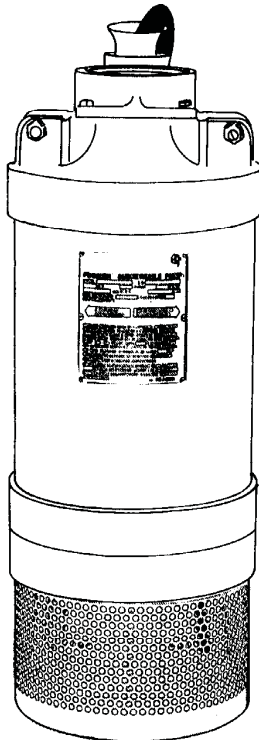


# PROSSER<sup>®</sup>

## INSTALLATION and OPERATION MANUAL STANDARD-LINE<sup>®</sup> Submersible Dewatering Pumps



Series: 9-81000, 9-81500  
9-82500, 9-85000

10HP thru 50HP, 3450RPM

### IMPORTANT!

*Read all instructions in this manual before operating pump.*

*As a result of Crane Pumps & Systems, Inc., constant product improvement program, product changes may occur. As such Crane Pumps & Systems reserves the right to change product without prior written notification.*

**CRANE**<sup>®</sup>

A Crane Co. Company

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Form No. 096928-Rev. V

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# SAFETY FIRST!

Please Read This Before Installing Or Operating Pump.

This information is provided for **SAFETY and to PREVENT EQUIPMENT PROBLEMS**. To help recognize this information, observe the following symbols:



**IMPORTANT!** Warns about hazards that can result in personal injury or Indicates factors concerned with assembly, installation, operation, or maintenance which could result in damage to the machine or equipment if ignored.

**CAUTION !** Warns about hazards that can or will cause minor personal injury or property damage if ignored. Used with symbols below.

**WARNING !** Warns about hazards that can or will cause serious personal injury, death, or major property damage if ignored. Used with symbols below.



Hazardous fluids can cause fire or explosions, burnes or death could result.



Extremely hot - Severe burnes can occur on contact.



Biohazard can cause serious personal injury.



Hazardous fluids can Hazardous pressure, eruptions or explosions could cause personal injury or property damage.

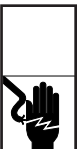


Rotating machinery Amputation or severe laceration can result.



Hazardous voltage can shock, burn or cause death.

Only qualified personnel should install, operate and repair pump. Any wiring of pumps should be performed by a qualified electrician.



**WARNING !** - To reduce risk of electrical shock, pumps and control panels must be properly grounded in accordance with the National Electric Code (NEC) or the Canadian Electrical Code (CEC) and all applicable state, province, local codes and ordinances.



**WARNING!** - To reduce risk of electrical shock, always disconnect the pump from the power source before handling or servicing. Lock out power and tag.



**WARNING!** Operation against a closed discharge valve will cause premature bearing and seal failure on any pump, and on end suction and self priming pump the heat build

may cause the generation of steam with resulting dangerous pressures. It is recommended that a high case temperature switch or pressure relief valve be installed on the pump body.



**CAUTION !** Never operate a pump with a plug-in type power cord without a ground fault circuit interrupter.



**CAUTION!** Pumps build up heat and pressure during operation-allow time for pumps to cool before handling or servicing.



**WARNING! - DO NOT** pump hazardous materials (flammable, caustic, etc.) unless the pump is specifically designed and designated to handle them.



Do not block or restrict discharge hose, as discharge hose may whip under pressure.



**WARNING! - DO NOT** wear loose clothing that may become entangled in the impeller or other moving parts.



**WARNING!** - Keep clear of suction and discharge openings. **DO NOT** insert fingers in pump with power connected.



Always wear eye protection when working on pumps.



Make sure lifting handles are securely fastened each time before lifting. **DO NOT** operate pump without safety devices in place. Always replace safety devices that have been removed during service or repair. Secure the pump in its operating position so it can not tip over, fall or slide.



**DO NOT** exceed manufacturers recommendation for maximum performance, as this could cause the motor to overheat.



**DO NOT** remove cord and strain relief. Do not connect conduit to pump.



**WARNING!** Cable should be protected at all times to avoid punctures, cut, bruises and abrasions - inspect frequently. Never handle connected power cords with wet hands.



**WARNING!** To reduce risk of electrical shock, all wiring and junction connections should be made per the NEC or CEC and applicable state or province and local codes. Requirements may vary depending on usage and location.



**WARNING!** Submersible Pumps are not approved for use in swimming pools, recreational water installations, decorative fountains or any installation where human contact with the pumped fluid is common.



**WARNING!** Products Returned Must Be Cleaned, Sanitized, Or Decontaminated As Necessary Prior To Shipment, To Insure That Employees Will Not Be Exposed To Health Hazards In Handling Said Material. All Applicable Laws And Regulations Shall Apply.



Bronze/brass and bronze/brass fitted pumps may contain lead levels higher than considered safe for potable water systems. Lead is known to cause cancer and birth defects or other reproductive harm. Various government agencies have determined that leaded copper alloys should not be used in potable water applications. For non-leaded copper alloy materials of construction, please contact factory.



**IMPORTANT! -** Crane Pumps & Systems, Inc. is not responsible for losses, injury, or death resulting from a failure to observe these safety precautions, misuse or abuse of pumps or equipment.

## SECTION: A - PUMP SPECIFICATIONS:

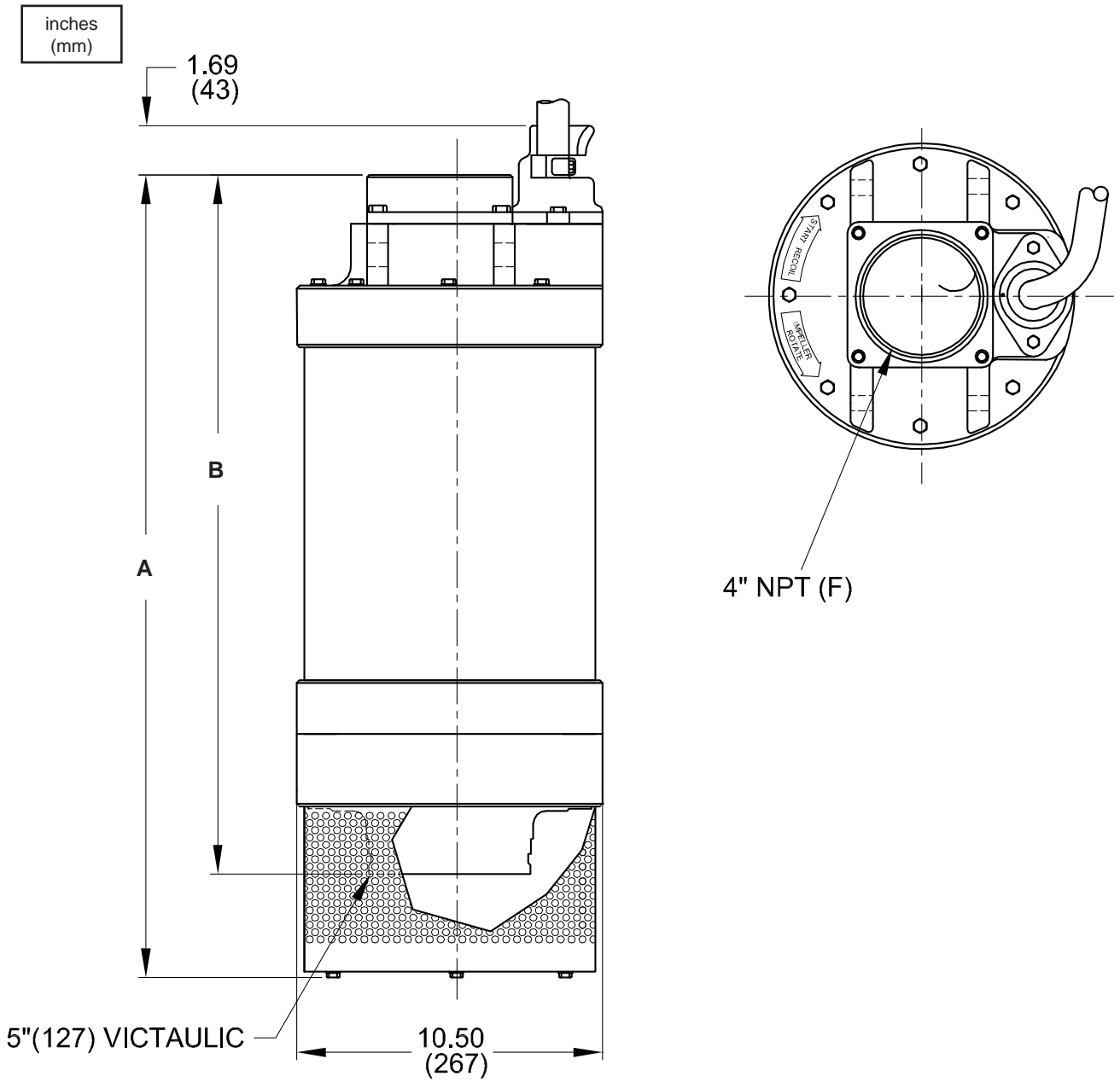
<b>LIQUID TEMPERATURE</b> .....	104°F (40°C)
<b>DISCHARGE CASE</b> .....	356T6 Aluminum, Hard Anodized
<b>DIFFUSER</b> .....	356T6 Aluminum, Hard Anodized
<b>SUCTION CASE</b> .....	356T6 Aluminum, Hard Anodized with wear resistant polyurethane liner
<b>FRAME &amp; OUTER CASE</b> .....	6063T6 Aluminum, Hard Anodized
<b>PUMP SHAFT</b> .....	Stainless Steel
<b>IMPELLER</b> .....	Hardened 17-4 Stainless Steel
<b>HARDWARE</b> .....	Stainless Steel
<b>O-RINGS</b> .....	Buna
<b>SEAL:</b> <i>Design</i> .....	Tandem Mechanical, Oil Lubricated
<b>INBOARD:</b> <i>Material</i> .....	Rotating Faces - Carbon
	Stationary Faces - Ceramic
	Elastomer - Buna-N
	Hardware - 300 Series Stainless
<b>OUTBOARD:</b> <i>Material</i> .....	Rotating Faces - Silicon Carbide
	Stationary Faces - Silicon Carbide
	Elastomer - Viton®
	Hardware - 300 Series Stainless
<b>STRAINER</b> .....	300 Series Stainless Steel .25" (6.35mm) Holes
<b>UPPER BEARING:</b>	
<i>Design</i> .....	Single Row, Shielded, Ball
<i>Lubrication</i> .....	Prelubricated high-temperature grease
<i>Load</i> .....	Radial
<b>LOWER BEARING:</b>	
9-81000 & 9-81500 .....	<i>Design</i> .....
9-82500 & 9-85000 .....	Double Row, Shielded, Ball, Angular Contact
	<i>Lubrication</i> .....
	Prelubricated high-temperature grease
	<i>Load</i> .....
	Radial & Thrust
<b>CORD ENTRY</b> .....	50 ft. (15m) Strain Relief and Pressure Grommet for Sealing
<b>MOTOR:</b> <i>Design</i> .....	NEMA B - Three Phase Torque Curve. Squirrel Cage Induction
	<i>Insulation</i> .....
	Class F
<b>CONTROL:</b> <i>Three Phase</i> .....	Rainproof, NEMA 3R (NEMA 4 for 9-85000), Provides Circuit Breaker for overload and short circuit protection
<b>OPTIONAL EQUIPMENT</b> .....	Watertight, NEMA 4 <b>Control</b> , Series Adapter Kit, Carrying Handle, Viton® Seals, Hardened 440C Stainless Steel Impeller

**WARRANTY INVALID IF CORRECT PROSSER CONTROL IS NOT USED AT ALL TIMES.**

PUMP SERIES	WEIGHT			
	PUMP ONLY	CONTROL	CORD	EXPORT
9-81000	145lbs/66kg	12lbs./5.4kg	12/4 = .27lbs./Ft. 6/4 = .78lbs./Ft.	209lbs./95kg - 6.3 Cu. Ft. 230lbs./104kg - 6.3 Cu. Ft.
9-81500	150lbs./68kg	12lbs./5.4kg	12/4 = .27lbs./Ft. 6/4 = .78lbs./Ft.	214lbs./97kg - 6.3 Cu. Ft. 235lbs./107kg - 6.3 Cu. Ft.
9-82500	275lbs./125kg	12lbs./5.4kg	4/4 = 1.33lbs./Ft.	398lbs./181kg - 8.7 Cu. Ft.
9-85000	343lbs./156kg	12lbs./5.4kg	4/4 = 1.33lbs./Ft.	468lbs./212kg - 9.4 Cu. Ft.

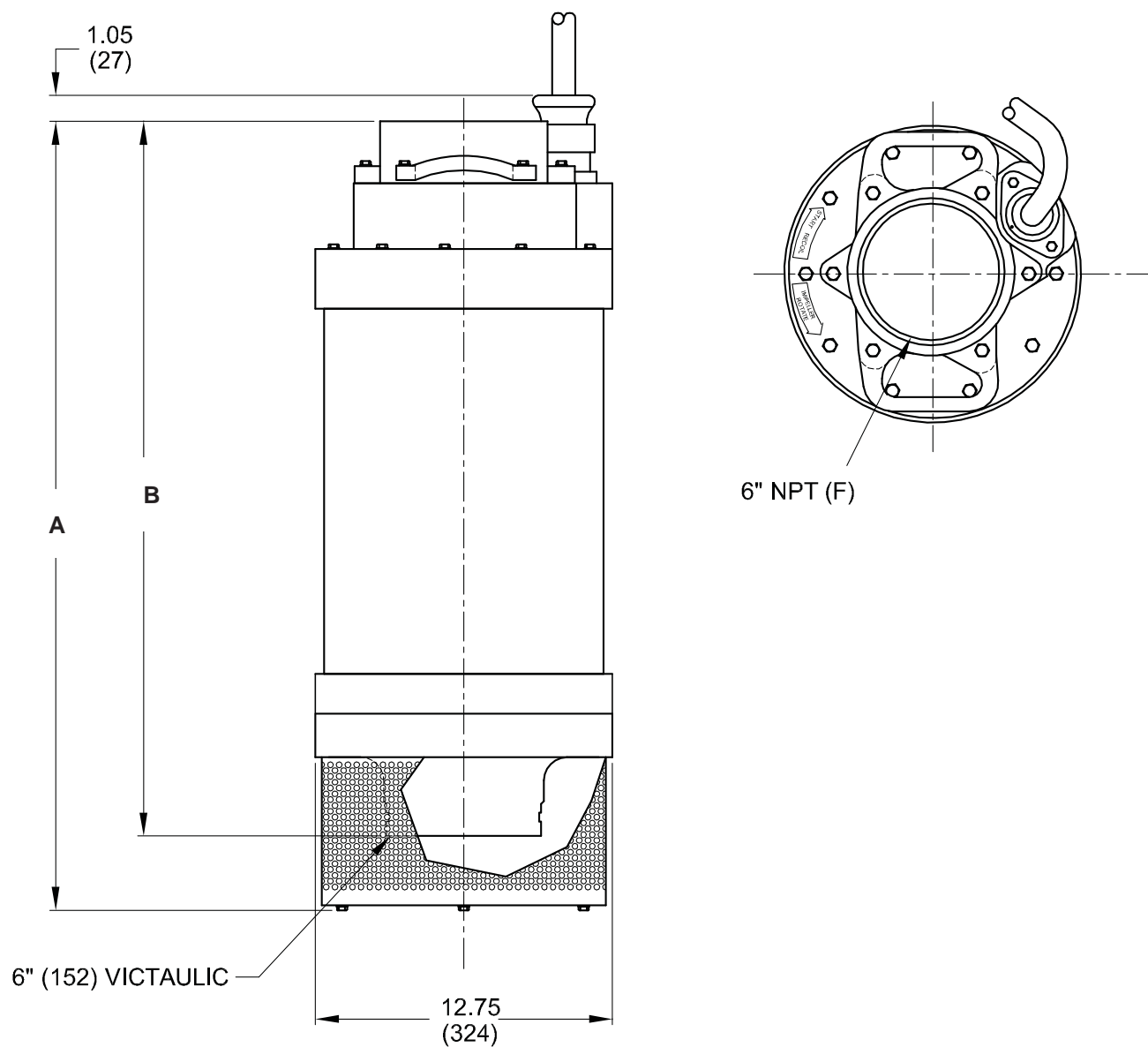
### IMPORTANT !

