Installation, Operation and Maintenance Manual

SPT/SPU Series Self-Priming Non-Clog Centrifugal Pump

SPT PUMP

SPU PUMP

ROTECH
Pumps & Systems Inc

"A Trusted Partner in Pump Solutions"

WARRANTY

Rotech Pumps

Pumps manufactured & assembled by Rotech covered by warranty for free of manufacturing defects for a period not exceeding twelve months from the date of shipment from our Plant/warehouse. This warranty will be limited and subject to Rotech authorisation/approval.

Rotech will make good by repair or its option the replacement of faulty parts under warranty, providing always that:

(a) The equipment was correctly installed and properly used in accordance with Rotech Installation & Operating instruction manual and accepted codes of good engineering practice.
(b) The claims for goods under warranty arise solely from faulty design, material or workmanship. Rotech products don't offer warranty or gaurantee for any pump applications. The customer can consult consuling engineers before purchase of pumps.
(c) The repair is carried on in the Rotech service department or by an authorized agent or distubor appointed by Rotech. Authorized repair agent must obtain written approval (WRA#) from Rotech before Completing repair under warranty.
(d) Authorized repair agents will be refunded with the amount of equivalent to a similar repair work in the Rotech service department.
(e) All freight costs to and from the service department or repair agents to be paid by the purchaser.

In the case of equipment or components which are not manufactured by Rotech, but supplied by Rotech, for example: Electric motors, engines, trade accessories etc. The warranty is limited of such equipment and subject to respective manufacturers.

Rotech Pumps warranty doesn't cover any of the following:

(a) Claims for third party liability, labor cost, transportation cost or damage caused by failure of any of the company's products.
(b) Damage caused by abnormal operating conditions, war, violence, storm, cataclysm or any other force.
(c) Damage caused by the equipment being used for an application for which it is not recommended.
(d) Damage caused by sand or abrasive materials, corrosion due to acid waters, electrolytic action, liquid temperature beyond the recommended range, cavitation, improper supply voltage or insufficient liquid to enable the pump to specification.

The decision of Rotech in relation to any claims or disputes over warranty is final.

This warranty is in lieu of all other warranties and conditions expressed or limited written or oral, statutory to the extent allowable by law or otherwise, which are hereby negated and excluded.

Limited Liability

Rotech shall not be liable for any damage, delays or personal injury caused by following improper or proper procedure of installation and maintenance of equipment being supplied by Rotech.

The pump and other equipment supplied by Rotech based on customer specification. Rotech can't be liable the installation of pump and equipment in any hazardous environment. Customer has to consult engineers before purchasing for proper pump application.

CONTENTS

1. INTRODUCTION

SPT and SPU model self priming Trash pumps are designed for economical and trouble free operation in handling solid-laden liquids and slurries. Pumps are able to handle up to 75mm (3") spherical solids depending upon model size. Incase if pump shaft or bearing needs to be replaced, the entire rotating assembly can be removed without disturbing pump casing or pipe lines.

SAFETY

The following symbols are used for the protection and safety of both personnel and equipment.

⚠ WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in property damage.

2. RECEIPT AND STORAGE

RECEIVING AND HANDLING OF PUMP

Immediately after receipt of pump, please check following:

Check Name plate details on pump.

Please check name plate details on which Pump Model number, Size of pump, Flow, Head, Serial number, HP of Motor, RPM and compared with Purchase order just to make sure you have received right pump against order to avoid any issue.

