

SUMMIT™

SN

Installation, Operation, and Maintenance Manual Model: SN Self-Priming, Non-Clogging Centrifugal Pump



Self-Priming Non-Clogging



SUMMIT™
PUMP, Inc

www.SUMMITPUMP.com

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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.

SUMMIT PUMP, INC. Green Bay, WI

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 this manual.

The equipment is not for use in or with any nuclear facility or fire sprinkler system. Buyer accepts the responsibility for insuring 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.

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2 INTRODUCTION

This pump is a centrifugal, self-priming, non-clogging pump with a semi open impeller. It is designed to pump liquids, i.e. water, mild corrosive slurries including solids up to 3” diameter.

It is imperative to your safety, and the safety of others, that the pump be used only in applications for which it has been designed. If you have any questions regarding a specific application, call Summit Pump, Inc at (920) 869-4800. It is equally as important that the pump is operated according to this manual and all personnel in contact with this pump fully understand it.

For information or technical assistance on the power source, contact the power source manufacturer’s local dealer or representative.

2.1 SAFETY

The following messages are used throughout this manual to alert maintenance and operating 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.

3 RECEIPT AND STORAGE

3.1 LIFTING

WARNING

Inspect all lifting equipment and rigging before lifting pump. Rig the pump securely ensuring a proper safety factor. Refer to **Table 3-1** for pump weights

Table 3-1

Pump Size	Approximate Weight in Lbs
2"	292
3"	432
4"	664
6"	934
8"	1710
10"	1750

3.2 RECEIVING THE PUMP

Immediately upon arrival, carefully inspect the pump for evidence of damage during transit. Locate, read and understand the following tags:

CAUTION

Do not use for pumping explosive or corrosive liquids. Read and understand the operation manual. To obtain a copy of the manual call (920) 869-4800. Check the following before startup:

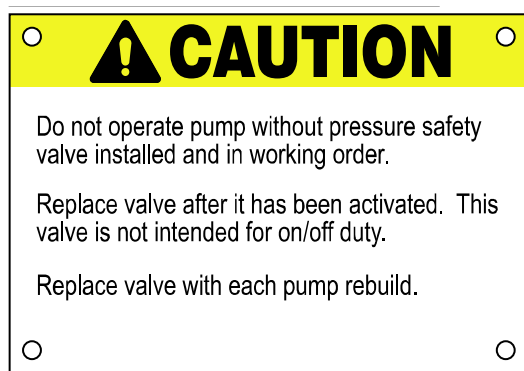
- Motor rotation agrees with pump rotation.
- Pump is lubricated.
- Guards are securely in place.
- Priming chamber is filled with liquid.
- Suction valve is open.
- Discharge line is properly vented.

CAUTION

Contents may be hot and/or pressurized. Check the following before servicing:

- Power source is disconnected or locked out.
- Pump and liquid have cooled to room temperature.
- Suction valve is closed.
- Discharge valve is closed.

Remove drain plug cautiously before opening pump.

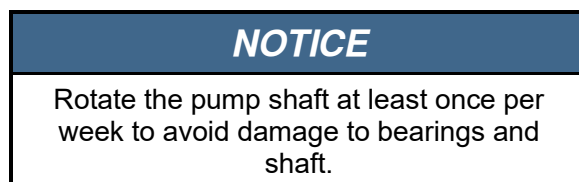


SUMMIT PUMP, Inc ™		
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SERIAL NUMBER		PUMP NUMBER
SIZE	MATL CODE	IMP DIA
SEAL TYPE		SEAL MATL
MODEL SN		
SELF-PRIMING, NON-CLOGGING CENTRIFUGAL PUMP		

Immediately report any damage or missing tags to your Summit Distributor.

3.3 STORING THE PUMP

Store the pump in a clean dry place. **Do not remove piping connection covers.** If the pump has been used prior to storage, be sure to drain the casing.



Rotate the pump shaft at least once per week to maintain a protective film of oil on bearings and seals. Gaskets can dry out and become brittle over time. Check all joints with gaskets before putting pump in service. If you anticipate long-term storage, special treatment is available for purchase from Summit Pump, Inc.

4 INSTALLATION

DANGER

Do not operate without proper guards and other safety devices in place.

4.1 LOCATION

Locate the pump as close to the liquid supply as practical. This pump is designed to operate with a negative suction supply, but also has the ability to operate with a positive suction supply. The suction pressure must never exceed 50% of the maximum pressure published on the pump curve.

CAUTION

Suction pressure must never exceed 50% of the maximum pressure published on the pump curve.

Locate the pump for accessibility. The pump requires clearance in front of the back cover to permit removal of the cover and easy access to the pump for cleaning and service. See Appendix A – Pump Drawings.

4.2 FOUNDATION

Use a foundation that is sufficient to support pump and driver. It is recommended that the foundation mass be five times the equipment mass.

