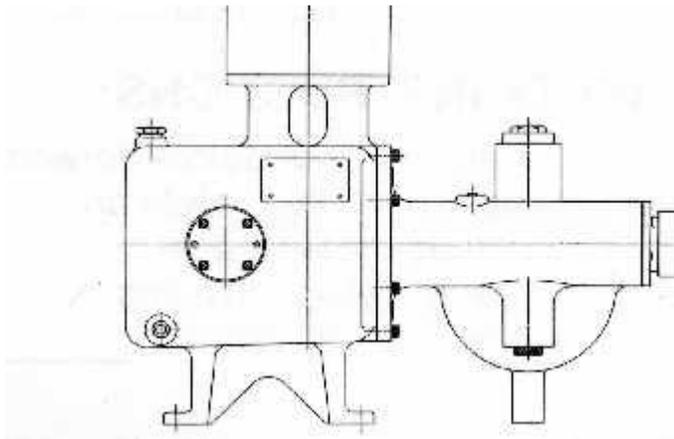


# OPERATING & INSTRUCTION MANUAL

## for **NEPTUNE** **SERIES 600 “dia-PUMP”** **MODELS 610 thru 647**



**NEPTUNE**

CHEMICAL PUMP CO., INC.

Lansdale, PA. 19446 \* Tel.: 215-699-8700 \* FAX: 215-699-0370

# **WARNING**

**LOCKOUTS ARE REQUIRED BEFORE  
SERVICING THIS EQUIPMENT.**

## **SAFETY INSTRUCTIONS:**

**Shut off/ Lockout pump Power before  
Servicing. Be certain pump isolation  
valves are closed – chemical is shut off.  
Bleed pressure before servicing.**

## TABLE OF CONTENTS

<b>SECTION</b>	<b>PARAGRAPH</b>		<b>PAGE</b>
I	--	<b>GENERAL DESCRIPTION</b>	1
		<b>LIMITED WARRANTY</b>	2
		<b>PARTS ORDERING INSTRUCTIONS</b>	3
II	--	<b>INSTALLATION INSTRUCTIONS</b>	4
	1.0	GENERAL	4
	2.0	SUCTION PIPING	5
	3.0	DISCHARGE PIPING	6
	4.0	ADJUSTMENT OF INTERNAL RELIEF VALVE	6
	5.0	INSTALLATION OUTDOORS	8
	6.0	START UP PROCEDURE	8
III	--	<b>NORMAL MAINTENANCE</b>	<b>9-12</b>
	7.0	<b>MAINTENANCE</b>	<b>9-12</b>
IV	8.0	MOTOR OPERATING CONDITIONS	13
V	--	<b>TROUBLE SHOOTING CHART</b>	14-16
VI	9.0	<b>PARTS LIST AND PUMP DRAWINGS</b>	17-27
	10.0	SPARE PARTS	28
VII	11.0	<b>SPECIAL INSTRUCTIONS FOR PNEUMATIC STROKE CONTROL</b>	29
VIII	--	<b>DRAWINGS FOR PNEUMATIC STROKE CONTROL MATERIAL SAFETY DATA SHEET</b>	31

## SECTION I

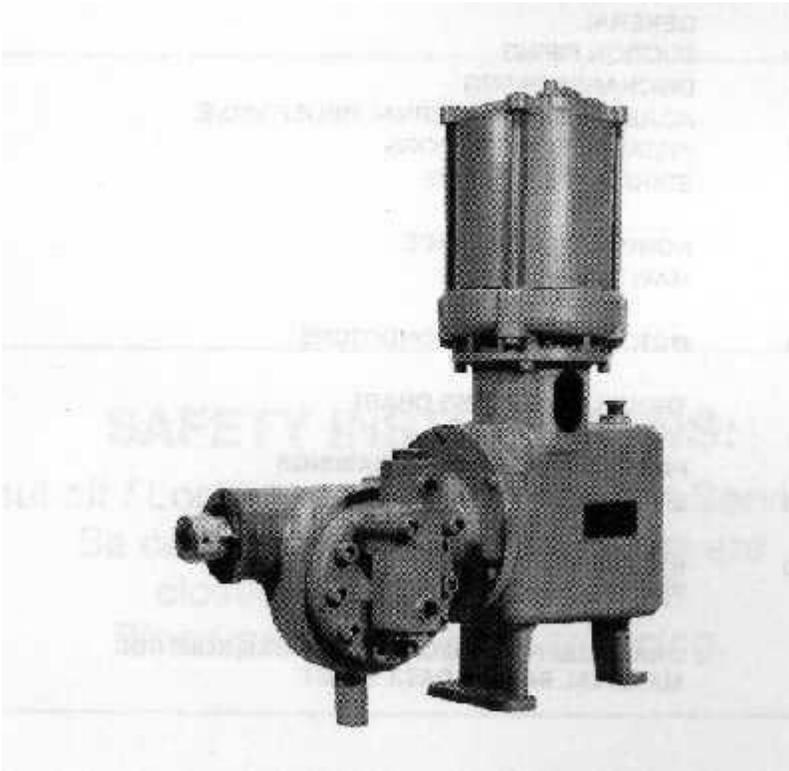
### GENERAL DESCRIPTION

The Neptune series 600 “dia-PUMP” is a reliable metering pump of the high-pressure diaphragm type. Under constant conditions of temperature, pressure, and capacity adjustment settings, a plus or minus range of 1% metered discharge volume is maintained.

A plunger reciprocating at a fixed stroke displaces hydraulic fluid which actuates a flexible, chemically inert, Teflon® diaphragm to create pumping action. The capacity of the pump is regulated by controlling the volume of hydraulic fluid, which bypasses the diaphragm cavity.

Metering accuracy is maintained by a control rod which allows hydraulic fluid replacement and air venting automatically with each stroke, while also taking into account temperature changes of the hydraulic fluid. Metering accuracy is also insured by the use of double ball check valves on the suction and discharge of the pump.

PLEASE READ THE INSTRUCTION MANUAL COMPLETELY BEFORE INSTALLING THE PUMP.



**SECTION I**

**NEPTUNE CHEMICAL PUMP COMPANY**

**LIMITED WARRANTY**

All Neptune Pumps are tested at the factory prior to shipment. Each part used in their construction has been carefully checked for workmanship.

If the pump is installed properly, Neptune Chemical Pump Company, Inc. warrants to the purchaser of this product for a period of twelve months from the date of first use or eighteen months from shipment, whichever occurs first, this products shall be free of defects in material and/or workmanship, as follows:

1. Neptune Chemical Pump Company, Inc. will replace, at no charge, any part that fails due to a defect in material and/or workmanship during the warranty period, FOB our factory, Lansdale, Pennsylvania. To obtain warranty service, you must forward the defective parts to the factory for examination, freight pre-paid.<sup>1</sup>
2. This warranty period does not cover any product or product part which has been subject to accident, misuse, abuse or negligence. Neptune Chemical Pump Company, Inc. shall only be liable under this warranty if the product is used in the manner intended by the manufacturer as specified in the written instructions furnished with this product.

Any express warranty not provided in this warranty document, and any remedy for breach of contract that, but for this provision, might arise by implication or operation of law, is hereby excluded and disclaimed. Under no circumstances shall Neptune Chemical Pump Company, Inc. be liable to purchaser or any other person for any charge for labor, repairs, or parts, performed or furnished by others, nor for any incidental consequential damages, whether arising out of breach of warranty, express or implied, a breach of contract or otherwise. Except to the extent prohibited by applicable law, any implied warranty of merchantability and fitness for a particular purpose are expressly limited in duration to the duration of this limited warranty.

Some states do not allow the exclusion or limitation of incidental or consequential damages, or allow limitations on how long any implied warranty lasts, so the above limitations may not apply to you. This warranty gives you specific legal rights, and you may have other rights which may vary from state to state.

**IMPORTANT**

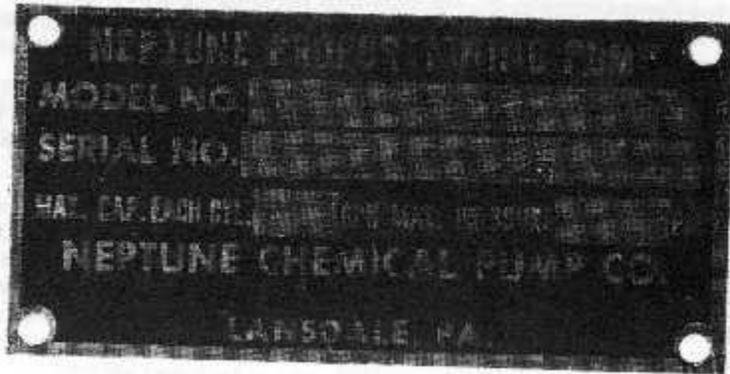
SHOULD IT BE NECESSARY TO SEND THE PUMP TO THE FACTORY FOR REPAIR OR MAINTENANCE REBUILDING, DRAIN ALL OIL AND CHEMICAL FROM PUMP BEFORE SHIPPING, FAILURE TO DO SO CAN CAUSE EXTENSIVE DAMAGE TO THE MOTOR.

‘ SEE IMPORTANT NOTICE – RETURN GOODS AUTHORIZATION

<b>IMPORTANT NOTICE</b> <b>RETURN GOODS AUTHORIZATION</b>	
(1)	All equipment returned to Neptune Chemical Pump Company, Inc. requires proper Returned Goods Authorization Number (RGA) and tags.
(2)	All equipment returned to the factory for repair or service must first be thoroughly flushed and have all chemical contact areas neutralized.
(3)	All equipment which has been in contact with chemicals must be accompanied by a copy of the Chemical Product Material Safety Data Sheet (MSDS).
(4)	Failure to comply with the above instructions, will result in equipment being returned to sender, freight collect, without service.

## PARTS ORDERING INSTRUCTIONS

The complete model number and serial number of the pump must be furnished to insure prompt and accurate parts service. These numbers are found on the name plate (sample photo below) located on the side of the pump. Refer to Section VI for complete parts lists.



Send all orders or inquired for parts to:

Parts Department  
Neptune Chemical Pump Company, Inc.  
P.O. Box 247  
Lansdale, PA 19446  
Tel: 215-699-8700  
Fax: 215-699-0370

**NOTE! PLEASE SUPPLY BOTH MODEL AND SERIAL NUMBERS.**

## SECTION II

### INSTALLATION INSTRUCTIONS

#### 1.0 GENERAL

##### 1.0.1 UNPACKING & INSPECTION

When unpacking a pump or chemical feed system, be certain that no parts are thrown away. Examine the equipment for possible damage. If damage has occurred, file claim with the common carrier within 24 hours. Neptune will assist in estimating the repair costs.

1.0.2 The “dia-Pump” should be located on a level surface. Four mounting holes are provided to anchor the pump securely to the mounting surface. All piping to the pump should be supported to prevent stress on the pump input and output fittings.

1.0.3 Before connecting the pump, make sure that all fittings are completely clean by flushing thoroughly. Any foreign matter entering the pump can damage the internal parts and severely limit the life of the pump.

1.0.4 A “Y” STRAINER (AT LEAST ONE PIPE SIZE LARGER THAN SUCTION INLET SIZE OF THE PUMP) MUST BE INSTALLED IN THE SUCTION LINE OF THE PUMP TO INSURE AGAINST FOREIGN MATTER ENTERING THE PUMP.