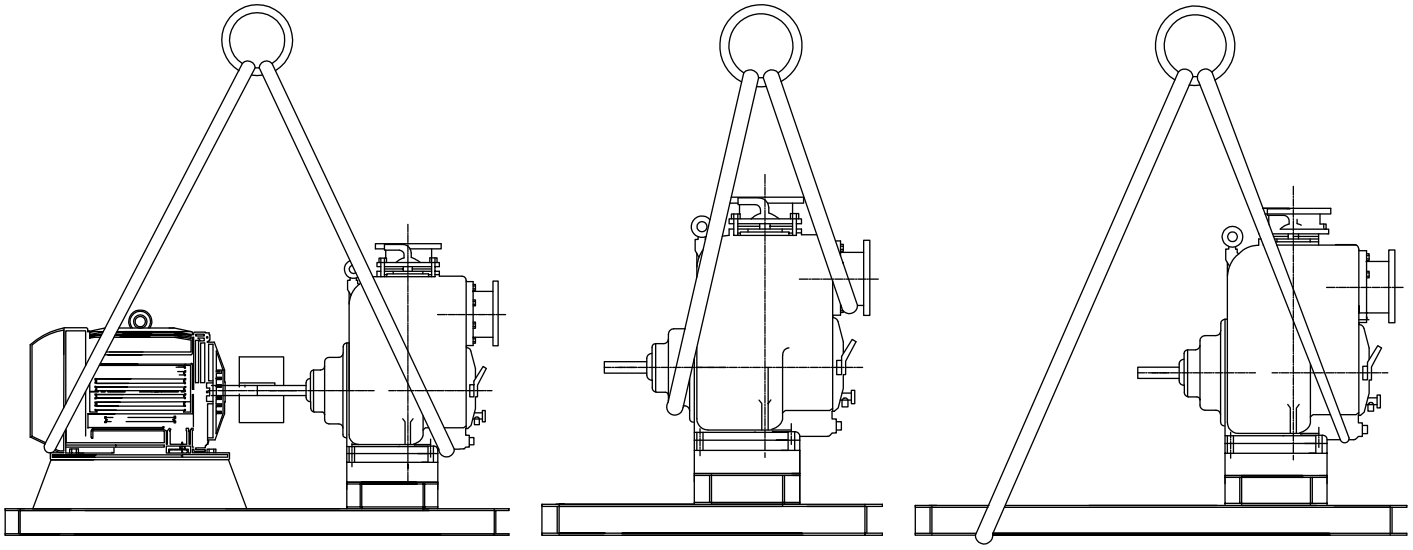
Check pump crate and pump & other equipment is in good condition and did not damage in transportation. If there is any damage, immediately report to shipper Rotech Distributor or your supplier.

Use proper procedure unloading pump and equipment from truck

TABLE 1

Pump Size	Weight in LBS
2”	290
3”	434
4”	662
6”	936
8”	1712
10”	1748

Please follow proper handling procedure of the pump as shown in figure below:



RECEIVING AND HANDLING OF PUMP

STORING OF THE PUMP

Store pump in a cool and dry area free from heat, dirt. Do not remove packing if not necessary. Rotate pump shaft at least once a week to maintain protective film of oil or grease on bearings.

If you intend to store for long term, use proper storage treatment for safegaurd of pumps.

3. INSTALLATION

⚠ WARNING

Operation of this pump without gaurds and other safety devices in place could result in severe personal injury.

LOCATION

Locate the pump as near as liquid source/reservoir. This pump is designed to operate with a negative suction supply. Although, it can operate with a positive suction supply.

⚠ CAUTION

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

FOUNDATION

It is recommended that the foundation should be rigid strong and five times the total mass of pump set.

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.

Whenever practical, run the system piping from the pump.

CAUTION

Never use force to align piping to the pump flanges.

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.

