

Technical Information

Motor Brakes

Type HB, HK, CE, RE and DT



TABLE OF CONTENTS

TECHNICAL INFORMATION

Operating Recommendations.....	4-5
Motor Connections	5
Product Testing (Understanding the Performance Charts).....	6
Allowable Bearing & Shaft Loads	7
Vehicle Drive Calculations.....	8-9
Induced Side Loading.....	10
Hydraulic Equations.....	10
Shaft Nut Dimensions & Torque Specifications	11

OPTIONAL MOTOR FEATURES

Internal Drain.....	12
Valve Cavity Option	13
Freeturning Rotor Option.....	13

HYDRAULIC MOTOR/BRAKES

HB & HK Product Line Introduction	14
HB & HK Displacement Performance Charts	15-19
HB & HK Porting Options	20-21
HB 310 Series Housings & Technical Information	22
HB 310 Series Shafts	23
HB 310 Series Ordering Information	24
HK 315 Series Housings & Shafts.....	25
HK 315 Series Technical Information	26
HK 315 Series Ordering Information	27

CE Product Line Introduction.....	28
CE Displacement Performance Charts.....	29-34
CE 410/411 Series Housings.....	35
CE 410/411 Series Technical Information.....	36
CE 410/411 Series Ordering Information.....	37

RE Product Line Introduction.....	38
RE Displacement Performance Charts.....	39-44
RE 510/511 Series Housings.....	45
RE 510/511 Series Technical Information.....	46
RE 510/511 Series Ordering Information.....	47

DT Product Line Introduction.....	48
DT Displacement Performance Charts.....	49-53
DT 710 Series Housings & Technical Information	54
DT 710 Series Porting Options.....	55-56
DT 710 Series Shafts & Ordering Information	57

OPERATING RECOMMENDATIONS

OIL TYPE

Hydraulic oils with anti-wear, anti-foam and demulsifiers are recommended for systems incorporating these 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.

We recommend maintaining an oil cleanliness level of ISO 17-14 or better.

INSTALLATION & START-UP

When installing a 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! - The 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.

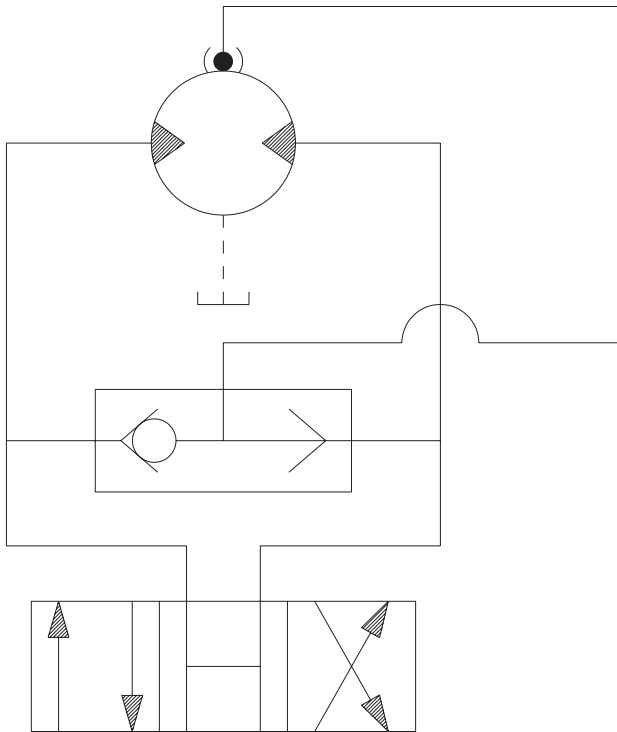
Caution! - Because it is possible for some large displacement motors to overpower the brake, it is critical that the maximum system pressure be limited for these applications. Failure to do so could cause serious injury or death. When choosing a motor/brake for an application, consult the performance 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 both of these ports may be used to release the brake in the

OPERATING RECOMMENDATIONS & MOTOR CONNECTIONS

MOTOR/BRAKE PRECAUTION (continued)

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.

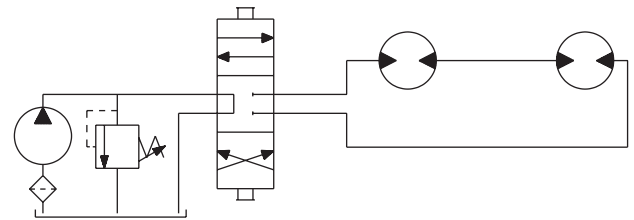
► NOTE: It is vital that all operating recommendations be followed. Failure to do so could result in injury or death.

MOTOR CIRCUITS

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

SERIES CONNECTION

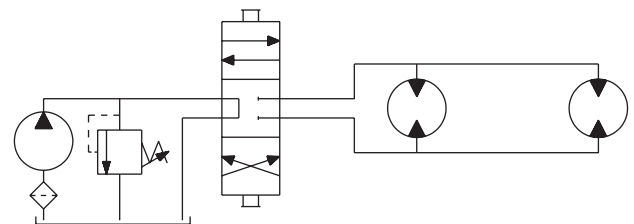
When motors are connected in series, the outlet of one motor is connected to the inlet of the next motor. This allows the full pump flow to go through each motor and provide maximum speed. Pressure and torque are distributed between the motors based on the load each motor is subjected to. The maximum 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.

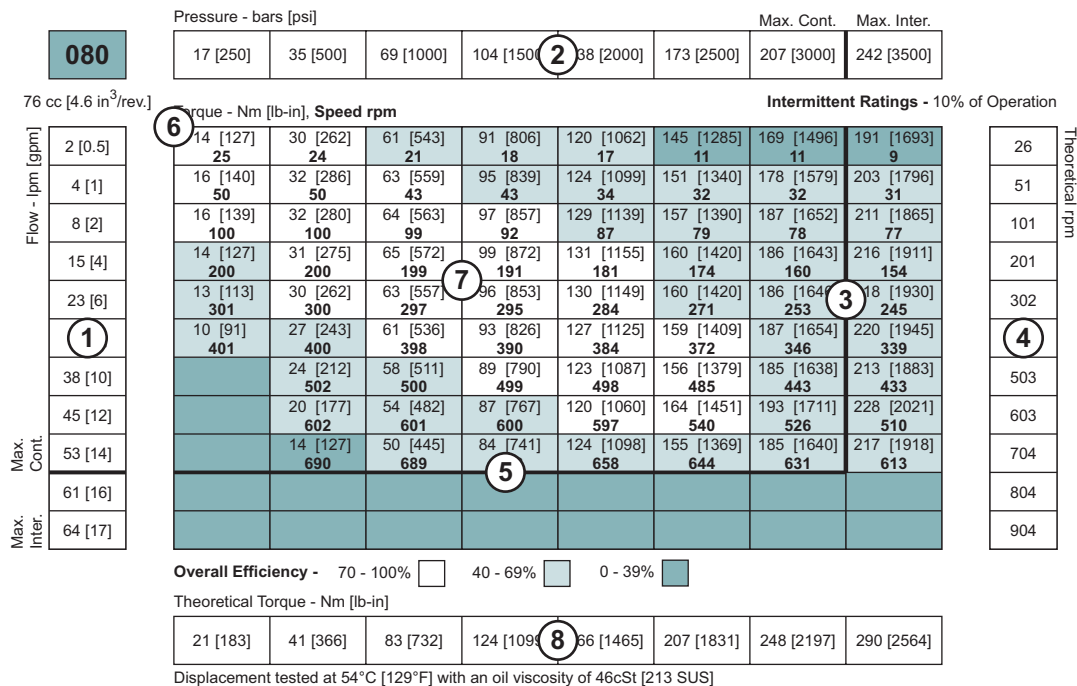


SERIES CIRCUIT

► 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 a 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.



- Flow represents the amount of fluid passing through the motor during each minute of the test.
- Pressure refers to the measured pressure differential between the inlet and return ports of the motor during the test.
- The maximum continuous pressure rating and maximum intermittent pressure rating of the motor are separated by the dark lines on the chart.
- 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.
- The maximum continuous flow rating and maximum intermittent flow rating of the motor are separated by the dark line on the chart.
- 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.
- Areas within the white shading represent maximum motor efficiencies.
- 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.

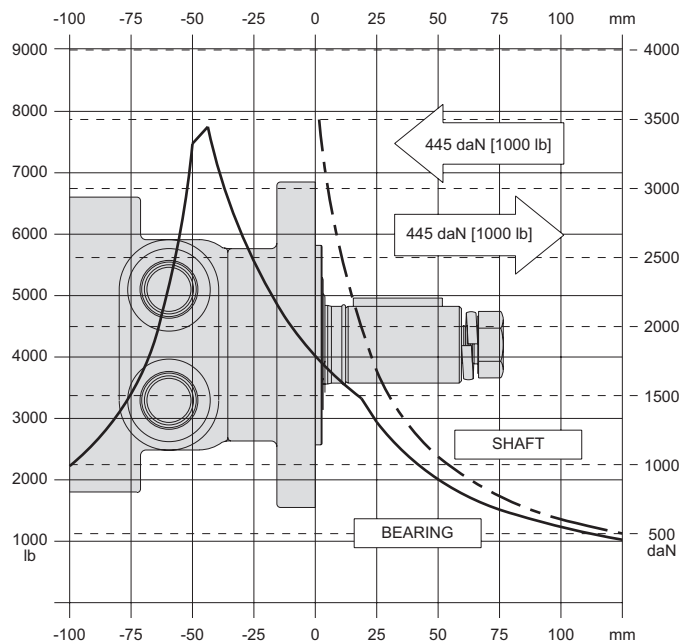
The bearing curves for each model are based on laboratory analysis and testing results constructed at the organization. The shaft loading is based on a 3:1 safety factor and 330 Kpsi tensile strength. The allowable load is the lower of the curves at a given point. For instance, one inch in front of the 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

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

$$L_{10} = \text{nominal rating life}$$

$$C = \text{dynamic load rating}$$

$$P = \text{equivalent dynamic load}$$

$$\text{Life Exponent } P = 10/3 \text{ for needle bearings}$$

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

$$\text{RPM} = \frac{2.65 \times \text{KPH} \times G}{r_m} \quad \text{RPM} = \frac{168 \times \text{MPH} \times G}{r_i}$$

Where:

MPH = max. vehicle speed (miles/hr)
 KPH = max. vehicle speed (kilometers/hr)
 r_i = rolling radius of tire (inches)
 G = gear reduction ratio (if none, $G = 1$)
 r_m = rolling radius of tire (meters)

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

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:

$$\text{TE} = \text{RR} + \text{GR} + \text{FA} + \text{DP} \text{ (lbs or N)}$$

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.

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

Where:

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

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

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:

$$\% \text{ Grade} = [\tan \text{ of angle (degrees)}] \times 100$$

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

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

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.

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

Where:

t = time to maximum speed (seconds)

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

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.

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

$$\text{Example } TE = 33 + 300 + 34 + 0 \text{ (lbs)} = 367 \text{ lbs}$$

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.

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

Where:

M = number of driving motors

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

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.

$$TS = \frac{W \times f \times r_i}{G} \qquad TS = \frac{W \times f \times r_m}{G}$$

(lb-in per motor) (N-m per motor)

Where:

f = coefficient of friction (see table 2)

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

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

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.

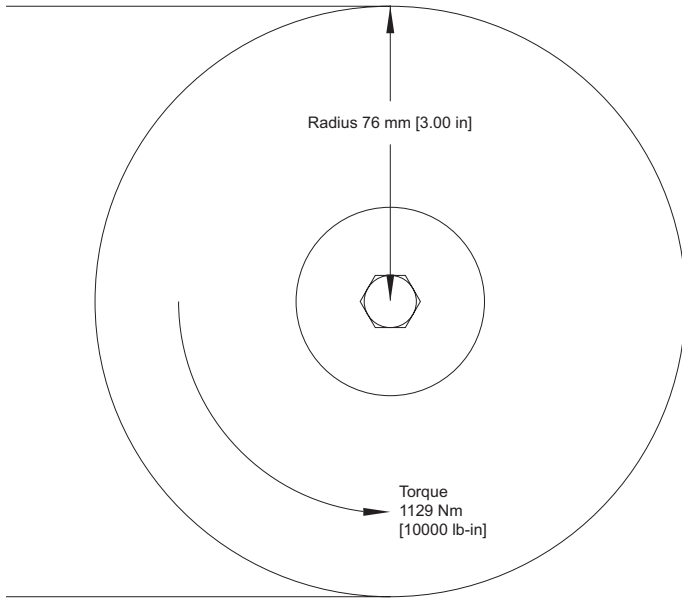
$$RL = \sqrt{W^2 + \left(\frac{T}{r_i}\right)^2} \text{ lb} \qquad RL = \sqrt{W^2 + \left(\frac{T}{r_m}\right)^2} \text{ kg}$$

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

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

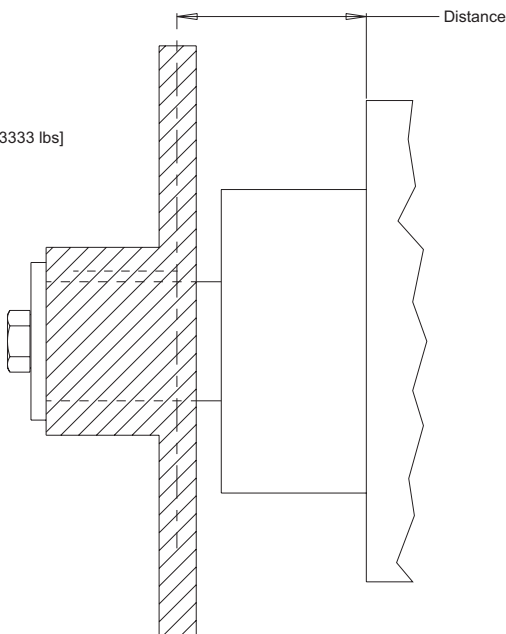
In many cases, pulleys or sprockets may be used to transmit the torque produced by the motor. Use of these components will create a torque induced side load on the motor shaft and bearings. It is important that this load be taken into consideration when choosing a motor with sufficient bearing and shaft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

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

$$\text{Side Load} = 14855 \text{ Nm [3333 lbs]}$$



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) =

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

Power In (HP) =

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

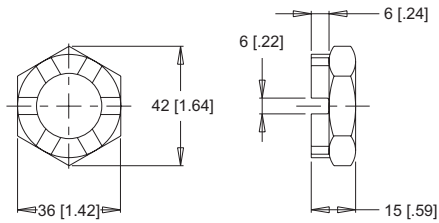
Power Out (HP) =

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

SHAFT NUT INFORMATION

35MM TAPERED SHAFTS M24 x 1.5 Thread

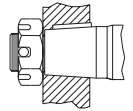
A Slotted Nut



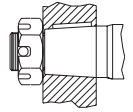
Torque Specifications: 32.5 daNm [240 ft.lb.]

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.



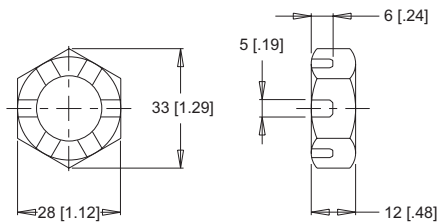
incorrect



correct

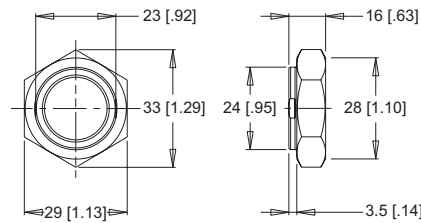
1" TAPERED SHAFTS 3/4-28 Thread

A Slotted Nut



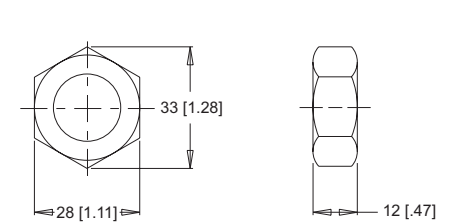
Torque Specifications: 20 - 23 daNm [150 - 170 ft.lb.]

B Lock Nut



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

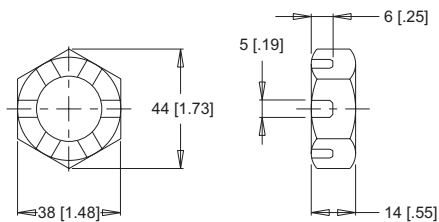
C Solid Nut



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

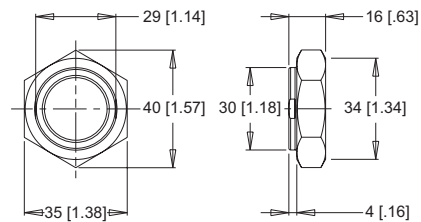
1-1/4" TAPERED SHAFTS 1-20 Thread

A Slotted Nut



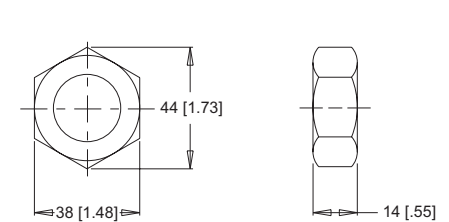
Torque Specifications: 38 daNm [280 ft.lb.] Max.

B Lock Nut



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

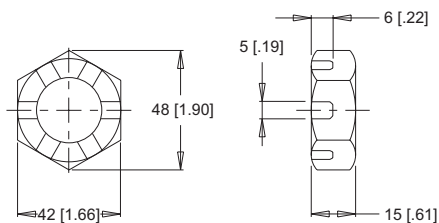
C Solid Nut



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

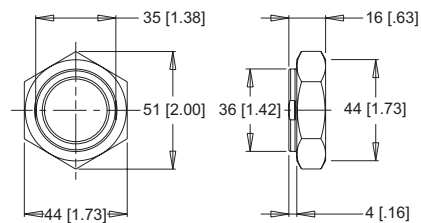
1-3/8" & 1-1/2" TAPERED SHAFTS 1 1/8-18 Thread

A Slotted Nut



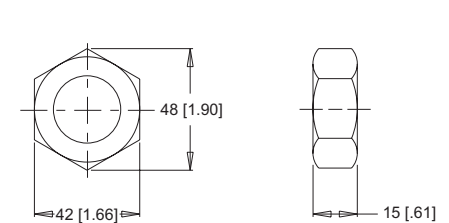
Torque Specifications: 41 - 54 daNm [300 - 400 ft.lb.]

B Lock Nut



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

C Solid Nut



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

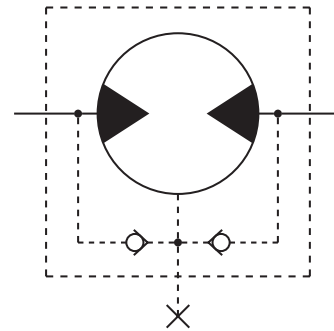
INTERNAL DRAIN

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.

