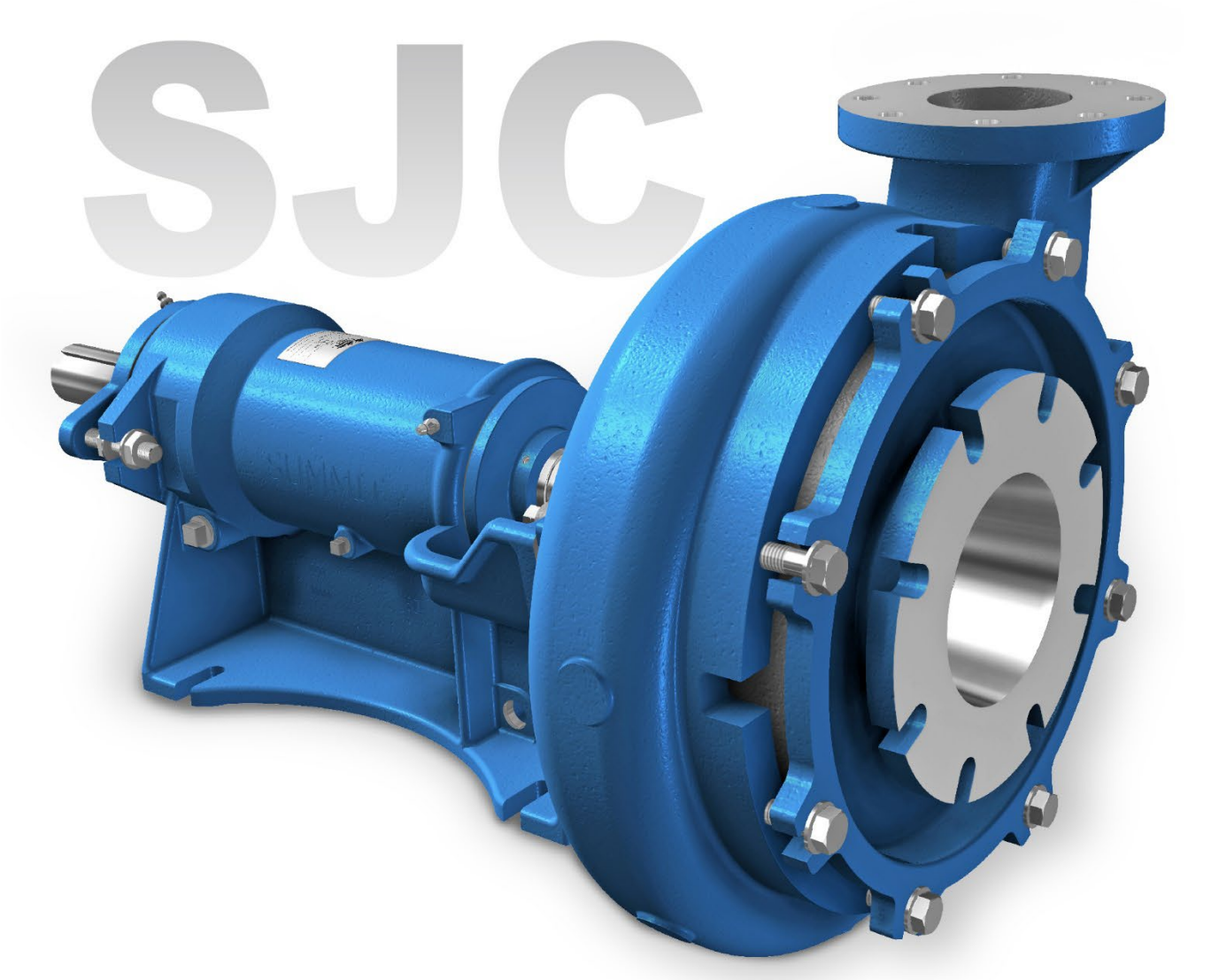
SUMMIT™

SJC

Installation, Operation, and Maintenance Manual



Medium Duty Slurry Pump

SUMMIT™
PUMP, Inc
www.SUMMITPUMP.com

I.WARRANTY

Pumping units assembled by Summit Pump, Inc., Green Bay, WI are guaranteed to be free from defects in material and workmanship for one year from date of shipment from factory in Green Bay, WI. The obligation under this warranty, statutory or otherwise, is limited to replacement or repair at Green Bay, WI, of such part as shall appear to us upon inspection at such point, to have been defective in material or workmanship.

This warranty does not obligate Summit Pump, Inc. to bear the cost of labor or transportation charges in connection with replacement or repair of defective parts; nor shall it apply to a pump upon which repairs or alterations have been made unless authorized by Summit Pump, Inc.

No warranty is made in respect to engines, motors, or trade accessories, such being subject to warranties of their respective manufacturers.

No express implied or statutory warranty, other than herein set forth is made or authorized to be made by Summit Pump, Inc.

In no event shall Summit Pump, Inc. be liable for consequential damages or contingent liabilities arising out of the failure of any Summit Pump, Inc. pump or parts thereof to operate properly.

II.LIABILITY

Summit Pump, Inc. shall not be liable for personal physical injury, damage or delays caused by failure to follow the instructions and procedures for installation, operation and maintenance contained in the current manual found at https://summitpump.com/resources/document-library#Manuals.

The equipment is not for use in or with any nuclear facility or fire sprinkler system. Buyer accepts the responsibility for ensuring that the equipment is not used in violation and Buyer shall indemnify and hold Seller harmless from any and all liability (including such liability resulting from seller's negligence) arising out of said improper use.

III.COPYRIGHT

The information contained herein is for informational use only and is subject to change without notice. Summit Pump assumes no responsibility or liability for any errors or inaccuracies that may appear in this manual.

1 INTRODUCTION

The instruction, operation and maintenance (IOM) manual for the SJC is written for the safety of the personnel that handle, operate and repair the pump equipment. Following this manual will allow the best and trouble-free life from your Summit Pump.

1.1 SJC PUMP

The SJC is of rotodynamic (OH-centrifugal) type. Meaning that kinetic energy is continuously transferred to the liquid by means of rotating impeller. In addition, the SJC is considered a medium duty slurry pump which can handle solids and abrasive materials within the pumped mixture.

1.1.1 Materials

The hardened high chrome (HC600) material allows for less wear in abrasive slurries over using standard cast iron. HC600 has in increased martensite and eutectic carbides content which form rods with hexagonal cross-sectional shape. Because of the high chrome content this white iron material also has good corrosion resistance over a standard cast iron part.

These chemical and microstructure properties are the key to obtain the high abrasion resistance performance demanded in slurry applications.

CD4 parts offer similar mechanical properties as the HC600 but are the material of choice when chemical corrosion environments are present, such as the presences of chlorine.

1.1.2 Replaceable Parts

The design of the SJC includes replaceable wearable parts. The suction cover liner was designed to protect the casing and suction cover plate which are more complex costly casted parts. The replacement of the suction cover liner is simple without need to remove the pump from the installation. This convenience is also practical if the slurry were to ever become clogged from high fibrous solids.

The shaft sleeve is designed as a wearable part. The shaft stiffness is increased over other pump models excluding the need for a solid shaft option. Packing and mechanical sleeve options are available in different diameters.

1.1.3 Bearing Frame

One rigid cast iron bearing frame supports the drive and wet end components which promotes precision machined alignments between parts. This is important for the running tolerances of mechanical seals and assists with soft-foot during alignment.

Impeller clearance is externally and easily adjusted by adjusting the location of the bearing housing within the bearing frame.

These bearing frames are also easily converted to oil lubrication from standard grease lubricated.

1.1.4 Liquid End

In addition to the material options, the wetted components are thickened to increase wear life of the pump. The casing can be rotated in 45 degree increments for a total of 8 different discharge positions. The impeller vane geometry allows for maximum solid size pathways and the matchup with the casing makes for reduced radial loading on the shaft.

The stuffing box is designed specifically for slurry applications. This type allows drainage of accumulated solids away from the seal area.

1.1.5 Pump Principal

The SJC pump impeller imparts liquid velocity to the casing. The casing converts the velocity energy to pressure energy and guides the liquid out the discharge. The pressure difference between the pump discharge and downline piping induces flow.

The lower pressure at the eye of the impeller verses the higher pressure at the suction pipe entrance allows the liquid to enter the suction pipe and pump.

Below is the general pumping principle:

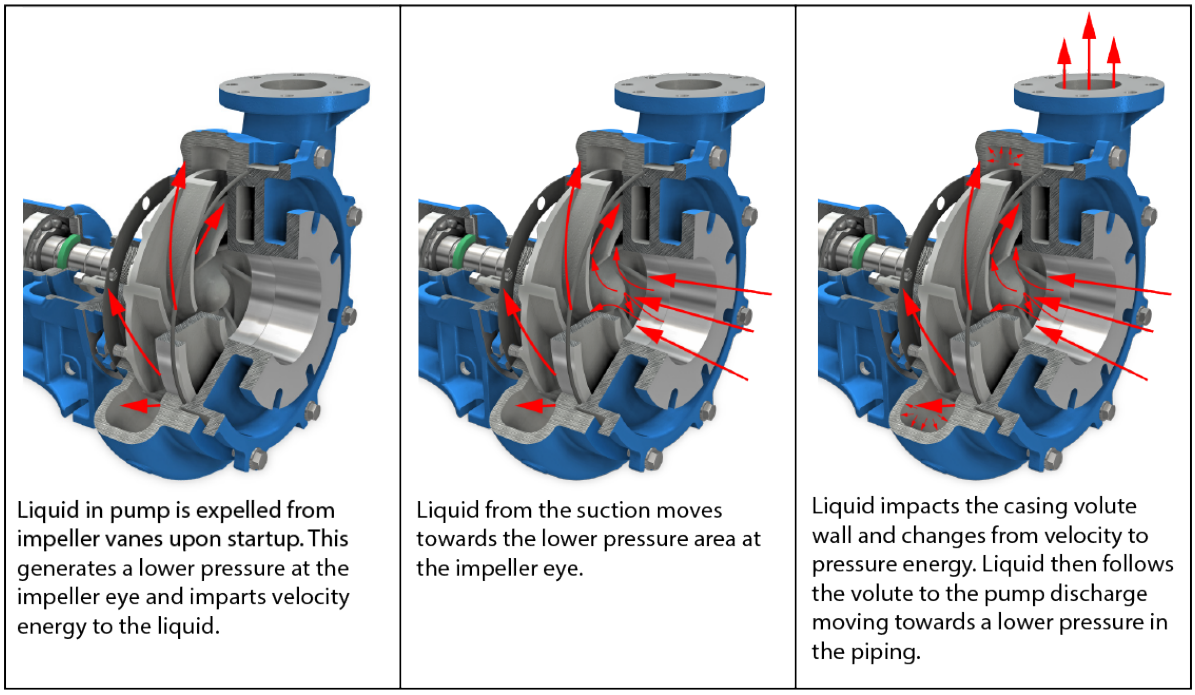


Figure 1-1: General SJC pumping principle

2 SAFETY

The following message types are used in this manual to alert maintenance personnel to procedures that require special attention for the protection and safety of both personnel and equipment:

⚠ DANGER

Imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE

Includes Information on operation, maintenance, rules or directions. May indicate possible property damage.

2.1 PUMP SAFETY WARNINGS

The safety information below should be followed and observed to prevent damage to equipment or injury to operators:

⚠ DANGER

NEVER over pressurize the pump or any component in the system. All measures must be taken by the end user to ensure all components are operated within allowable limits.

⚠ DANGER

Pumping hazardous/toxic liquids – follow all personal protective precautions found in the MSDS. Ensure all limits are considered to avoid potential hazards such as explosion.

⚠ WARNING

Never overheat pump or pumped liquid. Doing so could cause equipment failure or explosion.

⚠ CAUTION

Adhere to equipment handling, assembly and disassembly instructions. Negligence from this IOM could result in death or serious injury.

NOTICE

This IOM is written for pump equipment only. Refer to respected IOM for auxiliary equipment, such as but not limited to: seals, couplings, motors, belts, sheeves and VFDs.

2.2 SAFETY CONCERNS

Summit Pump expects the end user to comply with industry and on-site safety protocols. In addition, the end user is expected to understand the product that is being supplied and all appropriate industrial standards for their application. Individuals involved in the installation, operation and maintenance (IOM) of the pumping equipment should be able to identify and eliminate unsafe environments.

User safety is a of high priority which Summit Pump addresses through user education and product design. Please contact your Summit Pump representative or visit https://summitpump.com/home for further information.

Summit Pump will not be liable for any damages because of non-conformance to instruction in this manual. The pump is not to be operated outside of the range of parameters given at time of sale for the individual order which include but not limited to, maximum pressures, temperature ranges, used with liquids outside specification, RPM ranges and NPSHa margins. Doing so without written permission from Summit Pump may also void any warranties or replacement parts.

3 NOMENCLATURE

3.1 PUMP TAG INFORMATION

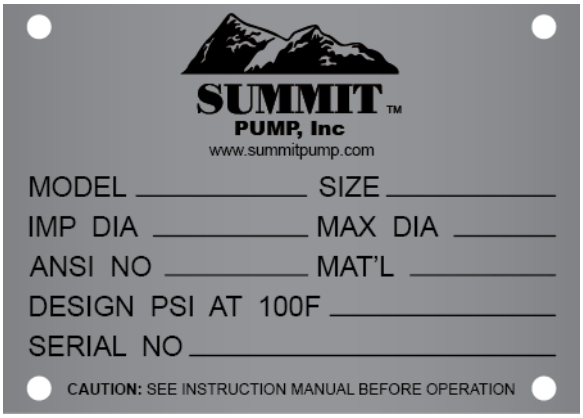


Figure 3-1: SJC pump tag - blank

All pumps and back pullouts with impellers will receive a pump tag with serial number. Serial numbers are not generated for products that are unable to identify a specific pump size.

Location of pump tags can be found on the bearing frame (228).

3.1.1 MODEL

This field identifies the product line. For the SJC line this will be labeled as "SJC".

3.1.2 SIZE

The size field will identify the wet end size of the product. i.e 4x6-14. The first number is the nominal size of the discharge followed by "x". The second number is the nominal size of the suction followed by "-. The third number is the nominal maximum diameter of the impeller. Note that nominal maximum impeller diameter shown here may not be the true maximum diameter of the impeller.

3.1.3 IMP DIA

This field is the impeller diameter as furnished into commerce for the pump.

3.1.4 MAX DIA

This field is the true maximum diameter for the pump

3.1.5 ANSI No

This field is not applicable to the SJC model line and will be left blank

3.1.6 MAT'L

The MAT'L field will identify the material of the casing and impeller the pump was sold into commerce with. The format will be as shown:

Example: HC600/HC600

The first material indicates the casing material and the second is the impeller material – *"Casing / Impeller*

3.1.7 Design PSI at 100°F

The value shown here is the maximum allowable working pressure (MAWP) at 100°F. Refer to Summit Pump technical document SP-ENG-103 for further MAWP at different temperatures.

3.1.8 Serial No.

The value here is the serial number of the sold assembly as it was distributed from Summit Pump's assembly facility. Refer to Summit Pump document SP-ENG-087 for serial number nomenclature. Reference this number when making inquiries to Summit Pump or any representative of Summit Pump.

3.2 FRAME SIZES

SJC power end frame sizes are labeled by number with "1" being the smallest frame size. The frame size controls the relationship between certain parts such as, bearings, shafts, sleeves, bearing frames and housings.

4 RECEIPT AND STORAGE

4.1 RECEIVING THE PUMP

Immediately upon arrival, carefully inspect the pump for evidence of damage during transit. Immediately report any damage to your local Summit Pump, Inc. Distributor and make a claim with the shipping carrier.

Locate, read and understand all tags on the pump and installation operation and maintenance manual for the pump.

Check for loose hardware and tighten if needed. Prepare pump for storage duration or installation. Pumps shipped from Summit Pump's factory are assumed to be installed upon delivery.

4.2 STORAGE

4.2.1 TEMPORARY

Temporary storage: less than six months.

1. Flush the pumped product from pump with clean water. If pumped product is water reactive, remove the suction and discharge line after draining the pump, and with compressed air blow all liquid from cavity. Lightly cover all internal metal parts with oil and replace the suction and discharge lines if needed.
2. Store pump in a clean, dry place, free from extreme swings in temperature and humidity.
3. Cover with protective covering to reduce dust contamination.
4. Rotate the shaft once a week to protect the bearings from brinelling the raceway and/or bearing balls. This also maintains an oil film on bearings and seals.

4.2.2 LONG TERM

Long Term Storage: more than six months.

1. Follow temporary storage guidelines 1-4 in section 4.2.1.
2. Remove suction cover, suction cover liner and casing to remove all solid contents and clean casing internals. Packing should be removed and install new packing prior to next startup. Follow mechanical seal manufacturer's storage guidelines.
3. Keep oil or grease in bearing housing.
4. Coat all unpainted and machined surfaces with a rust inhibitor, such as LPS-3.

4.3 HANDLING

Pump unit boxes, pallets and crates may be unloaded using a forklift or slings depending on size and package construction.

⚠ CAUTION

Pump and assemblies are heavy, improper handling could result in serious injury.

4.4 LIFTING

To avoid damage to pump and/or motor use nylon, chain, or wire rope sling. The slings should be placed so the lift is equally supported at three or more points.

⚠ WARNING

Ensure all components are securely fastened to baseplate or pallet before lifting.

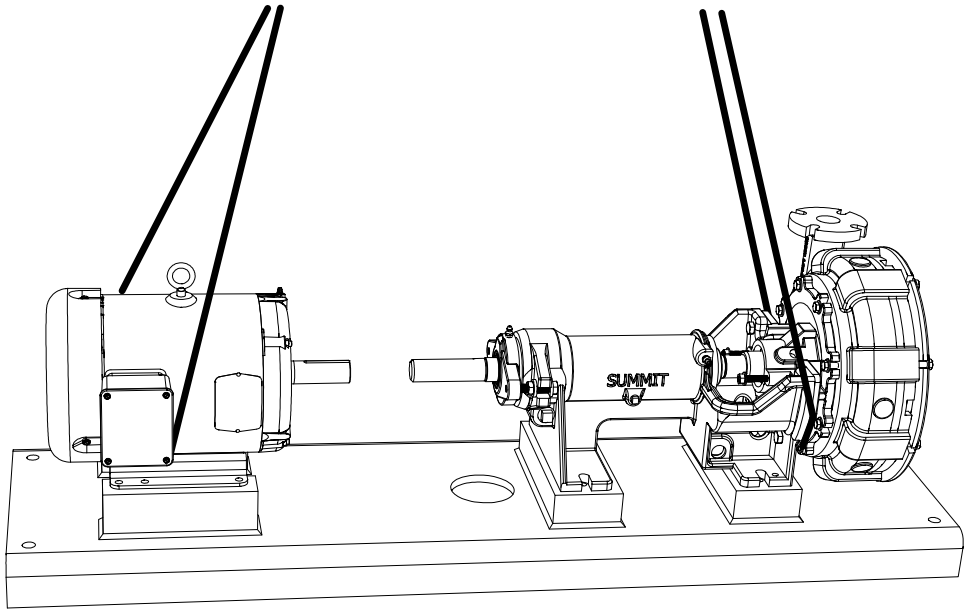


Figure 4-1: Pump, motor and base general lift

⚠ WARNING

Inspect all lifting equipment and rigging before lifting pump. Rig the pump securely ensuring a proper safety factor. Refer to Table 13-4 for pump weights.

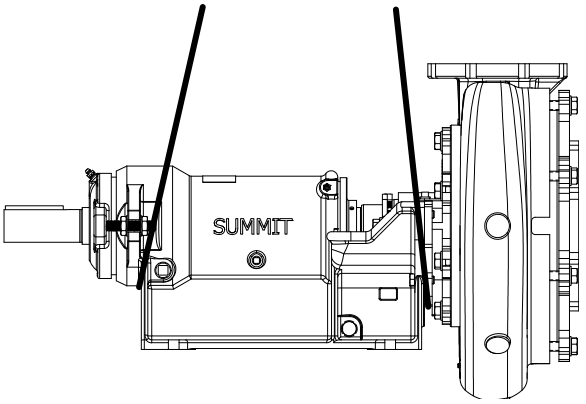


Figure 4-2: Pump general lift

5 INSTALLATION

5.1 GENERAL

Summit pumps are assembled at the factory. Follow all instruction tags on the pump. Ensure all fluid properties and application requirements have been considered and relayed to manufacturer and/or distributor. Suction piping should be as short and direct as possible. Electrical grounding of the pump and base assembly shall be completed.

5.2 LOCATION

Location considerations are easy access for inspection, maintenance and ample overhead space for lifting with crane or hoist. In side-by-side belt driven configuration leave room to remove pump shaft assembly while bearing frame remains in position on base.

Locate the pump as close to the liquid supply as practical. Pump should be in a clean and dry area in most ideal environmental conditions.