- 1.) PUMP MAY BE OPERATED "DRY" FOR EXTENDED PERIODS WITHOUT DAMAGE TO MOTOR AND/OR SEALS.
- 2.) INSTALLATIONS SUCH AS DECORATIVE FOUNTAINS OR WATER FEATURES PROVIDED FOR VISUAL ENJOYMENT MUST BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE ANSI/NFPA 70 AND/OR THE AUTHORITY HAVING JURISDICTION. THIS PUMP IS NOT INTENDED FOR USE IN SWIMMING POOLS, RECREATIONAL WATER PARKS, OR INSTALLATIONS IN WHICH HUMAN CONTACT WITH PUMPED MEDIA IS A COMMON OCCURRENCE.



MODEL	A	B
9-81000	27.38 (696)	24.00 (610)
9-81500	29.12 (740)	25.75 (654)

inches  
(mm)



MODEL	A	B
9-82500	33.95 (862)	30.69 (780)
9-85000	36.68 (932)	33.69 (856)

## SECTION B: GENERAL INFORMATION

### B-1) To the Purchaser:

Congratulations! You are the owner of one of the finest pumps on the market today. These pumps are products engineered and manufactured of high quality components. Over one hundred years of pump building experience along with a continuing quality assurance program combine to produce a pump which will stand up to the toughest applications.

This manual will provide helpful information concerning installation, maintenance, and proper service guidelines.

### B-2) Receiving:

Upon receiving the pump, it should be inspected for damage or shortages. If damage has occurred, file a claim immediately with the company that delivered the pump. If the manual is removed from the packaging, do not lose or misplace.

### B-3) Storage:

**Short Term** - Prosser Pumps are manufactured for efficient performance following short inoperative periods in storage. For best results, pumps can be retained in storage, as factory assembled, in a dry atmosphere with constant temperatures for up to six (6) months.

**Long Term** - Any length of time exceeding six (6) months, but not more than twenty four (24) months. The units should be stored in a temperature controlled area, a roofed over walled enclosure that provides protection from the elements (rain, snow, wind-blown dust, etc.), and whose temperature can be maintained between +40 deg. F and +120 deg. F. If extended high humidity is expected to be a problem, all exposed parts should be inspected before storage and all surfaces should then be sprayed with a rust-inhibiting oil.

Pump should be stored in its original shipping container. On initial start up, rotate impeller by hand to assure seal and impeller rotate freely. If it is required that the pump be installed and tested before the long term storage begins, such installation will be allowed provided:

- 1.) The pump is not installed under water for more than one (1) month.
- 2.) Immediately upon satisfactory completion of the test, the pump is removed, thoroughly dried, repacked in the original shipping container, and placed in a temperature controlled storage area.

### B-4) Service Centers:

For the location of the nearest Prosser Service Center, check your Prosser representative or Crane Pumps & Systems, Inc., Service Department in Piqua, Ohio, telephone (937) 778-8947 or Crane Pumps & Systems Canada, Bramton, Ontario, (905) 457-6223.

## SECTION C: INSTALLATION

### C-1) Location:

These pumping units are self-contained and are recommended for well type predewatering of building sites or pipelines, sumping and dewatering of coffer dams, caissons and tunnels, for dewatering of manholes and transformer vaults, construction sites and for emergency service, for shipboard dewatering of cargo holds and tanks, for damage control or ballast transfer and for general use in shipyards, dry-docks or off-shore rigs.

Before pumping fluids other than water, consult the factory, giving fluid, fluid temperature, specific gravity, viscosity, capacity in USGPM and total head and/or pressure requirements, including friction loss through discharge line, fittings, valves, etc. Maximum fluid temperature for sustained operation is 104°F (40°C) at specific gravity 1.0. Pump may run dry for reasonable period in air without damage where air can circulate freely through pump. DO NOT allow pump to be buried in mud or sand.



**IMPORTANT! - Pump should have strainer affixed at all times. Inspect and clean the pump strainer periodically for maximum efficiency and performance.**

### C-2) Discharge:

Discharge hose is recommended. If rigid pipe is used, install so that there is no weight or strain on the pump.

#### C-2.1) Series Connection: (Optional)

The In-Line suction and discharge permits multiple pumps to be operated in series where the discharge of one pump is directly connected to the suction of another with the use of an adapter kit. Two small pumps instead of one large one enables the user to meet high head requirements on one job and separate the pumps to meet lower head requirements on the next.

When a group of pumps are SERIES connected the appropriate SERIES ADAPTER KIT (See page 30) should be used. It is important to remember that all the weight should not be carried through the pump housings. This is particularly important where the "spacing" method is used. Each pump is supplied with attachment points so that they may be steel cable supported for lifting, lowering or supporting (See Figure 1). **NEVER LIFT OR**

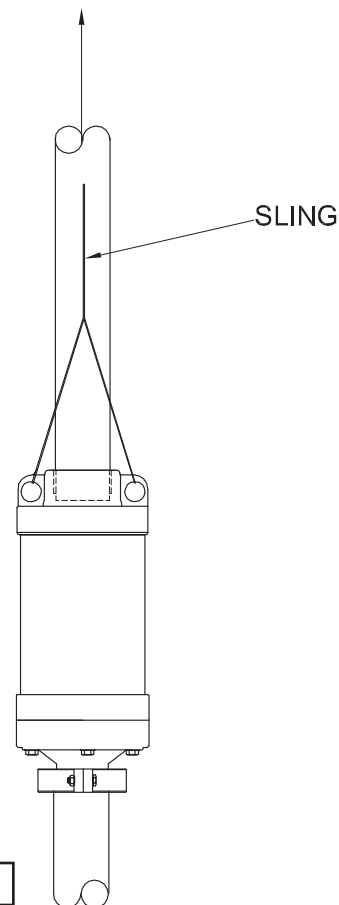


FIGURE 1

### SUPPORT THE PUMP BY ITS ELECTRICAL CABLE !

Each pump must be treated as an individual unit as far as cabling and overload protection is concerned. Individual cables must be run up to each pump controller for proper protection. Provide suitable protection for the cable rubbing against the caisson. This is particularly important around the pump housing of the upper pumps. PVC pipe or steel braiding may be in order in extreme cases of tight clearances. Some have crimped (both

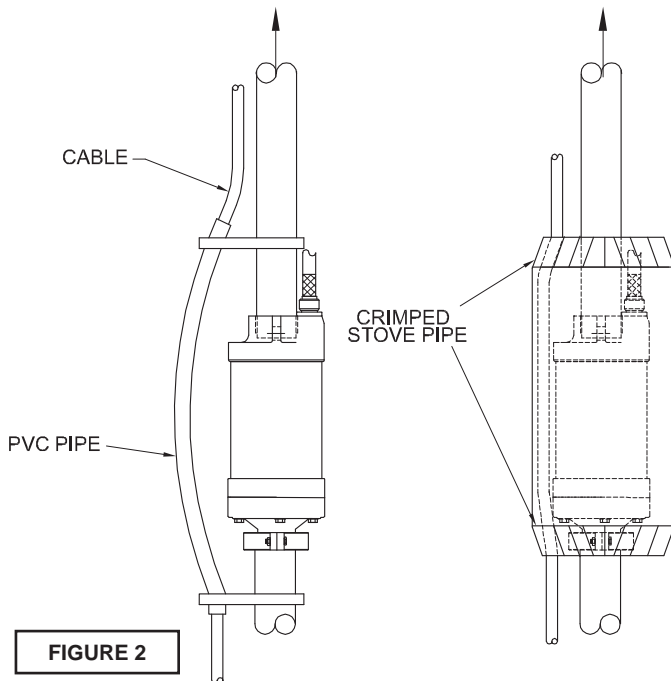


FIGURE 2

ends) stove pipe around the cable and pump (See Fig. 2). Check valves in a clean system where no or small amounts of solids are entrained, will not be troublesome. If they leak, no harm will be done. It should be noted that substantial amounts of solids will tend to block check valves after shutdown. If check valves are placed in an "S" bend ABOVE the lowest point, solids

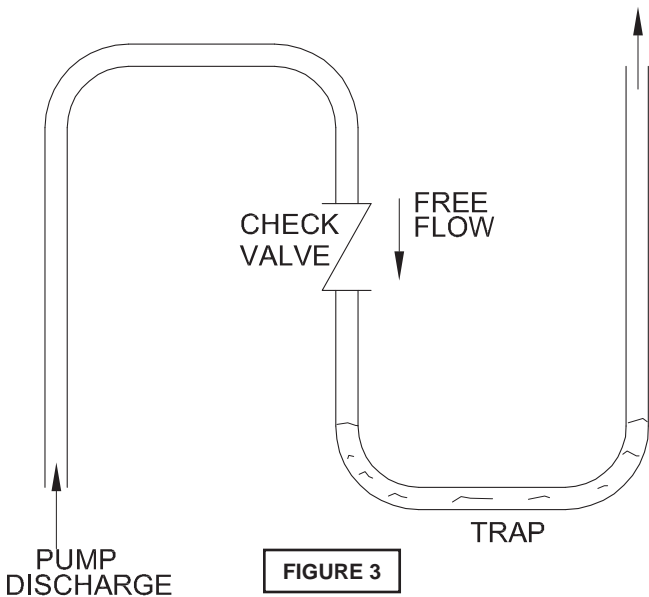


FIGURE 3

### C-2.2) Series Connection of Dissimilar Pumps:

(Optional) In some cases where high heads and relatively low-flow rates are desired at the most economic cost, two or

more different size pumps may be used.

**IT IS VERY IMPORTANT THAT THE FLOW RATE PRODUCED IS WITHIN THE CAPACITY OF THE SMALLER PUMP, PUMP B.** If the system is flowing more than the smaller pump can handle, i.e., greater than Q, the smaller pump, Pump B, will actually retard the flow, and can induce cavitation in Pump A. To predict the performance, simply add the heads produced at a particular flow rate,

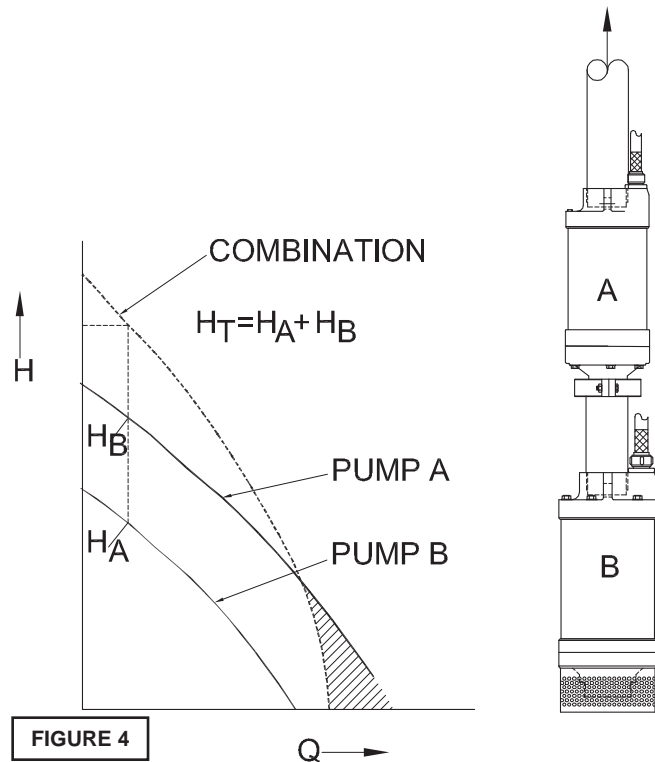


FIGURE 4

$H_{<M>T} = H_{<M>A} + H_{<M>B}$ . (See Fig. 4).

### C-3) Liquid Level Controls: (If Applicable)

Attach "ON" float to discharge hose or pump cable at desired pump "ON" level. Attach "OFF" float to discharge hose or pump cable at desired pump "OFF" level. The "OFF" float must be below the "ON" float.

To attach the floats, thread the cable strap through the buckle with the ratchet pawl, cinch up tight, thread excess strapping through outer buckle slot. Be certain that the level controls cannot hang up or foul in its swing. It is recommended that the pump is completely submerged when the level control is in the "Off" mode.

### C-4) Galvanic Protection Kit: (If Applicable)

For protection against Electrolytic action, whether in saltwater or in other reactionary applications, the Galvanic Protection Kit is a proven method for protecting the pump against corrosion by using a Zinc Anode fitted to the pump. See page 29.

### C-5) Electrical Cables:



**WARNING! - All model pumps and control panels must be properly grounded per THE NATIONAL ELECTRIC CODE or CANADIAN ELECTRIC CODE and STATE, PROVINCE and LOCAL CODES.**

**Improper grounding voids warranty.**



### C-5.1) Power Cable:

The cord assembly mounted to the pump must not be modified in any way except for shortening to a specific application. Any splice between the pump and the control panel must be made in accordance with the electric codes. Install and pull pumps only by attaching a rope or cable to the lifting lugs or handles provided on the pump. Cable should be protected at all times to avoid punctures and cuts. Do not use the power cable to lift pump. **DO NOT DROP PUMPS !**

### C-5.2) Wire Size:

Transmission of power from source to pump control should be accomplished with sufficiently large 4 conductor cable of heavy duty type to prevent excessive voltage drop under full load conditions. Voltage supplied to pump must not vary more than plus or minus 10% of rated pump voltage, measured at motor terminal. Voltage must be balanced phase to phase within 5%. See table on next page for electrical information.

PUMP SERIES	MAX. CABLE LENGTH
9-81032	500 Ft./100m
9-81034	520 Ft./160m
9-81035	820 Ft./250m
9-81532	375 Ft./81m
9-81534	420 Ft./128m
9-81535	658 Ft./281m
9-82532	400 Ft./123m
9-82534	875 Ft./269m
9-82535	1375 Ft./423m
9-85034	800 Ft./246m
9-85035	800 Ft./246m

### C-5.3) Overload Protection:

Three Phase - units control boxes utilizes a circuit breaker for pump overload, locked rotor or short circuit conditions and will disconnect the power to the pump if any of these conditions occur. Before restarting pumps, check for correct voltage and phase. Also check for short circuits, cuts or breaks in cable and that connections are tight. Then if pump still won't start, pull unit for inspection. **DO NOT LET THE PUMP CYCLE OR RUN IF AN OVERLOAD CONDITION OCCURS !**



**WARNING! - Avoid repeated attempts to start motor. If motor fails to start after two attempts, pull pump and correct problem.**

**C-6) Control** - Mount the control above the ground to avoid seepage of dirt and water into control. This is critical or damage may occur. Control enclosure must be operated with cover closed.

## SECTION D: START-UP OPERATION

### D-1) Check Voltage and Phase:

Before operating pump, compare the voltage and phase information stamped on the pump's identification plate to the available power. Install proper safety ground connection to the green conductor to insure the motor, pump and control remains at ground potential, independent of the power supply.

A metal well casing is one of the best available. Use voltmeter to make certain that voltage at pump control is within  $\pm 10\%$  of the

rated voltage shown on the pump nameplate.

### D-2) Check Pump Rotation:

Before putting pump into service for the first time, the motor rotation must be checked. Improper motor rotation can result in poor pump performance and can damage the motor and/or pump. To check the rotation, suspend the pump freely, momentarily apply power and observe the "kick". "Kick" should always be in a clockwise direction as viewed from the top of the pump motor housing. Pump "Kick" is the opposite direction of pump rotation.

### D-2.1) Incorrect Rotation for Three-Phase Pumps:

In the event that the rotation is incorrect for a three-phase installation, interchange any two power cable leads at the control box. **DO NOT** change leads in the cable housing in the motor. Recheck the "kick" rotation again by momentarily applying power.