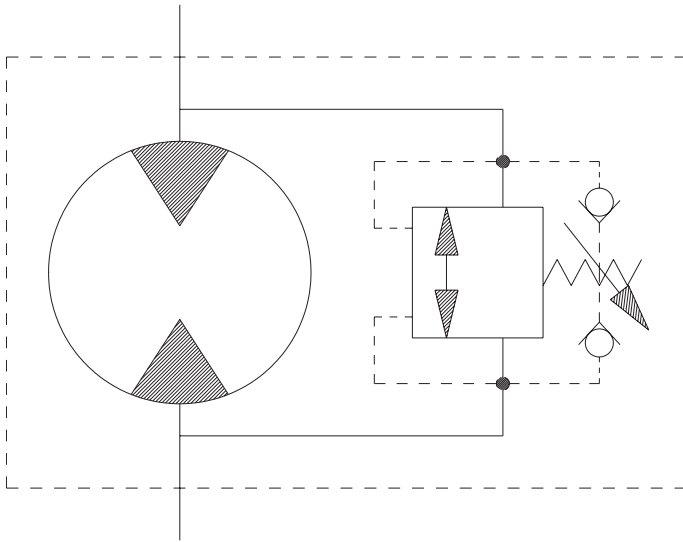
Although this option can simplify many motor installations, precautions must be taken to insure that return line pressure remains below allowable levels (see table below) to insure proper motor operation and life. If return line pressure is higher than allowable, or experiences pressure spikes, this 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 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]



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 distributor.

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.

HB/HK (All Series)

Medium Duty Hydraulic Motor Brakes

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 driveline, 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

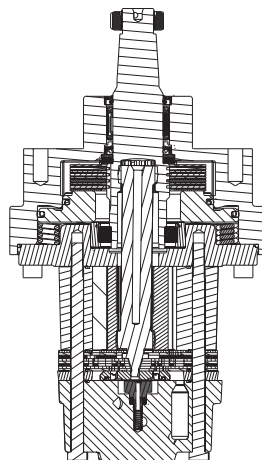
SPECIFICATIONS

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
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]

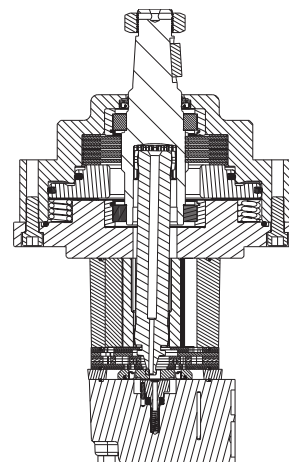
▶ Performance data is typical. Performance of production units varies slightly from one motor to another. Running at intermittent ratings should not exceed 10% of every minute of operation.

SERIES DESCRIPTIONS

310 - Hydraulic Motor/Brake
Standard



315 - Hydraulic Motor/Brake
With Greater Holding Torque



DISPLACEMENT PERFORMANCE

050		Pressure - bar [psi]						Max. Cont.	Max. Inter.				
		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	242 [3500]				
		52 cm ³ [3.2 in ³] / rev						Intermittent Ratings - 10% of Operation					
		Torque - Nm [lb-in], Speed rpm											
Flow - lpm [gpm]	2 [0.5]	7 [66] 36	18 [158] 31	38 [314] 26	51 [447] 21	66 [587] 9					37	Theoretical rpm	
	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]				51 [451] 699	71 [628] 683	92 [810] 665	111 [978] 634	133 [1174] 604		722		
	45 [12]				48 [427] 847	68 [606] 825	88 [781] 798	111 [980] 770		867			
			Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input type="checkbox"/>										
	Rotor Width		Theoretical Torque - Nm [lb-in]										
8.0 [316]		14 [127]	29 [255]	58 [510]	86 [764]	115 [1019]	144 [1274]	173 [1529]	202 [1783]				
mm [in]		Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]											

080		Pressure - bar [psi]						Max. Cont.	Max. Inter.			
		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	242 [3500]			
		76 cm ³ [4.6 in ³] / rev						Intermittent Ratings - 10% of Operation				
		Torque - Nm [lb-in], Speed rpm										
Flow - lpm [gpm]	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	Theoretical rpm
	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]		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]										904		
		Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input type="checkbox"/>										
Rotor Width		Theoretical Torque - Nm [lb-in]										
11.7 [462]		21 [183]	41 [366]	83 [732]	124 [1099]	166 [1465]	207 [1831]	248 [2197]	290 [2564]			
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 6.

HB/HK (All Series)

Medium Duty Hydraulic Motor Brakes

DISPLACEMENT PERFORMANCE

		Pressure - bar [psi]						Max. Cont.	Max. Inter.		
090		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	242 [3500]		
		89 cm ³ [5.4 in ³] / rev									
		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation			
Flow - lpm [gpm]	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]				134 [1190] 677	187 [1654] 660	192 [1701] 644	227 [2007] 629	269 [2384] 610	685	
Max. Inter.	68 [18]				136 [1201] 748	189 [1675] 729	240 [2122] 719			770	
	76 [20]				136 [1205] 835	174 [1536] 819	216 [1916] 806			856	
		Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input type="checkbox"/>									
		Theoretical Torque - Nm [lb-in]									
		24 [215]	49 [430]	97 [860]	146 [1290]	194 [1720]	243 [2150]	291 [2580]	340 [3010]		
		mm [in]									
		Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]									

		Pressure - bar [psi]						Max. Cont.	Max. Inter.		
110		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	242 [3500]		
		111 cm ³ [6.8 in ³] / rev									
		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation			
Flow - lpm [gpm]	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	
Max. Cont.	68 [18]			120 [1059] 609	179 [1586] 603	233 [2058] 593	284 [2510] 580	347 [3071] 561	612		
	76 [20]			107 [944] 678	160 [1419] 677	217 [1918] 661	268 [2374] 645	327 [2896] 627	680		
Max. Inter.	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]			77 [678] 847	132 [1171] 844	191 [1694] 835	243 [2154] 828		850		
		Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input type="checkbox"/>									
		Theoretical Torque - Nm [lb-in]									
		31 [271]	61 [541]	122 [1083]	184 [1624]	245 [2166]	306 [2707]	367 [3248]	428 [3790]		
		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 6.

DISPLACEMENT PERFORMANCE

		Pressure - bar [psi]						Max. Cont.	Max. Inter.						
		125						17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	242 [3500]
		127 cm ³ [7.7 in ³] / rev													
		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation							
Flow - lpm [gpm]	Max. Cont.	2 [0.5]	14 [127]	44 [394]	109 [961]	159 [1408]	217 [1922]	267 [2364]	313 [2766]	355 [3146]	Theoretical rpm	15			
		4 [1]	14	14	13	13	12	10	9	7		30			
		8 [2]	16 [138]	45 [401]	108 [952]	167 [1475]	226 [2004]	278 [2459]	332 [2936]	367 [3245]		60			
		15 [4]	29	29	29	27	25	23	21	19		120			
		23 [6]	49 [432]	108 [953]	165 [1462]	231 [2046]	286 [2528]	332 [2941]	387 [3421]	45		180			
		30 [8]	59	59	57	54	48	48	45	45		240			
		38 [10]	49 [430]	107 [949]	167 [1479]	229 [2024]	284 [2513]	342 [3023]	392 [3467]	98		300			
		45 [12]	119	119	118	113	108	102	98	98		360			
		53 [14]	102 [902]	166 [1473]	223 [1973]	279 [2473]	337 [2985]	393 [3477]	457	420		480			
		61 [16]	179	177	173	169	163	157	157	157		540			
		68 [18]	100 [888]	160 [1420]	222 [1968]	287 [2541]	337 [2987]	391 [3459]	453	453		600			
		76 [20]	239	239	235	235	221	214	214	214		660			
		83 [22]	95 [841]	154 [1359]	217 [1919]	273 [2413]	332 [2940]	387 [3428]	453	453		720			
		91 [24]	299	298	298	292	281	273	273	273		750			
		95 [25]	83 [738]	147 [1304]	207 [1831]	267 [2361]	329 [2914]	406 [3590]	485	485					
	359	358	357	350	342	308	308	308							
	82 [727]	146 [1293]	204 [1801]	268 [2375]	332 [2935]	419 [3704]	505	505							
	419	418	417	413	402	340	340	340							
	69 [608]	168 [1484]	198 [1756]	258 [2287]	327 [2895]	386 [3419]	453	453							
	473	463	440	415	384	341	341	341							
		193 [1704]	214 [1894]	278 [2460]	360 [3188]	386 [3412]	453	453							
		517	498	472	438	384	384	384							
		205 [1815]	245 [2164]	290 [2567]	344 [3040]	408 [3606]	485	485							
		577	561	537	505	453	453	453							
			151 [1336]	201 [1781]	260 [2298]	320 [2832]	384	384							
			640	623	597	563	563	563							
			85 [751]	151 [1334]	218 [1930]	284 [2516]	340	340							
			705	686	662	621	621	621							
			79 [697]	139 [1227]	209 [1853]	270 [2387]	320	320							
			736	723	694	669	669	669							

Rotor Width

19.7 [.776]
mm [in]

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

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]

		Pressure - bar [psi]						Max. Cont.	Max. Inter.						
		160						17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	242 [3500]
		164 cm ³ [10.0 in ³] / rev													
		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation							
Flow - lpm [gpm]	Max. Cont.	2 [0.5]	24 [216]	61 [538]	143 [1267]	213 [1881]	287 [2536]	351 [3106]	411 [3640]	470 [4159]	Theoretical rpm	12			
		4 [1]	11	11	10	9	8	7	5	4		24			
		8 [2]	28 [244]	67 [596]	145 [1287]	215 [1899]	291 [2578]	355 [3145]	425 [3758]	493 [4366]		47			
		15 [4]	23	22	21	18	16	14	13	11		93			
		23 [6]	66 [588]	148 [1306]	224 [1983]	301 [2666]	366 [3241]	441 [3904]	508 [4493]	28		139			
		30 [8]	46	44	39	34	32	30	28	28		185			
		38 [10]	66 [584]	146 [1291]	226 [2002]	313 [2769]	375 [3318]	451 [3990]	516 [4569]	66		231			
		45 [12]	92	91	87	80	71	67	66	66		278			
		53 [14]	62 [551]	146 [1295]	224 [1986]	307 [2718]	379 [3358]	449 [3975]	515 [4553]	106		324			
		61 [16]	137	136	134	125	119	108	106	106		370			
		68 [18]		142 [1258]	221 [1954]	299 [2644]	376 [3329]	447 [3952]	520 [4603]	146		416			
		76 [20]		184	182	172	161	152	146	146		462			
		83 [22]		132 [1169]	216 [1909]	289 [2558]	371 [3282]	448 [3961]	520 [4598]	190		509			
		91 [24]		230	229	222	211	195	190	190		555			
		95 [25]		129 [1144]	208 [1842]	284 [2510]	357 [3161]	436 [3862]	512 [4529]	228		578			
		277	275	270	261	239	228	228							
		117 [1040]	202 [1788]	275 [2438]	353 [3124]	427 [3781]	509 [4508]	279							
		323	320	316	305	291	279	279							
		103 [913]	187 [1659]	275 [2431]	338 [2994]	418 [3698]	496 [4392]	325							
		369	367	364	356	341	325	325							
		91 [803]	175 [1553]	257 [2278]	325 [2874]	405 [3587]	480 [4246]	376							
		415	413	410	403	389	376	376							
			169 [1499]	246 [2176]	328 [2906]	397 [3514]	477 [4223]	422							
			461	459	447	438	422	422							
			147 [1297]	232 [2049]	315 [2792]	385 [3411]	487	487							
			507	504	498	487	487	487							
			131 [1157]	218 [1928]	300 [2655]	378 [3344]	453	453							
			553	550	546	531	531	531							
			121 [1073]	208 [1844]	291 [2577]	365 [3229]	440	440							
			577	574	571	557	557	557							

Rotor Width

25.4 [1.000]
mm [in]

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

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 6.

HB/HK (All Series)

Medium Duty Hydraulic Motor Brakes

DISPLACEMENT PERFORMANCE

		Pressure - bar [psi]						Max. Cont.	Max. Inter.	
200		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	242 [3500]	
205 cm ³ [12.5 in ³] / rev		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation		
Flow - lpm [gpm]	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
	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
	95 [25]				139 [1229] 460	252 [2234] 458	349 [3087] 456	447 [3955] 444		462
Rotor Width		Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input type="checkbox"/>								
31.8 [1.251] mm [in]		Theoretical Torque - Nm [lb-in]								
		56 [498]	112 [995]	225 [1990]	337 [2986]	450 [3981]	562 [4976]	675 [5971]	787 [6967]	
		Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]								

		Pressure - bar [psi]						Max. Cont.	Max. Inter.	
250		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	242 [3500]	
254 cm ³ [15.5 in ³] / rev		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation		
Flow - lpm [gpm]	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
	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
	95 [25]				184 [1627] 371	313 [2768] 368	442 [3915] 365	575 [5088] 360		373
Rotor Width		Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input type="checkbox"/>								
39.4 [1.551] mm [in]		Theoretical Torque - Nm [lb-in]								
		70 [617]	139 [1234]	279 [2468]	418 [3702]	558 [4936]	697 [6170]	837 [7404]	976 [8639]	
		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 6.

HB/HK (All Series)

Medium Duty Hydraulic Motor Brakes

PORTING

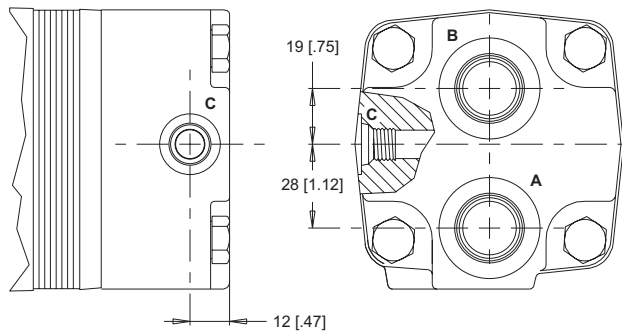
► Dimensions shown are without paint. Paint thickness can be up to 0.13 [0.005].

END PORTED - ALIGNED

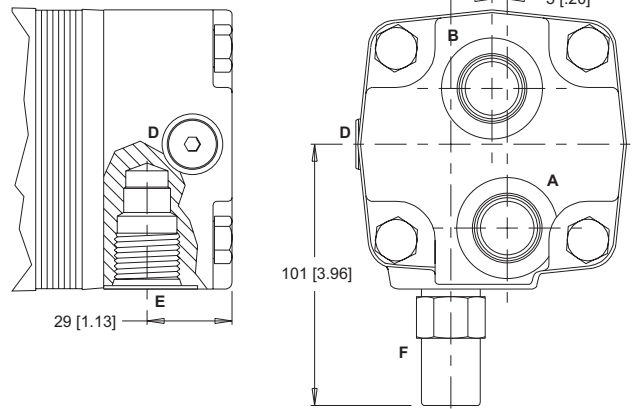
1 Main Ports **A, B:** 7/8-14 UNF
Drain Port **C:** 7/16-20 UNF

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

STANDARD



OPTIONAL



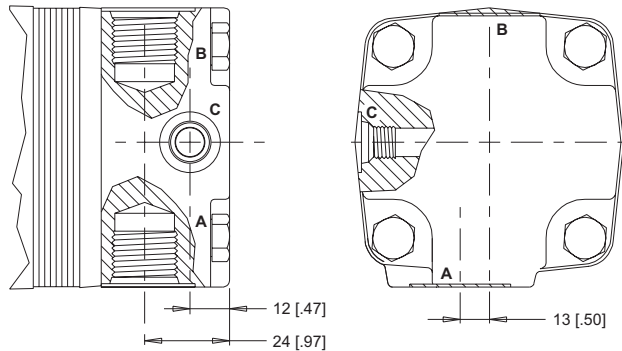
D: Internal Drain E: 10 Series/2-Way Valve Cavity 7/8-14 UNF F: Valve Cartridge Installed

SIDE PORTED - 180° OPPOSED

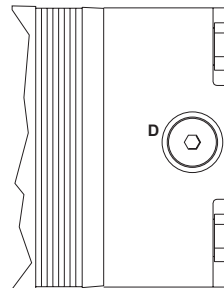
6 Main Ports **A, B:** 1 1/16-12 UNF
Drain Port **C:** 7/16-20 UNF

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

STANDARD



OPTIONAL

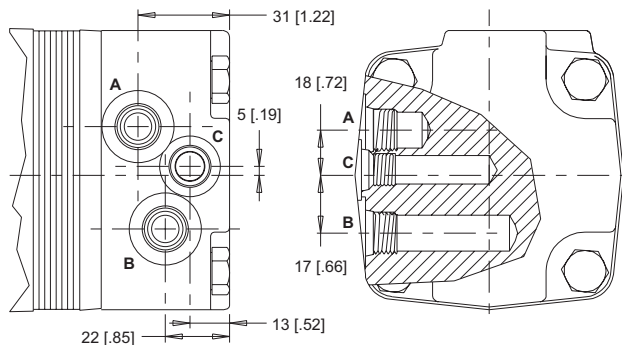


D: Internal Drain

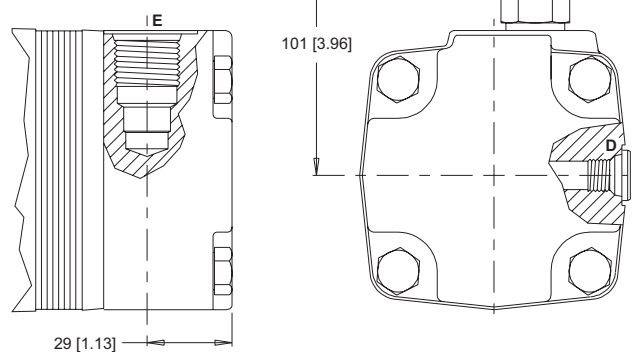
SIDE PORTED - OFFSET

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

HB/HK (All Series)

Medium Duty Hydraulic Motor Brakes

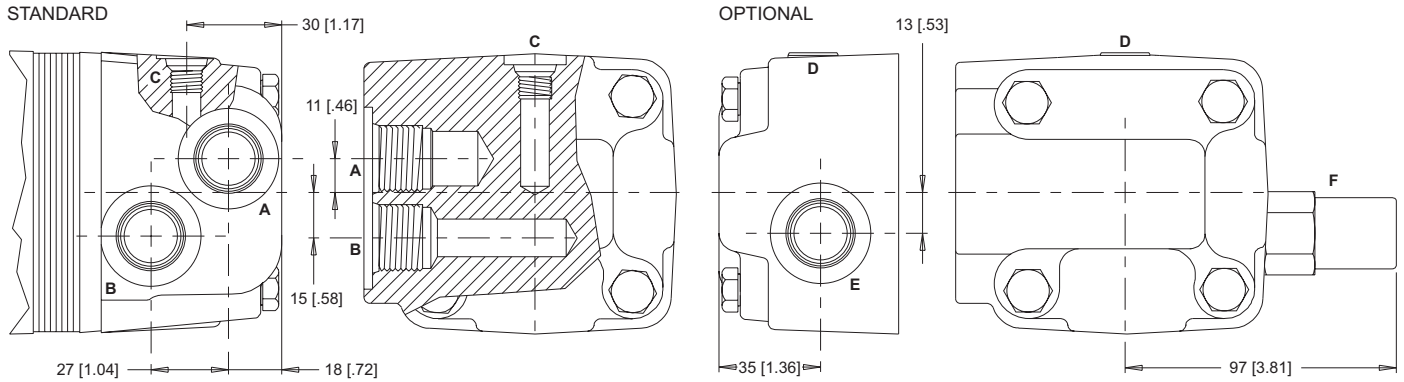
PORTING

► 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

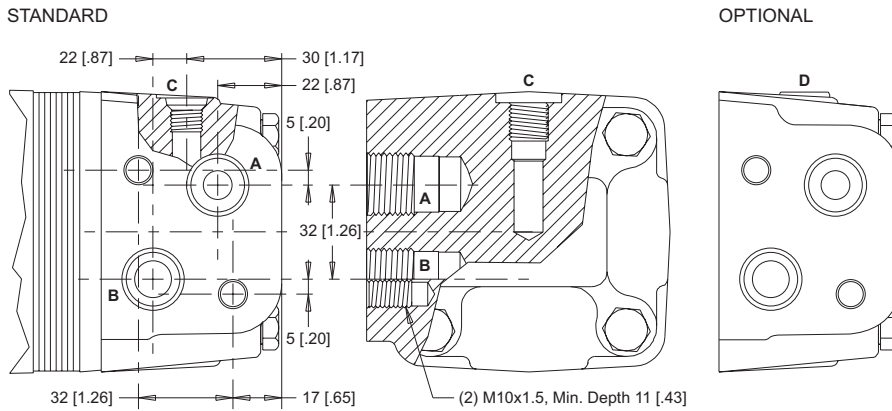
2 Main Ports **A, B**: G 1/2
 Drain Port **C**: G 1/4