5.3 PIPING

Ensure all system calculations have been completed and checked for accuracy prior to sizing a pump. Selection and sizing of piping will also need these calculations completed for most efficient and economical systems:

- Total Dynamic Head of system
    - Suction Static and frictional losses
    - Discharge static and frictional losses
- NPSHa
- Submergence
- Liquid velocities and settling velocity of slurry
- Slurry specific gravity and viscosity
- Expected temperature of liquid

Equation 5-1: Liquid Velocity

$$Velocity\ \left({}^{ft}/_{s}\right) = \frac{Flow\ (GPM) \times 0.4085}{(Pipe\ ID\ (in))^2}$$

⚠ DANGER

Lock out all electrical and mechanical equipment prior to any work.

5.3.1 PIPING SUPPORT

Pumps are not designed to act as piping support. Piping must be supported with appropriate means. Use of excessive force to connect piping to pump may cause damage to pump casing and/or introduce shaft alignment issues.

5.3.2 SUCTION PIPING

Suction piping should be as short as possible, free of leaks, and NPSHa (Net Positive Suction Head Available) must exceed NPSHr (Net Positive Suction Head Required) with an acceptable margin. Typically piping material matches pump's casing material to reduce electrolysis concerns. Piping should be at least the same size of the pump's suction nozzle or larger. The SJC is not a self-priming pump and must be primed with casing and suction line full of liquid prior to startup. Install one isolation valve for maintenance.

5.3.3 DISCHARGE PIPING

Discharge piping should have a flow control valve, pump isolation valve and one check valve especially in high static discharge systems to prevent reverse flow at shut down.

⚠ CAUTION

Confirm pump limitations for operation and installation.

5.4 BASEPLATE

Each pump unit should be mounted on a fabricated steel, stainless steel, cast-iron or polymer concrete base plate. The base plate should be mounted on a concrete subbase 4" to 8" longer and wider than the fabricated base plate.

5.5 FOUNDATION

Use a foundation that is sufficient to support all points of the pump baseplate. Level and grout the baseplate per standard construction practices.

5.5.1 Concrete Subbase

The concrete sub foundation performs several functions. It must support the weight of the entire pump assembly, maintain the alignment of all system components, and absorb the loads, forces and vibrations that are developed under normal operating conditions. The concrete material used must be top quality and conform to local building codes as well as the contractor's strength requirements. Reinforcing bars and mesh should be used as required.

The mounting surface of the concrete foundation must be flat and level beneath the footprint of the sub-base, or the pump could be installed out of square. This could create problems aligning the piping, place extra loads on the couplings and bearings, and alter the operating levels of lubricants or hydraulic fluids in the system. It is recommended that the top surface of the slab be held flat and level to at least F50 according to American Concrete Institute (#117) and the Canadian Standards Association (#A23.1) which is approximately 1/8" per 10 foot.

The subbase height is usually determined by the process piping runs and elevation.

The weight of the sub foundation should be 3-5 times the weight of the pump, motor and baseplate. Dimensionally, it should be 4” to 8” longer and wider than the base plate. Anchor bolts are installed in pipe sleeves. The pipe diameter is 2.5 times larger than the anchor bolt diameter. This sleeve/bolt assembly is embedded in the base when poured.

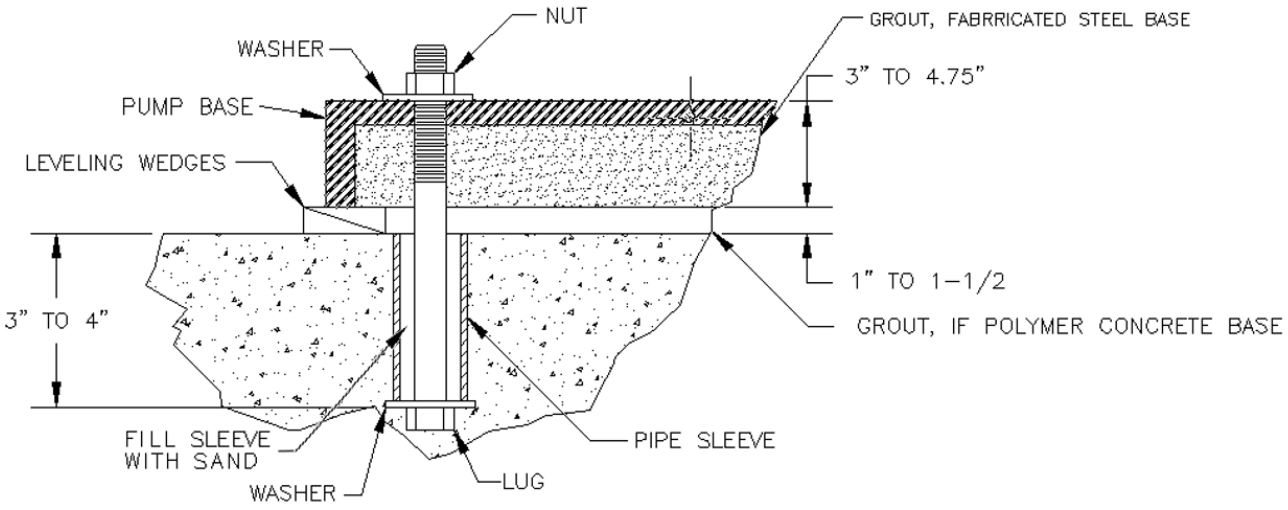


Figure 5-1: Anchor bolt configuration

The pipe sleeve should be filled with sand or plastic foam to the top of the sleeve. This will prevent the grout material from spilling into the sleeve and reducing the movement of the sleeve when pouring the grout.

Anchor bolt sizes: 1”-8UNC. Length is usually 7.5” to 10”, depending on base thickness and overall size.

5.6 BASEPLATE GROUTING

1. This grouting instruction assumes a concrete subbase has been put in place to accept the baseplate. The subbase should be clean of dirt, oil and any other debris.

2. Shims/wedges should be wood.

3. Shims/wedges should be placed on the subbase, as shown in Figure 5-2. Use 2 to 3 per stack to obtain desired gap between baseplate and sub-base. Normal gap is 1” to 1-1/2”.

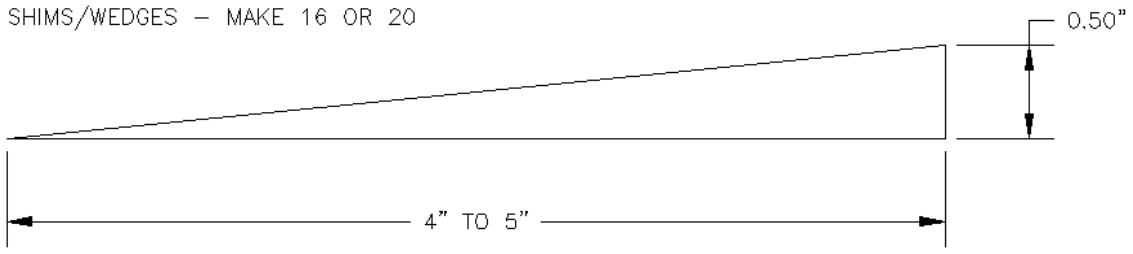


Figure 5-2: Wodden Wedges

4. Carefully lower baseplate with pump and motor onto subbase over anchor bolts.

5. Level baseplate to 0.125” over length and 0.088” over width.

6. When leveling is complete, uniformly hand tighten the anchor bolts.

7. Build a plywood form around baseplate supported on the subbase. It should be 3” high and 1” to 1.5” larger than the baseplate. Its size should be large enough to include the shims or wedges that are left in place.

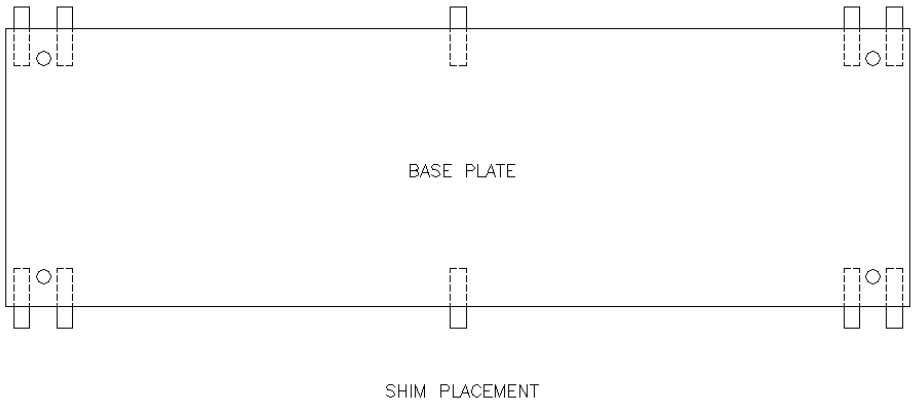


Figure 5-3: Wedge Locations

8. Use a high quality non-shrinking epoxy grout, following manufacturer’s mixing and installation instructions.

9. When grout has cured, per grout manufacturer’s recommended cure time, tighten anchor bolts till secure.

10. When grouting is complete, check coupling alignment and re-align as necessary.

5.7 ALIGNMENT

Alignment of the driver to the pump is imperative to the operating life of the equipment. Misalignment can lead to bearing failures, coupling wear, and shortened V-belt life.

Power sources mounted by Summit Pump are rough aligned prior to shipment. Shipping and handling may cause misalignment. Units must be checked before and after piping is attached to pump and prior to operation. It is recommended to check alignment again after pump has been operated reaching operation temperature and cooled again.

⚠ DANGER

Lock out all electrical and mechanical equipment prior to any work. Disconnect coupling from pump for alignment.

5.7.1 DIRECT COUPLED PUMP

1. Use flexible spacer couplings to achieve proper alignment.

2. Check and adjust the parallel and angular alignment to within 0.005 inches in all planes prior to connecting the coupling halves.

3. Check that driver rotation agrees with pump rotation. The pump shaft rotation is clockwise when viewed from the driven end of the pump.

4. Install a coupling guard when alignment is complete.

5.7.2 BELT DRIVEN PUMP

Select belts for specified speed ratio and environment. Proper alignment and tension are critical for long equipment life. Over tension of belts will cause premature equipment failure.

Align driver shaft and sheaves parallel to the pump shaft and sheaves. If more than one belt is used, use a match set for belts. Belts of the same type, manufacturer and age should be used.

Tension belts to belt and sheave manufacturer's recommendations. Ideal tension is such that belt is as loose as possible without belt slippage.

⚠ CAUTION

Confirm pump limitations for operation and installation.

NOTICE

Align and Tension belts to belt manufacturer recommendations.

Review Summit Pump Document SP-ENG-106: SJC BHP Limits for belt drive and engine driven power reduction calculations.

6 OPERATION

6.1 IMPELLER ADJUSTMENT

Impeller clearance adjustment upon installation of pump onsite should be done after the first rough alignment of the pump and motor but prior to the coupling being connected. If a mechanical seal is installed, it should not yet be attached to the sleeve. Setting the impeller clearance involves moving the shaft axially and can damage the seal if the seal is already set to the sleeve.

⚠ WARNING

Set mechanical seal after impeller clearance is adjusted.

NOTICE

Impeller clearance is NOT set at the factory and must be set onsite.

NOTICE

Pump should be minimally moved after impeller clearance is set.

Proper impeller clearance is critical for pump performance. Improper settings can increase wear of the pump components, reduce expected performance or cause severe damage to impeller and suction cover liner or thrust bearing.

6.1.1.1 Impeller Clearance definition

Impeller clearance is defined by the distance between the suction side of the machined surface of the impeller vanes and the suction cover liner surface closest to the impeller. This dimension is shown as “IC” in Figure 6-1.

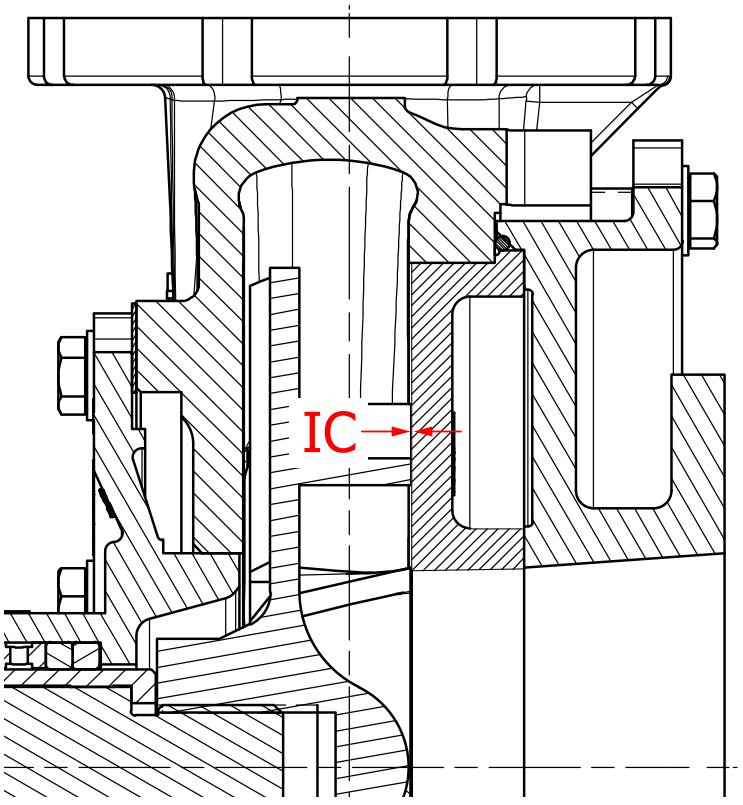


Figure 6-1: Impeller Clearance "IC"

Table 6-1: Impeller Clearance

Frame Size	*Impeller Clearance (IC)
All Sizes	0.015 to 0.031

*Note Max Allowable Working Temperature is 250°F

The impeller clearances shown in Table 6-1 can be set when pump is at ambient

temperature. Clearances are designed as contact with impeller and suction cover liner will not happen due to thermal expansion of the shaft and wetted components.

6.1.1.2 Setting Impeller Clearance

Impeller clearance is set externally after pump has been assembled utilizing the studs (356A), nuts (415) and washers (528P). Reference Table 8-1 on page 32 for item numbers in parentheses.

1. Loosen OB nuts (415), on the coupling side of bearing frame (226) ears. Evenly tighten IB nuts (415), on the impeller side of bearing frame (228) ears, until the shaft (122) has a slight noticeable drag when rotating by hand. This means the impeller (101) is touching the suction cover liner (100B). This current position of the shaft assembly will be noted as the datum, or zero, position.

2. For most accurate clearance setting, the use of a dial indicator is recommended. Set the dial against the shaft (122) end as shown in Figure 6-2 and set the dial to numeric value zero.

3. Loosen IB nuts (415) from the bearing frame (228) ears and thread the OB nuts (415) to the bearing frame (228) ears.

4. Tighten the OB nuts (415) nuts evenly until the dial indicator reaches the value shown in Table 6-1. Ensure while moving the shaft (122) threading of the OB nuts (415) is done evenly as not to skew the bearing housing (134A). A skewed bearing housing (134A) can increase loading on the thrust bearing (112C) leading to shorter life.

5. Tighten IB nuts (415) to the bearing frame (228) ears. Torque all four nuts (415) to values in Table 12-1 on page 51.

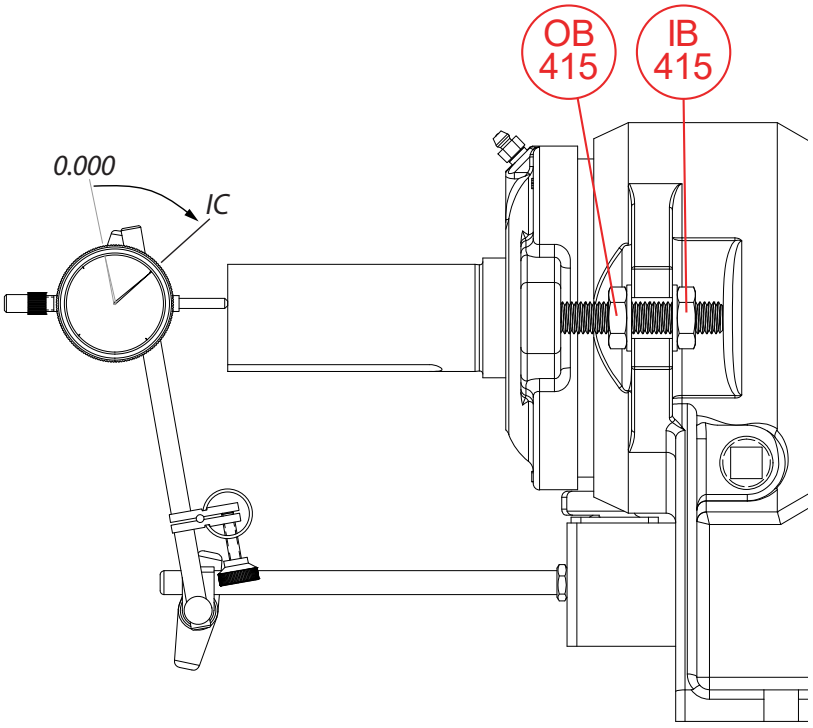


Figure 6-2: Dial indicator method

6.2 ROTATION

The pump can only operate in clockwise rotation when viewed from the driven end of the pump. If the pump as accidently operated in a counter-clockwise rotation, remove the suction cover and suction cover liner. Check for damage with suction cover liner, impeller and shaft. If any damage is found or the impeller came loose a full inspection of the pump is recommended.

Note: The pump will produce about half the expected head at an unknown flow if the pump is rotating counter-clockwise.

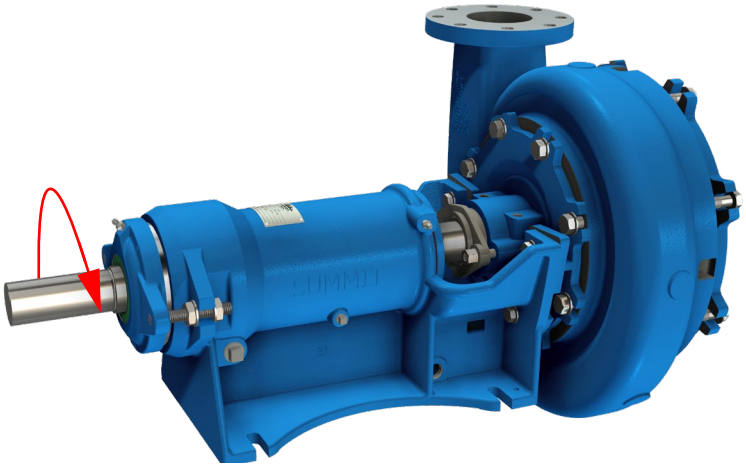


Figure 6-3: Pump Rotation

6.2.1 CHECKING ROTATION

⚠ DANGER

Lock out power to avoid personal injury or death.

1. Lockout power to drive.
2. Disconnect coupling for the pump and motor.
3. Unlock power to motor.
4. Clear personnel from the immediate area, jog the motor just enough to determine the direction of rotation.
5. If the motor is rotating in the wrong direction, the electrical wiring will need to be adjusted by qualified personnel. Then repeat Steps 1-5.
6. Once rotation is in the desired direction, lockout motor power and reattach the coupling to the pump and motor.
7. Connect piping to pump and check shaft alignment.
8. Unlock power to drive.

6.3 STUFFING BOX

The stuffing box comes standard with packing, and mechanical seals are optional. The SJC pump are designed for medium duty slurry applications and pumped liquid should be kept away from packing or rotating mechanical seal faces. The common way to accomplish this is to introduce clean liquid such as water into the stuffing box at a higher pressure than the stuffing box pressure without the clean liquid flush.

The flush should be 10-15 psig higher than the suction pressure and it should not be less than 15% of the differential pressure. Pressure is

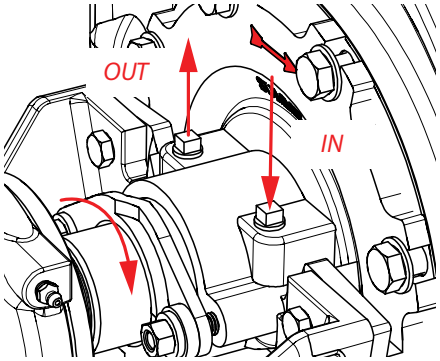


Figure 6-4: Flush ports in and out.

control is typically done using a valve on the outlet side of the flush from the stuffing box. Ensure the piping of the flush is well sealed, any air leaks may cause damage to the impeller and cause loss of prime especially in suction lift applications.

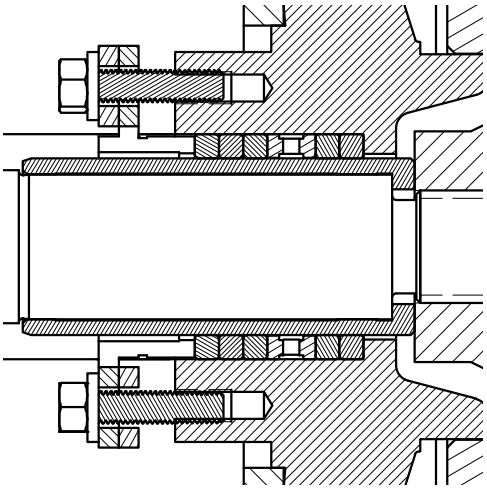


Figure 6-5: SJC Stuffing Box

6.3.1 PACKING

The packing supplied from the factory is a graphite type packing. Alternate materials are acceptable depending on the application.

The lantern ring is in line with the flush ports to help evenly distribute the flush liquid. It is important that when installing the packing rings that the proper order is followed, see section 10.1.3 on page 44.

