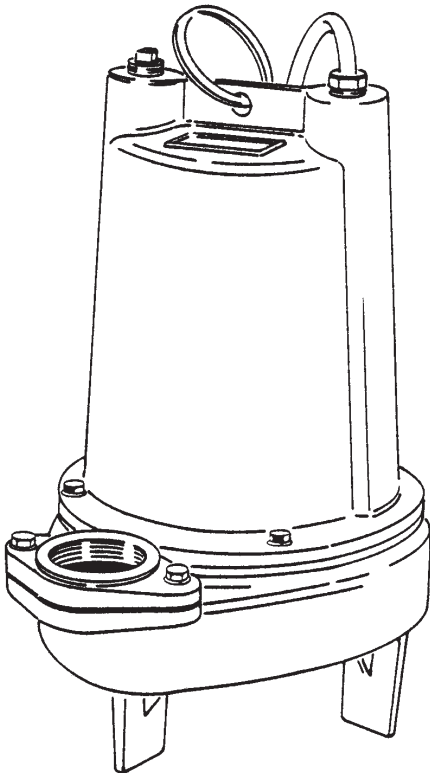


BARNES®

INSTALLATION MANUAL Submersible Sewage Ejectors



Series: SE51 & SE52
.4Hp, 1750 RPM, 60 Hz.

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®

A Crane Co. Company

PUMPS & SYSTEMS

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Form No. 027277-Rev. J

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SPECIAL TOOLS and EQUIPMENT:
INSULATION TESTER (MEGGER)
DIELECTRIC TESTER
SEAL TOOL KIT (see parts list)
PRESSURE GAUGE KIT (see parts list)

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, burns or death could result.



Extremely hot - Severe burns can occur on contact.



Biohazard can cause serious personal injury.



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

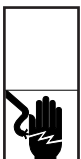


Rotating machinery Amputation or severe laceration can result.



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. Improper grounding voids warranty.



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 up 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.



CAUTION! 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 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.



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 B: GENERAL INFORMATION

B-1) To The Purchaser:

Congratulations! You are the owner of one of the finest pumps on the market today. Barnes® 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.

Check local codes and requirements before installation. Servicing should be performed by knowledgeable pump service contractors or authorized service stations.

The pump is packaged ready for installation and no connections or adjustments are necessary except for attaching discharge piping and plugging in service cord.

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 crating, do not lose or misplace.

B-3) Storage:

Short Term- Barnes Pumps are manufactured for efficient performance following long 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. Pump should be stored in its original shipping container and before initial start up, rotate impeller by hand to assure seal and impeller rotate freely.

B-4) Service Centers:

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

SECTION C: INSTALLATION

C-1) Location:

These pumping units are self-contained and are recommended for use in a sump, lift station or basin. The sump, lift station or basin shall be vented in accordance with local plumbing codes. This pump is designed to pump sewage, effluent, or other nonexplosive or noncorrosive wastewater, and shall NOT be installed in locations classified as hazardous in accordance with the National Electrical Code (NEC), ANSI/NFPA 70 or the Canadian Electrical Code (CEC).

Never install the pump in a trench, ditch or hole with a dirt bottom; the legs will sink into the dirt and the suction will become plugged.

C-1.1) Submergence:

It is recommended that the pump be operated in the submerged condition and the sump liquid level should never be less than 7 inches above the pump bottom (see Fig. 1).

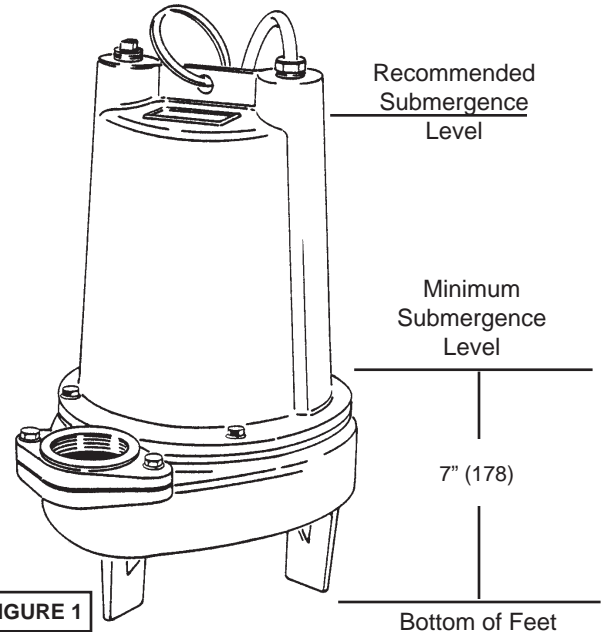


FIGURE 1

C-2) Discharge:

Discharge piping should be as short as possible. Both a check valve and a shut-off valve are recommended for each pump being used. The check valve is used to prevent backflow into the sump. Excessive backflow can cause flooding and/or damage to the pump. The shut-off valve is used to stop system flow during pump or check valve servicing.