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



D: Internal Drain

HB (310 Series)

Medium Duty Hydraulic Motor Brake

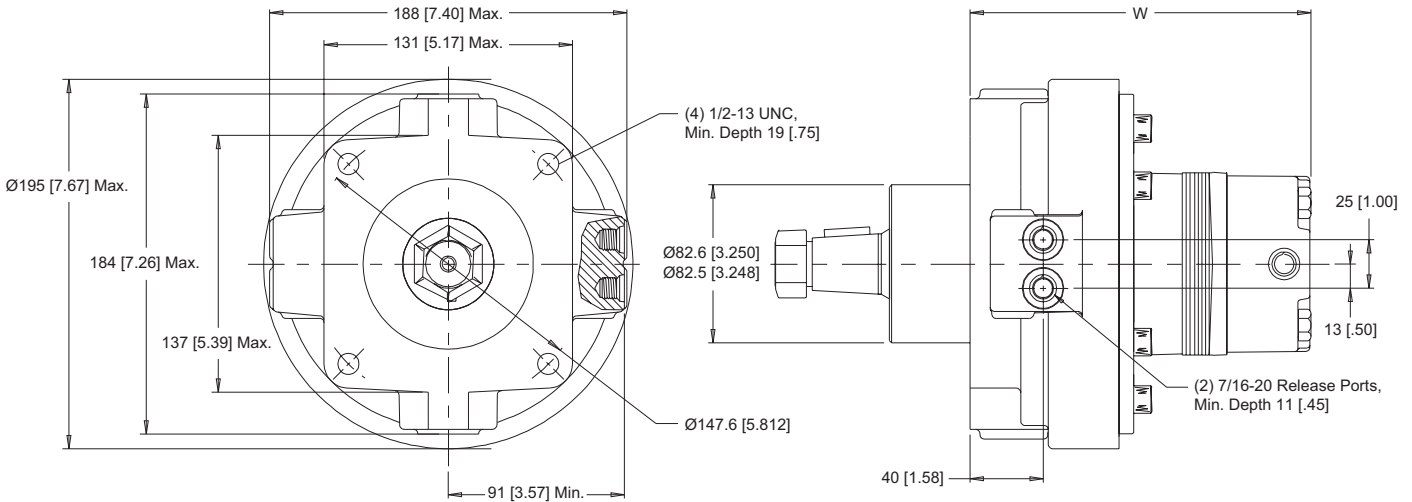
HOUSINGS

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

4-HOLE, MOTOR BRAKE

W2 End Ports

W8 Side Ports



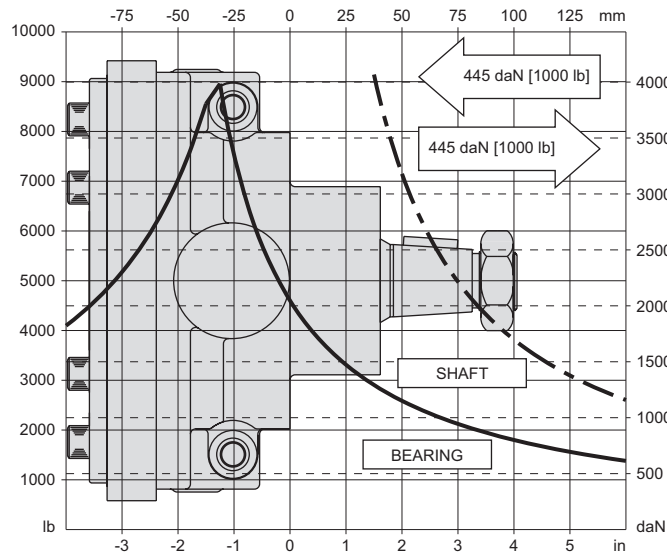
► Porting options listed on pages 20-21.

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 7.

MOTOR BRAKE



SPECIFICATIONS

Rated brake torque..... 904 Nm [8000 lb-in]
 Initial release pressure 21 bar [300 psi]
 Full release pressure 31 bar [450 psi]
 Maximum release pressure 207 bar [3000 psi]
 Release volume..... 13-16 cm³ [0.8 - 1.0 in³]

LENGTH & WEIGHT CHART

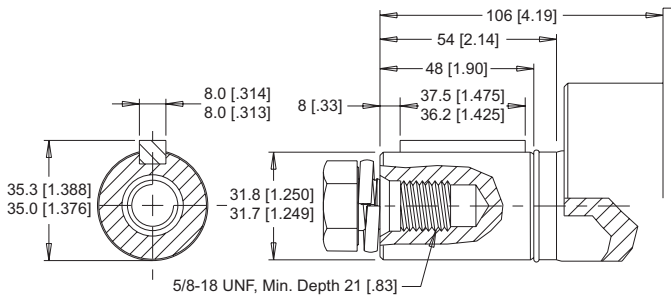
Dimension W is the overall motor length from the rear of the motor to the mounting flange surface.

W	Endcovers on pg. 20	Endcovers on pg. 21	Weight
#	mm [in]	mm [in]	kg [lb]
050	163 [6.41]	181 [7.12]	19.1 [42.2]
080	167 [6.56]	185 [7.27]	19.4 [42.7]
090	169 [6.64]	187 [7.35]	19.5 [42.9]
110	172 [6.78]	190 [7.49]	19.7 [43.4]
125	175 [6.87]	193 [7.58]	19.8 [43.7]
160	180 [7.10]	198 [7.81]	20.1 [44.4]
200	187 [7.35]	205 [8.06]	20.5 [45.3]
250	194 [7.32]	212 [8.36]	20.9 [46.1]
300	200 [7.65]	218 [8.59]	21.3 [47.0]
400	218 [8.60]	236 [9.31]	22.3 [49.1]

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

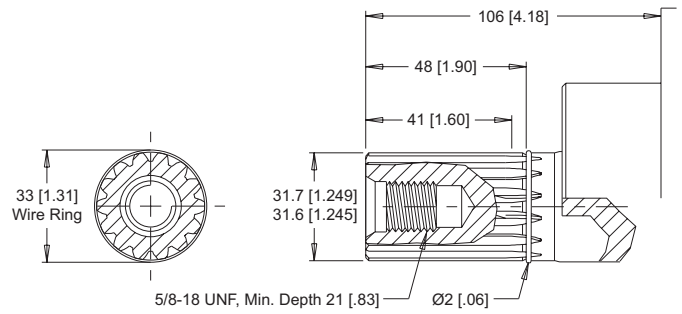
SHAFTS

20 1-1/4" Straight



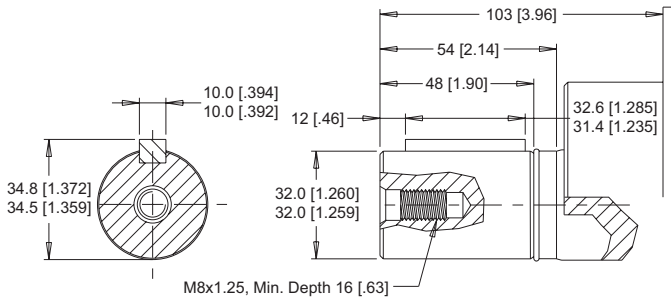
Max. Torque: 882 Nm [7804 lb-in]

23 14 Tooth Spline



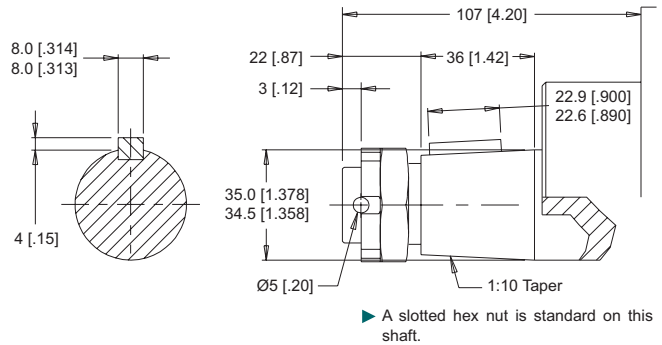
Max. Torque: 882 Nm [7804 lb-in]

21 32mm Straight



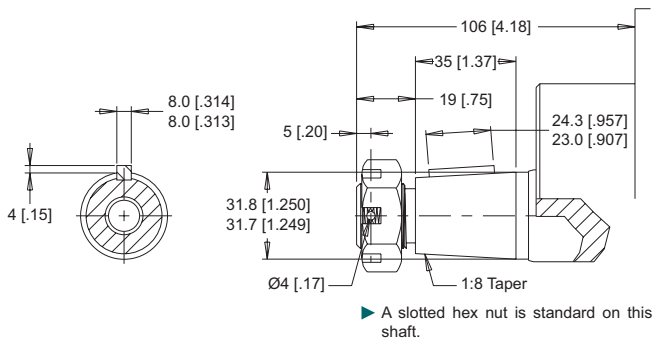
Max. Torque: 882 Nm [7804 lb-in]

28 35mm Tapered



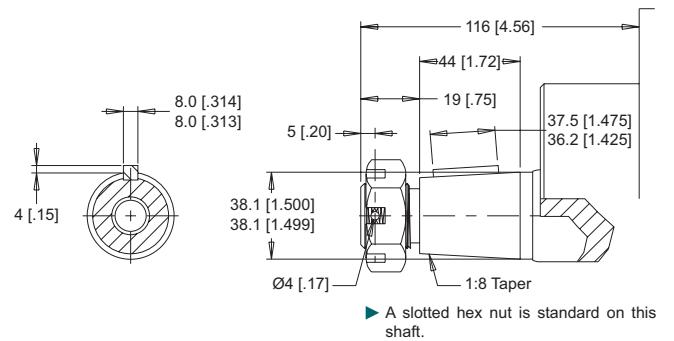
Max. Torque: 882 Nm [7804 lb-in]

22 1-1/4" Tapered



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

31 1-1/2" Tapered



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

HB (310 Series)

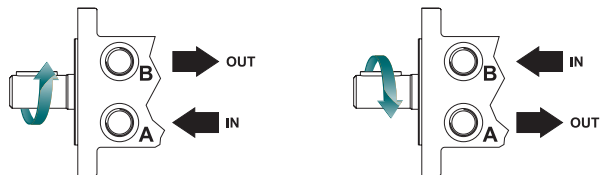
Medium Duty Hydraulic Motor Brake

ORDERING INFORMATION



1. CHOOSE SERIES DESIGNATION

310 HB Series Motor/Brake



► The 310 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 MOUNT

W2 4-Hole, Motor/Brake

▼ SIDE MOUNT

W8 4-Hole, Motor/Brake

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, Aligned

2 G 1/2, Aligned

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



4. SELECT A SHAFT OPTION

20	1-1/4" Straight	23	14 Tooth Spline
21	32mm Straight	28	35mm Tapered
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	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

8. SELECT A MISCELLANEOUS OPTION

AA	None
AC	Freeturning Rotor

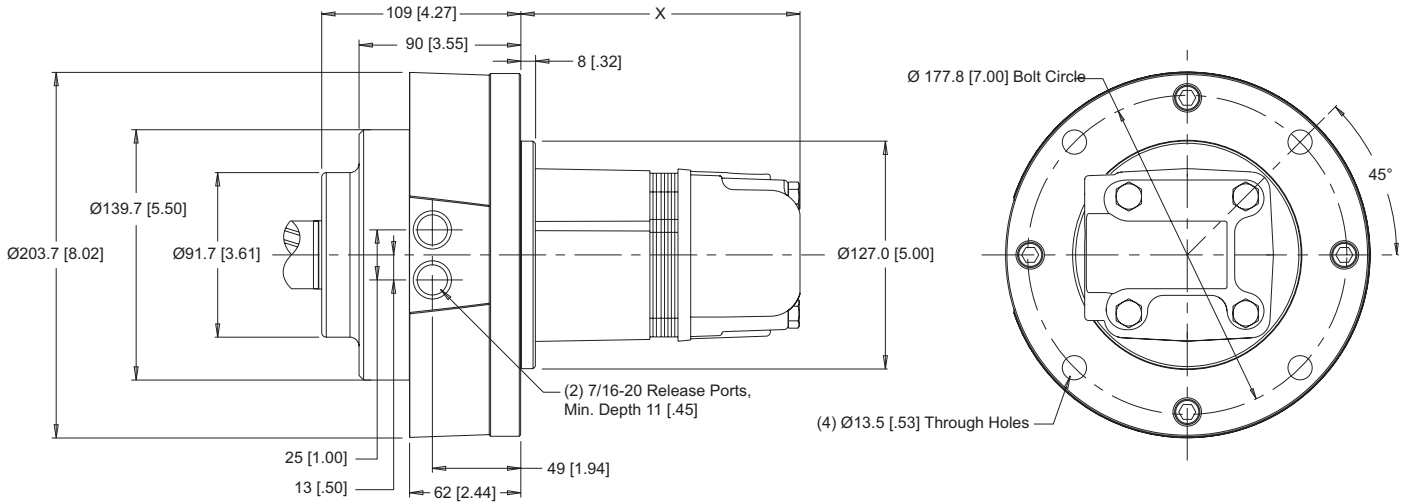
HK (315 Series) Medium Duty Hydraulic Motor Brake

HOUSINGS

► Housing dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

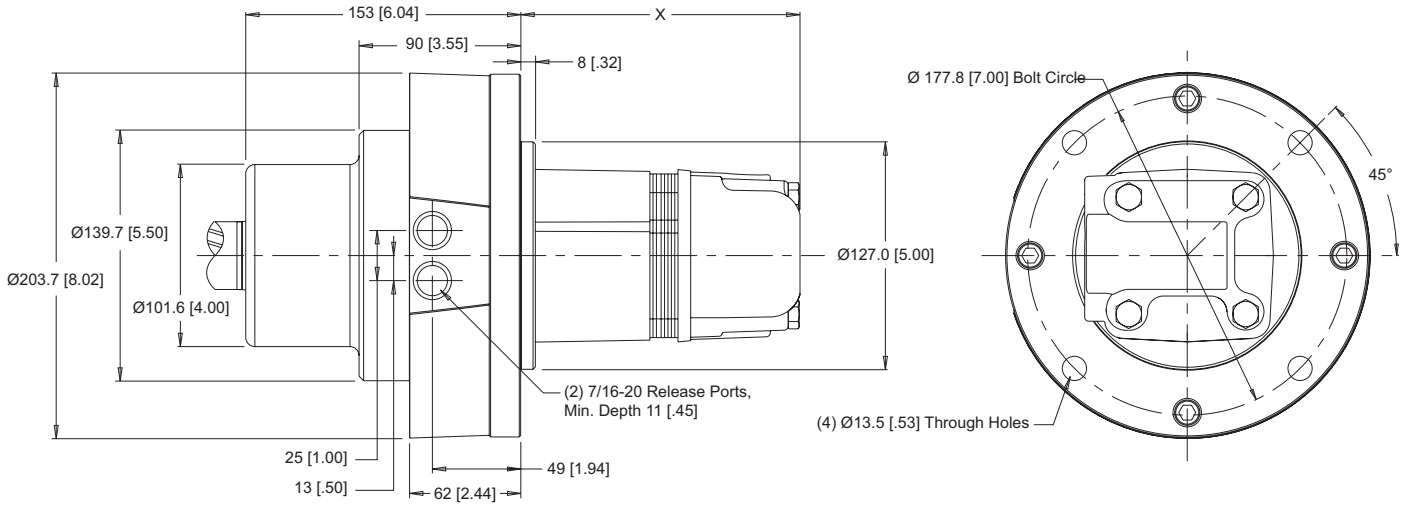
4-HOLE, MOTOR BRAKE

W2 End Ports **W8** Side Ports



4-HOLE, MOTOR BRAKE, TALL PILOT

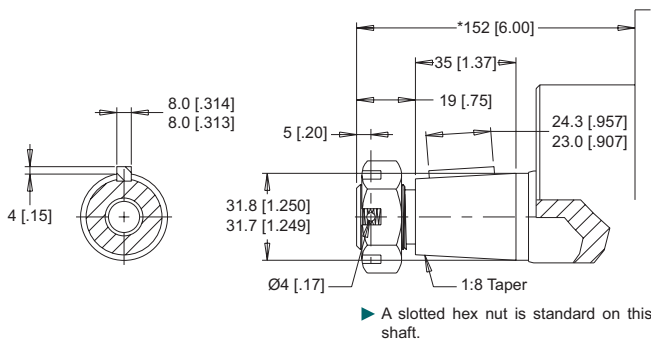
WB End Ports **WC** Side Ports



► Dimension X is charted on page 26. Porting options listed on pages 20-21.

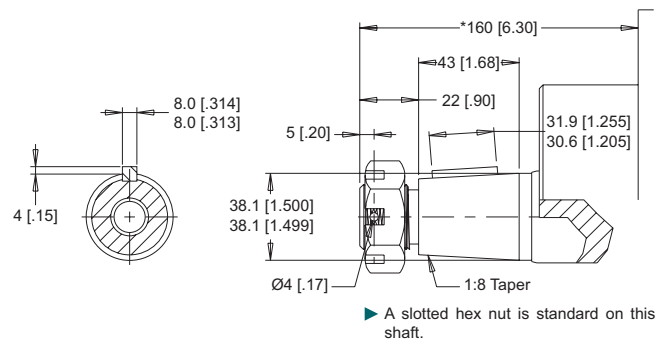
SHAFTS

22 1-1/4" Tapered



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

31 1-1/2" Tapered



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

► * Dimension from end of shaft to mounting flange shown is for the W2 and W8. When using the WB or WC mount add 45 [1.77] from this dimension.