**WARNING ! - DO NOT operate pump in reverse rotation as damage may result.**

### D-3) Start-Up:

**DO NOT** attempt to start a frozen pump. Instead, submerge pump in water for twenty (20) minutes before starting. **DO NOT** attempt to thaw a frozen pump with a torch. Start pumps one at a time to avoid excessive current draw on power supply. When starting up pumps connected in series, turn on the bottom pump first, then the next to the bottom, etc (See Fig 5). When shutting down, turn off the top pump first and continue downward after allowing sufficient time for the water column to drain down to the next lower pump. This process reduces the chance of over-pressuring the lower seals when there are no system check

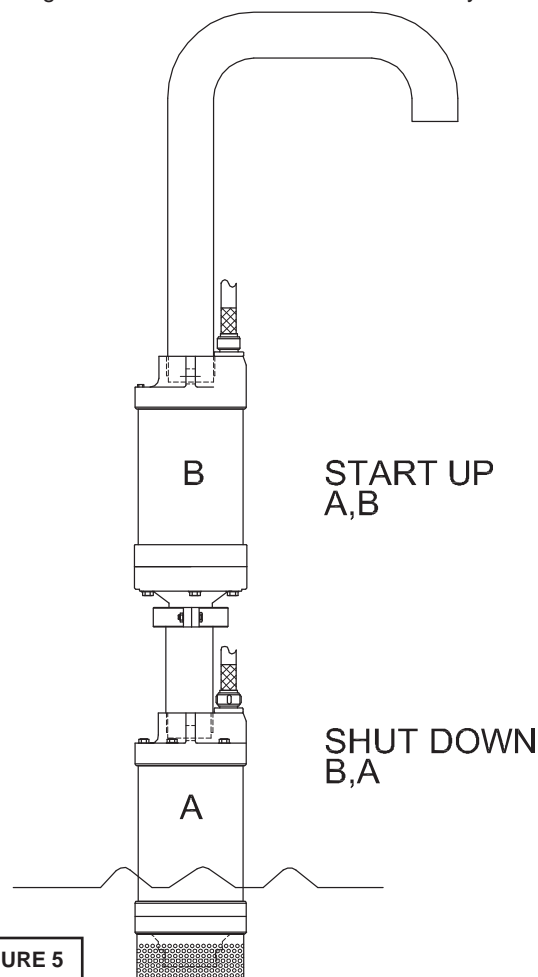


FIGURE 5

PART NO.	HP	VOLT/ PH	Hz	RPM (Nom)	NEMA START CODE	FULL LOAD AMPS	LOCKED ROTOR AMPS	CORD SIZE	CORD TYPE	CORD OD	WINDING RESISTANCE W,B--R,B--R,W
<b>HH SERIES PUMP w/RAINPROOF CONTROL</b>											
9-81032-23	10	230/3	60	3450	K	30.0	208.0	6/4	SOW	1.100	0.30 -- 0.30 -- 0.30
9-81034-23	10	460/3	60	3450	K	15.0	104.0	12/4	SOW	0.650	1.14 -- 1.14 -- 1.14
9-81035-23	10	575/3	60	3450	K	12.0	83.0	12/4	SOW	0.650	2.00 -- 2.00 -- 2.00
9-81532-23	15	230/3	60	3450	J	39.5	288.0	6/4	SOW	1.100	0.21 -- 0.21 -- 0.21
9-81534-23	15	460/3	60	3450	J	19.7	144.0	12/4	SOW	0.650	0.75 -- 0.75 -- 0.75
9-81535-23	15	575/3	60	3450	J	15.6	110.0	12/4	SOW	0.650	1.21 -- 1.21 -- 1.21
9-82532-43*	25	230/3	60	3450	J	65.8	464.0	4/4	SOW	1.286	0.37 -- 0.37 -- 0.37
9-82534-43	25	460/3	60	3450	J	32.9	232.0	4/4	SOW	1.286	0.10 -- 0.10 -- 0.10
9-82535-43	25	575/3	60	3450	J	26.3	185.0	4/4	SOW	1.286	0.55 -- 0.55 -- 0.55
<b>HV SERIES PUMP w/RAINPROOF CONTROL</b>											
9-81032-03	10	230/3	60	3450	K	30.0	208.0	6/4	SOW	1.100	0.30 -- 0.30 -- 0.30
9-81034-03	10	460/3	60	3450	K	15.0	104.0	12/4	SOW	0.650	1.14 -- 1.14 -- 1.14
9-81035-03	10	575/3	60	3450	K	12.0	83.0	12/4	SOW	0.650	2.00 -- 2.00 -- 2.00
9-81532-03	15	230/3	60	3450	J	39.5	288.0	6/4	SOW	1.100	0.21 -- 0.21 -- 0.21
9-81534-03	15	460/3	60	3450	J	19.7	144.0	12/4	SOW	0.650	0.75 -- 0.75 -- 0.75
9-81535-03	15	575/3	60	3450	J	15.6	110.0	12/4	SOW	0.650	1.21 -- 1.21 -- 1.21
9-82532-33*	25	230/3	60	3450	J	65.8	464.0	4/4	SOW	1.286	0.37 -- 0.37 -- 0.37
9-82534-33	25	460/3	60	3450	J	32.9	232.0	4/4	SOW	1.286	0.10 -- 0.10 -- 0.10
9-82535-33	25	575/3	60	3450	J	26.3	185.0	4/4	SOW	1.286	0.55 -- 0.55 -- 0.55
<b>HH SERIES PUMP w/ OPTIONAL WATERTIGHT CONTROL</b>											
9-81032-24	10	230/3	60	3450	K	30.0	208.0	6/4	SOW	1.100	0.30 -- 0.30 -- 0.30
9-81034-24	10	460/3	60	3450	K	15.0	104.0	12/4	SOW	0.650	1.14 -- 1.14 -- 1.14
9-81035-24	10	575/3	60	3450	K	12.0	83.0	12/4	SOW	0.650	2.00 -- 2.00 -- 2.00
9-81532-24	15	230/3	60	3450	J	39.5	288.0	6/4	SOW	1.100	0.21 -- 0.21 -- 0.21
9-81534-24	15	460/3	60	3450	J	19.7	144.0	12/4	SOW	0.650	0.75 -- 0.75 -- 0.75
9-81535-24	15	575/3	60	3450	J	15.6	110.0	12/4	SOW	0.650	1.21 -- 1.21 -- 1.21
9-82532-44*	25	230/3	60	3450	J	65.8	464.0	4/4	SOW	1.286	0.37 -- 0.37 -- 0.37
9-82534-44	25	460/3	60	3450	J	32.9	232.0	4/4	SOW	1.286	0.10 -- 0.10 -- 0.10
9-82535-44	25	575/3	60	3450	J	26.3	185.0	4/4	SOW	1.286	0.55 -- 0.55 -- 0.55
<b>HV SERIES PUMP w/ OPTIONAL WATERTIGHT CONTROL</b>											
9-81032-04	10	230/3	60	3450	K	30.0	208.0	6/4	SOW	1.100	0.30 -- 0.30 -- 0.30
9-81034-04	10	460/3	60	3450	K	15.0	104.0	12/4	SOW	0.650	1.14 -- 1.14 -- 1.14
9-81035-04	10	575/3	60	3450	K	12.0	83.0	12/4	SOW	0.650	2.00 -- 2.00 -- 2.00
9-81532-04	15	230/3	60	3450	J	39.5	288.0	6/4	SOW	1.100	0.21 -- 0.21 -- 0.21
9-81534-04	15	460/3	60	3450	J	19.7	144.0	12/4	SOW	0.650	0.75 -- 0.75 -- 0.75
9-81535-04	15	575/3	60	3450	J	15.6	110.0	12/4	SOW	0.650	1.21 -- 1.21 -- 1.21
9-82532-34*	25	230/3	60	3450	J	65.8	464.0	4/4	SOW	1.286	0.37 -- 0.37 -- 0.37
9-82534-34	25	460/3	60	3450	J	32.9	232.0	4/4	SOW	1.286	0.10 -- 0.10 -- 0.10
9-82535-34	25	575/3	60	3450	J	26.3	185.0	4/4	SOW	1.286	0.55 -- 0.55 -- 0.55
<b>HH SERIES PUMP w/ WATERTIGHT CONTROL</b>											
9-85034-24	50	460/3	60	3450	G	56.0	360.0	4/4	SOW	1.286	0.19 -- 0.19 -- 0.19
9-82535-24	50	575/3	60	3450	G	44.6	288.0	4/4	SOW	1.286	0.29 -- 0.29 -- 0.29
<b>HV SERIES PUMP w/ WATERTIGHT CONTROL</b>											
9-85034-04	50	460/3	60	3450	G	56.0	360.0	4/4	SOW	1.286	0.19 -- 0.19 -- 0.19
9-85035-04	50	575/3	60	3450	G	44.6	288.0	4/4	SOW	1.286	0.29 -- 0.29 -- 0.29

Pump rated for operation at  $\pm 10\%$  voltage at motor.

Winding Resistance  $\pm 5\%$ . (\*) 230 Volt Pumps are **NOT** CSA Listed



valves or the units are spaced.

**CAUTION ! - When check valves are not used and a series system is accidentally shut down instantaneously (power failure), sufficient time must be allowed for pump impellers to stop rotating backwards before restarting.**

**NOTE:** Pressure inside 3" discharge pumps or smaller should not exceed 100 PSI (231 ft of Head). Pressure inside 4" discharge pumps or larger should not exceed 200 PSI (462 ft. of Head).

#### D-3.1) Report:

Included at the end of this manual are two start-up report sheets, these sheets are to be completed as applicable. Return one copy to the Prosser Pumps Service Department and store the second in the control panel or with the pump manual if no control panel is used. It is important to record this data at initial start-up since it will be useful to refer to should servicing the pump be required in the future.

#### D-3.2) Identification Plate:

Record the numbers from the pump's identification plate on both START-UP REPORTS provided at the end of the manual for future reference.

#### D-3.3) Insulation Test:

Before the pump is put into service, an insulation (megger) test should be performed on the motor. The resistance values (ohms) as well as the voltage (volts) and current (amps) should be recorded on the start-up report.

### SECTION E: PREVENTIVE MAINTENANCE:

Prosser pumps are CSA approved. The following procedure must be followed to assure proper pump operation and unit CSA approval integrity.

1.) **General Safety:** Frequent inspection shall be made. All electrical parts, including the portable cable and wiring, shall be kept in a safe condition. **KEEP CABLE GLAND NUTS TIGHT, CHECK FREQUENTLY.** There shall be no openings into the casing of the electrical parts. The machine frame shall be effectively grounded. The power wires shall not be used for grounding. The operating voltage shall match the voltage rating of the motor(s).

2.) **Servicing:** Pump and control enclosures shall be restored to the state of original safety with respect to all lead entrances, etc., following disassembly.

3.) **Renewals and Repairs:** Special care shall be taken in making renewals or repairs. Leave no parts off. Use replacement parts furnished by the manufacturer. When any lead entrance is disturbed, the original leads or exact duplicates thereof shall be used.

4.) **Fastenings:** All bolts, nuts, screws and other means of fastenings and also threaded covers, shall be in place, properly tightened and secured.

5.) **Cable Requirements:** A heavy usage, type SOW submersible cable shall be used. Special care shall be taken in handling the cable against mechanical injury and wear. Connections and wiring to the power source shall be in accordance with all local electrical and safety codes.

6.) **Shaft Seals:** The seals should be inspected every 1500 operating hours for wear (more often if abrasives are present). To make a quick check of the seal's condition, drain and inspect the oil in the seal chamber (See Section F-1). If oil removed from the pump contains water or abrasives, replace seals.

7.) **Amperage:** Amperage should be checked periodically (at least weekly) to be certain that it does not exceed limits recommended by manufacturer on pump nameplate.

8.) **Volts:** If a generator is the power source, check daily for variation of voltage and cycles.

This pump is equipped with prelubricated bearings.

When a job is completed and before pumps are stored, drain the oil from the seal chamber (a must before freezing weather). If dirt or water are found in the oil, replace seals, bearings, lower "O" rings and oil.

### SECTION F: SERVICE AND REPAIR

**NOTE:** All item numbers in ( ) refer to Figures 14 & 15 for 10-15HP and 16 & 17 for 25-50HP.



**WARNING ! - Electrical power to the pump motors must be disconnected and locked out to prevent any dangerous electrical hazards or personnel danger before any service work is done to the pump.**

#### F-1) Electrical Inspection:

When pumps are returned from a field operation, or when a pump needs repair, prior to disassembly, and after disconnecting the unit from the power source, make electrical inspection of the pump, cable and control box. The test can be done by using a megger and an ohmmeter.

##### F-1.1) Insulation Resistance - Cable & Control:

Use the megger to measure the insulation resistance. Attach the megger probes to the pump lead side of the circuit breaker in the control box, one probe to the ground lead and one probe to a pump power lead. Acceptable values of insulation resistance are 10 megohms or greater. If insulation resistance is below 10 megohms, the motor leads should be disconnected from the cable assembly so that the cable and motor can be tested separately.

Should the cable show insulation resistance of less than 10 megohms, disconnect from control box and attach megger probes to the individual leads within the cable. Values below 10 megohms of insulation resistance would indicate damage or moisture and cable should be replaced. Low values of insulation resistance below 10 megohms for the circuitry within the control box would indicate damage or moisture, Any bad parts should be replaced.

##### F-1.2) Insulation Resistance - Motor:

The insulation resistance of the motor stator can be measured by attaching one probe of the megger to the motor power leads and the other probe to the motor ground lead or to bare metal of the pump frame. Insulation resistance values under 10 megohms would indicate presence of excessive moisture within the stator winding. Such moisture can be removed from the stator by placing the stator and frame assembly in an oven and baking the assembly at 250° - 275°F for two to three hours. Following such baking, re measure the insulation resistance to verify that a minimum of 10 megohms has been attained, if



not, replace stator.

**WARNING ! - Always wear appropriate clothing and safety gear when working with or around oven.**

If low stator insulation resistance is due to other modes of failure, such as damaged leads, deformed end turns, etc, the stator should be replaced. Another test of the electrical integrity of the stator is the measurement of winding resistance with an ohmmeter. Such measurement is made between the leads of the stator. If the resistance of the stator winding is greater than listed on page 10, the stator should be replaced.

## F-2) Lubrication:

### F-2.1) Checking Oil:

To check oil, remove pipe plug (42) from diffuser (9). With a flashlight, visually inspect the oil in the seal cavity to make sure it is clean and clear, light amber in color and free from suspended particles. Milky white oil indicates the presence of water. If the the oil looks milky white, pour the oil out of the oil chamber and let it settle in a clean, dry container. If any water settles out in the bottom of the container or if the oil is white and thick (emulsified) replace rotary shaft seals (See Section F-4) and oil.

You can also check oil for contamination by using an oil tester with a range to 30 Kilovolts breakdown. If oil is found to be clean and uncontaminated (measure at or above 15 KV. breakdown), refill the seal cavity. If oil is found to be dirty or contaminated (or measures below 15 KV. breakdown), replace rotary seals and oil.

TABLE 1 - SEAL CHAMBER OIL	
SUPPLIER	GRADE
Gulf	(334206) Harmony 68
Texaco	URSA P-68

### F-2.2) Replacing Oil:

Remove pipe plug (42) from diffuser (9), and drain oil from seal chamber and dispose of properly. Flush inside seal chamber of diffuser (9) thoroughly to be sure it is clean and free of abrasives. Refill oil chamber for 10 & 15 HP pumps with 25 oz (740 ml), and 32 oz (950ml) for 25-50HP, or about half full, of a 20W non-detergent turbine oil with rust and oxidation inhibitors. After replacing oil, replace pipe plug (42) using a sealant.

### F-2.3) Seal Cavity Pressure Test:

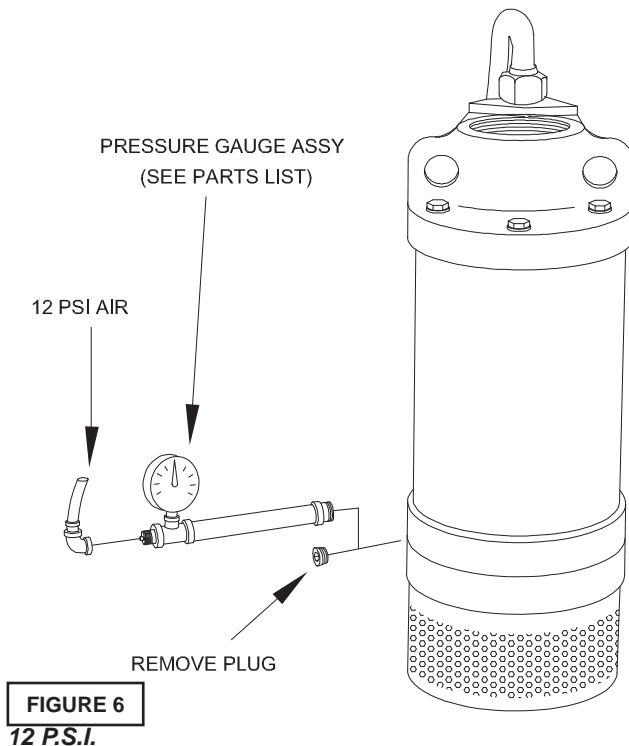
Remove pipe plug (42) from diffuser (9) and check that the seal chamber is of the correct amount of oil (See Figure 6). Apply pipe sealant to pressure gauge assembly and tighten into hole in Intermediate diffuser (9). Pressurize seal chamber to 12 P.S.I. and check for leaks. If after five minutes, the pressure is still holding constant, and no leaks are observed, slowly bleed the pressure and remove the gauge assembly. Replace the pipe plug (42) using a sealant. If the pressure does not hold, then the leak must be located and repaired.



