Close coupled condensate pump and receiver Type SR

Instructions

- **Installation**
- **Operation**
- **Maintenance**

Read this entire book

before attempting to install, operate or repair this pump. Properly installed, your Peerless pump will give you satisfactory, dependable service. We urge that you read carefully these step-by-step instructions, to simplify any problems of installation, operation or repair.

Failure to read and comply with installation and operating instructions will void the responsibility of the manufacturer and may also result in bodily injury as well as property damage.

This book is intended to be a permanent part of your pump installation and should be preserved in a convenient location for ready reference. If these instructions should become soiled, obtain a new copy from Peerless Pump. Include pump model and/or serial number with your request.

WARRANTY

New equipment manufactured by Seller is warranted to be free from defects in material and workmanship under normal use and service for a period of one year from date of shipment; Seller's obligation under this warranty being limited to repairing or replacing at its option any part found to its satisfaction to be so defective provided that such part is, upon request, returned to Seller's factory from which it was shipped, transportation prepaid. This warranty does not cover parts damaged by decomposition from chemical action or wear caused by abrasive materials, nor does it cover damage resulting from misuse, accident, neglect, or from improper operation, maintenance, installation, modification or adjustment. This warranty does not cover parts repaired outside Seller's factory without prior written approval. Seller makes no warranty as to starting equipment, electrical apparatus or other material not of its manufacture, since the same are usually covered by warranties of the respective manufacturers thereof.

In the event, notwithstanding the terms of this agreement, it is determined by a court of competent jurisdiction that an express warranty has been given by Seller to Purchaser with respect to the head, capacity or other like performance characteristics of said equipment, Seller's liability for breach of the same shall be limited to accepting return of such equipment F.O.B. plant of manufacture, refunding any amount paid thereon by Purchaser (less depreciation at the rate of 15% per year if Purchaser has used equipment for more than thirty (30) days) and cancelling any balance still owing on the equipment.

This warranty is expressly in lieu of any other warranties, expressed or implied, and Seller specifically disclaims any implied warranty of merchantability or fitness for a particular purpose.

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IMPORTANT SAFETY PRECAUTIONS

Pump parts and the tools and lifting equipment used in installation are heavy and may easily cause personal injury if dropped or carelessly handled. The normal precautions and safety rules associated with the installation or repair of machinery, in regard to manual lifting, use of power equipment, and handling of tools, must be observed in the installation of this pump.

Petroleum-base cleaning solvents are flammable. Smoking by personnel, open flame, or other activity which could ignite vapors in the vicinity of these solvents is extremely hazardous and must not be permitted.

Do not work under a suspended object unless there is a positive support under it to stop its fall in event of sling or hoist failure.

Before attempting examination, handling or repair, be certain that the electrical current to the motor is shut off. An electrical shock from contact with live wires or cords can be fatal.

Before attempting examination or repairs to pump, open the disconnect switch to electric motor. This prevents accidental running of pump motor. Starting motor during examination or repair activities could damage pump and may cause personal injury.

A replacement electric motor must be of the same voltage, RPM and frame number as original motor. If replacement motor is of higher RPM, pump will develop excessive pressure and horsepower, causing pump and equipment damage and personal injury.

WARNING

The pumps described in this bulletin must not be installed in any manner except as specified herein, and must not be operated with different electrical power supplied than listed on the motor nameplate. Pumps are designed to operate in gravity feed condensate return steam heating systems or in medium to low pressure condensate return steam heating systems at 10 inches of mercury vacuum to 30 psig, and at temperature not more than 180°F (82°C).

The receiver must be properly vented to avoid exposing the receiver to any pressure other than standard atmospheric pressure.

Violation of this warning will void the warranty and may result in serious property damage or grave personal injury.

INTRODUCTION

UPON RECEIPT OF PUMP EQUIPMENT: Check carefully to see that all of the equipment has been received. Report immediately any shortages or damages to the transportation company handling the shipment, noting the extent of the damage or shortage on the freight bill and bill of lading. Do not leave the unit exposed to weather or construction hazards. The pump may become mechanically damaged. This pump is a well-designed and carefully manufactured unit. It should be given the same attention accorded to any precision machine.