Barnes supplies a variety of 2" break-away fitting discharge systems designed to allow the submersible wastewater pump to be installed or removed without requiring personnel to enter the wet well. Contact your local Barnes distributor for complete details.

C-3) Liquid Level Controls:

The level controls are to be supported by a mounting bracket that is attached to the sump wall, cover or junction box. Cord grips are used to hold the cords in place on the mounting bracket. The control level can be changed by loosening the grip and adjusting the cord length as per the plans and specifications. Be certain that the level controls cannot hang up or foul in its swing and that the pump is completely submerged when the level control is in the "Off" mode.

Figure 2 shows a typical installation for any submersible pump using a level control with a piggy-back plug.

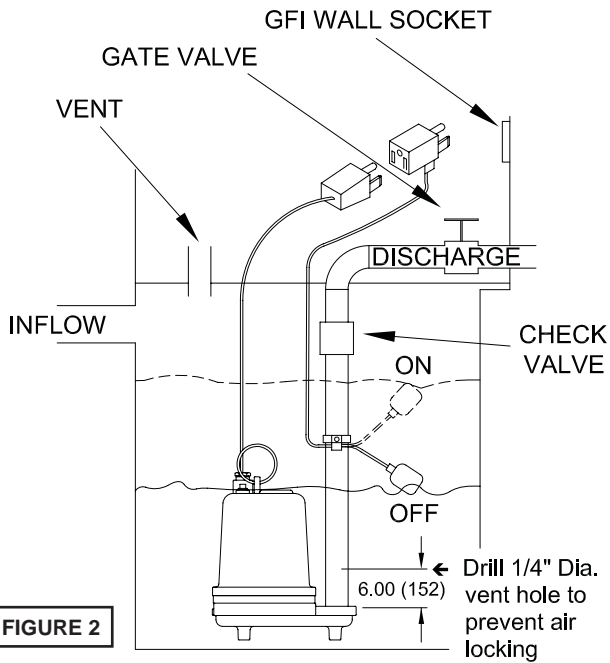


FIGURE 2

General Comments:

- 1) Never work in the sump with the power on.
- 2) Level controls are factory set for a pumping differential of 9 inches. If that is the cycle desired, simply circle the discharge pipe with the pipe mounting strap, feed the end through the worm drive, and tighten with a screwdriver. Be certain that the level control cannot hang up or foul in it's swing. Also, make certain the pump impeller is still submerged when the level control is in the 'off' mode.
- 3) If a higher pump differential is needed, grip the cord near the neck of the float, then using the other hand, exert a steady force on the lower edge of the cable clamp. The cable clamp should slide up to the new pivot point. Attach the level control to the discharge hose in the manner described above.
- 4) Plug the level control plug into the GFI receptacle, then plug the pump into the piggyback plug. One cycle of operation should be observed, so that any potential problems can be corrected.
- 5) It is recommended that the float should be set to insure that the sump well liquid level never drops below the top of the motor housing.
- 6.) Figure 3 shows a typical connection for pumps with the wide angle float and piggy-back plug. For manual and automatic operations.

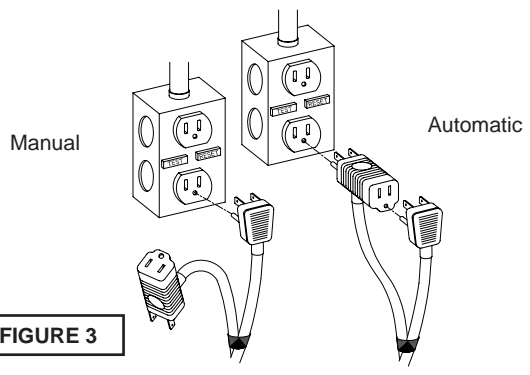


FIGURE 3

- Automatic - Plug float cord into GFI outlet, then plug pump cord into float cord.
- Manual - Plug pump cord directly into GFI outlet.

