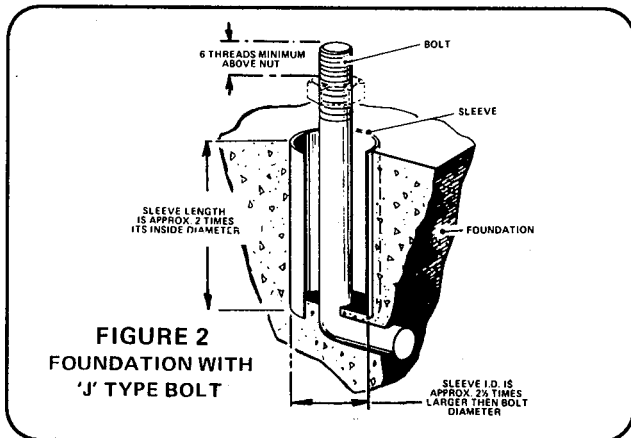


sleeve that is approximately 2- 1/2 times the bolt diameter of the sleeve. When using a standard bolt (figure 1) a washer should be used to support the head of the bolt in the sleeve. After the concrete foundation has been poured, the pipe sleeve remains in place allowing for alignment with the holes in the motor feet.



2. When "J" type bolts (figure 2) are used the same procedure is used except that no washer is needed.

3. If the foundation has been laid, holes may be drilled and expansion bolts used to anchor the pump to the foundation.

### C) MOUNTING PUMP - Foot Mounted

1. Uncrate the pump leaving all instructions attached and install at its' place of operation.
2. Locate the leveling plates and shims at each foundation bolt.
3. Level the motor perpendicular to shaft, shimming as necessary.
4. Level the motor parallel to shaft and tighten the nuts on the foundation bolts evenly.

### C) MOUNTING PUMP - Pipe Mounted

1. Horizontal Lines - Normally the pump is mounted with the motor perpendicular to the ground with the motor end up. The piping must be adequate to support both the piping and pump.

2. Vertical Lines - The motor will be parallel to the floor and may require additional support other than that offered by the piping.

### D) PIPING

1. Both suction and discharge piping should be as short and as direct as possible. There should be as few fittings and bends as possible. Bends, where used should be of the long radius variety.

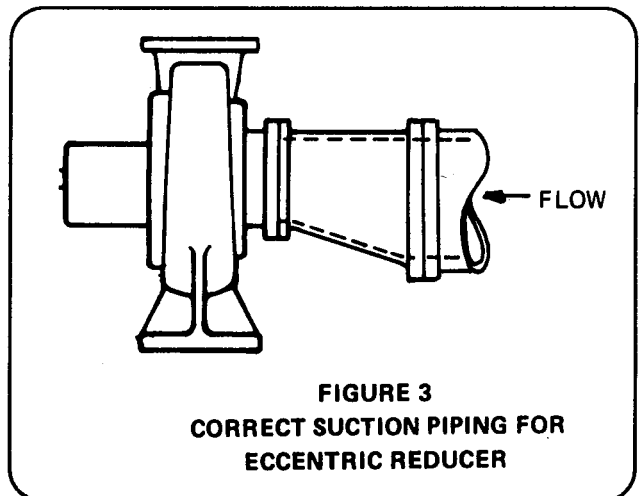
2. Piping should be supported near the pump to prevent strains from being transmitted to the pump, and piping at the pump suction and discharge should be as large or larger than the openings in the pump.

3. Gate valves and pressure gauges should be installed in both the suction and discharge line to facilitate pump maintenance and performance checks.

