



2022

# Vertical Sump and Sewage Pumps Type VCS

INSTALLATION, OPERATION, AND MAINTANENCE



## ***Read this entire book***

before attempting to install, operate or repair this pump. Properly installed, your Peerless Pump sump 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 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.



## IMPORTANT SAFETY PRECAUTIONS

Pump parts, and the tools and rigging equipment used in installing pumps are heavy and may easily cause personal injury if dropped or carelessly handled. The normal precautions and safety rules associated with the erection of heavy 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. Open flame or smoking by personnel in the vicinity of these solvents is extremely hazardous and must not be permitted.

Do not work under a heavy 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.

Before handling any wiring or performing any wiring connections, be certain that the electric power supply source is shut off. An electrical shock from contact with live wires or leads can be fatal.

Due to automatic switch or controller operation of sump pumps, tie the main disconnect switch open or remove fuses from main lines before attempting lubrication, mechanical and electrical examinations, or repairs. Attach a card "DO NOT CLOSE SWITCH - PUMP REPAIR IN PROGRESS". Disregard of this warning may result in serious personal injury or death.

One piece shafts are up to 15 feet long and are heavy. Provide good support and use care while withdrawing [inserting] to keep from bending.

### WARNING

The pumps described in this bulletin must not be installed in any manner except as specified herein, and must be operated at intermittent duty service only for sump and sewage lift applications transferring sanitary liquid wastes and liquid wastes with solids to sewers. Liquids pumped must be compatible or within corrosion limits of standard or optional materials of construction. Maximum fluid temperature is 110°F [43°C] for standard construction. Pumping element must be submerged at all times. Refer to Pump Data Table and attached notes for other applicable limits of this equipment. Violation of this warning will void the warranty and may result in serious property damage or grave personal injury.

## INTRODUCTION

**UPON RECEIPT OF VCS PUMP:** 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

Pump parts, and the tools and rigging equipment used in installing pumps, are heavy and may easily cause personal injury if dropped or carelessly handled. The normal precautions and safety rules associated with

the erection of heavy machinery, in regard to manual lifting, use of power equipment, and handling of tools, must be observed in the installation of this pump.



**PUMP DATA**

Pump Size	Discharge Connection NPT (45° Elbow)	Minimum Water Level Inches	MAXIMUM		Minimum Basin Size (ID x Depth - Inches)												
			Sphere Dia Inches	Impeller Dia Inches	Pump Speed RPM	Discharge Above Floorplate		Discharge Below Floorplate									
						Simplex Rd or Sq	Duplex Rd or Sq	Simplex Rd or Sq	Duplex Rd or Sq	Simplex Rd or Sq	Duplex Rd or Sq	Duplex With Flush Kleen Fittings Round	Duplex With Flush Kleen Fittings Square				
NS3A	3																
NSC4A	4	11	1.88	7	1750	30 x 36	42 x 36	48 x 54	60 x 54	48 x 54	48 x 72	48 x 72	48 x 72	48 x 72	48 x 72	48 x 72	48 x 72
LMB3A	3																
LMBC4A	4	11	2.50														
LM3A&B	3																
LMC4A&B	4	12.5	2.50	9													
LL3A&B	3			9	1750												
LLC4A&B	4	12.5	2.00	11	1150	30 x 48	42 x 48										
				10	1750												
				11	1150												
OM4A&B	4			10	1750												
		12.5	3.00	11													
				10		60 x 72	84 x 72										
OMC5A&B	5			11	1750												

Notes: 1. Bearing interval for light duty service is 6 feet; for medium/heavy duty service is 4 feet.

2. Special construction is available for maximum fluid temperature of 180° F (82° C). Consult factory.

**LOCATION:** Install the pump where it will be accessible for inspection and maintenance. Observe the following:

1. Locate the receiver (basin) and pump so that the liquid flows into the basin by gravity.
2. Install basin so that the basin cover is not below grade level. If below grade level, water may collect on the cover.

**SETTING BASIN:** Dig a pit of sufficient depth and diameter to accommodate the basin and pipe connections. Note the following:

1. If pit bottom is soft or soggy, prepare a gravel or concrete slab (or equivalent bed) to support basin.
2. Set the basin on the bed, turned to orient the pump discharge connection properly. If necessary, level basin with wedges or shims.
3. Fill the space around the basin with firmly tamped gravel, or similar material.

**BASIN COVER:** Set the basin cover on the basin, locating as required for proper pump discharge connection. Use a pliable, non-hardening sealer at the split (if that type cover is used) and install and tighten flange bolts.

If a basin cover with manhole or access hatch as shown in figure 1 is used, the cover may be permanently set before pump installation.

**MOTOR ROTATION:** Prior to setting the pump in the basin check the direction of rotation of three phase motors as follows:

**CAUTION** The pump impeller must rotate in the direction shown by the arrow on the discharge casing.

**WARNING** Make certain that power supply disconnect switch is tied open, or fuses have been removed from the load side, when making connections to an electric motor. Failure to observe this warning could result in fatal electrical shock.