6.3.2 MECHANICAL SEAL

Mechanical seals will replace packing and offer a different sealing method. This method consists of two highly polished faces typically made of carbon and ceramic materials which are quite brittle. Careful handling any mechanical seal is necessary to avoid damage to the seal faces.

The SJC pump is considered a medium duty slurry pump and is expected to see abrasive particles in the stuffing box area. The abrasiveness of these particles can lead to premature wear of the seal faces. To reduce this wear a clean liquid flush may be necessary. Follow the mechanical seal manufacturers installation and operation manual for setting up the clean liquid flush. Stocking spares of the mechanical seal is highly recommended in slurry applications for short downtime.

6.4 PRIMING PUMP

Prior to startup the pump must be primed. This means the suction pipe and pump casing need to be filled completely with liquid. The SJC pump is not a self-priming pump and only filling the casing will not be sufficient for proper operation. This must be done every startup if not checked that these two components are filled.

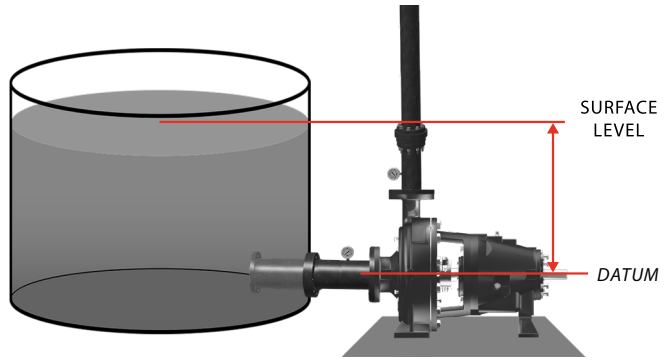


Figure 6-6: Flooded Suction

To prime the pump and system can be done multiple ways. If the system is flooded and the static suction head is large enough to open the discharge check valve then simply opening the suction isolation valve will allow prime.

In suction lift condition, manual priming will need to be done. This can be completed by filling the casing via the discharge port or by fittings installed in the discharge pipe before the check valve but after the pump nozzle. There must be means of holding liquid in the suction line during priming.

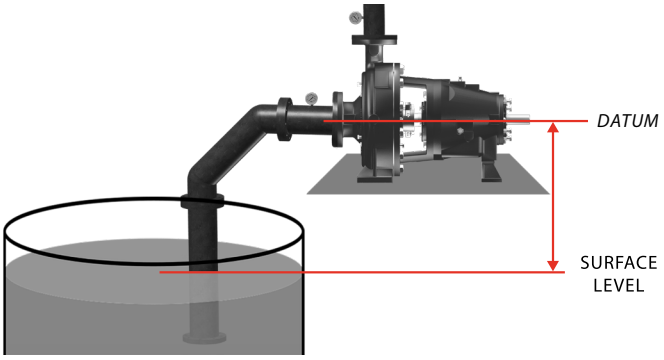


Figure 6-7: Suction Lift

6.5 LUBRICATION

⚠ CAUTION

Oil lubricated pumps are shipped WITHOUT oil. Add proper oil prior to startup.

NOTICE

Grease lubricated pump bearings are hand packed with Mobil Grease XHP222 at the factory.

NOTICE

Never add oil to grease lubricated pumps.

SJC pumps are standard grease lubricated, as an option oil lubrication is available. Oil lubricated pumps are not shipped with oil from the factory. Oil must be added prior to the first startup.

6.5.1 GREASE LUBRICATION

Greased lubricated pumps have bearings hand packed at the factory and do not require additional grease for the first 24 hours of operation.

During the first 24 hours of operation grease will be purged from the bearings and bearing will run hotter than normal during the break-in period. Adding additional grease will increase bearing temperature during break-in.

After the 24-hour break-in period add a small amount of additional grease to each grease fitting and every 500 hours of operation thereafter.

NOTICE

Clean grease fittings prior to adding grease for maximum bearing life.

Acceptable greases are petroleum base or synthetic meeting NLGL grade 2. Grease is only recommended when bearing temperature is between -5°F and 230°F. Temperature range of the process fluid is -60°F to 350°F, grease is not recommended outside of this range. Bearing temperature is generally 20°F higher than bearing housing surface temperature.

Table 6-2: Acceptable Greases

Acceptable Greases:	NLGI Grade 2
Citgo	Mystic EP2
Keystone	81EP2
Mobil	Mobil Grease XHP222
Mobil Synthetic	SCH 100
Exxon	Unirex N2
Sunoco	Multipurpose EP
SKF	LGMT 2

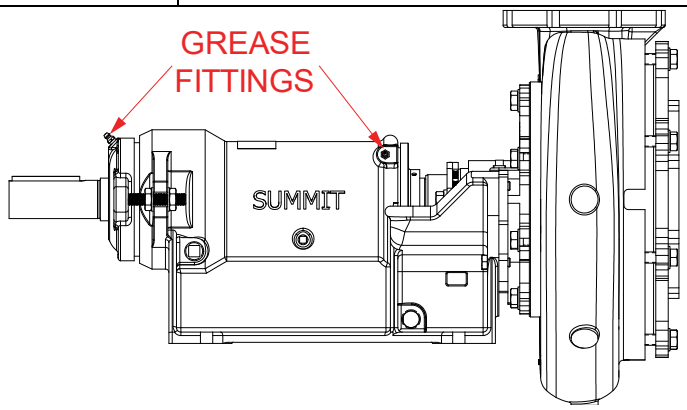


Figure 6-8: Grease fitting locations

6.5.2 OIL LUBRICATION

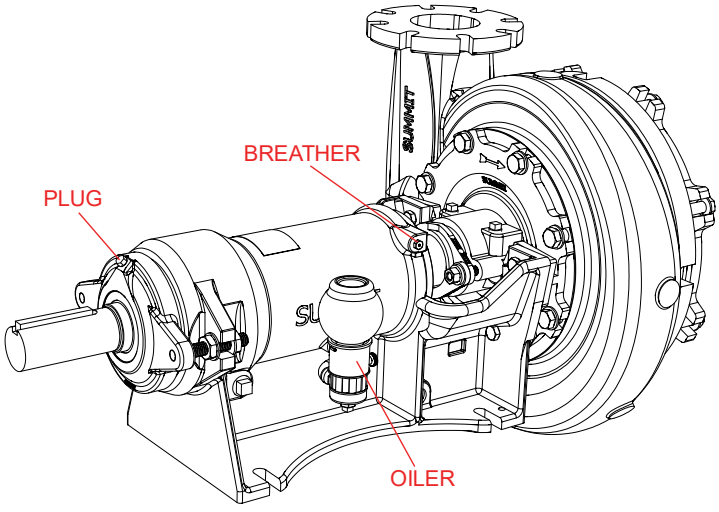


Figure 6-9: Oil lubricated components

Oil lubrication for the SJC is an option and comes with a breather, a vented constant level oiler and pipe fittings.

Oiler is shipped loose from assembled pump to avoid damage in transport.

Level of oil should be at the middle of the bottom ball of the bearings as indicated by "OL" in Figure 6-14 on page 25 which uses the bearing frame foot mounting surface as the reference plane.

Dimension "OP" is the vertical height of the oiler connection port and may be needed when setting the oil level in the oiler.

6.5.2.1 Oiler

The oiler that is supplied from the factory with the power end or pump is a standard vented oiler. This oiler can either be connected to the bearing frame (228) via ¼" NPT connections at the bottom or side of the lower casting (B). Oilers are the same size for all bearing frame sizes.

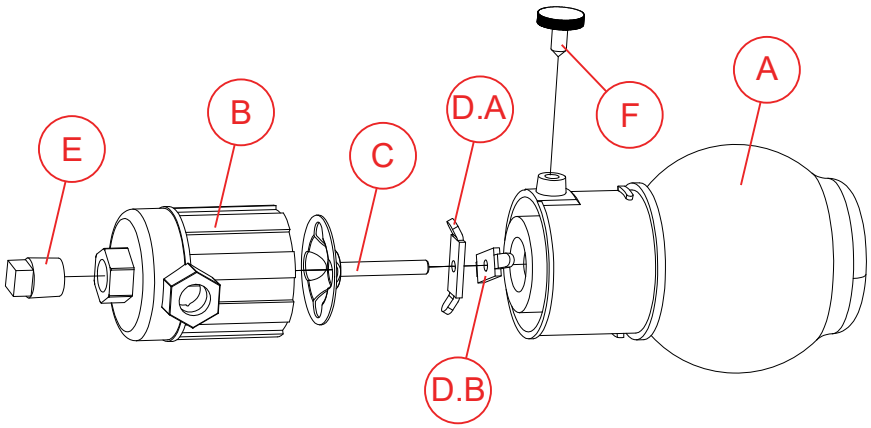


Figure 6-10: Oiler components

Table 6-3: Oiler part list

SJC STANDARD VENTED OILER	
ITEM	DESCRIPTION
A	TOP CASTING & BULB
B	LOWER CASTING
C	ADJUSTMENT STUD
D.A	LOCKING TANG
D.B	LEVELING TANG
E	PLUG
F	LOCKING KNOB

6.5.2.2 Installing the oiler

Install the pipe fittings as shown in Figure 6-11. Use a hydraulic thread sealant on all threads and not a PTFE based thread sealant or tape. Install the lower casting (B) on the pipe fittings and use a level to ensure that the lower casting is level in the horizontal plane.

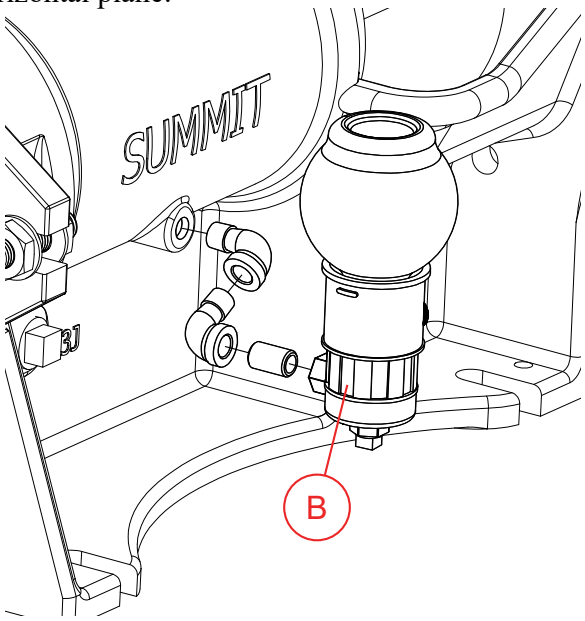


Figure 6-11: Installing oiler on bearing frame (228)

6.5.2.3 Setting Oiler Height

The oiler top casting (A) must be set for the proper oil level in the bearing frame (228). The datum reference on the oiler top casting (A) is shown in Figure 6-13. This datum must be at the same vertical height as the bearing oil level (OL) referencing the frame foot mounting surface.

The 0.125 inch dimension shown in Figure 6-13 is identified to simplify the locating process of the datum surface on top casting (A) as it is not visible with top casting (A) installed.

Adjust the pipe fittings and leveling tang (D.B) on the adjustment stud (C) to set the datum height to equal level with dimension “OL”.

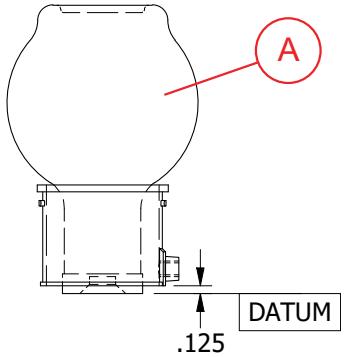


Figure 6-13: Top casting (A) datum reference

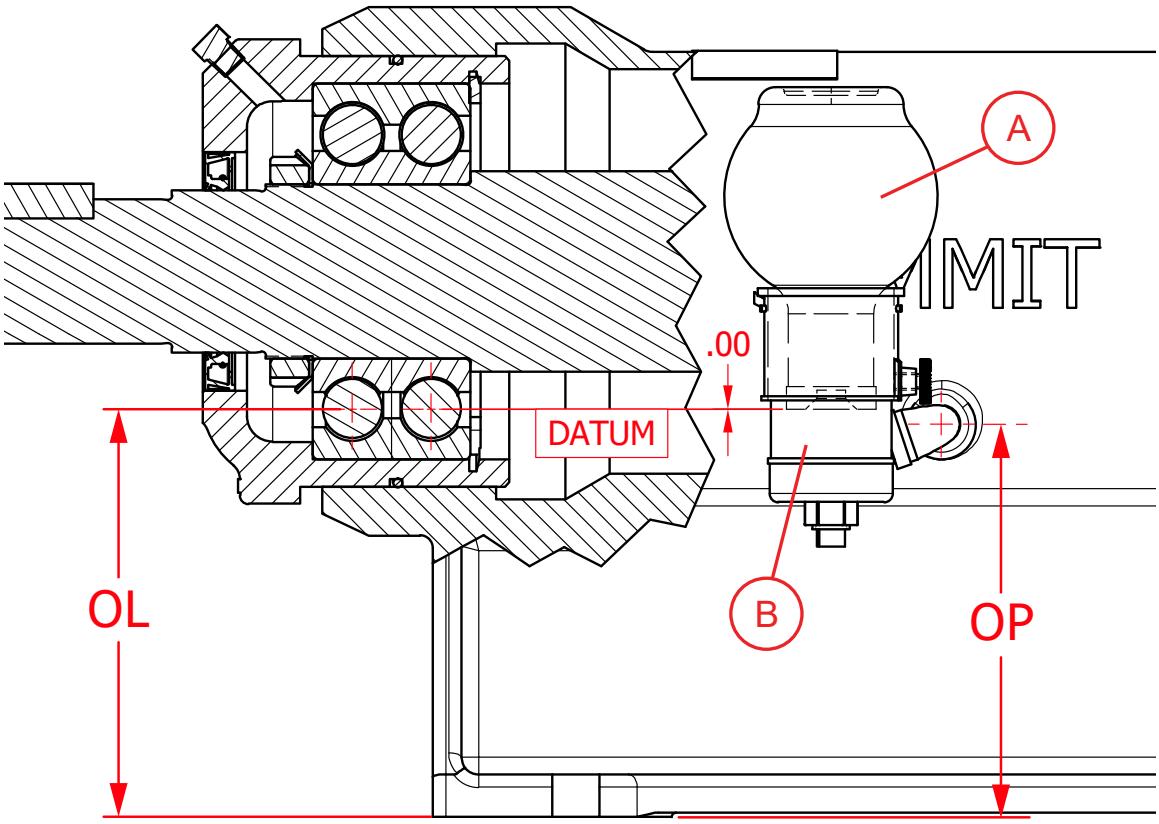


Figure 6-14: Oiler height setting

Table 6-4: Oiler setting dimensions

SJC Oiler Setting Dimensions				
Dimension	**SJC Frame 1**	**SJC Frame 2**	**SJC Frame 3**	**SJC Frame 4**
	(INCHES)			
OL	4.82	5.43	5.98	6.54
OP	4.75	5.25	5.76	6.25

Once the correct height of the top casting (A) is determined, tighten locking tang (D.A) against leveling tang (D.B). This will keep the top casting (A) from moving overtime.

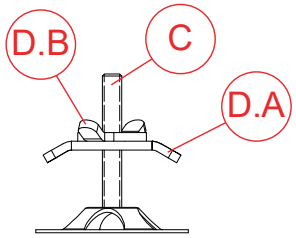


Figure 6-15: Locking Tang (D.A)

6.5.2.4 Adding Oil

Use good quality commercial grade non-detergent oil. Acceptable lubrication would be of SAE No. 30 (ISO VG 100). Consideration of the pump's operating temperature will affect which weight oil to be used.

Table 6-5: Oil weights operating temperatures

Temperature Range	Oil Weight
32F to 150F	SAE 20
32F to 160F	SAE 30
50F to 175F	SAE 40
70F to 200F	SAE 50

Table 6-6: Acceptable bearing oils

Acceptable Lubricating Oils	Available Grades		
Chevron GTS Oil	46	68	100
Exxon Terrestic	46	68	100
Lubriplate	AC1	AC2	AC3
Mobil: DTE	-	Medium	Heavy
Mobil: Synthetic	525	626	627
Shell: Tellus Fluids HD	46	68	100

Remove either the plug or breather on the bearing frame (228) to allow for faster venting as oil is added. Add oil to the bearing frame (228) by pouring oil into the lower casting (B) of the oiler with the top casting (A) removed. Adjustment stud (C) and tangs in the lower casting (B) should remain installed.

Continue to add oil until the oil level reaches the underside of the leveling tang (D.B)

Hold the top casting and bulb (A) upside down, fill the glass bulb 2/3 to 3/4 full of oil. Quickly rotate top casting (A) over to install on to lower casting (B). Tighten the locking knob (F) to secure top casting (A) in place.

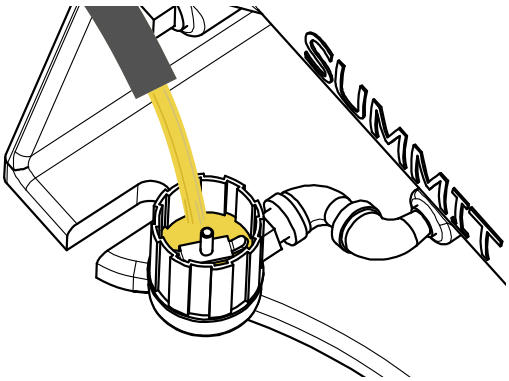


Figure 6-16: Adding Oil

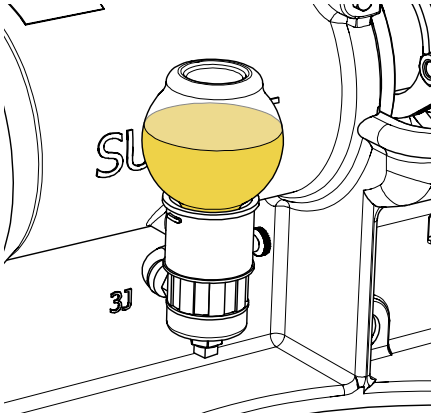


Figure 6-17:Fill oil in top casting (A)

6.6 FIRST RUN CHECK

1. Reference the operations manual for the pump's driven equipment. Understand all starting parameters and procedures.
2. Ensure all plugs, seals and piping are installed correctly and properly supported.
3. Ensure proper alignment of pump shaft with driven equipment.
4. Check all electrical connections and ensure pump assembly is properly grounded.
5. All instruments and gauges are in working accurate order.
6. Pump and suction line are primed. All potential air locks are vented.
7. Motor is wired for correct rotation. See Figure 6-3 for the correct rotation.
8. Stuffing box flush is in working order and at proper pressure.
9. Bearings are lubricated
10. Open the suction valve and crack open the discharge valve. There must be some resistance when starting and this will help avoid the pump running off the pump curve at high flow rates.

6.7 START UP

⚠ DANGER

Install all guards which comply with ASME B15.1

⚠ WARNING

Read and understand the operation manuals supplied by all equipment manufacturers.

NOTICE

Shaft rotation is clockwise when viewed from the drive end.

Understand the expected flow and head of the pump by understanding the pump curve and system curve intersection. Know the expected suction and discharge pressures when pump is at operation speed.

Energize the driven components and bring pump to operating speed as quickly as possible. Read the flow and pressure gauges, compare with expected. Adjust system components as needed, never control flow with valve on suction side.

If unable to achieve expected flow and head, record flow and pressures then shut down the pump.

7 MAINTENANCE

7.1 TROUBLESHOOTING

7.1.1 PUMP PROBLEMS

Pump turns, no flow.	1, 2, 3, 4, 5, 8, 10, 11, 12, 13, 14, 16, 23, 28
Pump flow rate below expected capacity.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 22, 23, 26, 28, 32, 34, 35
Pump will not produce rated pressure.	1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 22, 23, 26, 28, 31, 32, 34, 35
Pump develops too much pressure.	6, 8, 9, 12, 28, 31, 35
Stuffing box is leaking excessively	2, 7, 9, 18, 20, 21, 23, 24, 25, 26, 30, 33
Motor overloads or excessive amperage	5, 6, 7, 18, 19, 20, 21, 23, 25, 27, 29, 30, 31, 33, 35
Pump is very noisy/excessive vibration.	1, 2, 3, 4, 5, 6, 7, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 25, 26, 29, 32, 34
Pump runs hot.	2, 4, 6, 11, 14, 15, 16, 18, 19, 20, 21, 23, 25, 26, 29, 30, 31, 33, 34
Pump seals have short life.	1, 2, 3, 4, 6, 7, 9, 10, 11, 13, 14, 16, 18, 19, 20, 21, 23, 24, 25, 26, 30, 31, 33
Excessive internal wear.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 29, 30, 31, 32, 33, 34
Pump does not reach maximum flow on curve	1, 2, 3, 4, 5, 6, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 22, 23, 27, 28, 32, 34, 35
Pump shut off head does not match curve	2, 3, 5, 6, 7, 9, 10, 14, 15, 18, 19, 23, 25, 26, 27, 28, 35

7.1.2 PROBABLE CAUSE AND REMEDY

NPSHA not sufficient.	1
Pump has run dry.	2
Air leaking into the pump.	3
Liquid temperature higher than stated.	4
Viscosity is higher than expected.	5
Pump running too fast for application.	6
Abrasives in liquid.	7
Losses in system are greater than calculated	8
Suction or differential pressure too high.	9
Suction valve not open.	10
Suction valve partially open.	11
Discharge valve not open or partially open.	12
Clogged strainer.	13
Supply vessel empty.	14
Pump rotation wrong.	15
Minimum submergence not met	16
Velocity in suction pipe too high	17
Internal parts are worn	18
Internal part rubbing	19
Improper seal installed.	20
Inadequate lubrication.	21
Velocity in suction is too low for solids	22
Suction lift is too great and/or pump is not primed	23
Material compatibility.	24
Drive misalignment	25
Pump/pipe supports loose	26
Drive not sized for horsepower required.	27
Gauges are not located correctly	28
Low or insufficient bearing lubricant	29
Stuffing box gland is too tight	30
Liquid SG is heavier than specified	31
Suction piping does not have straight unobstructed pipe before pump	32
Stuffing Box is packed incorrectly	33
Entrance velocity in suction is too high for submergence	34
Impeller diameter different than expected	35

7.2 MAINTENANCE SCHEDULE

Routine maintenance will increase the life of the pump and induce fewer repairs. The below are suggestions for routine maintenance. Actual routine maintenance schedules should be determined by the end user based upon environmental, service and operation conditions.