TABLE 2

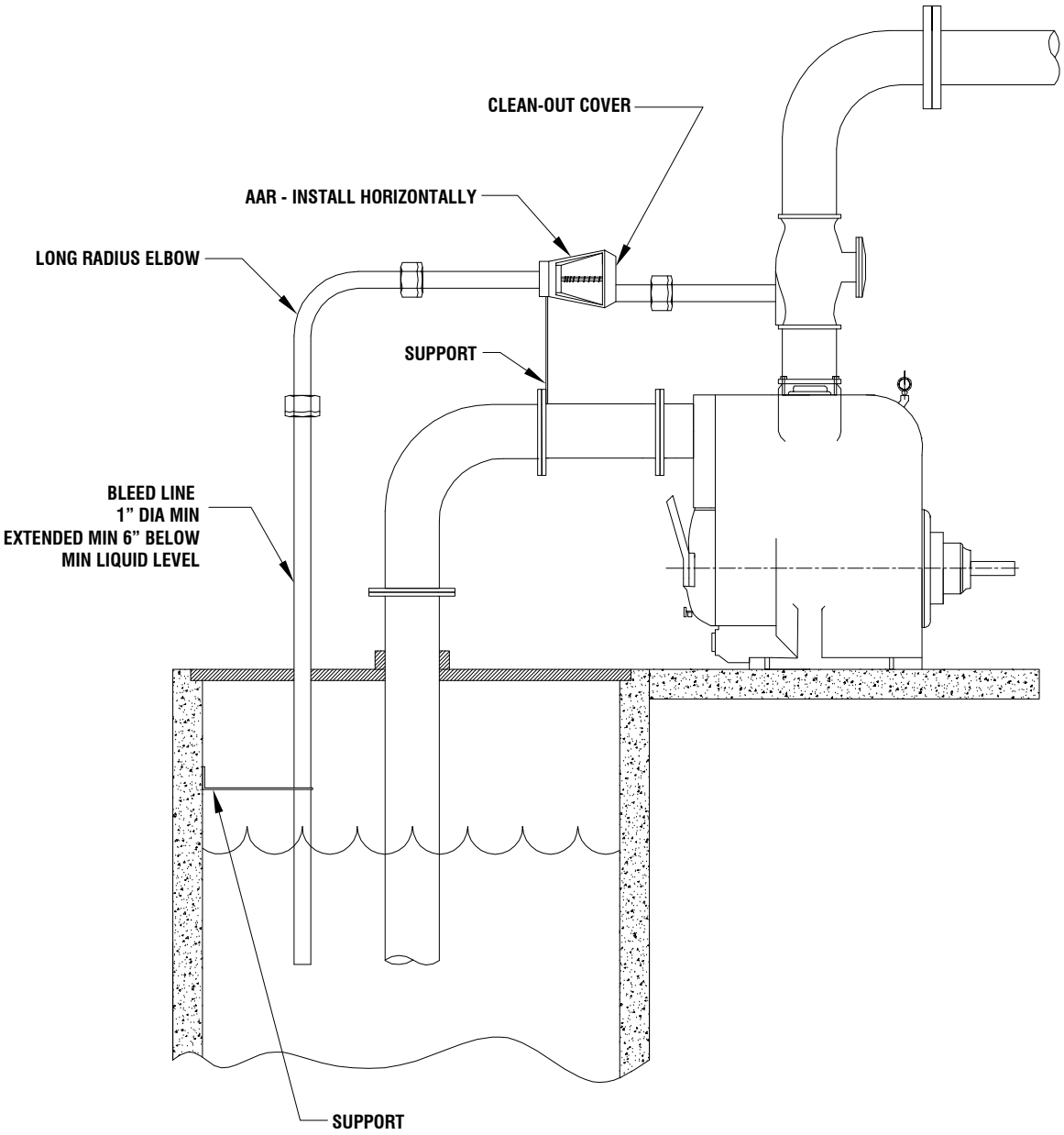
Pump Size	Max Solid
3	2.5”
4, 6, 8 & 10	3”

Piping placed in a sump should be positioned away from any wall by a distance of atleast 1.5 times the diameter of the suction line. The submergence of the end of the suction line is vital to efficient pump operation.

The discharge line should include a valve that can be used to throttle flow and shut off. The size of this valve should be equal to 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.