The satisfactory operation of a pump depends to a large extent upon proper installation. These instructions cannot answer every question that may arise, as each installation will be different. The installer and the operator of this equipment must use good judgement to adapt these procedures to the installation.

INSTALLATION

WARNING **Do not work under a suspended object unless there is a positive support under it to stop its fall in event of sling or hoist failure. Disregard of this warning could result in grave personal injury.**

LOCATION: Install this pump in a clean, ventilated, dry location. Pipe connections should be short and direct, and the equipment accessible for inspection and care. The top of the receiver should be below the lowest point in the return line so that the condensate flows by gravity into the receiver. If the pump location is subject to floods, the unit should be raised so that the motor and controls are above high water level. If the unit must be set in a pit, provide adequate drainage. For permanence and quieter operation, it is recommended that the condensation unit be firmly bolted to a suitable foundation or to the floor.

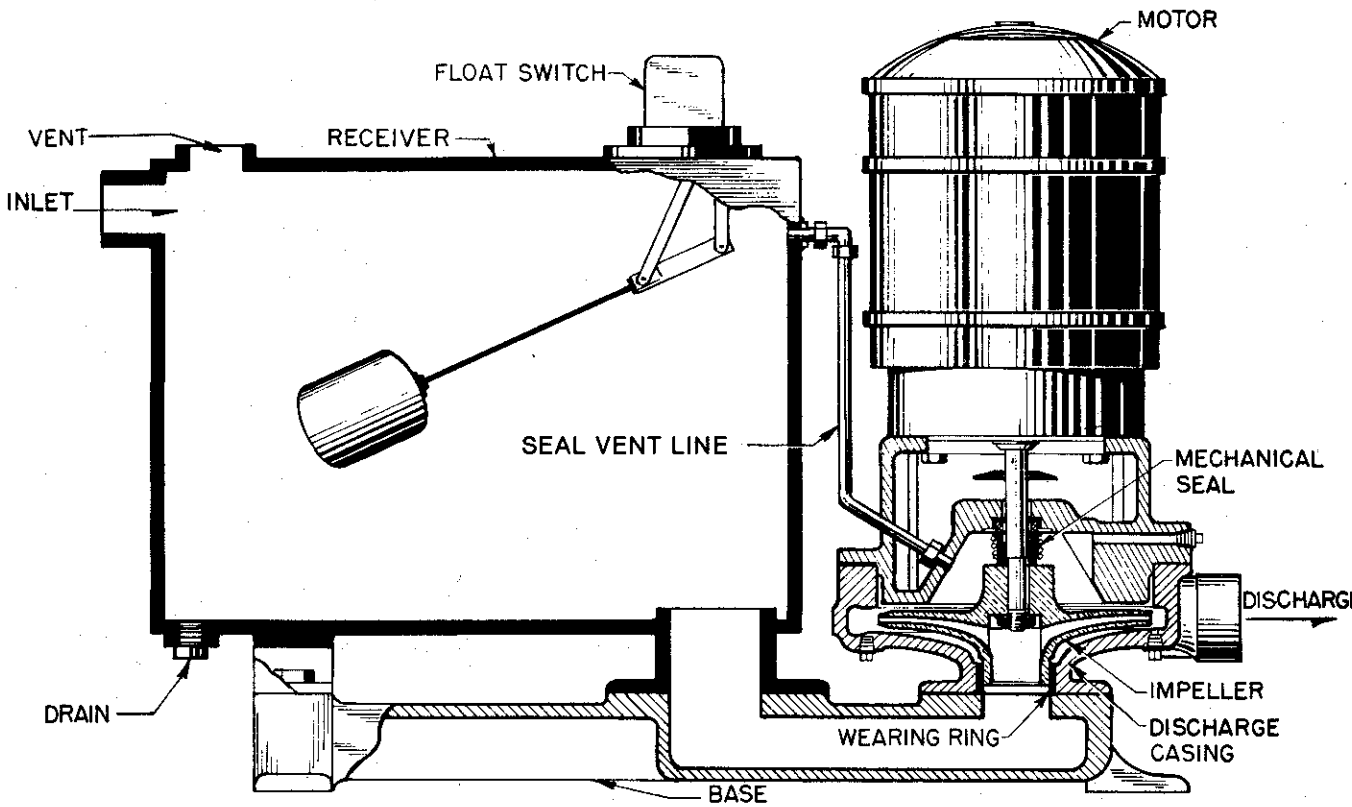


FIGURE 1. TYPE SR CONDENSATE PUMP AND RECEIVER

PIPING: (See Figure 2.) When piping to the pump or receiver, include a union in each line as near as possible to the unit. Extreme care should be taken to prevent any pipe strains on the unit. Pipes used should not be smaller than their connections on the unit and should be at least one or two sizes larger if runs are long. The following pipe connections are necessary:

Condensate return line. There should be a gradual pitch downward so that the return line remains dry. A valved mud leg or leader line should be installed to permit flushing the system. A gate valve should be placed in the line between the mud leg and receiver.

Boiler return line. Be sure to include a check valve and a gate valve in this line. Check valve should be nearer the receiver. Connect the line to boiler by Hartford return connection or according to local plumbing codes.

Vent line should be run from the vent connection to the outside or up the stack to a height of at least 10 feet above normal boiler water level. The vent pipe should not be smaller than the connection on the receiver.

CAUTION **Be sure the voltage and frequency indicated on motor nameplate are the same as service provided. If the motor has been wired at the factory, note the voltage caution card. If available service is other than that indicated, consult motor and switch manufacturer's instructions accompanying unit for proper wiring changes.**

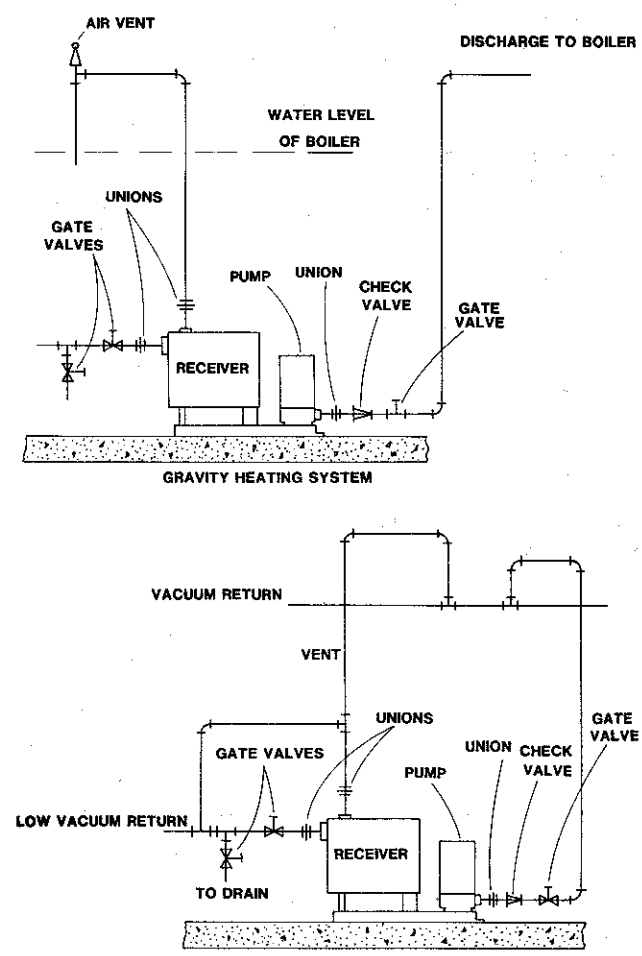


FIGURE 2. INSTALLATION OF TYPE SR PUMP AND RECEIVER

WIRING: Connect the electric service to the controls and make inter-control electrical connections when necessary according to wiring instructions accompanying the switch, using conduit and wire sizes as required by local codes. Be sure the voltage and frequency indicated on motor nameplate are the same as those of the service provided. If connections are not made per wiring instruction, or if current, voltage and frequency are not the same as indicated on motor nameplate, the motor and control equipment will not operate properly and may be damaged.

CONTROLS: If single phase motor horsepower and current fall within the rating of the float switch, an automatic across-the-line type starter is generally not required, depending on the electrical code and requirements of the local power company.

It is recommended that a suitable overload protector or a full-voltage automatic starter switch with overload protection be installed in the motor circuit to prevent motor burn-outs if for some reason an overload should occur. Any three phase installation will require an across-the-line magnetic starter as the primary motor start device. The float switch is used as a magnetic starter pilot device in this instance.