7.2.1 DAILY MAINTENANCE

1. Check the lip seals, casing gasket, the seal area of the pump and look for piping damage or leakage.
2. Verify expected flow, head and power consumption are achieved.
3. Check noise levels, fluid and bearing frame temperatures.
4. Monitor vibrations and noise levels

7.2.2 SIX MONTH MAINTENANCE

1. Daily maintenance and the following.
2. Recommended every three months or upon a schedule based on service intensity, lubricate bearings or change oil.
3. Inspect and/or clean suction and discharge spools for debris and wear.
4. Check pump/piping supports and hold down bolts. Tighten if needed, report and resolve issue.
5. If the pump has not been in service, check and lubricate packing. Rotate shaft by hand to defer false brinelling of the bearings.

7.2.3 YEARLY MAINTENANCE

1. All the above and the following:
2. Check and compare pump performance with published performance curve and previous data recordings of the pump. These inspections can range from once a year, to once every three to five years.

7.3 RECOMMENDED SPARE PARTS

Table 7-1: SJC Recommended Spare Parts

MODEL SJC SLURRY PUMP			
ITEM	DESCRIPTION	ITEM	DESCRIPTION
100B	SUCTION COVER LINER	237	COLLAR, THRUST BEARING (FRAME 5)
101	IMPELLER	332	OIL SEAL
105	LANTERN RING	351	GASKET
106	PACKING SET	361	SNAP RING
112C	BEARING THRUST, OB	382	BEARING, LOCKWASHER
112D	BEARING RADIAL, OB (FRAME 5)	412F	O-RING, SUCTION COVER
126	SHAFT SLEEVE	496	O-RING, BEARING HOUSING
136	BEARING LOCKNUT	496A	O-RING, STUFFING BOX TO CASE
168C	BEARING RADIAL, IB		

8 EXPLODED VIEWS

Use the figures below and table with respect to identifying item numbers in this IOM manual. Item numbers will be referenced in parentheses following the name of the item. Example: Casing (100).

8.1 Pump Working Components

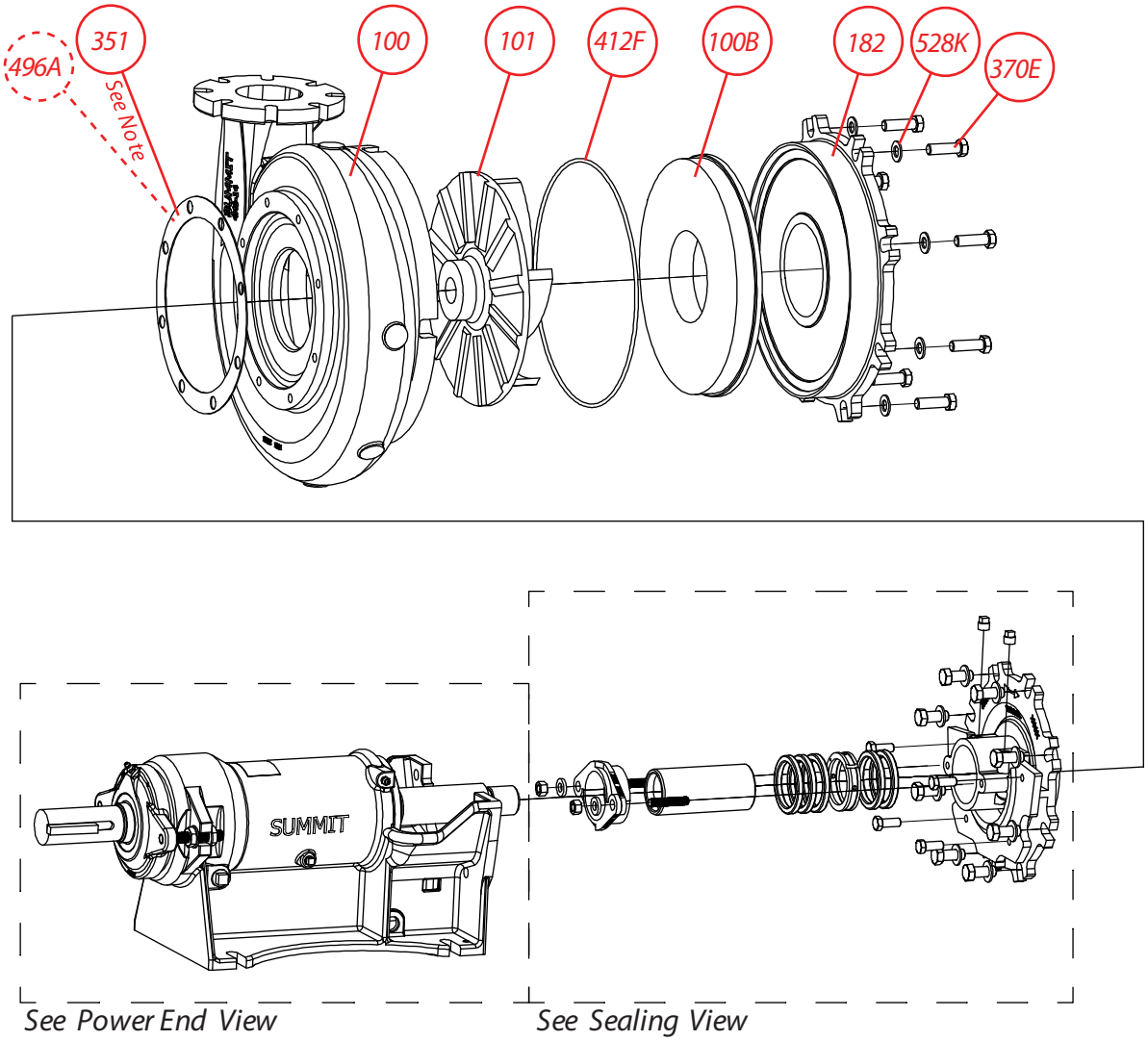


Figure 8-1: Pump Working Components – See note in section 8.4

8.2 Power End

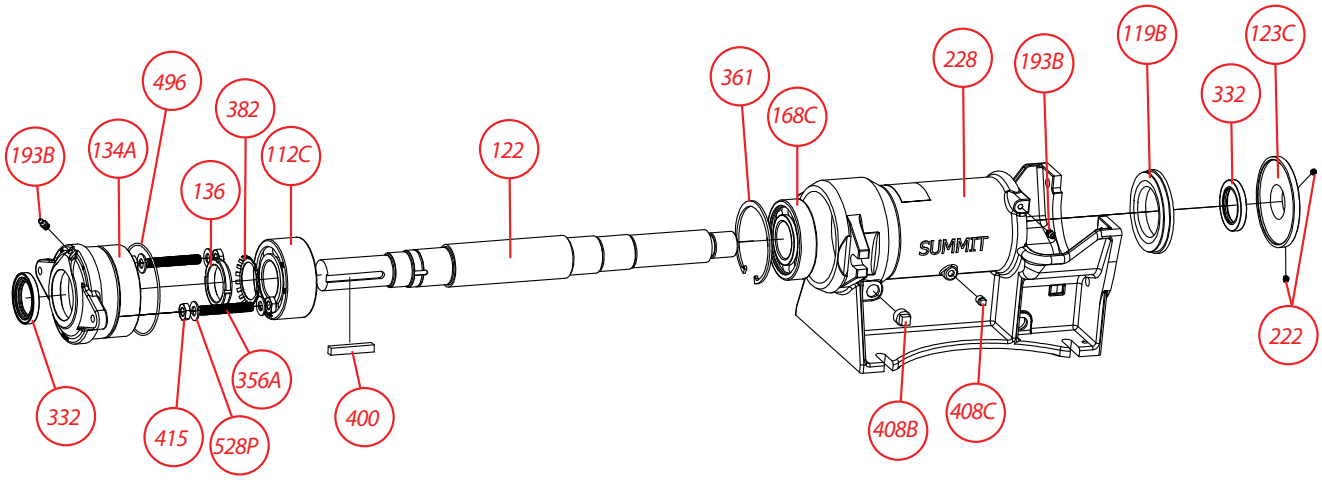


Figure 8-2: Power End Frame 1 thru 4 greased lubricated

8.2.1 Frame 5

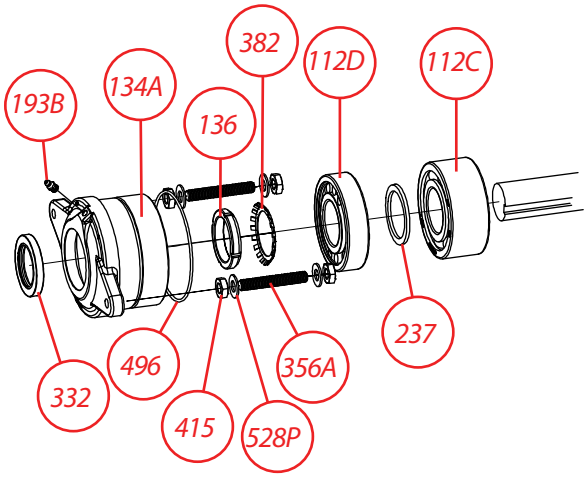


Figure 8-3: Power End Frame 5 greased lubricated

8.3 Sealing Components

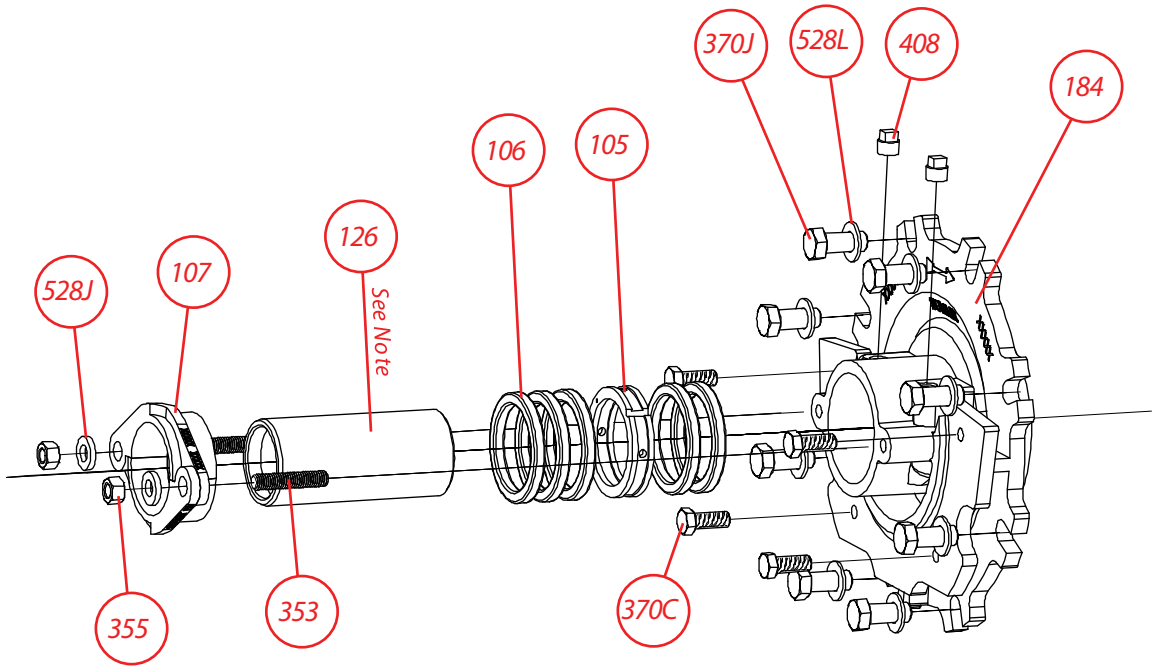


Figure 8-4: Sealing Components - See note in section 8.4

8.4 Parts List

Table 8-1: Parts List, Item Number identifier.

MODEL SJC SLURRY PUMP					
ITEM	**DESCRIPTION**	**ITEM**	**DESCRIPTION**	**ITEM**	**DESCRIPTION**
100	CASING	182	SUCTION COVER	382	BEARING, LOCKWASHER
100B	SUCTION COVER LINER	184	STUFFING BOX COVER	400	KEY, COUPLING
101	IMPELLER	193B	GREASE FITTING	408	PLUG, STUFFING BOX
105	LANTERN RING	222	SET SCREW	408B	PLUG, FRAME OIL DRAIN
106	PACKING SET	228	FRAME, BEARING	408C	PLUG, FRAME OIL LEVELER
107	GLAND	237	COLLAR, THRUST BEARING (FRAME 5)	412F	O-RING, SUCTION COVER
112C	BEARING THRUST, OB	332	OIL SEAL	415	NUT, JAM BEARING HOUSING
112D	BEARING RADIAL, OB (FRAME 5)	351	GASKET	496	O-RING, BEARING HOUSING
119B	IB END COVER	353	STUD, GLAND	496A	O-RING, STUFFING BOX TO CASE
122	SHAFT	355	NUT, GLAND	528J	WASHER, GLAND
123C	DEFLECTOR	356A	STUD, HOUSING	528K	WASHER, SUCTION CVR TO CASE
126	SHAFT SLEEVE	361	SNAP RING	528L	WASHER, STUFFING BOX TO CASE
134A	BEARING HOUSING	370C	BOLT, FRAME TO STUFFING BOX	528P	WASHER, BEARING HOUSING
136	BEARING LOCKNUT	370E	BOLT, SUCTION CVR TO CASE		
168C	BEARING RADIAL, IB	370J	BOLT, STUFFING BOX TO CASE		

Note: Gasket 351 gets replaced by O-ring 496A on sizes 6x6-14, 8x10-18 and 10x12-22
Sleeve 126 is sealed using RTV silicone to Impeller 101, except size 10x12-22.

8.5 Assembled Cross Section

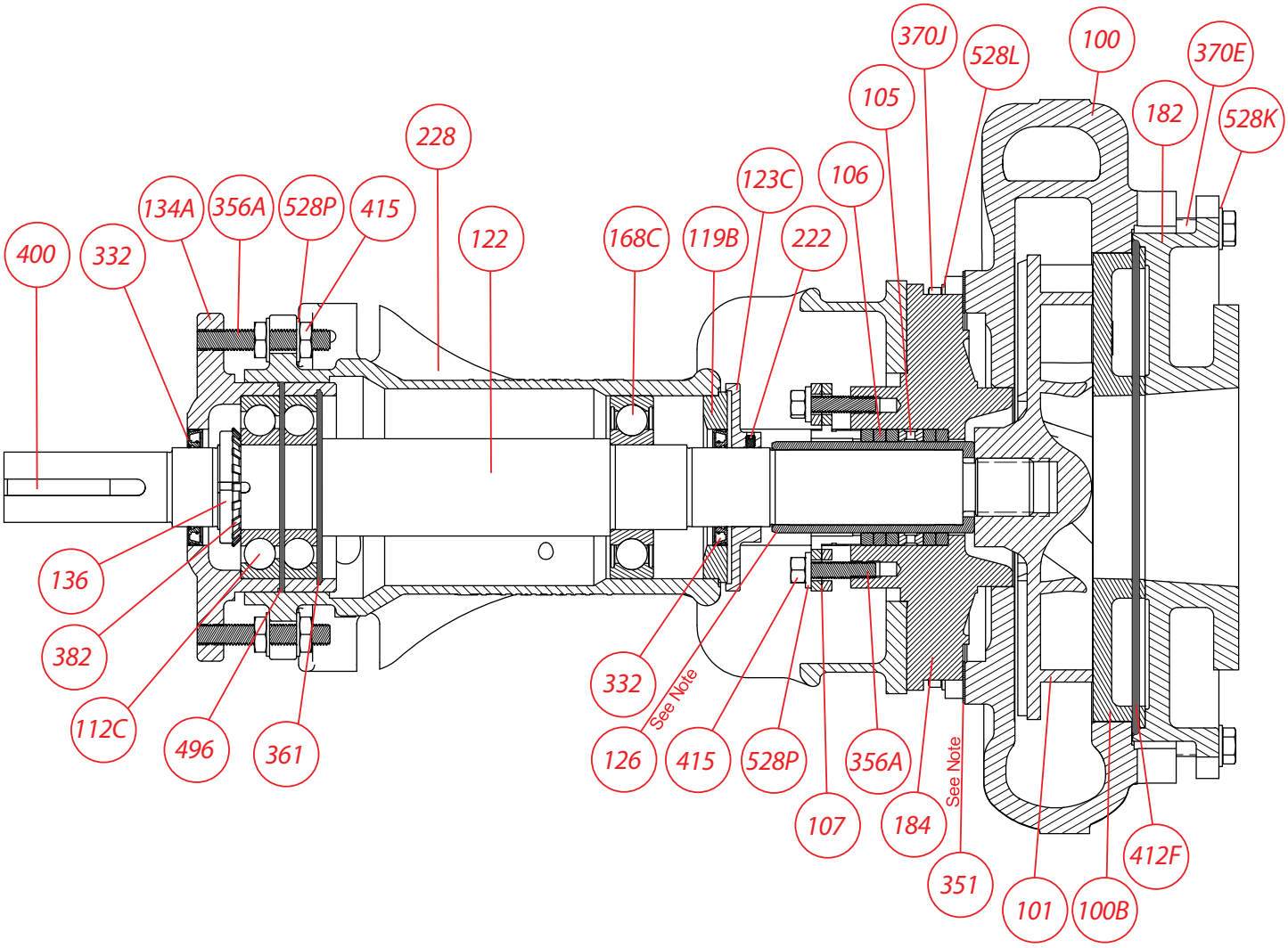


Figure 8-5: Assembled cross section TOP view. Refer to Table 8-1.

9 DISASSEMBLY

This section will cover all SJC pump sizes. When pump components are referenced, the associated item number will be represented in parentheses following the component name, i.e. Casing (100). These item numbers are identified in Section 8.4 and can be located on the pump in Section 8.

Use the following steps as a general guideline, as it is impractical to cover every situation considering the possible conditions of the pump.

Notes:

- SJC pumps may have a mechanical seal. This section will only consider packing. Refer to the seal manufacturer's instructions for disassembly and assembly.

⚠ DANGER

Lock out power to avoid personal injury or death when working on pump.

⚠ DANGER

Properly vent any pressure in pump, fittings and connecting lines.

⚠ DANGER

Never apply heat to the impeller for removal. The risk of explosion is elevated.

⚠ WARNING

Understand material being pumped. Obtain MSDS information for product. Take all necessary precautions.

⚠ CAUTION

Secure pump before disassembly. Pump's center of gravity changes when removing parts

NOTICE

Recycle used grease, oil and worn parts. Follow all local guidelines and regulations.

9.1 Wet End

The pump should be secured to a flat clean surface prior to removal of any parts.

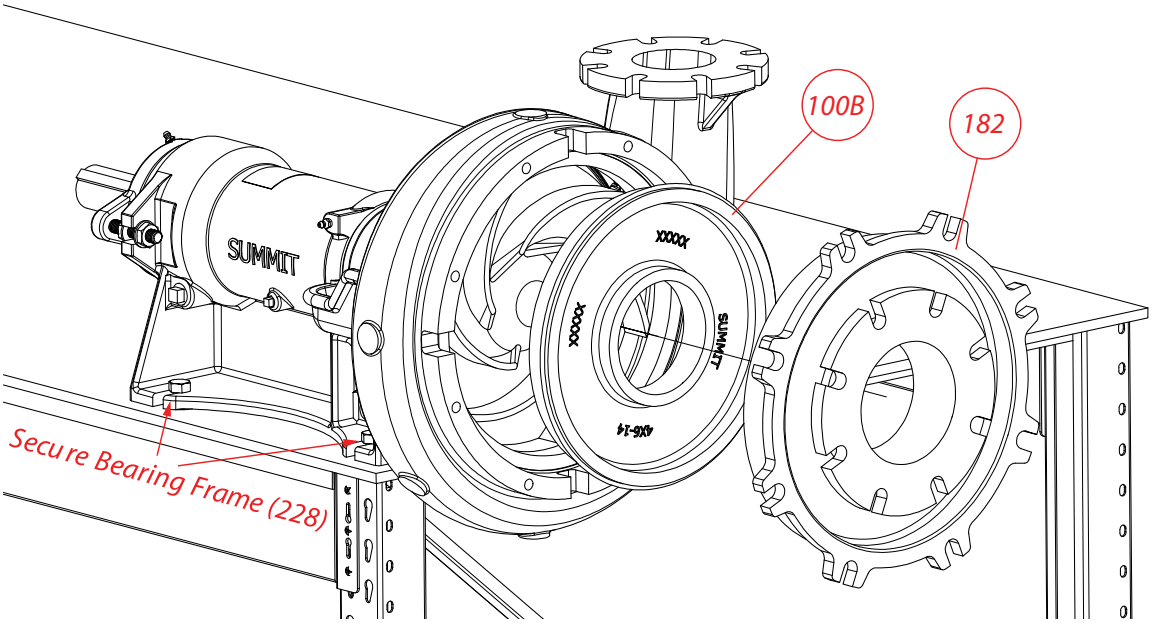


Figure 9-1: Suction Cover (182) and Liner (100B) removal.

