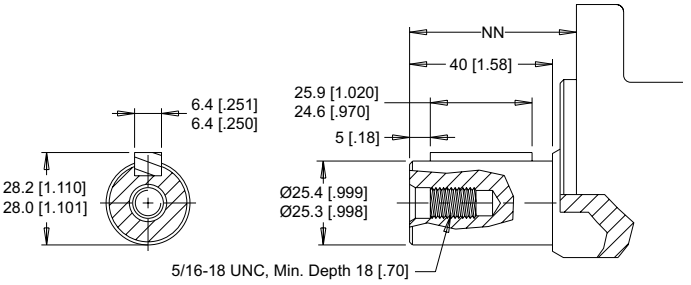
Max. Torque: 1200 Nm [10600 lb-in]

07 1-1/4" Straight



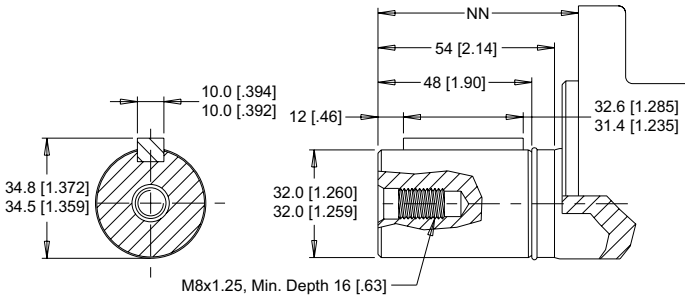
Max. Torque: 1200 Nm [10600 lb-in]

15 1" Straight



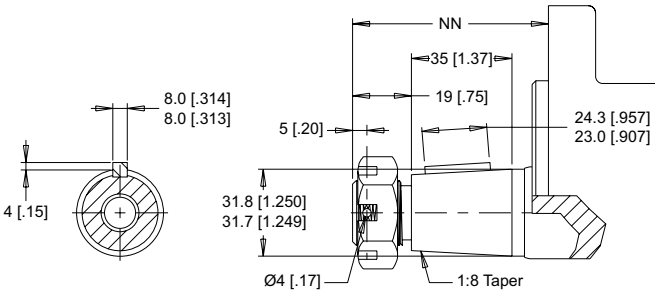
Max. Torque: 655 Nm [5800 lb-in]

08 32mm Straight



Max. Torque: 1200 Nm [10600 lb-in]

25 1-1/4" Tapered



▶ A slotted hex nut is standard on this shaft.

Max. Torque: 1200 Nm [10600 lb-in]

MOUNTING / SHAFT LENGTH CHART

Dimension NN is the overall distance from the motor mounting surface to the end of the shaft and is referenced on detailed shaft drawings above.

NN	SAE A Mounts	Wheel Mounts
#	mm [in]	mm [in]
03	51 [2.02]	119 [4.69]
07	63 [2.47]	131 [5.15]
08	62 [2.47]	130 [5.15]
09	63 [2.47]	131 [5.15]
15	51 [2.02]	119 [4.69]
25	67 [2.63]	133 [5.25]

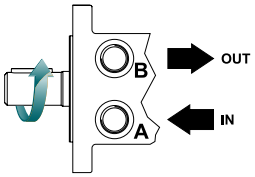
▶ Shaft lengths vary ± 0.8 mm [.030 in.]

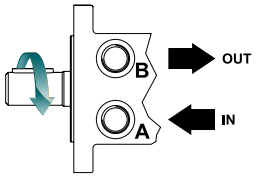
ORDERING INFORMATION

1 2 3 4 5 6 7 8

1. CHOOSE SERIES DESIGNATION

520	Standard Rotation
521	Reverse Rotation





▶ The 520 & 521 series are bi-directional. For applications requiring the motor to rotate in only one direction, shaft seal life may be prolonged by pressurizing the A port of the motor.

2. SELECT A DISPLACEMENT OPTION

120	121 cm^3/rev [7.4 in^3/rev]	**350**	348 cm^3/rev [21.2 in^3/rev]
160	162 cm^3/rev [9.9 in^3/rev]	**375**	375 cm^3/rev [22.8 in^3/rev]
200	204 cm^3/rev [12.4 in^3/rev]	**470**	465 cm^3/rev [28.3 in^3/rev]
230	232 cm^3/rev [14.2 in^3/rev]	**540**	536 cm^3/rev [32.7 in^3/rev]
260	261 cm^3/rev [15.9 in^3/rev]	**620**	631 cm^3/rev [38.5 in^3/rev]
300	300 cm^3/rev [18.3 in^3/rev]	**750**	748 cm^3/rev [45.6 in^3/rev]

3. SELECT A MOUNT & PORT OPTION

A51	6-Hole, SAE A Mount, Aligned Ports, 7/8-14 UNF
A57	6-Hole, SAE A Mount, Aligned Manifold Ports, 1/2” Drilled
A58	6-Hole, SAE A Mount, Aligned Ports, G 1/2
W31	4-Hole, Wheel Mount, Aligned Ports, 7/8/14 UNF
W38	4-Hole, Wheel Mount, Aligned Ports, G 1/2

4. SELECT A SHAFT OPTION

03	1” 6B Spline	**09**	14 Tooth Spline
07	1-1/4” Straight	**15**	1” Straight
08	32mm Straight	**25**	1-1/4” Tapered