FUSES: It is recommended that Fusetron (dual element) fuses be used if no other thermal or motor protecting device is used. The Fusetron provides for motor protection against short circuits. Care must be taken in selecting the proper size Fusetron. When a fuse blows, it indicates that something is wrong either in the motor, pump, switch, fuse rating or service. Do not replace a fuse until you find and remove the cause of the blow-out.

ROTATION: Check the rotation of the motor. All SR pumps rotate in a clockwise direction. The motor and pump should turn to the right when looking down on the motor. If rotation of a single phase motor is incorrect, refer to motor manufacturer for procedure to reverse the direction. Incorrect rotation of motor will result in improper performance and may result in damage to the pump.

If motor is a three phase type, interchange any two of the three power supply leads to the motor (at the electrical panel) to change direction of rotation.

MOTOR LUBRICATION: Lubricate the motor according to directions given in the motor instruction sheet, but avoid over-lubrication, especially of the top bearing, which may overflow onto the windings. Consult the specific motor manufacturer for instruction if sheet is not available.

OPERATION

CAUTION **New or repaired heating systems should be operated several days with the returns open to sewer until water appears clear in order to thoroughly flush and clean the lines and prevent clogging of the pump when it is put into operation. This may take from four days to two weeks.**

WARNING **Never operate pump unless discharge is flooded. Failure to do so will injure rotary seal and cause pump to leak.**

BEFORE STARTING: Check the pump as follows:

1. Be sure pump is fully primed and motor lubricated per manufacturer's instructions.

2. See that current characteristics of voltage and frequency on motor nameplate are the same as service provided.

3. See that float switches are set for proper operation and that thermal units are "set."

4. Check motor rotation direction by momentarily closing switch contacts or momentarily placing H.O.A. switch in hand position.

5. Be sure valves are open on boiler return and condensate return lines, and valve on bleeder line closed.

6. See that receiver is properly vented to atmosphere.

STARTING: Throw in the motor disconnect switch. The pump will not operate unless the receiver is full enough to close the float switch contacts.

AFTER STARTING:

1. See that motor rotates in the proper direction.

2. See that all pipe connections are tight.

3. See that the float switch starts and stops the pump automatically.

4. See that motor comes up to speed quickly and maintains a constant rotation rate.

5. Observe operation closely for three hours after starting and at regular intervals for 10 days. A new machine should be carefully watched to note its initial performance. (See Periodic Inspection under Maintenance.)

MAINTENANCE

CARE OF EQUIPMENT: Life of a pump unit can be considerably prolonged by following a few simple rules:

1. At regular intervals, lubricate motor bearing as per lubrication instructions.

2. Keep inside and outside of motor and controls free of moisture, oil and dirt. If necessary, blow out their interiors. If switch contacts become corroded or pitted, they should be smoothed and treated with petroleum jelly, dressed with sand paper (never use emery cloth) or replaced.

3. Maintain the pump. To insure peak performance, rotating parts should be checked at regular intervals. The time between checks will depend upon the severity of service.

PERIODIC INSPECTION: To insure the best operation of the pump, make a systematic inspection at least once a week. Note the following:

1. Sticking: See that the unit does not stand idle for very long periods. If necessary, start pump manually to see that the shaft is free.

2. Automatic equipment: Check frequency of starts and stops to see that pump is properly regulated. Check contacts of switches, cleaning them and applying petroleum jelly if they show signs of burning. If contacts are badly burned, replace the switch before serious consequences result.

3. Motor: See that the motor comes up to speed quickly and maintains constant rotation rate.

ROUTINE CARE: Keep the interior and exterior of motor and switch apparatus free from moisture, oil and dirt.

CAUTION **Never run pump when receiver is empty, or expose unit to freezing temperature when filled with water, or severe equipment damage can occur.**

SHUTTING DOWN: At the end of the heating season, open main line switch, close valves on return and discharge, and drain receiver and pump by removing the pipe plug at the bottom of the receiver. Cover motor and switch to protect them against dust and moisture.