HK (315 Series)

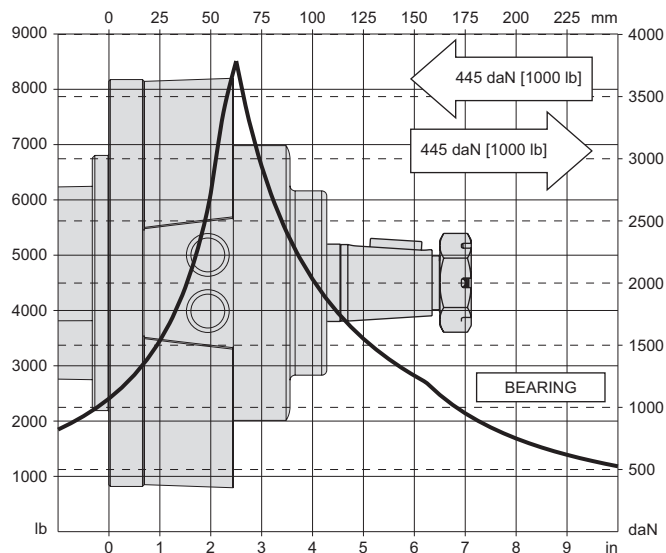
Medium Duty Hydraulic Motor Brake

TECHNICAL INFORMATION

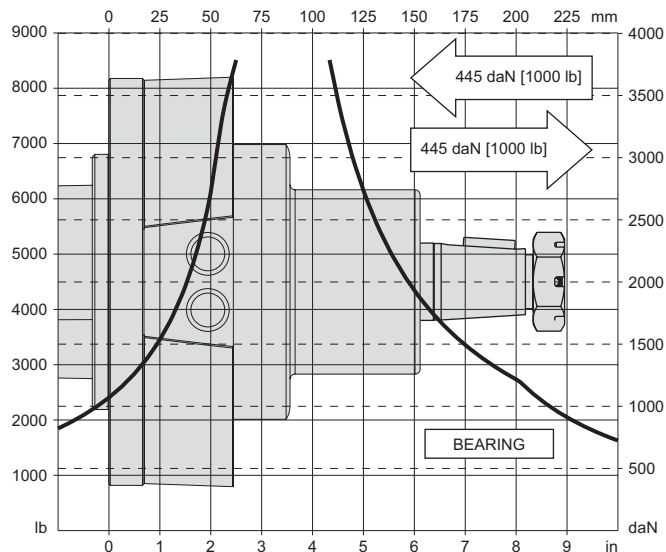
ALLOWABLE SHAFT LOAD / BEARING CURVE

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 7.

MOTOR BRAKE (SHORT PILOT)



MOTOR BRAKE (TALL PILOT)



SPECIFICATIONS

Rated brake torque..... 1130 Nm [10000 lb-in]
 Initial release pressure28 bar [400 psi]
 Maximum release pressure207 bar [3000 psi]
 Release volume..... 16 cm³ [1.0 in³]

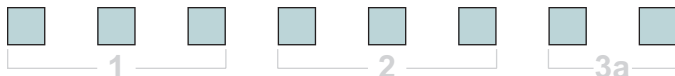
LENGTH & WEIGHT CHART

Dimension X is the overall motor length from the rear of the motor to the mounting flange surface.

X	Endcovers on pg. 20	Endcovers on pg. 21	Weight
#	mm [in]	mm [in]	kg [lb]
050	83 [3.26]	101 [3.97]	21.9 [48.2]
080	86 [3.40]	104 [4.11]	22.1 [48.7]
090	88 [3.45]	106 [4.16]	22.2 [48.9]
110	91 [3.59]	109 [4.30]	22.5 [49.4]
125	94 [3.68]	112 [4.39]	22.6 [49.7]
160	99 [3.91]	117 [4.62]	22.9 [50.4]
200	106 [4.16]	124 [4.87]	23.3 [51.3]
250	113 [4.46]	131 [5.17]	23.7 [52.1]
300	119 [4.70]	137 [5.41]	24.1 [53.0]
400	137 [5.41]	155 [6.12]	25.0 [55.1]

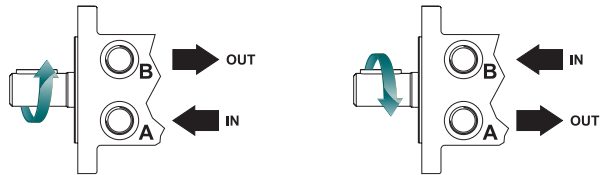
► 315 series motor/brake weights can vary ± 1kg [2 lb] depending on model configurations such as housing, shaft, endcover, options etc. Add 1.4 kg [3 lb] to the weight listed for the Tall Pilot mount housings.

ORDERING INFORMATION



1. CHOOSE SERIES DESIGNATION

315 HK Series Motor/Brake



► The 315 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 MOUNT	
W2	4-Hole, Motor/Brake
WB	4-Hole, Motor/Brake (TP)
▼ SIDE MOUNT	
W8	4-Hole, Motor/Brake
WC	4-Hole, Motor/Brake (TP)

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, Aligned
2	G 1/2, Aligned
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



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	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

8. SELECT A MISCELLANEOUS OPTION

AA	None
AC	Freeturning Rotor

CE (410/411 Series)

Medium Duty Mechanical Drum Brake

OVERVIEW

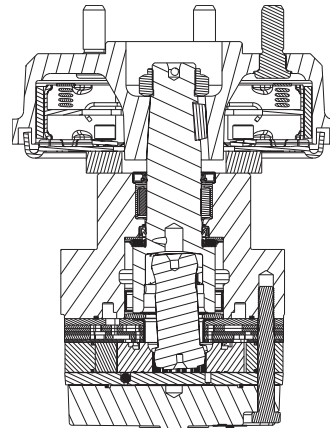
The combination of compact size, light weight and low speed efficiency make the CE motor the best wheel drive motor available. To reduce overall motor length and weight, all unnecessary material was removed from the housing and the valve was placed in the face of the rotor. The pressure-compensated balance plate allows the motor to maintain high volumetric efficiencies 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.

SERIES DESCRIPTIONS

410/411 - Hydraulic Motor
With Integral Drum Brake



TYPICAL APPLICATIONS

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

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

		Pressure - bar [psi]						Max. Cont.	Peak
120		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	241 [3500]
121 cm ³ [7.4 in ³] / rev		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation	
Flow - lpm [gpm]	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	32
	8 [2]		52 [456] 58	110 [977] 56	161 [1424] 51	208 [1845] 47	269 [2382] 33	310 [2746] 29	63
	15 [4]		48 [422] 119	110 [975] 112	169 [1497] 103	225 [1992] 95	271 [2399] 91	327 [2896] 83	125
	23 [6]		46 [409] 187	106 [934] 182	158 [1402] 177	204 [1803] 173	248 [2199] 168	297 [2630] 160	188
	30 [8]			99 [876] 248	157 [1389] 244	207 [1829] 240	253 [2241] 233	323 [2857] 205	250
	38 [10]			96 [853] 306	156 [1379] 298	207 [1834] 293	257 [2278] 286	297 [2633] 279	313
	45 [12]			85 [749] 371	151 [1337] 360	206 [1823] 352	256 [2267] 345	305 [2695] 341	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.									
Rotor Width		Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input type="checkbox"/>							
13.8 [542] mm [in]		Theoretical Torque - Nm [lb-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]							

		Pressure - bar [psi]						Max. Cont.	Peak
160		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	241 [3500]
162 cm ³ [9.9 in ³] / rev		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation	
Flow - lpm [gpm]	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
	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
	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
	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
	23 [6]		70 [623] 133	146 [1294] 131	225 [1991] 128	296 [2617] 122	365 [3232] 117	428 [3786] 115	492 [4352] 111
	30 [8]		66 [583] 181	141 [1251] 177	216 [1916] 175	286 [2533] 171	350 [3102] 165	414 [3663] 159	476 [4210] 152
	38 [10]		61 [537] 224	138 [1224] 223	212 [1873] 219	282 [2497] 213	347 [3072] 211	411 [3641] 204	473 [4183] 196
	45 [12]		56 [495] 272	130 [1150] 265	207 [1829] 264	279 [2465] 262	344 [3046] 256	407 [3603] 249	470 [4157] 242
	53 [14]			123 [1088] 318	196 [1737] 313	269 [2384] 306	332 [2939] 297	400 [3540] 295	464 [4111] 284
	61 [16]			114 [1010] 362	187 [1659] 356	263 [2327] 351	329 [2910] 344	395 [3499] 334	458 [4053] 330
Max. Cont.									
Max. Inter.									
Rotor Width		Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input type="checkbox"/>							
13.8 [542] mm [in]		Theoretical Torque - Nm [lb-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 6.

CE (410/411 Series)

Medium Duty Mechanical Drum Brake

DISPLACEMENT PERFORMANCE

		Pressure - bar [psi]						Max. Cont.	Peak
200		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	241 [3500]
204 cm ³ [12.4 in ³] / rev									
		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation	
Flow - lpm [gpm]	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
	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
	23 [6]		86 [760] 111	181 [1600] 107	278 [2457] 104	365 [3228] 100	451 [3989] 95	524 [4636] 90	605 [5353] 85
	30 [8]		75 [663] 148	174 [1539] 145	267 [2363] 142	359 [3176] 137	441 [3905] 132	518 [4584] 125	597 [5286] 120
	38 [10]		62 [549] 185	162 [1430] 184	257 [2272] 181	347 [3072] 177	429 [3798] 171	507 [4488] 164	587 [5198] 157
	45 [12]			146 [1290] 222	244 [2159] 217	339 [2996] 213	429 [3798] 204	506 [4476] 198	583 [5161] 193
	53 [14]			129 [1145] 259	227 [2005] 256	328 [2905] 250	410 [3628] 244	492 [4354] 236	571 [5049] 226
	61 [16]			112 [994] 298	208 [1842] 297	316 [2795] 284	399 [3534] 281	484 [4285] 273	562 [4971] 266
68 [18]			90 [799] 334	207 [1833] 330	304 [2689] 327	395 [3493] 320	481 [4260] 316		
76 [20]			75 [665] 366	178 [1576] 365	282 [2495] 361	372 [3288] 361	465 [4115] 351		
Max. Cont.									
Max. Inter.									
Theoretical rpm									
Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input type="checkbox"/>									
Rotor Width									
17.3 [.682]		Theoretical Torque - Nm [lb-in]							
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]									

		Pressure - bar [psi]						Max. Cont.	Peak
230		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	241 [3500]
233 cm ³ [14.2 in ³] / rev									
		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation	
Flow - lpm [gpm]	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
	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
	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
	30 [8]		84 [743] 128	197 [1739] 125	304 [2691] 122	410 [3627] 119	506 [4479] 112	600 [5313] 103	647 [5728] 95
	38 [10]		72 [634] 162	186 [1650] 159	292 [2585] 156	402 [3556] 153	493 [4363] 146	584 [5169] 136	634 [5613] 126
	45 [12]			167 [1477] 192	282 [2494] 191	393 [3479] 185	491 [4349] 178	576 [5094] 167	658 [5822] 155
	53 [14]			152 [1343] 225	260 [2301] 225	374 [3310] 220	470 [4160] 208	555 [4910] 201	657 [5818] 186
	61 [16]			135 [1198] 259	250 [2209] 259	362 [3207] 253	464 [4110] 244	553 [4895] 232	637 [5637] 220
68 [18]			115 [1021] 291	231 [2044] 289	344 [3042] 286	447 [3956] 279	540 [4777] 266		
76 [20]			93 [822] 325	210 [1859] 323	327 [2898] 319	432 [3825] 311	529 [4677] 299		
Max. Cont.									
Max. Inter.									
Theoretical rpm									
Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input type="checkbox"/>									
Rotor Width									
19.7 [.777]		Theoretical Torque - Nm [lb-in]							
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 6.

DISPLACEMENT PERFORMANCE

		Pressure - bar [psi]						Max. Cont.	Peak	
260		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	241 [3500]	
261 cm ³ [15.9 in ³] / rev										
		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation		
Flow - lpm [gpm]	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]			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]			104 [924] 348	233 [2063] 346	358 [3166] 335	471 [4168] 333	551 [4875] 332		349
	Max. Cont.									
	Max. Inter.									
Rotor Width		Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input type="checkbox"/>								
22.1 [.872] mm [in]		Theoretical Torque - Nm [lb-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]										

		Pressure - bar [psi]						Max. Cont.	Peak	
300		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	241 [3500]	
300 cm ³ [18.3 in ³] / rev										
		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation		
Flow - lpm [gpm]	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]			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]			56 [496] 314	197 [1740] 313	364 [3225] 310	484 [4281] 309	632 [5594] 298		316	
	Max. Cont.									
	Max. Inter.									
Rotor Width		Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input type="checkbox"/>								
25.4 [1.000] mm [in]		Theoretical Torque - Nm [lb-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 6.

CE (410/411 Series)

Medium Duty Mechanical Drum Brake

DISPLACEMENT PERFORMANCE

		Pressure - bar [psi]						Max. Cont.	Peak	
350		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	241 [3500]	
348 cm ³ [21.2 in ³] / rev										
		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation		
Flow - lpm [gpm]	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	
	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	
	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	
	38 [10]		109 [962] 108	288 [2550] 107	455 [4027] 106	621 [5500] 100	754 [6670] 94	907 [8028] 85	1029 [9105] 77	
	45 [12]		94 [833] 130	268 [2376] 129	439 [3889] 128	588 [5205] 124	758 [6712] 115	901 [7970] 104	1031 [9120] 94	
	53 [14]		65 [575] 152	244 [2162] 151	409 [3619] 150	572 [5059] 148	727 [6433] 137	879 [7777] 127	1025 [9070] 117	
	61 [16]			220 [1947] 174	385 [3406] 173	549 [4855] 171	697 [6172] 163	855 [7570] 152	1000 [8853] 139	
Max. Cont.	68 [18]		186 [1644] 196	361 [3195] 194	520 [4599] 192	685 [6062] 187	825 [7297] 177	967 [8555] 165	197	
	76 [20]			147 [1301] 216	324 [2863] 213	483 [4275] 212	637 [5634] 209	790 [6993] 194	944 [8357] 183	
	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	
Rotor Width		Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input type="checkbox"/>								
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]								

		Pressure - bar [psi]						Max. Cont.	Peak	
375		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	241 [3500]	
375 cm ³ [22.8 in ³] / rev										
		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation		
Flow - lpm [gpm]	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	
	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	
	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	
	38 [10]		118 [1048] 101	303 [2684] 99	495 [4382] 97	647 [5726] 92	801 [7090] 83	922 [8161] 74	1058 [9364] 77	
	45 [12]		98 [870] 121	288 [2547] 119	469 [4147] 117	635 [5620] 112	804 [7115] 107	972 [8605] 93	1121 [9920] 94	
	53 [14]		71 [625] 141	261 [2308] 140	435 [3849] 139	603 [5337] 135	786 [6953] 126	938 [8298] 114	1104 [9771] 117	
	61 [16]		55 [487] 162	241 [2134] 161	423 [3744] 160	593 [5248] 155	758 [6706] 147	922 [8160] 135	1086 [9614] 139	
Max. Cont.	68 [18]		204 [1805] 182	391 [3461] 181	564 [4988] 177	723 [6402] 168	893 [7899] 164	1053 [9320] 165	183	
	76 [20]			219 [1942] 201	365 [3231] 200	533 [4714] 198	662 [5860] 193	864 [7643] 178	1030 [9112] 183	
	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	
Rotor Width		Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input type="checkbox"/>								
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 6.

DISPLACEMENT PERFORMANCE

		Pressure - bar [psi]					Max. Cont.	Peak	
470		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	
		465 cm ³ [28.3 in ³] / rev						Intermittent Ratings - 10% of Operation	
		Torque - Nm [lb-in], Speed rpm							
Flow - lpm [gpm]	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
	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
	95 [25]				348 [3079] 204	552 [4885] 203	769 [6808] 197		205
		Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input type="checkbox"/>							
		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]							

		Pressure - bar [psi]					Max. Cont.	Max. Inter	
540		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	172 [2500]		
		536 cm ³ [32.7 in ³] / rev						Intermittent Ratings - 10% of Operation	
		Torque - Nm [lb-in], Speed rpm							
Flow - lpm [gpm]	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	
	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	
	95 [25]			153 [1358] 176	426 [3768] 174	689 [6095] 173		177	
		Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input type="checkbox"/>							
		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]							

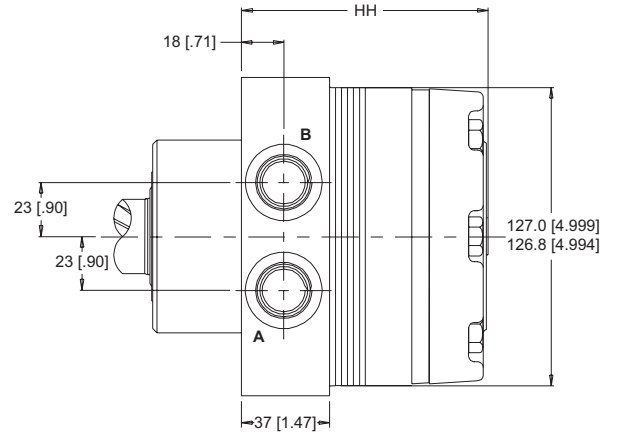
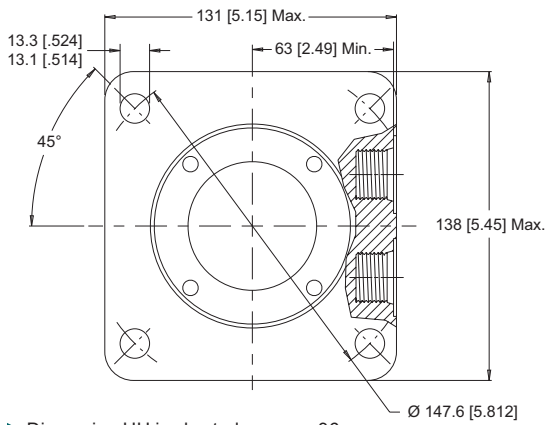
► Performance data is typical. Performance of production units varies slightly from one motor to another. Operating at maximum continuous pressure and maximum continuous flow simultaneously is not recommended. For additional information on product testing please refer to page 6.

HOUSINGS

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

4-HOLE, WHEEL BRAKE MOUNT, ALIGNED PORTS

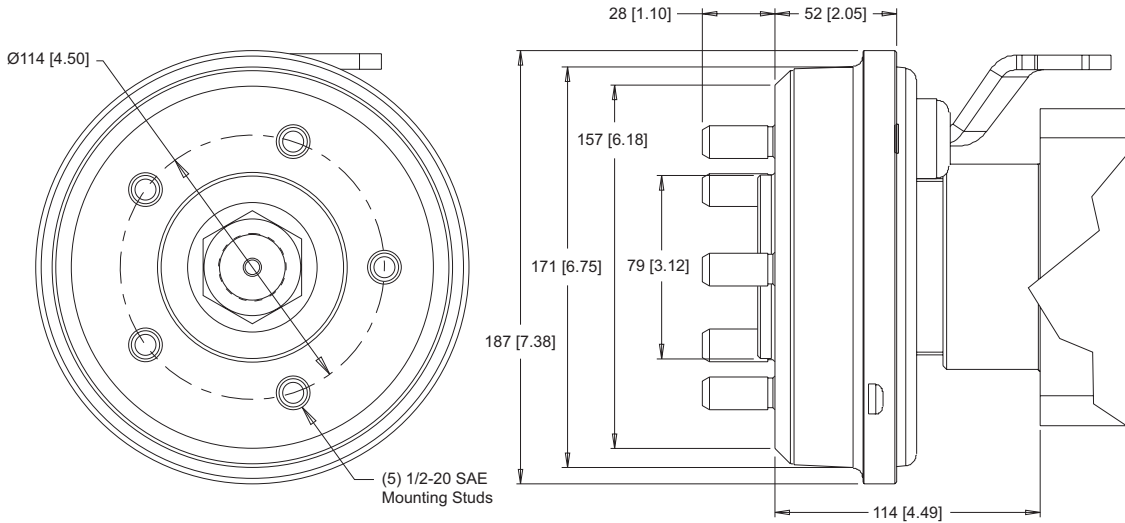
K31 7/8-14 UNF **K35** 9/16-18 UNF **K38** G 1/2



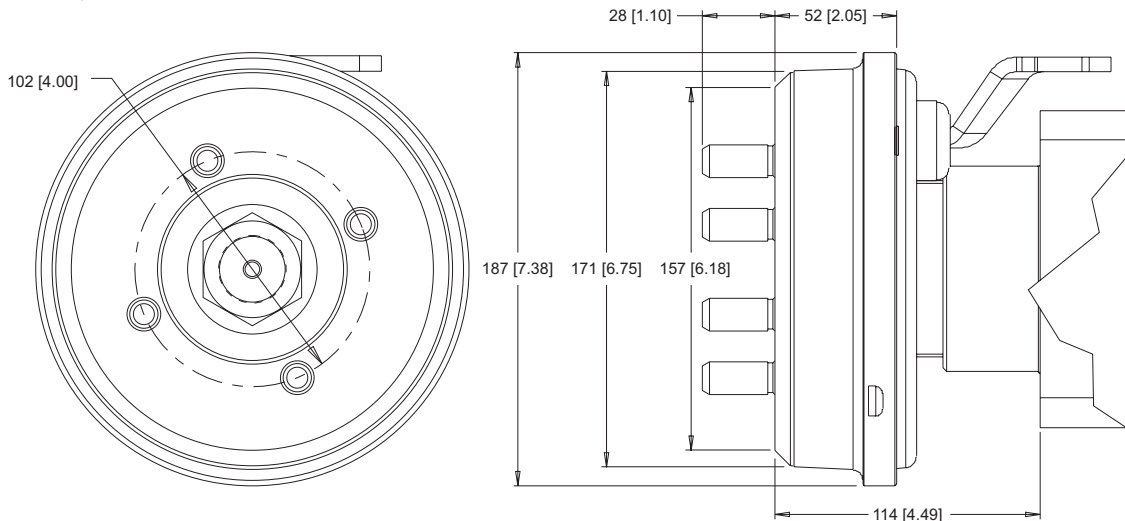
► Dimension HH is charted on page 36.