5. SELECT A PAINT OPTION

A	Black
B	Black, Unpainted Mounting Surface
Z	No Paint

6. SELECT A VALVE CAVITY / CARTRIDGE OPTION

A	None

7. SELECT AN ADD-ON OPTION

A	Standard
B	Lock Nut
C	Solid Hex Nut

8. SELECT A MISCELLANEOUS OPTION

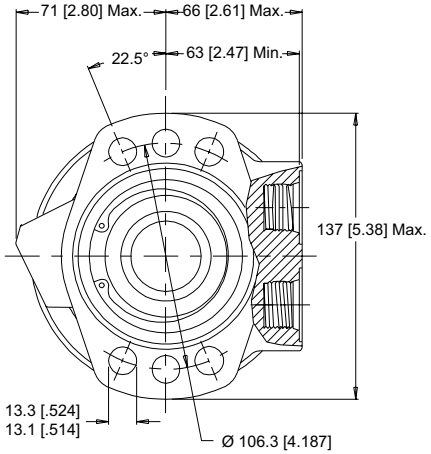
AA	None
AC	Freeturning Rotor
AE	Hydraulic Declutch With Freeturning Rotor

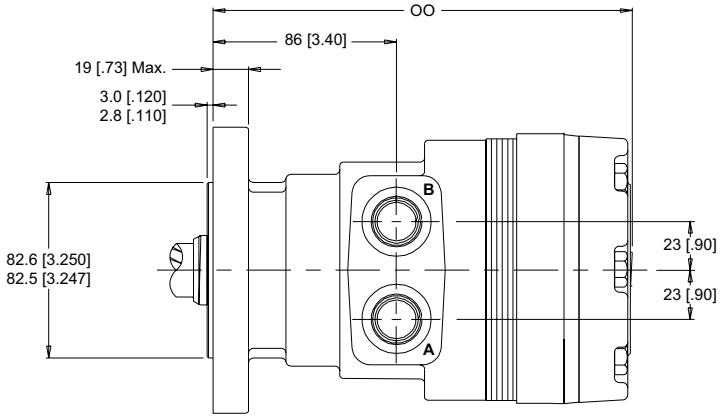
HOUSINGS

▶ Dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

6-HOLE, SAE A MOUNT, ALIGNED PORTS

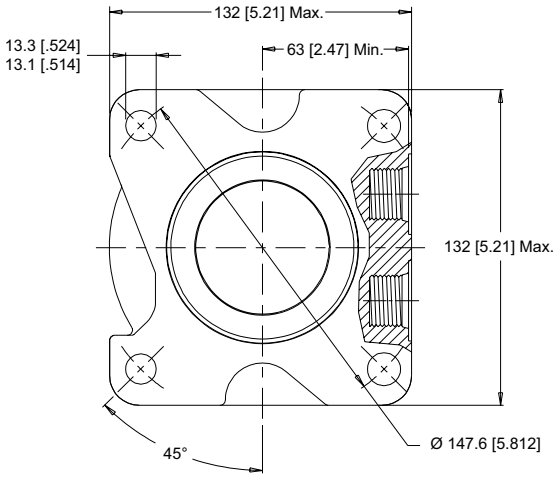
A51 7/8-14 UNF **A58** G 1/2

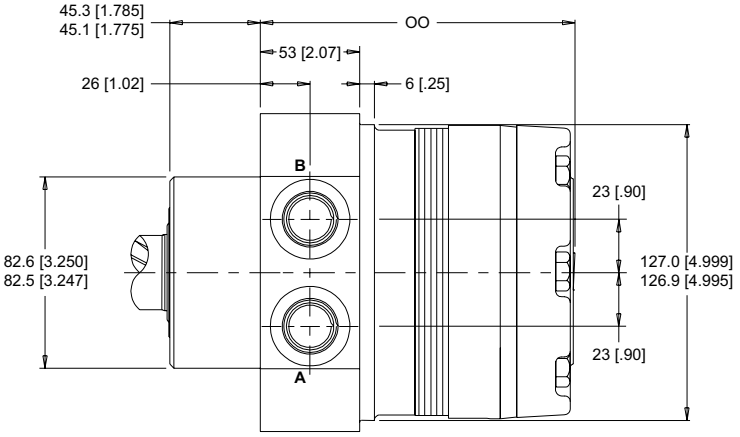




4-HOLE, WHEEL MOUNT, ALIGNED PORTS

T31 7/8-14 UNF **T38** G 1/2 **W31** 7/8-14 UNF **W38** G 1/2





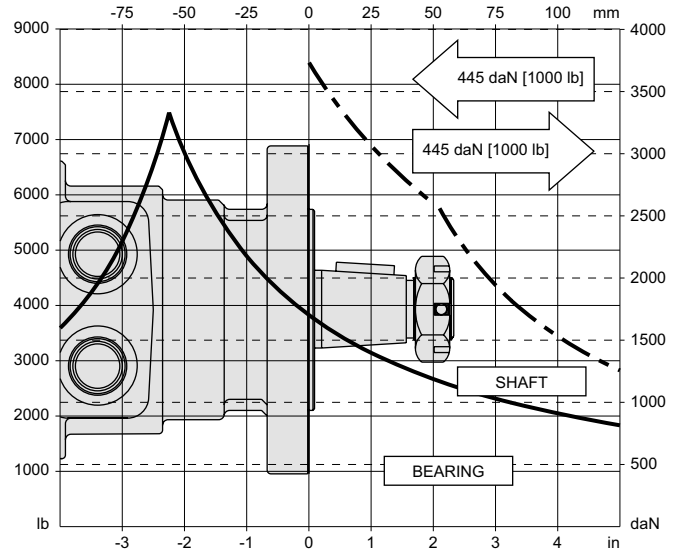
▶ Dimension OO is charted on page 84.