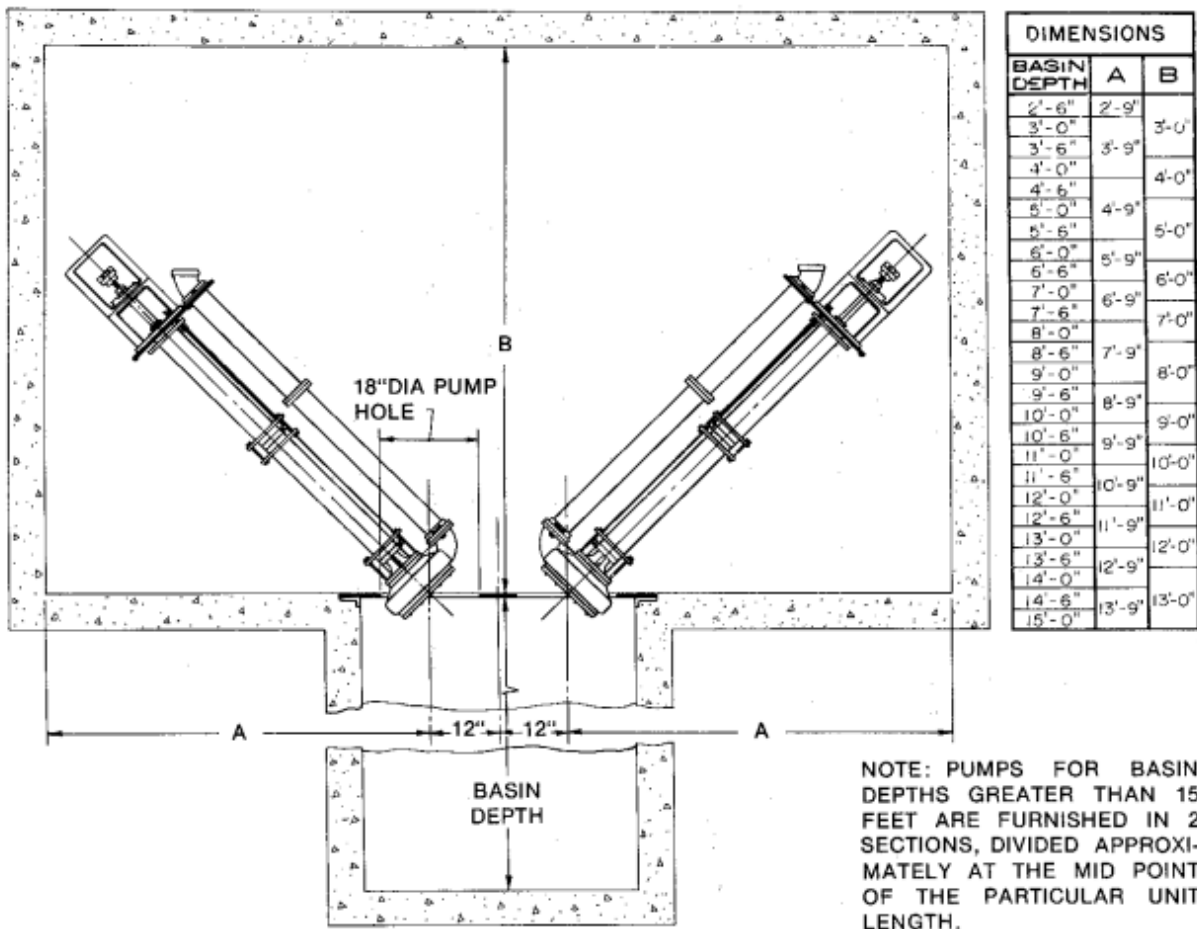


Figure 1. Pump Room Clearance for Installation and Removal of VCS Pumps



1. Temporarily connect motor leads to power source.
2. Momentarily energize motor to just start turning.
3. Observe that motor rotation is clockwise when looking at end of motor opposite shaft extension.
4. If rotation is not correct, assure disconnection of power supply, then interchange any 2 leads to the motor. Reconnect power supply and repeat step 2 to check rotation again.
5. Mark the leads and power supply to identify for permanent connection later.
6. Disconnect power supply.

**PUMP INSTALLATION:** Flush the drainage system with water and clean the basin. Foreign material occasionally found in new systems could damage or plug the pump if not removed.

**NOTE:** In the following steps the index numbers are for figures 4, 5 and 6. In a few instances the name differs for the same index number; also, a few index numbers are used on figures 4 and 5 but not on figure 6.

For One-Section Pump:

1. If a cutless rubber casing bearing is used, the lower Caplug plug in the hanger pipe (508) just above the discharge casing (1A) should be removed to allow this opening to act as a flushing relief port for the clear water supply which lubricates the rubber bearing.

**WARNING**

Do not work under a heavy 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.

2. Using a suitable hoist or lifting means, ease the unit slowly through the basin cover hole (see figure 1) and lower the pump into the basin.

3. To block moisture and gas exchange between the basin pool and surrounding areas, the pump floor plate should be sealed to the basin cover as shown in figure 2.

4. Check for proper position of discharge pipe connection.

5. Secure the pump floor plate to the basin cover with cap screws.

For Two-Section Pump: Two-section sump and sewage pumps are shipped with motor and upper and lower sections separated. The sections are usually marked for proper assembly at installation. If not marked, align the grease line holes in the companion flanges when joining the sections. Proceed as follows.

1. Apply a little clean light oil on the O-ring (517) and end of the discharge pipe. If not already done, round-off the pipe end with a file.

2. With a rotary push, insert the discharge pipe into the packing flange (530).

3. Temporarily secure discharge pipe to lower section of pump.

4. Screw upper section of discharge pipe into discharge elbow (516A).

5. If a cutless rubber casing bearing is used, the lower Caplug plug in the hanger pipe (508) just above the discharge casing (1A) should be removed to allow this opening to act as a flushing relief port for the clear water supply which lubricates the rubber bearing.

6. Lower the bottom section of pump and discharge pipe into the sump and set to one side.

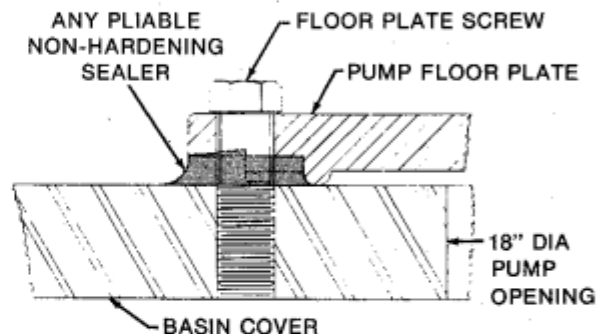


Figure 2. Sealing Pump Floor Plate

7. Lower the upper section of the pump into position and rest on 4-inch blocks between the pump floor plate (518) and basin cover.

8. Move the lower section into position, aligning match marks (or grease line holes).

9. Rotate upper section shaft to align keyway with locating pins (538, figure 7) or coupling key (540, figure 7). Check basic model number to determine if pins, or key, should be present. Check for presence of the key in the coupling, clamped by a set screw to the lower section shaft, or the presence of locating pins. Also, the coupling must always have the lower section shaft taper pin firmly in place.

10. Raise the lower section to engage the coupling with the upper section shaft, carefully seating the hanger pipe register. Secure the lower section by installing hanger pipe bolts, washers and nuts. Tighten the nuts.

11. Working through large access hole in hanger pipe, insert taper pin (537, figure 7) in upper section and tap to seat solidly. If your model has a coupling key, tighten the upper set screw. Install plastic plugs in openings in hanger pipe.

12. Make sure that rubber gasket is between discharge pipe flanges, align screw holes and attach screws and nuts, tightening securely.

13. Rotate shaft (6) by hand to check that there is no rubbing of impeller. If impeller rubs, refer to step 12 of Assembly for clearance adjustment.

14. Install grease lines and grease fittings.

**MOUNTING MOTOR:** Install keys in slots of motor and pump shafts. Slide motor half coupling (527, figure 4) on motor shaft and pump half coupling (529) on pump shaft, temporarily holding with set screws.

1. Install coupling flexible member (528) in pump coupling half. Flexible members may be in two parts with wire ring or in single part with side split.

2. Clean mounting surfaces of motor flange and motor adapter (71).

3. Set motor on the adapter, aligning and engaging motor half coupling with flexible member. When motor is seated in adapter, turn shaft by hand. If no binding, install and tighten motor screws securely.

4. Loosen set screws as required and slide half couplings toward each other to completely engage flexible member. Tighten set screws securely.

5. Connect motor leads as previously marked, using flexible conduit at the motor.

**PIPING:** The discharge pipe line of the pump should include a union, a horizontal swing check valve, and a gate valve, all near the pump.

The line should be run to a point above the basin level so as to drop into the sewer from above. This arrangement permits easy removal of the unit for repairs or cleaning and helps to prevent sewer water backing up through the discharge pipe.

The discharge pipe should not be smaller in size than the discharge connection on the pump. Where runs are long, they should be at least one or two sizes larger.

It is important that the pipe connections to the unit be so made that there is no pipe strain upon the pump.