HUB OPTION DETAILS

5-BOLT, WHEEL HUB



4-BOLT, WHEEL HUB

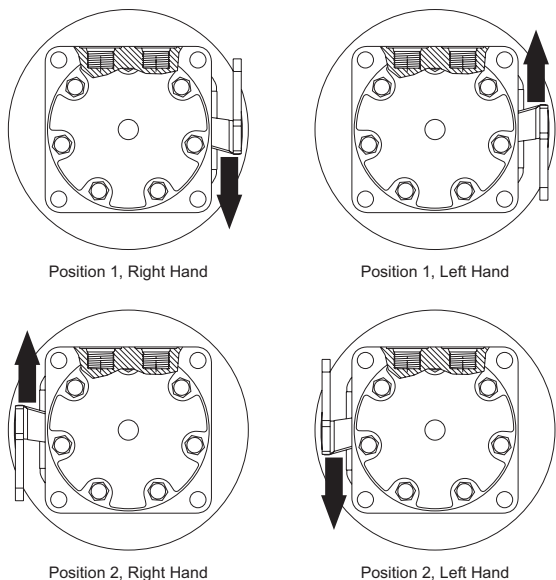


CE (410/411 Series)

Medium Duty Mechanical Drum Brake

TECHNICAL INFORMATION

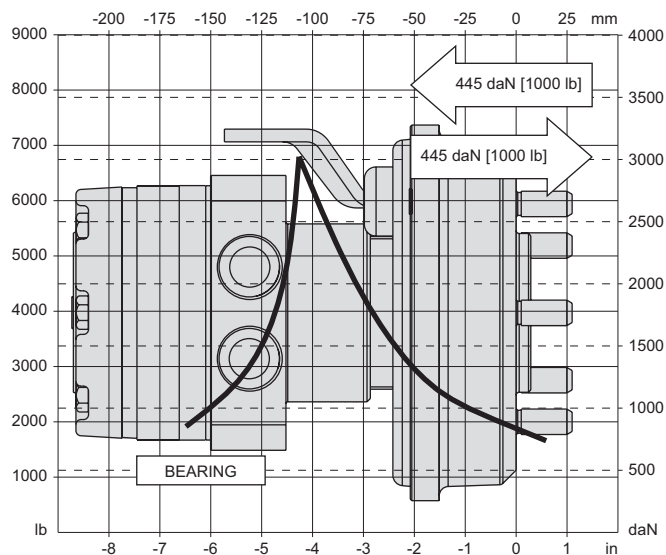
BRAKE LEVER POSITION & PULL DIRECTION



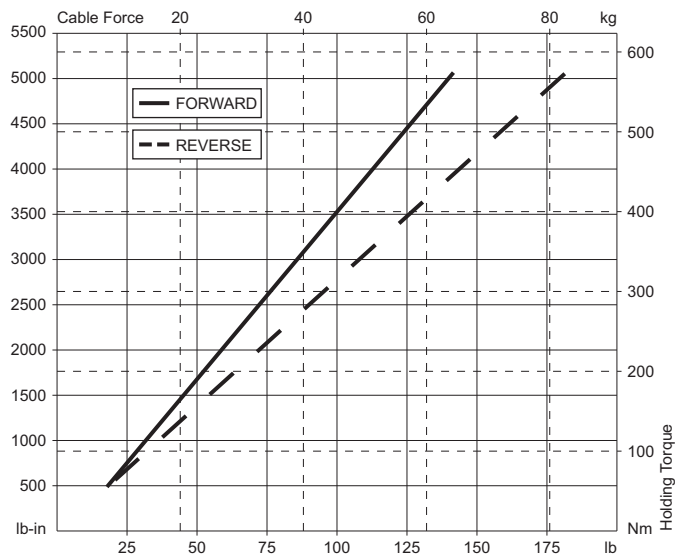
ALLOWABLE SHAFT LOAD / BEARING CURVE

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 7.

MOTOR BRAKE



BRAKE HOLDING TORQUE



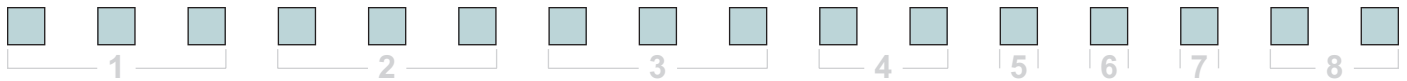
LENGTH & WEIGHT CHART

Dimension HH 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 35.

HH	Length	Weight
#	mm [in]	kg [lb]
120	99 [3.91]	16.0 [35.2]
160	99 [3.91]	16.0 [35.2]
200	103 [4.05]	16.3 [35.9]
230	105 [4.15]	16.5 [36.3]
260	108 [4.24]	16.7 [36.7]
300	111 [4.37]	17.0 [37.4]
350	125 [4.92]	18.1 [39.9]
375	117 [4.62]	17.5 [38.5]
470	125 [4.92]	18.1 [39.9]
540	131 [5.16]	18.7 [41.1]
750	149 [5.87]	20.1 [44.2]

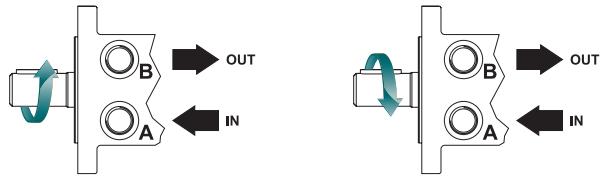
▶ 410/411 motor/brake weights can vary ± 0.5 kg [1 lb] depending on model configurations such as housing, shaft, endcover, options etc.

ORDERING INFORMATION



1. CHOOSE SERIES DESIGNATION

- 410** Standard Rotation
- 411** Reverse Rotation



► The 410 & 411 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

- K31** 4-Hole, Wheel Brake Mount, Aligned Ports, 7/8-14 UNF
- K35** 4-Hole, Wheel Brake Mount, Aligned Ports, 9/16-18 UNF
- K38** 4-Hole, Wheel Brake Mount, Aligned Ports, G 1/2

4. SELECT A SHAFT OPTION

- 22** 1-1/4" Tapered

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

8. SELECT A MISCELLANEOUS OPTION

- YA** 5 Bolt Hub, Position 2, Right Hand
- YB** 5 Bolt Hub, Position 2, Left Hand
- YE** 4 Bolt Hub, Position 2, Right Hand
- YF** 4 Bolt Hub, Position 2, Left Hand
- ZA** 5 Bolt Hub, Position 1, Left Hand
- ZB** 5 Bolt Hub, Position 1, Right Hand
- ZE** 4 Bolt Hub, Position 1, Left Hand
- ZF** 4 Bolt Hub, Position 1, Right Hand

RE (510/511 Series)

Medium Duty Mechanical Drum Brake

OVERVIEW

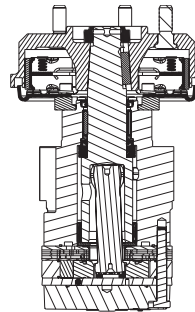
RE Series motors offer the perfect compromise between price and performance by producing work horse power at a reasonable cost. Although these motors perform well in a wide range of applications, they are especially suited for low flow, high pressure applications. During startup, pressure causes the 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.

SERIES DESCRIPTIONS

510/511 - Hydraulic Motor
With Integral Drum Brake



TYPICAL APPLICATIONS

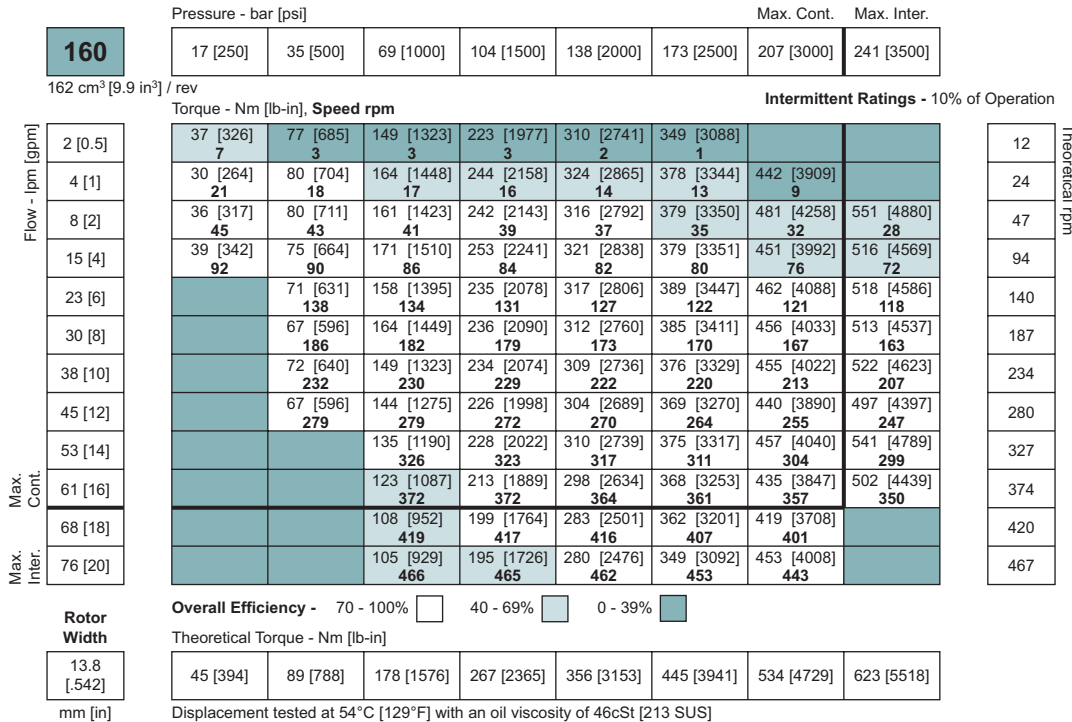
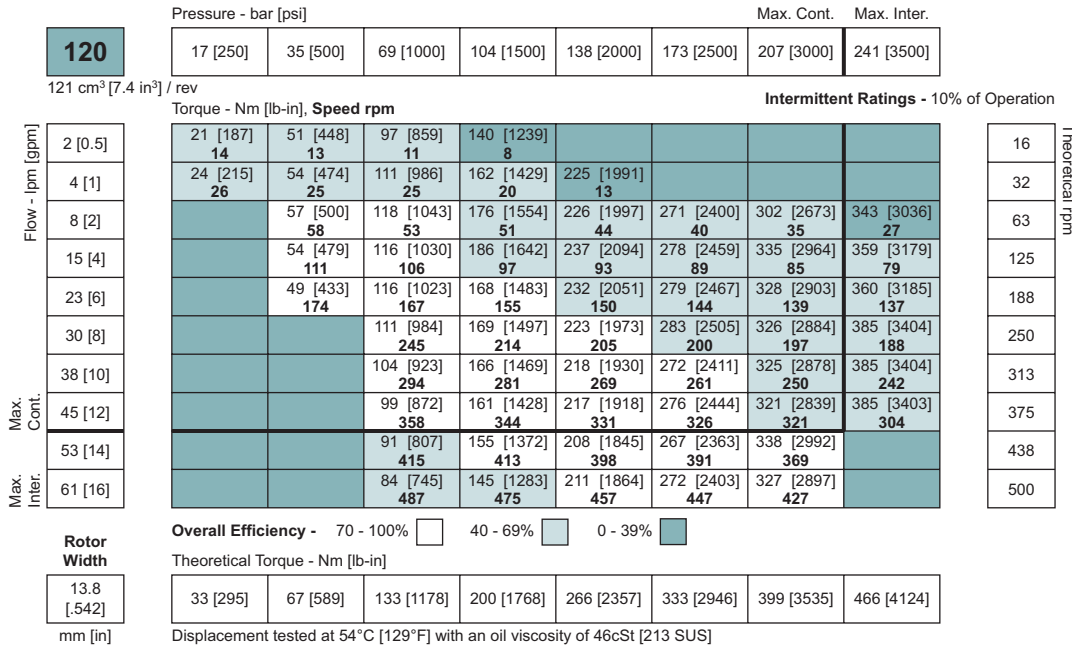
Medium-duty wheel drives, augers, mixers, winch drives, swing drives, grapple heads, feed rollers, broom drives and more

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



► 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 6.

RE (510/511 Series)

Medium Duty Mechanical Drum Brake

DISPLACEMENT PERFORMANCE

		Pressure - bar [psi]						Max. Cont.	Max. Inter.		
200		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	241 [3500]		
204 cm ³ [12.4 in ³] / rev											
		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation			
Flow - lpm [gpm]	2 [0.5]	40 [358] 7	91 [808] 4	133 [1181] 4	294 [2602] 4	375 [3323] 3			10	Theoretical rpm	
	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]			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]				191 [1689] 407	285 [2520] 403	379 [3353] 397	486 [4303] 388		410		
Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input checked="" type="checkbox"/>											
Rotor Width		Theoretical Torque - Nm [lb-in]									
17.3 [.682]		56 [494]	112 [987]	223 [1975]	335 [2962]	446 [3949]	558 [4936]	669 [5924]	781 [6911]		
mm [in]		Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]									

		Pressure - bar [psi]						Max. Cont.	Max. Inter.		
230		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	241 [3500]		
233 cm ³ [14.2 in ³] / rev											
		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation			
Flow - lpm [gpm]	2 [0.5]	45 [397] 6	92 [813] 4	184 [1628] 3	293 [2590] 2	375 [3323] 1			9	Theoretical rpm	
	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]			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]				210 [1855] 357	338 [2987] 351	464 [4104] 345	550 [4864] 339		358		
Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input checked="" type="checkbox"/>											
Rotor Width		Theoretical Torque - Nm [lb-in]									
19.7 [.777]		64 [565]	128 [1131]	256 [2261]	383 [3392]	511 [4522]	639 [5653]	767 [6783]	894 [7914]		
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 6.

DISPLACEMENT PERFORMANCE

		Pressure - bar [psi]							Max. Cont.	Max. Inter.	
260		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	241 [3500]		
261 cm ³ [15.9 in ³] / rev		Torque - Nm [lb-in], Speed rpm							Intermittent Ratings - 10% of Operation		
Flow - lpm [gpm]	2 [0.5]	49 [432] 5	112 [989] 2							8	Theoretical rpm
	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]			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]			82 [722] 348	227 [2009] 347	361 [3190] 345	496 [4386] 340			349	
Rotor Width		Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input type="checkbox"/>									
22.1 [.872] mm [in]		Theoretical Torque - Nm [lb-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]									

		Pressure - bar [psi]							Max. Cont.	Max. Inter.	
300		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	241 [3500]		
300 cm ³ [18.3 in ³] / rev		Torque - Nm [lb-in], Speed rpm							Intermittent Ratings - 10% of Operation		
Flow - lpm [gpm]	2 [0.5]	51 [452] 3	95 [839] 1							7	Theoretical rpm
	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]			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]			105 [928] 315	262 [2319] 314	434 [3838] 311	553 [4894] 307	707 [6257] 294		316		
Rotor Width		Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input type="checkbox"/>									
25.4 [1.000] mm [in]		Theoretical Torque - Nm [lb-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 6.

DISPLACEMENT PERFORMANCE

		Pressure - bar [psi]					Max. Cont.	Peak
470		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]
465 cm ³ [28.3 in ³] / rev		Torque - Nm [lb-in], Speed rpm						
		Intermittent Ratings - 10% of Operation						
Flow - lpm [gpm]	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	17
	15 [4]	94 [834] 31	200 [1774] 30	444 [3932] 28	659 [5829] 28	886 [7836] 26	1066 [9434] 23	1250 [11062] 21
	23 [6]	86 [759] 48	193 [1704] 47	438 [3880] 44	673 [5955] 44	872 [7715] 41	1073 [9499] 37	1258 [11128] 32
	30 [8]	73 [643] 64	179 [1587] 63	424 [3752] 60	663 [5863] 60	857 [7586] 57	1098 [9718] 50	1279 [11317] 43
	38 [10]	52 [464] 81	164 [1455] 80	407 [3597] 78	627 [5550] 78	851 [7533] 75	1067 [9444] 68	1276 [11288] 61
	45 [12]		141 [1248] 97	379 [3350] 94	630 [5575] 93	832 [7363] 90	1067 [9441] 83	1273 [11264] 76
	53 [14]		114 [1006] 113	350 [3094] 112	580 [5133] 111	802 [7101] 108	1013 [8964] 102	1222 [10817] 94
	61 [16]		83 [736] 130	322 [2846] 129	545 [4819] 127	796 [7040] 123	965 [8538] 119	1190 [10528] 113
	68 [18]		56 [497] 146	275 [2434] 145	526 [4657] 145	737 [6519] 142	956 [8464] 138	1166 [10317] 128
	76 [20]			235 [2078] 162	479 [4239] 161	706 [6249] 158	917 [8117] 154	1122 [9933] 143
83 [22]			202 [1790] 179	460 [4075] 178	669 [5920] 176	883 [7811] 170		
91 [24]			157 [1392] 195	385 [3410] 194	620 [5484] 190	843 [7464] 186		
Max. Cont.								170
Max. Inter.								196
Rotor Width		Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input type="checkbox"/>						
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]						

		Pressure - bar [psi]					Max. Cont.	Max. Inter.
540		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	
536 cm ³ [32.7 in ³] / rev		Torque - Nm [lb-in], Speed rpm						
		Intermittent Ratings - 10% of Operation						
Flow - lpm [gpm]	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
	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	
91 [24]			215 [1905] 169	491 [4349] 168	750 [6639] 168		170	
Max. Cont.								170
Max. Inter.								
Rotor Width		Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input type="checkbox"/>						
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 6.

RE (510/511 Series)

Medium Duty Mechanical Drum Brake

DISPLACEMENT PERFORMANCE

		Pressure - bar [psi]				Max. Cont.	Max. Inter.		
620		17 [250]	35 [500]	69 [1000]	104 [1500]	121 [1750]	155 [2250]		
631 cm ³ [38.5 in ³] / rev									
		Torque - Nm [lb-in], Speed rpm				Intermittent Ratings - 10% of Operation			
Flow - lpm [gpm]	Max. Cont.	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]			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]			247 [2185] 143	556 [4922] 142	706 [6249] 141		144
	Max. Inter.								