TECHNICAL INFORMATION

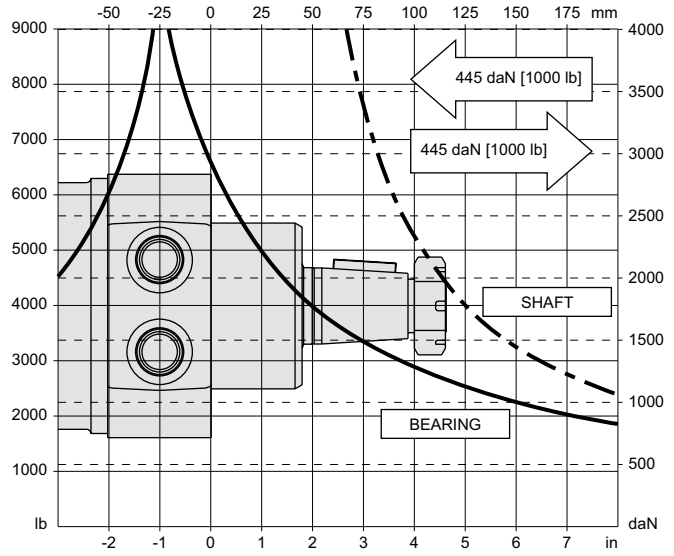
ALLOWABLE SHAFT LOAD / BEARING CURVE

The bearing curve represents allowable bearing loads based on ISO 281 bearing capacity for an L_{10} life of 2,000 hours at 100 rpm. Radial loads for speeds other than 100 rpm may be calculated using the multiplication factor table on page 8.

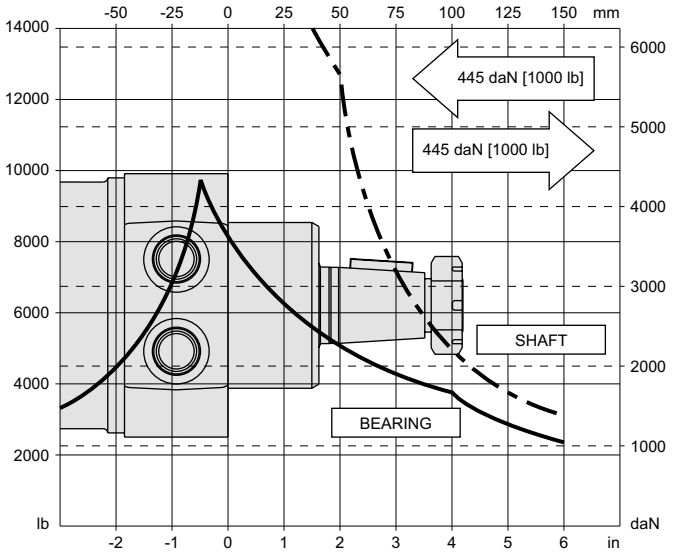
SAE A MOUNTS



T31 & T38 WHEEL MOUNTS



W31 & W38 WHEEL MOUNTS



LENGTH & WEIGHT CHART

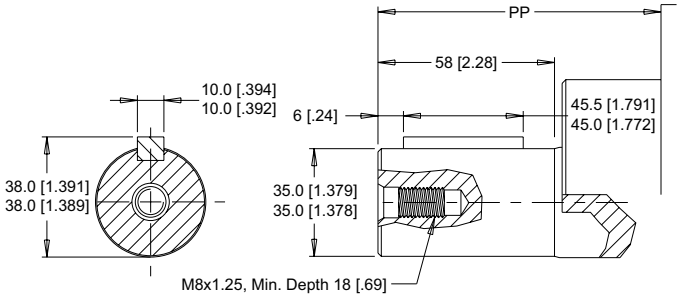
Dimension OO is the overall motor length from the rear of the motor to the mounting flange surface and are referenced on detailed housing drawings listed on page 83.

OO	SAE A Mounts	Wheel Mounts	Weight
#	mm [in]	mm [in]	kg [lb]
120	187 [7.37]	156 [6.15]	13.3 [29.4]
160	187 [7.37]	156 [6.15]	13.3 [29.4]
200	191 [7.51]	159 [6.29]	13.7 [30.2]
230	193 [7.61]	162 [6.38]	13.8 [30.4]
260	196 [7.70]	165 [6.48]	14.1 [31.0]
300	199 [7.83]	168 [6.61]	14.4 [31.8]
350	213 [8.38]	182 [7.16]	15.5 [34.2]
375	205 [8.08]	174 [6.86]	15.0 [33.0]
470	213 [8.38]	182 [7.16]	15.5 [34.2]
540	219 [8.62]	188 [7.40]	16.1 [35.4]
620	227 [8.95]	196 [7.77]	16.8 [36.9]
750	237 [9.33]	206 [8.11]	17.5 [38.5]

▶ All RE series motor weights can vary ± 0.5 kg [1 lb] depending on model configurations such as housing, shaft, endcover, options etc.