**CAUTION ! - Always wear eye protection when working on pumps.**



**CAUTION ! - Pressure builds up extremely fast, increase pressure by "TAPPING" air nozzle. Too much pressure will damage seal. DO NOT exceed**



**FIGURE 6**

**12 P.S.I.**

## F-3) Impeller Service:

### F-3.1) Disassembly:

To inspect or replace impeller (3) and impeller o-ring (43, on 10-15HP only), remove screws (40), washers (65) and remove strainer (24). Remove strainer bolts (66), cap screws (32), and washers (30, on 10-15HP) (49, on 25-50HP) then remove suction case (4). Check the suction case (4) lining for wear, cuts, or defects and replace if necessary. Now remove locknut (16) and washer (27, on 10-15HP), or bushing (72, on 25-50HP) from shaft. The impeller (3) should slip off the shaft, if not, remove the o-ring (43, on 10-15HP) from the impeller groove and use a bearing puller. Inspect the impeller for wear or damage, also check shims (17a) & (17b) and replace if necessary. **NOTE:** Seal spring relaxes when impeller is removed and may cause oil to leak through.

### F-3.2) Reassembly:

To reassemble, slide inner shims (17a) & (17b) onto shaft, then apply an anti-seize compound on the shaft area where the impeller fits. Insert o-ring (43, on 10-15HP) into groove on impeller (3) and slide the impeller (3) onto the shaft. Apply grease to o-ring (63) and place on diffuser (9), slide the impeller (3) onto the shaft, replace washer (27, on 10-15HP) or bushing (72, on 25-50HP), and locknut (16) onto shaft and tighten to; (10 & 15 HP, 37 ft. lbs.) (25 & 50HP, 103 ft. lbs) Replace suction case (4) onto diffuser (9), lining up holes and inserting cap screws (32) with washers (30, on 10-15HP) or (49, on 25-50HP), tightening to 15 Ft. lbs.(on 10-15HP) or 26 Ft. Lbs. (on 25-50HP).

Insert strainer bolts (66) with washers (30, on 10-15HP) or (49, on 25-50HP), into remaining holes in suction case (4). After assembly, check that the impeller rotates smoothly, but with a slight drag due to bearing and rotary seal friction. If the impeller turns roughly, the bearings should be replaced (See Section F-6). If impeller hangs up or is hard to turn, the gap between the impeller and suction case should be checked. To check the gap, a feeler gauge should be used. Check the gap between the suction case liner and the impeller vanes as shown in Figure 7. Determine the proper gap setting from Table 2 and adjust by



adding or removing shims (17a) & (17b) behind the impeller.

TABLE 2 - IMPELLER GAP		
PUMP MODEL	HP, 60 CYCLE	GAP "X"
9-81000	10	.020 to .030
9-81500	15	.020 to .030
9-82500	25	.030 to .040
9-85000	50	.030 to .040

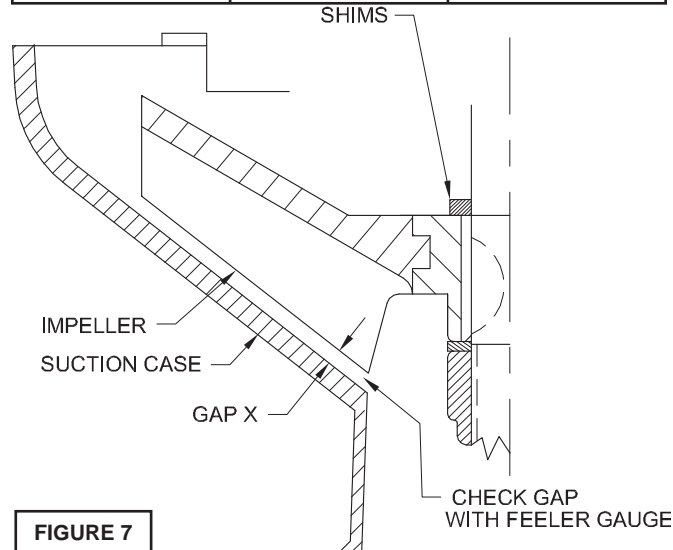


FIGURE 7

Inspect strainer (24) and clean, making sure holes are not clogged to ensure unrestricted flow. Now position strainer (24) onto suction case (4) and inserting screws (40) with washers (65) in holes and tightening.

#### F-4) Shaft Seal Service:

##### F-4.1) Disassembly:

To replace outer shaft seal, drain oil per Section F-2.1 and remove impeller per Section F-3. Remove the shim washers (17a) & (17b), impeller key (15), seal retaining ring (48a) seal spring (48b), and seal rotating member (48c) from shaft. See

Figure 8.

Examine all seal parts and specifically contact faces. Inspect seal for signs of uneven wear pattern on stationary members, chips and scratches on either seal face. **DO NOT** interchange seal components, replace the entire shaft seal (48). If replacing seal, remove screws (14) from seal retainer (12) and carefully pry the retainer (12) from diffuser (9) being careful not to damage diffuser (9) or o-ring (13), now remove retainer from the shaft. This will allow the removal of stationary (48d) by pushing out from back side of retainer or prying out with flat screw driver.

To remove inner shaft seal (10), remove snap ring (11), spring retainer (10a), and spring (10b) from shaft. The diffuser (9) and the rest of the inner seal (10) can now be removed by tapping the diffuser with a plastic hammer until free. Pull the lower end assembly from the stator/frame assembly, and check the rotor and stator for evidence of water, oil, electrical or mechanical damage. If damaged, replace rotor and stator/frame assembly, See section F-6.

##### F-4.2) Reassembly:

**Inner Seal** - Clean oil cavity in diffuser (9). Lightly oil (**DO NOT use grease**) outer surface of stationary member (10d). Press stationary member (10d) firmly into diffuser (9), using a seal pusher (see Parts List - seal tool kit). Nothing but the seal pusher is to come in contact with the seal face. Make sure the stationary member is in straight. (See Figure 9A).



**CAUTION ! - Handle seal parts with extreme care. DO NOT scratch or mar lapped surfaces.**



**IMPORTANT ! - DO NOT hammer on the seal pusher- it will damage the seal face.**

Slide a bullet (see parts list-seal tool kit) over motor shaft. Lightly oil (**DO NOT use grease**) shaft, bullet and inner surface of bellows on rotating member (10c). With lapped surface of rotating member (10c) facing inward toward stationary member (10d), slide rotating member (10c) over bullet and onto shaft, using seal pusher, until lapped faces of (10d) and (10c) are together (see Figure 9B).

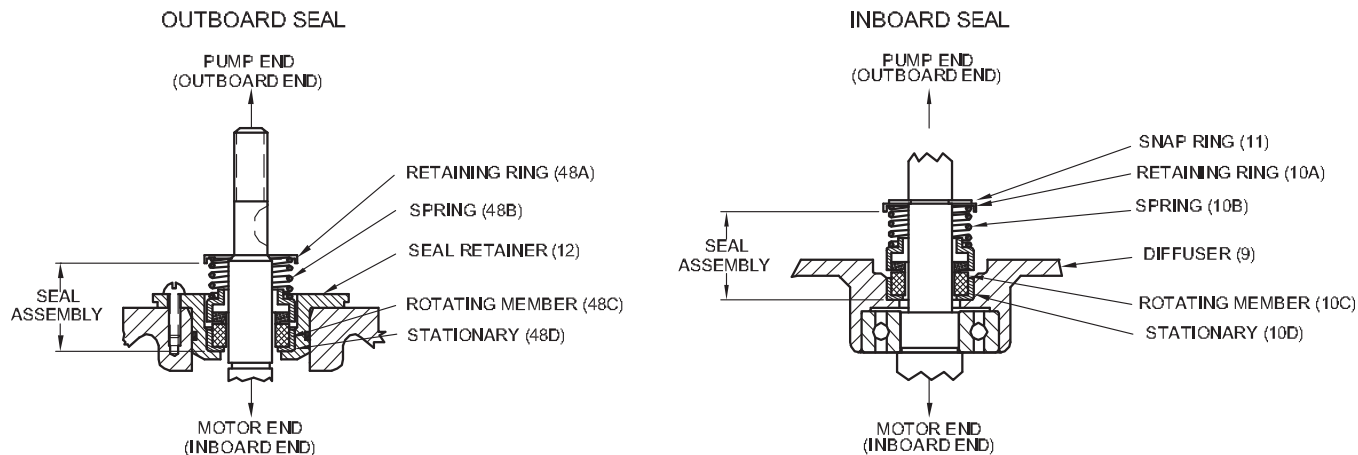


FIGURE 8

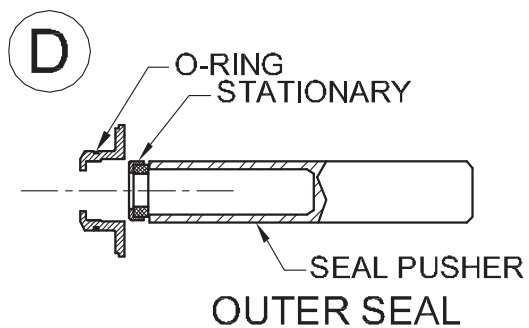
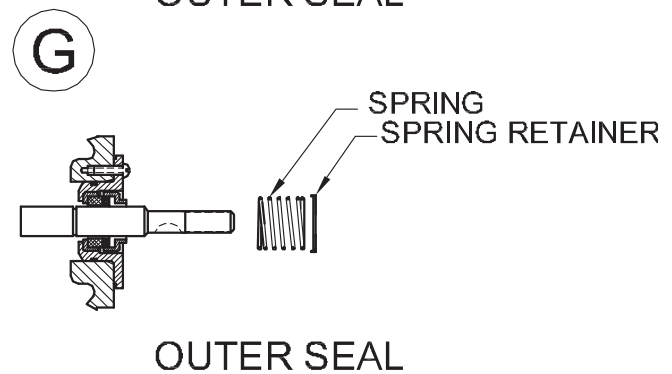
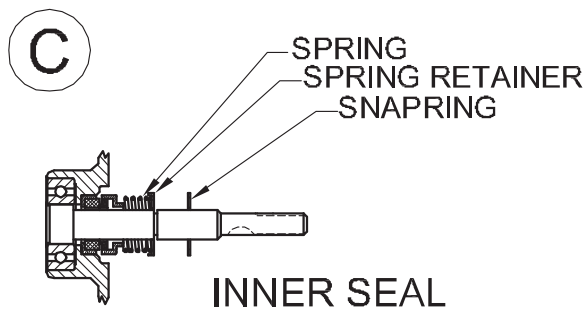
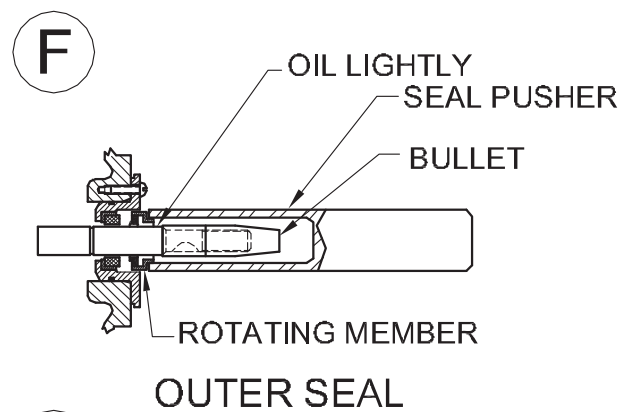
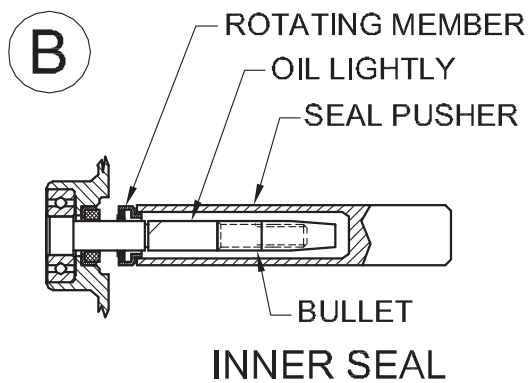
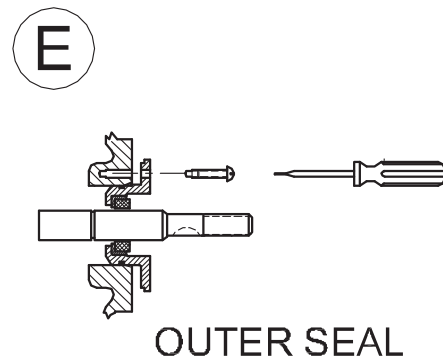
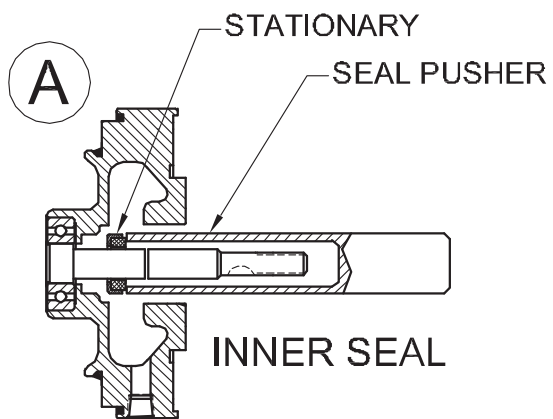


FIGURE 9



**IMPORTANT! - It is extremely important to keep seal faces clean during assembly. Dirt particles lodged between these faces will cause the seal to leak.**

Place spring (10b) over shaft and in place on rotating member (10c), making sure it is seated on retainer and not cocked or resting on bellows tail. Slide retaining ring (10a) over shaft and let rest on spring (10b). Replace snap ring (11) onto shaft. (See Figure 9C).

**Outer Seal** - Lightly oil (**DO NOT use grease**) outer surface of stationary member (48d). Press stationary member (48d) firmly into seal retainer (12), using a seal pusher (see Parts List - seal tool kit). Nothing but the seal pusher is to come in contact with the seal face. Make sure the stationary member is in straight, See Figure 9D. Lubricant O-ring (13) with a grease, and place it in the groove on seal retainer (12). Place seal retainer (12) into diffuser (9) and insert screws (14) and tighten, See Figure 9E. **NOTE:** When installing the seal retainer over shaft, do not scratch the shaft or seal seat face. Slide a bullet (see parts list-seal tool kit) over motor shaft.

Lightly oil (**DO NOT use grease**) shaft, bullet and inner surface of bellows on rotating member (48c). With lapped surface of rotating member (48c) facing inward toward stationary member (48d), slide rotating member (48c) over bullet and onto shaft, using seal pusher, until lapped faces of (48d) and (48c) are together (see Figure 9F). Place spring (48b) over shaft and in place on rotating member (48c), making sure it is seated on retainer and not cocked or resting on bellows tail. Slide retaining ring (48a) over shaft and let rest on spring (48b), See Figure 9G. Assemble impeller, suction case and screen per Section F-3.2. Replace oil as outlined in paragraph F-2.2.

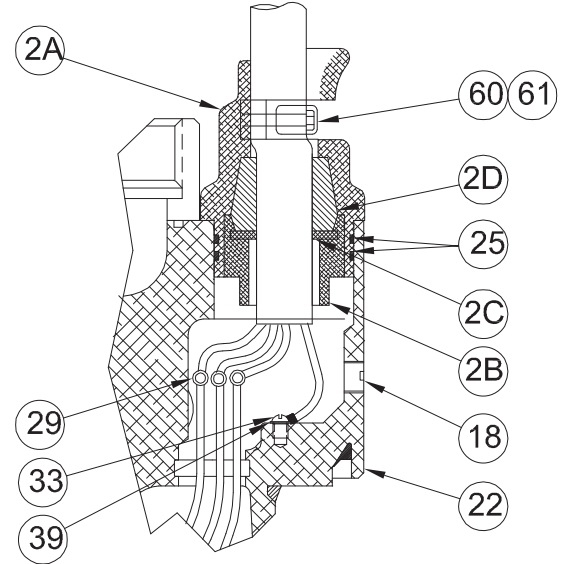
## F-5) Discharge & Cable Service:

### F-5.1) Disassembly:

Refer to Section F-1 before disassembly. While disassembling, check for indications of water leaks. Remove cap screws (28) and washers (30), cable gland assembly (2) and o-rings (25) from discharge head (22). Use care to avoid damaging the metal surface. Remove cap screws (60) and washers (61) from cable clamp (2f). Disconnect cable wires from stator leads by removing connectors (29), being sure that the stator's wires are identified before disconnecting. Check wires for breaks or cuts. If water is present, there may be leakage through the cable gland (2e), o-rings (19), (20), (25) and (63), the power cable (2a) if it has been cut, or the shaft seals (10) and (48). Check all items and replace if needed. Remove ground screw

(33) and washer (39) from discharge head (22).