1.0.5 It is recommended that shut-off valves and unions be placed in the suction and discharge lines if possible. Such an arrangement will facilitate servicing the pump.

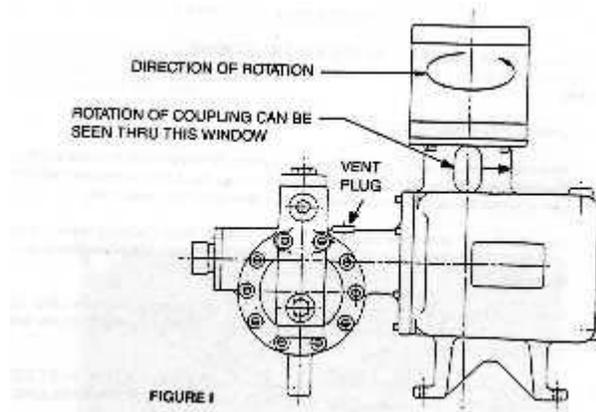
1.0.6 The electrical supply to the pump must match the motor nameplate characteristics. The motor rotation is counter clockwise when viewed from the top of the motor or looking down on the pump. (See Figure 1)

#### **IMPORTANT**

On single phase units, the rotation is set at the factory and must not be changed.

On all units, motor rotation may be viewed through the coupling access points just below the motor.

Please note Figure 1, indicating the correct rotation. Operation with the incorrect rotation will damage the pump and motor.



- 1.0.8 Please note, that some items in the parts list have more than one part number for an individual figure number. These different part numbers insure unique identification of parts, which are available in more than one material of construction, or as in the case of gears, more than one speed. Please use the **part number**, not the figure number when ordering.
- 1.0.9 Fill gear box and pump by pouring the hydraulic fluid (drive lubricant) supplied through the fill opening at the rear of the pump. Pour fluid in slowly until it is at the dipstick mark. The control knob should be in the zero position during the filling. PLEASE NOTE: TO VENT THE AIR, REMOVE A VENT PLUG, LOCATED ON TO OF THE OIL HEAD.

Allow 30 minutes for hydraulic fluid to make its way into pump chamber and then recheck fluid level.

The hydraulic fluid supplied by Neptune is EP SAE 90.

Common sources for hydraulic fluid are:

Shell Oil	Omala #220
Mobil Oil	Mobil Gear #629
Sun Oil	Sun Oil #220
Texaco	Meropa #220

## 2.0 SUCTION PIPING

- 2.0.1 The suction piping to the pump must be absolutely air tight and one size larger than suction inlet size of the pump. It is suggested that the suction piping be tested with low pressure and a soap solution to assure that no leaks exist. Limit the total length of the suction line to 3-4 feet suction lift or 6-7 feet flooded suction. Minimize bends, elbows, or other restrictions.
- 2.0.2 NEPTUNE RECOMMENDS THAT THE "dia-PUMPS" BE OPERATED WITH A FLOODED SUCTION, AS THIS WILL FACILITATE START UP AND INCREASE THE SERVICE LIFE OF THE PUMP.
- 2.0.3 It is highly recommended that all solution tanks be furnished with a low level cut off switch or low level alarm and cut off switch to prevent the pump from running dry. OPERATION AGAINST A DRY SYSTEM WILL CAUSE DAMAGE TO THE PUMP DIAPHRAGM AND REDUCE THE OPERATING LIFE OF THE PUMP.

### 3.0 DISCHARGE PIPING

- 3.0.1 It is recommended that the “dia-PUMP” operate against a minimum discharge pressure of 50 psig.
- 3.0.2 All Neptune Series 600 “dia-Pumps” are supplied with an internally pre-set relief valve. This relief valve is set approximately 25% above the actual rated discharge pressure of the pump and is designed to protect the pump should a discharge pressure beyond the rated limit of the pump occur.
- 3.0.3 To protect the piping system, it is recommended that an external relief valve as manufactured by Neptune Chemical Pump Company, or equal, be placed in the discharge line of the pump.
- 3.0.4 Discharge piping should equal discharge port size.

### 4.0 ADJUSTMENT OF INTERNAL RELIEF VALVE

- 4.0.1 All Neptune Series 600 “dia-Pumps” are supplied with an internally pre-set relief valve. The internal relief valve is set as follows:

Model	INTERNAL RELIEF VALVE SETTINGS (PSI)				
	1/2H/P	3/4 H/P	1 H/P	1-1/2 HP	2 HP
610	1500	2500	3150	4375	----
615	1500	2500	3150	4375	----
620	----	625	750	1000	1500
625	----	625	750	1000	1500
635	----	300	350	550	750
637	----	300	350	550	750
637 PVC	----	250	----	----	----
647	----	----	----	----	300
647 PVC	----	----	----	----	250

The internal relief valve is designed to protect the pump itself should a discharge pressure beyond the relief valve setting occur.

If a customer order specifies a relief valve setting above those indicated above, the specified setting will be set at the factory. All pumps are tagged with the relief valve setting used by the factory.

To protect the external piping system, it is recommended that a relief valve as manufactured by Neptune Chemical or equal be placed in the discharge line of the pump. It is further recommended that this relief valve be piped into return of the tank with clear PVC tubing so that it can be determined if the solution is bypassing through the valve and returning to the tank, indicating a line blockage.

Drawing on page 18 illustrates the locations of the internal relief valve for Models 610 and 615 (FIG. #1435, #1411, #0145, #0119, #0146, #0120).

Drawing on page 20 illustrates the locations of the internal relief valve for Models 620 and 625 (FIG. #2335, #2311, #0145, #0119, #0146, #0120).

Drawing on page 22 illustrates the locations of the internal relief valve for Models 635 and 637 (FIG. #3235, #3211, #0145, #0119, #0146, #0120).

Drawing on page 24 illustrates the locations of the internal relief valve for Models 647 (FIG. #3235, #3211, #0145, #0119, #0146, #0120).

The drawing shows a passage connecting the hydraulic fluid reservoir with the hydraulic fluid side of the diaphragm.

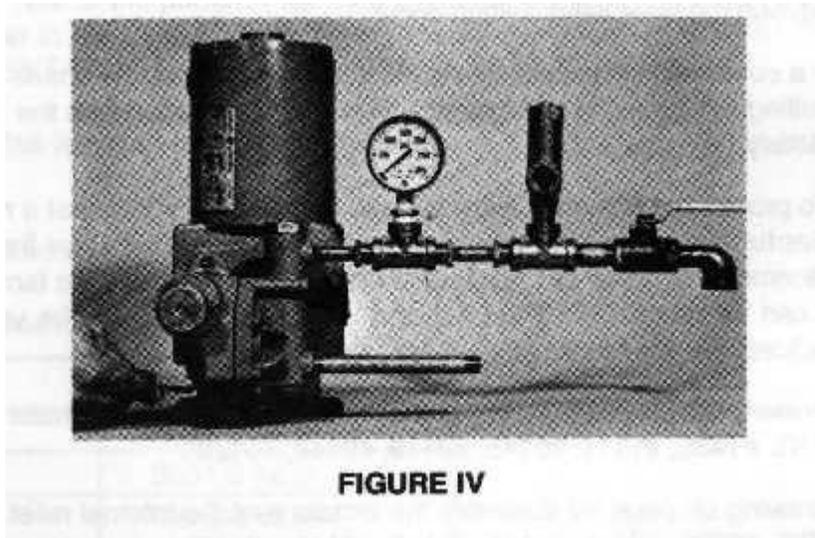
The passage is interrupted by the relief valve ball (FIG. #1435, #2335, #3235) which is backed up by a relief valve spring (FIG #0146).

If, during the pump operation, the pressure on the hydraulic fluid side of the pump exceeds the set pressure of the internal relief valve, the ball is forced from its seal allowing the hydraulic fluid to flow back to the reservoir.

4.0.2 To reset the relief valve to a higher pressure (the relief valve setting cannot be reduced because of design considerations), instructions are as follows:

- 4.0.21 Connect a test set-up shown in Figure IV below. **NOTE:** All parts must have a working pressure rating above the required set pressure.
- 4.0.22 Start and run the pump until air is relieved from the discharge liquid (hand valve open).
- 4.0.23 Remove relief valve cap (FIG. #0120).
- 4.0.24 Close hand valve; pressure gauge should read between 250 and 4500 psi depending on pump model.
- 4.0.25 Use 5/16" Allen wrench to adjust spring tension by turning relief valve adjusting screw (FIG. #0119).
  - (1) To increase pressure, turn relief valve adjusting screw (FIG. #0119) in.
  - (2) To decrease pressure, turn relief valve adjusting screw (FIG. #0119) out.
- 4.0.26 After resetting or adjusting pressure, replace relief valve cap (FIG. #0119) completely in.

Do not attempt to set the internal relief valve more than 25% in excess of name plate rating.



## 5.0 INSTALLATION OUTDOORS

The "dia-PUMP" is a totally enclosed pump which can be used outdoors or indoors. When installed outdoors, make sure that the pump is protected against extremes of nature as follows:

- 5.0.1 Running of the pump when exposed to tropical sunshine with ambient temperature above 90° F (32°C) would cause excessive oil motor temperatures. The pump should be shaded and located in such a way as to permit an ample degree of air circulation.
- 5.0.2 Under cold conditions, the pump should be insulated and a heater should be supplied in order to maintain the hydraulic fluid at an ambient temperature above 30°F (-1°C).

## 6.0 START UP PROCEDURE

The following start up procedure is complete and does repeat instructions on filling the gearbox and pump.

- 6.0.1 Remove backpressure spring (anti-siphon spring) for start up. Reinstall after pump is operational if needed.
- 6.0.2 Flooded Suction: Refer to Section II, Paragraph 1.0.9, for instructions on filling gearbox with hydraulic fluid.
- 6.0.3 After having let pump stand for 30 minutes and having rechecked fluid level, set pump capacity indicator at approximately 30%. Be certain that pump suction and discharge lines are open.
- 6.0.4 Make certain that pumping chamber is flooded by loosening vent plug (FIG. #1412 for Models 610 & 615, FIG #2314 for Models 620 & 625, FIG. #3214 for Models 635 & 637) and allowing solution to appear. Then tighten discharge vent plug. This procedure will also allow air to vent from pumping chamber. The "dia-PUMP" WILL NOT FUNCTION IF AIR IS TRAPPED IN THE HYDRAULIC FLUID OR LIQUID PUMP CHAMBERS. Start pump.
- 6.0.5 On initial start-ups: Check for proper motor rotation (Refer to Paragraph 1.0.9). Run the pump for 10-20 seconds, then stop for 20-30 seconds. Repeat approximately 15 items in order to fill the diaphragm oil cavity. During these short runs, listen for any abnormal motor or crank noises, and if present, refer to trouble shooting chart.

### **WARNING**

BEWARE APPLICATIONS WHERE WATER IS NOT COMPLETE WITH CHEMICAL TO BE PUMPED.  
EXAMPLE: NEVER FORCE PRIME WHEN PUMPING ACID OR OIL BASED PRODUCTS.

**SECTION III**  
**PUMP MODELS 610 AND 615**  
**NORMAL MAINTENANCE**

**7.0 MAINTENANCE**

Under normal conditions, the "dia-PUMP" should not require any significant amount of maintenance. It is advised that periodic visual observations be made of the oil level to make sure that it is within ¼" of the dipstick mark. The liquid end of the pump should also be inspected for leakage. These observations should be made regularly.