C-4) Electrical Connections:

An acceptable motor control switch shall be provided at the time of installation.

C-4.1) Power Cord:

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 all applicable electric codes. It is recommended that a junction box, if used, be mounted outside the sump or be of at least Nema 4 (EEMAC-4) construction if located within the wet well. **DO NOT USE THE POWER CABLE TO LIFT PUMP. NOTE: THE WHITE WIRE IS NOT A NEUTRAL OR GROUND LEAD, BUT A POWER CARRYING CONDUCTOR.**

C-4.2) Overload Protection :

C-4.2-1) Single Phase (Standard) - The type of in-winding overload protector used is referred to as an inherent overheating protector and operates on the combined effect of temperature and current. This means that the overload protector will trip out and shut the pump off if the windings become too hot, or the load current passing through them becomes too high. It will then automatically reset and start the pump up after the motor cools to a safe temperature. In the event of an overload, the source of this condition should be determined and rectified immediately. **DO NOT LET THE PUMP CYCLE OR RUN IF AN OVERLOAD CONDITION OCCURS !**

If current through the temperature sensor exceeds the values listed, an intermediate control circuit relay must be used to reduce the current or the sensor will not work properly.

TEMPERATURE SENSOR ELECTRICAL RATINGS		
Volts	Continuous Amperes	Inrush Amperes
110-120	3.00	30.0
220-240	1.50	15.0

MODEL NO	HP	VOLT/ PH	Hz	RPM (Nom)	NEMA START CODE	FULL LOAD AMPS	LOCKED ROTOR AMPS	CORD SIZE	CORD TYPE	CORD O.D inch (mm)	WINDING RESISTANCE MAIN - START
SE51	.50	115/1	60	1750	D	11.6	18.4	14/3	SJTOW	0.390 (9.9)	1.34 -- 16.88
SE52	.50	230/1	60	1750	E	5.8	10.5	14/3	SJTOW	0.390 (9.9)	4.15 -- 11.84

Winding Resistance \pm 5%. Pump rated for operation at \pm 10% voltage at motor.

C-4.3) Wire Size:

Consult a qualified electrician for proper wire size if additional power cable length is required. See table for electrical information.

SECTION: D START-UP OPERATION

D-1) Check Voltage and Phase:

Before operating pump, compare the voltage and phase information stamped on the pump identification plate to the available power.

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 "kickback". "Kickback" should always be in a counter-clockwise direction as viewed from the top of the pump motor housing.

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 "kickback" rotation again by momentarily applying power.

D-2.2) Incorrect Rotation for Single-Phase Pumps:

In the unlikely event that the rotation is incorrect for a single phase pump, contact a Barnes Service Center.

D-3) Start-Up Report:

Included at the end of this manual is a start-up report sheet, this sheet is to be completed as applicable. Return one copy to Barnes 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-3.1) Identification Plate:

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

D-3.2) 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.

D-3.3) Pump-Down Test:

After the pump has been properly wired and lowered into the basin, sump or lift station, it is advisable to check the system by filling with liquid and allowing the pump to operate through its pumping cycle. The time needed to empty the system, or pump-down time along with the volume of water, should be recorded on the start-up report.

SECTION E: PREVENTATIVE MAINTENANCE

As the motor is oil filled, no lubrication or other maintenance is required, and generally Barnes will give very reliable service and can be expected to operate for years on normal sewage pumping without failing. However as with any mechanical piece of equipment a preventive maintenance program is recommended and suggested to include the following checks:

- 1) Inspect motor chamber for oil level and contamination and repair as required per section F-1.
- 2) Inspect impeller and body for excessive build-up or clogging and repair as required per section F-2.
- 3) Inspect motor and bearings and replace as required per section F-3.
- 4) Inspect seal for wear or leakage and repair as required per section F-4.

SECTION F: SERVICE AND REPAIR

NOTE: All item numbers in () refer to Figures 10 & 11.

F-1) Lubrication:

Anytime the pump is removed from operation, the cooling oil in the motor housing (11) should be checked visually for oil level and contamination.