**FLOAT CONTROLS:** The float control (when furnished) provides automatic operation of the pump unit.

On liquid level rise the float raises the float rod with its fixed buttons until the lower button trips the float switch, starting the pump. As the liquid level drops, the upper float button trips the switch to the off position, stopping the pump.

When the pumping unit consists of two pumps (duplex installation) in a common receiver it is

**WARNING** Due to automatic switch or controller operation of sump pumps, tie the main disconnect switch open or remove fuses from main lines before attempting lubrication, mechanical and electrical examinations,

desirable to provide automatic alternation of the pumps. Alternate operation of the pumps insures equal wear and keeps both units in good running condition. Alternating control provides alternate operation of the two pumping units on successive cycles as long as a single pump can handle the pump load. However, under peak flow conditions, when the liquid level continues to rise more rapidly than can be handled by one pump, both units are automatically placed in operation.

Installation, operation, and maintenance of float controls used with VCS pumps are explained in Peerless Pump bulletin entitled "Float Controls and High Water Alarms for Sump and Sewage Pumps."

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

It is recommended that a suitable overload protector, or an across-the-line automatic starter be installed in the motor circuit to prevent motor burn-outs if an overload should occur. The float switches provided will not protect the motor circuit from overloads.

**FUSES:** It is recommended that Fusetron (dual element) fuses be used if no other thermal or motor overload protecting device is used. 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 blowout.

**WARNING** Before handling any wiring or performing any wiring connections, be certain that the electric power supply source is shut off. An electrical shock from contact with live wires or leads can be fatal.

**WIRING:** Connect the electric service to the controls and make inter-control electrical connections when necessary according to wiring instructions accompanying the switches, using conduit and wire sizes as required by local and national codes. Typical wiring diagrams are illustrated in figure 3. A length of flexible conduit should be used adjacent to the motor for convenience in pump or motor repair. Be sure the voltage and frequency indicated on motor nameplates are the same as those of the service provided.

## LUBRICATION

or repairs. Attach a card "DO NOT CLOSE SWITCH - PUMP REPAIR IN PROGRESS." Disregard of this warning may result in serious personal injury or death.



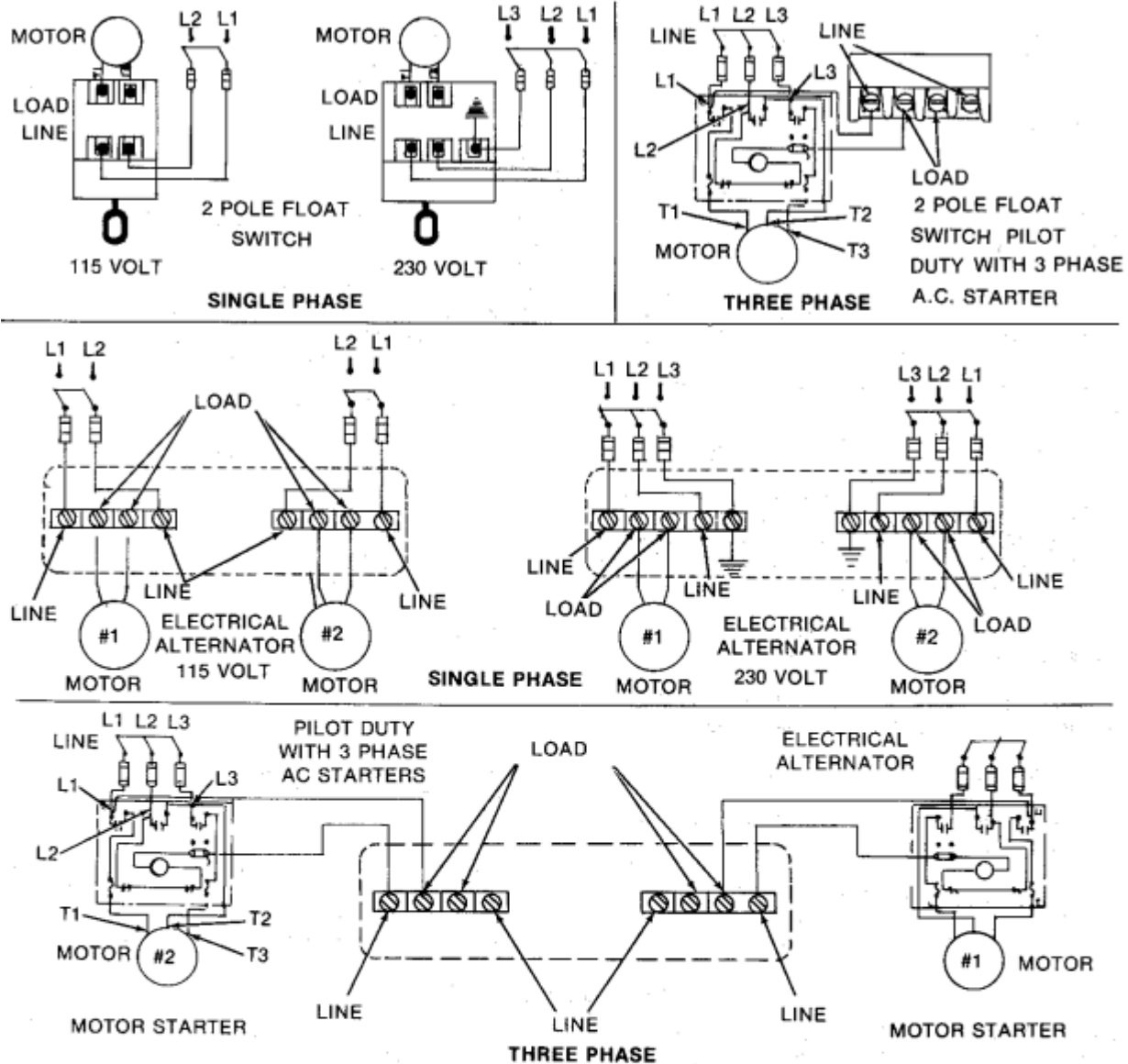


Figure 3. Typical Control Wiring Diagrams

**BALL THRUST BEARING:** The pump has a ball thrust bearing located in the pedestal, below the motor coupling. Lubricate separately through a zerk alemite fitting located in the bearing cap. In general the bearing should be lubricated every three to six months, depending upon service. Always grease sparingly. Use a high grade lithium soap base grease meeting National Lubricating Grease Institute Grade 2 specifications.

**SLEEVE GUIDE BEARINGS:** Lubrication for sleeve guide bearings is provided through separate grease lines. It is recommended that bearings be lubricated with any of the following lubricants or approved equal: Arco Litholine EP-1 Grease, or Shell's Alvania EP. The bearings should be greased before starting the pump, and at weekly intervals thereafter, depending on service. Standard units are fitted with

zerk alemite fittings located on the pump pedestal at the pump floor plate.

**CUTLESS RUBBER CASING BEARING:** Rubber casing bearings are generally furnished when the liquid pumped contains some sand or other similar abrasive materials.

Pumps furnished with lower rubber casing bearings are provided with stainless steel shafts. Do not use a rubber casing bearing with a steel pump shaft.