WARNING **Before attempting examination or repairs to pump, open the disconnect switch to electric motor, to prevent accidental running of pump motor. Starting motor during examination or repair activities could damage pump and may cause personal injury. An electrical shock from contact with live wires or cords can be fatal.**

IF PUMP FAILS TO OPERATE:

1. Check fuses or thermal units, see if blown, thrown, or loose. Before replacing or resetting, be sure the cause for blowing is determined and corrected.

2. See if shaft rotates freely, try turning by hand.

3. See that switch contacts are not corroded, shorted, or electrical service broken anywhere in the circuit.

4. Check power supply and compare with motor characteristics.

5. Have motor examined for winding failure.

IF PUMP OPERATES BUT FAILS TO EMPTY RECEIVER:

1. Check rotation of pump.

2. See if check valve in discharge line is operating properly.

3. Check discharge pressure, see if beyond pump rating.

4. Check condensate return rate to receiver; see if inflow is excessive.

5. See if shaft is intact and if the impeller rotates.

DISASSEMBLY: Proceed as follows (see figure 3):

WARNING **Always take adequate precaution to prevent accidental running of pump motor before starting to remove pump from base. Starting motor during pump removal could damage pump and may cause personal injury.**

1. Open the disconnect switch to cut off power to the motor. Temporarily tie switch open and attach note: DO NOT CLOSE SWITCH – PUMP REPAIR IN PROCESS.

2. Close gate valves in the condensate return and pump discharge lines and drain receiver.

WARNING **Before opening conduit box of electric motor, be certain that the current to the motor is shut off. An electrical shock from contact with live motor leads can be fatal.**

3. Disconnect the motor leads and carefully mark them so they can be reconnected in the exact same order.

WARNING **Let the unit cool to ambient temperature before servicing, as severe burns can result from contact.**

4. Disconnect pump discharge piping and seal vent line.

5. Remove hex head bolts and carefully pull motor-adapter-seal-impeller assembly from pump casing (3). Move assembly to a bench for further disassembly.

NOTE: Peerless Pump furnishes a blank-off flange to attach to the base opening where the pump casing fits so that one pump of a duplex unit may remain in service.

6. VIEW A. Insert a rod of suitable diameter into a passage of impeller (2) and hold while loosening hex head bolt (26) and lock washer (301), and pull impeller from shaft. If impeller is hard to remove, use a small wood block against adapter and pry carefully at several points around impeller to loosen. VIEW B. Insert a rod of suitable diameter into a passage of impeller (2) and hold while loosening set screw (303). Hold motor shaft by screwdriver slot in shaft end under plug at motor end shield, or with thin water pump pliers on shaft section between motor and back of adapter seal cavity. This impeller is attached by a right hand thread. Turn counter-clockwise to remove.

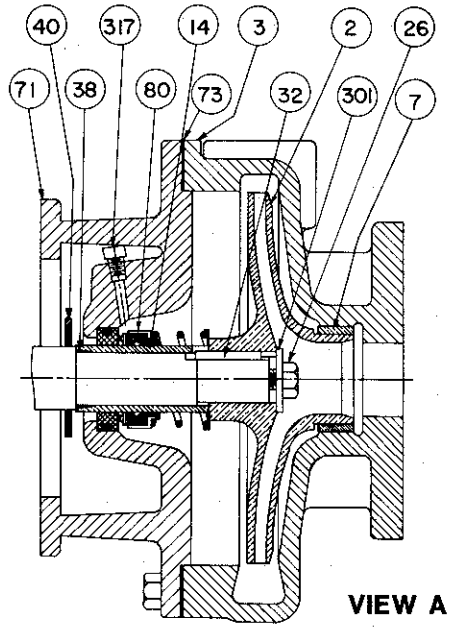
CAUTION **Use care not to damage highly finished faces of mechanical seal. Any damage to one or both faces will require replacement of entire mechanical seal.**

7. Very carefully remove seal parts (80A thru 80D, figure 4). Be particularly careful not to scratch or damage lapped surface of sealing washer (80D). Store seal parts in suitable container; lapped surface of sealing washer must be up and covered.