4.3 PIPING

Pipe or hose can be utilized for suction and discharge lines. Line material must be compatible with the liquid being pumped and able withstand the maximum pressure in the system plus a conservative safety factor. If hose is used on the suction side it must be rigid wall, reinforced type to prevent collapse when pump is operating.

All piping must be independently supported and accurately aligned to the pump flanges. Never use force to align piping to the pump flanges.

CAUTION

Never use force to align piping to the pump flanges

Whenever practical, run the system piping from the pump.

Table 4-1

Pump Size	Max Solid
2	1.5"
3	2.5"
4	3"
6	
8	
10	

Piping should be as short and straight as possible, while minimizing fittings which increase friction losses. Suction line size must be the same size of the pump suction flange. If a reducer is used, it should be the eccentric type, and installed with the flat portion on top. The suction line should slope up to the suction flange to help reduce air pockets.

Piping placed in a sump should be positioned away from any wall by a distance of at least 1.5 times the diameter of the suction line. The submergence of the end of the suction line is vital to efficient pump operation. Recommended submergence is shown in Figure 4-1.

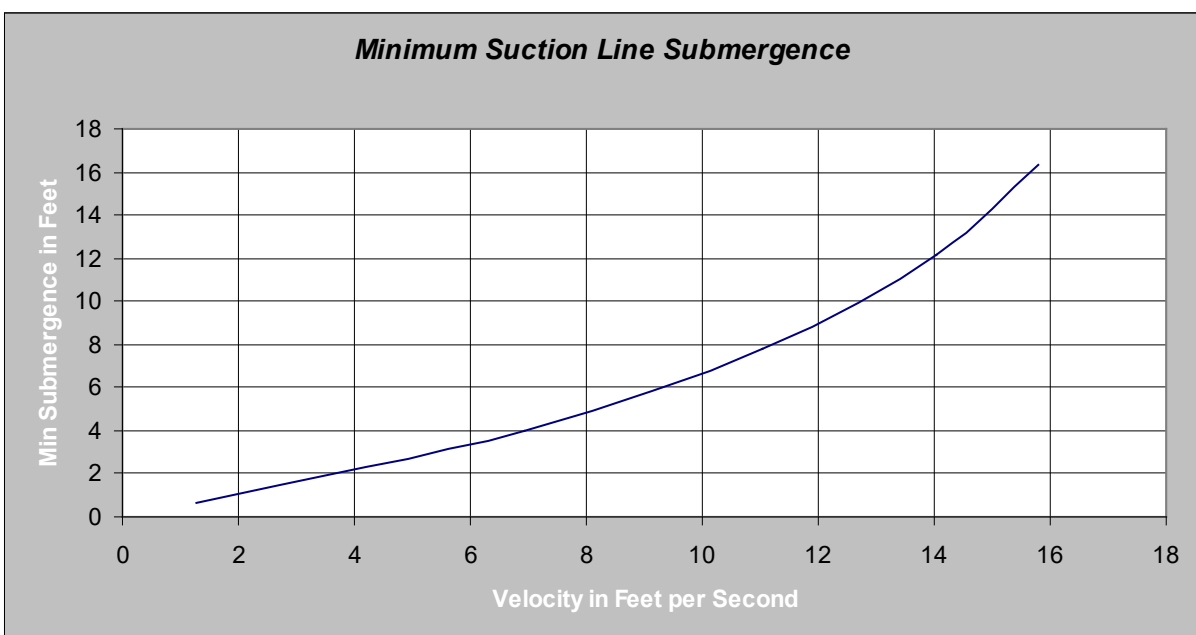


Figure 4-1

$$\text{Velocity in feet per second} = \frac{\text{Flow rate in GPM} \times .4085}{(\text{Diameter in inches})^2}$$

The discharge line should include a valve that can be used to throttle and shutoff flow. The size of this valve should be equal to the size of the largest discharge line. A check valve in the system should be installed to prevent excessive shock pressure and reverse rotation flow which could cause pump damage.

⚠ CAUTION

A valve should never be used to throttle the suction line

4.4 BYPASS LINE

⚠ WARNING

Do not operate pump with a closed valve other than the AARV (Automatic Air Release Valve) in the bypass line. Doing so may result in an unsuccessful prime and possible explosion.

A bypass line is needed when a check valve is in the discharge line. During the priming cycle, air in the suction piping side must be vented to the atmosphere. If a check valve is installed in the discharge line, the discharge side of the pump must be opened to vent the air in the system. The pump will not prime if there is sufficient static head to keep the discharge check valve closed.

The bypass line should be at least 1 inch diameter to minimize plugging yet small enough to prevent significantly impacting pump performance.

⚠ CAUTION

Bypass line must discharge into intake reservoir or appropriate vessel to avoid a hazardous spill

NOTICE

Bypass line discharge into intake reservoir should be secured and far enough from pump intake to avoid cavitation.