If pump shaft is supplied with cutless rubber bearings, provide a supply of clear water to the lower bearing (first above discharge casing). The line is usually supplied without a grease fitting at the floorplate and is tagged to indicate that a clear water supply is needed. Adjust the supply at 3 to 5 psi



above the pump discharge pressure. Also, remove the plug from the hanger assembly just above the bearing. When the pump casing has been provided with a cutless rubber bearing, shaft seal (51) is not furnished and should not be used.

**FLOAT ROD SEAL HOUSING:** At approximately weekly intervals, lubricate the float rod seal assembly felt washer saturating it with SAE 30 oil.

## OPERATION

**WARNING** Due to automatic switch or controller operation of sump pumps, tie the main disconnect switch open or remove fuses from main lines before attempting lubrication, mechanical and electrical examinations, or repairs. Attach a card "DO NOT CLOSE SWITCH - PUMP REPAIR IN PROGRESS". Disregard of this warning may result in serious personal injury or death.

**BEFORE STARTING:** Check the following items:

1. Turn shaft by hand and see that it rotates freely. Failure of shaft to turn freely may be caused by packing gland being too tightly drawn or by impeller binding in casing (refer to instruction on how to adjust impeller, maintenance).
2. See that voltage and frequency on motor nameplate are the same as service provided.
3. Most motors are of the dual voltage type. Be sure motor leads are wired for the voltage used.
4. See that the proper fuses are installed.
5. See that switches are regulated for operation and that thermal units are "set".
6. Check motor rotation direction by momentary switch contact. Motor must rotate in same direction as arrow indicated on pump floor plate.

**STARTING:** Close the discharge gate valve fully, reopen just a small amount (a 'crack') and close the motor disconnect switch. The pump will not operate unless the float control switch is closed. If a manual bypass circuit switch has been used, the pump may be run independently of the water level controls by turning it to "on" or manual position.

**AFTER STARTING:** Note the following:

1. Slowly open the discharge gate valve.
2. Note operation of the float control mechanism. Observe a complete start-stop cycle for freedom of float. See that the float switch closes and opens properly as basin fills and is emptied by the pump. The operation of the unit should be absolutely automatic.
3. See that pipe connections do not leak.
4. See that the pump and motor rotate in a clockwise direction when looking down on the motor.
5. Observe operation of pump closely for the first day and at regular intervals for ten days. A new machine is frequently stiff and tight, and therefore the unit should be watched to note performance.

## MAINTENANCE

**TROUBLESHOOTING:** The following troubles may occur. To correct trouble check for the possible causes given:

**WARNING** Due to automatic switch or controller operation of sump pumps, tie the main disconnect switch open or remove fuses from main lines before attempting lubrication, mechanical and electrical examinations, or repairs. Attach a card "DO NOT CLOSE SWITCH - PUMP REPAIR IN PROGRESS". Disregard of this warning may result in serious personal injury or death.

1. Pump Fails to Operate:

- a. Shaft binding or impeller blocked.
- b. A blown fuse, tripped or loose thermal unit.
- c. Switch contacts corroded, circuit shorted, or connections broken somewhere in circuit.
- d. Wiring, hook-up or service provided incorrect, or switches not "set" for operation.

- e. Motor windings grounded or internal centrifugal switch malfunctioning.
- f. Electric service or phase failure.
- g. Float control mechanism not functioning, or float water-logged.
- h. Float rod buttons may be improperly adjusted or slipping on float controlled pumps.

2. Blown Fuse, Tripped Thermal Unit:

- a. Fuse or thermal unit used of incorrect rating or surrounding area too hot.
- b. Shaft stuck or not rotating freely.
- c. Loose or broken connection somewhere in circuit.
- d. Control switches worn or arcing.
- e. Motor windings grounded or internal centrifugal switch malfunctioning.
- f. Motor overloading.
- g. Discharge head is lower than anticipated.

3. Pump Runs Continuously:

- a. Check pump rotation.
- b. See if check valve in discharge line is stuck.
- c. Check discharge head, see if beyond pump rating.
- d. Check inflow rate to basin; see if inflow is excessive.
- e. See if shaft is intact and if the impeller rotates.
- f. Check to see if pump is air bound.
- g. Check float and float switch assembly.

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

1. Maintain proper adjustment of the packing gland; change packing when deteriorated.
2. Keep inside and outside of motor and controls free of moisture, oil and dirt. If necessary, blow out their interiors with a bellows. If switch contacts become corroded or pitted they should be smoothed and treated with vaseline, or replaced.
3. See that the pump does not stand idle for very long periods. If necessary, start pump manually to see that the shaft is free.
4. Follow lubrication instructions.

**PERIODIC INSPECTION:** Reread WARNING at the beginning of this Maintenance section.

To insure the best operation of the pump, make a systematic inspection at least once a week, and check the following:

1. See that the pump starts and stops when the float or controller makes or breaks contact, and that the pump empties the sump.
2. See that the float mechanism or controller responds properly to rising and falling water levels in the sump.
3. See that the motor comes quickly up to speed, and maintains a constant rotation rate.
4. See that the operation of the pump is not excessively noisy.

**PACKING RENEWAL:** Reread WARNING at the beginning of this Maintenance section.

Packing consists of three rings of graphited 3/8-inch square packing. The packing is cut on one side to slip around the pump shaft. Never add one or two rings of packing on top of old packing. If packing can no longer be taken up by the packing gland adjustment, complete repacking is required.

Remove all old packing.

When replacing packing, ring joints must be staggered.

Packing should be drawn up only snug.

Rotate shaft occasionally when packing the pump to insure free movement.

**REMOVAL:** Remove the sump and sewage pump in the following manner (see figures 1, 4, 5 or 6):

**WARNING** Tie the disconnect switch open or remove fuses from lines before attempting to remove pump from the basin. Attach a card "DO NOT CLOSE SWITCH - PUMP REPAIR IN PROGRESS." Disregard of this warning may result in fatal electrical shock.

1. Shut off or blank the system drain inflow line to the basin.
2. Close the gate valve in the discharge line.
3. Open disconnect switch at power supply. Tie switch open and attach card to prevent closing accidentally.
4. Disconnect the union or flange of the discharge pipe near the discharge elbow (516A).

5. Remove cap screws and nuts. Remove motor with motor adapter (71) and set to one side. (Coupling halves (527, 529) should separate from the coupling flexible member (528) as the adapter and motor are withdrawn.)

**NOTE:** Refer to separate instructions for removal of two-section pump.

**WARNING** Do not work under a heavy 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.

6. Remove the cap screws attaching the floor plate (518) to the basin cover and lift pump from basin.
7. Lay across saw horses or other suitable support to facilitate disassembly.

**Two-Section Pump:** Drain, or bail, all liquid from the basin. Proceed as follows (see figures 4 thru 7):

1. Block pump up with a suitable support between discharge casing and basin floor to hold the lower section firm while dismantling it from the upper section.
2. Disconnect and remove all grease line tubing to prevent damage when handling the pump. Be sure to mark grease lines to facilitate reassembly. Plug all grease line openings so that no dirt gets into lines and bearings.