Remove cap screws (31), washers (30, on 10-15HP) or (49, on 25-50HP), from discharge head (22). Carefully, using a plastic hammer, tap the discharge case (22) free from the frame assembly and remove while feeding the stator wires through the terminal cavity and stator dam (47) in the discharge case. Now remove o-rings (19) and (20), replace o-rings showing any nicks, cuts, cracks, or deformation. To remove cable (2a), loosen cable grip nut (2b), cable grip (2c) and bushing (2d) and

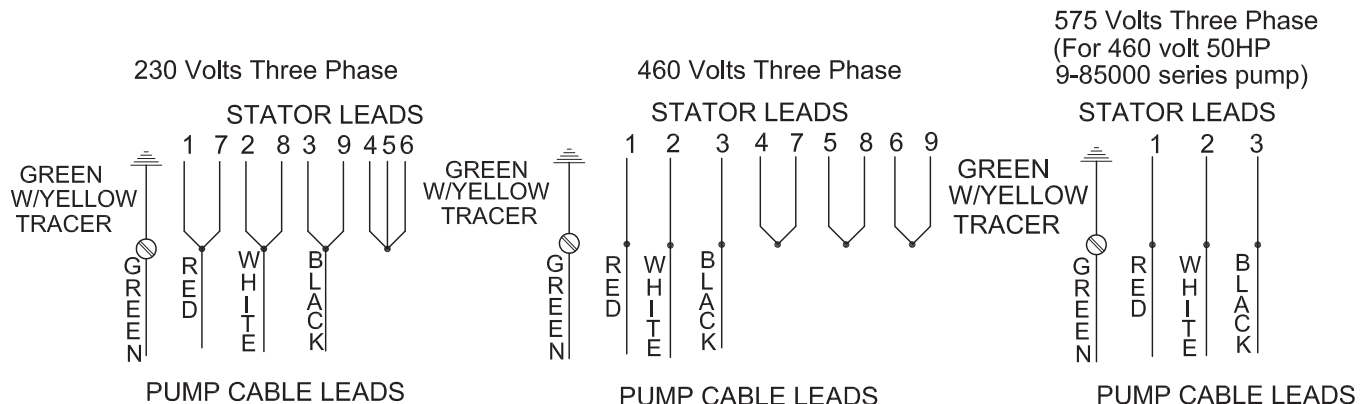


**FIGURE 10**

remove from cable. (See Figure 10).

### F-5.2) Reassembly:

To assemble discharge case (22) to stator/frame assembly, set the assembly in the upright position. Make sure all stator leads are properly identified (See Figure 11). Each lead should be color coded or numbered for identification. Apply grease to o-rings (19) and (20) and place on discharge case (22). Set the discharge case (22) onto the stator/frame assembly with the terminal cavity directly over the stator leads and insert the leads through the stator dam (47) into cavity opening, being careful not to lose the lead identification numbers or damage the o-rings. Be sure that load spring (8) is sitting properly in bearing bore of discharge case. Line up the holes and insert cap screws (31) washers (30), into holes and torque to 15 Ft. Lbs. (on 10-15HP) or 26 Ft. Lbs. (on 25-50HP).



**FIGURE 11**

Slide cable grip nut (2b), cable grip (2c), bushing (2d) and cable gland (2e) with o-rings (25) onto cable (2a), and expose approximately 3" of wire at the end of the cable. Attach ground screw (33) and washer (39) with ground wire (Green) to the inside of terminal cavity in discharge case (22). Make wire connections in accordance to Figure 11 using connectors (29) and then tape each connector individually with electrical tape. Fold and insert the connectors and wires into the terminal box cavity. Insert cap screws (28) with washers (30) and tighten to 15 Ft. Lbs.

Move Bushing (2d), cable grip (2c) and gland nut (2b) into place and tighten to 25 ft. lbs. Insert cap screws (60) and washers (61) into clamp (2f), and tighten to 7 ft. lbs. After assembly, an insulation test (or MEGGER) should be performed per section F-1.1.

## F-6) Motor and Bearing Service:

### F-6.1) Disassembly:

To service or replace motor and/or bearings, first remove discharge case (22) per Section F-5.1 and lower pump end per Section F-4.1. Remove rotor from stator, remove cap screws (59) with washers (71) from bearing retainer (57) and remove bearing retainer (57). Remove bearings (7), (46), and loading spring (8) from rotor shaft. Use a bearing puller if needed. Bearings that feel rough, show wear or rust should be replaced. If stator needs replaced, replace stator and frame assembly.

### F-6.2) Reassembly:

Set the stator/frame assembly and the discharge case in a vertical position with the discharge case down. Slip the outer case (21) over the frame (5). Press bearing (7) onto discharge end of rotor shaft and press bearing (46) with bearing retainer (57) onto suction end of rotor shaft. It is **IMPORTANT** that this bearing be installed as shown in Figure 12. The outer race of bearing (46) that is imprinted with the words "**SUPPORT HERE**" must be positioned toward the diffuser (9). Axial thrust after start up is in the direction towards the impeller. Inner race of bearing has more surface area on top side when installed correctly. When installed correctly, there will be movement

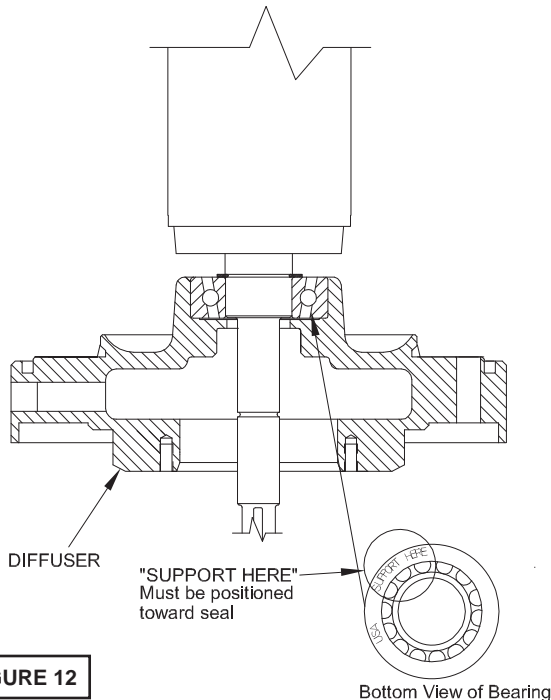


FIGURE 12

upward in rotor/shaft assembly.

This is opposite of downward thrust which occurs when pump is running. "**LOOSENESS**" between inner and outer race is normal for angular contact bearing. Bearing failure will result in a short period of time if it is not installed as specified. Now assemble rotor assembly into stator/frame assembly. Assemble discharge case onto motor/frame assembly per Section F-5.2 and Pump lower end per Section F-4.2. An electrical inspection should be performed after reassembly per Section F-1.

### F-7 Motor Chamber Pressure Test:

After final assembly, pressure test the motor chamber by removing plug (18) from discharge case (22) and connect an air hose fitting into the pipe thread. Submerge the pump completely and apply 12 PSI air pressure.



**WARNING! - DO NOT exceed 12 PSI air pressure.**

Pump must not show any leakage, if leakage occurs, determine location and replace defective or damaged parts, then retest pump. After pump has been tested and no leaks have been found, remove air hose connection and replace plug (18) using a sealant, into discharge case (22).

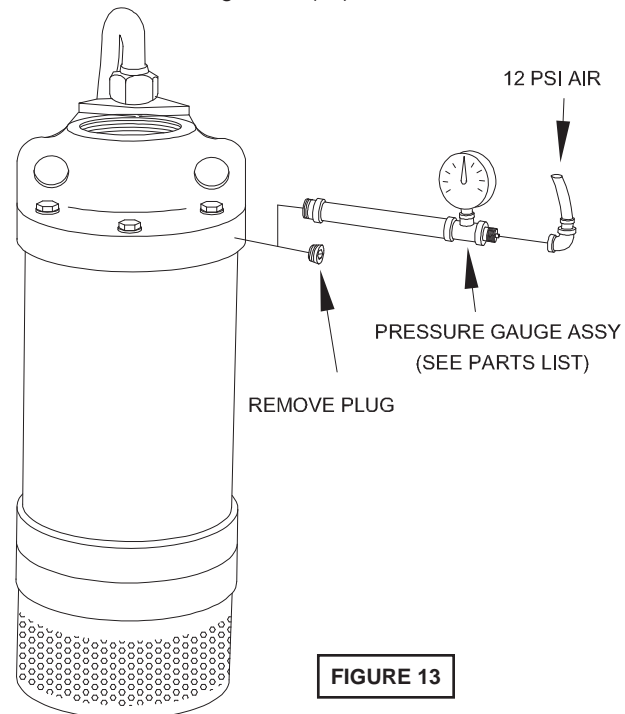


FIGURE 13



## SECTION: G REPLACEMENT PARTS

### G-1 ORDERING REPLACEMENT PARTS:

Your local Prosser distributor can supply parts and repair service. When ordering parts, ALWAYS furnish the following information: Specify pump model number as shown on nameplate, serial number, part number, item number and part name.

1. Pump serial number. (G-1)
2. Pump model number. (G-2)
4. Part description.
5. Item part number.
6. Quantity required.
7. Shipping instructions.

**PROSSER®**  
 SUBMERSIBLE PUMP

MODEL 2  
 H.P.  
 FULL LOAD SPEED  
 CONTINUOUS DUTY

S/N 1  
 PHASE  
 VOLTS A.C.  
 LR CODE LETTER

HERTZ  
 AMPS  
 IMPELLER ROTATION  
 SUCTION END VIEW

PUMP RECOIL  
WHEN STARTING

IMPELLER ROTATION  
SUCTION END VIEW

IMPELLER ROTATION MUST BE CLOCKWISE WHEN VIEWED FROM SUCTION END. TO CORRECT DIRECTION, REVERSE CONNECTION OF BLACK & WHITE LEADS AT CONTROL END OF PUMP CABLE. CHANGE OIL IN DIFFUSER SEAL CHAMBER EVERY 500-600 HOURS WITH   OUNCES SAE 20W NON-DETERGENT MOTOR OIL. CAUTION: DO NOT OVERFILL. USE WITH CERTIFIED STARTER OF AT LEAST   H.P. WITH OVERLOAD ELEMENT SELECTED OR ADJUSTED IN ACCORDANCE WITH STARTER INSTRUCTIONS.  
 UTILISER AVEC UN DEMARREUR CERTIFIE POUR AU MOINS   HP AVEC UN DISPOSITIF CONTRE LES SUR-CHARGES CHOISI OU REGLE CONFORMEMENT A LA FICHE TECHNIQUE DU DEMARREUR.

P/N 2-33241

### 8. Billing Instructions.

#### G-1 SERIAL NUMBER:

The Serial Number block will consists of a six digit number, which is specific to each pump and may be preceded by a alpha character, which indicates the plant location. This number will also be suffixed with a three or four digit number, which indicates the date the unit was built (Date Code).

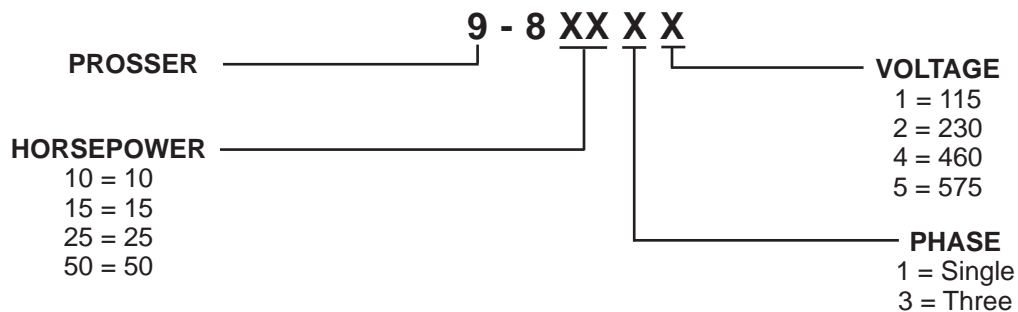
EXAMPLE: A012345 495

Reference the six digit portion (Serial Number) of the number when referring to the product.

#### G-2 MODEL NUMBER:

This designation consist of numbers which represent, Pump Line, Horsepower, Motor phase, Voltage and Variations (as shown below). This Number is used for ordering and obtaining information.

### MODEL NUMBER DESIGNATION



## TROUBLE SHOOTING

CAUTION ! Always disconnect the pump from the electrical power source before handling.  
If the system fails to operate properly, carefully read instructions and perform maintenance recommendations.  
If operating problems persist, the following chart may be of assistance in identifying and correcting them:  
MATCH "CAUSE" NUMBER WITH CORRELATING "CORRECTION" NUMBER.

NOTE: Not all problems and corrections will apply to each pump model.

PROBLEM	CAUSE	CORRECTION
Pump will not run	<ol style="list-style-type: none"> <li>1. Poor electrical connection, blown fuse, tripped breaker or other interruption of power, improper power supply.</li> <li>2. Motor or switch inoperative (to isolate cause, go to manual operation of pump).</li> <li>2a. Float movement restricted.</li> <li>2b. Switch will not activate pump or is defective.</li> <li>2c. Defective motor</li> <li>3. Insufficient liquid level.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check all electrical connections for security. Have electrician measure current in motor leads, if current is within <math>\pm 20\%</math> of locked rotor Amps, impeller is probably locked. If current is 0, overload may be tripped. Remove power, allow pump to cool, then recheck current.</li> <li>2a. Reposition pump or clean basin as required to provide adequate clearance for float.</li> </ol>
Pump will not turn off	<ol style="list-style-type: none"> <li>2a. Float movement restricted.</li> <li>2b. Switch will not activate pump or is defective.</li> <li>4. Excessive inflow or pump not properly sized for application.</li> <li>9. Pump may be airlocked</li> <li>14. H-O-A switch on panel is in "HAND" position</li> </ol>	<ol style="list-style-type: none"> <li>2b. Disconnect level control. Set ohmmeter for a low range, such as 100 ohms full scale and connect to level control leads. Actuate level control manually and check to see that ohmmeter shows zero ohms for closed switch and full scale for open switch. (Float Switch).</li> <li>2c. Check winding insulation (Megger Test) and winding resistance. If check is outside of range, dry and recheck. If still defective, replace per service instructions.</li> </ol>
Pump hums but does not run	<ol style="list-style-type: none"> <li>1. Incorrect voltage</li> <li>8. Impeller jammed or loose on shaft, worn or damaged, impeller cavity or inlet plugged.</li> </ol>	<ol style="list-style-type: none"> <li>2c. Check winding insulation (Megger Test) and winding resistance. If check is outside of range, dry and recheck. If still defective, replace per service instructions.</li> </ol>
Pump delivers insufficient capacity	<ol style="list-style-type: none"> <li>1. Incorrect voltage.</li> <li>4. Excessive inflow or pump not properly sized for application.</li> <li>5. Discharge restricted.</li> <li>6. Check valve stuck closed or installed backwards.</li> <li>7. Shut-off valve closed.</li> <li>8. Impeller jammed or loose on shaft, worn or damaged, impeller cavity or inlet plugged.</li> <li>9. Pump may be airlocked.</li> <li>10. Pump running backwards</li> </ol>	<ol style="list-style-type: none"> <li>3. Make sure liquid level is at least equal to suggested turn-on point.</li> <li>4. Recheck all sizing calculations to determine proper pump size.</li> <li>5. Check discharge line for restrictions, including ice if line passes through or into cold areas.</li> <li>6. Remove and examine check valve for proper installation and freedom of operation.</li> <li>7. Open valve.</li> </ol>
Pump cycles too frequently or runs periodically when fixtures are not in use	<ol style="list-style-type: none"> <li>6. Check valve stuck closed or installed backwards.</li> <li>11. Fixtures are leaking.</li> <li>15. Ground water entering basin.</li> </ol>	<ol style="list-style-type: none"> <li>8. Check impeller for freedom of operation, security and condition. Clean impeller and inlet of any obstruction.</li> <li>9. Loosen union slightly to allow trapped air to escape. Verify that turn-off level of switch is set so that the suction is always flooded. Clean vent hole.</li> </ol>
Pump shuts off and turns on independent of switch, (trips thermal overload protector). <b>CAUTION!</b> Pump may start unexpectedly. Disconnect power supply.  <b>NOTE:</b> Some pumps <b>DO NOT</b> have thermal overload protection on the motor. Check pump specifications to determine.	<ol style="list-style-type: none"> <li>1. Incorrect voltage.</li> <li>4. Excessive inflow or pump not properly sized for application.</li> <li>8. Impeller jammed, loose on shaft, worn or damaged, impeller cavity or inlet plugged.</li> <li>12. Excessive water temperature. (internal protection only)</li> </ol>	<ol style="list-style-type: none"> <li>10. Check rotation. If power supply is three phase, reverse any two of three power supply leads to ensure proper impeller rotation..</li> <li>11. Repair fixtures as required to eliminate leakage.</li> </ol>
Pump operates noisily or vibrates excessively	<ol style="list-style-type: none"> <li>2c. Worn bearings, motor shaft bent.</li> <li>5. Debris in impeller cavity or broken impeller</li> <li>10. Pump running backwards</li> <li>13. Piping attachments to building structure too rigid or too loose.</li> </ol>	<ol style="list-style-type: none"> <li>12. Check pump temperature limits &amp; fluid temperature.</li> <li>13. Replace portion of discharge pipe with flexible connector.</li> <li>14. Turn to automatic position.</li> <li>15. Check for leaks around basin inlet and outlets.</li> </ol>