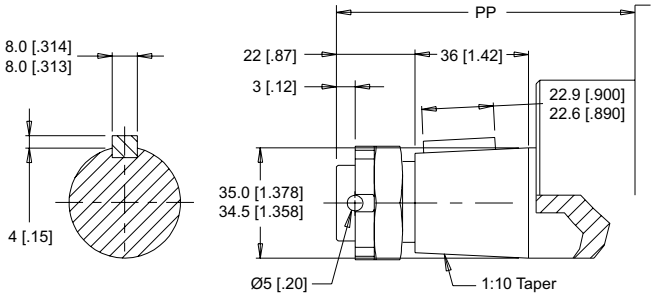
SHAFTS

27 35mm Straight



Max. Torque: 1200 Nm [10600 lb-in]

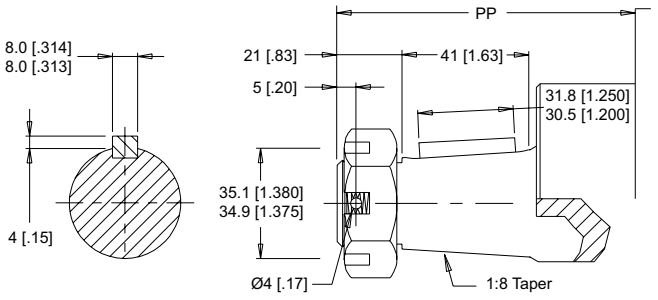
28 35mm" Tapered



▶ A slotted hex nut is standard on this shaft.

Max. Torque: 1200 Nm [10600 lb-in]

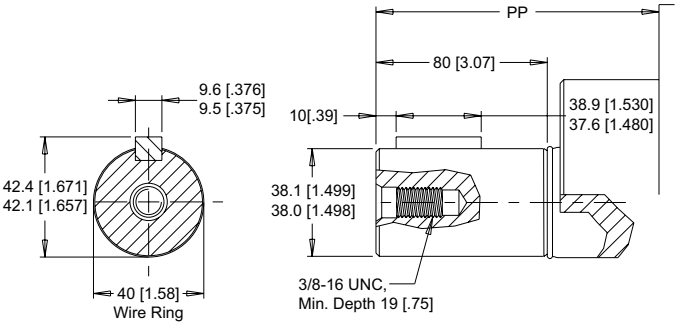
M4 1-3/8" Tapered



▶ A slotted hex nut is standard on this shaft.

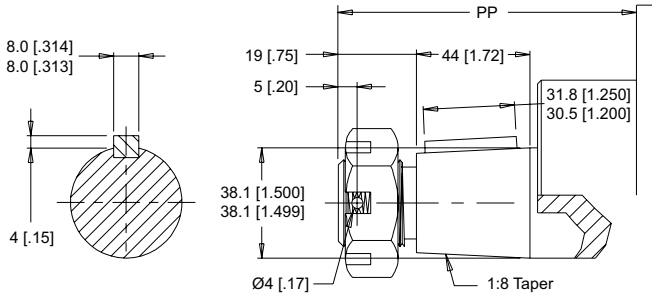
Max. Torque: 1200 Nm [10600 lb-in]

30 1-1/2" Straight



Max. Torque: 1200 Nm [10600 lb-in]

31 1-1/2" Tapered



▶ A slotted hex nut is standard on this shaft.

Max. Torque: 1200 Nm [10600 lb-in]

MOUNTING / SHAFT LENGTH CHART

Dimension PP is the overall distance from the motor mounting surface to the end of the shaft and is referenced on detailed shaft drawings above.

▶ Shaft lengths vary ± 0.8 mm [.030 in.]

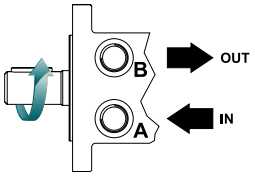
PP	SAE A Mounts	Wheel Mounts
#	mm [in]	mm [in]
27	N/A	104 [3.97]
28	N/A	105 [4.14]
30	87 [3.42]	118 [4.63]
31	84 [3.32]	115 [4.53]
M4	83 [3.28]	114 [4.49]

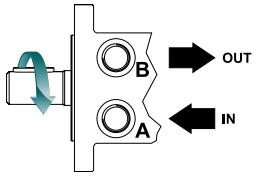
ORDERING INFORMATION

1	2	3	4	5	6	7	8

1. CHOOSE SERIES DESIGNATION

530	Standard Rotation
531	Reverse Rotation





▶ The 530 & 531 series are bi-directional. For applications requiring the motor to rotate in only one direction, shaft seal life may be prolonged by pressurizing the A port of the motor.

2. SELECT A DISPLACEMENT OPTION

120	121 cm^3/rev [7.4 in^3/rev]	**350**	348 cm^3/rev [21.2 in^3/rev]
160	162 cm^3/rev [9.9 in^3/rev]	**375**	375 cm^3/rev [22.8 in^3/rev]
200	204 cm^3/rev [12.4 in^3/rev]	**470**	465 cm^3/rev [28.3 in^3/rev]
230	232 cm^3/rev [14.2 in^3/rev]	**540**	536 cm^3/rev [32.7 in^3/rev]
260	261 cm^3/rev [15.9 in^3/rev]	**620**	631 cm^3/rev [38.5 in^3/rev]
300	300 cm^3/rev [18.3 in^3/rev]	**750**	748 cm^3/rev [45.6 in^3/rev]

3. SELECT A MOUNT & PORT OPTION

A51	6-Hole, SAE A Mount, Aligned Ports, 7/8-14 UNF
A58	6-Hole, SAE A Mount, Aligned Ports, G 1/2
T31	4-Hole, Wheel Mount, Aligned Ports, 7/8/14 UNF
T38	4-Hole, Wheel Mount, Aligned Ports, G 1/2
W31	4-Hole, Wheel Mount, Aligned Ports, 7/8/14 UNF
W38	4-Hole, Wheel Mount, Aligned Ports, G 1/2

4. SELECT A SHAFT OPTION

27	35mm Straight	**31**	1-1/2” Tapered
28	35mm Tapered	**M4**	1-3/8” Tapered
30	1-1/2” Straight		

▶ The 27 & 28 shafts are not available with SAE A mounts. The M4 shaft is only available with the “T” mount wheel motors.