In applications with less than 30 feet of discharge head, the bypass line should run back to the wet well. Locate discharge end 6 to 8 inches below the minimum liquid level of the sump.

In applications with more than 30 feet of discharge head a significant amount of liquid could be bypassed. This will negatively impact pump efficiency. To improve this condition an automatic air release valve should be installed in the bypass line. See section *Automatic Air Release Valve*.

4.5 AUTOMATIC AIR RELEASE VALVE (AARV)

The AARV is designed to allow ventilation of air during the priming cycle. Once the pump is primed and pumping liquid, the AARV will close due to the discharge pressure generated by the pump. A small amount of liquid (1 to 5 gallons per minute) will still bypass when the valve is in the closed position. Each AARV size must be chosen and adjusted for its specific application.

⚠ WARNING

Each AARV must be sized and adjusted for its specific application

The AARV is installed in the discharge line between the discharge flange and inlet side of the check valve as shown in Figure 4-2. The inlet must be installed below the center line of the AARV. The discharge of the valve must be safely directed back to the sump using an appropriate piping. The bleed line must slope towards the sump or vessel and be one inch or larger in size.

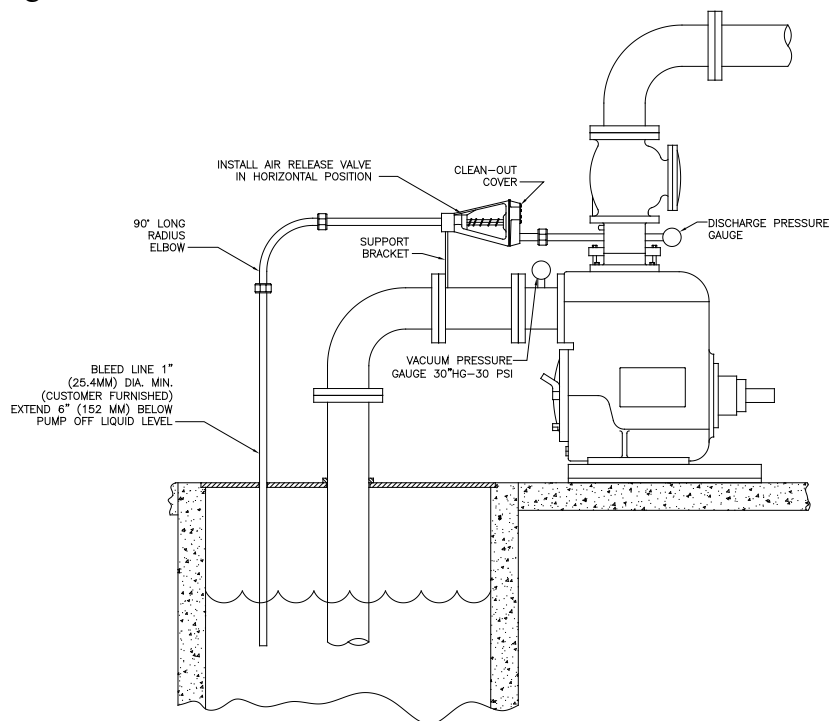


Figure 4-2

4.6 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 aligned prior to shipment. Shipping and handling may cause misalignment. Units must be checked prior to operation.

Pump rotation is clockwise when viewed from driven end of the pump

4.7 *DIRECT COUPLED PUMP*

1. Use flexible spacer couplings to achieve proper alignment.
2. Check and adjust the parallel and angular alignment to within .005 inches prior to connecting the coupling halves.
3. Check that driver rotation agrees with pump rotation. The pump shaft rotation should be clockwise when viewed from the drive end.
4. Install a coupling guard when alignment is complete.

4.8 *BELT DRIVEN PUMP*

Locate driver shaft parallel to pump shaft. Aline the sheaves and belt tensioner to properly set up V-belts.

⚠ CAUTION

A solid shaft must be used in all engine-driven applications. ***Note: Solid shafts require an extra spacer.***

5 ASSEMBLY PROCEDURES

5.1 ROTATING ASSEMBLY

(See Appendix A & B for Cross-Section of pump, rotating assembly and cartridge mechanical seal)

To assemble a rotating assembly:

1. Clean the disassembled bearing housing (199);
2. Secure the bearing frame to bench or holding stand;
3. Install vent, oil and cavity plugs (409, 414, 415, 416);
4. Install sight glass (319)
5. Install outboard bearing (118) on shaft (106) retaining ring towards end of shaft;
6. Install inboard bearing (116) on shaft (106);
7. Install outboard lip seal (149) in bearing cap (237);
8. Install inboard lip seal (147) in bearing housing (199);
9. Slide shaft bearing assembly into bearing housing (199) from drive end of frame until outboard bearing retaining ring is in its groove in frame;
10. Slide bearing cap (237) and gasket (601) over shaft (106);
11. Insert bearing cap bolts through cap (237) and gasket (601).
12. Install shaft o-ring (412).
13. Slide gasket (606) and back seal plate (184) over impeller end of shaft;
14. Install bolt (377) and lock washer (344) into bearing frame (199) and back seal plate (184) and tighten;
15. To install mechanical seal (189), install the sleeve o-ring (412) to the step of shaft (106). Lubricate stationary seat o-ring with P-80 Thix rubber lubricant gel. Using the recommended oil noted in the "Lubrication" section on page 18, place one drop of oil at the 90° location, and one drop at the 270° location, on one of the seal faces.
 - a. For a cartridge mechanical seal. Install complete seal on shaft.
 - b. For a component mechanical seal, install stationary seal of mechanical seal into seal plate (184). Slide rotary portion of mechanical seal over the end of shaft (106).
16. Install impeller shim(s) (450) over shaft (106) and between impeller (102) and mechanical seal assembly (189).
17. Screw on and lock down impeller (102) onto shaft (106).
18. Measure space between impeller (102) and seal plate (184). Correct clearance is 0.025-inches to 0.040 inches. If not within range, remove impeller (102) and add or subtract from shim stack (450). Repeat step 16 and 17;
19. When impeller (102) to seal plate (184) clearance is correct, install impeller washer (345) and impeller bolt (379) and tighten. Rotating assembly is now complete and ready for installing in pump or storing as spare.

5.2 FRONT COVER AND WEAR PLATE ASSEMBLY

5.2.1 SN03A, SN04A, SN06A, SN08A

To inspect and assemble a front cover and wear plate assembly:

1. Remove front cover hand nuts (377) and front cover assembly (260).
2. Make sure front cover plate assembly (260) and wear plate (205) are inspected and clean.
3. If either are damaged or worn, replace by removing wear plate nuts (340) and washers (341), and then installing new components.
4. Replace cover O-ring (496).
5. Install cover plate assembly (260) back into casing (100) and tighten hand nuts (377).
6. The pump is now ready to accept the rotating assembly

5.2.2 SN10A SUCTION HEAD ASSEMBLY

To assemble a SN10A head assembly:

1. Install the suction head gasket (square suction ring). Use silicone grease to aid holding gasket in place;
2. Use a lifting device and sling to hold suction casing in place;
3. Insert the two large suction to casing bolts in the twelve and six-o-clock positions. Tighten the bolts, being careful that the gasket stays in place. Insert the four smaller suction to casing bolts and tighten;
4. The pump is now ready to accept the rotating assembly.

5.3 INSTALLING ROTATING ASSEMBLY

NOTICE

Ensure rotating assembly is filled with proper oil, SAE 30 (non-detergent)

⚠ WARNING

Use suitable hoist and rigging to hoist assembly

To install a rotating assembly:

1. Screw adjusting screws (451) into casing;
2. Install new O-rings (496 & 498) on assembly (103),
3. Slide rotating assembly (103) into the casing (100);
4. Insert the bearing housing to casing bolts (370) into the bearing housing (199), tighten until impeller (102) rubs on front wear plate (205);
5. Refer to the impeller clearance section; follow steps 8 through 15 to adjust impeller (102) clearance.

6 IMPELLER CLEARANCE

Impeller clearance is the measurement between the impeller (102) and the wear plate (205). This clearance is set at .013 inches during assembly but may need to be adjusted before initial startup.

NOTICE

Check impeller clearance prior to starting the pump. Settings may have changed during transportation

6.1 PROCEDURE TO SET IMPELLER CLEARANCE

(See Appendix A for cross section of corresponding model)

DANGER

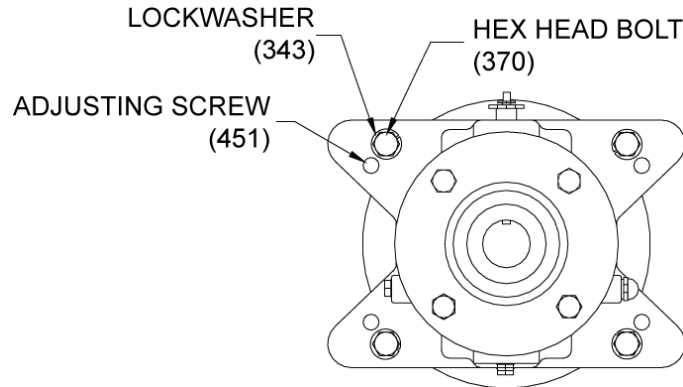
Electricity can cause electric shock. Lockout and power prior to working on pump

WARNING

Allow pump to cool before any maintenance work or disassembly. Operation could create enough heat to cause serious burns.