1. Unthread bolts (370E) from the casing (100) and suction cover (182). Remove bolts (370E) and washers (528K).

2. Pull out suction cover (182), use caution when doing so as the suction cover liner (100B) is now loose in the casing (100).

3. Remove the suction cover liner (100B) and O-ring (412F). Inspect suction cover liner (100B) for damage, replace if any.

4. Unthread the impeller (101) from the shaft (122). Threads are right hand, to unthread hold shaft (122) from rotating on the coupling end and rotate impeller (101) counter-clockwise when viewing the pump from the impeller side.

5. Check for wear or damage on impeller (101), replace if necessary.

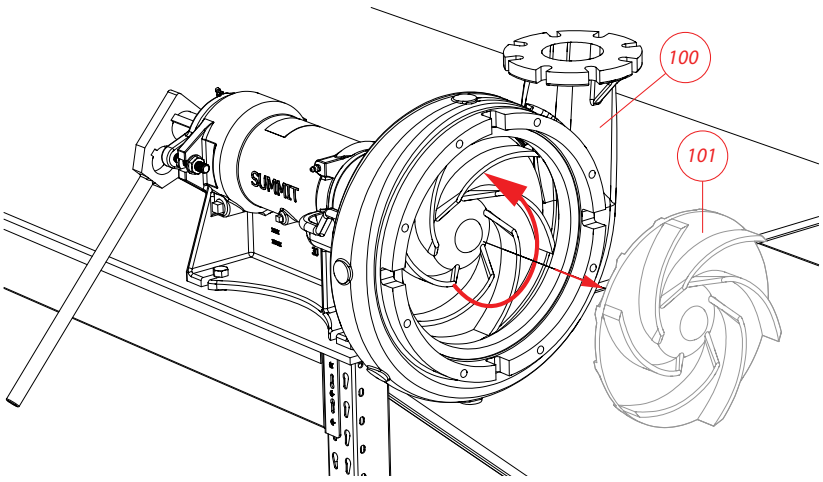


Figure 9-2: Impeller (101) Removal

6. Support casing (100) with overhead crane or blocks under the casing (100) to prepare for removal. Unthread bolts (370J) from the casing (100) and stuffing box cover (184). Remove bolts (370J) and washers (528L).

7. Remove casing (100) and gasket (351) from the stuffing box cover (184). Inspect casing (100) for wear or damage and replace if necessary.

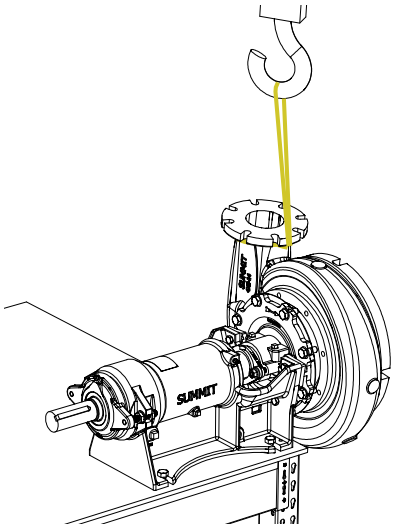


Figure 9-3: Support Casing during Removal

9.2 Sealing Components

Refer to the mechanical seal manufacturer's instructions for removal of the seal. The instructions below will consider a packed pump.

With the split gland (107) to remove packing, it is not necessary to remove the wet end components or the stuffing box cover (184). If removing all components of the stuffing box cover (184) it is practical to remove all sealing components together as a unit and separate once removed from the power end. The instructions below will remove all sealing components as a unit.

1. Remove bolts (370C).

2. Stuffing box cover (184) and all sealing components can now slide off the end of the shaft (122). Place in a clean area to continue disassembly.

3. Remove the gland nuts (355) and washers (528J)

4. Remove the gland (107) from gland studs (353) and remove gland studs (353) from stuffing box cover (184) if necessary.

5. Pull sleeve (126) from the packing (106) out of the stuffing box cover (184). Check for wear or damage and replace if needed.

6. Remove the packing (106) and lantern ring (105) from the stuffing box cover (184). Replace packing for reassembly.

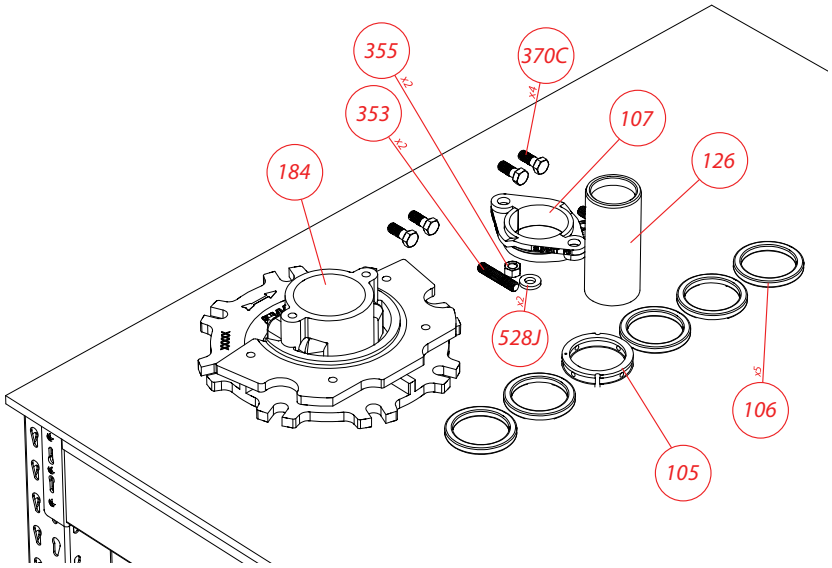


Figure 9-4: Sealing Components Disassembled

9.3 Power End

⚠ CAUTION

Do not remove IB End Cover (119B). Press fitted at the factory for permanent fit.

NOTICE

Oil lubed power ends - Drain all oil using plug (408B).

1. Remove the coupling key (400) from the shaft (122).
2. Remove the two set screws (222) from the deflector (123C) on the inboard size of the power end.
3. Slide deflector (123C) off the end of the shaft (122).
4. Loosen and remove the two most inboard jam nuts (415) and washers (528P) used for impeller clearance adjustment.
5. Slide out the shaft assembly while holding both ends of the shaft (122) giving support to minimize vertical movement.
6. Remove the housing studs (356A), jam nuts (415) and washers (528P).
7. To remove the bearing housing (134A), remove snap ring (361) using the proper size snap ring pliers.

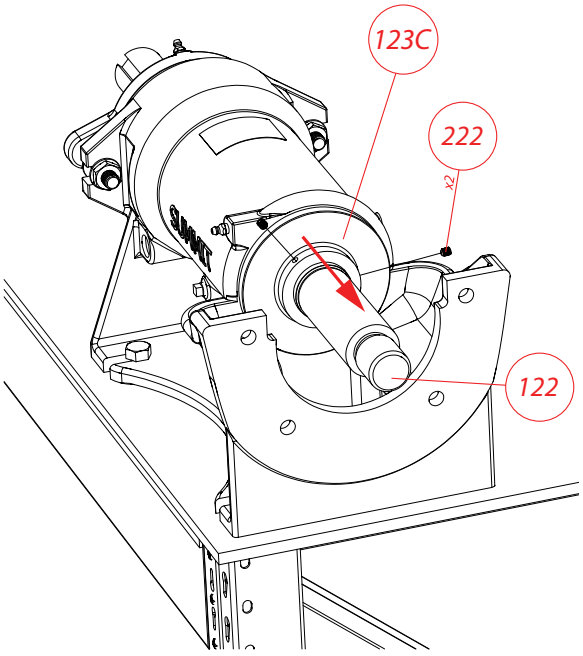


Figure 9-6: Remove Deflector (123C)

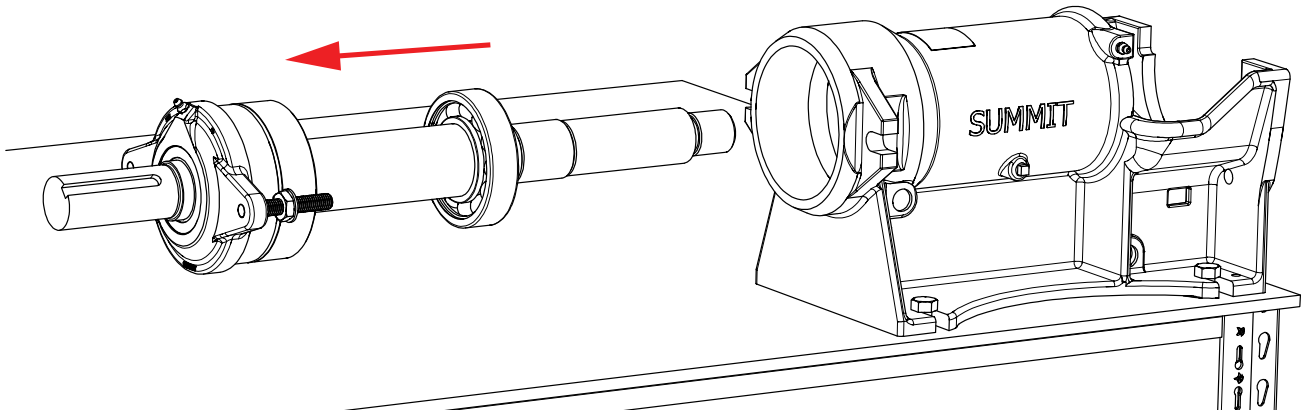


Figure 9-5: Remove Shaft Kit from bearing frame (228)

8. Slide the bearing housing (134A) off the thrust bearing (112C) and shaft (122) being careful not to damage the lip seal (332) if planning to reuse.

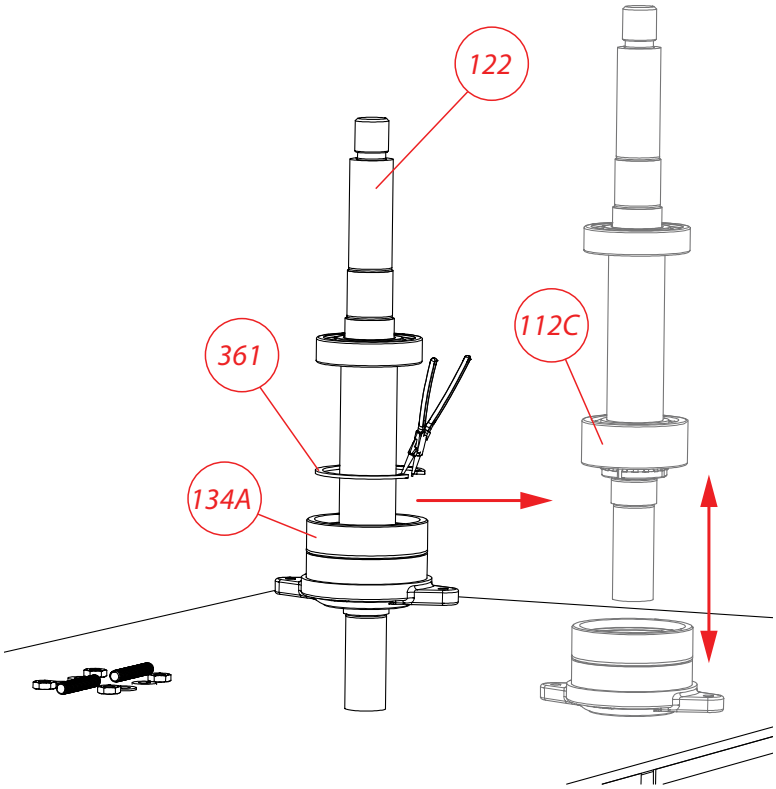


Figure 9-7: Remove bearing housing (134A) from thrust bearing (112C)

9. Remove outboard lip seal (332) and O-ring (496) from bearing housing (134A).

10. Remove inboard lip seal (332) from the bearing frame (228). Oils seals (332) can be removed with hydraulic press and a pusher sleeve or other means. It is recommended to replace the lip seals (332) and O-ring (496).

11. If replacing the bearings, release the bent tab on the bearing lock washer (382) and remove the bearing locknut (136). Threads are right-hand threads.

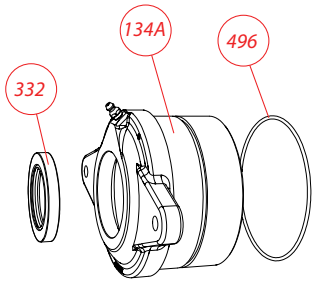


Figure 9-8: Removing Housing (134A) Seals

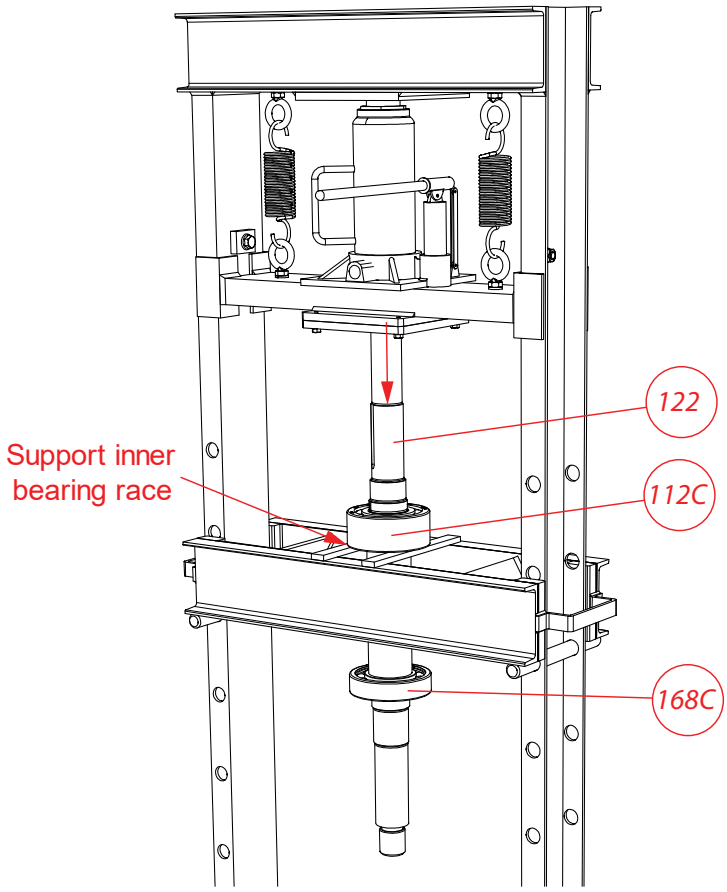


Figure 9-9: Remove Bearings from Shaft.

12. Using a hydraulic press, support bearings (112C & 168C) from the inner bearing race and press the shaft squarely to remove the bearing. It is recommended to replace shaft (122) and bearings (112C & 168C) if bearings need replacement, as removing the bearings (112C & 168C) can damage the shaft (122) at bearing locations.

NOTE: SJC Frame 5 will have two bearings (112D & 112C) on the outboard end of the shaft (122) separated by a collar (237). The removal process will remain the same.

10 ASSEMBLY

Use the following steps as a general guideline, as it is impractical to cover every situation. The assembly considers a packed bare pump with no auxiliary equipment.

Notes:

- SJC pumps may have a mechanical seal. This section will only consider packing. Refer to the seal manufacturer's instructions for disassembly and assembly.
- Assembly assumes pumps are being assembled in a clean environment. Assembly will start as all individual parts and finish with a fully assembled bare pump without other auxiliary equipment.
- SJC frame 5 has one extra radial bearing (112D) and bearing collar (237) on the coupling end of the shaft. All other frame sizes will follow the same procedure.

Tools Required:

- SAE socket set and combination wrench set
- Torque wrench
- Bearing Heater ideally an oil bath or induction heater.
- Impeller Wrench for shaft coupling size
- Hydraulic press (seals (332) and end cover (119B) if needed)
- Spanner Wrench
- Bearing Locknut wrench
- Soft-headed mallet
- Custom packing tamper – to fit in stuffing box with sleeve.

⚠ DANGER

Lock out power to avoid personal injury or death when working on pump.

⚠ WARNING

Wear eye protection and proper personal protective equipment

NOTICE

Secure bearing frame before assembly. Pump's center of gravity changes when adding parts

10.1 Power End

10.1.1 Shaft Kit Components

1. Clean shaft (122), bearing housing (134A) and ensure bearings (112C, 112D, 168C) are free from defect or debris. Having a clean environment and parts is necessary.

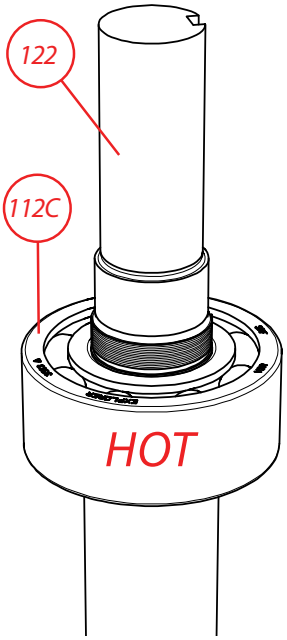


Figure 10-1: Thrust Bearing (112C) Install

Frames size 1 through 4:

A. Heat thrust bearing (112C) to 180°F but no more than 240°F. Use of oil bath or induction heater is ideal.

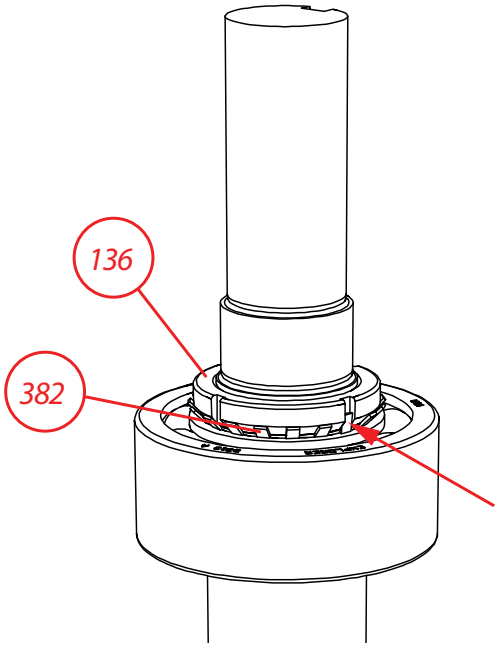


Figure 10-2: Bend in locking tab in lock washer (382) after bearing (112C) has cooled to ambient

B. With shaft in vertical position and coupling end facing up, install bearing (112C) on coupling end of shaft (122) with the bearing's (112C) identification numbers facing outboard towards the coupling end. With bearings heated it should easily slide onto the shaft (122), no press will be needed. Ensure bearing is seated firmly against shaft shoulder.

C. Install the bearing lock washer (382) and bearing locknut (136) and hand tight. Leave the shaft in vertical position until bearing cools to ambient.

D. Torque lock nut (136) to torque in Table 12-1. Bend a tab of the lock washer (382) into a groove in the bearing locknut (136). If none of the tabs line up with a groove, tighten the locknut (136) until the next tab aligns with the next groove.

NOTICE

Bearings must be kept clean at all stages of assembly to ensure long bearing life.

Frame size 5:

A. Heat thrust bearing (112C), bearing collar (237) and radial bearing (112D) to 180°F but not more than 240°F in oil bath or with induction heater. With shaft in vertical position and coupling end facing up, install thrust bearing (112C) first with identification numbers facing coupling end of shaft (122). With bearings heated it should easily slide onto the shaft (122), no press will be needed. Ensure the bearing (112C) is seated against the shaft shoulder. Let Bearing (112C) cool to ambient temperature.

B. Install bearing collar (237) against the bearing (112C). Let collar (237) cool to ambient temperature.

C. Install the radial bearing (112D) against the bearing collar with identification numbers facing towards coupling end of shaft (122).

D. Keep shaft in vertical position, install the bearing lock washer (382) and bearing locknut (136). Hand tighten the locknut (136). Let radial bearing (112D) cool to ambient temperature.

E. Tighten locknut (136) to torque value in Table 12-1. Bend a tab of the lock washer (382) into a groove in the bearing locknut (136). If none of the tabs line up with a groove, tighten the locknut (136) until the next tab aligns with the next groove.