### E) SUCTION PIPING

1. Suction piping must be free of vapor trapping pockets.

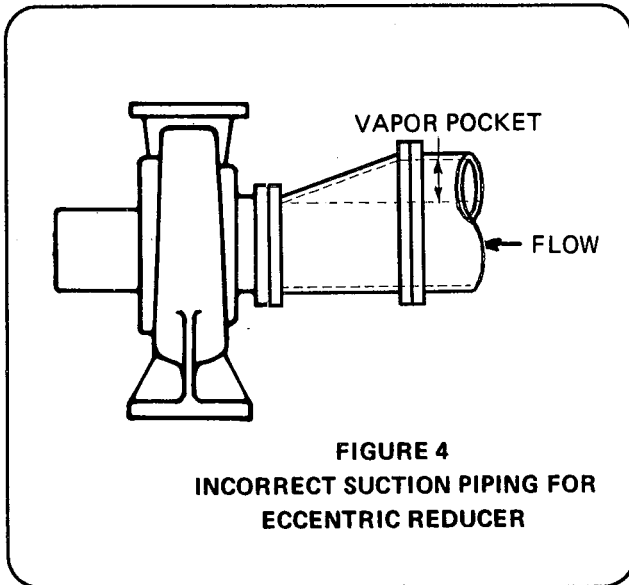
2. In horizontal piping leading to the pump only eccentric-reducers should be used (see figures 3 & 4).



3. The suction pipe must be free from the expansion of hot lines.

4. It is recommended that a strainer be installed near the pump suction inlet to catch scale or other foreign material. A pressure gauge installed on each side of the strainer can be used for measuring the pressure drop across the strainer.

5. If a strainer or foot valve is to be used on the inlet end of the suction line, the free area through the



**FIGURE 4**  
**INCORRECT SUCTION PIPING FOR**  
**ECCENTRIC REDUCER**

strainer or valve should be approximately 2-1/2 to 4 times the area of the suction pipe.

#### F) DISCHARGE PIPING

1. On some installations, a check valve and balancing cock in addition to a gate valve may be required in the discharge piping. The check valve would be used to prevent liquid from running back through the pump in case of failure of the motor. The balancing cock is used to control the pumps' operating capacity by providing a changeable control in the piping system. The gate valve would be used in priming, starting and shutting down the pump.

2. When valves are required in the discharge line, they should be located as near as possible to the pump.

3. In some applications when the pump may be operated with zero flow, provisions should be made for recirculating a portion of the liquid from the discharge to the suction of the pump to reduce the possibility of overheating.

#### G) PIPING FOR SPARE PUMPS

1. Spare pumps in high temperature service should be piped so that hot liquid from the discharge of the operating pump circulated continuously through a bypass to the spare pump and back to the suction of the operating pump. This can greatly reduce thermal shock when the spare pump is started.

#### H) INSTALLING PUMP

1. Make up the piping to the suction and discharge connections of the pump. All piping must be properly supported by hangers and not by the pump.

2. Wire the pump motor for the voltage required as specified on the wiring diagram located on the motor nameplate, or in cover of the motor terminal box. All wiring must be in accordance with local regulations. If the motor is damaged due to improper wiring, the guarantee is void.

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## SECTION 2 - PUMP OPERATION

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#### A) STARTING PUMP

1. Open the suction and discharge valves to the pump. These pumps have a mechanical seal and must NOT be run dry. Open the cock at the top of the pump case to vent out any air.

**NOTE:** a. If the pump is above the level of the liquid to be pumped, close the discharge valve. If the pump is below the level of the liquid, open the discharge valve 1-1/2 to 2 turns.

b. Prime the pump. All air and vapor must be removed. The pump case and suction pipe must be filled with liquid before the pump is started.

2. Rotate the pump shaft by hand (if possible) to be sure the pump is not binding. On some models the end of the motor shaft has a screwdriver slot. It may be used to turn the shaft. A check for sticking of the shaft should also be made after a prolonged pump shutdown. Close discharge valve, then open slightly.

3. Start the pump and check for correct rotation according to the arrow on the case. If it is running in the wrong direction on three phase current, change any two leads to the motor. You must disconnect the power before changing the wiring.

4. Lack of capacity and head may indicate the passageways of the pump impeller have become clogged with foreign matter or that the motor speed is low. If speed of the motor is low, the wiring connections at the motor should be checked for miswiring or looseness. If the pump is wired for 460 volt current, but is actually operating on 230 volt current, the motor will never come up to proper speed and may burn out. If low voltage occurs, notify local power company. Slugging of air is another cause of low capacity and head on a closed system. Be sure the system is properly vented of all air - see further notes under Trouble Shooting - Section IV.

**WARNING - DO NOT ATTEMPT TO OPERATE PUMP WITH SUCTION VALVE CLOSED**

5. As soon as the pump is up to full speed, slowly open the discharge valve until it is completely open. Do not let the pump run with the discharge valve closed.