1. Lockout power to the pump motor.
2. Allow pump to cool if it has been operating.
3. Close the suction and discharge valves.
4. Remove the casing drain plug (510).
5. Remove priming cover clamp bar (269).
6. Loosen priming cover (604).
7. Allow pump to drain if it has been operating.
8. Remove 4 hex head bolts (370) and then remove the lock washers (343). Reinsert the hex head bolts (370) into their holes.
9. Slowly turn the 4 adjusting screws (451) into the casing in a crisscross pattern.
10. Use the hex head bolts (370) minus the lock washers (343) to move the rotating element until the impeller comes in contact with the wear plate (205).
11. Loosen the 4 hex head bolts (370) until a .010 - .015 feeler gauge can be inserted against the bearing housing (199) hex head bolts (370). For SNU B-version, 0.003-0.010 feeler gauge for impeller clearance with wear plate.
12. Turn the 4 adjusting screws (451) out of the casing until they are tight against the bearing housing (199).
13. Remove the 4 hex head bolts (370) and add the lock washers (343).

14. Reinstall the 4 hex head bolts (370) and tighten in a crisscross pattern to 60 ft·lbs (lubed) or 88 ft·lbs (dry).



15. Turn the pump shaft 360 degrees to check for rubbing/binding. If there is binding, repeat steps 8 thru 15. If there is no rubbing /binding the impeller clearance is correct
16. Reinstall the casing drain plug (510). Reinstall the priming cover (604) then insert the clamp bar (269) and tighten the flap valve pin (372).

7 OPERATION

DANGER

Never operate pump outside its design region. Death or severe injury could result

DANGER

Do not pump volatile, highly corrosive or flammable liquids with this pump. Death or severe injury could result.

7.1 PRIMING

Make sure the pump and piping are installed as detailed in this manual. Check all piping joints for tightness and that the pump and driver are secured.

CAUTION

Do not operate pump without liquid in the casing

Pump should never be operated with an empty casing. The pump casing is filled by removing the fill cover (604), loosening the hand screw (267), swing the clamp bar (269) away, removing the cover plate, and filling the casing with pumpage or compatible


liquid. Replace the cover, swing the clamp bar into the closed position, and tighten the clamp screw.


The liquid level in the casing should be checked when:

1. The pump is first put into service.
2. The pump has not been in service for an extended time period.
3. The liquid has had a chance to evaporate.

The pump will prime and re-prime as necessary only if the casing remains full.

7.2 STARTING

 DANGER
Install all guards which comply with ASME B15.1.

 WARNING
Read and understand the operation manual supplied by the driver.

NOTICE
Shaft rotation is clockwise when viewed from the drive end

7.3 LINES WITH A BYPASS

If an automatic air release valve (AARV) has been installed it will automatically open allowing air to be evacuated out of the suction line and the pump to prime. It will automatically close after prime is complete. A small amount of liquid (1 to 5 gallons per minute) will continue to be bypassed during regular operation.

If an AARV has not been installed, air from the suction line will be discharged through the bypass line. Liquid will continue to circulate through the bypass line during regular operation.

See the section “BYPASS LINE” for complete instructions.

7.4 LINES WITHOUT A BYPASS

⚠ WARNING

Do not attempt to prime without properly ventilating the discharge line. Pressure against a check valve can prevent ventilation and cause an explosion

Open all valves in the discharge line and start the driver. Priming will be indicated by a positive pressure reading on the discharge gauge. The pump will not prime until the air has been evacuated and the suction line is filled with liquid.

Shut down the driver if the pump fails to prime within five minutes. Check for clogs and leaks in the suction line.

When the pump has primed, partially close the discharge throttling valve. This step will fill the line slowly guarding against excess shock pressure. When line is full, adjust valve to required flow.

⚠ DANGER

Do not operate pump against a closed discharge valve. Doing so may cause the pump to explode

⚠ CAUTION

Do not stop the pump suddenly

7.5 LIQUID TEMPERATURE

The maximum liquid temperature for this pump is 160° F. The temperature of a liquid can increase due to the pumping action. The liquid temperature must be monitored to insure it remains below 160° F at the discharge of the pump.

This is particularly true when pumping against a closed or restricted discharge or suction valve as in the case of operating on the left side of the performance curve. Also be aware of changes in the ambient temperature of the liquid e.g. seasonal changes.

⚠ CAUTION

Overheated pumps must be allowed to cool prior to servicing. Do not remove any cover plates fittings or gauges. Let pump stand to cool

7.6 BACK FLUSHING

Never back flush the pump with high pressure air or steam. The high pressure could damage the pump and result in personal injury. Never use more than 50% of the maximum operating pressure indicated on the pump curve during back flushing.

NOTICE

Do not exceed 50% of the maximum operating pressure during back flushing

7.7 SHUTDOWN

CAUTION

Do not stop the pump suddenly

Do not stop the pump suddenly; the resulting hammer or shock wave is transmitted across the entire system including the pump. Damage to the system and/or the pump may result. Gradually close the discharge valve before shutting down the driver.