2. Slide snap ring (361) over impeller end of shaft (122). The flat side of the snap ring (361) must face the thrust bearing (112C), the bevel side must face away from the thrust bearing (112C).

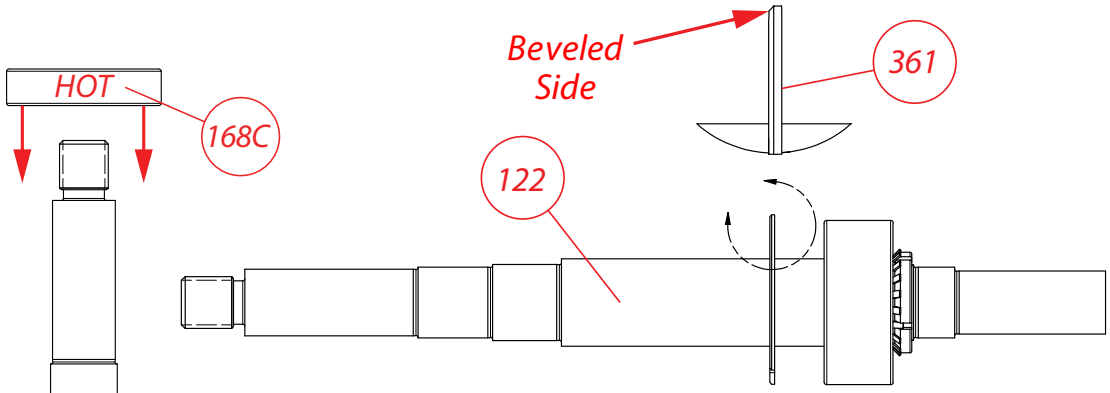


Figure 10-3: Snap Ring (361) orientation

Heat radial bearing (168C) in oil bath or use induction heater to 180°F but not more than 240°F. Install bearing (168C) on shaft (122) with identification numbers facing the impeller side of the shaft (122). With bearings heated it should easily slide onto the shaft (122), no press will be needed. Ensure bearing is seated firmly against shaft shoulder.

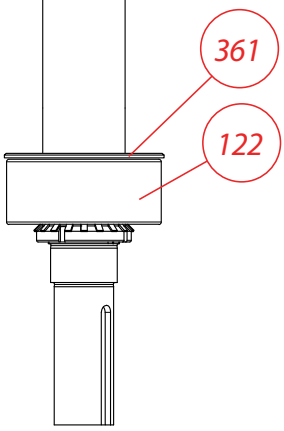


Figure 10-4: Radial Bearing (168C) install.

3. Allow bearing (168C) to cool to ambient temperature. Ensure bearing is still seated on shaft shoulder.

4. Using bearing oil or grease, lubricate outer diameter of seal (332) and inner diameter of bearing housing (134A) to install the outboard seal (332). Use a flat plate and hydraulic press to install seal (332). The outer face of seal will be flush with bearing housing (134A) outer face.

5. For greased lubrication the open side (spring side) of seal (332) will be visible when pump is assembled. Oil lubrication, the open side (spring side) of the seal (332) will not be visible once pump is assembled.

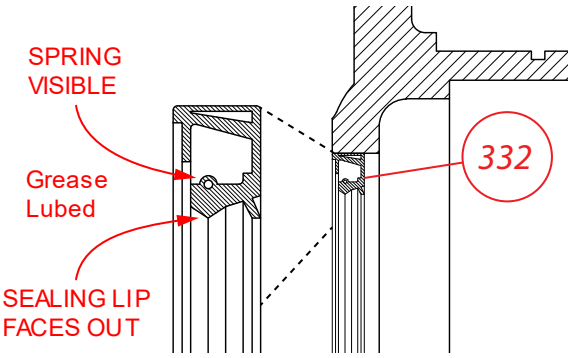


Figure 10-5: Seal (332) Orientation

6. Lubricate O-Ring (496) with bearing oil or grease. Install over bearing housing (134A) into groove.

7. Install grease zerk (193B) for greased bearings or pipe plug for oil lubricated bearings in the bearing housing (134A).

8. Slide bearing housing (134A) over the coupling end of the shaft (122) and over the thrust bearing (112C). Take care as not to damage the seal (332) in the bearing housing (134A).

9. Install snap ring (361) into bearing housing (134A) groove using spanner wrench to compress the snap ring (361). For oil lubricated bearings it is ideal to install the opening of the snap ring (361) in the 6 o'clock position when the bearing housing (134A) is installed in the bearing frame (228) to allow for better oil drainage.

10.1.2 Power End Components

10. Thread in housing stud (356A) into bearing housing (134A) and one jam nut (415) and one washer (528P) on each stud (356A).

11. On the bearing frame (228) if inboard end cover (119B) is not installed this will need to be pressed in using a hydraulic press. Inboard end cover (119B) is typically installed at the factory due to the interference fit. To install, lubricate interference faces with bearing oil or grease and with the hydraulic press insert the end cover (119B) squarely into bearing frame (228) until the shoulder of the end cover (119B) rests on the bearing frame (228).

12. With the bearing frame (228) still in the hydraulic press install the inboard seal (332) after lubricating the outer diameter of the seal (332) and inner diameter of the end cover (119B). If bearings are to be

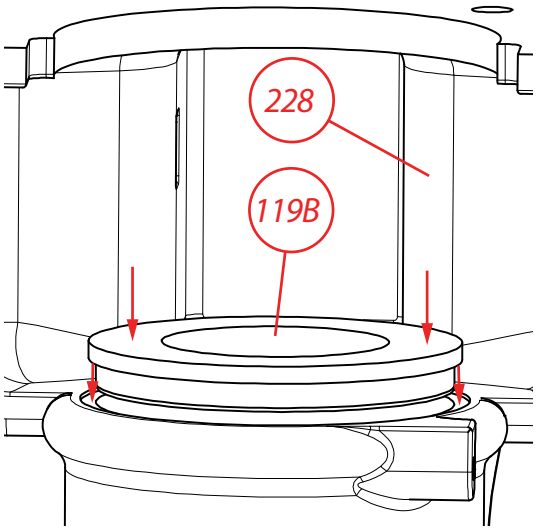


Figure 10-6: Lubricate and squarely set End Cover (119B) to bore.

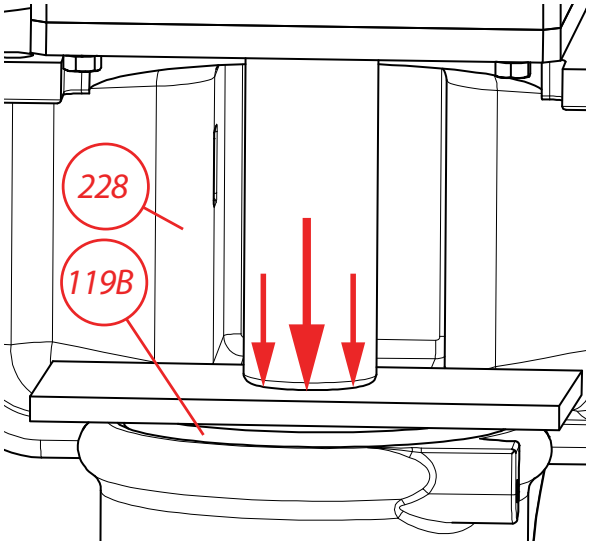


Figure 10-7: Press fit End Cover (119B) into bearing frame (228)

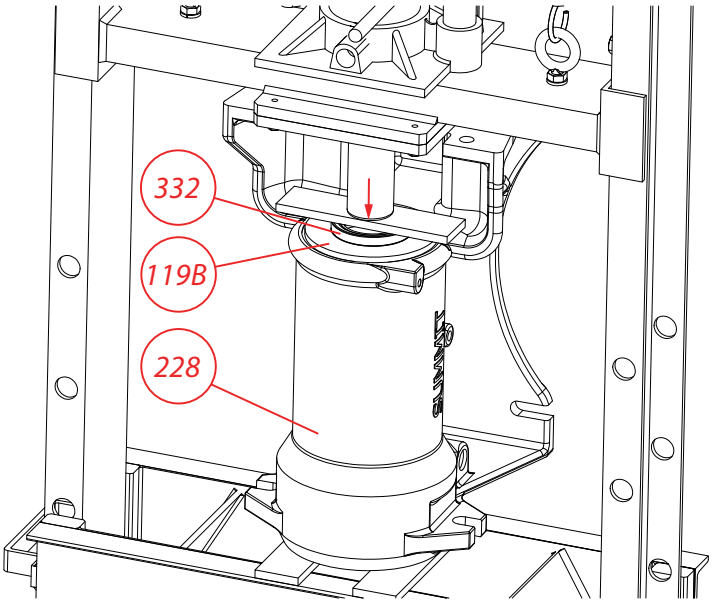


Figure 10-8: lubricate and install IB seal (332)

lubricated with oil the open side (spring visible) of the seal (332) should face the bearings. If using grease to lubricate bearings the open side (spring visible) of the seal (332) should face the external environment.

13. Install all plugs and fittings as needed. Refer to Section 6.5 on page 22 for greased or oil lubricated details.

14. Lubricate outer diameters of the bearings and bearing bores in the bearing frame (228) with bearing oil or grease.

15. Install shaft assembly into bearing frame (228) from the coupling end of the bearing frame (228). Take care not to damage the inboard seal (332) with shaft (122). Slight tapping with a soft-headed mallet on shaft might be needed to slide shaft assembly in, especially if installed in horizontal position.

16. Install the last two washers (528P) and nuts (415) onto studs (356A) so that the ears on the bearing frame (228) are being clamped by the nuts (415).

17. Install the deflector (123C) over the impeller end of shaft (122). The diameter of the deflector (123C) with the tapped holes should be inboard or nearest the impeller (101).

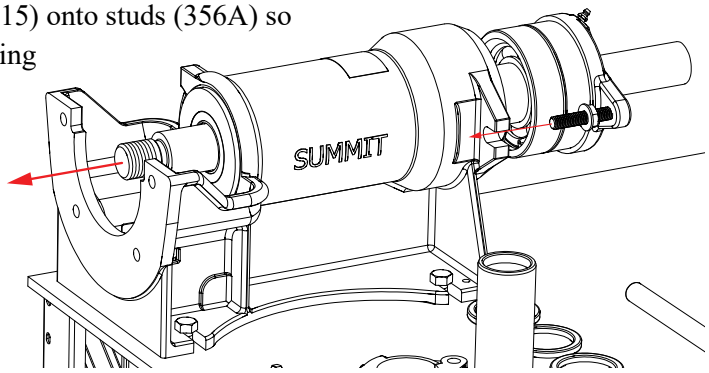


Figure 10-9: Install shaft kit into bearing frame (228)

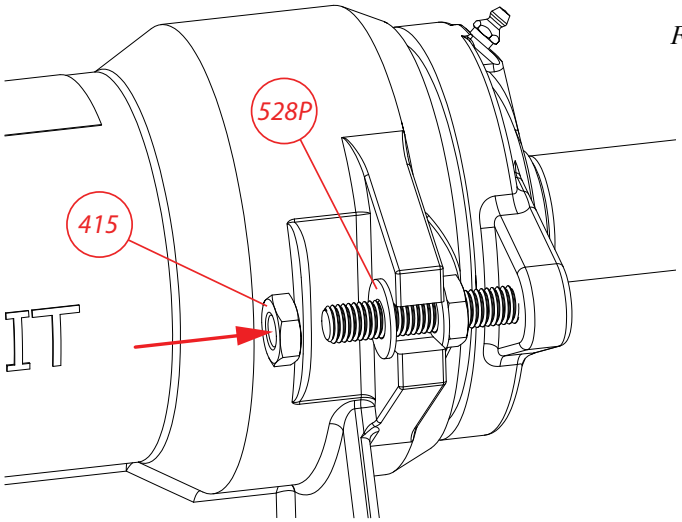


Figure 10-10: Secure bearing housing (134A)

18. Install set screws (222) into deflector. Make minor adjustments to deflector (123C) on shaft (122) so that the end cover (119B) sets inside the lip of the deflector (123C) but does not rub. Tighten set screws (222) to shaft (122) and torque to values in Table 12-1 on page 51.

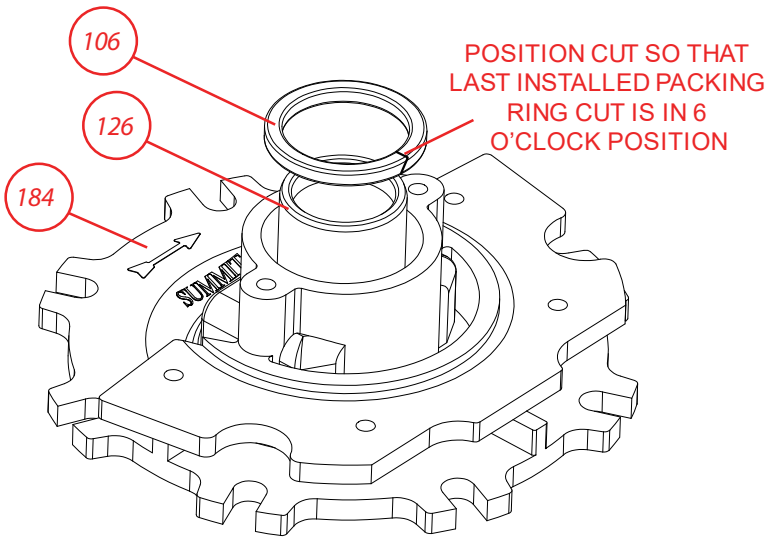


Figure 10-11: First packing ring (106)

10.1.3 Sealing Components

Installing mechanical seals, refer to the seal manufacturer's installation and operation manual. For packing, the following steps are those we found to be the most convenient when starting from disassembled parts. Order of steps could be rearranged depending on the pump condition or level of assembly.

19. With stuffing box cover (184) impeller-side down on a workbench place the sleeve (126) within the bore of the stuffing box. Ensure the sleeve (126) is correctly oriented as it would be in service.

20. Insert the first packing ring (106) in the stuffing box around the sleeve (126) with the cut of the packing ring (106) such that the last packing ring (106) installed will have the cut in the bottom or 6 o'clock position. Each packing ring (106) installed will have the cut rotated 90 degrees from the previous ring installed. If a total of 5 packing rings (106) are being used, the cut will be in the 6 o'clock position for the first and last (5^{th}) packing rings (106).

21. Tamp the first packing ring (106) with custom made tool. PVC pipe works well. Ensure the packing ring (106) is fully seated at the bottom of the stuffing box.

22. Insert the next packing ring (106) into the stuffing box and around the sleeve (126). The cut of the packing should be 90 degrees from the cut of the previously installed packing ring (106). Tamp packing ring (106) with custom tamping device.

23. Install the lantern ring (105) in the stuffing box around the sleeve (126). Flush ports should closely be in line with lantern ring (105) with allotment of compression for the first two packing rings (106).

24. Install the remaining packing rings (106) with cuts 90 degrees apart from the previously installed packing ring (106). Tamp each packing ring (106) after installing it in the stuffing box.

25. Install the packing gland studs (353) into the stuffing box cover (184).

26. Install packing gland (107) over the sleeve (126) and over the packing gland studs (353).

27. Install washers (528J) and nuts (355), tighten only finger tight. This must be adjusted once in service to desired drip rate.

28. Clean the surface of the shaft (122) and ensure all debris are gone and shaft (122) has no burrs.

29. Take the entire stuffing box cover (184) assembly and slide over the end of the shaft (122) of the assembled power end. Fasten the stuffing box cover (184) to the bearing frame (228) using bolts (370C). Torque to values in Table 12-1 on page 51

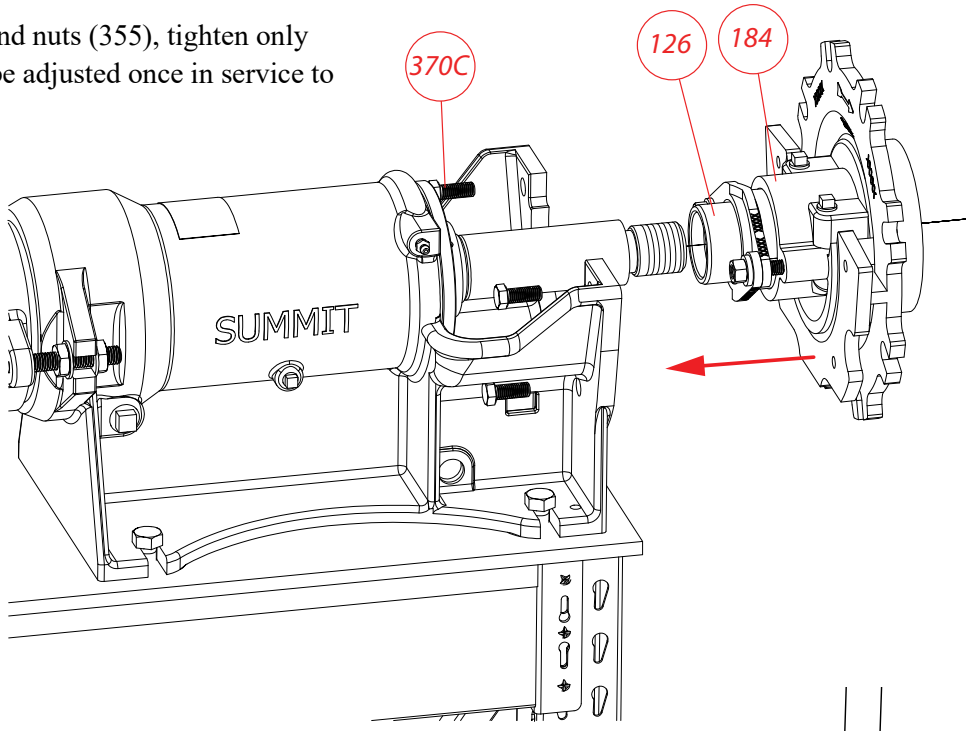


Figure 10-12: Install stuffing box assembly

30. Push the sleeve (126) towards the power end as far as it slides.

10.1.4 Wet End Components

31. Install the top four bolts (370J) and washers (528L) along with gasket (351) to hold in place. Note, gasket (351) is replaced by O-Ring (496A) on larger pump sizes.

32. Use an overhead crane or rigging system to support the casing (100) when positioning it on the stuffing box cover (184). The casing discharge can be rotated in 45° incremented positions. Align the bolts (370J) and gasket (351) with the threaded holes on the casing (100).

33. Install the four remaining bolts (370J) and washers (528L). Evenly tighten all bolts (370J) in a crisscross pattern. Follow the same pattern about three times increasing torque values each time until torque values in Table 12-1 are met with two pattern passes.

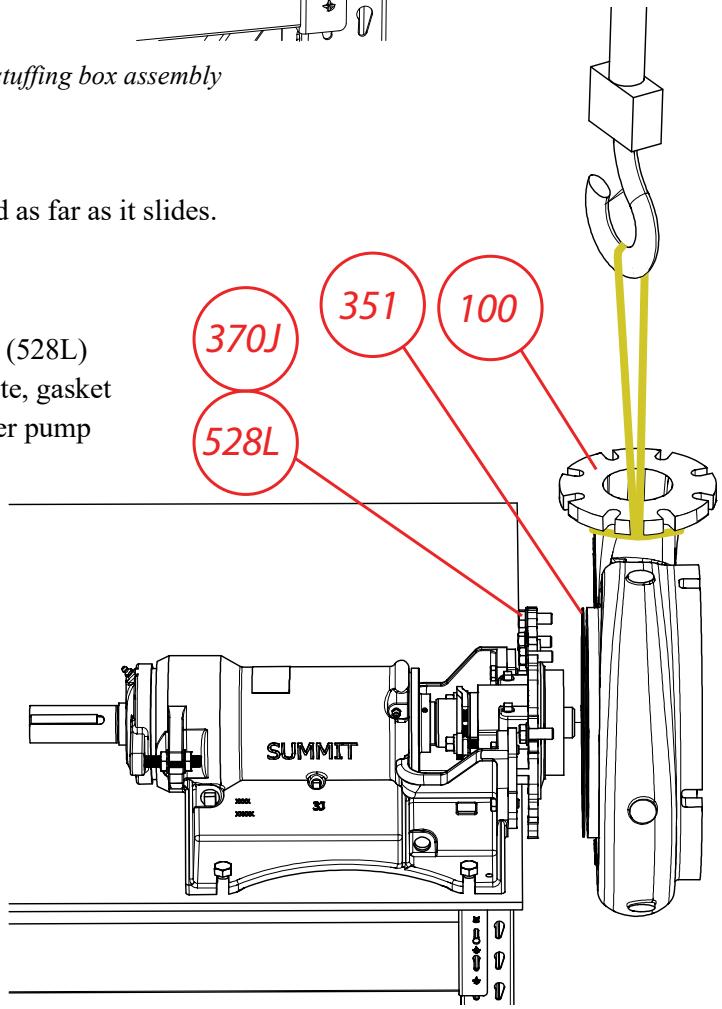


Figure 10-13: Install Casing (100) with lift assist

34. Apply a small bead of RTV silicone to the surface of the impeller hub where it will mate with the sleeve (126) once the impeller (101) is installed. This is to keep slurry abrasives and liquid from getting under the sleeve (126) causing wear on the shaft (122).