F-1.1) Checking Oil:

Motor Housing - To check oil, set unit upright. Remove pipe plug (41) from motor housing (11). With a flashlight, visually inspect the oil in the motor housing (11) 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. Oil level should be to the midpoint of capacitor (18) Fig. 10, when pump is in vertical position.

F-1.2) Testing Oil:

- 1.) Place pump on it's side, remove pipe plug (41), from motor housing (11) and drain oil into a clean, dry container.
- 2.) Check oil for contamination using an oil tester with a range to 30 Kilovolts breakdown.
- 3.) If oil is found to be clean and uncontaminated (measure above 15 KV. breakdown), refill the motor housing as per section F-1.3.
- 4.) If oil is found to be dirty or contaminated (or measures below 15 KV. breakdown), the the pump must be carefully inspected for leaks at the shaft seal (1), gland nut (12b), O-ring (23) pipe plug (41), before refilling with oil. To locate the leak, perform a pressure test as per section F-1.4. After leak is repaired, refill with new oil as per section F-1.3.

F-1.3) Replacing Oil:

Motor Housing - Drain all oil from motor housing and dispose of properly. Set unit upright and refill with (see parts list for amount) new cooling oil as per Table 1. An air space must remain in the top of the motor housing to compensate for oil expansion (see Fig. 10). Set unit upright and fill only until the motor, as viewed through the pipe plug opening, is just covered and no more. Apply pipe thread compound to threads of pipe plug (41) and install in motor housing (11).



WARNING ! - DO NOT overfill oil. Overfilling of motor housing with oil can create excessive and dangerous hydraulic pressure which can destroy the pump and create a hazard.

Overfilling oil voids warranty.

TABLE 1 - COOLING OIL - Dielectric	
SUPPLIER	GRADE
BP	Enerpar SE100
Conoco	Pale Paraffin 22
Mobile	D.T.E. Oil Light
G & G Oil	Circulating 22
Imperial Oil	Voltesso-35
Shell Canada	Transformer-10
Texaco	Diala-Oil-AX
Woco	Premium 100

F-1.4) Pressure Test:

Before checking the pump for leaks around the shaft seal, square rings, and cord inlet, the oil level should be full as described in section F-1.3. Remove pipe plug (41) from motor housing (11). Apply pipe sealant to pressure gauge assembly and tighten into hole (see Fig. 4). Pressurize motor housing to 10 P.S.I. Use a soap solution around the sealed areas and inspect joints for "air bubbles".

If, after five minutes, the pressure is still holding constant, and no "bubbles" are observed, slowly bleed the pressure and remove the gauge assembly. Replace the pipe plug (41) using a sealant. If the pressure does not hold, then the leak must be located and repaired.

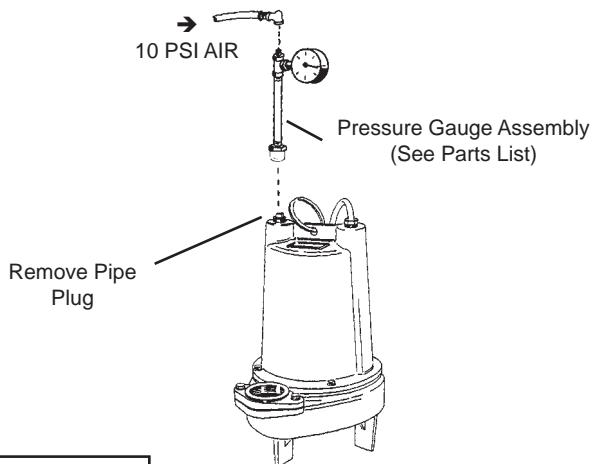


FIGURE 4



CAUTION ! - pressure builds up extremely fast, increase pressure by "TAPPING" air nozzle. Too much pressure will damage seal. DO NOT exceed 10 P.S.I. in motor housing.

F-2) Impeller, Volute and Exclusion Seal Service:

F-2.1) Disassembly and Inspection:

To clean out volute (7), disconnect power, remove cap screws (34) and lockwashers (22), vertically lift motor and seal assembly from body (7). Clean out body if necessary. Inspect gasket (24) and replace if cut or damaged. Clean and examine impeller (2) for pitting, wear, cracks or breakage, replace if required.

If impeller (2) requires replacing, remove jam nut (29) by placing a flat screwdriver in the slot of the end of the shaft to hold the shaft stationary while unscrewing the impeller (2). Once impeller (2) is removed, remove spacer (32), and exclusion seal (31) if damaged or cut.