The hydraulic fluid should be drained and replaced twice a year, using the drain plug (FIG. #0130) at the back of the pump. This charge can be scheduled with the normal factory maintenance at seasonal periods.

**7.0.1 Check Valves: Removing, cleaning, replacing.**

The "dia-PUMP" incorporates a unique check valve design whereas the discharge and suction piping **NEED NOT** be disturbed in order to service the valves.

7.0.11 Remove discharge cap (FIG. #1412).

7.0.12 Remove ball retainer (FIG. #1424) using 5/16" Allen wrench.

7.0.13 Remove discharge valve cartridge (FIG. #1460) using special wrench provided. Be certain that valve "O" ring (FIG. #1442) is removed with valve cartridge.

7.0.14 Remove suction cap (FIG. #1428).

7.0.15 Remove suction valve cartridge (FIG. #1460) using special wrench provided. Be certain that valve "O" ring (FIG. #1442) is removed with valve cartridge.

7.0.16 Clean valve cartridges with suitable solvent. The valve cartridge is a complete and integral unit and should not be disassemble for cleaning if the valves are found to be worn and in need of replacement; an entire valve cartridge in either suction or discharge should be ordered. The suction valve is the longer of the two valve cartridges.

7.0.17 To replace, reverse above procedure using a small amount of grease to hold valve 'O' rings in place. Do not over tighten the valve cartridges as this could damage the valve "O" rings.

**REFER TO DRAWING ON PAGE 18.**

**SECTION III**  
**PUMP MODELS 620 AND 625**  
**NORMAL MAINTENANCE**

7.1 MAINTENANCE

Under normal conditions, the “dia-Pump” should not require any significant amount of maintenance. It is advised that periodic visual observations be made of the oil level to make sure that it is within ¼” of the dipstick mark. The liquid end of the pump should also be inspected for leakage. These observations should be made regularly.

The hydraulic fluid should be drained and replaced twice a year, using the drain plug (FIG. #0130) at the back of the pump. This change can be schedule with the normal factory maintenance at seasonal periods.

7.1.1 Check Valves: Removing, cleaning, replacing.

The “dia-Pump” incorporates a unique check valve design whereas the discharge and suction piping **NEED NOT** be disturbed in order to service the valves.

Should the valves need cleaning, remove as follows:

- 7.1.11 Remove vent plug (FIG. #2314) with anti-siphon spring (FIG. #2318) if installed.
- 7.1.12 Remove eight valve cap screws (FIG. #2336) on suction and discharge caps.
- 7.1.13 Remove discharge cap (FIG. #2312) with retaining screen. Remove suction cap (FIG. #2328).
- 7.1.14 With heavy wood dowel or bar of soft material, tap and push complete valve stack out of pump from top through to bottom. The valve stack consists of:

4 Valve Balls (FIG. #2340)

4 Valve Seats (FIG. #2363)

3 Ball Guides (FIG. #2362)

1 Stack Spacer (FIG. #2361)

4 Valve Seat “O” Rings (FIG. #2342)

NOTE: Valve seats are *seated* both sides and may be reversed.

- 7.1.15 Clean valve stack parts with suitable solvent. Replace in same order as removed from top to bottom, putting suction valve cap (FIG. #2328) in place with “O” ring first.

**REFER TO DRAWING ON PAGE 20.**

## SECTION III

### PUMP MODELS 635, 637 AND 647

#### NORMAL MAINTENANCE

#### TO VIEW FIGURE NUMBERS:

For Models 635 & 637 refer to Drawing on page 22.

For Model 647 refer to Drawing on page 24.

## 7.2 MAINTENANCE

Under normal conditions, the "dia-Pump" should not require any significant amount of maintenance. It is advised that periodic visual observations be made of the oil level to make sure that it is within  $\frac{1}{4}$ " of the dipstick mark. The liquid end of the pump should also be inspected for leakage. These observations should be made regularly.

The hydraulic fluid should be drained and replaced twice a year, using the drain plug (FIG. #0130) at the back of the pump. This change can be scheduled with the normal factory maintenance at seasonal periods.

### 7.2.1 Check Valves: Removing, cleaning, replacing.

The "dia-Pump" incorporates a unique check valve design whereas the discharge and suction piping NEED NOT be disturbed in order to service the valves.

Should the valves need cleaning, remove as follows:

7.2.11 Remove vent plug (FIG. #3214) with anti-siphon spring (FIG. #3218) if installed.

7.2.12 Remove eight valve cap screws (FIG. #3236) on suction and discharge caps.

7.2.13 Remove discharge cap (FIG. #3212) along with retaining screen (FIG. #3216). Remove suction cap (FIG. #3228).

7.2.14 With heavy wood dowel or bar of soft material, tap and push complete valve stack out of pump from top through to bottom. The valve stack consists of:

4 Valve Balls (FIG. #3240)

4 Valve Seats (FIG. #3222)

2 Ball Retainers (FIG. #3224)

3 Stack Spacers (FIG. #3226)

1 Valve Ball Spacer Retainer (FIG. #3220)

4 Valve Seat "O" Rings (FIG. #3242)

NOTE: Valve seats are *seated* both sides and may be reversed.

7.2.15 Clean valve stack parts with suitable solvent. Replace in same order as removed from top to bottom, putting suction valve cap (FIG. #3228) in place with "O" ring first.

7.3.1 Procedure for replacing CONTROL ROD "O" RING (FIG. #1434 for Models 610 & 615, FIG. #2334 for Models 620 & 625, FIG. #3234 for Models 635, 637 & 647) and SEALING PLATE "O" RING (FIG. #2333 for Models 620 & 625, FIG. #3233 for Models 635, 637 & 647).

7.3.11 Remove hydraulic fluid from gear box.

7.3.12 Remove indicator plate (FIG. #0118) by removing two indicator plate screws (FIG. #0143).

- 7.3.13 Remove control rod assembly with control rod attached (FIG. #0117 for all pumps; #1406 and #1408 for Models 610 & 615, #2306 and #2308 for Models 620 & 625, #3206 and #3208 for Models 635, 637 & 647) by turning counter clockwise until threads are disengaged, then pulling out.
- 7.3.14 Remove four sealing nut retaining screws (FIG. #0144).
- 7.3.15 Remove seal plate retainer (FIG. #0166) and sealing nut (FIG. #0115).
- 7.3.16 Remove seal plate (FIG. #1407 for Models 610 & 615, FIG #2307 for Models 620 & 625, FIG. #3207 for Models 635, 637 & 647) using small brass hook to pry loose.
- 7.3.17 Replace control rod "O" ring (FIG. #1434 & 1465 [BACKUP RINGS] for Models 610 & 615, FIG. #2334 for Models 620 & 625, FIG #3234 for Models 635, 637 & 647) and/or sealing plate "O" ring (FIG. #1433 for Models 610 & 615, FIG. #2333 for Models 620 & 625, FIG. #3233 for Models 635, 637 & 647).
- 7.3.18 When replacing sealing plate, take care so as to not shear the sealing plate "O" ring (FIG. #1433 for Models 610 & 615, FIG. #2333 for Models 620 & 625, FIG. #3233 for Models 635, 637 & 647). Apply grease to "O" ring before assembly.
- 7.3.19 Replace balance of parts and fill pump with hydraulic fluid per previous instructions.
- 7.3.20 Follow start-up procedure as if starting a new pump. Refer to Section II, Paragraph 1.0.9 and 6.0.
- 7.4.1 Removal of pump head and replacement of diaphragm.
  - 7.4.11 Remove drain plug (FIG. #0130), and drain hydraulic fluid.
  - 7.4.12 Remove long and short pump head bolts (FIG. #1438 and #1444 for Models 610 & 615, FIG. #2338 and #2344 for Models 620 & 625, FIG. #3238 and #3244 for Models 635, 637 & 647). Lift pump head (FIG. #1402 for Models 610 & 615, FIG. #2302 for Models 620 & 625, FIG. #3202 for Models 635, 637, & 647) away from pump.
  - 7.4.13 Remove and examine Teflon diaphragm (FIG. #1410 for Models 610 & 615, FIG.#2310 for Models 620 & 625, FIG. #3210 for Models 635, 637 & 647). Remove and examine the liquid side diaphragm backup plate (FIG. #1430 for Models 610 & 615, FIG. #2330 for Models 620 & 625, FIG. #3230 for Models 635, 637, & 647). Replace with new pump, if required. When replacing the Teflon diaphragm, be certain to line it up properly with the sealing grooves.
  - 7.4.14 To reassemble, reverse the above procedure. Reassemble is facilitated by laying the pump on its side. Be certain to tighten all bolts evenly. Tighten to 100 ft. lbs.

## **SECTION IV**

### **MOTOR OPERATING CONDITIONS**

8.0 The normal temperature rise for standard motors is 40° C above ambient temperature and, thus, it might appear that the motor is operating at a higher than normal temperature. This situation is normal and should not cause concern.

As a precaution against motor overheating, it is recommended that the pump be located where adequate ventilation is available. It is also recommended that a MOTOR STARTER WITH THE PROPER OVERLOAD PROTECTION BE SUPPLIED AS AN ADDITIONAL SAFETY DEVICE.

## SECTION V

### TROUBLE SHOOTING CHART

SYMPTOM	CAUSE	REMEDY
1. Pump Motor Will Not Operate.	A. Blown Fuse.	Check for short circuit
	B. Open thermal overload device in starter	Reset.
	C. Low liquid level in tank (where low level cut-off is used).	Fill Tank.
	D. Broken Wire	Locate and repair.
	E. Low voltage	Check for too light wiring.
	F. Oil "frozen" in pump.	Thaw out.
2. Pump Does Not Deliver Rated Capacity.	A. Starved suction.	Replace suction piping with larger size.
	B. Leaky suction piping.	Pressure test, repair or replace defective piping.
	C. Excessive suction lift.	Rearrange equipment location to reduce suction lift.
	D. Liquid too close to boiling point.	Lower temperature or increase suction pressure slightly.
	E. Air or gas trapped in oil of chemical solution.	Decrease capacity to 20% for 7 mins., then increase to 100% for 7 mins. Bleed air from valve system.
	F. Worn or dirty valves or seats, or both.	Clean or replace.
	G. Viscosity of liquid too high.	1. Reduce viscosity by heating or other means.  2. Increase size of suction piping.  3. Increase suction pressure slightly.
	H. Insoluble materials, crystallization or solids settling.	Limit solution strength to 5% by weight. Flush and clean solution tank periodically. Suction connection should be 2 to 4" from bottom of solution tank.

SYMPTOM	CAUSE	REMEDY
	I. Low discharge pressure.	A minimum discharge pressure of 50 psi is required to insure proper capacity control.
3. Pump delivers erratically.	A. Leaky suction line.	Repair or replace piping.
	B. Worn or dirty valves or seats, or both.	Clean or replace valve assembly.
	C. Excessive excursion of ball valves from seats (indicated by ball chatter).	Increase back pressure.
	D. Insufficient suction pressure	Increase suction pressure. Raise tank level.
	E. Liquid too close to boiling point.	Reduce temperature or raise suction pressure.
	F. Leaky system relief valve.	Repair or replace relief valve.
	G. Low hydraulic fluid level.	Add hydraulic fluid.
4. Motor overheats thermal overload activates.	A. Power supply does not match motor.	Check power supply against motor nameplate data.
	B. Overload caused by operating pump beyond rated capacity.	Check operating pressure against pump manufacturer data plate maximum rating.
5. Noisy Operation.	A. Pump Valves	Valves must move to open and close, and they will make a clicking noise as they operate. These noises are sometimes amplified by natural resonance's in piping system. They are usually indications of normal valve functioning.
1. In pump.		
2. In Gear Reducer.	A. Pounding noise at high discharge pressure.	Fluid compressibility causes reversal of load on gears at end of pressure stroke. Not considered detrimental.