**NOTE:** Mark all hanger pipe connections so that they may be reassembled in their original position in relation to their position to the grease line and location in the pump column.

3. Remove the two cap plug protectors (figure 7) from the hanger pipe (508). The two cap protectors are located 180° apart and are at the point where the shaft is coupled together near the middle of the pump.

4. Turn the upper shaft (6A) until the small end of the taper pin (537) in the shaft coupling (70) is in line with one of the holes in the hanger pipe.

5. Drive the taper pin from its small end until it can be removed from the opposite hole in the hanger pipe.

6. Remove cap screws from the bearing cap (503). Do not disturb setting of lock nut (501) and bearing adapter (170).

7. Raise shaft approximately 4 inches so that the lower end of the upper shaft (6A, figure 7) clears the top of the coupling (70). Block in place with a 4-inch piece of wood between the bottom of the bearing (515) and the bearing pedestal (81) to keep shaft in a raised position.

8. Unbolt the flange connection in the pump discharge line at point B (figure 7), and temporarily secure to the hanger pipe.

**WARNING** Do not work under a heavy 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.

9. At hanger pipe A (figure 7), which is the joint closest to the opening left by the removal of the cap-plug plug, remove bolts and nuts joining hanger pipe and intermediate bearing assembly, and remove lower section of pump.

10. Remove lower section of discharge pipe (522A, figure 7) from packing flange (530), by using a pulling twisting motion.

11. To remove upper section of discharge pipe from discharge elbow (516B, figure 7) unscrew with counter-clockwise turns as viewed from point B.

12. Remove separated lower and upper sections of the pump from the basin. Lay across suitable supports or saw horses.

**DISASSEMBLY:** Mark hanger pipe (508), flanges prior to disassembly for grease line (532) locations, and proper hanger pipe location (hanger pipes are usually not the same length).

1. Remove cap screws (536) and suction cover (1B). Block impeller (2) to keep shaft (6) from turning.

2. Remove split packing gland or packing plate (17) and packing set (13).

3. Remove pump coupling half (not shown in pump assembly) and key (46)

4. With 1-1/8-inch open end wrench, remove nut (501) by turning in a counter-clockwise direction as viewed from coupling end.

5. Remove bearing cap (503) by removing screws.

6. With spanner wrench, unscrew bearing adapter (170) with its bearing (515) from its seat in the bearing pedestal by turning in a counter-clockwise direction as viewed from the coupling end.

**CAUTION** One piece shafts are up to 15 feet long and are heavy. Provide good support and use care while withdrawing to keep from bending.

7. Remove impeller block. Shaft and impeller assembly are now free to be removed from the pump. Withdraw from casing end.

8. Back impeller screw (24) out from shaft approximately five turns. Place a hard wood block or bronze rod against the impeller screw. Strike the rod with a hammer to jar impeller from shaft. Once impeller is loose, remove screw and impeller. Impeller screw should be used only once as the Nylok plug loses its locking quality.

9. For models NS and LMB pumps (figure 6) withdraw impeller and key after removing nut and washer (24).

10. Remove grease lines (532).

11. To remove discharge casing (1A), remove nuts holding hanger pipe assembly (508), nuts, screws attaching packing flange (530) to the discharge casing.

12. With a pulling twisting motion, withdraw discharge pipe from discharge elbow (516A).

**NOTE:** On two section pump, discharge pipe is threaded to discharge elbow.

13. With a pulling twisting motion, remove packing flange from discharge pipe (522).

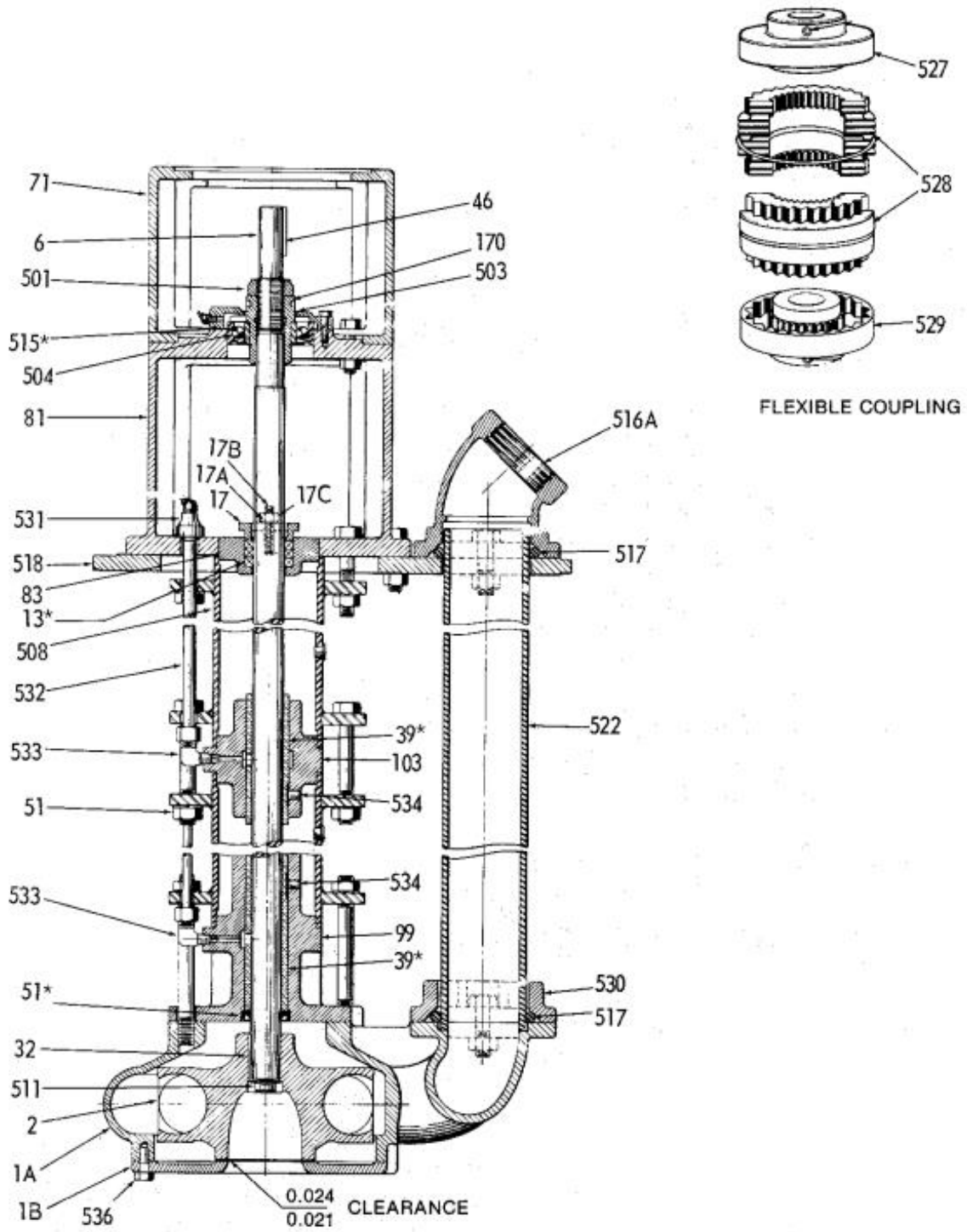
14. To remove discharge elbow, unscrew nuts joining elbow and pump floor plate (518).