PUMP SERIES: 9-81000, 9-81500

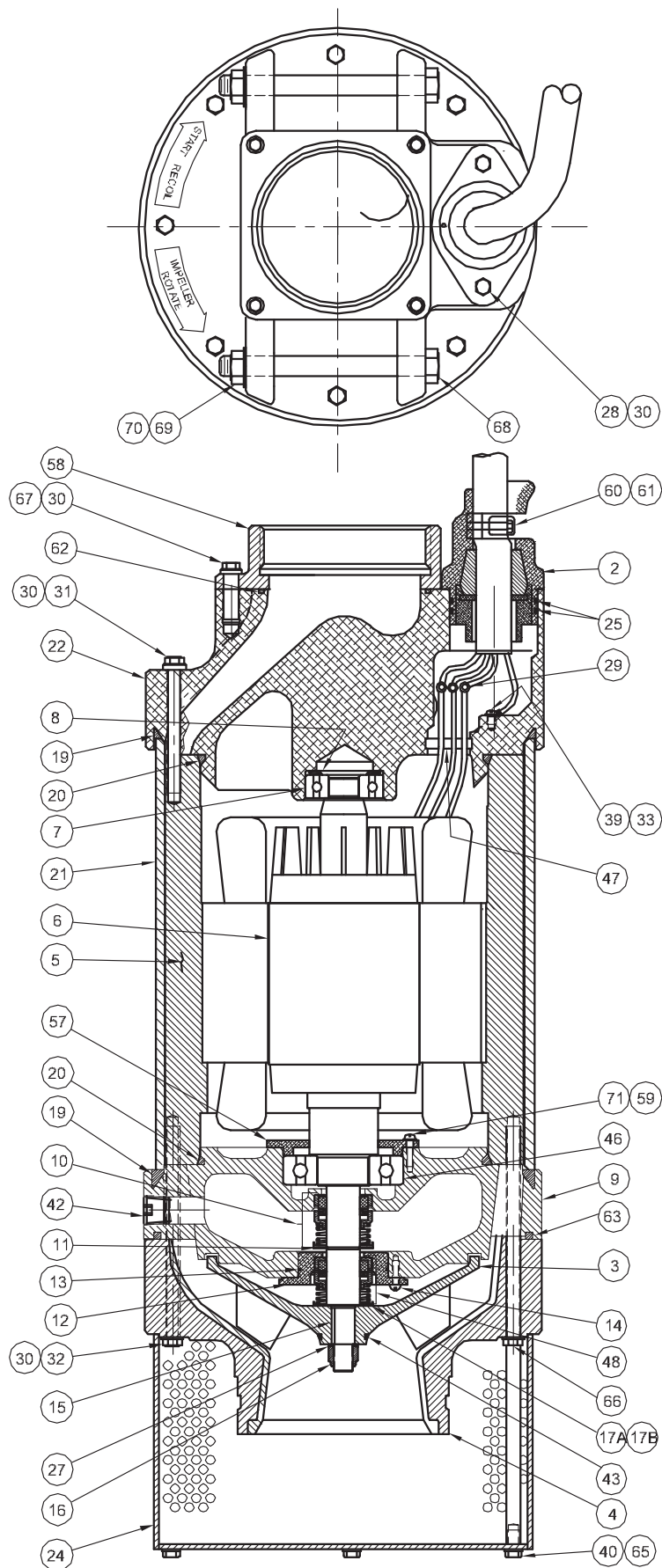


FIGURE 14

PUMP SERIES: 9-81000, 9-81500

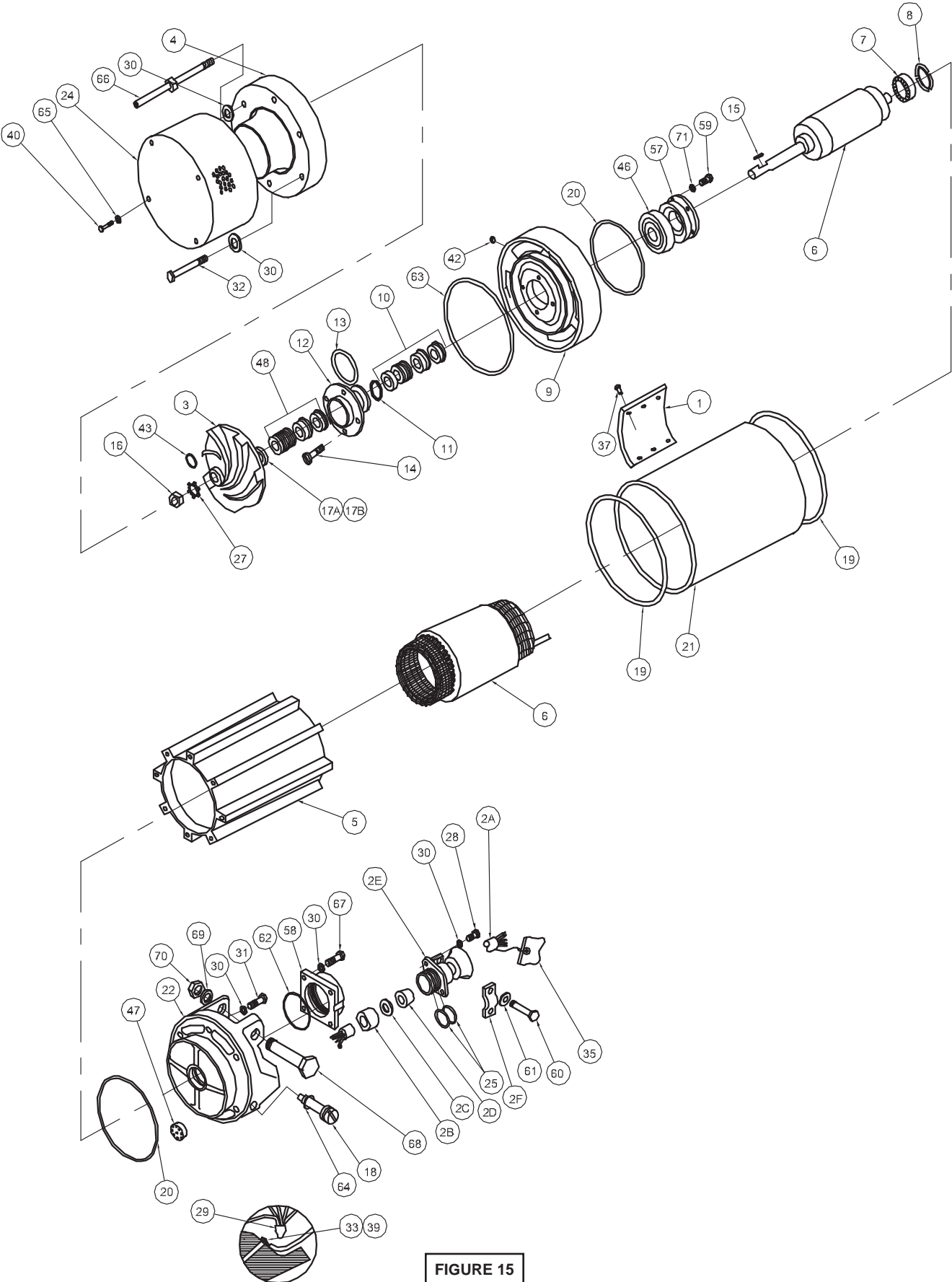


FIGURE 15

# PUMP SERIES: 9-81000, 9-81500

## PARTS KITS

**Bearing & Seal Kit ..... P/N- 9-815580 (+) 7, 8, 10, 11, 13, 15, 16, 17a, 17b, 27, 43, 46, 48**

**O-Ring Kit..... P/N- 9-815574 (♦) 2d, 19, 20, 25, 29, 47, 62, 64**

**Seal Tool Kit..... TL - 213557 Contact Parts Dept.**

## PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION		
1	1	2-33241	Name Plate		
2	1	9-840710-44	Cable & Gland Assy	230V	
	1	9-840710-5	Cable & Gland Assy	460/575V	
2a	1	9-810893-50	* Cable, 50 ft.	230V	
	1	9-350887-50C	* Cable, 50 ft.	460/575V	
2b	1	9-840755	* Cable Grip Nut	Zp	
2c	1	9-840759-1	* Cable Grip Washer	230V	
	1	9-840759-2	* Cable Grip Washer	460/575V	
2d	1	9-840751-3	*♦ Bushing, Neoprene	230V	
	1	9-840751-6	*♦ Bushing, Neoprene	460/575V	
2e	1	9-840711	* Cable Gland	Aluminum	
2f	1	9-840760-4	* Cable Clamp	Aluminum	
3	1	9-810203	Impeller, Stainless	7.80" Dia	10HP-HH
	1	9-810200	Impeller, Stainless	7.19" Dia.	10HP-HV
	1	9-815203	Impeller, Stainless	7.80" Dia	15HP-HH
	1	9-815200	Impeller, Stainless	7.19" Dia.	15HP-HV
4	1	9-810105	Suction Case	10HP-HH	
	1	9-815100	Suction Case	10 & 15HP-HV	
	1	9-815105	Suction Case	15HP-HH	
5	1	9-610500-1	Frame	10HP	
	1	9-615500-2	Frame	15HP	
6	1	9-610400	Rotor	10HP, 230V	
	1	9-810630	Stator	10HP, 230V	
	1	9-610400	Rotor	10HP, 460V	
	1	9-810630	Stator	10HP, 460V	
	1	9-610400	Rotor	10HP, 575V	
	1	9-810635	Stator	10HP, 575V	
	1	9-615400	Rotor	15HP, 230V	
	1	9-815630	Stator	15HP, 230V	
	1	9-615400	Rotor	15HP, 460V	
	1	9-815630	Stator	15HP, 460V	
	1	9-615400	Rotor	15HP, 575V	
	1	9-815635	Stator	15HP, 575V	
7	1	2-34007	+ Bearing		
8	1	2-30002-3	+ Bearing Loading Spring		
9	1	9-815300	Diffuser		
10	1	2-31006	+ Shaft Seal, Inboard	Carbon/Ceramic/Buna-N	
11	1	2-27002-87	+ Snap Ring		
12	1	9-815310	Seal Retainer		
13	1	2-31003-035	+ O-Ring		
14	4	2-22003-41	Rd. Hd. Screw	10-24 x .50"Lg.	
15	1	9-815410	+ Key	.13" x .13 x .88"	
16	1	2-20002-38	+ Lock Nut, Impeller	1/2-20, Stainless	
17a	A/R	9-815210-1	+ Shim, .016 Thk		
17b	A/R	9-815210-2	+ Shim, .032 Thk.		
18	1	9-615758	Plug Assy.		

(\*) Included with item number 2.

## PUMP SERIES: 9-81000, 9-81500

19	2	2-31003-448	◆	O-Ring	
20	2	2-31003-366	◆	O-Ring	
21	1	9-810555		Outer Shell	10HP
	1	9-815555		Outer Shell	15HP
22	1	9-615700		Discharge Head	
24	1	9-815000-1		Strainer	Stainless Steel
25	2	2-31003-138	◆	O-ring	
27	1	9-815211	+	Lockwasher, Impeller	.51 x 1.20, Stainless
28	2	2-23012-51		Capscrew	3/8-16 x 1"Lg, Zp
29	4	2-12029	◆	Connector	230V
	6	2-12026-2	◆	Connector	460V
	3	2-12026-2		Connector	575V
30	21	2-21002-18		Flat Washer	3/8 Stainless
31	7	2-23013-39		Capscrew	3/8-16 x 3.25"Lg., Zp
32	4	2-23013-84		Capscrew, HH	3/8-16 x 5.00"Lg., Zp
	4	2-23013-93		Capscrew, HV	3/8-16 x 5.50"Lg., Zp
33	1	2-23027-67		Rd. Hd. Screw	1/4-20 x .375"Lg., Cad
35	1	2-33012		Tag, Lead, Ground	
37	6	2-25001-4		Drive Screw	
38	25oz	029034		Oil, Cooling	
39	1	2-21001-22		Lockwasher	1/4 Cad
40	4	2-23011-2		Hex Hd Screw	5/16-18 x .50"Lg. Zp.
42	1	2-32004-20		Pipe Plug	.50" NPT Stainless
43	1	2-31003-122	+	O-Ring	
46	1	2-34004	+	Bearing, Angular Ball	
47	1	9-840752	◆	Stator Dam	230/460V
	1	9-840752-1	◆	Stator Dam	575V
48	1	9-815350	+	Shaft Seal, Outboard	Silicon/Silicon/Viton®
57	1	9-815311		Bearing Retainer	
58	1	9-815720		Discharge Adapter	
59	4	2-23014-43		Hex Hd Cap Screw	10-24 x .625" Lg. Zp
60	2	1-130-1		Hex Hd Cap Screw	5/16-18 x 1.50" Lg Stainless
61	2	2-21002-15		Flat Washer	5/16 Zp
62	1	2-31003-244	◆	O-Ring	
63	1	2-31003-273	◆	O-Ring	
64	1	2-31003-015	◆	O-Ring	
65	4	2-21002-14		Flat Washer	5/16 Zp
66	4	9-815010		Strainer Bolt	
67	4	2-23012-60		Hex Hd Cap Screw	3/8-16 x 1.125" Lg. Zp
68	2	2-23013-95		Hex Hd Cap Screw	1/2-13 x 5.50" Lg. Zp
69	2	2-21005-23		Lockwasher	1/2 Zp
70	2	2-20009-17		Hex Nut	1/2-13 Zp
71	5	002618		Lockwasher	#10 Cad