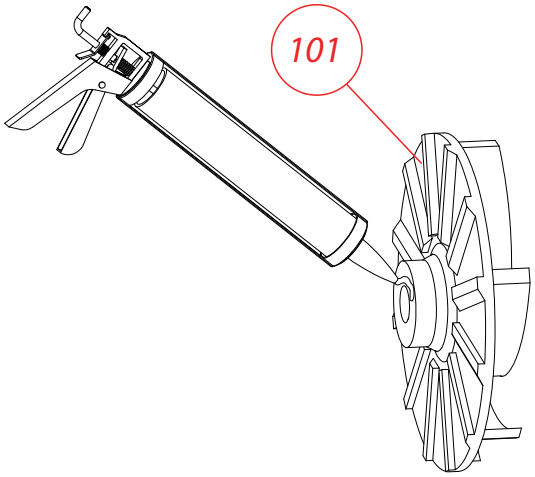


Figure 10-14: Apply RTV Silicone

35. Thread the impeller (101) on the shaft. Tighten impeller (101) firmly against sleeve (126) using an impeller wrench on the coupling end of the shaft (122) to keep assembly from rotating. Once Impeller (101) is seated tightly against the sleeve (126), rotate impeller wrench and impeller (101) counterclockwise (CCW) about one-quarter turn. Quickly rotate impeller (101) clockwise (CW) so that the handle of the impeller wrench contacts the table. This further tightens the impeller (101) to the shaft (122).

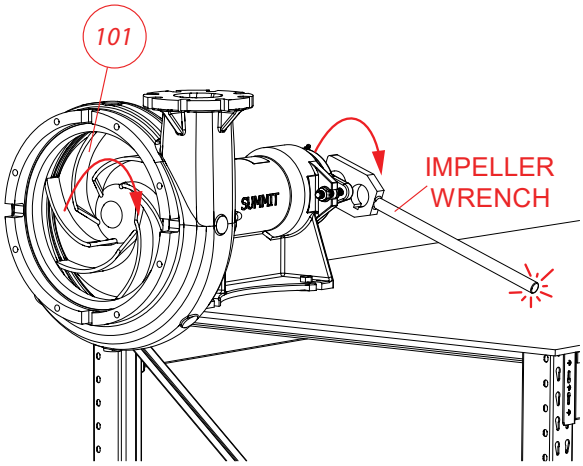


Figure 10-15: Impeller (101) install

36. Install O-Ring (412F) on outer diameter of suction cover liner (100B). Install both parts into the casing (100). The large, machined surface must face the impeller (101).

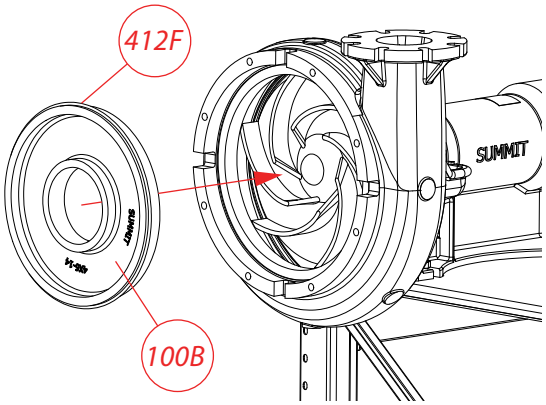


Figure 10-16: Suction cover liner (100B) install

37. Hold the suction cover liner (100B) in place. Install the suction cover (182) into the casing (100). Hold suction cover (182) in place while installing the bolts (370E) and washers (528K).

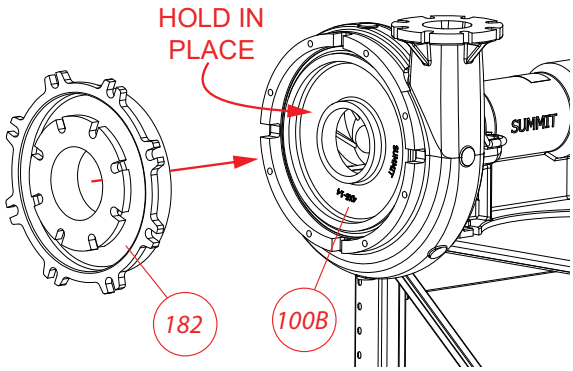


Figure 10-17: Suction Cover (182) install

38. Evenly tighten all bolts (370E) in a crisscross pattern. Follow the same pattern about three times increasing torque values each time until torque values in Table 12-1 are met with two pattern passes.

39. Set the impeller clearance per section 6.1 on page 18.

11 Barrel Type Coupling Guards

Summit Pump manufactured barrel type coupling guards come as an option to the SJC pump. Assembly and disassembly instructions shall be followed as described in this manual. If a separate manual is supplied with the guard these instructions are superseded. For third party supplied guards please refer to the manufacturer's instruction manual.

⚠ DANGER

Lock out tag out driver power before performing any work on pump assembly.

⚠ WARNING

Replace all guarding before re-energizing the driver equipment

NOTICE

Summit Pump, Inc. assumes no liability when these procedures are neglected.

11.1 Guard Components

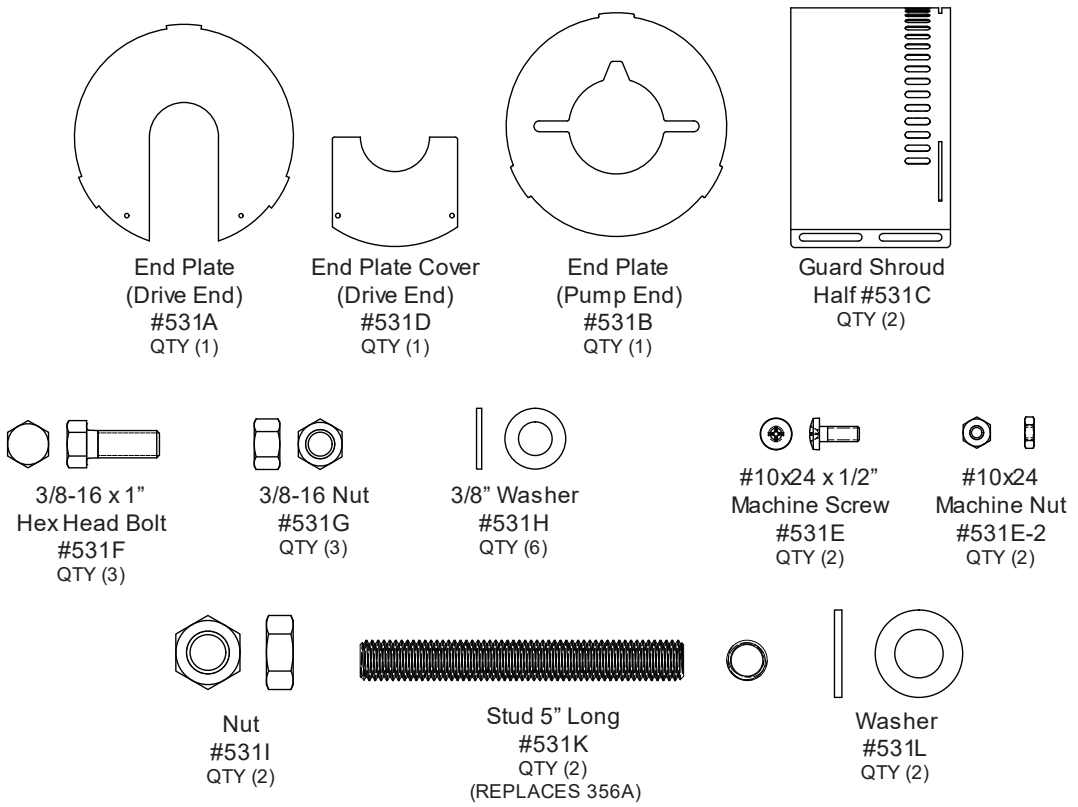


Figure 11-1: Barrel Coupling Guard Components

11.2 Assembly

1. Replace stud (356A) from the bearing housing (134A) with a longer stud (531K).
2. Attach the pump end plate (531B) using studs (531K), nuts (531I) and washers (531L).

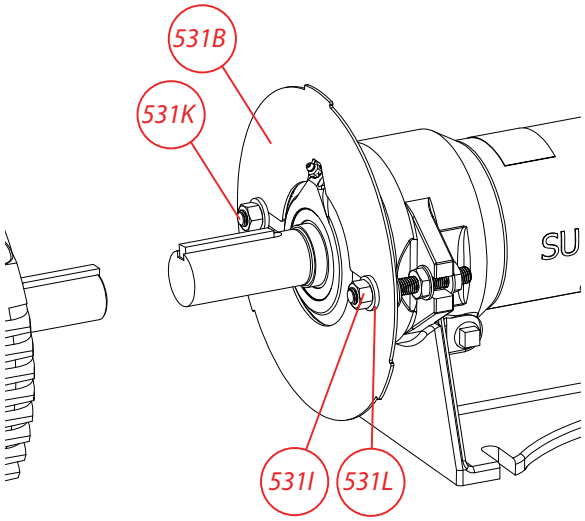


Figure 11-2: Pump end plate (531B) install

3. Set the impeller clearance as described in Section 6.1.1.2 on page 19.
4. Install the motor end plate (531A) over motor shaft and attach the end plate cover (531D) with machine screws (531E) and nuts (531E-2). It does not matter what side the end plate cover (531D) is attached on.
5. Install the coupling.

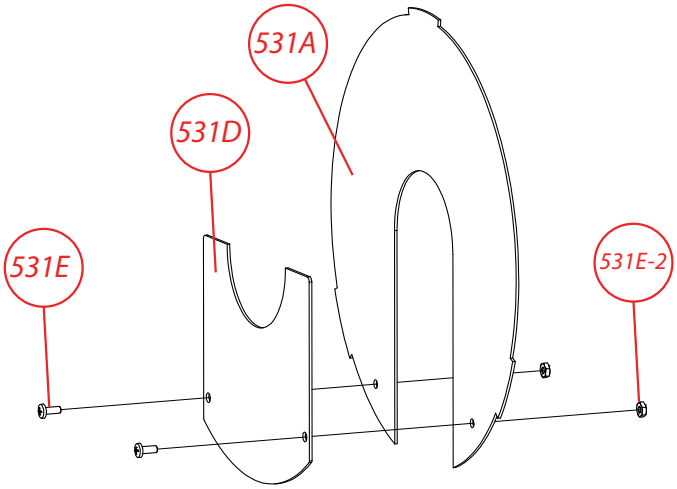


Figure 11-3: Assemble motor end plate and install over motor shaft

6. Slide one guard shroud (531C) inside the other guard shroud (531C). Holding both shrouds (531C) at the flanged opening, separate the flanges and install over the pump and motor shaft, if applicable.

7. Attach the guard shroud (531C) closest to the pump to the pump end plate (531B). Ensure the tabs of the pump end plate (531B) are engaged with the slots on the guard shroud (531C).

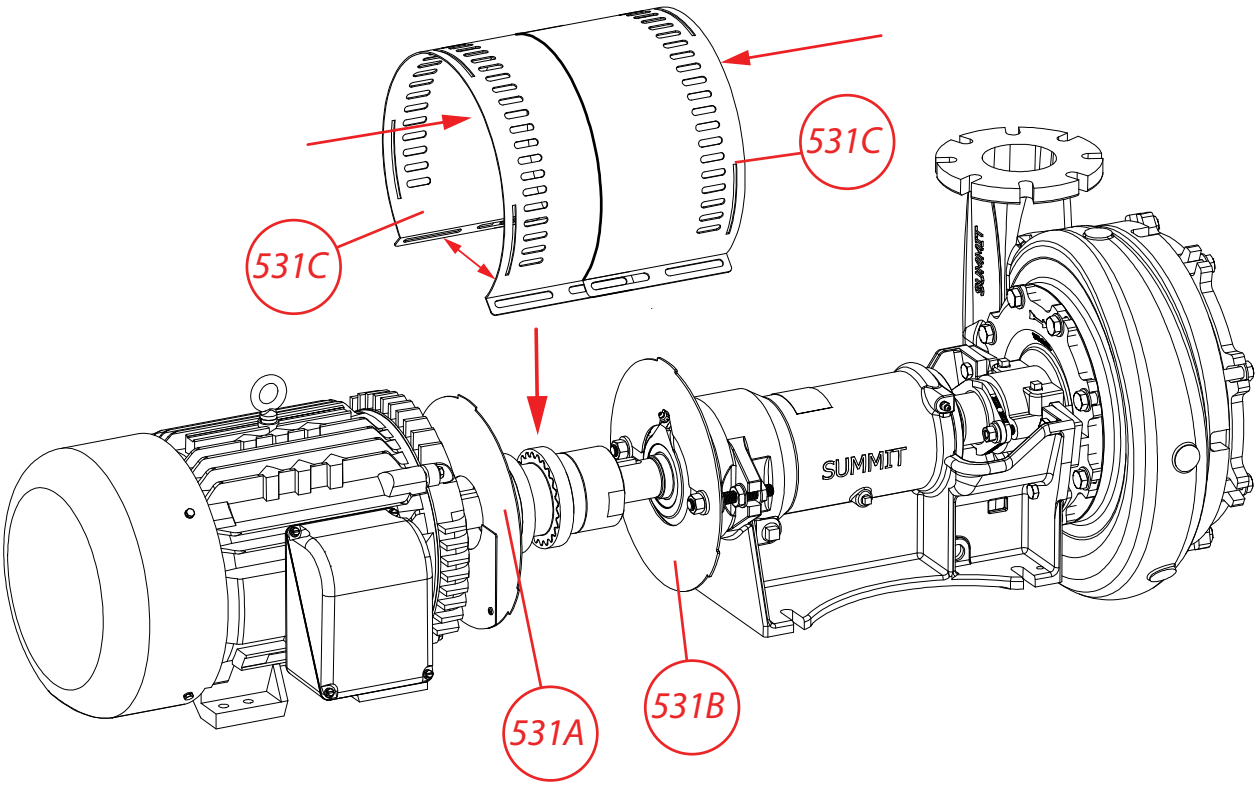


Figure 11-4: Shroud (531C) installation

8. Engage the assembled motor end plate (531A/531D) with the guard shroud (531C). Ensure tabs are engaged with the slots.

9. Install bolts (531F), nuts (531G) and washers (531H) in the slots of the flanged section of the guard shrouds (531C). Space the bolts (531F) relatively evenly, do not tighten yet.

10. Slide the guard shrouds (531C) apart from each other to desired distance from the motor.

11. Tighten nuts (531G) and bolts (531F).

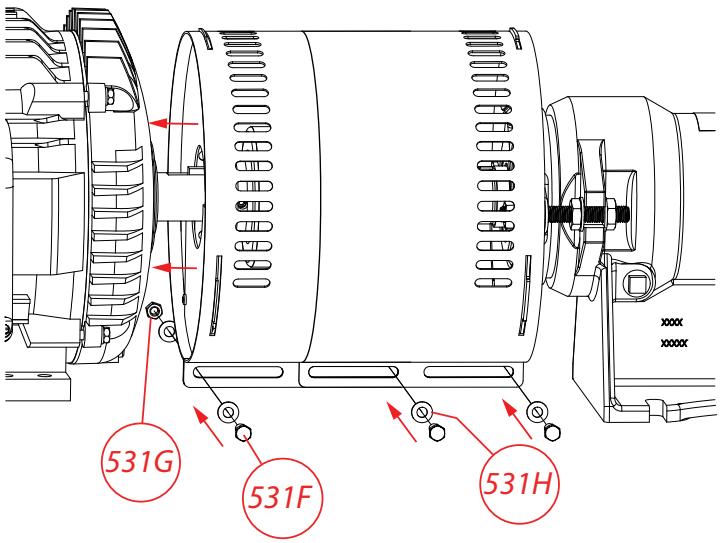


Figure 11-5: Fasten guard and set clearance to motor

12 APPENDIX A: HARDWARE

12.1 Hardware List

Note: Torque values are based on dry fit non-lubricated threads.

Table 12-1: SJC Hardware list unlubricated

Item ID	Description	Pump Size	Fastener Thread Size	Length	Qty Per Pump	Steel Grade	Stainless Grade	Steel Torque (lbft)	Stainless Torque (lbft)
136	Bearing Locknut	Frame 1	N-08	N/A	1	Steel	N/A	40	N/A
		Frame 2	N-10					70	
		Frame 3	N-13					140	
		Frame 4	AN-16					220	
		Frame 5	AN-16					220	
193B	Grease Fitting	Frame 1	1/8"-27 NPT	N/A	2	Steel	N/A	N/A	N/A
		Frame 2							
		Frame 3							
		Frame 4	3/8"-24 UNF						
		Frame 5							
222	Set Screw	All Frames	5/16"-18 UNC	3/8"	2	N/A	Stainless	N/A	12
353	Stud, Packing Gland	Frame 1	3/8"-16 UNC	3"	2	N/A	Stainless	N/A	N/A
		Frame 2	1/2"-13 UNC						
		Frame 3		2-1/2"					
		Frame 4		3-1/2"					
		Frame 5							
355	Nut, Packing Gland	Frame 1	3/8"-16 UNC	N/A	2	N/A	Stainless	N/A	N/A
		Frame 2	1/2"-13 UNC						
		Frame 3							
		Frame 4							
		Frame 5							
528J	Washer, Packing Gland	Frame 1	3/8"	N/A	2	N/A	Stainless	N/A	N/A
		Frame 2	1/2"						
		Frame 3							
		Frame 4							
		Frame 5							
356A	Stud, Housing	Frame 1	1/2"-13 UNC	4"	2	Steel	N/A	N/A	N/A
		Frame 2							
		Frame 3	5/8"-11 UNC	4"					
		Frame 4							
		Frame 5							
415	Nut, Jam Housing	Frame 1	1/2"-13 UNC	N/A	4	Steel	Steel	52	N/A
		Frame 2							
		Frame 3	5/8"-11 UNC					103	
		Frame 4							
		Frame 5							
528P	Washer, Housing	Frame 1	1/2"-13 UNC	N/A	4	Steel	Steel	N/A	N/A
		Frame 2							
		Frame 3	5/8"-11 UNC						
		Frame 4							
		Frame 5							

Item ID	Description	Pump Size	Fastener Thread Size	Length	Qty Per Pump	Steel Grade	Stainless Grade	Steel Torque (lbft)	Stainless Torque (lbft)
370C	Bolt, Frame to Stuffing Box	All Frames	1/2"-13 UNC	1-1/4"	4	ASTM A307 Gr A	ASTM F593	29	52
370E	Bolt, Suction Cover to Case	Frame 1	3/8"-16 UNC	1-1/4"	8	ASTM A307 Gr A	ASTM F593	12	22
		Frame 2	5/8"-11 UNC	1-1/2"		ASTM A307 Gr B		58	104
		Frame 2 - 3x4-11	1/2"-11 UNC	1-1/2"				29	52
		Frame 3	5/8"-11 UNC	1-3/4"				58	104
		Frame 3 - 6x6-14LS		2-1/4"					
		Frame 4 - 6x6-14HS		2-1/4"					
		Frame 4		1-3/4"					
528K	Washer, Suction Cover to Case	Frame 1	3/8"	N/A	8	Steel	Stainless	N/A	N/A
		Frame 2	5/8"						
		Frame 2 - 3x4-11	1/2"						
		Frame 3	5/8"						
		Frame 4							
370J	Bolt, Stuffing Box to Case	Frame 1	3/8"-16 UNC	1-1/4"	8	ASTM A307 Gr A	ASTM F593	12	22
		Frame 2	1/2"-13 UNC	1-1/2"		ASTM A307 Gr B		29	52
		Frame 3	5/8"-11 UNC	1-1/2"				58	104
		Frame 4							
528L	Washer Stuffing Box to Case	Frame 1	3/8"	N/A	8	Steel	Stainless	N/A	N/A
		Frame 2	1/2"						
		Frame 3	5/8"						
		Frame 4							
400	Key, Coupling	Frame 1	1/4" x 5/16"	1-11/16"	1	Steel	N/A	N/A	N/A
		Frame 2	3/8" x 3/8"	2-1/2"		N/A	Stainless		
		Frame 3	1/2" x1/2"	3-3/4"		Steel	N/A		
		Frame 4	5/8" x 5/8"	3"					
408	Plug, Stuffing Box	All Frames	3/8" NPT	N/A	2	Steel	316SS or CD4	2*TFFT	2*TFFT
408B	Plug, Bearing Frame Drian	All Frames	3/4" NPT	N/A	1	Steel	N/A	2*TFFT	N/A
408C	Plug, Bearing Oil Level	All Frames	1/4" NPT	N/A	1	Steel	N/A	2*TFFT	N/A

TFFT = Turns From Finger Tight

13 APPENDIX B: ENGINEERING DATA

13.1 SHAFT SLEEVES

Prior to year 2024 Summit Pump manufactured shaft sleeves for packing and mechanical seals in different lengths (“L”). The shorter length sleeve was for packing and the longer length sleeve for mechanical seals. The shorter length packing sleeve did not work with mechanical seals as the set collar set screws would not engage with the sleeve designed for packing.