15. To remove intermediate bearing housing (103) unscrew nuts joining hanger pipe assemblies.

16. To remove bearing pedestal (81) from pump floor plate (518) unscrew nuts.

17. To remove ball bearing (515) from bearing adapter (170) remove snap ring (504) with snap ring pliers, or pry loose from its seat in bearing adapter with a screwdriver. Remove bearing by pressing it from the adapter.



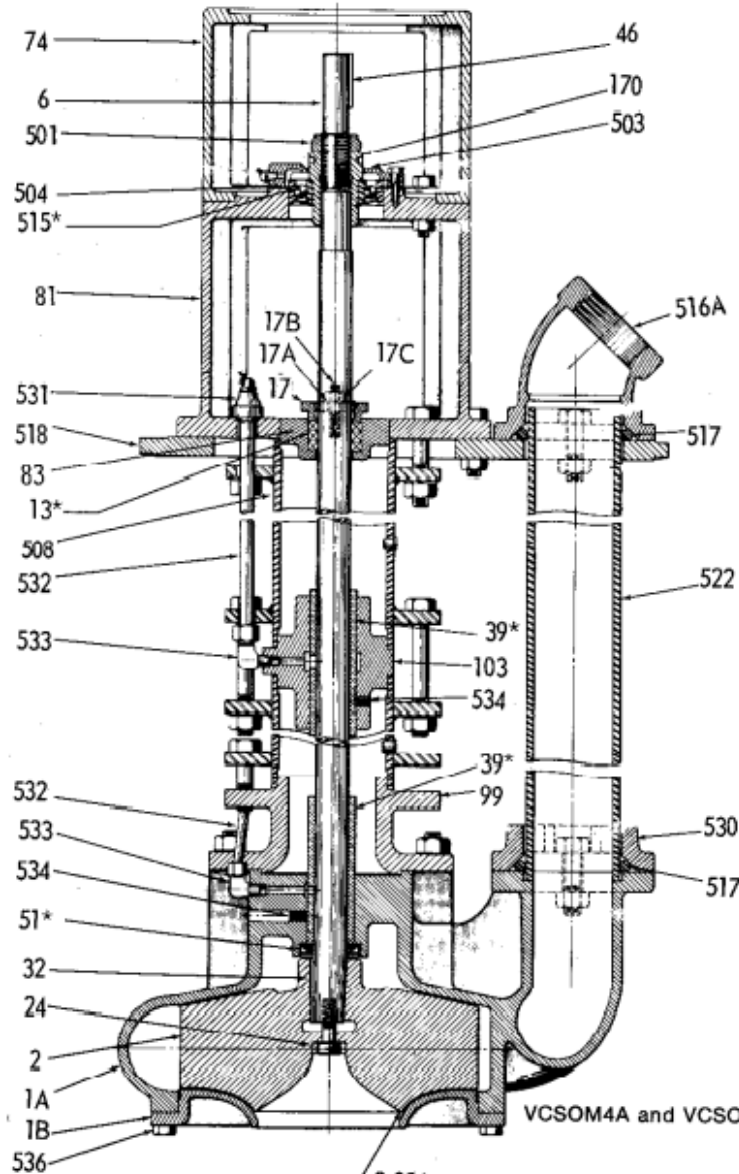


VCSLM3A&B AND VCSLMC4A&B  
VCSSL3A&B AND VCSSL4A&B

Figure 4. LM and LL Model Sump Pumps



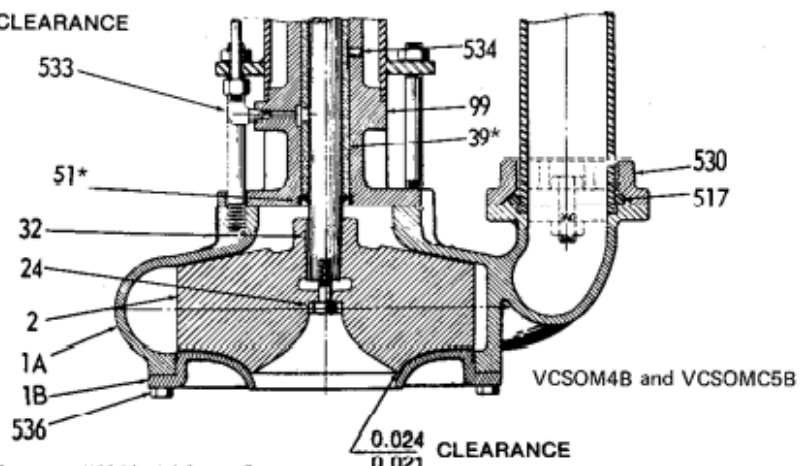




- Legend for figures 4, 5 and 6
- 1A Casing
  - 1B Suction cover
  - 2 Impeller
  - 6 Shaft
  - 6A Upper shaft
  - 6B Lower pump shaft
  - 13\* Packing set
  - 17 Split packing gland (Fig. 4, 5)
  - 17A Gland clamp (Fig. 4, 5 only)
  - 17B Packing gland stud
  - 17C Hex nut (Fig. 4, 5)
  - Socket Head cap screw (Fig. 6)
  - 24 Impeller screw and lockwasher (Fig. 4, 5)
  - Impeller nut and washer (Fig. 6)
  - 32 Impeller key
  - 39\* Intermediate bearing
  - 39\* Discharge casing sleeve bearing
  - 46 Pump coupling key
  - 51 Oil seal

0.024  
0.021 CLEARANCE

\*Recommended spare parts for two years.



0.024  
0.021 CLEARANCE

Figure 5. OM Model Su.np Pumps



- 70 Shaft coupling
- 71 Motor adapter
- 81 Bearing pedestal
- 83 Packing box
- 99 Discharge casing adapter (Fig. 5)\*\*
- Lower bearing housing (Fig. 4, 5, 6)
- 103 Intermediate bearing housing
- 170 Bearing Adapter
- 501 Elastic stop nut
- 503 Bearing cap
- 504 Snap ring (retainer)
- 508 Hanger pipe assembly

- 515\* Ball bearing
- 516A Discharge elbow
- 516B Discharge elbow
- 517 "O" Ring
- 518 Floor plate
- 522 Discharge pipe
- 522A Upper discharge pipe
- 522B Lower discharge pipe
- 527 Motor half-coupling
- 528 Coupling flexible member
- 529 Pump half-coupling
- 530 Packing flange