5. SELECT A PAINT OPTION

A	Black
B	Black, Unpainted Mounting Surface
Z	No Paint

6. SELECT A VALVE CAVITY / CARTRIDGE OPTION

A	None

7. SELECT AN ADD-ON OPTION

A	Standard
B	Lock Nut
C	Solid Hex Nut

8. SELECT A MISCELLANEOUS OPTION

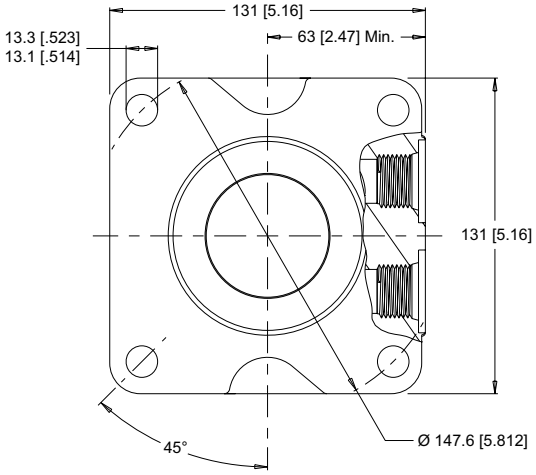
AA	None
AC	Freeturning Rotor
AE	Hydraulic Declutch With Freeturning Rotor

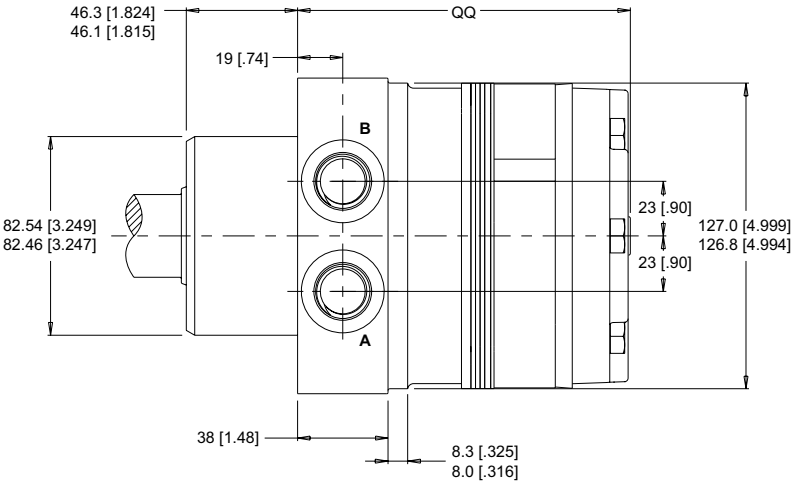
HOUSINGS

▶ Dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

4-HOLE, WHEEL MOUNT, ALIGNED PORTS

T31 7/8-14 UNF



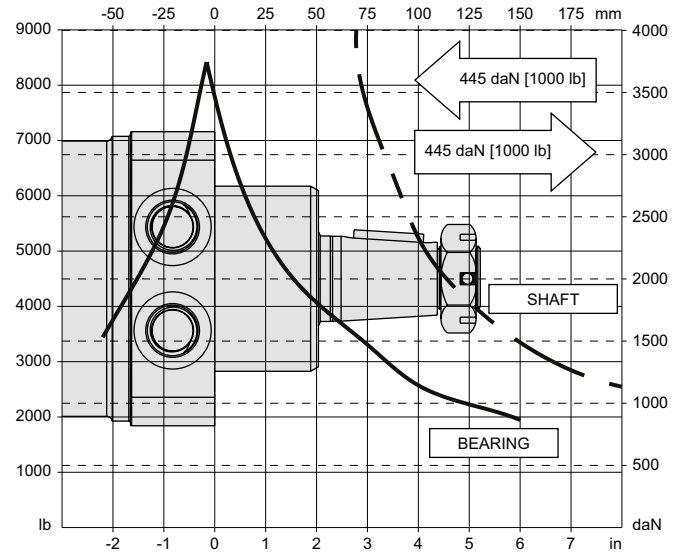


TECHNICAL INFORMATION

ALLOWABLE SHAFT LOAD / BEARING CURVE

The bearing curve represents allowable bearing loads based on ISO 281 bearing capacity for an L_{10} life of 2,000 hours at 100 rpm. Radial loads for speeds other than 100 rpm may be calculated using the multiplication factor table on page 8.

WHEEL MOUNT



LENGTH & WEIGHT CHART

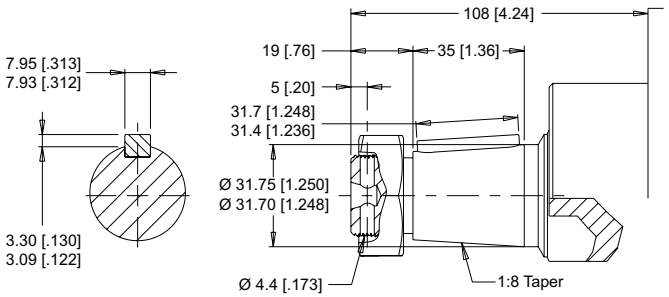
Dimension QQ is the overall motor length from the rear of the motor to the mounting flange surface and are referenced on detailed housing drawings listed above.