Rotor Width

54.0 [2.125]

mm [in]

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

Theoretical Torque - Nm [lb-in]

173 [1532]	346 [3064]	692 [6127]	1039 [9191]	1212 [10729]	1559 [13794]
------------	------------	------------	-------------	--------------	--------------

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

		Pressure - bar [psi]				Max. Cont.	Peak	
750		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]		
748 cm ³ [45.6 in ³] / rev								
		Torque - Nm [lb-in], Speed rpm				Intermittent Ratings - 10% of Operation		
Flow - lpm [gpm]	Max. Cont.	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]		62 [552] 100	423 [3741] 100	805 [7123] 99	1173 [10385] 98	102
		83 [22]			385 [3404] 110	747 [6608] 110		112
		91 [24]			302 [2669] 121	670 [5932] 120		122
	Max. Inter.							

Rotor Width

63.5 [2.501]

mm [in]

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

Theoretical Torque - Nm [lb-in]

205 [1815]	410 [3631]	821 [7261]	1231 [10892]	1641 [14522]
------------	------------	------------	--------------	--------------

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 6.

RE (510/511 Series)

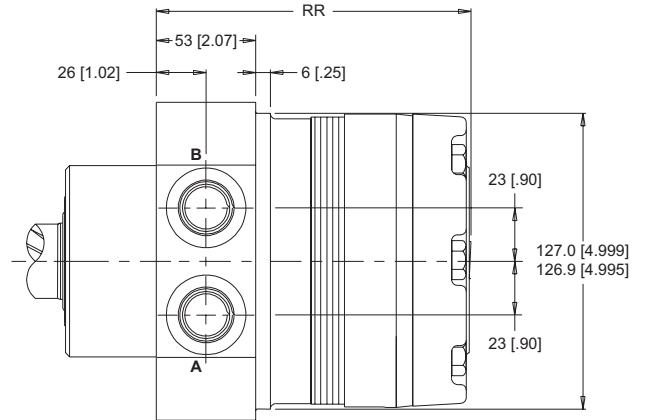
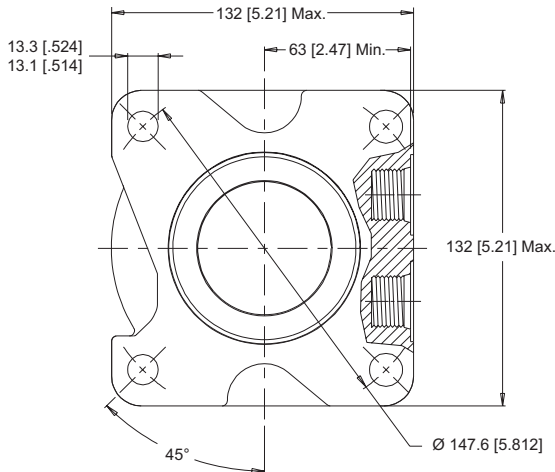
Medium Duty Mechanical Drum Brake

HOUSINGS

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

4-HOLE, WHEEL BRAKE MOUNT, ALIGNED PORTS

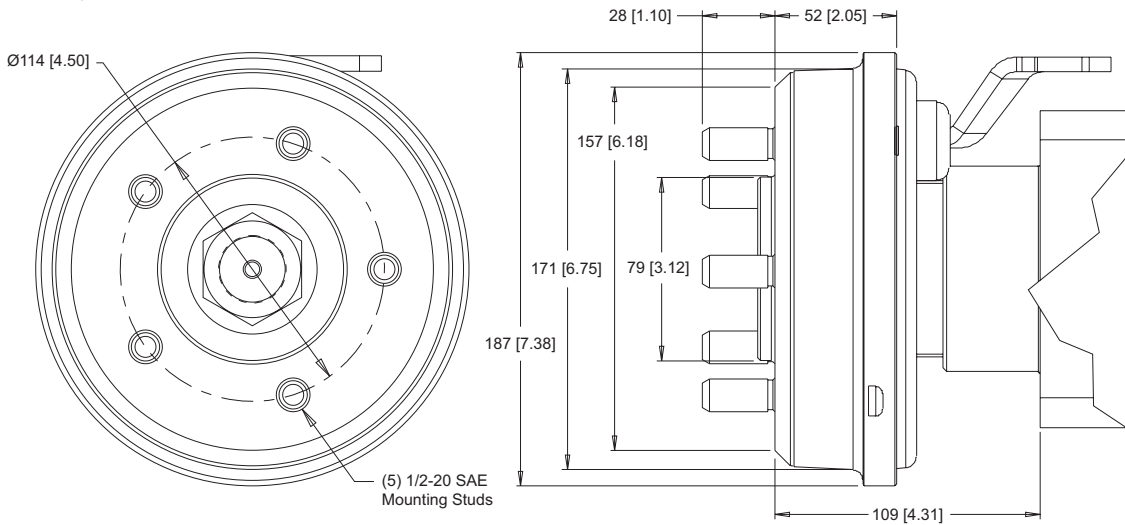
X31 7/8-14 UNF **X38** G 1/2



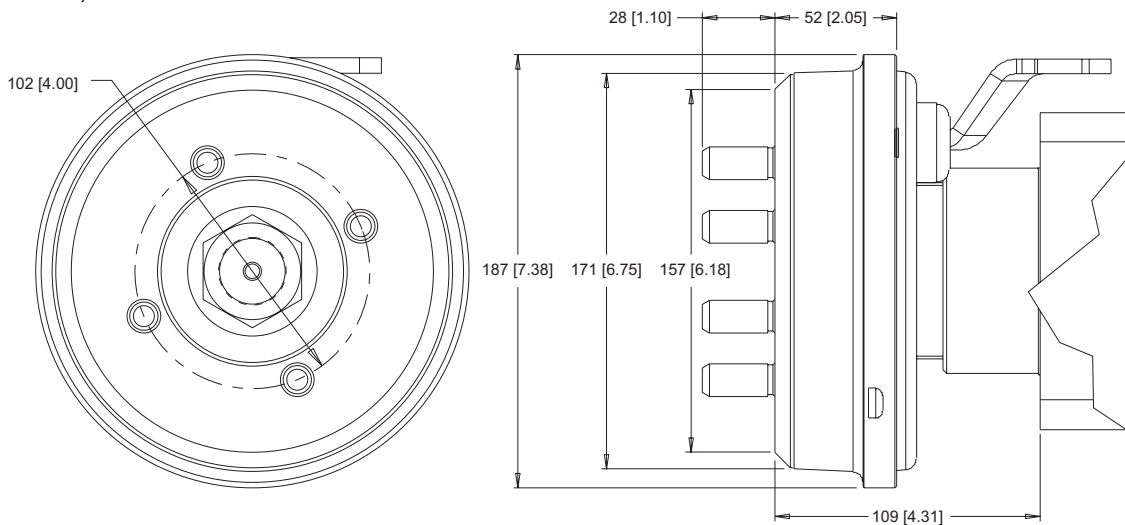
► Dimension RR is charted on page 46.

HUB OPTION DETAILS

5-BOLT, WHEEL HUB



4-BOLT, WHEEL HUB

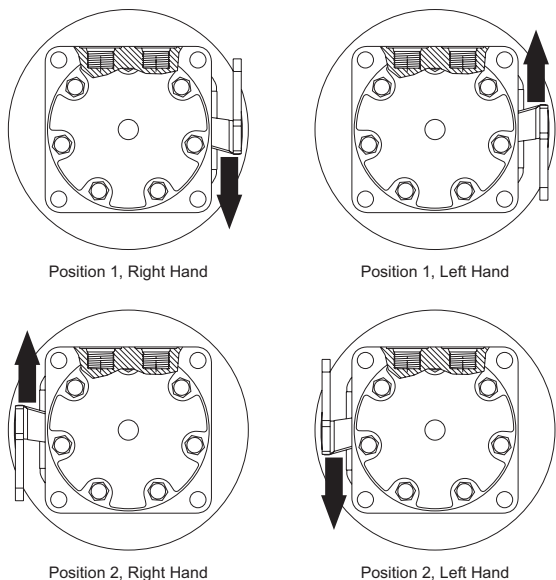


RE (510/511 Series)

Medium Duty Mechanical Drum Brake

TECHNICAL INFORMATION

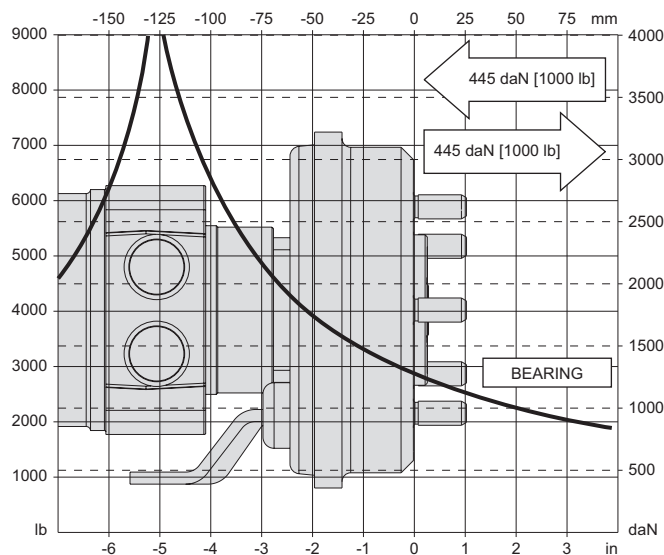
BRAKE LEVER POSITION & PULL DIRECTION



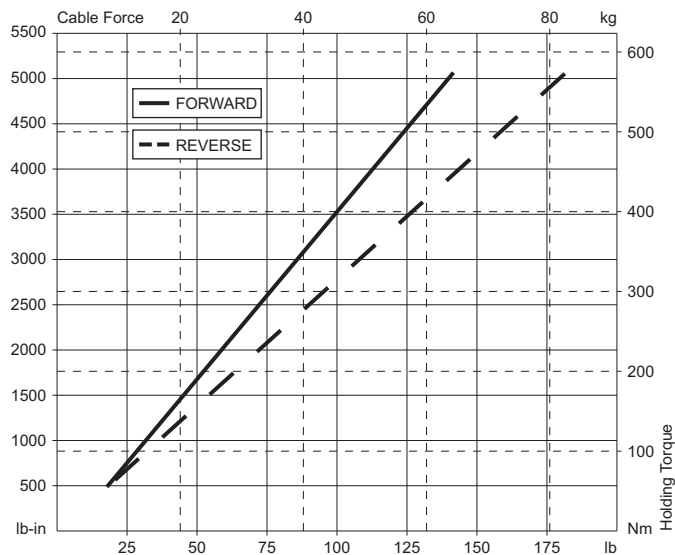
ALLOWABLE SHAFT LOAD / BEARING CURVE

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 7.

MOTOR BRAKE



BRAKE HOLDING TORQUE



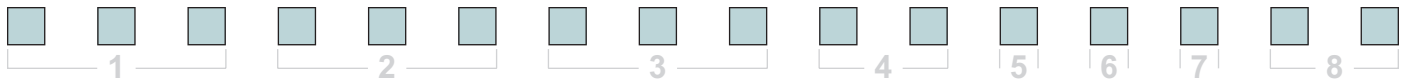
LENGTH & WEIGHT CHART

Dimension RR 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 45.

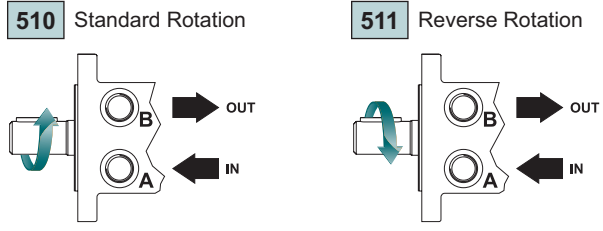
RR #	Length mm [in]	Weight kg [lb]
120	156 [6.15]	14.9 [42.9]
160	156 [6.15]	14.9 [42.9]
200	159 [6.29]	15.2 [43.7]
230	162 [6.38]	15.3 [43.9]
260	165 [6.48]	15.6 [44.5]
300	168 [6.61]	16.0 [45.3]
350	182 [7.16]	17.1 [47.7]
375	174 [6.86]	16.5 [46.5]
470	182 [7.16]	17.1 [47.7]
540	188 [7.40]	17.6 [49.0]
620	196 [7.77]	18.4 [50.5]
750	206 [8.11]	19.0 [52.0]

► 510/511 motor/brake weights can vary ± 0.5 kg [1 lb] depending on model configurations such as housing, shaft, endcover, options etc.

ORDERING INFORMATION



1. CHOOSE SERIES DESIGNATION



► The 510 & 511 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

- X31** 4-Hole, Wheel Brake Mount, Aligned Ports, 7/8-14 UNF
- X38** 4-Hole, Wheel Brake Mount, Aligned Ports, G 1/2

4. SELECT A SHAFT OPTION

- 31** 1-1/2" Tapered

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

8. SELECT A MISCELLANEOUS OPTION

- YA** 5 Bolt Hub, Position 2, Right Hand
- YB** 5 Bolt Hub, Position 2, Left Hand
- YE** 4 Bolt Hub, Position 2, Right Hand
- YF** 4 Bolt Hub, Position 2, Left Hand
- ZA** 5 Bolt Hub, Position 1, Left Hand
- ZB** 5 Bolt Hub, Position 1, Right Hand
- ZE** 4 Bolt Hub, Position 1, Left Hand
- ZF** 4 Bolt Hub, Position 1, Right Hand

DT (710 Series)

Heavy Duty Hydraulic Motor Brake

OVERVIEW

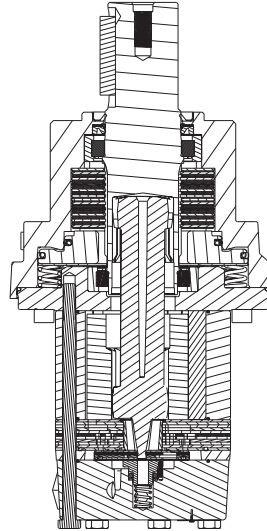
The most amazing aspect of the DT Series motor is its huge torque potential from its relatively small size. The DT Series motor is capable of producing output torque comparable to competitive designs, but from a package that is both shorter and lighter. The savings in space and weight in no way compromises durability, as the motor uses massive shafts, bearings and drive links to transmit the torque produced by this powerful package. The use of a case drain allows reduced pressure on the shaft seal while maintaining drive-line lubrication for maximum motor life. Standard mounting and shaft options offer interchangeability with competitive designs. An internal drain option is also available.

FEATURES / BENEFITS

- Heavy-Duty Roller Bearing supports high side loads and receives forced lubrication for cooling and increased life.
- Compact Housing contributes to high power-to-weight ratio of motor and offers front and rear mounting flanges.
- Heavy-Duty Drive Link receives forced lubrication for long life and is capable of extreme duty cycles.
- Roller Stator® Motor available in displacements up to 2093 cm³ [127.7 in³] for high torque output.
- Three-Zone Orbiting Valve precisely meters oil to produce exceptional volumetric efficiencies.

SERIES DESCRIPTIONS

710 - Hydraulic Motor
With Integral Hydraulic Brake



TYPICAL APPLICATIONS

Heavy-duty wheel drives, augers, mixers, pumping units, conveyors, boring machines, rotators, mining equipment, forestry equipment and more and more

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
300	300 [18.3]	320	380	95 [25]	114 [30]	819 [7250]	955 [8450]	207 [3000]	241 [3500]	259 [3750]
375	374 [22.8]	250	300	95 [25]	114 [30]	1045 [9250]	1127 [9975]	207 [3000]	224 [3250]	241 [3500]
470	464 [28.3]	200	240	95 [25]	114 [30]	1071 [9475]	1390 [12300]	172 [2500]	224 [3250]	241 [3500]
540	536 [32.7]	180	210	95 [25]	114 [30]	1277 [11300]	1525 [13500]	172 [2500]	207 [3000]	241 [3500]
750	747 [45.6]	130	150	95 [25]	114 [30]	1780 [15750]	2090 [18500]	172 [2500]	207 [3000]	241 [3500]
930	929 [56.7]	100	120	95 [25]	114 [30]	1780 [15750]	2141 [18950]	138 [2000]	172 [2500]	207 [3000]
1K1	1047 [63.9]	90	110	95 [25]	114 [30]	1915 [16950]	2316 [20500]	138 [2000]	172 [2500]	207 [3000]
1K5	1495 [91.2]	60	70	95 [25]	114 [30]	2090 [18500]	2316 [20500]	103 [1500]	121 [1750]	138 [2000]
2K1	2093 [127.7]	40	50	95 [25]	114 [30]	2661 [23550]	3342 [29580]	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

		Pressure - bar [psi]						Max. Cont.	Max. Inter.			
		300						207 [3000]	241 [3500]			
		300 cm ³ [18.3 in ³] / rev						Intermittent Ratings - 10% of Operation				
		Torque - Nm [lb-in], Speed rpm										
Flow - lpm [gpm]	2 [0.5]	54 [476] 4	115 [1014] 3	237 [2100] 2							7	Theoretical rpm
	4 [1]	47 [415] 11	108 [952] 9	255 [2256] 7	380 [363] 5	486 [4304] 3					13	
	8 [2]	49 [435] 24	119 [1057] 23	257 [2278] 21	410 [3628] 19	543 [4801] 15	671 [5942] 12	789 [6983] 9	899 [7959] 7		26	
	15 [4]	49 [430] 50	120 [1064] 49	264 [2336] 46	409 [3616] 43	554 [4904] 37	701 [6202] 32	839 [7424] 28	971 [8595] 26		51	
	23 [6]		116 [1025] 75	278 [2462] 69	420 [3719] 65	567 [5019] 58	712 [6297] 54	854 [7554] 51	983 [8701] 48		76	
	30 [8]		105 [929] 100	251 [2222] 97	396 [3506] 93	542 [4793] 86	692 [6122] 78	831 [7353] 70	974 [8621] 69		101	
	38 [10]		99 [877] 126	237 [2099] 122	388 [3438] 115	549 [4857] 113	687 [6081] 107	833 [7369] 96	970 [8588] 90		127	
	45 [12]		88 [762] 151	237 [2094] 150	378 [3342] 140	527 [4666] 135	666 [5893] 129	823 [7281] 119	963 [8523] 113		152	
	53 [14]		77 [679] 176	211 [1864] 175	361 [3191] 172	506 [4478] 164	656 [5802] 156	805 [7121] 151	951 [8420] 140		177	
	61 [16]		60 [528] 201	208 [1845] 200	359 [3179] 189	495 [4378] 185	648 [5731] 178	791 [6999] 172	928 [8213] 165		202	
	68 [18]			191 [1694] 225	335 [2961] 222	497 [4402] 211	632 [5592] 206	776 [6871] 196	914 [8093] 189		228	
	76 [20]			168 [1489] 251	320 [2835] 247	461 [4083] 240	610 [5401] 233	764 [6762] 228	897 [7934] 216		253	
	83 [22]			147 [1298] 276	302 [2675] 272	444 [3926] 269	588 [5205] 258	742 [6570] 249	883 [7810] 234		278	
	91 [24]			123 [1086] 300	272 [2409] 298	414 [3666] 296	558 [4934] 290	708 [6264] 281	851 [7535] 272		303	
95 [25]			108 [958] 315	257 [2278] 313	393 [3482] 308	549 [4857] 300	694 [6139] 289	839 [7421] 280		316		
114 [30]				186 [1642] 376	333 [2945] 372	473 [4189] 369				379		