8. Remove impeller key (32), shaft sleeve (14) and shaft sleeve gasket (38).

9. Remove screws and slide motor adapter (71, figure 3) from shaft.

CURRENT DESIGN MODELS
9221B, 9222B, 9223B, 9224B & 9230B
(JULY 1981 TO PRESENT)
OBSOLESCENT MODELS
9222A, 9223A, 9224A & 9230A
(MARCH 1974 TO JULY 1981)

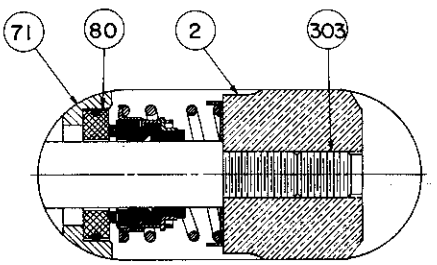


VIEW A

143 JMV THROUGH 184JMV FRAME MOTORS
1.25 IN. DIA. SHAFT SLEEVE.

Construction for pumps larger than 1.5 hp at 1750 rpm or 2.0 hp at 3500 rpm; motor frames 143 JMV thru 184 JMV.

2. Impeller
3. Pump casing
7. Wear ring
14. Shaft sleeve
26. Hex head bolt
32. Impeller key
38. Shaft sleeve gasket
40. Slinger
71. Motor adapter
73. Gasket
80. Mechanical seal
301. Lock washer
303. Set screw
317. Tube fitting



56J FRAME MOTORS
.625 IN. DIA. MOTOR SHAFT.

VIEW B

Construction for pumps of 1.5 hp at 1750 or 2.0 hp at 3500 rpm and smaller; motor frame 56J.

FIGURE 3. TYPE SR CONDENSATE PUMP

10. Carefully push floating seat (65A, figure 4) from adapter; avoid scratching or other damage to lapped surface. Use narrow, flat screwdriver to lift and work O-ring (65B) from seat. Store seat with remaining mechanical seal parts with lapped surface up and covered.

11. Remove wear ring (7) from casing only if damaged or worn to excess (refer to Repair).

WARNING **Petroleum-base cleaning solvents are flammable. Smoking or open flame in the vicinity of these solvents is extremely hazardous and must not be permitted. Disregard of this warning could result in grave personal injury.**

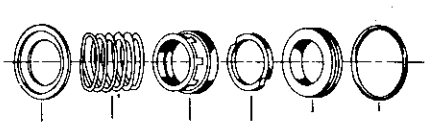
CLEANING: Clean all metal parts with a solvent. Use a bristle brush (not metal or wire) to remove tightly adhering deposits. A fiber scraper may be used to remove the gasket and shellac from casing flanges. Blow dry with clean dry compressed air.

CAUTION **Never use hydrocarbon liquids (oil or solvent) to clean mechanical seal parts. Use of oil or solvent will deteriorate material used for manufacture of the seal.**

Clean seal parts using a mild soap solution. Rub only with finger to remove dirt. Rinse with clear water and dry with mild air stream. Use care not to damage or scratch lapped surfaces.

INSPECTION: Visually inspect parts for damage affecting serviceability or sealing.

1. Examine impeller for cracks, dents, gouges or embedded material.



*80A Spring Retainer
80B Spring
80C Seal bellows Assy
80D Sealing Washer
65A Floating Seat
65B Seat Ring

*Some pumps have a step turned on the impeller hub to accept the spring and therefore do not have or use a spring retainer.

FIGURE 4. MECHANICAL SEAL

2. Manually actuate float switch. Switch should click when opening or closing. When switch is closed, check motor circuit with a continuity meter. If circuit is open when switch is closed, switch should be repaired or replaced.

3. Check O-rings, gaskets, and seals for shrinkage, cracks, nicks or tears.

4. Inspect shaft sleeves (14) for excessive wear. Replace sleeves that are worn.

5. Inspect lapped surfaces of sealing washer and floating seat for chipping, gouges, nicks, scratches or other damage. These surfaces must be free from any defect. If lapped surfaces are damaged, replace the entire seal.

6. Check wear ring and impeller skirt for wear. Normal diametral clearance is 0.008 to 0.012 inch.

REPAIR: Remove burrs, nicks or scratches from non-critical areas with a fine stone or crocus cloth and make other minor repairs that will not affect serviceability or sealing. Replace all gaskets and all worn parts; order parts by name and index number shown on Figure 3, and give the pump serial number stamped on nameplate.