PUMP SERIES: 9-82500, 9-85000

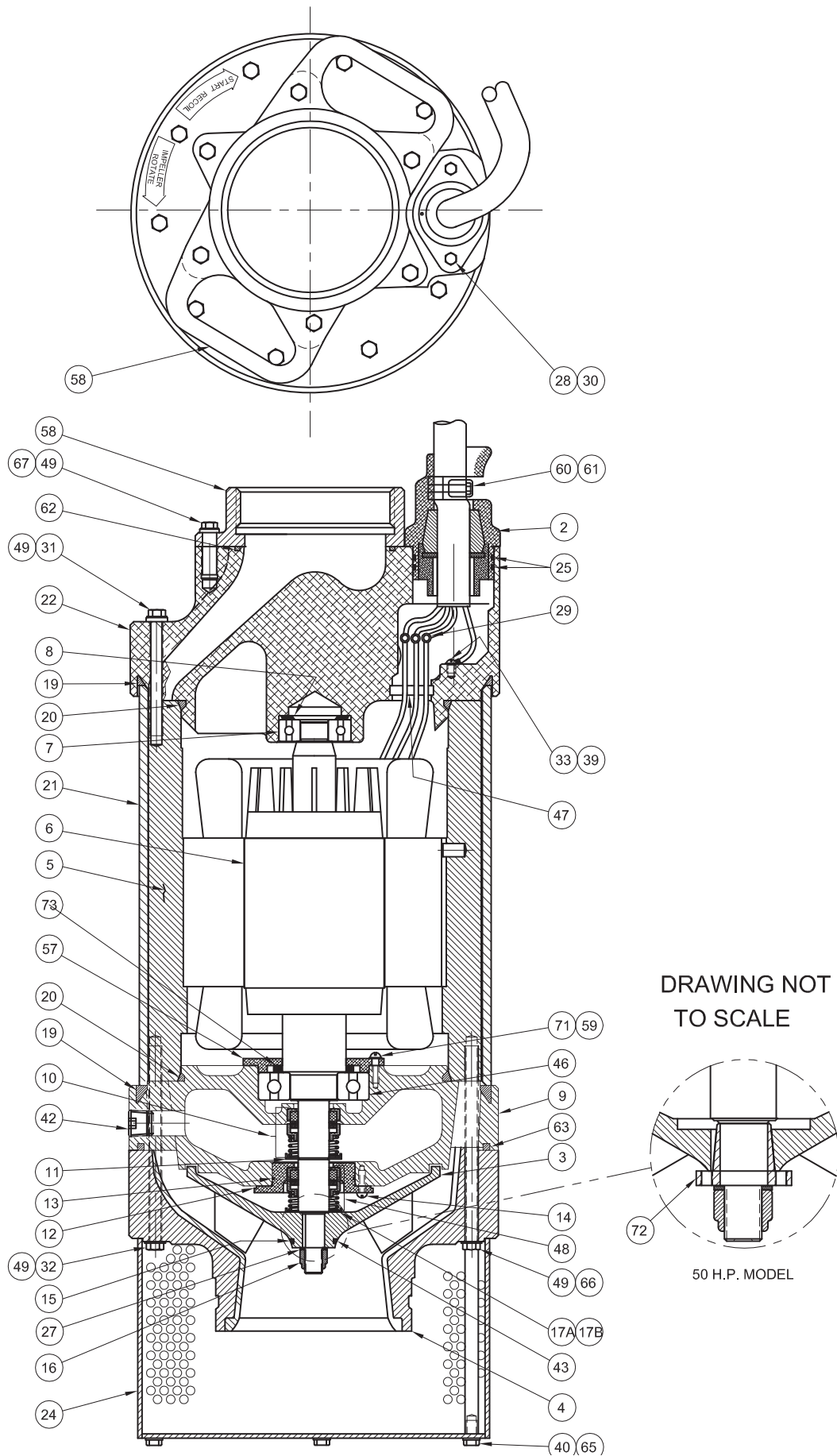
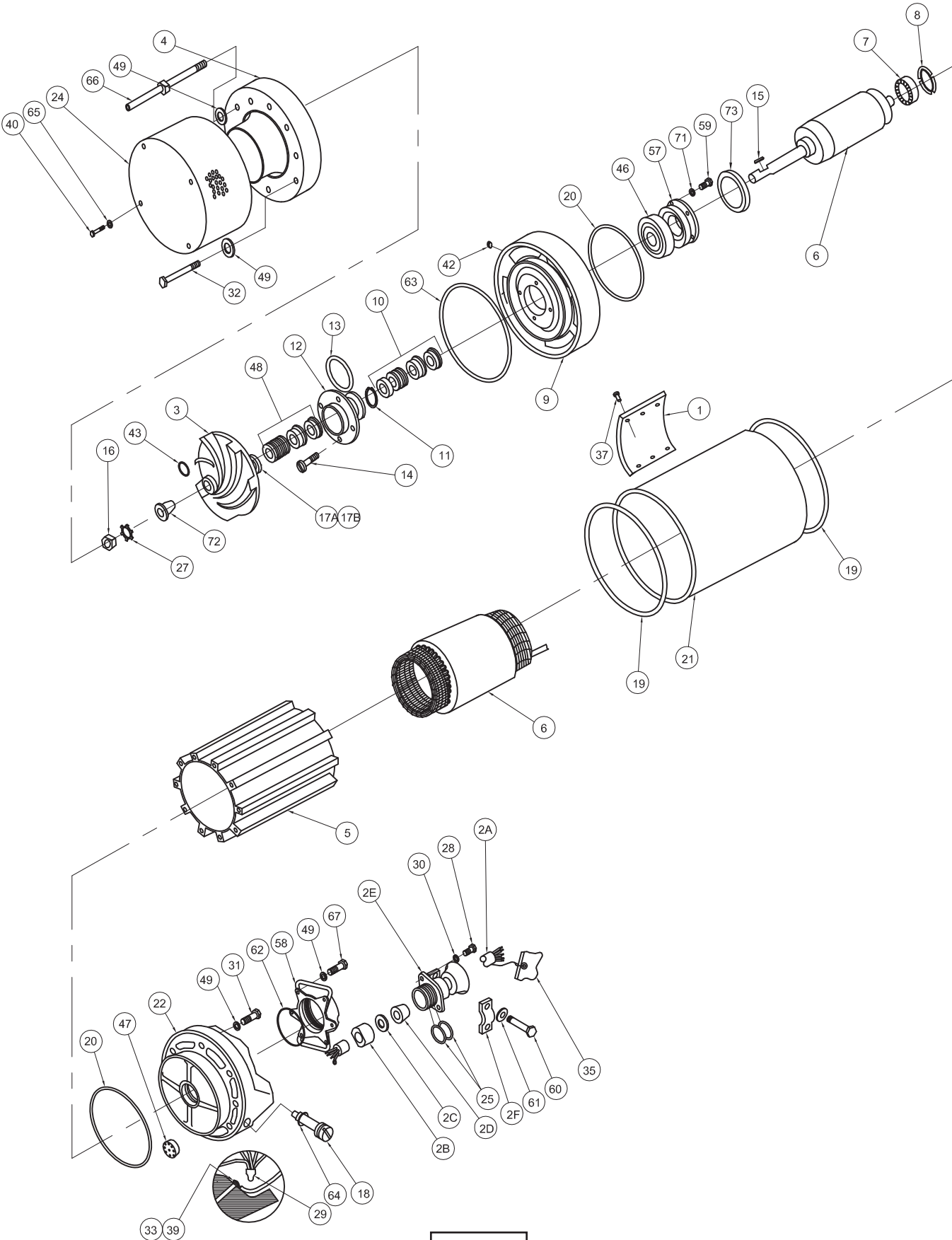


FIGURE 16



**PUMP SERIES: 9-82500, 9-85000**



**FIGURE 17**



# PUMP SERIES: 9-82500, 9-85000

## PARTS KITS

<b>Bearing &amp; Seal Kit, 25HP P/N- 9-840582</b>	(+) 7, 8, 10, 11, 13, 15, 16, 17a, 17b, 27, 43, 46, 48
<b>Bearing &amp; Seal Kit, 50HP P/N- 9-850582</b>	(+) 7, 8, 10, 11, 13, 15, 16, 17a, 17b, 27, 43, 46, 48
<b>O-Ring Kit..... P/N- 9-840574</b>	(♦) 2d, 13, 18, 19, 20, 25, 29, 47, 62, 63, 64
<b>Tools: Seal Pusher..... P/N- TL-21358</b>	For 9-82500
<b>Bullet..... P/N- TL-21377</b>	For 9-82500
<b>Tools: Seal Pusher..... P/N- TL-21358</b>	For 9-85000
<b>Bullet..... P/N- TL-21378</b>	For 9-85000

## PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION		
1	1	2-33241	Name Plate, CSA		
	1	2-33013	Name Plate,		
2	1	9-840710-10	Cable & Gland Assy		
2a	1	9-825907-50	* Cable, 50 ft.		
2b	1	9-840748	* Cable Grip Nut		
2c	1	9-840759-5	* Cable Grip Washer		
2d	1	9-840749-2	*♦ Bushing, Neoprene		
2e	1	9-840715	* Cable Gland	Aluminum	
2f	1	9-840760-4	* Cable Clamp	Aluminum	
3	1	9-825203	Impeller, Stainless	11.00" Dia	25HP-HH
	1	9-825200	Impeller, Stainless	8.01" Dia.	25HP-HV
	1	9-850203	Impeller, Stainless	8.46" Dia	50HP-HH
	1	9-850200	Impeller, Stainless	8.01" Dia.	50HP-HV
4	1	9-840100-4	Suction Case	25 & 50HP-HH	
	1	9-840100	Suction Case	25HP-HV	
	1	9-840100-8	Suction Case	50HP-HV	
5	1	9-840500	Frame	25HP	
	1	9-850500	Frame	50HP	
6	1	137853	Rotor / Stator	25HP, 230/460V	
	1	137854	Rotor / Stator	25HP, 575V	
	1	137855	Rotor / Stator	50HP, 460V	
	1	137856	Rotor / Stator	50HP, 575V	
7	1	2-34013	+ Bearing		
8	1	2-30002-5	+ Bearing Loading Spring		
9	1	9-840300	Diffuser		
10	1	09917	+ Shaft Seal, Inboard	Carbon/Ceramic/Buna-N	
11	1	2-27002-125	+ Snap Ring		
12	1	9-840310	Seal Retainer		
13	1	2-31003-038	+♦ O-Ring		
14	4	2-22003-41	Rd. Hd. Screw	10-24 x .50"Lg.	
15	1	9-840410	+ Key, 25HP	.15" x .15" x .80"	
	1	9-850410-1	Key, 50HP	.25 x .27 x 1.0" Lg	
16	1	2-20002-43	+ Lock Nut, Impeller	5/8-18, Stainless	
	1	9-850209	Lock Nut, Impeller	1-12	
17a	A/R	9-840210-2	+ Shim, .010 Thk	25HP	
	A/R	2-21003-43	Shim, 1"	50HP	
17b	A/R	9-840210-3	+ Shim, .020 Thk.	25HP	
	A/R	2-21003-44	Shim, 1"	50HP	
18	1	9-840758	♦ Plug Assy.		
19	2	M-6458	♦ O-Ring		
20	2	2-31003-446	♦ O-Ring		
21	1	9-840555-1	Outer Shell	25HP	
	1	9-850555	Outer Shell	50HP	
22	1	9-840700	Discharge Head		

(\*) Included with item number 2.

## PUMP SERIES: 9-82500, 9-85000

24	1	9-825000-1		Strainer	Stainless Steel
25	2	2-31003-138	◆	O-ring	
27	1	9-840211	+	Lockwasher,	Impeller, 25HP, .64 x 1.437, Stainless
	1	2-21016		Lockwasher,	Impeller, 50HP, 1 x 1.937, Stainless
28	2	2-23012-51		Capscrew	3/8-16 x 1"Lg, Zp
29	4	2-12029-1	◆	Connector	230V
	6	2-12029-1	◆	Connector	460V
	3	2-12029		Connector	575V
30	21	2-21002-18		Flat Washer	3/8 Stainless
31	7	2-23013-59		Capscrew	1/2-13 x 3.75"Lg., Zp
32	4	2-23013-86		Capscrew, HH	1/2-13 x 5.00"Lg., Zp
	4	2-23013-93		Capscrew, HV	3/8-16 x 5.50"Lg., Zp
33	1	2-23027-67		Rd. Hd. Screw	1/4-20 x .375"Lg., Cad
35	1	2-33012		Tag, Lead, Ground	
37	6	2-25001-4		Drive Screw	
38	32oz	029034		Oil, Cooling	
39	1	2-21001-22		Lockwasher	1/4 Cad
40	4	2-23011-2		Hex Hd Screw	5/16-18 x .50"Lg. Zp.
42	1	2-32004-20		Pipe Plug	.50" NPT Stainless
43	1	2-31003-122	+◆	O-Ring	25HP ONLY
46	1	2-34016	+	Bearing, Angular Ball	
47	1	9-840750	◆	Stator Dam	25HP, 230/460V
	1	9-840750-1	◆	Stator Dam	25HP- 575V, 50H -460V
48	1	9-840350	+	Shaft Seal,	Outboard, 25HP Silicon/Silicon/Viton®
	1	9-850350		Shaft Seal,	Outboard, 50HP Silicon/Silicon/Viton®
49	25	2-21002-23		Flat Washer	1/2" Zp
57	1	9-840313		Bearing Retainer	
58	1	9-840732		Discharge Adapter	
59	4	2-23030-16		Hex Hd Cap Screw	10-24 x .625" Lg. Stainless
60	2	2-23006-68		Hex Hd Cap Screw	5/16-18 x 1.25" Lg Zp
61	2	2-21002-15		Flat Washer	5/16 Zp
62	1	2-31003-260	◆	O-Ring	
63	1	2-31003-277	◆	O-Ring	
64	1	2-31003-015	◆	O-Ring	
65	4	2-21002-14		Flat Washer	5/16 Zp
66	4	9-825010		Strainer Bolt	1/2-13
67	4	2-23012-89		Hex Hd Cap Screw	1/2-13 x 1.50" Lg. Zp
71	4	2-21005-18		Lockwasher	#10 Cad
72	1	9-850208-1		Taper Lock Bushing	50HP ONLY
73	1	625-03556		Retaining Ring	Steel

## NEMA 3R (RainProof)

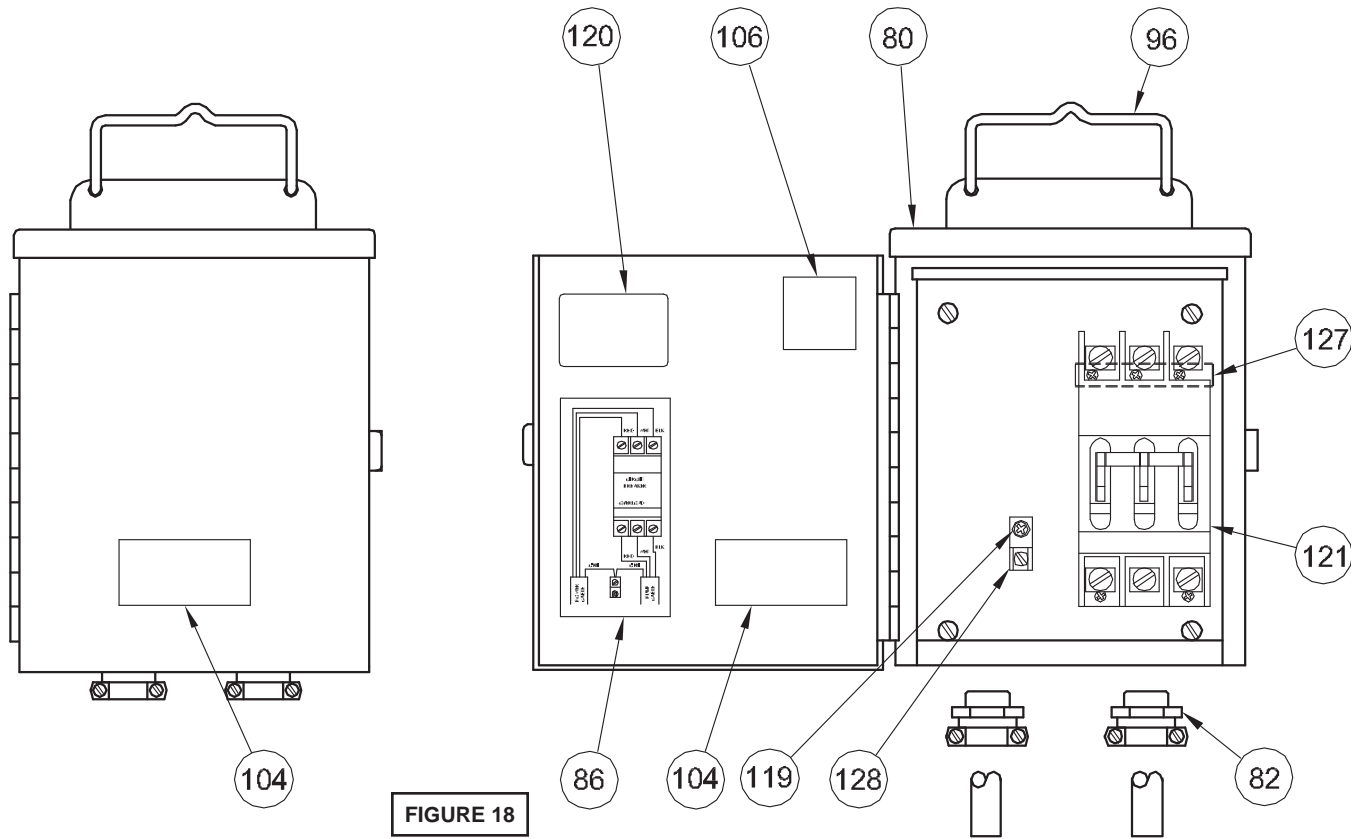


FIGURE 18

## PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION
80.	1	9-840814	Enclosure, NEMA 3R
81.	4	2-22002-10	Screw 6-32 x .312"Lg.
82.	2	2-12005-2	Connector, 10-15HP .75", 230V
	2	2-12005-3	Connector, 10-15HP 1.00", 460/575V
	2	2-21005-4	Connector, 25-50HP 1.25", 230/460/575V
86.	1	2-33065	Connection Diagram 3 Phase
87.	5	2-22009-16	Screw 8-32 x .50"Lg
96.	1	9-100803	Handle
104.	2	2-33063	Name Plate
106.	1	085809	Label, CSA
120.	1	2-33016	Caution Label
121.	1	9-810850-032	Circuit Breaker, 10HP, 230V 240V, 34A
	1	9-815850-136	Circuit Breaker, 10HP, 460V 600V, 18A
	1	9-810850-036	Circuit Breaker, 10HP, 575V 600V, 13.6A
	1	9-840850-036	Circuit Breaker, 15HP, 230V 600V, 45A
	1	9-815850-034	Circuit Breaker, 15HP, 460V 480V, 22A
	1	9-815850-136	Circuit Breaker, 15HP, 575V 600V, 18A
	1	9-825850-032	Circuit Breaker, 25HP, 230V 240V, 80A
	1	9-825850-034	Circuit Breaker, 25HP, 460V 480V, 40A
	1	9-825850-036	Circuit Breaker, 25HP, 575V 600V, 30A
125.	1	2-33011	Label (Not Shown)
127.	1	2-28014	Mounting Bracket
128.	1	086335	Ground Lug