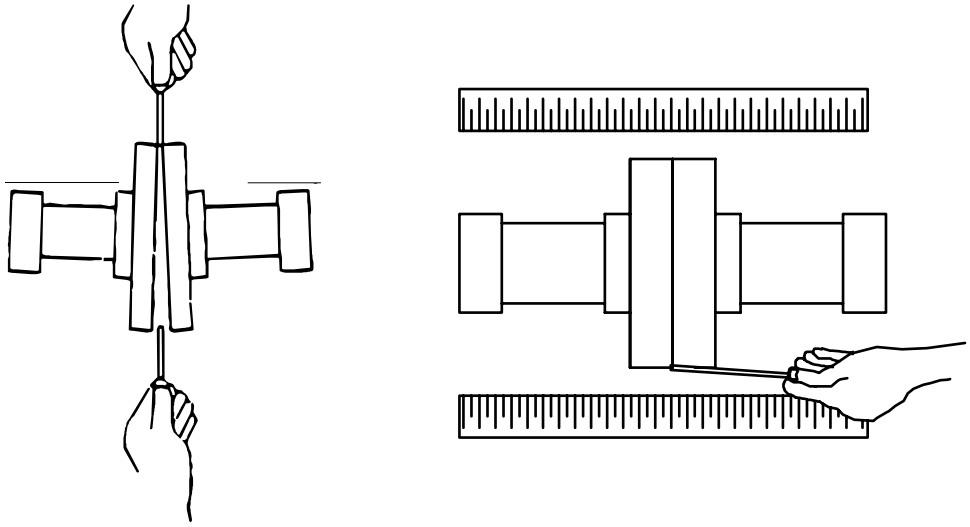


ALIGNMENT

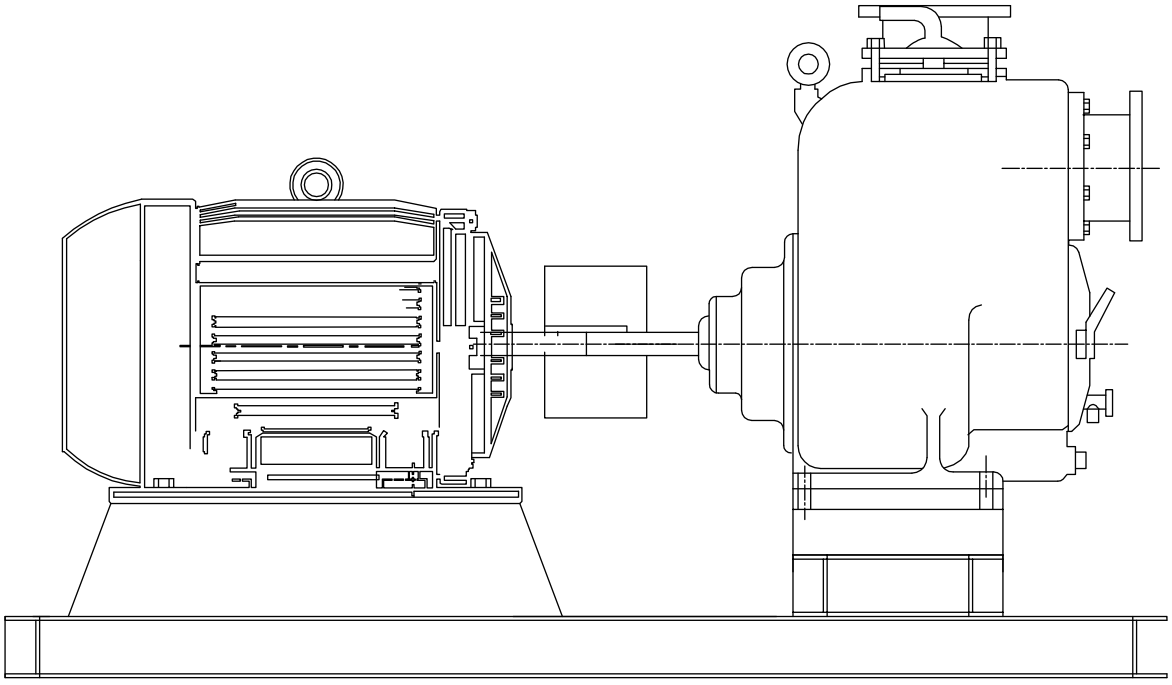
Alignment of the driver to the pump is imperative to the operating lift of the equipment. Misalignment can lead to bearing failures, coupling wear, and shortened V-belt. Power sources mounted by Rotech Pump are aligned prior to shipment. Shipping and handling may cause misalignmnet. Units must be checked prior to opertaion.

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 valves.
3. Check that driver rotation agrees with pump rotation.
4. Install a coupling gaurd when alignment is complete.



Aligning Non-Spider Type Couplings

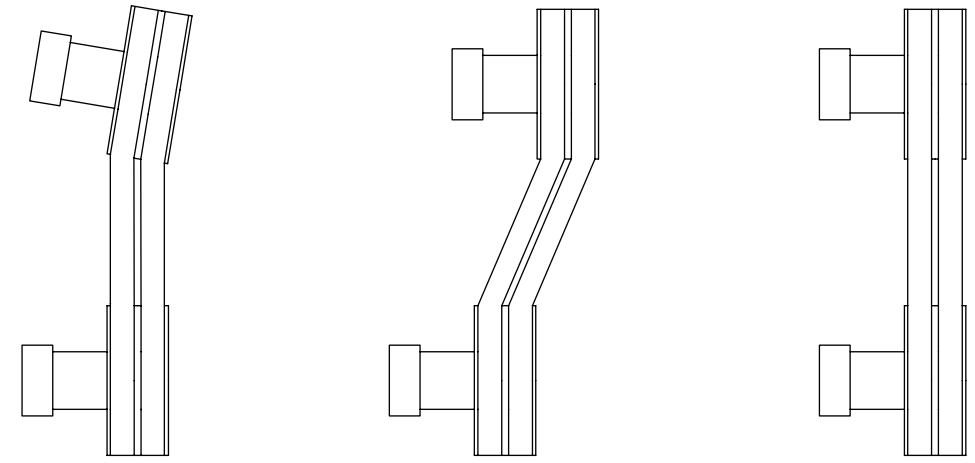


Direct Couple Pump

BELT DRIVEN PUMP

Locate driver shaft parallel to pump shaft. Use a straight edge and belt tensioner to properly set up V-belts.