Following 2024, sleeves were redesigned to one length so that packing and mechanical seals would work using the same sleeve. Other optional sleeve outer diameters (“OD”) were introduced to accommodate a broader range of mechanical seals.

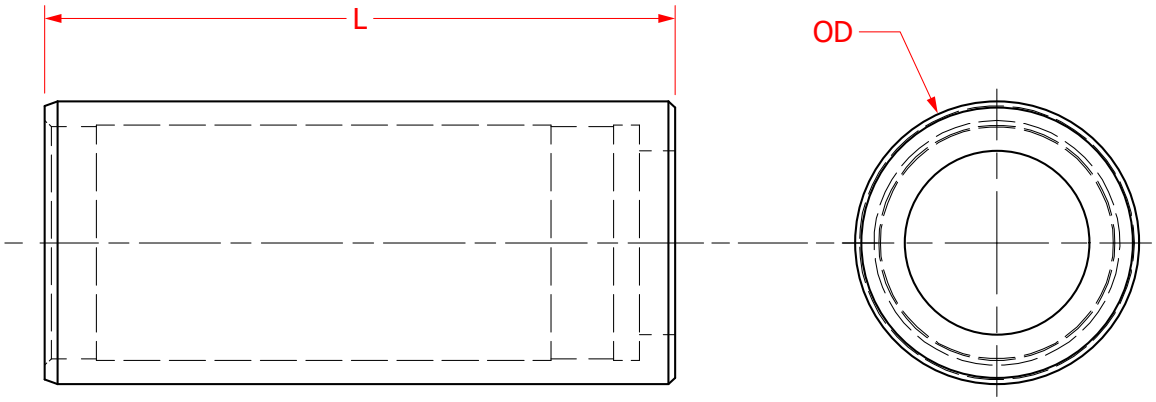


Figure 13-1: SJC Sleeve

Table 13-1: Sleeve options

Frame Size	Sleeve Type	OD	L	Packing	Mechanical Seal
1	**Standard**	**1 7/8**	**6 1/16**	**X**	**X**
	Optional	1 3/4	6 1/16		X
	Obsolete Packing	1 7/8	4 3/4	X	
2	**Standard**	**2 1/8**	**6 1/32**	**X**	**X**
	Optional	2	6 1/32		X
	Obsolete Packing	2 1/8	4 3/4	X	
3	**Standard**	**2 3/4**	**6 3/32**	**X**	**X**
	Optional 1	2 1/2	6 3/32		X
	Optional 2	2 5/8	6 3/32		X
	Obsolete Packing	2 3/4	4 3/4	X	
4	**Standard**	**3 3/8**	**7 13/32**	**X**	**X**
	Optional	3 1/4	7 13/32		X
	Obsolete Packing	3 3/8	6	X	
5	**Standard**	**4 1/8**	**8 3/8**	**X**	**X**
	Obsolete Packing	4 1/8	8	X	

13.2 MATERIALS OF CONSTRUCTION

Standard pump materials are generalized below. Check with the local Summit Pump Distributor for the construction material of an existing pump via the serial number. When ordering a new pump and no materials are specified the standard materials will be used.

Table 13-2: Material of construction for standard pumps

Item Number	Part Description	Pump Material		
		HC600	All HC600	CD4
100	Casing	HC600	HC600	CD4MCuN
100B	Suction Cover Liner	HC600	HC600	CD4MCuN
101	Impeller	HC600	HC600	CD4MCuN
105	Lantern Ring	PTFE		
106	Packing	Graphite		
107	Gland or Mech. Seal	316SS		
112C/D	Thrust Bearing	Steel		
119B	IB End Cover	Steel		
122	Shaft	Alloy Steel 4140		
123C	Deflector	Cast Iron		
126	Shaft Sleeve	416SS		
134A	Bearing Housing	Cast Iron		
168C	Radial Bearing	Steel		
182	Suction Cover	HC600	HC600	CD4MCuN
184	Stuffing Box Cover	Cast Iron	HC600	CD4MCuN
228	Bearing Frame	Cast Iron		
332	Oil Seal	Buna-N		
351	Gasket	Buna-N		
370E	Bolt Suction-Casing	Steel		316SS
370J	Bolt Stuffing-Casing	Steel		316SS
412F	O-Ring, Suction Cover	Buna-N		
496	O-Ring, Bearing Housing	Buna-N		
496A	O-Ring, Stuffing-Casing	Buna-N		

Table 13-3: Material Specifications

Material	Specification
Cast Iron	A48, ASTM A395 or ASTM A216 WCB
HC600	ASTM A532 Class 3
CD4MCuN	ASTM A995 CD4MCuN
HMC	AISI 304/NCB Coated
316SS	AISI 316
416SS	AISI 416

13.3 ENGINEERING DATA

Table 13-4: Engineering data SJC

			1x1.5-8	1x1.5-11	1.5x2-8	1.5x2-11	2x3-8	2x3-11	1.5x2-14	2x3-14	3x4-11	3x4-14	4x6-14	6x6-14 LS	6x6-14 HS	8x10-18	10x12-22
Pump	Frame Size:		1						2			3			4		5
	Weight (lbs):		190	220	195	230	205	245	315	330	300	440	475	590	710	1020	1800
	Maximum Solid Size (in):		1/2	1/2	3/4	3/4	7/8	7/8	3/4	7/8	1 1/8	1 1/8	1 3/8	1 1/2	1 1/2	2 1/4	2 1/4
	BHP/100 RPM:		1.43						3.43			8.62			11.43	16.95	33.9
	Maximum RPM:		1750											1450	1750	1180	
	Belt Drive Constant (BD):		260						108			52			32.5		16.25
	Specific Speed:		640	500	883	741	915	802	480	649	1040	734	1227	1538	1583	2075	1838
	Suction Specific Speed:		3024	2281	3408	2704	5726	3175	2832	2691	5352	6782	6347	5870	6397	5980	9060
Impeller & Casing	Maximum Impeller Diameter (in):		8.000	11.000	8.000	11.000	8.000	11.000	14.000	14.000	11.000	14.000	14.000	14.000	14.000	18.000	22.000
	Minimum Impeller Diameter (in):		5.000	8.000	5.000	8.000	5.000	8.000	11.000	11.000	7.000	11.000	10.000	10.000	10.000	14.000	18.000
	MAWP (psi) (Max Allowable Working Pressure)	Cast Iron	110														
		HC600 & CD4	127														
	Maximum Temperature (°F)		250														
Shaft & Bearings	Rotory Components Moment of Inertia ($lb_m \cdot ft^2$):		66.4	210.0	76.0	235.1	78.6	255.8	594.8	633.0	270.0	744.9	750.9	946.7	1185.8	5351.4	8486.1
	Shaft Area Moment of Inertia (in^4)		2332						2864			5375			9567		16037
	Critical Speed (rpm):		10,786	9,494	10,594	9,351	10,576	9,037	8,485	8,345	9,186	8,597	8,607	8,108	8,105	6,448	6,492
	Overhang (in):		10						10.5			11.75			13		15.25
	L^3/D^4 Ratio:		235						123			63			32		25
	Ø at Impeller (in):		1.25						1.50			1.75			2.50		2.75
	Ø under Sleeve (in):		1.44						1.75			2.25			2.87		3.44
	Ø between Bearings (in):		1.75						2.25			2.94			3.56		4.00
	Ø at Coupling (in):		1 3/8						1 5/8			2 1/8			2 5/8		3
	Bearing Span (in):		9.72						9.28			11.00			13.50		14.75
	Outboad (Thrust) Bearing:		3208A						3310A/C3			3313A/C3			3316A		7316 BECBY
	Inboard (Radial) Bearing:		208/C3						310			313			6316/C3		6318M
Stuffing Box	Ø Bore (in):		2.625						2.875			3.500			4.375		5.375
	Ø Sleeve OD (in)*:		1.875						2.125			2.750			3.375		4.125
	Bore Depth (in):		2.938												3.750		4.500
	Number of Rings:		5														
	Packing Size (in):		3/8												1/2		5/8
	Flush Water Required (Gal/hr):		1/2									3/4			1	1 1/2	

*Additional diameters are available

14 APPENDIX C: DIMENSIONAL DATA

14.1 PUMP

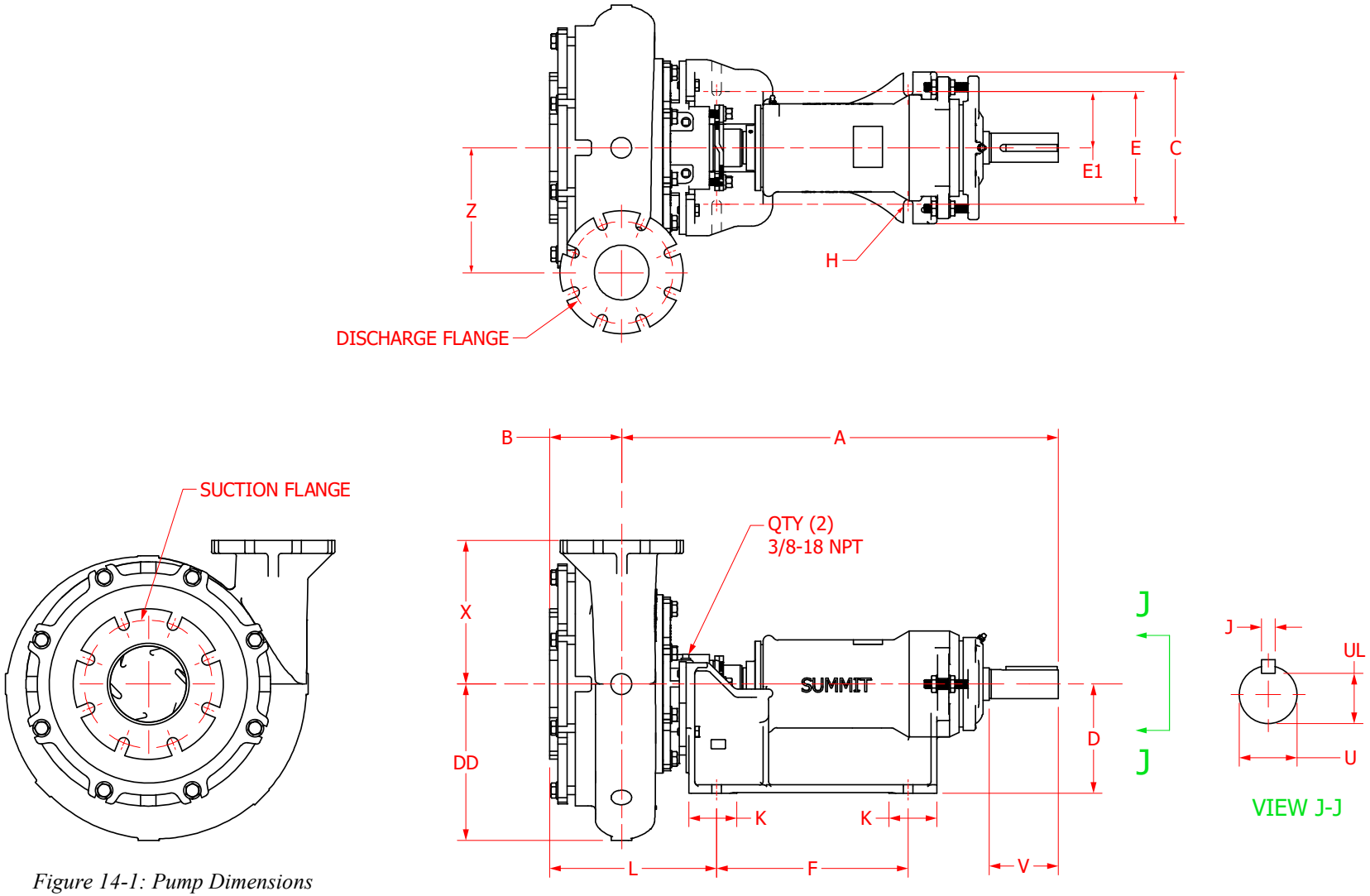


Figure 14-1: Pump Dimensions

Table 14-1: Pump Dimensions (Dimensions are in inches)

Frame Size	Pump Size	A	B	X	Z	DD	L	Frame Mounting						
								D	E	E_1	F	C	K	ØH
1	1x1.5-8	28.00	3.00	6.25	4.44	5 3/4	9.25	6.00	8.15	4.08	11.25	10	3 1/4	5/8
	1x1.5-11	28.00	3.00	7.00	5.88	6 1/4	9.25	6.00	8.15	4.08	11.25	10	3 1/4	5/8
	1.5x2-8	28.00	3.50	6.50	5.00	6 3/8	9.75	6.00	8.15	4.08	11.25	10	3 1/4	5/8
	1.5x2-11	28.00	3.50	7.50	6.44	7 7/8	9.75	6.00	8.15	4.08	11.25	10	3 1/4	5/8
	2x3-8	28.00	4.00	6.88	5.13	6 3/4	10.25	6.00	8.15	4.08	11.25	10	3 1/4	5/8
	2x3-11	28.00	4.00	8.00	6.56	8 1/4	10.25	6.00	8.15	4.08	11.25	10	3 1/4	5/8
2	1.5x2-14	28.00	3.50	8.25	7.88	9 3/8	9.75	7.00	8.25	4.13	11.25	9 7/8	3 1/2	5/8
	2x3-14	28.00	4.00	9.00	8.06	9	10.25	7.00	8.25	4.13	11.25	9 7/8	3 1/2	5/8
	3x4-11	28.00	4.75	8.63	6.88	7 15/16	11.00	7.00	8.25	4.13	11.25	9 7/8	3 1/2	5/8
3	3x4-14	32.00	4.75	9.25	8.38	10 5/8	11.75	8.00	8.25	4.13	14.00	11	3 1/2	5/8
	4x6-14	32.00	5.25	10.50	9.13	11 5/8	12.25	8.00	8.25	4.13	14.00	11	3 1/2	5/8
	6x6-14LS	32.75	5.63	12.50	9.50	13 5/8	13.38	8.00	8.25	4.13	14.00	11	3 1/2	5/8
4	6x6-14HS	42.13	5.63	12.50	9.50	13 1/4	13.38	9.00	8.25	4.13	17.00	11	4 1/4	5/8
	8x10-18	36.75	9.63	16.50	13.00	18.00	17.63	9.00	8.25	4.13	17.00	11	4 1/4	5/8
5	10x12-22	40.99	9.63	20.00	17.00	21 7/8	17.88	11.50	10.50	5.25	19.25	13	4 1/2	3/4

Table 14-2: Pump Dimensions cont. (Dimensions are in inches)

Frame Size	Pump Size	Pump Shaft				Suction Flange				Discharge Flange			
		ØU	UL	J	V	Nominal	OD	Bolt Circle	Slots QTY:WIDTH	Nominal	OD	Bolt Circle	Slots QTY:WIDTH
1	1x1.5-8	1.38	1.19	0.31	4.63	1 1/2	5	3 7/8	4 : 5/8	1	4 1/4	3 1/8	4 : 5/8
	1x1.5-11	1.38	1.19	0.31	4.63	1 1/2	5	3 7/8	4 : 5/8	1	4 1/4	3 1/8	4 : 5/8
	1.5x2-8	1.38	1.19	0.31	4.63	2	6	4 3/4	4 : 3/4	1 1/2	5	3 7/8	4 : 5/8
	1.5x2-11	1.38	1.19	0.31	4.63	2	6	4 3/4	4 : 3/4	1 1/2	5	3 7/8	4 : 5/8
	2x3-8	1.38	1.19	0.31	4.63	3	7 1/2	6	4 : 3/4	2	6	4 3/4	4 : 3/4
	2x3-11	1.38	1.19	0.31	4.63	3	7 1/2	6	4 : 3/4	2	6	4 3/4	4 : 3/4
2	1.5x2-14	1.63	1.41	0.38	4.03	2	6	4 3/4	4 : 3/4	1 1/2	5	3 7/8	4 : 5/8
	2x3-14	1.63	1.41	0.38	4.03	3	7 1/2	6	4 : 3/4	2	6	4 3/4	4 : 3/4
	3x4-11	1.63	1.41	0.38	4.03	4	9	7 1/2	8 : 3/4	3	7 1/2	6	4 : 3/4
3	3x4-14	2.13	1.85	0.50	5.00	4	9	7 1/2	8 : 3/4	3	7 1/2	6	4 : 3/4
	4x6-14	2.13	1.85	0.50	5.00	6	11	9 1/2	8 : 7/8	4	9	7 1/2	8 : 3/4
	6x6-14LS	2.13	1.85	0.50	5.00	6	11	9 1/2	8 : 7/8	6	11	9 1/2	8 : 7/8
4	6x6-14HS	2.63	2.26	0.63	5.81	6	11	9 1/2	8 : 7/8	6	11	9 1/2	8 : 7/8
	8x10-18	2.63	2.26	0.63	5.81	10	16	14 1/4	12 : 1	8	13 1/2	11 3/4	8: 7/8
5	10x12-22	3.00	2.57	0.75	6.50	12	19	17	12 : 1	10	16	14 1/4	12 : 1

14.2 STUFFING BOX

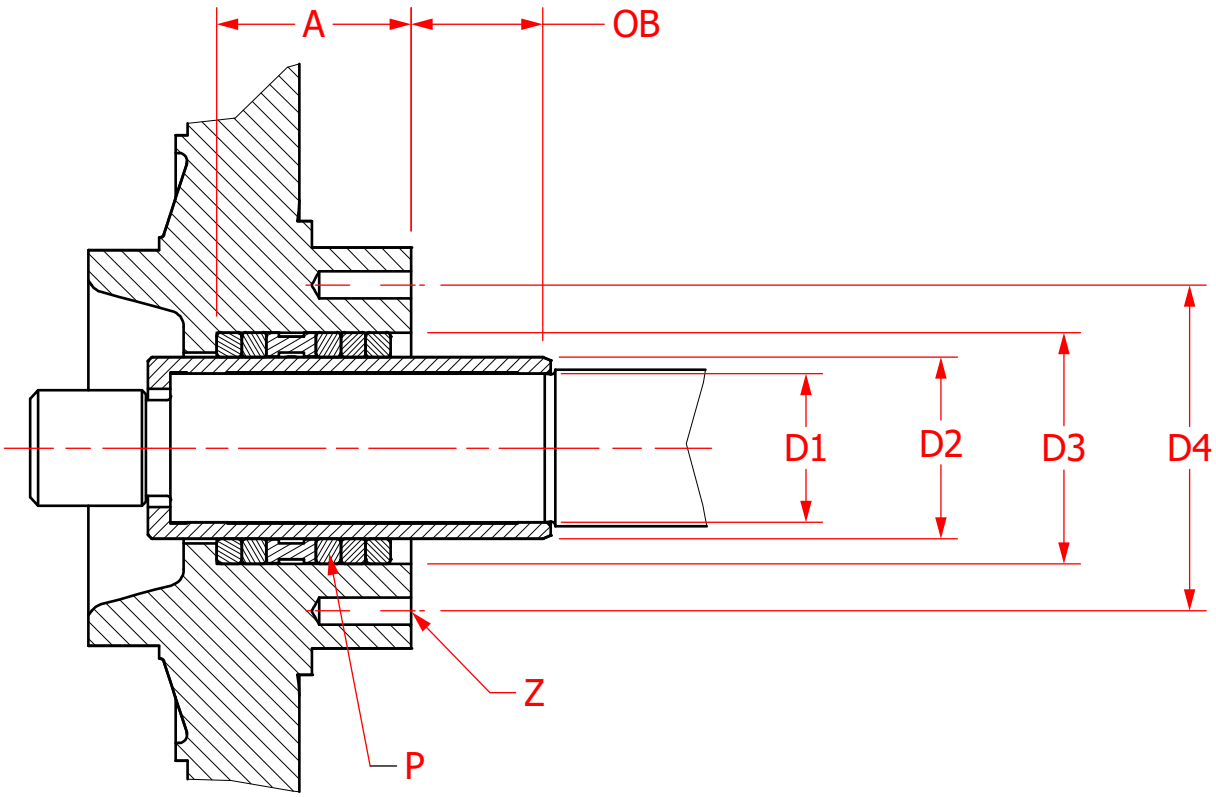


Figure 14-2: Stuffing Box Dimensions

Table 14-3: Stuffing Box Dimensions

Frame Size	D1	D2	D3	D4	A	OB	P	Z
1	1.437	1.875	2.625	4.000	2.938	2 1/8	QTY (5) 3/8"	QTY (2) 3/8"-16
2	1.750	2.125	2.875	4.375	2.938	2 1/4	QTY (5) 3/8"	QTY (2) 1/2"-13
3	2.250	2.750	3.500	5.000	2.938	2 1/4	QTY (5) 3/8"	QTY (2) 1/2"-13
4	2.875	3.375	4.375	5.500	3.500	2 7/8	QTY (5) 1/2"	QTY (2) 1/2"-13
5	3.437	4.125	5.375	7.125	4.500	3	QTY (5) 5/8"	QTY (2) 5/8"-11

NOTE: "OB" TO BE USED AS MINIMUM FOR MECHANICAL SEALS

15 PUMP INFORMATION

Purchase Date: _____

Purchase Order: _____

Serial Number: _____

Equipment Number: _____

PO Box 12145 Green Bay, WI 54307
www.summitpump.com

Rev. 03/2025