## NEMA 4 (WaterTight)

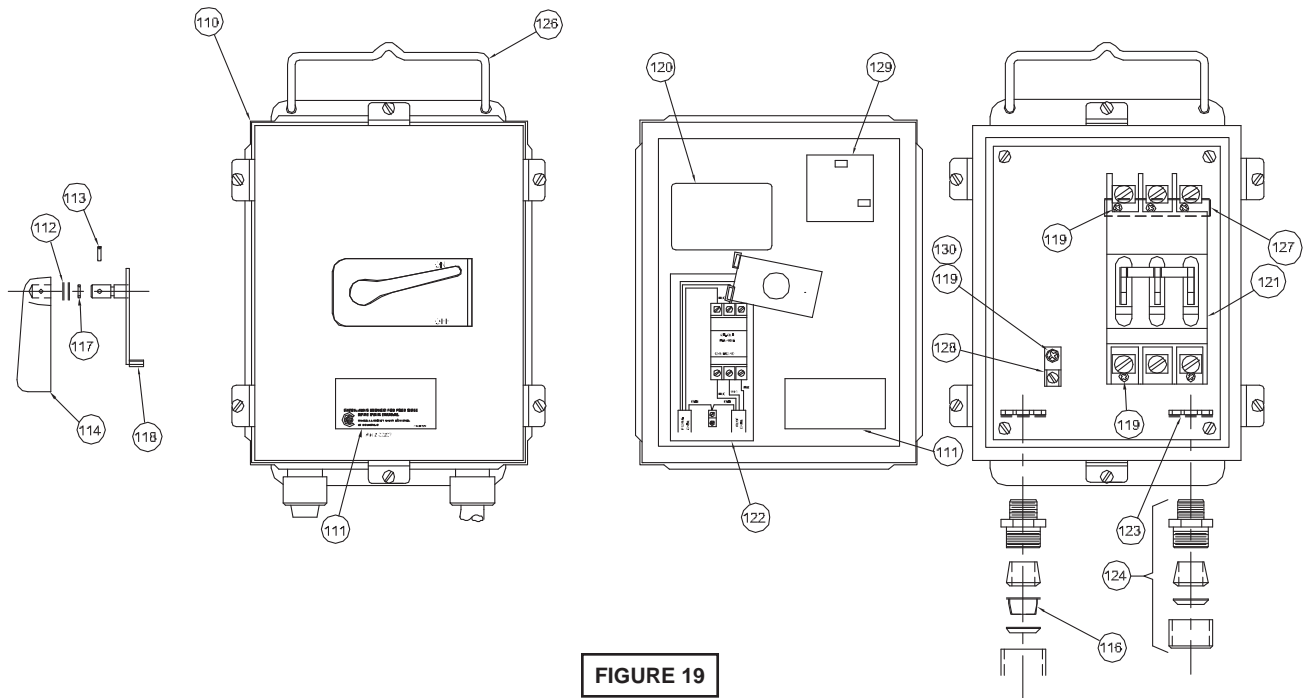


FIGURE 19

### PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION
110.	1	9-840859-2	Enclosure, NEMA 4
111.	2	2-33237	Name Plate
112.	A/R	2-21002-64	Shim Washer
113.	1	2-28008-3	Roll Pin
114.	1	9-840870	Handle
116.	1	2-32066-23	Caplug, 10-15HP 460/575V
	1	2-32066-30	Caplug, 10-15HP 230V
	1	625-00718	Caplug, 25-50HP
117.	1	2-31003-010	O-Ring
118.	1	9-840860	Actuator Assembly
119.	6	2-22009-16	Screw 8-32 x 1/2"Lg
120.	1	2-33016	Caution Label
121.	1	9-810850-032	Circuit Breaker, 10HP, 230V 240V, 34A
	1	9-815850-136	Circuit Breaker, 10HP, 460V 600V, 18A
	1	9-810850-036	Circuit Breaker, 10HP, 575V 600V, 13.6A
	1	9-840850-036	Circuit Breaker, 15HP, 230V 600V, 45A
	1	9-815850-034	Circuit Breaker, 15HP, 460V 480V, 22A
	1	9-815850-136	Circuit Breaker, 15HP, 575V 600V, 18A
	1	9-825850-032	Circuit Breaker, 25HP, 230V 240V, 80A
	1	9-825850-034	Circuit Breaker, 25HP, 460V 480V, 40A
	1	9-825850-036	Circuit Breaker, 25HP, 575V 600V, 30A
	1	9-850850-034	Circuit Breaker, 50HP, 460V 480V, 60A
	1	9-840850-134	Circuit Breaker, 50HP, 575V 600V, 38A
122.	1	2-33065	Wiring Diagram 3 Phase
123.	2	2-12055-4	Connector, Nut 10-25HP-230V; 50HP-575V
	2	2-12055-2	Connector, Nut 10-25HP-460/575V; 50H -460V
124.	2	2-12017-6	Connector, Cable, NEMA 4 10-15HP-230V; 50HP-575V
	2	2-12017-4	Connector, Cable, NEMA 4 10-15HP-460/575V; 50H -460V
	2	2-12017-14	Connector, Cable, NEMA 4 25-50HP-230/460/575V
125.	2	2-33011	Lable, (Not Shown)
126.	1	9-840867	Handle, NEMA 4
127.	1	2-28014	Mounting Bracket
128.	1	086335	Ground Lug
129.	1	085809	Name Plate, CSA
130.	2	2-21001-15	Lockwasher #8

## 230, 460, 575 Volt, Three Phase Control Panel Schematics

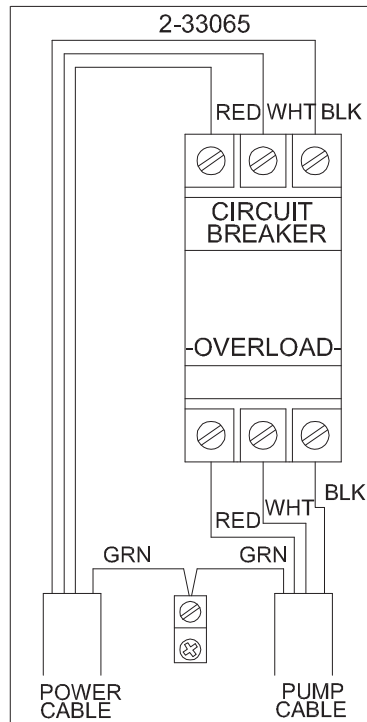
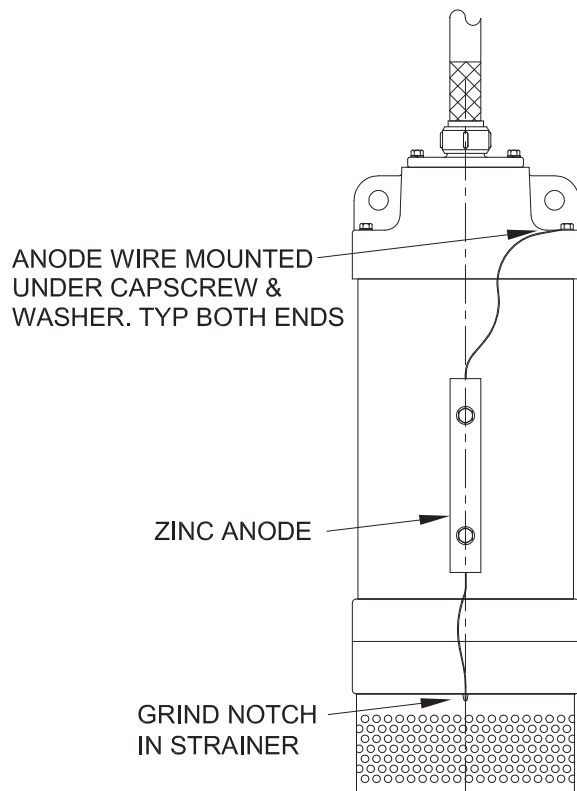


FIGURE 20

### Galvanic Protection Kit P/N: 9-840572

#### PARTS LIST

QTY	PART NO.	DESCRIPTION
2	2-210002-59	Flat Washer, 1/4" Stainless
2	2-23021-76	HxHd Screw, 1/4-20 x 1.37" lg SS
1	9-500520	Zinc Anode Sensor

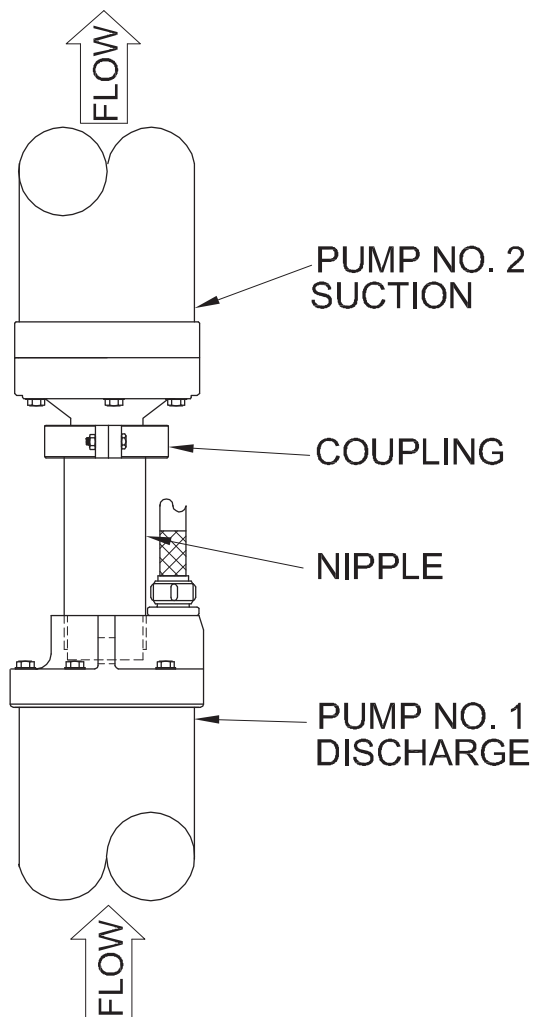


1. Pump must be ordered with the Galvanic Protection Kit to have the correct frame and outer shell.
2. Align two clearance holes in outer shell with the two drilled and tapped holes in frame, before tightening cap screws on the suction nozzle.
3. Fill the two drilled & tapped holes in frame approximately half full of electrical bonding grease part number 2-45003-1.
4. Install washers and capscrews through zinc anode and into the frame holes, partially filled with bonding grease and tighten securely.
5. Route wire from anode to the suction nozzle. Loosen suction nozzle capscrew & washer and install wire between washer & suction nozzle, retighten capscrew. Route other wire to discharge head and install under discharge head capscrew and washer.
6. Slip suction strainer on pump, align mounting screws, mark strainer where anode wire passes between suction nozzle and strainer. Grind a notch in the strainer to allow clearance for the wire. Install the strainer.

## Series Adapter Kit

**Pump Models: 9-81000, 9-81500.....P/N: 9-815770**

**Pump Models: 9-82500, 9-85000.....P/N: 9-840770**



### PARTS LIST

#### **P/N: 9-815770**

<b>QTY</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>
1	2-32015-3	Nipple, Reducer, 4" NPT x 6" Lg
1	2-32046-1	Coupling, Red, Victaulic, 5" x 4"
4	1-51-6	Hex Hd. Screw 3/8-16 x 5.50" Lg. Zp
4	2-23013-84	Hex Hd. Screw 3/8-16 x 5.00" Lg. Zp

#### **P/N: 9-840770**

<b>QTY</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>
1	2-32015-4	Nipple, Victaulic, 6" NPT x 6" Lg
1	2-32045-3	Coupling, 6" Victaulic
5	2-23013-86	Hex Hd. Screw 1/2-13 x 5.00" Lg. Zp

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## Limited 24 Month Warranty

Crane Pumps & Systems warrants that products of our manufacture will be free of defects in material and workmanship under normal use and service for twenty-four (24) months after manufacture date, when installed and maintained in accordance with our instructions. This warranty gives you specific legal rights, and there may also be other rights which vary from state to state. In the event the product is covered by the Federal Consumer Product Warranties Law (1) the duration of any implied warranties associated with the product by virtue of said law is limited to the same duration as stated herein, (2) this warranty is a LIMITED WARRANTY, and (3) no claims of any nature whatsoever shall be made against us, until the ultimate consumer, his successor, or assigns, notifies us in writing of the defect, and delivers the product and/or defective part(s) freight prepaid to our factory or nearest authorized service station. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply.

**THE SOLE AND EXCLUSIVE REMEDY FOR BREACH OF ANY AND ALL WARRANTIES WITH RESPECT TO ANY PRODUCT SHALL BE TO REPLACE OR REPAIR AT OUR ELECTION, F.O.B. POINT OF MANUFACTURE OR AUTHORIZED REPAIR STATION, SUCH PRODUCTS AND/OR PARTS AS PROVEN DEFECTIVE. THERE SHALL BE NO FURTHER LIABILITY, WHETHER BASED ON WARRANTY, NEGLIGENCE OR OTHERWISE.** Unless expressly stated otherwise, guarantees in the nature of performance specifications furnished in addition to the foregoing material and workmanship warranties on a product manufactured by us, if any, are subject to laboratory tests corrected for field performance. Any additional guarantees, in the nature of performance specifications must be in writing and such writing must be signed by our authorized representative. Due to inaccuracies in field testing if a conflict arises between the results of field testing conducted by or for user, and laboratory tests corrected for field performance, the latter shall control. **RECOMMENDATIONS FOR SPECIAL APPLICATIONS OR THOSE RESULTING FROM SYSTEMS ANALYSES AND EVALUATIONS WE CONDUCT WILL BE BASED ON OUR BEST AVAILABLE EXPERIENCE AND PUBLISHED INDUSTRY INFORMATION. SUCH RECOMMENDATIONS DO NOT CONSTITUTE A WARRANTY OF SATISFACTORY PERFORMANCE AND NO SUCH WARRANTY IS GIVEN.**

This warranty shall not apply when damage is caused by (a) improper installation, (b) improper voltage (c) lightning (d) excessive sand or other abrasive material (e) scale or corrosion build-up due to excessive chemical content. Any modification of the original equipment will also void the warranty. We will not be responsible for loss, damage or labor cost due to interruption of service caused by defective parts. Neither will we accept charges incurred by others without our prior written approval.

This warranty is void if our inspection reveals the product was used in a manner inconsistent with normal industry practice and/or our specific recommendations. The purchaser is responsible for communication of all necessary information regarding the application and use of the product. **UNDER NO CIRCUMSTANCES WILL WE BE RESPONSIBLE FOR ANY OTHER DIRECT OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO TRAVEL EXPENSES, RENTED EQUIPMENT, OUTSIDE CONTRACTOR FEES, UNAUTHORIZED REPAIR SHOP EXPENSES, LOST PROFITS, LOST INCOME, LABOR CHARGES, DELAYS IN PRODUCTION, IDLE PRODUCTION, WHICH DAMAGES ARE CAUSED BY ANY DEFECTS IN MATERIAL AND/OR WORKMANSHIP AND/OR DAMAGE OR DELAYS IN SHIPMENT. THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER EXPRESS OR IMPLIED WARRANTY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

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**IMPORTANT!**  
**WARRANTY REGISTRATION**

Your product is covered by the enclosed Warranty.  
To complete the Warranty Registration Form go to:

<http://www.cranepumps.com/ProductRegistration/>

If you have a claim under the provision of the warranty, contact your local  
Crane Pumps & Systems, Inc. Distributor.

**RETURNED GOODS**

**RETURN OF MERCHANDISE REQUIRES A "RETURNED GOODS AUTHORIZATION".  
CONTACT YOUR LOCAL CRANE PUMPS & SYSTEMS, INC. DISTRIBUTOR.**



**Products Returned Must Be Cleaned, Sanitized,  
Or Decontaminated As Necessary Prior To Shipment,  
To Insure That Employees Will Not Be Exposed To Health  
Hazards In Handling Said Material. All Applicable Laws  
And Regulations Shall Apply.**