DANGER

Do not operate pump against a closed discharge valve. Doing so may cause the pump to explode

If the pump is engine driven, throttle it slowly and allow it to briefly idle before shutting it down.

DANGER

Electricity can cause electric shock. Lockout and power prior to working on pump

7.8 BEARING TEMPERATURE

CAUTION

Do not check bearing temperature by use of hands. Burns can result.

Do not check bearing temperatures by hand as it is unsafe and inaccurate. Check the temperature with a contact or inferred gun type instrument. 180° F is the maximum temperature for operation. Higher temperatures may be the result of conditions that require attention, such as a damaged bearing, low lubricant level, wrong lubricant, misalignment between pump to driver.

8 LUBRICATION

8.1 MAINTENANCE SCHEDULE

Inspect seal and bearing oil levels weekly and change annually.

8.2 SEAL ASSEMBLY

Prior to starting the pump, remove the vented plug (409) and fill with SAE No. 30 non-detergent oil. The oil level should be just below the plug's tapped hole.

8.3 BEARINGS

Prior to startup fill with the bearing chamber with the recommended lubricant of SAE No. 30 or ISO 100, non-detergent oil (approximate 32oz.) through the fill plug (409) to center of sight glass (319).

Table 8-1

OIL CAPACITY (approximate)		
Pump Size	Seal Chamber	Bearing Chamber
SN02	22oz	32oz
SN03	22oz	
SN04	20oz	
SN06	40oz	
SN08	90oz	
SN10	25oz	

9 DISASSEMBLY PROCEDURES

(See Appendix A for cross section of corresponding model)

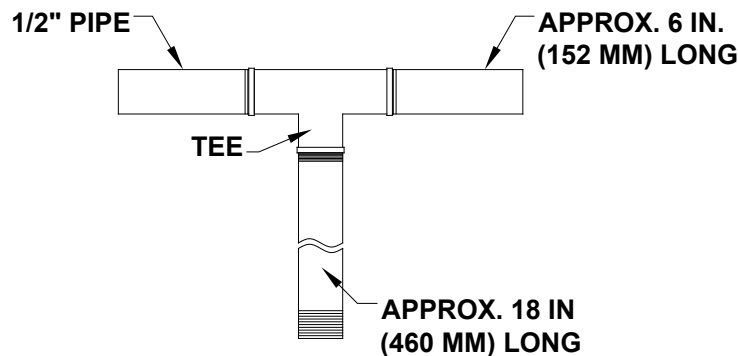
To disassemble a pump:

1. Lock out power supply at motor starter.
2. Close off discharge suction valves.
3. If pumping hot liquid, allow pump to cool.
4. Drain casing and flush as needed (510).
5. Loosen two hand nuts (377) and remove. Pull front cover assembly plate (260) from casing.
6. Loosen wear plate nut (340) and remove wear plate (205). Inspect for wear and replace if necessary.
7. If directly driven, remove coupling and motor. If belt driven, remove belts and sheaves.
8. Drain seal cavity lubricant, remove drain plug (414).
9. Wedge a wooden block between the impeller (102) vanes and casing (100).
Using a strap wrench turn the pump shaft (106) counter clockwise when facing the drive.
10. Remove vent plug (409)

⚠ CAUTION

Use two people or proper lifting equipment for removal of rotating assembly. Assemblies are heavy and not well counter balanced.