QQ	Length	Weight
#	mm [in]	kg [lb]
200	129 [5.08]	13.7 [30.1]
230	132 [5.18]	13.8 [30.4]
300	137 [5.40]	14.4 [31.7]
375	144 [5.65]	15.0 [33.0]

▶ All RE series motor weights can vary ± 0.5 kg [1 lb] depending on model configurations such as housing, shaft, endcover, options etc.

SHAFTS

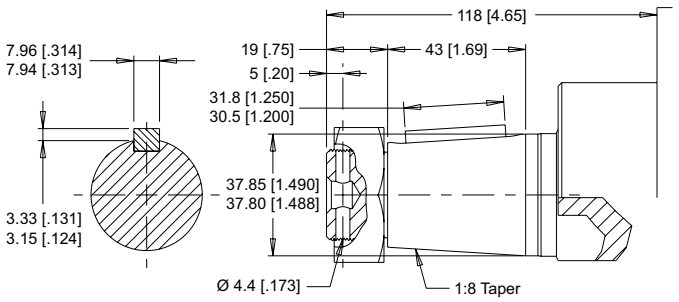
22 1-1/4" Tapered



▶ A slotted hex nut is standard on this shaft.

Max. Torque: 1200 Nm [10600 lb-in]

31 1-1/2" Tapered



▶ A slotted hex nut is standard on this shaft.

Max. Torque: 1200 Nm [10600 lb-in]

ORDERING INFORMATION

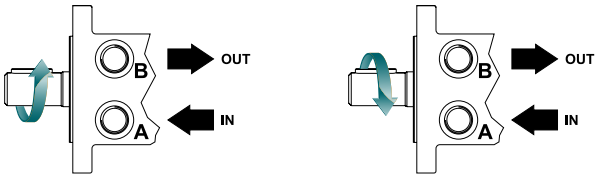
☐☐☐ ☐☐ ☐☐ ☐ ☐☐☐☐

1 2 3 4 5 6 7 8

1. CHOOSE SERIES DESIGNATION

535 Standard Rotation

536 Reverse Rotation



▶ The 535 & 536 series are bi-directional. For applications requiring the motor to rotate in only one direction, shaft seal life may be prolonged by pressurizing the A port of the motor.

2. SELECT A DISPLACEMENT OPTION

200	204 cm^3/rev [12.4 in^3/rev]	**300**	300 cm^3/rev [18.3 in^3/rev]
230	232 cm^3/rev [14.2 in^3/rev]	**375**	375 cm^3/rev [22.8 in^3/rev]