Please follow proper installation of V-belt Drive as follows:

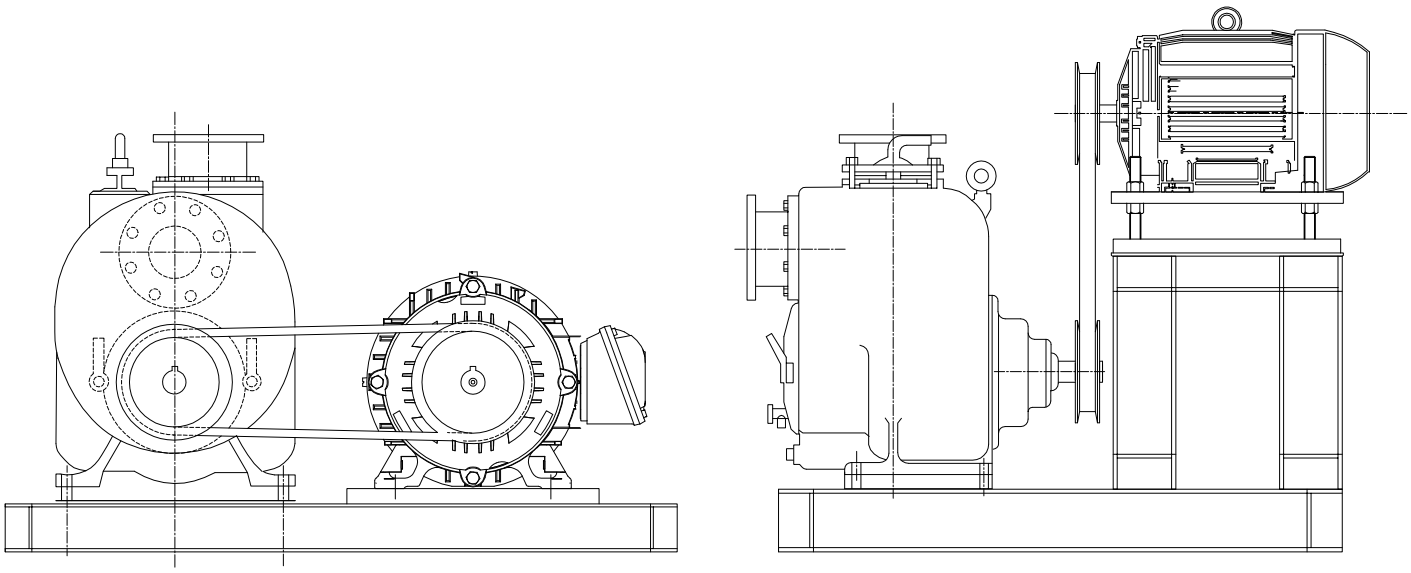


MISALIGNED: SHAFTS NOT PARALLEL

MISALIGNED: SHAFTS NOT IN LINE

ALIGNED: SHAFTS PARALLEL AND SHEAVES IN LINE

Alignment of V-Belt Driven Pumps



Different arrangement of V-Belt

4. ASSEMBLY PROCEDURES

ROTATING ASSEMBLY

(See Appendix A for Cross-Section of Pump and rotating assembly)

To assembly rotating assembly:

1. Clean the disassembled bearing housing (194).
2. Secure the bearing frame to bench or holding stand.
3. Install vent, oil and cavity plugs (409, 410, 414, 415, 416).
4. Install sight glass (300).
5. Install outboard bearing (108) on shaft (122) retaining ring towards end of shaft.
6. Install inboard bearing (107) on shaft (122).
7. Install outboard lip seal (148) in bearing cap (237).
8. Install inboard lip seal (147) in bearing housing (194).
9. Slide shaft bearing assembly into bearing housing (194) 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 (122).
11. Insert bearing cap bolts through cap (237) and gasket (601).
12. Slide back seal plate (184) and gasket (606) over impeller end of shaft.
13. Install bolt (317) and lock washer (305) into bearing frame (194) and back seal plate (184) and tighten.
14. Slide mechanical seal assembly (186) over end of shaft (122).
15. Install impeller shims (450) over shaft (122) between impeller (101) and mechanical seal assembly (186).
16. Install impeller bolt (319) and impeller washer (306) on to shaft (122).
17. Measure space between impeller(101) and back plate (184). Correct clearance is .026 inches. If not, remove impeller (101) and add or subtract from shim stack (450). Repeat step 16 and 17.
18. When impeller (101) to back seal plate (184) clearance is correct, install impeller bolt (319) and tighten. Rotating assembly is now complete and ready for installing in pump or storing as spare.