\*\*Name applies to OM4A and OMC5A models only

VCSNS3A and VCSNSC4A

VCSLMB3 and VCSLMBC4A

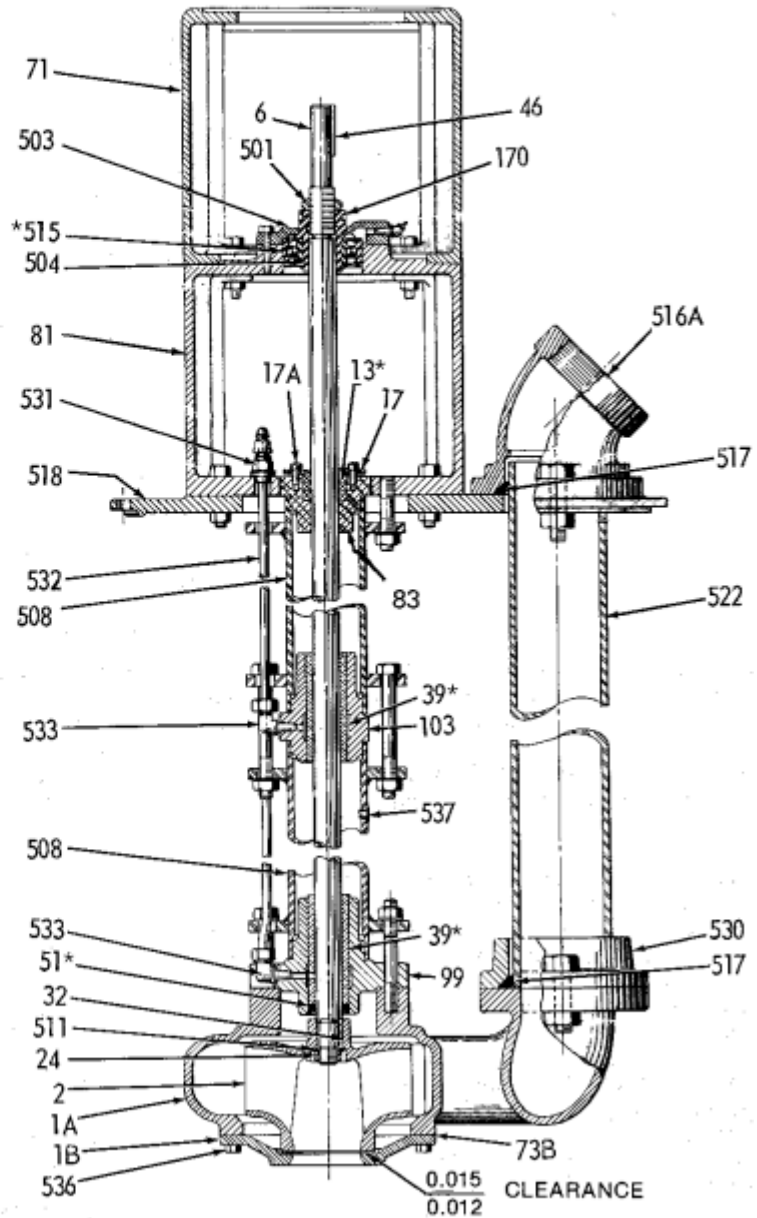


Figure 6. NS and LMB Model Sump Pumps

- 531 Connector and rubber bushing
- 532 Grease line
- 533 90° male elbow
- 534 Set screw (Fig. 4, 5 only)
- 536 Hex head cap screw
- 537 Taper pins
- 538 Locating pins  
(NS & LMB models)  
Set screws  
(LL, LM & OM models)
- 540 Shaft key

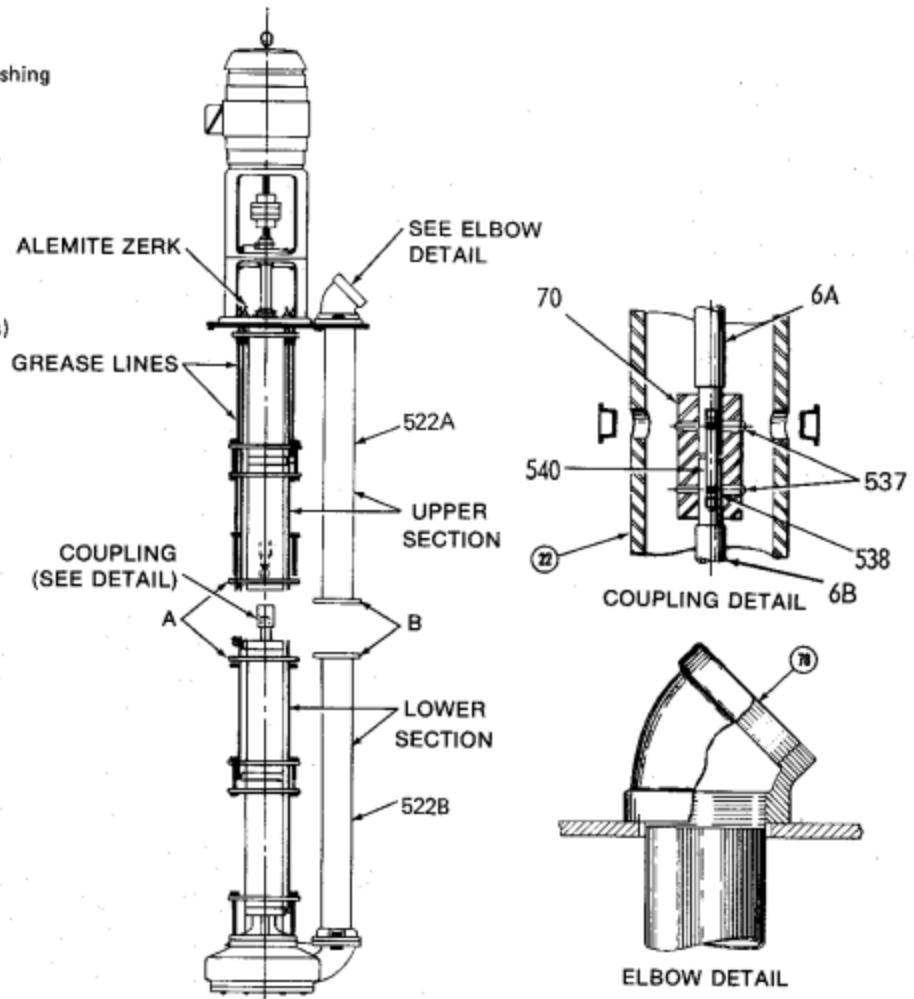


Figure 7. Two-Section Sump Pump

18. To remove sleeve bearings (45, 49) from bearing housing (46), or discharge casing adapter (48) or from lower bearing housing (48, figure 6), remove both cup point set screws (47) (see figure 8). (Set screws are not used in NS and LMB model pumps.) Using a drift, drive bearing from its housing.

**CAUTION** Refer motor to a service shop authorized by the particular motor manufacturer for repairs. It is not recommended that user attempt to make repairs on this type motor under any circumstances. Attempt to repair unit by unauthorized personnel voids manufacturer's warranty.

**WARNING** Petroleum base cleaning solvents are flammable. Open flame or smoking by personnel in the vicinity of these solvents is extremely hazardous and must not be permitted. Disregard of this Warning can result in serious bodily harm and could be fatal.