3. SELECT A MOUNT & PORT OPTION

T31 4-Hole, Wheel Mount, Aligned Ports, 7/8/14 UNF

4. SELECT A SHAFT OPTION

22 1-1/4" Tapered

31 1-1/2" Tapered

5. SELECT A PAINT OPTION

A Black

B Black, Unpainted Mounting Surface

Z No Paint

6. SELECT A VALVE CAVITY / CARTRIDGE OPTION

A None

7. SELECT AN ADD-ON OPTION

A Standard

8. SELECT A MISCELLANEOUS OPTION

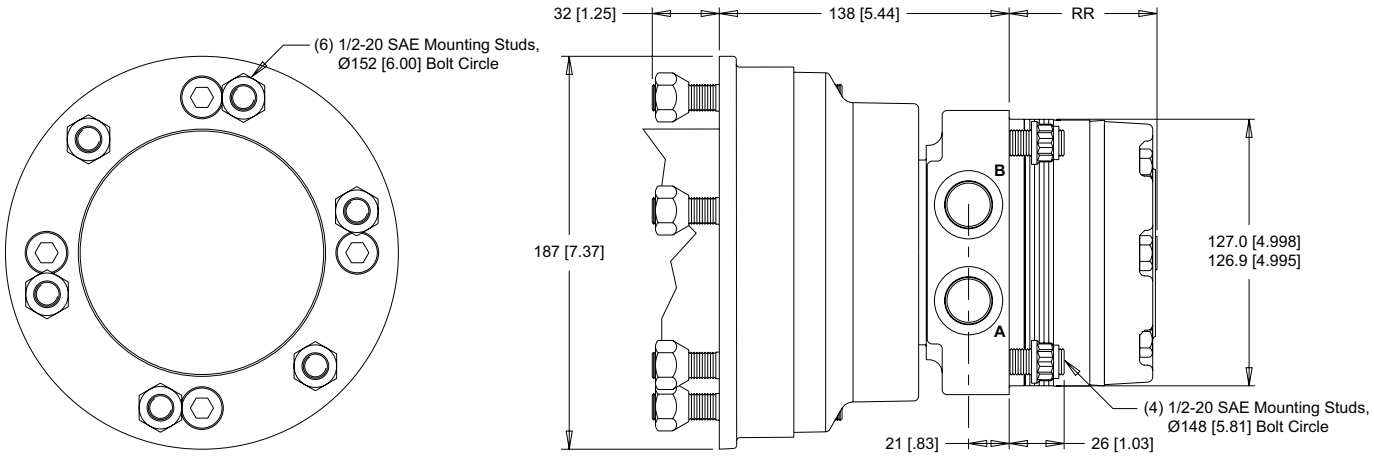
AA None

HOUSINGS

▶ Dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

4-HOLE, WHEEL HUB MOUNT, ALIGNED PORTS

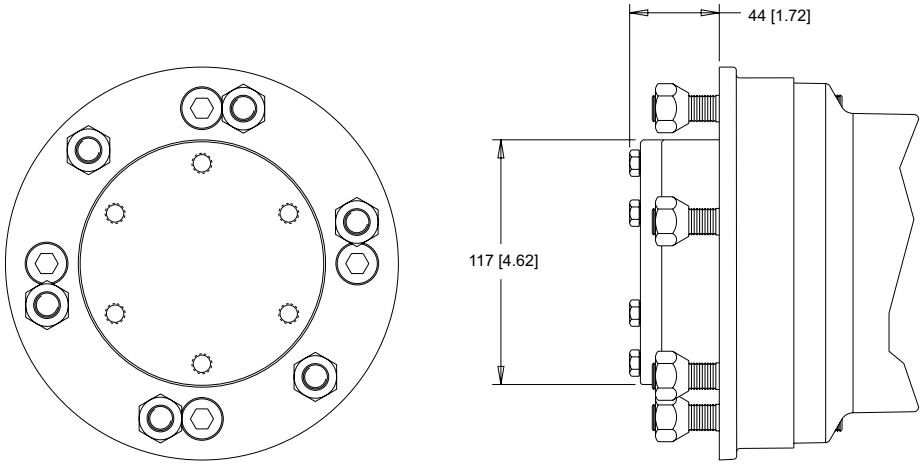
W31 7/8-14 UNF



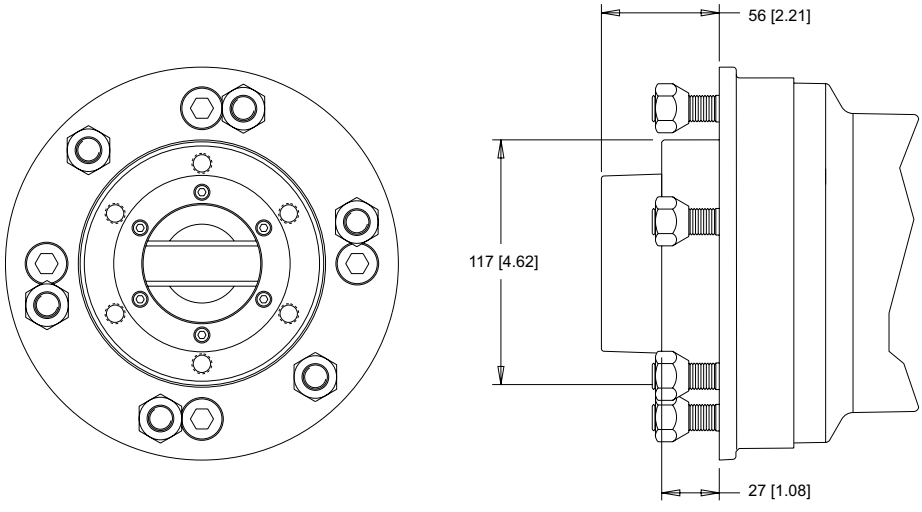
▶ Dimension RR is charted on page 90.

HUB OPTION DETAILS

STANDARD HUB



LOCKING HUB

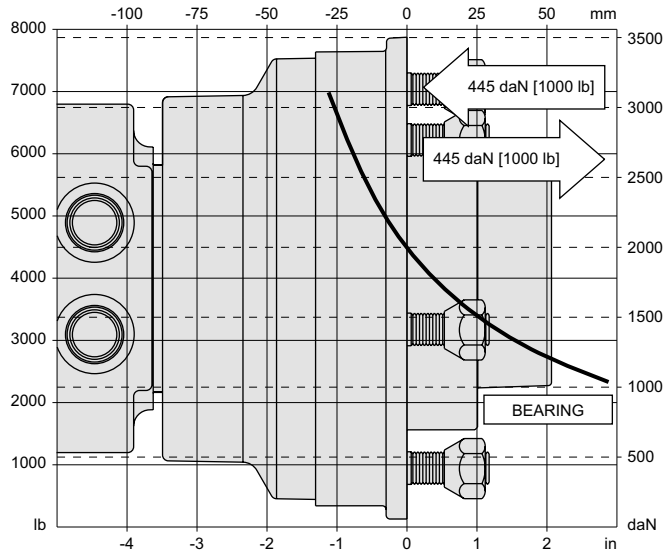


TECHNICAL INFORMATION

ALLOWABLE SHAFT LOAD / BEARING CURVE

The bearing curve represents allowable bearing loads based on ISO 281 bearing capacity for an L_{10} life of 2,000 hours at 100 rpm. Radial loads for speeds other than 100 rpm may be calculated using the multiplication factor table on page 8.

WHEEL HUB MOUNTS



LENGTH & WEIGHT CHART

Dimension RR is the overall motor length from the rear of the motor to the mounting flange surface and are referenced on detailed housing drawings listed on page 89.

RR	Length	Weight
#	mm [in]	kg [lb]
120	70 [2.77]	22.3 [49.1]
160	70 [2.77]	22.3 [49.1]
200	74 [2.90]	22.6 [49.9]
230	76 [2.99]	22.7 [50.1]
260	79 [3.09]	23.0 [50.7]
300	82 [3.22]	23.4 [51.5]
350	96 [3.77]	24.4 [53.9]
375	88 [3.47]	23.9 [52.7]
470	96 [3.77]	24.4 [53.9]
540	102 [4.01]	25.0 [55.1]
620	110 [4.34]	25.7 [56.6]
750	120 [4.72]	26.4 [58.2]

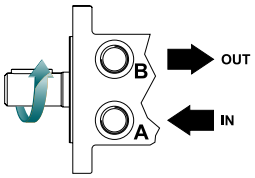
▶ All RE series motor weights can vary ± 0.5 kg [1 lb] depending on model configurations such as housing, shaft, endcover, options etc.