6. Check the pressure gauges on each side of the strainer in the suction line. A pressure drop across the strainer indicates it is becoming clogged with dirt or scale. In this case, the pump should be shut down and the strainer screen cleaned or replaced. A clogged strainer can cause damage to the pump.

7. The pump should be shut down if motor bearings overheat, if there is undue vibration or noise, or if it fails to develop its rated discharge pressure at operating speed.

#### B) OPERATING AT REDUCED CAPACITY

1. If the pump is connected to a constant speed driver or motor, the capacity of the pump can be reduced by throttling the discharge. When throttling the discharge, a by-pass connection may be used to by-pass sufficient liquid back to the suction inlet to prevent overheating.

#### C) OPERATING ROUTINE

1. Check the bearing temperatures periodically. If there is overheating, check the motor to insure adequate lubrication. Normal inspection consists of periodic checks of motor lubrication.

2. Lubricating the pump motor should be done in accordance with manufacturer's recommendations.

3. Check all seals for leakage.

4. Check the suction and discharge pressures gauges. If the differential pressure drops critically, shut down the pump at once.

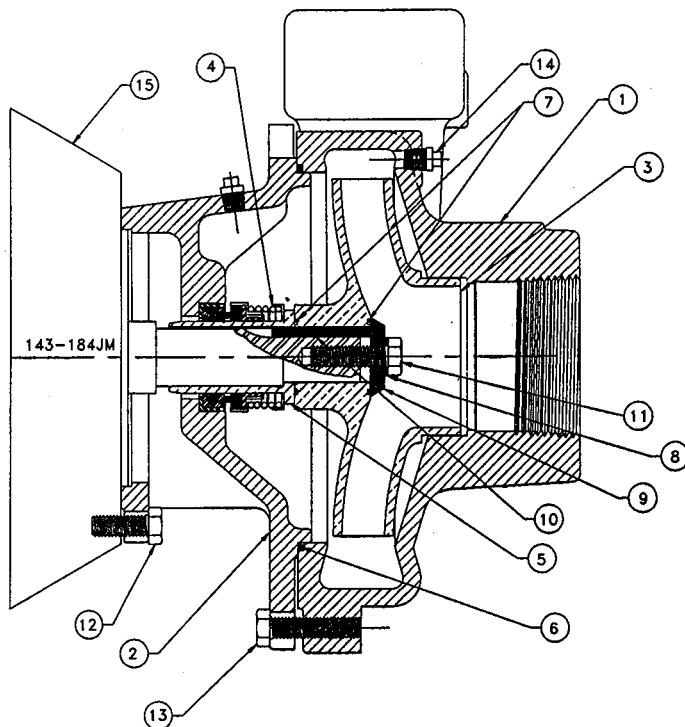
#### D) STOPPING

1. The pump should be shut down rapidly to keep liquid in the pump and to prevent the parts from seizing. After stopping the driver, close the discharge valve and then the inlet valve, in that order. Sometimes it is necessary to close the discharge valve immediately after stopping the driver to prevent reverse rotation. If the pumps are to remain idle under freezing conditions, precautions, such as draining the case, should be taken to avoid damage.

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### SECTION 3 - RC06 PUMP DISASSEMBLY AND ASSEMBLY

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1. Disconnect power to pump.

2. Close the valves in suction and discharge lines or drain the system.

3. Remove 4 hex head cap screws (12), holding the adapter (2) to the case (1) and remove motor adapter assembly.

4. Remove the case o-ring (6) and clean the o-ring surfaces of both the adapter (2) and case (1).

5. Remove the impeller screw (11) by turning it counter clockwise and remove washers (8) and (9) and the o-ring (7). Clean the o-ring surfaces.

6. Remove the impeller (3) and its key (10) from the shaft motor.

7. Remove the mechanical seal (4) and sleeve (5) from the shaft. Remove o-ring (7) from either the sleeve or impeller and clean the o-ring surfaces.

8. Remove adapter (2) from the motor (15) by removing 4 hex head cap screws (12).

9. Clean motor shaft with solvent.

10. Remove the cup & mating ring (1&3) of the mechanical seal from the adapter (2).

11. Lightly lubricate the O.D. of new mechanical seal stationary seal cup (2A) and press it into the recess of the adapter (2). Be sure that the seal is level and square.