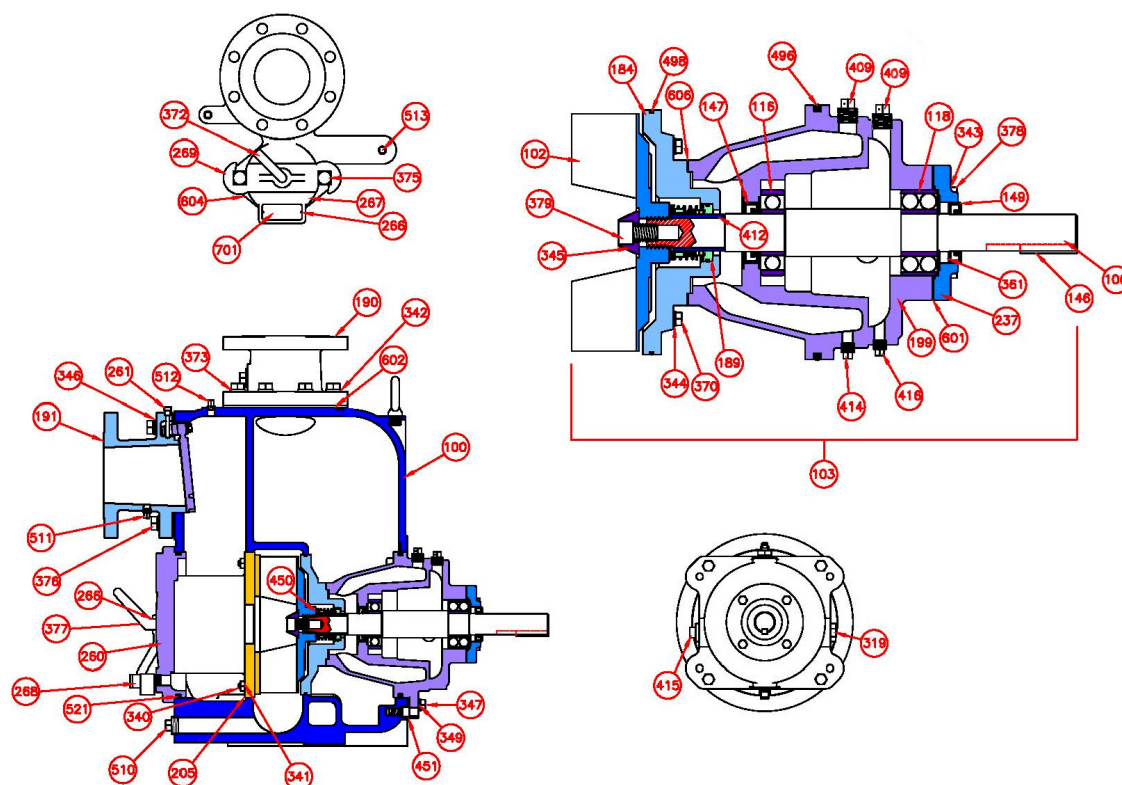
11. Remove the four housing to case bolts (347). Because the rotating assembly (103) is heavy and not well counter balanced, the lifting tool shown below is helpful for 2", 3", 4" and 6" pumps.



12. Remove seal plate gasket (606) and bearing housing o-ring (496).
13. Remove impeller from assembly, loosen and remove impeller socket head screw (379) and impeller washer (345).

14. Remove impeller adjusting shims (450) and record thickness - this will aid in re-assembly.
15. Pull the seal assembly off the shaft, use two stiff wires to pull the stationary element and seat.
16. Remove bearing housing drain plug (416), drain oil.
17. Remove bearing cap (237) and oil seal (149).
18. Slide shaft (106) out of bearing housing (199).
19. Remove radial oil seal (147).
20. Press radial bearing (116) and thrust bearing (118) off from shaft.
21. Clean bearing housing (199) and bearing cup (237).
22. Inspect all parts removed, replace as required.

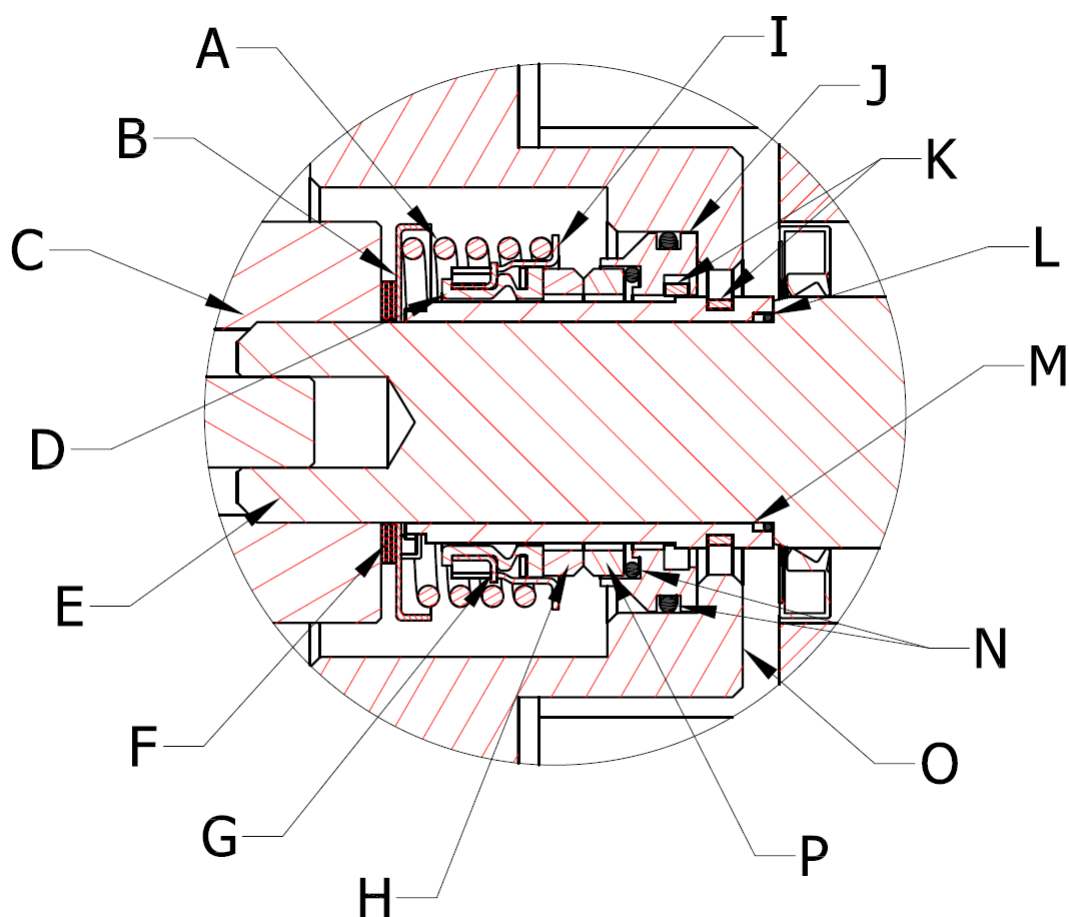
10 APPENDIX A – PUMP CROSS SECTION AND PARTS LIST