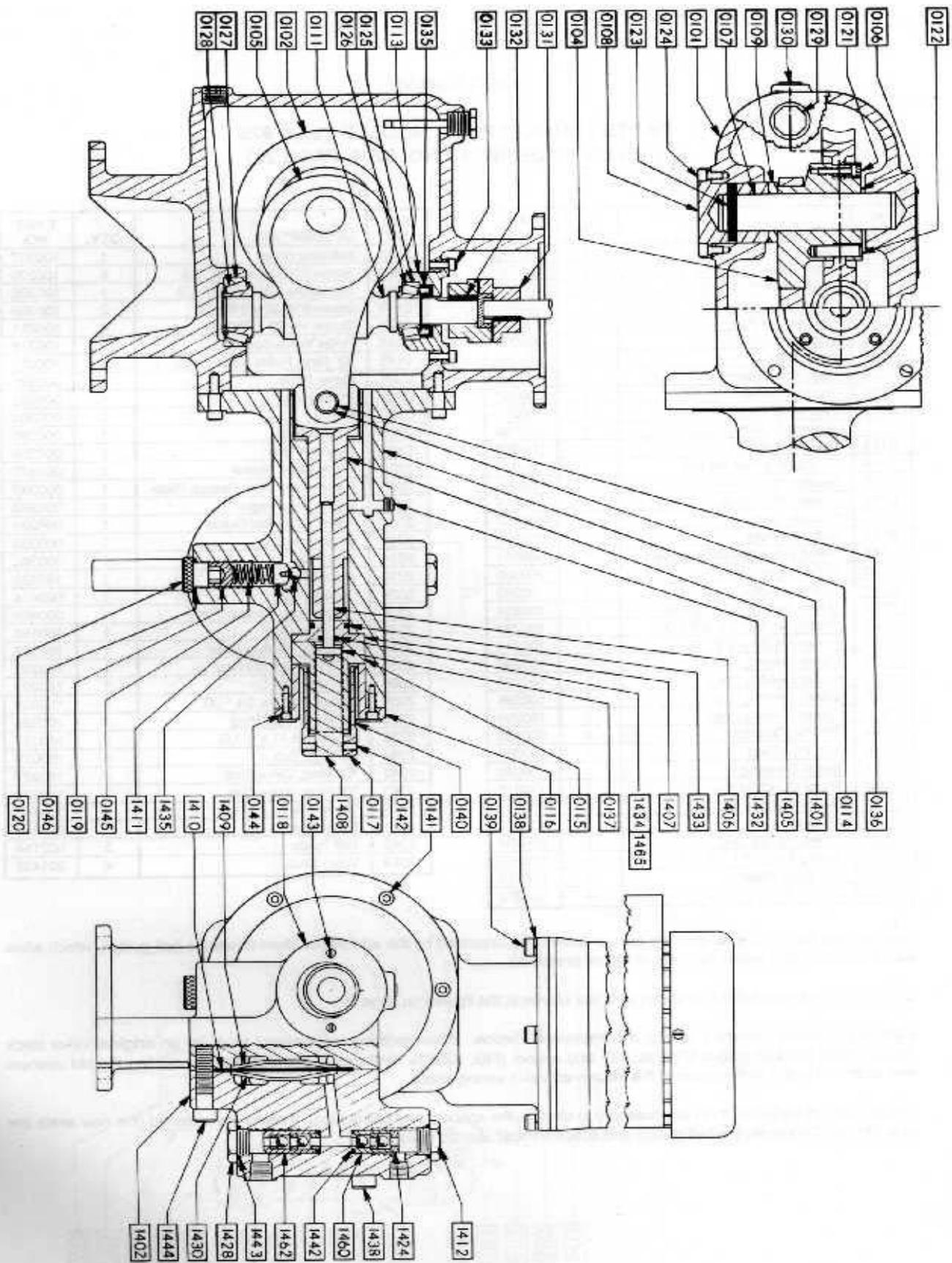
SYMPTOM	CAUSE	REMEDY
16	A. Flexible diaphragm punctured.	Replace diaphragm and hydraulic fluid (drive lubricant) if contaminated.
6. Oil level overflows reservoir.		

## SECTION VI

### PARTS LIST FOR PUMP MODELS 610 & 615

(REFER TO DRAWING NO. 6100, PAGE 18)

FIG NO.	DESCRIPTION	QTY.	PART NO.	FIG NO.	DESCRIPTION	QTY.	PART NO.
0101	Gearbox	1	000349	0138	3/8" Lock Washer	4	100217
0102	Worm Gear 58 SPM	1	000350	0139	Screw 8/8-16 x 1" LG	4	100216
	Worm Gear 117 SPM	1	000351	0140	Indicator Scale	1	100307
0104	Eccentric	1	000352	0141	Screw 5/16-18 x 1-1/4" LG	6	100205
0105	Connecting Rod	1	000353	0142	Set Screw 1/4-20 x 3/8" LG	1	100308
0106	Eccentric Collar	1	000354	0143	Screw #10-32 x 3/8" LG	2	100309
0107	Gear Shaft	1	000355	0144	Screw 1/4-20 x 5/8" LG	4	100211
0108	Gear Shaft Retainer	1	000356	0145	Relief Valve Spring	1	100310
0109	Thrust Washer	1	000357	0146	"O" Ring, Relief Valve Cap	1	100200
0111	Worm 58 SPM	1	100291	1401	Pump Body	1	000370
	Worm 117 SPM	1	100292	1402	Pump Head	1	000372
0113	Bearing Retainer	1	000358	1405	Piston	1	000374
0114	Connecting Rode Sleeve	1	000359	1406	Control Rod	1	000375
0115	Sealing Nut	1	000360	1407	Sealing Plate	1	000376
0116	Sealing Nut Retainer	1	000361	1408	Control Rod Screw	1	000377
0117	Control Knob	1	000362	1409	Pump Body Side, Backup Plate	1	000194
0118	Indicator Plate	1	000363	1410	Telfon Diaphragm	1	000378
0119	Relief Valve Adjusting Screw	1	000364	1411	Relief Valve Ball Guide	1	000379
0120	Relief Valve Cap	1	000365	1412	Discharge Cap	1	002073
0121	Screw 1/4-20 x 1" LG	3	100293	1424	Ball Retainer	2	000215
0122	Dowel Pin 3/8" x 1-1/2" LG	3	100294	1428	Suction Cap	1	000207
0123	Spring Pin 1/4" x 1-3/4" LG	1	100295	1430	Pump Head Backup Plate	1	000195
0124	Screw 1/4-20 x 5/8" LG	4	100211	1432	1/16" Pipe Plug	1	100210
0125	Upper Bearing Cup	1	100296	1433	"O" Ring, Sealing Plate	1	100185
0126	Upper Bearing Cone	1	100297	1434	"O" Ring, Control Rod	1	100188
0127	Lower Bearing Cup	1	100298	1435	1/4" Dia. Ball	1	100559
0128	Lower Bearing Cone	1	100299	1438	Screw 1/2-13 x 4" LG	2	100316
0129	Fill Plug Dipstick	1	000366	1442	"O" Ring, Valve Seat	2	100204
					"O" Ring, Discharge & Suction Cap	2	100200
0130	1/2" Pipe Plug	1	100300	1444	Screw 1/2-13 x 1-3/4" LG	8	100317
0131	Motor Coupling	1	100098	1460	Discharge Valve Cartridge	1	000209
0132	Motor Coupling Key	1	100218	1462	Suction Valve Cartridge	1	000217
0133	Screw 1/4-20 x 5/8" LG	4	100211	1465	Backup Ring	1	106546
0135	Oil Seal	1	100303				
0136	Dowel Pin 5/8" x 2" LG	1	100304				
0137	Spring Pin 1/8" x 3/4" LG	1	100305				



PARTS FOR MODELS 610 & 615

## SECTION VI

### PARTS FOR PUMP MODELS 620 & 625

(REFER TO DRAWING NO. 6200, PAGE 20)

FIG. NO.	DESCRIPTION	QTY.	PART NO.
0101	Gearbox	1	000349
0102	Worm Gear 58 SPM	1	000350
	Worm Gear 117 SPM	1	000351
0104	Eccentric	1	000352
0105	Connecting Rod	1	000353
0106	Eccentric Collar	1	000354
0107	Gear Shaft	1	000355
0108	Gear Shaft Retainer	1	000356
0109	Thrust Washer	1	000357
0111	Worm 58 SPM	1	100291
	Worm 117 SPM	1	100292
0113	Bearing Retainer	1	000358
0114	Connecting Rod Sleeve	1	000359
0115	Sealing Nut	1	000360
0116	Sealing Nut Retainer	1	000361
0117	Control Knob	1	000362
0118	Indicator Plate	1	000363
0119	Relief Valve Adjusting Screw	1	000364
0120	Relief Valve Cap	1	000365
0121	Screw 1/4-20 x 1" LG	3	100293
0122	Dowel Pin 3/8" x 1-1/2" LG	3	100294
0123	Spring Pin 1/4" x 1-2/4" LG	1	100295
0124	Screw 1/4-20 x 5/8" LG	4	100211
0125	Upper Bearing Cup	1	100296
0126	Upper Bearing Cone	1	100297
0127	Lower Bearing Cup	1	100298
0128	Lower Bearing Cone	1	100299
0129	Fill Plug Dipstick	1	000366
0130	1/2" Pipe Plug	1	100300
0131	Motoe Coupling	1	100098
0132	Motor Coupling Key	1	100218
0133	Screw 1/4-20 x 5/8" LG	4	100211
0135	Oil Seal	1	100303
0136	Dowel Pin 5/8" x 2" LG	1	100304
0137	Spring Pin 1/8" x 3/4" LG	1	100305
0138	3/8" Lock Washer	4	100217
0139	Screw 3/8-16 x 1" LG	4	100216