**CLEANING:** Pump parts may be cleaned with petroleum base solvent if desired. Metal parts (except

motor) may be soaked in solvent if necessary. Use a bristle brush (not metal or wire) to remove tightly adhering deposits. Wipe the exterior of motor housing with a solvent - dampened cloth. Blow parts dry with clean, dry, compressed air. Clean ball bearings in the following manner:

1. Place bearings in wire basket - so there is space for cleaner to reach all parts.
2. Immerse in clean Stoddard solvent. Agitate basket until old grease is thoroughly loosened and can be flushed out.
3. Place bearing on a screened surface.
4. Using a spray gun with air filter and clean Stoddard solvent, flush each bearing until all grease and sludge is removed.

**WARNING** Never spin ball bearings. Spinning a dry ball bearing can cause damage. Spinning any ball bearing by an air blast can cause bearing to fly apart resulting in possible fatal injury.

5. Blow solvent out of bearings with dry, filtered air.

6. Lubricate bearings immediately after cleaning with light spindle oil and place them in a covered container.

**INSPECTION:** Inspect pump parts for cracks, dents, nicks, scratches or other damage affecting serviceability or sealing.

Test cleaned and oiled ball bearings by rotating slowly with the hands. If worn, rough, noisy, loose or flatted, replace with new. Check bearing end play to be 0.006 inch maximum for single row. Do not unwrap new bearings until ready to be installed.

**REPAIR:** Remove burrs, nicks or scratches from non-critical surfaces with a fine stone or crocus cloth.

When ordering replacement parts always furnish data stamped on nameplate attached to the pump. Give the index number and part name as shown on figure 4 through 7.

**BEARING REPLACEMENT:** Install sleeve bearings in the following manner:

**NOTE:** All pumps except the OM4A and OMC5A use the same bearing at both the intermediate locations and in the discharge casing. On the OM4A and OMC5A the intermediate bearings have the grease hole and set screw flat on the same vertical center line, while on the casing bearing the flat and grease hole are 135° apart. NS and LMB models do not use set screws.

1. Thoroughly clean bore of bearing housing, avoid using abrasives.

2. Set sleeve bearing on shouldered arbor and place in housing bore perpendicular to support face.

3. Align flat on bearing with threaded set screw hole in bearing housing (see figure 8).

4. Align grease hole visually, or blow air through grease line opening in bearing housing to insure that grease lubrication hole in bearing is positioned within the channel of the bearing housing. It may be necessary to adjust position of bearing within the housing to obtain free flow of air through the bearing grease holes.

5. When properly positioned, lock bearing in housing with two 3/8 inch hollow head cup point set screws (one on top of the other).

6. Smooth inside of sleeve bearing with emery cloth to remove indentation after tightening set screw.

7. Check fit of bearing to shaft and if binding occurs ream bearing tube 0.003 to 0.005 inch larger than the shaft OD.

**ASSEMBLY:** Assemble the VCS pump as follows (see figures 4 thru 6):

1. Press bearing (515) on adapter (170) by applying force ONLY to inner race and install snap ring (504). Be sure ring seats in groove all around.

2. Assemble hanger pipe (508), matching the marks applied during disassembly, together with grease lines (532) and associated parts that may have been removed.

3. If bearing pedestal (81) was removed, locate on floor plate (518) and attach screws and nuts. Tighten securely.

4. Install new O-ring (517) in discharge elbow (516A), locate on floor plate and attach screws and nuts. Tighten securely.

5. If not already done, round both ends of discharge pipe (522) with a file. Apply soap or light oil to both ends of pipe and insert one end in discharge elbow with a twisting push. Slide packing flange (530) and a new O-ring (517) on the other end of discharge pipe.

6. Install discharge casing (1A) being sure that discharge pipe enters counter bore. (Discharge pipe butts against casing for models NS and LMB.) Attach nuts. Slide packing flange (530) against casing and attach screws and nuts. Tighten all securely.

7. Install impeller (2) on shaft (6). Except for NS and LMB models, using a hardwood block or bronze rod, tap the impeller to a firm seat on the shaft. Install lock washer and screw (24) and tighten securely. For NS and LMB models install washer and nut (24, figure 6) and tighten securely.

8. Install a new oil seal (51), with lip pointing toward sleeve bearing (39), in discharge casing (1A). Make sure seal is not cocked and seated all around in casing.

**NOTE:** Seal is not used with cutless rubber casing bearing.

**CAUTION** One piece shafts are up to 15 feet long and are heavy. Provide good support and use care while inserting to keep from bending.

9. Apply a thin coat of light oil or grease over entire length of shaft and insert shaft carefully through seal and bearings.

10. Install suction cover (1B) and attach screws (536) tightening securely.

11. Install bearing adapter (170) on shaft and turn clockwise until bearing (515) seats in pedestal (81). Install bearing cap (503) and screws, tightening securely.



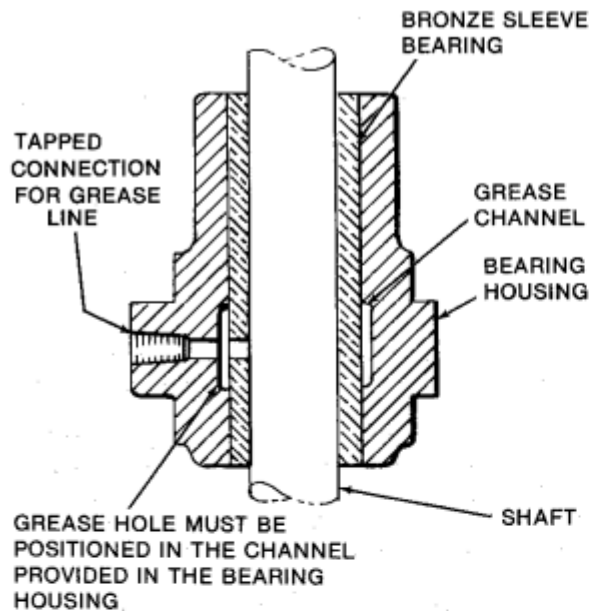


Figure 8. Installation of Sleeve Bearing for all LM, LL and OM Models

12. Adjust impeller clearance as follows:

- a. Block shaft at pump coupling to keep shaft from turning.
- b. With spanner wrench, turn bearing adapter (170) counterclockwise until impeller lightly touches suction cover (18). The shaft should be rotated during this adjustment in order to feel when impeller begins to rub.

c. When impeller rubs, turn bearing adapter (170) slowly clockwise until impeller is free. This method of adjustment will give approximate impeller clearance as illustrated in figures 4 thru 6. Clearance may be checked with feeler gage.

d. When impeller clearance is correct, install and tighten nut (501). Manually rotate impeller to check that there is no rubbing.

13. Install new packing (13), split gland or plate (17), clamps (17A) and nuts or screws (17A).

14. Install coupling key (46), pump coupling half (529), flexible member (528) and temporarily secure with set screw.

15. Install motor as directed in Mounting Motor, under Installation.

For Two-Section Pump: Assemble upper and lower sections in the same manner as for the one-section pump, being sure to align match marks applied during removal and disassembly.

**REINSTALLATION:** Refer to Pump Installation instructions at the beginning of this bulletin to reinstall the pump in the basin.

Notice: Materials of construction, specifications, dimensions, design features, and application information, where shown in this bulletin, are subject to change and/or modification without notice by Peerless Pump at their option.

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