Rotor Width

25.4 [1.000]
mm [in]

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

Theoretical Torque - Nm [lb-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]

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

375

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	224 [3250]
----------	----------	-----------	------------	------------	------------	------------	------------

375 cm³ [22.8 in³] / rev

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

Flow - lpm [gpm]	2 [0.5]	65 [574] 4	144 [1272] 3	302 [2670] 2	449 [3970] 1						6	Theoretical rpm
	4 [1]	66 [583] 9	152 [1345] 8	312 [2757] 7	475 [4208] 5	625 [5535] 4					11	
	8 [2]	67 [596] 19	154 [1365] 18	329 [2907] 17	496 [4388] 14	644 [5695] 12	805 [7122] 10	963 [8524] 8	1050 [9288] 7		21	
	15 [4]	71 [627] 40	158 [1400] 39	337 [2982] 37	513 [4536] 34	680 [6020] 30	858 [7596] 27	1013 [8962] 25	1099 [9723] 23		41	
	23 [6]	64 [570] 60	151 [1334] 60	336 [2969] 58	520 [4598] 54	694 [6141] 49	871 [7704] 45	1048 [9275] 41	1115 [9867] 41		61	
	30 [8]	53 [467] 81	151 [1337] 80	325 [2876] 78	512 [4532] 73	691 [6113] 69	873 [7724] 63	1051 [9304] 60	1126 [9964] 59		82	
	38 [10]		131 [1161] 101	313 [2768] 99	502 [4439] 95	686 [6075] 89	884 [7824] 82	1049 [9281] 79	1131 [10011] 77		102	
	45 [12]		112 [995] 121	308 [2725] 120	494 [4375] 116	685 [6059] 109	862 [7626] 103	1053 [9321] 98	1137 [10066] 97		122	
	53 [14]		99 [878] 141	283 [2508] 140	469 [4149] 136	645 [5705] 131	844 [7467] 125	1013 [8965] 117	1116 [9877] 115		142	
	61 [16]		75 [662] 162	262 [2319] 161	443 [3923] 160	631 [5587] 155	823 [7283] 148	1009 [8930] 143	1114 [9859] 136		163	
	68 [18]			248 [2198] 181	427 [3779] 178	612 [5416] 175	804 [7119] 167	1005 [8895] 160	1091 [9653] 156		183	
	76 [20]			218 [1925] 202	403 [3568] 200	583 [5161] 195	778 [6886] 189	966 [8549] 178	1071 [9474] 173		203	
	83 [22]			189 [1676] 222	375 [3318] 221	561 [4967] 217	754 [6669] 211	942 [8335] 201	1036 [9171] 196		223	
	91 [24]			155 [1374] 242	344 [3041] 240	535 [4732] 237	724 [6410] 229				244	
95 [25]				321 [2839] 252	519 [4596] 249	710 [6283] 241				254		
114 [30]				238 [2110] 303	432 [3820] 301	622 [5503] 296				304		

Rotor Width

31.8 [1.252]
mm [in]

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

Theoretical Torque - Nm [lb-in]

103 [908]	205 [1815]	410 [3631]	615 [5446]	821 [7261]	1026 [9076]	1231 [10892]	1333 [11799]
-----------	------------	------------	------------	------------	-------------	--------------	--------------

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 6.

DT (710 Series)

Heavy Duty Hydraulic Motor Brake

DISPLACEMENT PERFORMANCE

		Pressure - bar [psi]					Max. Cont.	Max. Inter.		
470		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	224 [3250]	
465 cm ³ [28.3 in ³] / rev		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation		
Flow - lpm [gpm]	2 [0.5]	86 [762] 3	201 [1780] 2	401 [3553] 2						5
	4 [1]	92 [817] 7	195 [1728] 7	406 [3597] 6	610 [5395] 5	806 [7137] 4				9
	8 [2]	94 [835] 15	199 [1761] 15	418 [3702] 14	631 [5580] 13	832 [7365] 11	1042 [9226] 9	1239 [10961] 8		17
	15 [4]	92 [815] 32	202 [1784] 32	426 [3769] 60	646 [5717] 28	849 [7513] 24	1066 [9430] 23	1272 [11256] 21	1381 [12217] 19	33
	23 [6]	82 [729] 48	203 [1799] 47	423 [3744] 46	647 [5725] 43	855 [7565] 39	1070 [9473] 36	1275 [11287] 34	1365 [12083] 32	49
	30 [8]	67 [595] 65	185 [1641] 64	414 [3663] 63	642 [5683] 60	867 [7671] 54	1078 [9538] 47	1300 [11508] 46	1398 [12367] 44	66
	38 [10]	52 [459] 81	170 [1503] 80	399 [3532] 79	630 [5573] 78	857 [7584] 69	1077 [9531] 63	1283 [11352] 61	1393 [12323] 58	82
	45 [12]		153 [1354] 97	380 [3366] 96	613 [5422] 93	842 [7454] 88	1072 [9488] 77	1302 [11523] 74	1394 [12334] 68	98
	53 [14]		127 [1121] 114	359 [3173] 113	591 [5229] 110	823 [7282] 104	1057 [9350] 97	1270 [11242] 89	1392 [12318] 85	115
	61 [16]		100 [888] 160	335 [2964] 129	564 [4993] 127	798 [7061] 119	1030 [9118] 114	1254 [11101] 108	1369 [12118] 102	131
	68 [18]		67 [595] 146	304 [2689] 145	535 [4734] 143	765 [6772] 137	1003 [8875] 132	1229 [10877] 120	1348 [11926] 114	147
	76 [20]			274 [2428] 162	504 [4458] 160	733 [6485] 155	965 [8536] 148	1197 [10592] 139	1318 [11668] 136	164
	83 [22]			226 [2003] 178	458 [4050] 175	691 [6118] 172	928 [8215] 165	1150 [10181] 156	1266 [11200] 154	180
	91 [24]			176 [1554] 194	415 [3670] 192	669 [5917] 190	885 [7833] 183			196
95 [25]				389 [3442] 203	632 [5589] 198	867 [7676] 190			205	
114 [30]				277 [2451] 243	514 [4549] 240	755 [6684] 235			245	

Rotor Width

39.4 [1.553]

mm [in]

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

Theoretical Torque - Nm [lb-in]

127 [1127]	255 [2253]	509 [4506]	764 [6760]	1018 [9013]	1273 [1126]	1528 [13519]	1655 [14646]
------------	------------	------------	------------	-------------	-------------	--------------	--------------

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

		Pressure - bar [psi]					Max. Cont.	Max. Inter.		
540		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]		
536 cm ³ [32.7 in ³] / rev		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation		
Flow - lpm [gpm]	2 [0.5]	103 [908] 2	215 [1607] 2	421 [3722] 1						4
	4 [1]	104 [917] 6	228 [2016] 5	454 [4015] 4	666 [5897] 3	874 [7730] 1				8
	8 [2]	108 [954] 13	231 [2043] 12	474 [4191] 11	704 [6231] 9	925 [8190] 5	1153 [10201] 4			15
	15 [4]	102 [906] 27	232 [2052] 26	503 [4448] 24	756 [6692] 21	994 [8799] 18	1221 [10806] 15	1461 [12930] 13		29
	23 [6]	98 [866] 42	230 [2038] 41	498 [4404] 39	766 [6774] 36	1023 [9049] 30	1268 [11225] 27	1494 [13219] 24		43
	30 [8]	84 [744] 56	213 [1883] 55	484 [4280] 53	754 [6669] 49	1032 [9130] 42	1273 [11262] 38	1524 [13486] 34		57
	38 [10]	63 [561] 70	195 [1727] 69	466 [4122] 68	737 [6519] 64	1006 [8903] 57	1285 [11374] 49	1532 [13556] 46		71
	45 [12]	42 [373] 84	179 [1586] 83	444 [3928] 82	717 [6349] 76	984 [8710] 72	1274 [11277] 65	1518 [13436] 57		85
	53 [14]		146 [1295] 97	421 [3722] 95	694 [6139] 93	964 [8529] 87	1253 [11091] 80	1512 [13381] 70		99
	61 [16]		116 [1025] 113	391 [3460] 111	663 [5865] 108	930 [8230] 103	1206 [10675] 97	1479 [13086] 84		114
	68 [18]		90 [798] 127	356 [3153] 125	629 [5563] 123	900 [7969] 116	1192 [10550] 107	1451 [12841] 100		128
	76 [20]		56 [498] 141	330 [2923] 139	595 [5265] 137	887 [7850] 133	1158 [10250] 123	1421 [12578] 114		142
	83 [22]			278 [2464] 155	549 [4859] 153	822 [7271] 148	1121 [9919] 136	1388 [12283] 133		156
	91 [24]			243 [2154] 169	508 [4494] 166	794 [7024] 164	1054 [9325] 163			170
95 [25]			220 [1948] 176	486 [4299] 174	762 [6741] 169	1025 [9075] 163			177	
114 [30]			90 [800] 211	366 [3237] 210	638 [5649] 207	920 [8144] 203			212	

Rotor Width

45.5 [1.791]

mm [in]

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

Theoretical Torque - Nm [lb-in]

147 [1302]	294 [2604]	588 [5207]	883 [7811]	1177 [10414]	1471 [13018]	1765 [15621]
------------	------------	------------	------------	--------------	--------------	--------------

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 6.

DISPLACEMENT PERFORMANCE

► 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 6.

		Pressure - bar [psi]						Max. Cont.	Max. Inter.		
750		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]			
748 cm ³ [45.6 in ³] / rev		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation			
Flow - lpm [gpm]	2 [0.5]	144 [1276]	290 [2566]							3	Theoretical rpm
	4 [1]	154 [1367]	323 [2863]	669 [5917]	931 [8242]					6	
	8 [2]	162 [1435]	341 [3015]	712 [6302]	1021 [9038]	1305 [11550]				11	
	15 [4]	158 [1400]	348 [3080]	723 [6399]	1082 [9578]	1402 [12410]				21	
	23 [6]	144 [1273]	331 [2927]	714 [6317]	1083 [9583]	1433 [12678]	1744 [15430]			31	
	30 [8]	126 [1116]	328 [2900]	697 [6167]	1072 [9486]	1451 [12843]	1769 [15658]			41	
	38 [10]	104 [922]	291 [2574]	675 [5976]	1055 [9334]	1445 [12785]	1786 [15805]	2076 [18373]		51	
	45 [12]	77 [682]	269 [2382]	655 [5792]	1032 [9136]	1431 [12668]	1786 [15801]	2094 [18528]		61	
	53 [14]	46 [410]	239 [2116]	627 [5545]	1003 [8880]	1407 [12451]	1767 [15634]	2099 [18578]		71	
	61 [16]		201 [1780]	584 [5164]	971 [8592]	1345 [11907]	1743 [15422]	2065 [18271]		82	
	68 [18]		161 [1421]	545 [4819]	928 [8209]	1306 [11556]	1709 [15120]			92	
	76 [20]		120 [1058]	497 [4395]	863 [7635]	1260 [11154]				102	
	83 [22]			444 [3926]	831 [7351]	1213 [10737]				112	
	91 [24]			389 [3447]	785 [6947]	1196 [10581]				122	
95 [25]			368 [3255]	757 [6697]	1144 [10126]				127		
114 [30]			205 [1813]	613 [5428]	979 [8665]				152		

Rotor Width

63.5 [2.501]

mm [in]

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

Theoretical Torque - Nm [lb-in]

205 [1815]	410 [3631]	821 [7261]	1231 [10892]	1641 [14522]	2051 [18153]	2462 [21783]
------------	------------	------------	--------------	--------------	--------------	--------------

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

		Pressure - bar [psi]						Max. Cont.	Max. Inter.				
930		17 [250]	35 [500]	52 [750]	69 [1000]	86 [1250]	104 [1500]	121 [1750]	138 [2000]	155 [2250]	173 [2500]		
929 cm ³ [56.7 in ³] / rev		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation					
Flow - lpm [gpm]	2 [0.5]	180 [1590]	387 [3423]	607 [5368]	801 [7089]						3	Theoretical rpm	
	4 [1]	196 [1734]	418 [3696]	653 [5780]	864 [7649]	1067 [9447]	1294 [11451]				5		
	8 [2]	205 [1816]	442 [3907]	680 [6015]	877 [7764]	1117 [9886]	1300 [11501]	1510 [13365]			9		
	15 [4]	198 [1753]	432 [3825]	664 [5878]	906 [8021]	1121 [9924]	1338 [11840]	1556 [13769]	1730 [15306]		17		
	23 [6]	185 [1633]	420 [3719]	651 [5765]	908 [8034]	1123 [9935]	1355 [11991]	1543 [13651]	1794 [15873]	1981 [17532]	25		
	30 [8]	162 [1438]	404 [3576]	636 [5624]	893 [7900]	1107 [9800]	1340 [11854]	1581 [13988]	1776 [15716]	1985 [17570]	2105 [18632]		33
	38 [10]	125 [1109]	368 [3253]	626 [5536]	845 [7476]	1087 [9620]	1314 [11625]	1497 [13251]	1736 [15364]	1956 [17306]	2153 [19054]		41
	45 [12]	91 [807]	341 [3018]	578 [5111]	815 [7213]	1072 [9487]	1314 [11630]	1525 [13492]	1713 [15159]	1946 [17222]	2133 [18873]		49
	53 [14]	35 [310]	290 [2565]	533 [4715]	765 [6772]	1024 [9059]	1240 [10974]	1487 [13155]	1727 [15287]	1945 [17216]	2168 [19188]		58
	61 [16]		239 [2118]	484 [4281]	726 [6429]	959 [8488]	1210 [10708]	1450 [12830]	1696 [15008]	1925 [17039]	2140 [18934]		66
	68 [18]		205 [1811]	440 [3891]	701 [6202]	920 [8143]	1177 [10418]	1422 [12580]	1643 [14538]	1893 [16741]	2105 [18625]		74
	76 [20]		150 [1325]	409 [3616]	632 [5590]	801 [7091]	1100 [9733]	1505 [12135]	1599 [14148]	1859 [16454]	2060 [18230]		82
	83 [22]		99 [875]	336 [2977]	581 [5139]	837 [7403]	1056 [9342]	1305 [11553]	1561 [13816]	1799 [15918]	2025 [17925]		90
	91 [24]			282 [2497]	501 [4438]	766 [6778]	1021 [9038]	1266 [11201]	1489 [13179]	1752 [15505]	1969 [17427]		98
95 [25]			241 [2137]	496 [4389]	722 [6390]	974 [8621]	1214 [10743]	1454 [12863]	1727 [15286]	1956 [17309]	102		
114 [30]			66 [582]	300 [2652]	532 [4711]	781 [6914]	1044 [9235]	1271 [11248]			123		

Rotor Width

78.9 [3.106]

mm [in]

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

Theoretical Torque - Nm [lb-in]

255 [2257]	510 [4514]	765 [6771]	1020 [9029]	1275 [11286]	1530 [13543]	1785 [15800]	2040 [18057]	2296 [20314]	2551 [22572]
------------	------------	------------	-------------	--------------	--------------	--------------	--------------	--------------	--------------

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

DT (710 Series)

Heavy Duty Hydraulic Motor Brake

DISPLACEMENT PERFORMANCE

		Pressure - bar [psi]						Max. Cont.	Max. Inter.			
1K1		17 [250]	35 [500]	52 [750]	69 [1000]	86 [1250]	104 [1500]	121 [1750]	138 [2000]	155 [2250]	173 [2500]	
1047 cm ³ [63.9 in ³] / rev												
Torque - Nm [lb-in], Speed rpm												
Intermittent Ratings - 10% of Operation												
Flow - lpm [gpm]	2 [0.5]	217 [1918]	455 [4026]	671 [5940]	890 [7879]							2
		1	1	0.9	0.6							
	4 [1]	206 [1821]	498 [4410]	706 [6251]	935 [8273]	1189 [10518]						4
		3	2	2	2	2						
	8 [2]	224 [1985]	498 [4407]	754 [6672]	983 [8700]	1222 [10810]	1428 [12635]					8
		6	6	6	5	5	4					
	15 [4]	224 [1980]	472 [4180]	754 [6669]	1011 [8946]	1262 [11169]	1486 [13147]	1697 [15014]				15
		14	13	13	13	11	10	9				
	23 [6]	170 [1500]	487 [4314]	739 [6538]	1020 [9023]	1238 [10956]	1501 [13286]	1695 [14998]	1914 [16936]			22
		21	21	20	19	18	16	14	12			
	30 [8]	164 [1451]	431 [3814]	709 [6270]	970 [8580]	1241 [10986]	1481 [13106]	1727 [15280]	1942 [17185]	2144 [18971]		29
		28	28	28	27	26	23	20	16	9		
	38 [10]	129 [1143]	401 [3546]	675 [5975]	944 [8356]	1208 [10688]	1455 [12879]	1714 [15168]	1919 [16982]	2145 [18983]		37
		36	36	35	34	32	29	26	26	17		
45 [12]	98 [871]	359 [3176]	624 [5526]	894 [7915]	1148 [10163]	1420 [12569]	1693 [14981]	1893 [16756]	2133 [18879]	2311 [20456]	44	
	43	43	41	40	37	33	31	25	22	19		
53 [14]	44 [390]	312 [2761]	580 [5129]	851 [7535]	1122 [9933]	1383 [12237]	1612 [14263]	1856 [16424]	2098 [18569]	2327 [20596]	51	
	50	50	49	49	47	44	40	33	29	25		
61 [16]		251 [2220]	516 [4569]	776 [6871]	1062 [9402]	1320 [11678]	1587 [14045]	1837 [16261]	2082 [18426]	2291 [20275]	58	
		57	56	56	55	52	50	38	30	29		
68 [18]		190 [1678]	458 [4053]	706 [6252]	1002 [8869]	1272 [11252]	1552 [13738]	1794 [15877]	2051 [18147]	2275 [20130]	66	
		65	65	64	62	60	59	52	41	33		
76 [20]		117 [1033]	390 [3453]	652 [5774]	930 [8227]	1187 [10502]	1596 [12874]	1723 [15246]	2001 [17705]	2228 [19716]	73	
		72	71	71	70	69	64	58	57	45		
83 [22]		50 [444]	310 [2741]	569 [5034]	847 [7493]	1113 [9846]	1380 [12214]	1650 [14599]	1927 [17055]	2138 [18924]	80	
		79	79	78	77	76	74	67	62	51		
91 [24]			210 [1862]	491 [4346]	755 [6677]	1018 [9007]	1288 [11398]	1557 [13777]	1827 [16164]	2101 [18591]	87	
			86	85	84	83	81	76	71	61		
95 [25]			185 [1635]	463 [4096]	710 [6281]	963 [8519]	1232 [10901]	1497 [13247]	1790 [15844]	2028 [17950]	91	
			90	90	89	88	85	82	76	71		
114 [30]				202 [1789]	477 [4217]	730 [6460]	1013 [8962]	1237 [10947]			109	
				108	107	106	105	104				

Rotor Width

88.9 [3.502]

mm [in]

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

Theoretical Torque - Nm [lb-in]

287 [2544]	575 [5088]	862 [7631]	1150 [10175]	1437 [12719]	1725 [15263]	2012 [17807]	2300 [20350]	2587 [22894]	2874 [25438]
------------	------------	------------	--------------	--------------	--------------	--------------	--------------	--------------	--------------