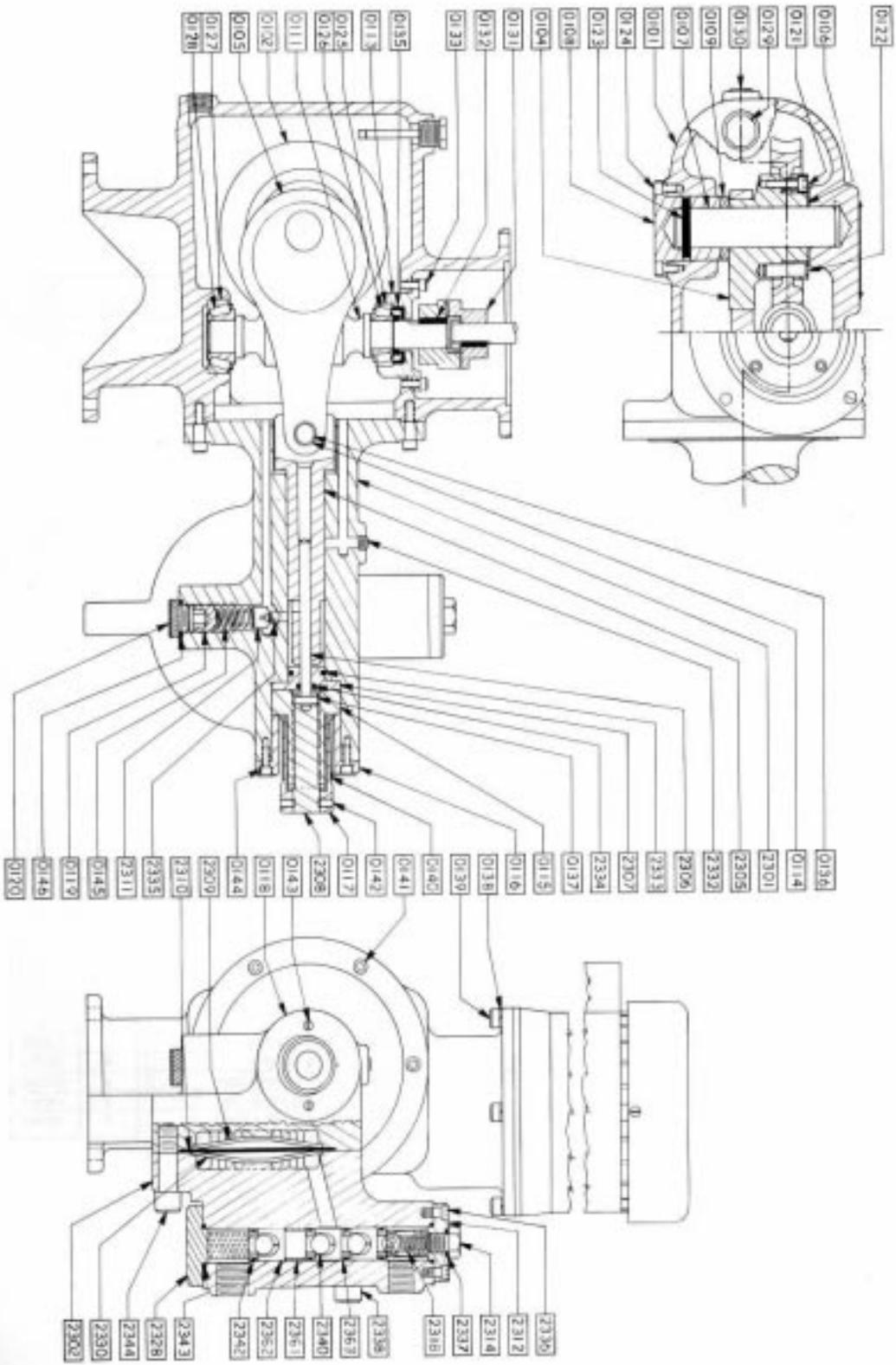
FIG. NO.	DESCRIPTION	QTY.	PART NO.
0140	Indicator Scale	1	100307
0141	Screw 5/16-18 x 1-1/4" LG	6	100205
0142	Set Screw 1/4-20 x 3/8" LG	1	100308
0143	Screw #10-32 x 3/8" LG	2	100309
0144	Screw 1/4-20 x	4	100211
0145	Relief Valve Spring	1	100310
0146	"O"Ring, Relief Valve Cap	1	100200
2301	Pump Body	1	000380
2302	Pump Head	1	000382
2305	Piston	1	000384
2306	Control Rod	1	000385
2307	Sealing Plate	1	000386
2308	Control Rod Screw	1	000377
2309	Pump Body Side, Backup Plater	1	000387
2310	Telfon Diaphragm	1	000388
2311	Relief Valve Ball Guide	1	000389
2312	Discharge Cap	1	000390
2314	Vent Plug	1	000392
2318	Anti-Siphon Spring	1	100320
2328	Suction Cap	1	000404
2330	Pump Head Backup Plate	1	000406
2332	1/8" Pipe Plug	1	100196
2333	"O"Ring, Sealing Plate	1	100322
2334	"O"Ring, Control Rod	1	100323
2335	3/8" Dia. Ball	1	100201
2336	Screw 1/4-20 x 3/4" LG	8	100329
2337	"O"Ring, Vent Plug	1	100325
2338	Screw 5/8-11 x 4" LG	2	100337
2340	5/8" Dia. Ball	4	100078
2342	"O"Ring, Valve Seat	4	100327
2343	"O"Ring, Valve Cap	2	100328
2344	Screw 5/8-11 x 2" LG	8	100343
2361	Stack Spacer	1	002833
2362	Ball Guide	3	002154
2363	Valve Seat	4	001432

Valve stacks for the Series 620/625 pumps have been improved by the addition of close tolerance ball guides, which allow better accuracy and better valve life at higher pressures.

Original and improved stack arrangements are shown in the figures on page 27.

Parts are currently furnished only for the **improved** version. When ordering replacement seals for an **original** valve stack design, order the ball guides (FIG. #2362) and spacer (FIG. #2361). Installing these parts and discarding the old spacers and seats will upgrade the pump to the **improved** valve arrangement.

If seats are not replaced, it is not necessary to change the spacers and ball guides. If seats are replaced (the new seats are of a different thickness) the ball guides and spacers **must** also be replaced.



PARTS FOR MODELS 620 & 625

## SECTION VI

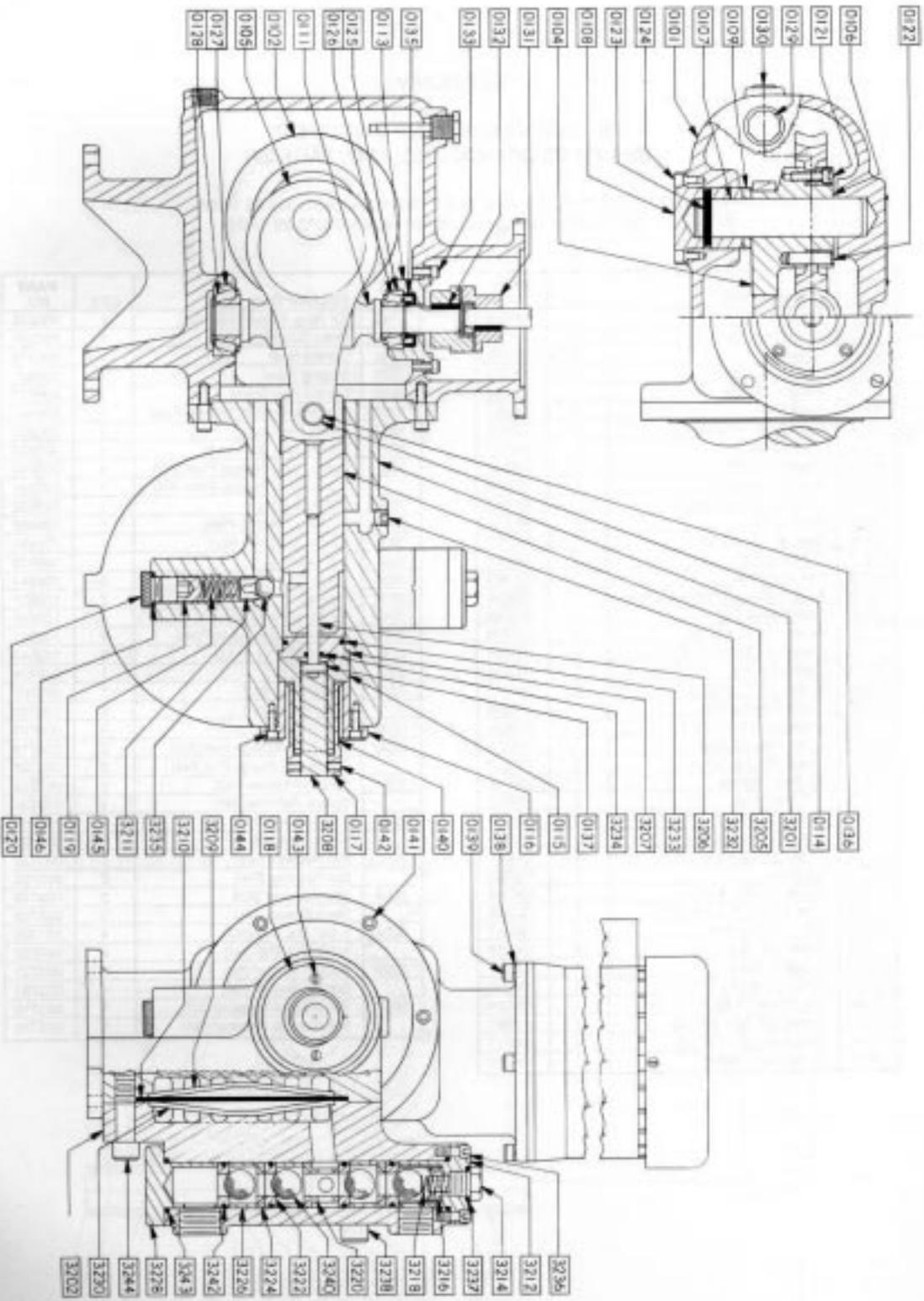
### PARTS LIST FOR PUMP MODELS 630, 635 & 637

(REFER TO DRAWING NO. 6300, PAGE 22)

**NOTE:** N-3 PUMPS HAVE 316SS PUMP HEAD AND 316SS TRIM.

N-4 PUMPS HAVE C-20 PUMP HEAD AND C-20 TRIM.