F-2.2) Reassembly:

Position exclusion seal (31) on shaft until it seats against the stationary portion of seal (1). Place spacer (32) on shaft until it seats against exclusion seal (31). To install impeller (2), clean the threads with loctite cleaner and screw impeller (2) onto the shaft hand tight. Apply thread locking compound to shaft threads and install nut (29). Torque to 40 ft. lbs. Rotate impeller to check for binding. Position impeller and motor assembly on volute (7). Apply thread locking compound to cap screw (34) and position lockwasher (22) on cap screw (34) and screw into volute (7). Torque to 8 ft. lbs. Check for free rotation of motor and impeller.

F-3) Motor, Bearing and Seal Service

F-3.1) Disassembly and Inspection:

To examine or replace the motor (14), bearing (21) and shaft seal (1), disassemble volute and impeller as outlined in paragraph F-2.1. Drain oil from motor as outlined in paragraph F-1.3.

Position unit upright, using blocks to avoid resting unit on shaft. Remove gland nut (12b), friction rings (12c) and grommet (12d) from motor housing (11), see Figure 8. Remove socket head cap screws (36) and lift motor housing (11) from lower end bell (10). Slide motor housing (11) up cable (12), until wire connectors and ground screw are exposed. Remove cable lead wires from motor lead wires by disconnecting wire connectors (19) and ground screw (20) from motor (14). The wiring connections should be noted to insure correct connections when reassembling.

Motor - Remove the motor bolts and lift motor stator from motor rotor and lower end bell (10). Unscrew conduit bushing (16) from lower end bell (10) and lift motor rotor, shaft, bearing (21), rotating portion of seal (1), washers (25) & (33), and conduit bushing (16) from lower end bell (10). Inspect windings for shorts and check resistance values. Check rotor for wear, if rotor or the stator windings are defective, the complete motor must be replaced.

To test the temperature sensor (if equipped), check the continuity between the black and white wires. If found to be defective contact a motor service station or Barnes Service Department. Check motor capacitor (18) on single phase units with an Ohm meter by first grounding the capacitor by placing a screwdriver across both terminals and then removing screwdriver. Connect Ohm meter (set on high scale) to terminals, if needle moves to infinity (∞) then drifts back, the capacitor is good. If needle does not move or moves to infinity (∞) and does not drift back, replace capacitor (18).

Seal - Remove rotating member (1a), spring (1c) and retaining ring (1d) from shaft. (see Figure 5). Examine all seal parts and especially contact faces. Inspect seal for signs of wear such as uneven wear pattern on stationary members, chips and scratches on either seal face. **DO NOT** interchange seal components, replace the entire shaft seal (1).

If replacing seal, remove stationary (1a) from lower end bell (10) by prying out with flat screwdriver.



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

Bearing - Examine bearing (21) and replace if required. If replacement is required, remove bearing (21) from motor shaft using a wheel puller. Washers (25), (33) and conduit bushing (16) can now be removed from motor shaft.



IMPORTANT ! - All parts must be clean before reassembly.

F-3.2) Reassembly:

Bearing - When replacing bearing, be careful not to damage the rotor or shaft threads. Clean the shaft thoroughly. Slide conduit bushing (16) and washers (25), (33) over motor shaft. Apply adhesive compound to the shaft and press bearing (21) on the motor shaft, position squarely onto shaft applying force to the inner race of the bearing only, until bearing seats against shoulder of the shaft.