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

		Pressure - bar [psi]						Max. Cont.	Max. Inter.			
1K5		17 [250]	35 [500]	52 [750]	69 [1000]	86 [1250]	104 [1500]	121 [1750]				
1495 cm ³ [91.2 in ³] / rev												
Torque - Nm [lb-in], Speed rpm												
Intermittent Ratings - 10% of Operation												
Flow - lpm [gpm]	2 [0.5]	305 [2703]	648 [5736]									2
		0.9	0.6									
	4 [1]	336 [2978]	693 [6128]	1011 [8942]								3
		2	1	1								
	8 [2]	351 [3106]	729 [6454]	1085 [9597]	1364 [12072]							6
		4	4	3	3							
	15 [4]	331 [2925]	712 [6304]	1116 [9879]	1491 [13191]	1771 [15668]						11
		9	9	8	7	7						
	23 [6]	297 [2629]	681 [3023]	1088 [9632]	1464 [12952]	1770 [15662]						16
		15	14	13	12	10						
	30 [8]	247 [2183]	640 [5662]	1038 [9188]	1430 [12655]	1793 [15864]	2123 [18786]					21
		20	19	18	17	15	9					
	38 [10]	197 [1740]	583 [5159]	1001 [8860]	1377 [12189]	1749 [15479]	2090 [18498]					26
		25	24	23	22	19	14					
45 [12]	131 [1157]	531 [4695]	940 [8315]	1330 [11770]	1702 [15066]	2041 [18059]	2329 [20613]				31	
	30	29	28	27	24	19	14					
53 [14]	67 [594]	484 [4282]	869 [7689]	1267 [11217]	1642 [14532]	1990 [17612]	2300 [20353]				36	
	36	35	33	32	30	24	15					
61 [16]		391 [3457]	769 [6805]	1172 [10374]	1567 [13866]	1914 [16941]	2258 [19986]				41	
		40	39	37	36	32	21					
68 [18]		294 [2602]	686 [6072]	1076 [9523]	1489 [13177]	1846 [16334]	2188 [19366]				46	
		45	44	43	40	38	27					
76 [20]		182 [1607]	614 [5435]	988 [8746]	1392 [12320]	1743 [15429]	2301 [18553]				51	
		50	49	48	47	44	37					
83 [22]		87 [770]	487 [4310]	872 [7720]	1283 [11356]	1632 [14442]	2021 [17883]				56	
		55	54	53	52	48	46					
91 [24]			456 [4032]	749 [6632]	1146 [10143]	1533 [13570]	1872 [16568]				61	
			60	60	58	58	50					
95 [25]			293 [2589]	704 [6232]	1052 [9313]	1465 [12961]	1843 [16306]				64	
			63	62	62	59	53					
114 [30]				246 [2174]	645 [5711]	1047 [9265]					76	
				75	74	73						

Rotor Width

127.1 [5.003]

mm [in]

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

Theoretical Torque - Nm [lb-in]

410 [3631]	821 [7261]	1231 [10892]	1641 [14522]	2051 [18153]	2462 [21783]	2872 [25414]
------------	------------	--------------	--------------	--------------	--------------	--------------

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 6.

DT (710 Series)

Heavy Duty Hydraulic Motor Brake

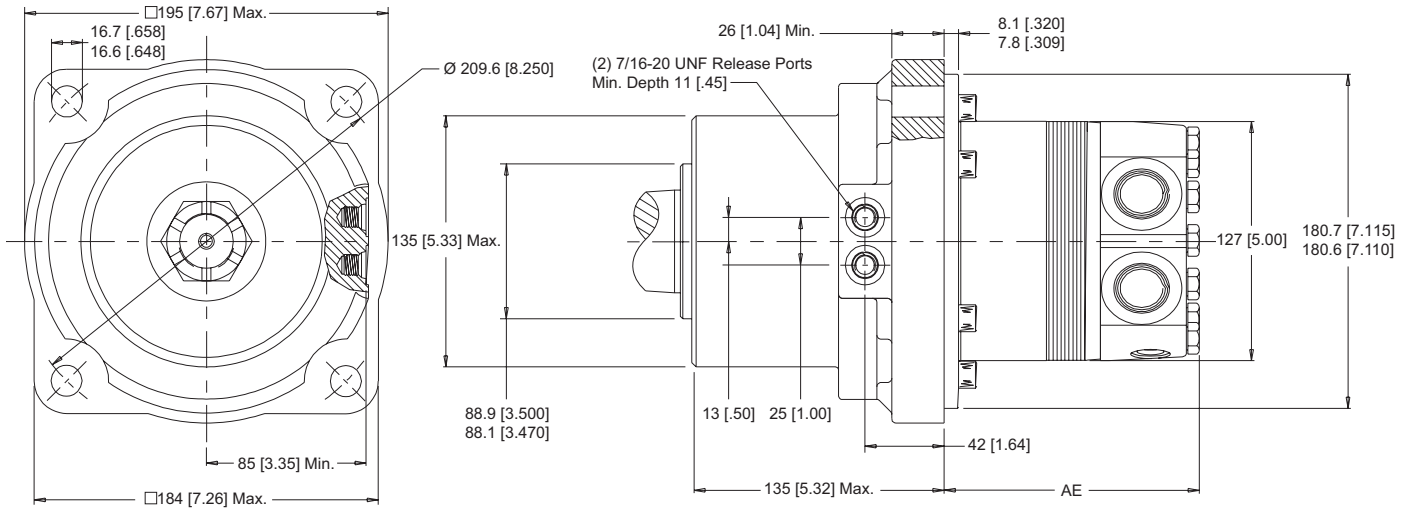
HOUSINGS

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

4-HOLE, WHEEL BRAKE MOUNT

W2 End Ports

W8 Side Ports

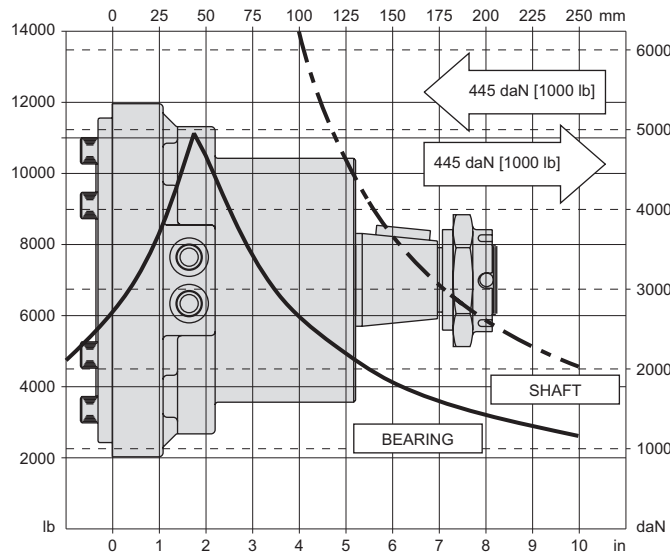


TECHNICAL INFORMATION

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 7.

WHEEL BRAKE MOUNTS



SPECIFICATIONS

Rated brake torque..... 1582 Nm [14000 lb-in]
 Initial release pressure19 bar [275 psi]
 Full release pressure33 bar [475 psi]
 Maximum release pressure207 bar [3000 psi]
 Release volume..... 13-16 cm³ [0.8 - 1.0 in³]

► The DT 710 series motor/brakes are available with different holding torque specifications. For additional information please contact Customer Service & Technical Support or your local distributor.

LENGTH & WEIGHT CHART

Dimension AE is the overall motor length from the rear of the motor to the mounting surface.

AE #	Endcovers on pg. 55	Endcovers on pg. 56	Weight
#	mm [in]	mm [in]	kg [lb]
300	112 [4.43]	115 [4.54]	27.2 [60.0]
375	119 [4.68]	122 [4.79]	27.8 [61.2]
470	126 [4.98]	129 [5.09]	28.3 [62.5]
540	132 [5.22]	135 [5.33]	28.8 [63.6]
750	150 [5.93]	153 [6.04]	30.3 [66.7]
930	166 [6.53]	169 [6.64]	31.4 [69.2]
1K1	176 [6.93]	179 [7.04]	32.2 [71.1]
1K5	214 [8.43]	217 [8.54]	35.3 [77.9]
2K1	265 [10.43]	268 [10.54]	39.3 [86.7]

► All DT series motor weights can vary ± 1.4 kg [3 lb] depending on model configurations such as housing, shaft, endcover, options etc.

DT (710 Series) Heavy Duty Hydraulic Motor Brake

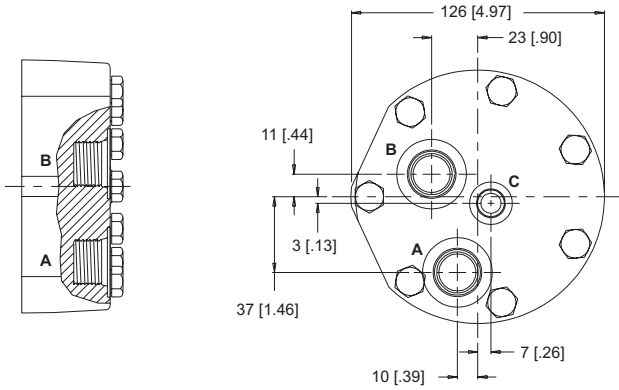
PORTING

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

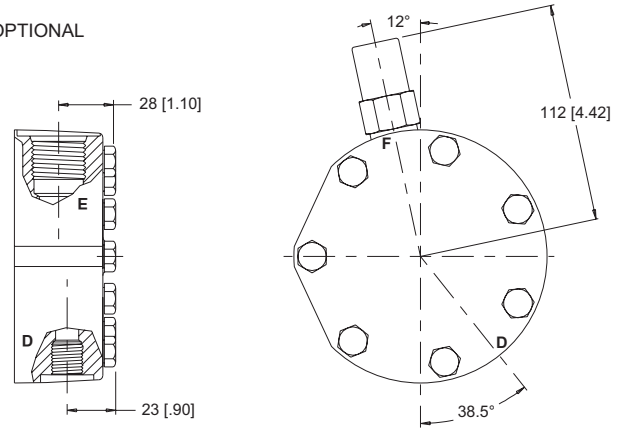
END PORTED - OFFSET

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

STANDARD



OPTIONAL



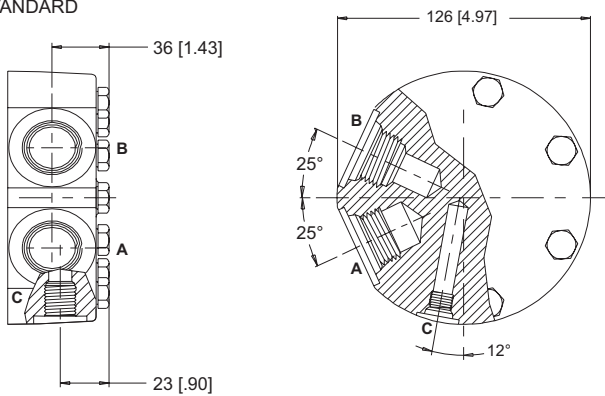
D: Internal Drain E: 10 Series/2-Way Valve Cavity 7/8-14 UNF F: Valve Cartridge Installed

SIDE PORTED - RADIAL

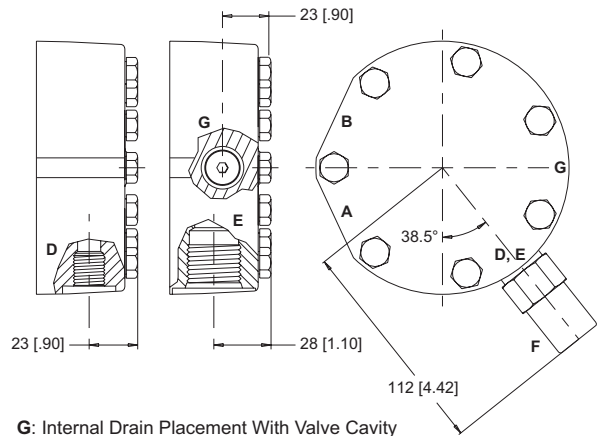
2 Main Ports **A, B**: G 3/4
Drain Port **C**: G 1/4

5 Main Ports **A, B**: 1 1/16-12 UN
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 G: Internal Drain Placement With Valve Cavity

DT (710 Series)

Heavy Duty Hydraulic Motor Brake

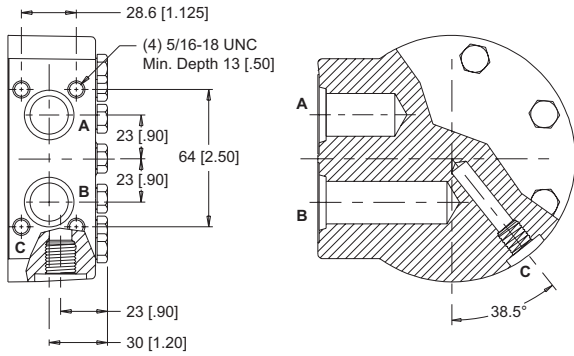
PORTING

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

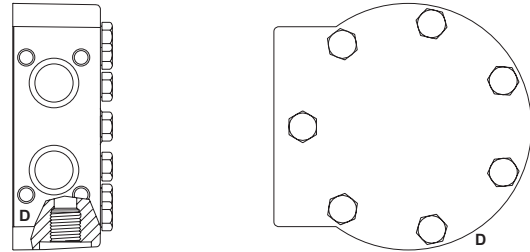
SIDE PORTED - MANIFOLD ALIGNED

3 Main Ports **A, B:** 11/16" Drilled
 Drain Port **C:** 7/16-20 UNF

STANDARD



OPTIONAL



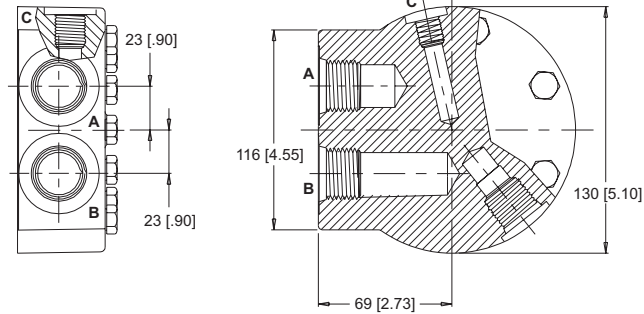
D: Internal Drain

SIDE PORTED - ALIGNED

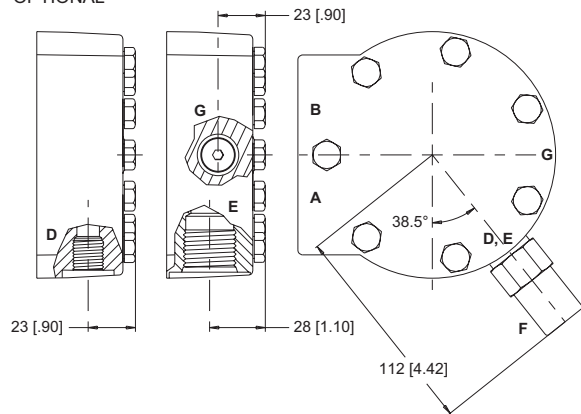
6 Main Ports **A, B:** 1 1/16-12 UN
 Drain Port **C:** 7/16-20 UNF

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

STANDARD



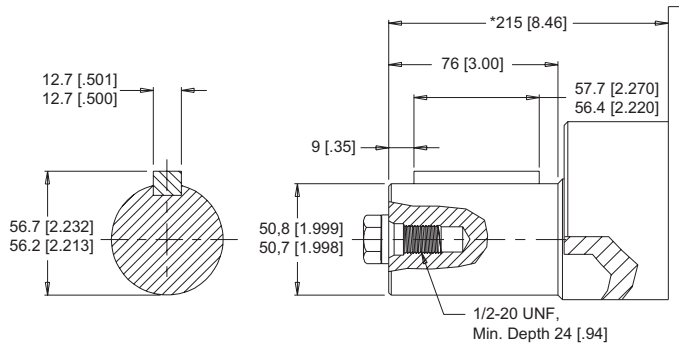
OPTIONAL



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

SHAFTS

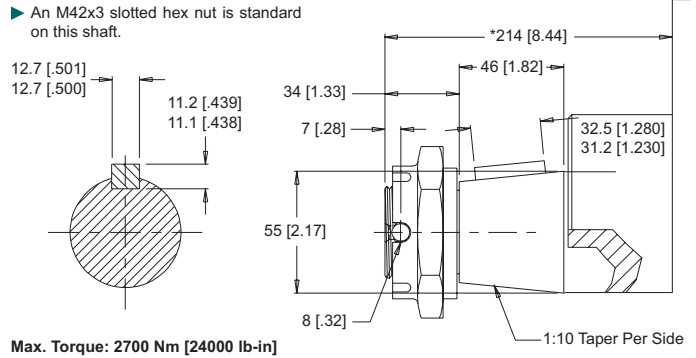
50 2" Straight



Max. Torque: 2700 Nm [24000 lb-in]

► *Shaft lengths vary ± 0.8 mm [.030 in.]

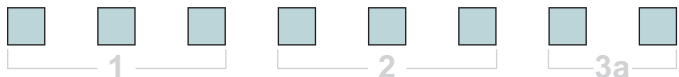
51 55mm Tapered



Max. Torque: 2700 Nm [24000 lb-in]

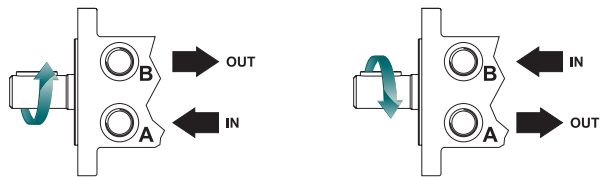
► An M42x3 slotted hex nut is standard on this shaft.

ORDERING INFORMATION



1. CHOOSE SERIES DESIGNATION

710 Hydraulic Motor With Integral Brake



► The 710 series is bi-directional.

2. SELECT A DISPLACEMENT OPTION

300	300 cm ³ /rev [18.3 in ³ /rev]	930	929 cm ³ /rev [56.7 in ³ /rev]
375	374 cm ³ /rev [22.8 in ³ /rev]	1K1	1047 cm ³ /rev [63.9 in ³ /rev]
470	464 cm ³ /rev [28.3 in ³ /rev]	1K5	1495 cm ³ /rev [91.2 in ³ /rev]
540	536 cm ³ /rev [32.7 in ³ /rev]	2K1	2093 cm ³ /rev [127.7 in ³ /rev]
750	747 cm ³ /rev [45.6 in ³ /rev]		

3a. SELECT MOUNT TYPE

- ▼ **END MOUNTS**
- W2** Wheel Brake Mount
- ▼ **SIDE MOUNTS**
- W8** Wheel Brake Mount

3b. SELECT PORT SIZE

- ▼ **END PORT OPTIONS**
- 1** 7/8-14 UNF Offset
- ▼ **SIDE PORT OPTIONS**
- 2** G 3/4, Radial
- 3** 11/16" Hole, Aligned Manifold
- 5** 1 1/16-12 UN, Radial
- 6** 1 1/16-12 UN, Aligned
- 7** G 3/4, Radial



4. SELECT A SHAFT OPTION

50 2" Straight **51** 55mm Tapered

5. SELECT A PAINT OPTION

- A** Black
- 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 not available on port option 3.

7. SELECT AN ADD-ON OPTION

- A** Standard

8. SELECT A MISCELLANEOUS OPTION

- AA** None
- AC** Freeturning Rotor