MODEL SN PARTS LIST

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
100	1	CASING	319	1	SIGHT GLASS	409	2	VENTED PLUG
102	1	IMPELLER	340	2	NUT, WEAR PLATE	412	1	O-RING, SLEEVE
103	1	ROTATING ASSY	341	2	WASHER, WEAR PLATE	414	1	PLUG, SEAL CAVITY DRAIN
106	1	SHAFT	342	4	WASHER, DISH FLANGE	415	1	PLUG
116	1	BEARING, IB	343	4	LOCKWASHER, OB COVER	416	1	PLUG, BRG HSG DRAIN
118	1	BEARING, OB	344	4	LOCKWASHER, HSG TO SEAL PLATE	450	1	SHIM SET - IMPELLER
126	1	SHAFT SLEEVE	345	1	WASHER, IMPELLER	451	4	ADJUSTING SCREW, ROT ASSY
146	1	COUPLING KEY	346	4	WASHER, SUCT FLANGE	496	1	O-RING, ROT ASSY
147	1	LIP SEAL, IB	347	4	BOLT, HSG TO CASE	498	1	O-RING, SEAL PLATE
149	1	LIP SEAL, OB	349	4	WASHER, HSG TO CASE	510	1	PLUG, CASING DRAIN
184	1	SEAL PLATE	361	1	RETAINING RING, OB	511	1	PLUG, SUCT FLG
189	1	SEAL ASSEMBLY WITH SLEEVE	370	4	BOLT - HSG TO SEAL PLATE	512	1	PLUG, VENT
190	1	DISCHARGE FLG - STD - FLANGED	372	1	CLAMP BAR SCREW	513	1	PLUG, VENT
191	1	SUCTION FLG- STD - FLANGED	373	4	BOLT, DISH FLANGE	521	1	O-RING, COVER TO CASE
192	1	DISCHARGE FLG - OPTION - THREADED	374	4	DRIVE SCREW, WARNING PLATE	601	1	GASKET - BRG CAP
193	1	SUCTION FLG - OPTION - THREADED	375	2	BOLT, PRIMING COVER	602	1	GASKET - DISCHARGE FLG
199	1	BEARING HOUSING	376	4	BOLT, SUCTION FLANGE	603	1	GASKET - PRIMING COVER
205	1	WEAR PLATE	377	2	HAND NUT, FRONT COVER	604	1	COVER, PRIMING WITH WARNING PLATE
237	1	BEARING CAP	378	4	BOLT, OB COVER TO HSG	606	1	GASKET, SEAL PLATE
260	1	COVER PLATE ASSY	379	1	BOLT, IMPELLER	700	1	WARNING PLATE, FRONT COVER
261	1	FLAPPER VALVE ASSY	380	1	HANDLE, FRONT COVER	701	1	WARNING PLATE, PRIMING COVER
266	4	DRIVE SCREW - WARNING PLATE	381	2	BOLT, HANDLE TO FRONT COVER			
267	1	PRIMING COVER	382	2	WASHER, HANDLE TO FRONT COVER			
268	1	RELIEF VALVE	407	1	BUSHING, REDUCING - VENT			
269	1	CLAMP BAR, PRIMING COVER	408	1	AIR VENT			

APPENDIX B – CARTRIDGE MECHANICAL SEAL CROSS SECTION



MECHANICAL SEAL PARTS LIST			
ITEM	DESCRIPTION	ITEM	DESCRIPTION
A	SPRING	I	RETAINER
B	SPRING CENTERING WASHER	J	STATIONARY SEAT
C	IMPELLER	K	SHEAR RING (SHEARED)
D	BELLOWS	L	SLEEVE O-RING
E	IMPELLER SHAFT	M	INTEGRAL SHAFT SLEEVE
F	IMPELLER SHIMS	N	O-RINGS
G	DRIVE BAND	O	SEAL PLATE
H	ROTATING ELEMENT	P	STATIONARY ELEMENT

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11 PUMP INFORMATION

Purchase Date: _____

Purchase Order#: _____

Serial Number: _____

Equipment Number: _____

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