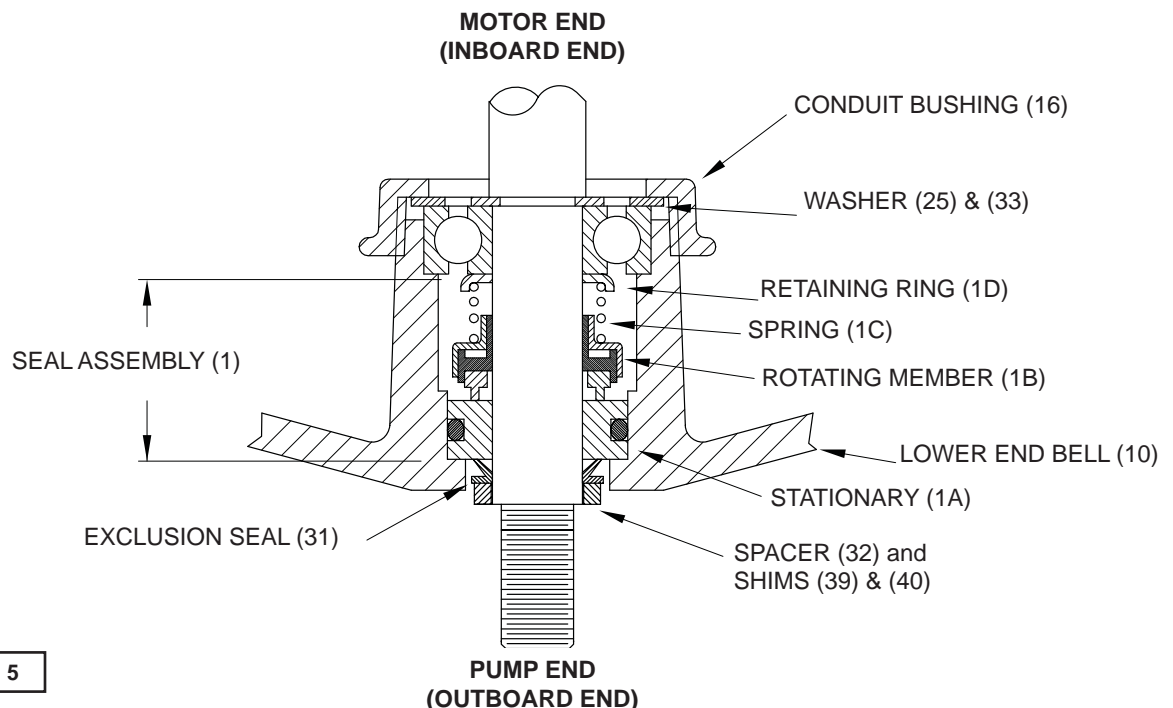


FIGURE 5

Seal - Clean and oil seal cavity in lower end bell (10). Press stationary member (1a) firmly into lower end bell (10), using a seal pusher (see parts list - seal tool kit), nothing but the seal pusher is to come in contact with seal face (see Figure 6). Make sure the stationary member is in straight.

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

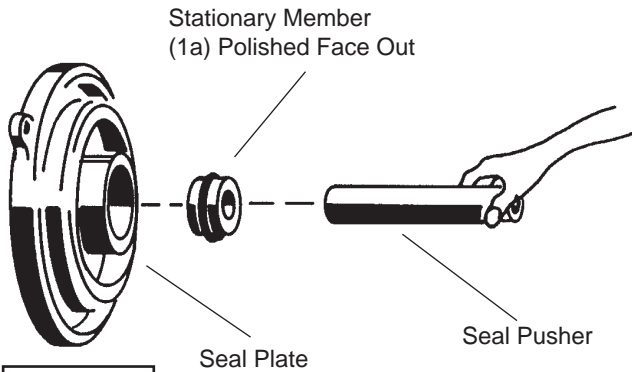


FIGURE 6

Slide retaining ring (1d) over shaft and let rest on bearing (21). Place spring (1c) over shaft and let rest on retaining ring (1d). Lightly oil (**DO NOT use grease**) shaft, bullet and inner surface of bellows on rotating member (1b), (see Figure 7), with lapped surface of rotating member (1b) facing outward, slide over bullet and onto shaft using seal pusher, making sure spring (1c) is seated in retaining ring (1d) and spring (1c) is lined up on rotating member (1b) and not cocked or resting on bellows tail.

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

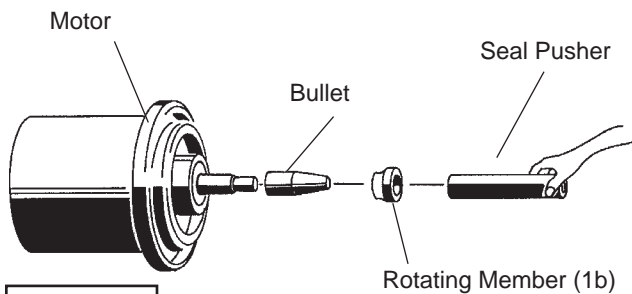


FIGURE 7

Motor - Slide motor rotor with conduit bushing (16), washers (25), (33) bearing (21) and seal parts (1b, c, d) into lower end bell (10) until bearing (21) seats in lower end bell (10). Center washers (25), (33) on bearing (21) and tighten conduit bushing (16) on lower end bell (10).