If impeller skirt-wear ring diametral clearance exceeds 0.015 inch, replace wear ring. Check wear ring and impeller skirt for wear.

If the O-ring for the floating seat of the mechanical seal is not damaged, it may be reused with the other satisfactory seal parts.

WARNING **A replacement electric motor must be of the same voltage, RPM and frame number as original motor. If replacement motor is of higher RPM, pump will develop excessive pressure and horsepower, causing pump and equipment damage and personal injury.**

REASSEMBLY: Reassemble pump in the following manner. Steps 1 thru 7 for View A; steps 8 thru 11 for View B. (See Figure 3).

1. Install slinger (40), shaft sleeve gasket (38) and shaft sleeve (14) on shaft. Be sure gasket is completely contained by sleeve and that sleeve bottoms on shaft shoulder. Position slinger midway between end of sleeve and grease retainer. Align sleeve slot with key slot of shaft.

CAUTION **Use care not to mar or scratch the lapped surfaces of floating seat and sealing washer when installing mechanical seal. Damage to these surfaces will result in leakage and will require replacement of the entire seal.**

2. Lubricate the O-ring (65B, Figure 4), groove in floating seat (65A) and seat cavity in adapter (1, Figure 3) with any of MOLYKOTE® lubricant, 3% detergent solution, mild soap solution, glycerine, ethylene glycol or silicone grease, DC No. 55.

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3. Install floating seat in adapter with lapped surface facing away from adapter shoulder.

4. For frames 143JMV through 184JMV, apply lubricant (step 4 above) to entire surface of shaft sleeve and carefully install adapter. Use care not to cock or scrape floating seat on sleeve. Seat adapter (71) against motor, tapping very lightly with plastic hammer, then install screws and tighten uniformly. Rotate shaft by hand to check that there is no binding or hang-up.

5. In the same manner as in step 4, lubricate the entire surface of shaft sleeve and the bores of sealing washer (80D, Figure 4) and spring bellows assembly (80C). Carefully install sealing washer, lapped surface toward floating seat and spring bellows assembly on shaft sleeve and slide along to contact floating seat. Install spring (80B) and spring retainer (80A) if used.

6. Install impeller key (32, Figure 3) in shaft keyway. Make sure that key enters slot in shaft sleeve. Align impeller (2) with key and install on shaft. Tap impeller hub lightly with plastic hammer to seat against shaft sleeve. Guide the spring retainer and spring to seat on the shoulder as impeller is installed. Be sure spring is correctly seated against bellows assembly.

7. Install impeller washer (301) and hex head bolt (26). Restrain impeller with rod inserted in one passage and securely tighten bolt. Rotate shaft by hand to check for free movement. Go to Step 12.

8. For 56J motor frame, apply lubricant (step 4 above) to entire surface of shaft and carefully install adapter. Use care not to cock or scrape floating seat on sleeve. Seat adapter (71) against motor, tapping very lightly with plastic hammer, then install screws and tighten uniformly. Rotate shaft by hand to check that there is no binding or hang-up.

9. Relubricate the shaft as necessary and the bores of sealing washer (80D, Figure 4) and spring bellows assembly (80C). Carefully install sealing washer, lapped surface toward floating seat and spring bellows assembly on shaft sleeve and slide along to contact floating seat. Install spring (80B) and spring retainer (80A) if used.

10. Install impeller (2, Figure 3), guiding spring retainer and spring to seat on the shoulder as impeller seats tightly against shaft shoulder. Be sure spring is correctly seated against bellows assembly.

11. Install set screw (303). Restrain impeller with rod inserted in one passage and securely tighten set screw. Rotate shaft by hand to check for free movement.

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12. Lightly coat both sides of casing gasket (73) with a non-hardening sealing compound, such as a mixture of grease and graphite. Position motor adapter on casing (3) making sure that holes are aligned, tapping lightly with plastic hammer to seat on casing. Install bolts and tighten uniformly in a star pattern.

13. Connect pump discharge piping and seal vent line.

14. Open valves in return and discharge lines. Close the disconnect switch. When receiver fills to a level to start pump, observe float switch and pump operation until acceptable performance is achieved (refer to the beginning of Maintenance).

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