INSTALLING ROTATING ASSEMBLY

CAUTION

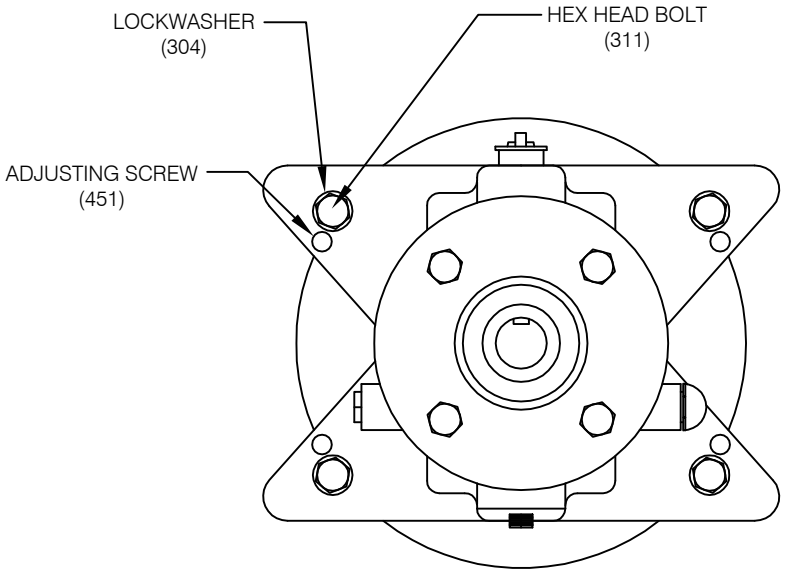
When installing rotating assembly, be sure it has been filled with proper oil, SAE 30 (non-detergent)

CAUTION

Use suitable hoist and rigging to lift 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 (311) into the bearing housing (194), tighten until impeller (101) rubs on front wear plate (200).
5. Refer to the impeller clearance section, follow steps 8 through 15 to adjust impeller (101) clearance.

5. SETTING OF IMPELLER CLEARANCE



⚠ WARNING

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

CAUTION

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

⚠ WARNING

Running pumps can create heat and cause hot gasses to form that if not properly released can cause serious burns. Allow Pump to cool completely before servicing. Do not remove any cover plates, fittings or gauges from a heated pump.

Impeller clearance is the measurement between the impeller (101) and the wear plate (200). This clearance is set at .013 inches during assembly but may need to be adjusted before initial startup.

ADJUST IMPELLER CLEARANCE

(See Appendix A for Cross-Section of correspondence model)

To adjust the impeller clearances use the following steps:

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 (196)
5. Loosen flap valve pin (312) and 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 (311) and then remove the lock washers (304). Reinsert the hex head bolts (311) into there holes.
9. Slowly turn the 4 adjusting screws (451) into casing in a criss cross pattern.
10. Use the hex head bolts (311) minus the lock washers (304) to move the rotating element until the impeller comes in contact with the wear plate (200).

11. Loosen the 4 hex head bolts (311) until a .010 - .015 feeler gauge can be inserted against the bearing housing (194) hex head bolts (311).
12. Turn the 4 adjusting screws (451) out of the casing until they are tight against the bearing housing (194).
13. Remove the 4 hex head bolts (311) and add the lock washers (304).
14. Reinstall the 4 hex head bolts (311) and tighten in a criss cross 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 building, repeat steps 8 through 15. If there is no rubbing/binding the impeller clearance is correct.
16. Reinstall the casing drain plug (196). Reinstall the priming cover (604) then insert the clamp bar (269) and tighten the flap valve pin (312).

6. OPERATION

⚠ WARNING

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

⚠ WARNING

Do not operate pump outside its design envelop. Death or sever injury could result.

LUBRICATION

SEAL ASSEMBLY

Prior to starting the pump, remove the vented plug (410) and fill with approximately 20 ounces of SAE No. 30 non detergent oil. The oil level should be just below the plug's tapped hole.

BEARINGS

SAE No. 30, non-detergent oil is the recommended lubricant. Check the lubricant level regularly in the sight glass (300), maintain level exactly at center of glass. Fill if need through vented plug (409).

BEARING TEMPERATURE

CAUTION

Do not check bearing temperature by using your hand. 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.

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 the casing be filled with liquid.

Pump should never be operated with an empty casing. The pump casing is filled by removing the fill cover (604), looseing 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, 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 reprime as necessary only if the casing remains full.

STARTING

⚠ WARNING

Read and understand the operation manual supplied with the driver.

⚠ WARNING

Do not operate without guards which comply with ASME B 15.1.

⚠ CAUTION

Driver rotation must agree with pump rotation.

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.