**CAUTION: Extreme care must be exercised not to scratch, mar or gouge the sealing face of the stationary seal or leakage will occur.**

12. Assemble the adapter (2) onto the motor (15) using 4 hex head cap screws (12).

13. Assemble the rotating seal elements onto the sleeve (5).

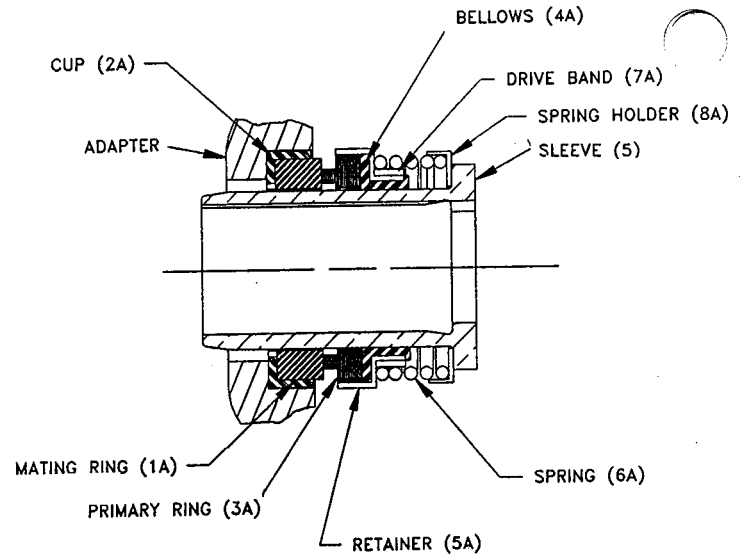
a. Slip spring retainer (5A) over sleeve (5) with the bent edge facing away from the shoulder.

b. Place spring (6A) over sleeve.

c. Lightly lubricate I.D. of new seal ring (3A) and slide it over sleeve with the carbon seal face away from sleeve shoulder.

14. Slide the sleeve over the shaft until seal faces butt together firmly and squarely.

15. Replace key (10) in keyway and slide impeller (13) onto shaft.



16. Place O-Ring (7) on impeller. Then place sealing washer (8) and washer (9) on the impeller cap screw (18) and tighten onto the shaft.

17. Place o-ring (6) on adapter (2) and assemble it to the case (1) using 9 hex head cap screws (13).

18. Open the valves to the pump or refill system and check pumps for leaks.

19. Reconnect power to pump and check again for leaks.



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## SECTION 4 - TROUBLE SHOOTING

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Operating troubles and their probable causes are as follows:

### A) NO DISCHARGE PRESSURE

1. Wrong direction of rotation.
2. Pump not primed.
3. Air or vapor in suction line.
4. Suction pipe not submerged enough.
5. Available NPSH not sufficient.
6. Pump not up to rated speed.
7. Too much system head.

### B) INSUFFICIENT PRESSURE

1. Wrong direction of rotation.
2. Air or vapor in suction line.
3. Air leaks in suction line.
4. Suction line not submerged enough.
5. Available NPSH not sufficient.
6. Pump not up to rated speed.
7. Mechanical defects; Impeller damaged, or Internal leakage (clearances).

### C) CAVITATION OR NOISE

1. Air or gas in liquid.
2. Suction line not filled with liquid.

3. Suction line not submerged enough.
4. Available NPSH not sufficient.

### D) PUMP LOSES SUCTION AFTER STARTING

1. Air leaks in suction line.
2. Air or vapor in suction line.
3. Suction line not submerged enough.
4. Available NPSH not sufficient.

### E) EXCESSIVE POWER CONSUMPTION

1. Speed too high.
2. Insufficient back pressure.
3. Mechanical Defects; shaft bent, rotating element dragging, piping improperly supported.

### F) VIBRATION

1. Air or vapor in suction line.
  2. Worn or loose motor bearings.
  3. Rotating element out of balance.
  4. Shaft bent.
  5. Foundation not rigid.
  6. Vibration in the driver.
  7. Wrong location of control valve.
  8. Piping improperly supported.
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