Lower motor stator over rotor until seated in lower end bell (10), while aligning holes for motor bolts. Insert motor bolts and torque to 17 inch pounds. If pump is a single phase unit place bracket (17) on one of the motor bolts.

Insert capacitor (18) in bracket (17), attach motor leads with flag terminals to capacitor and place terminal boot (15) over terminals.

Set motor housing (11) next to motor (14) and lower end bell (10) assembly. Make wire connections per paragraph F-3.3. Set square ring (23) in groove on lower end bell (10) and lower motor housing (11) down onto lower end bell (10) while aligning holes. Place socket head cap screws (36) through lower end bell (10) into motor housing (11) and torque to 60 inch pounds. Assemble impeller and volute per paragraph F-2.2.

F-3.3) Wiring Connections:

Check power cord (12), for cracks or damage and replace if required (see Figure 8). Place parts (12b, c & d) on power cord (12a). Bring cord sets (12) through openings in top of motor housing (11) and reconnect motor leads to power cord (12) using connectors (19), as shown in Figure 9. Attach ground wire to motor with screw (20).

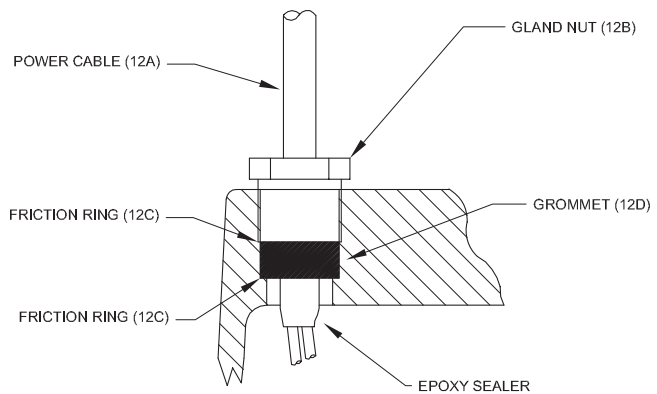
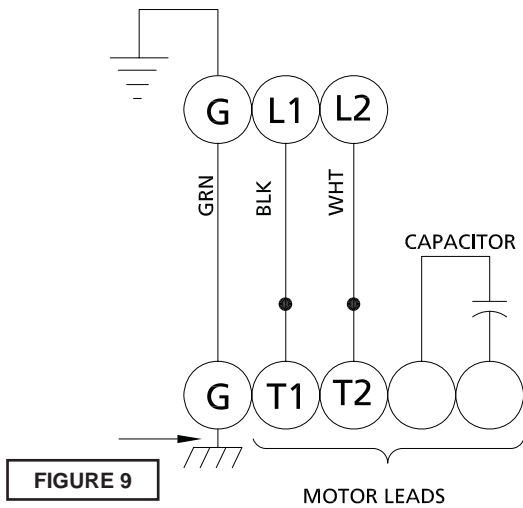


FIGURE 8

F-3.4) Cord Assembly:

Power Cord - Make wire connections as outlined in paragraph F-3.3. Refill with cooling oil (if it has been drained) as outlined in paragraph F-1.3. Insert one friction ring (12c), grommet (12d), another friction ring (12c) into motor housing (11). Apply pipe sealant to gland nut (12b) and screw into motor housing (11). Torque gland nut (12b) to 15 ft. lbs. to prevent water leakage (see Figure 8).



SINGLE PHASE, 115/230 VOLT AC (PSC)

Power Cable (12) Motor Lead Number

Green (Ground) Green

Black 1

White 2

Flag Connector Capacitor

Flag Connector Capacitor

SECTION: G REPLACEMENT PARTS

G-1 ORDERING REPLACEMENT PARTS:

When ordering replacement parts, ALWAYS furnish the following information:

1. Pump serial number and date code. (Paragraph G-4)
2. Pump model number. (Paragraph G-3)
3. Pump part number. (Paragraph G-2)
4. Part description.
5. Item part number.
6. Quantity required.
7. Shipping instructions.
8. Billing Instructions.