⚠ WARNING

Do not operate pump against a closed discharge valve for extended periods. Operation could cause liquid to boil, building pressures that will damage pump casing, causing rupture or explosion which could cause personal injury or death.

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

⚠ WARNING

Lockout or disable the driver from being operated.

DISASSEMBLY PROCEDURES

(See Appendix A for Cross-Section of corresponding model)

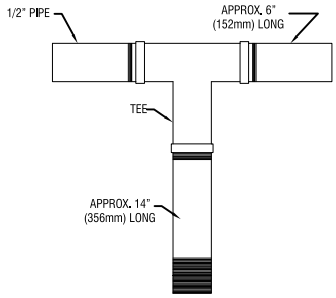
Back Cover and Wear Plate:

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 (196).
5. Loosen two hand nuts (317) and remove. Pull front cover assembly plate (260) from casing.
6. Loosen wear plate nut (301) and remove wearplate (200). 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 (101) vanes and casing (100). Using a strap wrench turn the pump shaft (122) counter clockwise when facing the drive.
10. Remove vent plug (410)

CAUTION

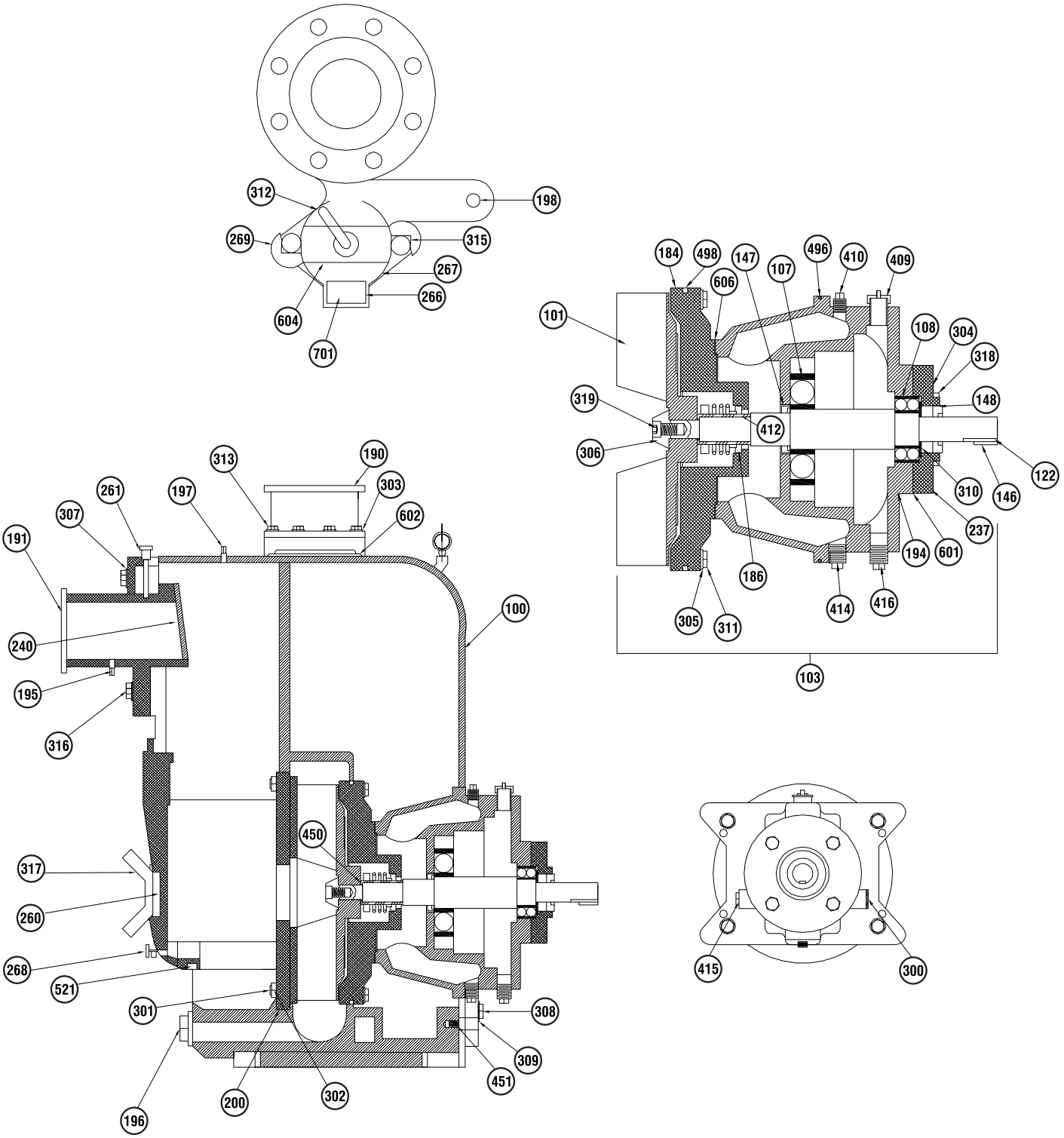
The rotating assembly is heavy and not well counter balanced. Use two people for removal to avoid personal injury from lifting the assembly

11. Remove the four housing to case bolts (308). Because the rotating assembly (103) is heavy and not well counter balanced, the lifting tool shown is helpful.