FIG. NO.	DESCRIPTION	QTY.	PART NO.	FIG. NO.	DESCRIPTION	QTY.	PART NO.
0101	Gearbox	1	000349	3201	Pump Body	1	000414
0102	Worm Gear 58 SPM	1	000350	3202	Pump Head (N3)	1	000416
	Worm Gear 117 SPM	1	000351		Pump Head (N4)	1	000417
	Worm Gear 144 SPM	1	003101	3205	Piston	1	000418
0104	Eccentric	1	000352	3206	Control Rod	1	000419
0105	Connecting Road	1	000353	3207	Sealing Plate	1	000420
0106	Eccentric Collar	1	000354	3208	Control Rod Screw	1	000377
0107	Gear Shaft	1	000355	3209	Pump Body Side, Backup Plate	1	000421
0108	Gear Shaft Retainer	1	000356	3210	Teflon Diaphragm	1	000422
0109	Thrust washer	1	000357	3211	Relief Valve Ball Guide	1	000423
0111	Worm 58 SPM	1	100291	3212	Discharge Cap (N3)	1	000424
	Worm 117 SPM	1	100292		Discharge Cap (N4)	1	000425
	Worm 144 SPM	1	106550	3214	Vent Plug (N3)	1	000426
0113	Bearing Retainer	1	000358		Vent Plug (N4)	1	000427
0114	Connecting Rod Sleeve	1	000359	3216	Retainer Screen (N3)	1	000428
0115	Sealing Nut	1	000360		Retainer Screen (N4)	1	000429
0116	Sealing Nut Retainer	1	000361	3218	Anti-Siphon Spring (N3)	1	002384
0117	Control Knob	1	000362		Anti-Siphon Spring (N4)	1	002426
0118	Indicator Plate	1	000363	3220	Spacer-Retainer (N3)	1	000430
0119	Relief Valve Adjusting Screw	1	000364		Spacer-Retainer (N4)	1	000431
0120	Relief Valve Cap	1	000365	3222	Valve Seat (N3)	4	000432
0121	Screw 1/4-20 x 1" LG	3	100293		Valve Seat (N4)	4	000433
0122	Dowel Pin 3/8" x 1-1/2" LG	3	100294	3224	Ball Retainer (N3)	2	100434
0123	Spring Pin 1/4" x 1-3/4" LG	1	100295		Ball Retainer (N4)	2	000435
0124	Screw 1/4-20 x 5/8" LG	4	100211	3226	Stack Spacer (N3)	3	000436
0125	Upper Bearing Cup	1	100296		Stack Spacer (N4)	3	000437
0126	Upper Bearing Cone	1	100297	3228	Suction Cap (N3)	1	000438
0127	Lower Bearing Cup	1	100298		Suction Cap (N4)	1	000439
0128	Lower Bearing Cone	1	100299	3230	Pump Head Backup Plate (N3)	1	000440
0129	Fill Plug Dipstick	1	000366		Pump Head Backup Plate (N4)	1	000441
0130	1/2" Pipe Plug	1	100300	3232	1/4" Pipe Plug	1	100332
0131	Motor Coupling	1	100098	3233	"O" Ring, Sealing Plate	1	100092
0132	Motor Coupling Key	1	100218	3234	"O" Ring, Control Rod	1	100184
0133	Screw 1/4-20 x 5/8" LG	4	100211	3235	5/8" Dia. Ball	1	100074
0135	Oil Seal	1	100303	3236	Screw 5/16-18 x 3/4" LG	8	100344
0136	Dowel Pin 5/8" x 2" LG	1	100304	3237	"O" Ring, Vent Plug	1	100335
0137	Spring Pin 1/8" x 3/4" LG	1	100305	3238	Screw 5/8-11 x 4" LG	2	100337
0138	3/8" Lock Washer	4	100217	3240	1" Dia. Ball (N3)	4	100338
0139	Screw 3/8-16 x 1" LG	4	100216		1" Dia. Ball (N4)	4	100339
0140	Indicator Scale	1	100307	3242	"O" Ring, Valve Seat	4	100340
0141	Screw 5/16-18 x 1-1/4" LG	6	100205	3243	"O" Ring, Valve Cap	2	100341
0142	Set Screw 1/4-20 x 3/8" LG	1	100308	3244	Screw 5/8-11 x 2" LG	8	100343
0143	Screw #10-32 x 3/8" LG	2	100309				
0144	Screw 1/4-20 x 5/8" LG	4	100211				
0145	Relief Valve Spring	1	100310				
0146	"O" Ring, Relief Valve Cap	1	100200				

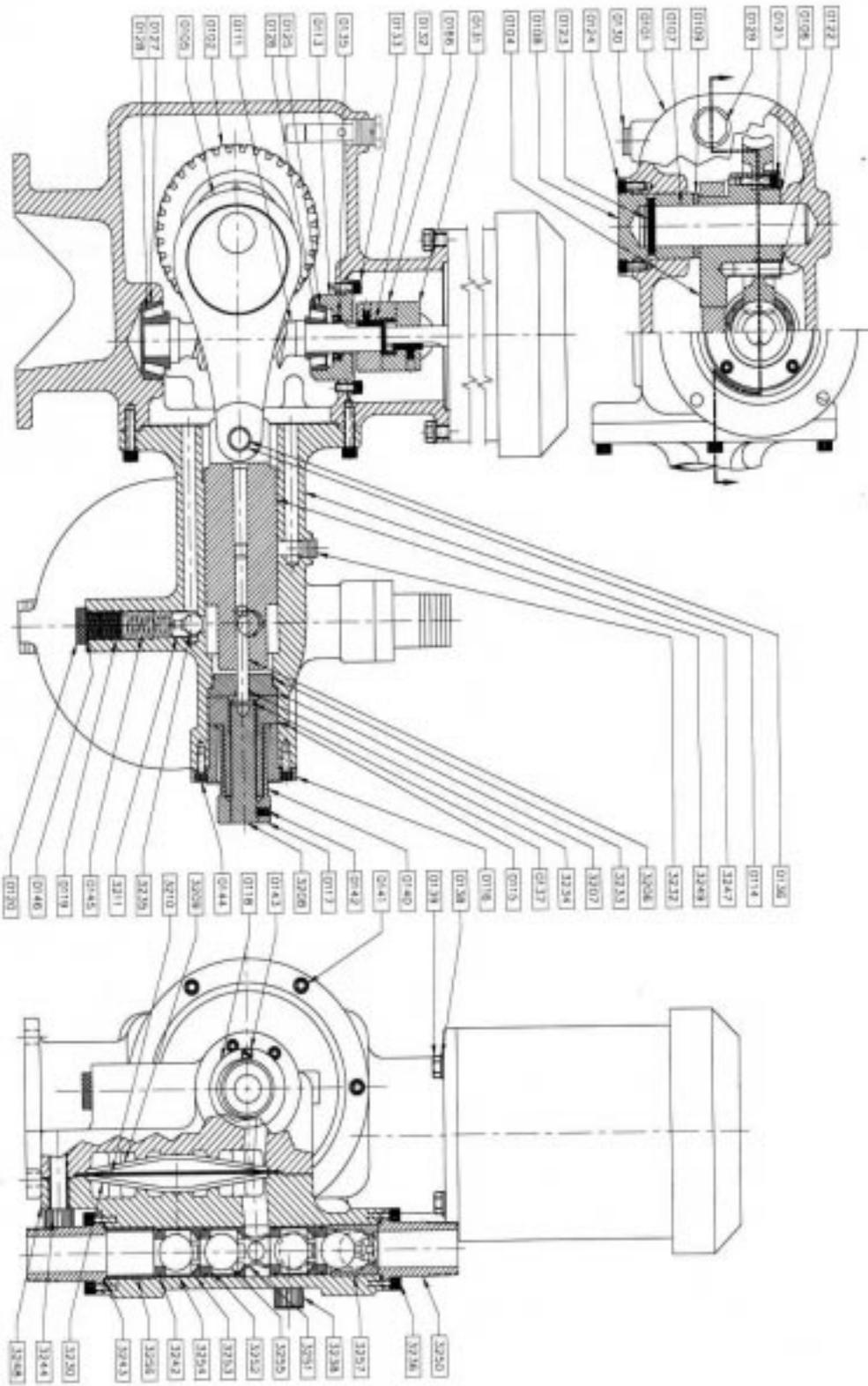


PARTS FOR MODELS 635 & 637 - METAL HEAD

**SECTION VI**  
**PARTS LIST FOR PUMP MODEL 647**  
**(REFER TO DRAWING NO. 6347, PAGE 24)**

**NOTE: N-3 PUMPS HAVE 316SS PUMP HEAD AND 316SS TRIM.**  
**N-4 PUMPS HAVE C-20 PUMP HEADED AND C-20 TRIM.**

FIG NO.	DESCRIPTION	QTY.	PART NO.	FIG. NO	DESCRIPTION	QTY.	PART NO.
0101	Gearbox	1	000349	0146	"O" Ring, Relief Valve Cap	1	100200
0102	Worm Gear 144 SPM	1	003101	0166	Motor Coupling, 7/8"	1	100301
0104	Eccentric	1	000352	3206	Control Rod	1	000419
0105	Connecting Rod	1	000353	3207	Sealing Plate	1	000420
0106	Eccentric Collar	1	000354	3208	Control Rod Screw	1	000377
0107	Gear Shaft	1	000355	3209	Pump Body Side, Backup Plate	1	000421
0108	Gear Shaft Retainer	1	000356	3210	Teflon Diaphragm	1	000422
0109	Thrust Washer	1	000357	3211	Relief Valve Ball Guide	1	000423
0111	Worm 144 SPM	1	106550	3230	Pump Head Backup Plate (N3)	1	000440
0113	Bearing Retainer	1	000358		Pump Head Backup Plate (N4)	1	000441
0114	Connecting Rod Sleeve	1	000359	3232	1/4" Pipe Plug	1	100332
0115	Sealing Nut	1	000360	3233	"O" Ring, Sealing Plate	1	100092
0116	Sealing Nut Retainer	1	000361	3234	"O" Ring, Control Rod	1	100184
0117	Control Knob	1	000362	3235	5/8" Dia. Ball	1	100074
0118	Indicator Plate	1	000363	3236	Screw 5/16-18 x 3/4" LG	8	100344
0119	Relief Valve Adjustment Screw	1	000364	3238	Screw 5/8-11 x 4" LG	2	100337
0120	Relief Valve Cap	1	000365	3242	"O" Ring, Valve Seat	4	100340
0121	Screw 1/2-20 x 1" LG	3	100293	3243	"O" Ring, Connection Ports	2	100341
0122	Dowel Pin 3/8" x 1-1/2" LG	3	100294	3244	Screw 5/8-11 x 2" LG	8	100343
0123	Spring Pin 1/4" x 1-3/4" LG	1	100295	3247	Pump Body	1	003724
0124	Screw 1/4-20 x 5/8" LG	4	100211	3248	Pump Head (N3)	1	003725
0125	Upper Bearing Cup	1	100296		Pump Head (N4)	1	003733
0126	Upper Bearing Cone	1	100297	3249	Piston 2.4 Dia.	1	003723
0127	Lower Bearing Cup	1	100298	3250	Suction/Discharge Port (N3)	2	003718
0128	Lower Bearing Cone	1	100299		Suction/Discharge Port (N4)	2	003728
0129	Fill Plug Dipstick	1	000366	3251	Spacer-Retainer (N3)	1	003720
0130	1/2" Pipe Plug	1	100300		Spacer-Retainer (N4)	1	003730
0131	Motor Coupling	1	100098	3252	Valve Seat (N3)	4	003717
0132	Motor Coupling Key	1	100218		Valve Seat (N4)	4	003727
0133	Screw 1/4-20 x 5/8" LG	4	100211	3253	Ball Retainer (N3)	2	003722
0135	Oil Seal	1	100303		Ball Retainer (N4)	2	003732
0136	Dowel Pin 5/8" x 2" LG	1	100304	3254	Stack Spacer (N3)	3	003719
0137	Spring Pin 1/8" x 3/4" LG	1	100305		Stack Spacer (N4)	3	003729
0138	3/8" Lock Washer	4	100217	3255	1-1/8" Dia. Ball (N3)	4	107229
0139	Screw 3/8-16 x 1" LG	4	100216		1-1/8" Dia. Ball (N4)	4	107230
0140	Indicator Scale	1	100307	3256	Suction Spacer (N3)	1	003721
0141	Screw 5-16-18 x 1-1/4" LG	6	100205		Suction Spacer (N4)	1	003731
0142	Set Screw 1/4-20 x 3/8" LG	1	100308	3257	Ball Guide & Retainer (N3)	1	003716
0143	Screw # 10-32 x 3/8" LG	2	100309		Ball Guide & Retainer (N4)	1	003726
0144	Screw 1/4-20 x 5/8" LG	4	100211				
0145	Relief Valve Spring	1	100310				



NOTE: PUMP SITS ON RISER BASE (2) P/N 003042

PARTS FOR MODEL 647 - METAL HEAD

## APPENDUM

### 600 SERIES PVC PUMP

#### THEORY OF OPERATION

The NEPTUNE 600 PVC “dia-Pump” is a double diaphragm pump employing the basic drive unit of the Neptune series 600 “dia-Pump”.

All drive, stroke control parts and oil head are common to the original flat diaphragm models. An intermediate plate and all parts in the liquid side are different from the basic pump.

Hydraulic oil displaces a flat diaphragm, which displaces “an intermediate fluid” which, in turn, flexes the second flat diaphragm.