ORDERING INFORMATION

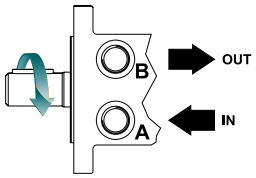
1 2 3 4 5 6 7 8

1. CHOOSE SERIES DESIGNATION

540 Standard Rotation



541 Reverse Rotation



▶ The 540 & 541 series are bi-directional. For applications requiring the motor to rotate in only one direction, shaft seal life may be prolonged by pressurizing the A port of the motor.

2. SELECT A DISPLACEMENT OPTION

120	121 cm³/rev [7.4 in³/rev]	**350**	348 cm³/rev [21.2 in³/rev]
160	162 cm³/rev [9.9 in³/rev]	**375**	375 cm³/rev [22.8 in³/rev]
200	204 cm³/rev [12.4 in³/rev]	**470**	465 cm³/rev [28.3 in³/rev]
230	232 cm³/rev [14.2 in³/rev]	**540**	536 cm³/rev [32.7 in³/rev]
260	261 cm³/rev [15.9 in³/rev]	**620**	631 cm³/rev [38.5 in³/rev]
300	300 cm³/rev [18.3 in³/rev]	**750**	748 cm³/rev [45.6 in³/rev]

3. SELECT A MOUNT & PORT OPTION

W31 4-Hole, Wheel Hub Mount, Aligned Ports, 7/8-14 UNF

4. SELECT A SHAFT OPTION

61 6-Bolt Wheel Flange

5. SELECT A PAINT OPTION

A Black
Z No Paint

6. SELECT A VALVE CAVITY / CARTRIDGE OPTION

A None

7. SELECT AN ADD-ON OPTION

A Standard
H Locking Hub

8. SELECT A MISCELLANEOUS OPTION

AA None
AC Freeturning Rotor
AE Hydraulic Declutch With Freeturning Rotor

DISCLAIMER

This catalog provides product options for further investigation by customers having technical expertise with respect to the use of such products. It is solely the responsibility of the customer to thoroughly analyze all aspects of the customer's application and to review the information concerning the product in the current product catalog. Due to the diversity of possible applications, the customer is solely responsible for making the final selection of the product(s) to be used and to assure that all performance, safety and warning requirements of the application are met. The customer is further solely responsible for all testing to verify acceptable life and performance of White Drive Products, Inc.'s products under actual operating conditions.

White Drive Products, Inc. has made all reasonable efforts to present accurate information in this catalog and shall not be responsible for any incorrect information which may result from unintentional errors or oversight. Due to continuous product improvement, the product specifications as stated in this catalog are subject to change by White Drive Products, Inc. at any time without notice. The customer should consult a sales representative of White Drive Products, Inc. for detailed information and to determine any changes in the information in this catalog.

IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIBED HEREIN CAN RESULT IN DEATH, PERSONAL INJURY AND/OR PROPERTY DAMAGE. WHITE DRIVE PRODUCTS, INC.'S SOLE RESPONSIBILITY WITH RESPECT TO ITS PRODUCTS IS SET FORTH IN WHITE DRIVE PRODUCTS, INC.'S WARRANTY/LIMITATION OF LIABILITY POLICY STATED HEREIN. EXCEPT AS SPECIFICALLY PROVIDED IN WHITE DRIVE PRODUCTS, INC.'S WARRANTY/LIMITATION OF LIABILITY POLICY, WHITE DRIVE PRODUCTS, INC. DISCLAIMS AND SHALL NOT BE LIABLE FOR ANY DAMAGES (INCLUDING DEATH), LIABILITY, CLAIMS, ACTIONS, CAUSES OF ACTION OR COST OF ANY KIND OR CHARACTER ARISING OUT OF OR RELATING IN ANY WAY TO ITS PRODUCTS, OR ANY USE, SELECTION OR APPLICATION OF ITS PRODUCTS. OUR WARRANTY/LIMITATION OF LIABILITY POLICY IS SUBJECT TO PERIODIC CHANGE; FOR A COPY OF OUR CURRENT WARRANTY/LIMITATION OF LIABILITY POLICY, PLEASE CONSULT A SELECT REPRESENTATIVE OF WHITE DRIVE PRODUCTS, INC.

PATENTED MOTOR DESIGN

Roller Stator® is the registered trademark (tradename) assigned to White Drive Products' patented rotor design. Found at the heart of every White Drive Products motor, this revolutionary rotor design is what sets White Drive Products motors apart from all other gerotor style hydraulic motors. Although other rotors may appear similar to the Roller Stator® design, closer examination reveals critical differences. The most important difference between White Drive Products motors and other designs lies in the profile of the rotor.

Through exhaustive analysis and testing, it was discovered that minute modifications to the profile of a standard rotor lead to increases in the life and efficiency of the motor. At any given point of rotor rotation, it is necessary for only three points on the rotor to maintain contact with the sealing rollers to isolate the high and low pressure areas of the motor from each other. Full contact by the remaining four rollers is functionally unnecessary, and robs power from the motor by producing additional friction. By making small dimensional changes to the rotor profile, measured in mere microns, the contact pressure of the rotor on the four rollers in noncritical positions was reduced, bringing about some very positive benefits to overall motor performance.

Reducing pressure on the four noncritical rollers leads to a reduction in drag, which increases the mechanical efficiency of the motor over the entire operating range, producing more usable power at the output shaft. Equally important, allowing the rollers in the noncritical sealing points to relax provides them the opportunity to rebuild the oil film, which is critical in reducing wear and extending motor life. These two key benefits give the Roller Stator® motor the technological edge over competitive designs, providing customers with motors that excel in efficiency and durability.