12. Remove seal plate gasket (606) and bearing housing o-ring (496).
13. Remove impeller from assembly, loosen and remove impeller socket head screw (319) and washer (306).
14. Remove impeller adjusting shims (450) and record thickness - this will aid 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 (148).
18. Slide shaft (260) out of bearing housing (194).
19. Remove radial oil seal (147).
20. Press radial bearing (107) and thrust bearing (108) off from shaft.
21. Clean bearing housing (194) and bearing cup (237).
22. Inspect all parts removed, replace as required.

APPENDIX A - PUMP CROSS SECTION AND PARTS LIST



*** Please see below Table for Details**

MODEL SPT/SPU PUMP PARTS LIST

ITEM	QTY	DESCRIPTION
100	1	CASING
101	1	IMPELLER
103	1	ROTATING ASSY
107	1	BEARING, IB
108	1	BEARING, OB
122	1	SHAFT
126	1	SHAFT SLEEVE
146	1	COUPLING KEY
147	1	LIP SEAL, IB
148	1	LIP SEAL, OB
184	1	SEAL PLATE
186	1	SEAL ASSEMBLY WITH SLEEVE
190	1	DISCHARGE FLG-STD-FLANGED
191	1	SUCTION FLG-STD-FLANGED
192	1	DISCHARGE FLG-OPTION-THREADED
193	1	SUCTION FLG-OPTION-THREADED
194	1	BEARING HOUSING
195	1	PLUG, SUCT FLG
196	1	PLUG, CASING DRAIN
197	1	PLUG, VENT
198	1	PLUG, VENT
200	1	WEAR PLATE
237	1	BEARING CAP
240	1	FLAPPER VALVE
260	1	COVER PLATE ASSY
261	1	FLAPPER VALVE ASSY
266	4	DRIVE SCREW-WARNING PLATE
267	1	PRIMING COVER
268	1	RELIEF VALVE
269	1	CLAMP BAR, PRIMING COVER
300	1	SIGHT GLASS
301	2	NUT, WEAR PLATE
302	2	WASHER, WEAR PLATE
303	4	WASHER, DISH FLANGE
304	4	LOCKWASHER, OB COVER
305	4	LOCKWASHER, HSG TO SEAL PLATE
306	1	WASHER, IMPELLER
307	4	WASHER, SUCT FLANGE
308	4	BOLT, HSG TO CASE
309	4	WASHER, HSG TO CASE
310	1	RETAINING RING, OB
311	4	BOLT-HSG TO SEAL PLATE
312	1	CLAMP BAR SCREW
313	4	BOLT, DISH FLANGE
315	2	BOLT, PRIMING COVER
316	4	BOLT, SUCTION FLANGE
317	2	HAND NUT, FRONT COVER
318	4	BOLT, OB COVER TO HSG
319	1	BOLT, IMPELLER
374	4	DRIVE SCREW, WARNING PLATE
380	1	HANDLE, FRONT COVER
381	2	BOLT, HANDLE TO FRONT COVER
382	2	WASHER, HANDLE TO FRONT COVER
407	1	BUSHING, REDUCING - VENT
408	1	AIR VENT
409	1	PLUG, VENTED
410	2	PLUG, VENT
412	1	O-Ring, SLEEVE
414	1	PLUG, SEAL CAVITY DRAIN
415	1	PLUG
416	1	PLUG, BRG HSG DRAIN
450	1	SHIM SET - IMPELLER
451	4	ADJUSTING SCREW, ROT ASSY
496	1	O-RING, ROT ASSY
498	1	O-RING, SEAL PLATE
521	1	O-RING, COVER TO CASE
601	1	GASKET - BRG CAP
602	1	GASKET - DISCHARGE FLG
603	1	GASKET - PRIMING COVER
604	1	COVER, PRIMING WITH WARNING PLATE
606	1	GASKET, SEAL PLATE
700	1	WARNING PLATE, FRONT COVER
701	1	WARNING PLATE, PRIMING COVER

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