- Note:
1. Valves may be removed for cleaning or replacement without disturbing the sealed portion containing the intermediate fluid.
  2. All Neptune 600 PVC pumps are furnished with the intermediate fluid installed and factory sealed. Do not attempt to add additional fluid. Follow the instructions below only if the head has lost fluid due to the diaphragm failure.

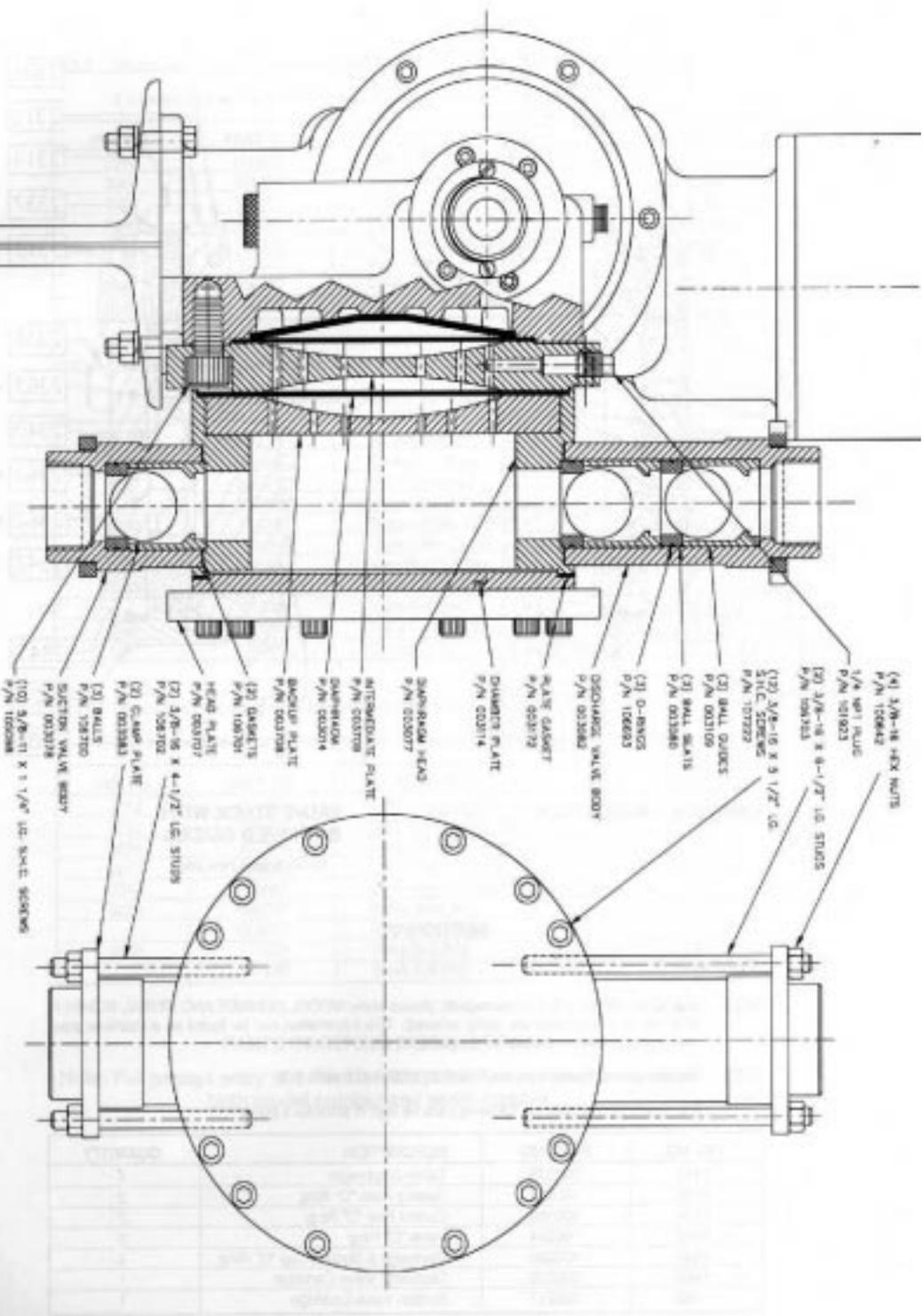
#### DISASSEMBLY OF LIQUID HEAD:

- 1.0.0 Shut pump off and disconnect suction and discharge piping. Remove drain plug in lower left had side or gear box and drain hydraulic oil from gearbox.
- 1.0.1 Remove (12) 3/8-16 screws and remove steel plate and liquid head. Process liquid and intermediate fluid will spill out when liquid head is removed.
- 1.0.2 Remove (1) 5/8-11 screws and remove intermediate plate. Some intermediate fluid and some hydraulic oil will spill out when intermediate plate is removed.
- 1.0.3 All parts should be inspected for any deficiency or wear and replaced if necessary. Both diaphragms should be replaced with new diaphragms.
- 1.0.4 To reassemble, reverse above procedure. Be certain that parts align properly and fill up hole on intermediate plate facing up.

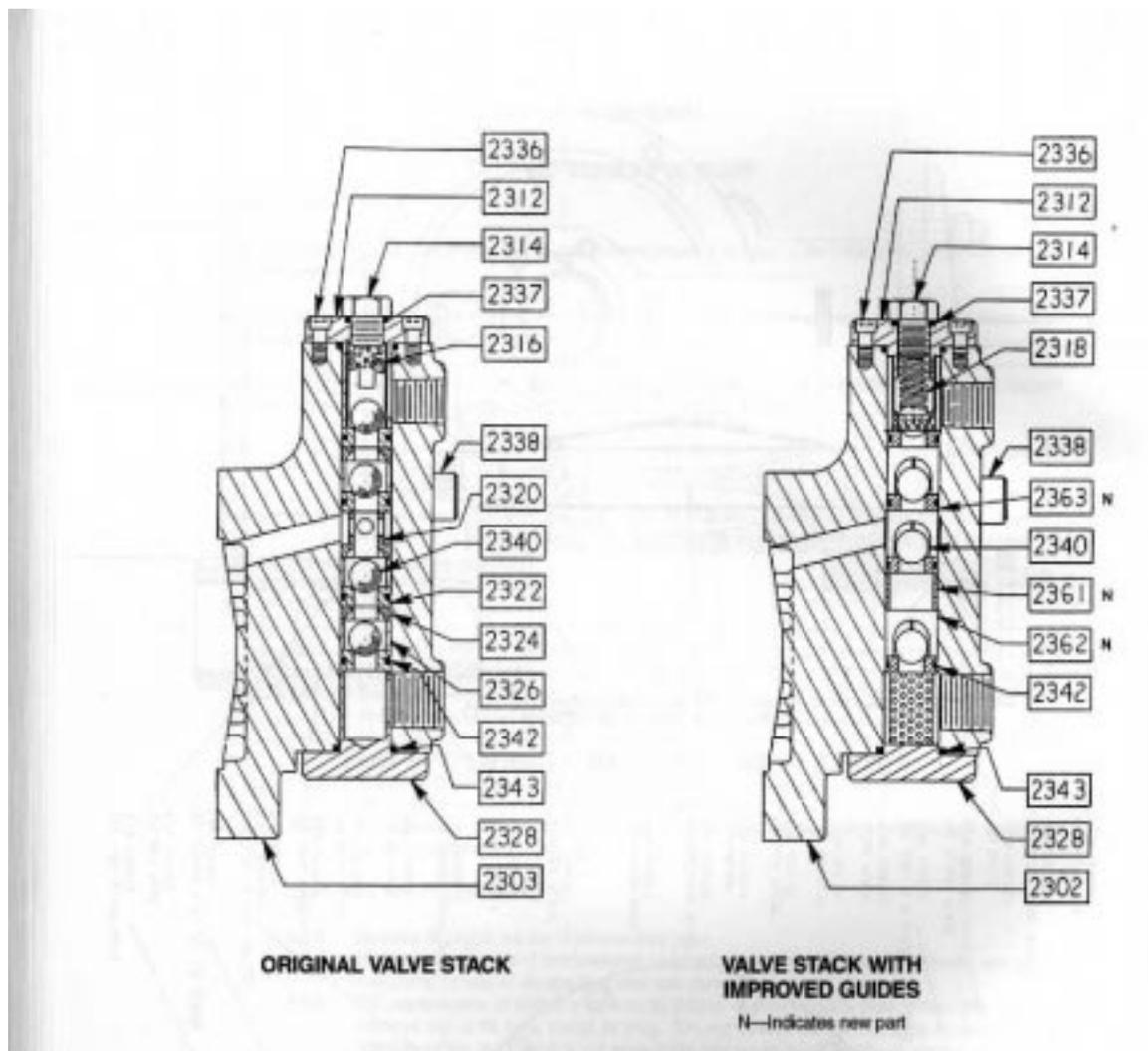
#### REFILLING INTERMEDIATE PLATE:

- 1.0.6 Remove fill plug in the top of intermediate plate.
- 1.0.7 Slowly pour contents of premeasured intermediate fluid into fill hole. Pour slowly and gently rock pump to help air escape from chamber during filling.
- 1.0.8 Fill intermediate chamber with exactly 165ml of intermediate fluid. When the solution reaches to of fill hole, install fill plug. Do not overfill the intermediate liquid chamber, collapse of the diaphragm is not acceptable and could result in difficult start-up and in lost pump capacity.
- 1.0.9 Reinstall pump. Follow procedure in NETPUNE STANDARD OPERATING AND INSTRUCTION MANUAL for initial pump start up.
- 1.0.10 Recommended Spare Parts for 600 PVC Head (addition to standard spare parts lists). It is recommended that the following parts be kept in stock for a pump.

PART NUMBER	DESCRIPTION	QUANTITY
003014	Teflon Diaphragm	1
106693	Valve Seat “O” Ring	6
003080	Ball Seat	6
003172	Plate Gasket	2
003708	Backup Plate	1



PARTS FOR MODELS 637 & 645 - PVC HEAD



## SECTION VI

### 10.0 SPARE PARTS

10.0.1 Important – When ordering spare parts, please show MODEL NUMBER AND SERIAL NUMBER of pump for which parts are being ordered. This information can be found on a stainless steel nameplate riveted to the side of the pump.

#### 10.0.2 Recommended Spare Parts for PUMP MODELS

It is recommended that the following parts be kept in stock for a pump:

FIG. NO.	PART NO.	DESCRIPTION	QUANTITY
1410	000378	Teflon Diaphragm	1
1433	100185	Sealing Plate "O" Ring	2
1434	100188	Control Rod "O" Ring	2
1442	100204	Valve "O" Ring	8
1443	100200	Discharge & Suction Cap "O" Ring	4
1460	000209	Discharge Valve Cartridge	1
1462	000217	Suction Valve Cartridge	1

10.0.3 Recommended Spare Parts for **PUMP MODELS 620 AND 625**

It is recommended that the following parts be kept in stock for a pump:

FIG. NO.	PART NO/	DESCRIPTION	QUANTITY
2310	000388	Teflon Diaphragm	1
2363	001432	Valve Seat	4
2333	100322	Sealing Plate "O" Ring	2
2334	100323	Control Rod "O" Ring	2
2337	100325	Vent Plug "O" Ring	2
2340	100078	Valve Ball	4
2342	100327	Valve Seat "O" Ring	8
2343	100328	Discharge & Suction Cap "O" Ring	4

10.0.4 Recommended Spare Parts for **PUMP MODELS 630, 635, AND 637**

It is recommended that the following parts be kept in stock for a pump:

FIG. NO.	PART NO/	DESCRIPTION	QUANTITY
3210	000422	Teflon Diaphragm	1
3222	000432	Valve Seat (N3)	4
	000433	Valve Seat (N4)	4
3233	100092	Sealing Plate "O" Ring	2
3234	100184	Control Rod "O" Ring	2
3237	100335	Vent Plug "O" Ring	2
3240	100338	Valve Ball (N3)	4
	100339	Valve Ball (N4)	4
3242	100340	Valve Seat "O" Ring	8
3243	100341	Discharge & Suction Cap "O" Ring	4

10.0.5 Recommended Spare Parts for **PUMP MODEL 647**

It is recommended that the following parts be kept in stock for a pump:

FIG. NO.	PART NO/	DESCRIPTION	QUANTITY
3210	000422	Teflon Diaphragm	1
3233	100092	Sealing Plate "O" Ring	2
3234	100184	Control Rod "O" Ring	2
3242	100340	Valve Seat "O" Ring	8
3243	100341	Discharge & Suction Cap "O" Ring	4
3252	003717	Valve Seat (N3)	4
	003727	Valve Seat (N4)	4
3255	107229	Valve Ball (N3)	4
	107230	Valve Ball (N4)	4

**PARTS ORDERING INSTRUCTIONS**

**Note:** For prompt entry of orders for this pump; your order must include both model number and serial number.

## SECTION VII

### SPECIAL INSTRUCTIONS FOR SERIES 600 'DIA-PUMPS' WITH PNEUMATIC STROKE CONTROL

Refer to Drawing No. B-001743

#### 11.0 FUNCTION OF THE PNEUMATIC STROKE CONTROL UNIT.

The Neptune pneumatic stroke control unit controls the capacity of the "dia-PUMP" over the full operating range. Control is normally effected by an instrument air signal of 3 to 15 psi applied to a Moore Products Model 73N control valve (Part #100265), (other air signal parameters also available), which is an integral part of Neptune stroke control unit.

The variation of instrument air signal changes the air pressure on the diaphragm (Part #100287) in the control unit, which in turn changes the position of the pump capacity control rod (Part #000375, 000385, 000419).

The position change of the control unit can be observed on a capacity percentage scale (Part #100284) seen through the clear plexi-glass shell of the control unit.

The pneumatic control unit may be attached to any Series 600 "dia-Pump".

The operating range of supply air may vary between 40 and 80 psi. The Moore control valve is preset at the factory for a supply air pressure of 60 psi.

The "Pneumatic Stroke Control Unit" is accurately preset and tested at the factory. If the unit does not appear to perform correctly, please contact your local representative or the factory. Do not attempt to adjust the unit in the field without factory advice.

- 11.0.1 The Moore control valve (Part #100265) which is attached to the Neptune actuator supplies a varying air pressure to the flexible diaphragm (Part #100287) which is, in turn, balanced by operating spring (Part #100290). The capacity control rod (Part #000375, 000385, 000419) is attached to this system.

With the required air signal, the Moore control valve maintains the correct constant air pressure on the flexible diaphragm (Part #100287); i.e., constant position of the capacity control rod (Part #000375, 000385, 000419). The springs in the actuator and Moore control valve insure that the controlled position is maintained without fluctuation. Only changes in the air signal will cause variations in position of the diaphragm (i.e., capacity control rod). Supply air and instrument input ports are clearly marked on the Moore Control Valve.

The Moore control valve connections are marked for "Supply Air" and "Instrument Air". It is important that clean, dry air be furnished to the "Pneumatic Stroke Control Unit". Cross sectional drawings of the complete unit and the Moore control valve are included with the instruction manual.

#### 11.0.2 Maintenance.

The Neptune "Pneumatic Stroke Control Unit" is normally maintenance free. Should, however, any parts be required, use attached drawing No. B-001743 and the parts list as an assembly guide.

#### 11.0.3 Moore Control Valve

If more complete information is required on the Moore Model 73N control valve, request Moore bulletin #SD73-5 in writing from Neptune.

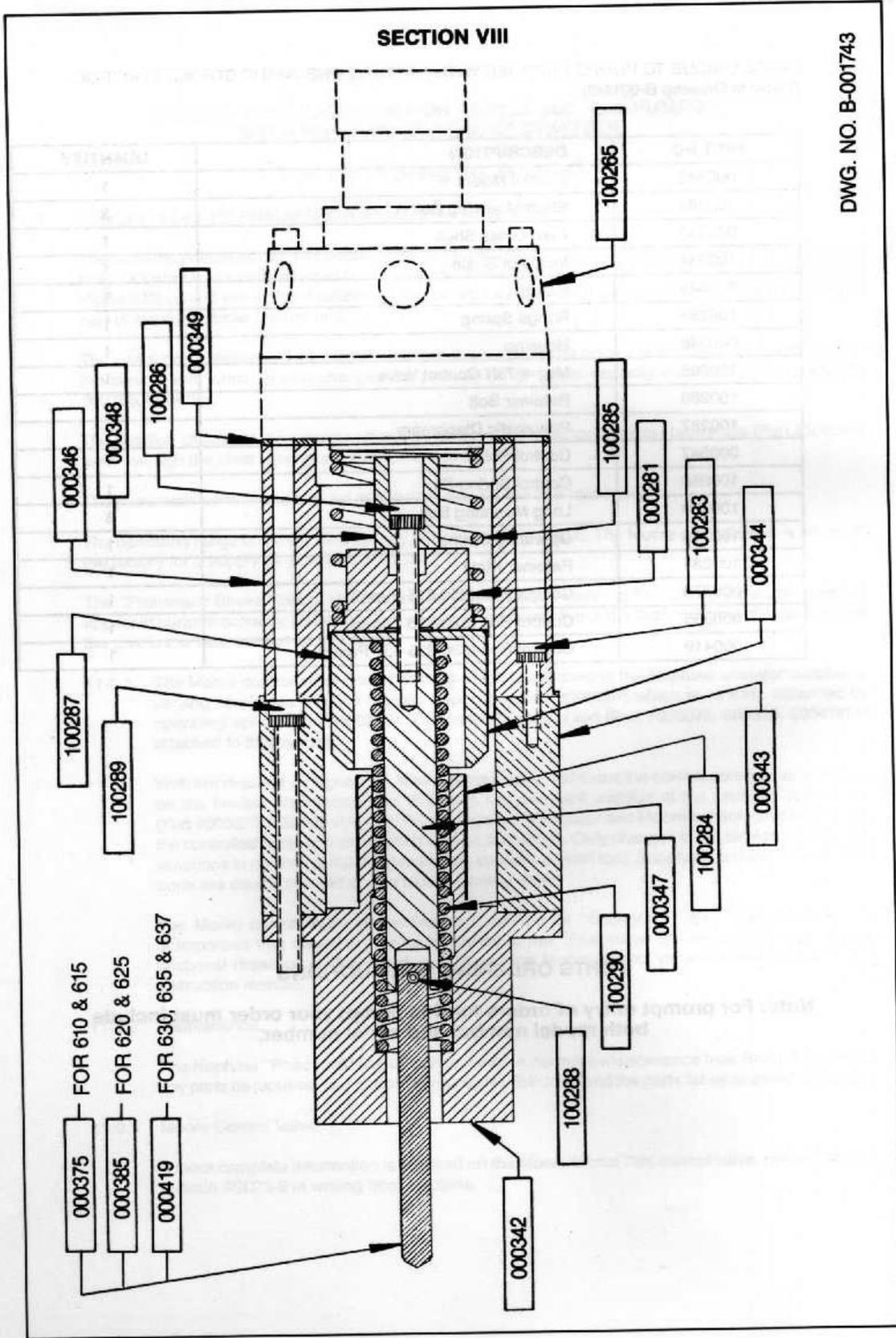
11.0 PARTS UNIQUE TO PUMPS SUPPLIED WITH NEPTUNE PNEUMATIC STROKE CONTROL.  
 (Refer to Drawing B-001743).

<b>PART NO.</b>	<b>DESCRIPTION</b>	<b>QUANTITY</b>
342	Control Mount	1
100283	Short Mounting Bolt	3
343	Plexi-Glass Shell	1
133284	Indicator Scale	1
344	Piston	1
100285	Range Spring	1
346	Housing	1
100265	Moore 73N Control Valve	1
100286	Retainer Bolt	1
100287	Pneumatic Diaphragm	1
347	Control Screw	1
100288	Control Spring Pin	1
100289	Long Mounting Bolt	3
100290	Operating Spring	1
100281	Retainer Plate	1
375	Control Rod (610-615 Pump)	1
385	Control Rod (620-625 Pump)	1
419	Control Rod (630-635-637 Pump)	1

**PARTS ORDERING INSTRUCTIONS**

**NOTE:** For prompt entry of orders for this pump; your order must include both model number and serial number.

SECTION VIII



DWG. NO. B-001743



## SECTION 4 - REACTIVITY HAZARD DATA

**STABILITY**  
 Stable  
 Unstable

Conditions  
To Avoid

Incompatibility (Materials to Avoid) Strong acids, alkalines, and oxidizers such as liquid chlorine and oxygen.

Hazardous Decomposition Products Burning or excessive heating may produce harmful gases/vapors.

**HAZARDOUS POLYMERIZATION**

May Occur  
 Will Not Occur

Conditions  
To Avoid

## SECTION 5 - HEALTH HAZARDS

**PRIMARY ROUTES OF ENTRY**

Inhalation  
 Skin Absorption

Ingestion  
 Not Hazardous

**CARCINOGEN LISTED IN**

NTP  
 IARC Monograph

OSHA  
 Not Listed

**HEALTH HAZARDS**

Acute Threshold limit value: 5.00 MG/M3

Chronic

Signs and Symptoms of Exposure None

Medical Conditions Generally Aggravated by Exposure None

**EMERGENCY FIRST AID PROCEDURES** - Seek medical assistance for further treatment, observation and support if necessary.

Eye Contact This product is expected to be non-irritating. (Flush eyes with water.) Obtain medical attention.

Skin Contact No significant adverse effects are expected to occur.

Inhalation No significant adverse effects are expected to occur.

Ingestion No significant adverse effects are expected to occur. (If swallowed, give quantities of water, induce vomiting.)  
Obtain medical attention.

## SECTION 6 - PRECAUTIONS FOR SAFE HANDLING AND LEAK PROCEDURES

Steps to be Taken if Material is Spilled or Released Clean up with oil absorbant.

Waste Disposal Methods Shovel up and dispose of at an appropriate waste disposal facility.

Precautions to be Taken in Handling and Storage Keep out of the reach of children! Do not store near heat or flame.

Other Precautions and/or Special Hazards Water contamination should be avoided.

NFPA  
Rating

Health \_\_\_ Flammability \_\_\_ Reactivity \_\_\_ Special \_\_\_

HMIS  
Rating

Health \_\_\_ Flammability \_\_\_ Reactivity \_\_\_ Personal Protection \_\_\_

## SECTION 7 - CONTROL AND PROTECTIVE MEASURES

Respiratory Protection (Specify type) None is needed under anticipated use with adequate ventilation.

Protective Gloves Eye Protection Needed if spraying or splashing.

**VENTILATION TO BE USED**

Local Exhaust

Mechanical (general)

N/A

Special

N/A

None needed.

Other (specify)

Other Protective Clothing and Equipment None.

Hygienic Work Practices Wash after skin contact.