HP.	Volts	Code	Ph.	Hz.
RPM	FLA	Model No.	2	
Part No.	3		Serial No.	1
Impeller Dia.	Max. Liq. Temp. °C	Ins. Class		

BARNES

WARNING TO REDUCE RISK OF ELECTRICAL SHOCK DISCONNECT THE PUMP FROM THE POWER SOURCE BEFORE HANDLING OR SERVICING. SEE INSTRUCTION MANUAL FOR PROPER INSTALLATION. SEE WARNING PLATE FOR ADDITIONAL CAUTIONS.

G-2 PART NUMBER:

The part number consists of a six (6) digit number, which appears in the catalog. A one or two letter suffix may follow this number to designate the design configuration. This number is used for ordering and obtaining information.

G-3 MODEL NUMBER:

This designation consists of numbers and letters which represent the discharge size, series, horsepower, motor phase and voltage, speed and pump design. This number is used for ordering and obtaining information.

G-4 SERIAL NUMBER:

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

EXAMPLE: A012345 0490.

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

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"> 1. Poor electrical connection, blown fuse, tripped breaker or other interruption of power, improper power supply. 2. Motor or switch inoperative (to isolate cause, go to manual operation of pump). <ol style="list-style-type: none"> 2a. Float movement restricted. 2b. Switch will not activate pump or is defective. 2c. Defective motor 3. Insufficient liquid level. 	<ol style="list-style-type: none"> 1. Check all electrical connections for security. Have electrician measure current in motor leads, if current is within $\pm 20\%$ 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. 2a. Reposition pump or clean basin as required to provide adequate clearance for float.
Pump will not turn off	<ol style="list-style-type: none"> 2a. Float movement restricted. 2b. Switch will not activate pump or is defective. 4. Excessive inflow or pump not properly sized for application. 9. Pump may be airlocked 14. H-O-A switch on panel is in "HAND" position 	<ol style="list-style-type: none"> 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). 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.
Pump hums but does not run	<ol style="list-style-type: none"> 1. Incorrect voltage 8. Impeller jammed or loose on shaft, worn or damaged, impeller cavity or inlet plugged. 	<ol style="list-style-type: none"> 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.
Pump delivers insufficient capacity	<ol style="list-style-type: none"> 1. Incorrect voltage. 4. Excessive inflow or pump not properly sized for application. 5. Discharge restricted. 6. Check valve stuck closed or installed backwards. 7. Shut-off valve closed. 8. Impeller jammed or loose on shaft, worn or damaged, impeller cavity or inlet plugged. 9. Pump may be airlocked. 10. Pump running backwards 	<ol style="list-style-type: none"> 3. Make sure liquid level is at least equal to suggested turn-on point. 4. Recheck all sizing calculations to determine proper pump size. 5. Check discharge line for restrictions, including ice if line passes through or into cold areas. 6. Remove and examine check valve for proper installation and freedom of operation. 7. Open valve.
Pump cycles too frequently or runs periodically when fixtures are not in use	<ol style="list-style-type: none"> 6. Check valve stuck closed or installed backwards. 11. Fixtures are leaking. 15. Ground water entering basin. 	<ol style="list-style-type: none"> 8. Check impeller for freedom of operation, security and condition. Clean impeller and inlet of any obstruction. 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.
Pump shuts off and turns on independent of switch, (trips thermal overload protector). CAUTION! Pump may start unexpectedly. Disconnect power supply.	<ol style="list-style-type: none"> 1. Incorrect voltage. 4. Excessive inflow or pump not properly sized for application. 8. Impeller jammed, loose on shaft, worn or damaged, impeller cavity or inlet plugged. 12. Excessive water temperature. (internal protection only) 	<ol style="list-style-type: none"> 10. Check rotation. If power supply is three phase, reverse any two of three power supply leads to ensure proper impeller rotation.. 11. Repair fixtures as required to eliminate leakage.
Pump operates noisily or vibrates excessively	<ol style="list-style-type: none"> 2c. Worn bearings, motor shaft bent. 8. Debris in impeller cavity or broken impeller 10. Pump running backwards 13. Piping attachments to building structure too rigid or too loose. 	<ol style="list-style-type: none"> 12. Check pump temperature limits & fluid temperature. 13. Replace portion of discharge pipe with flexible connector. 14. Turn to automatic position. 15. Check for leaks around basin inlet and outlets.

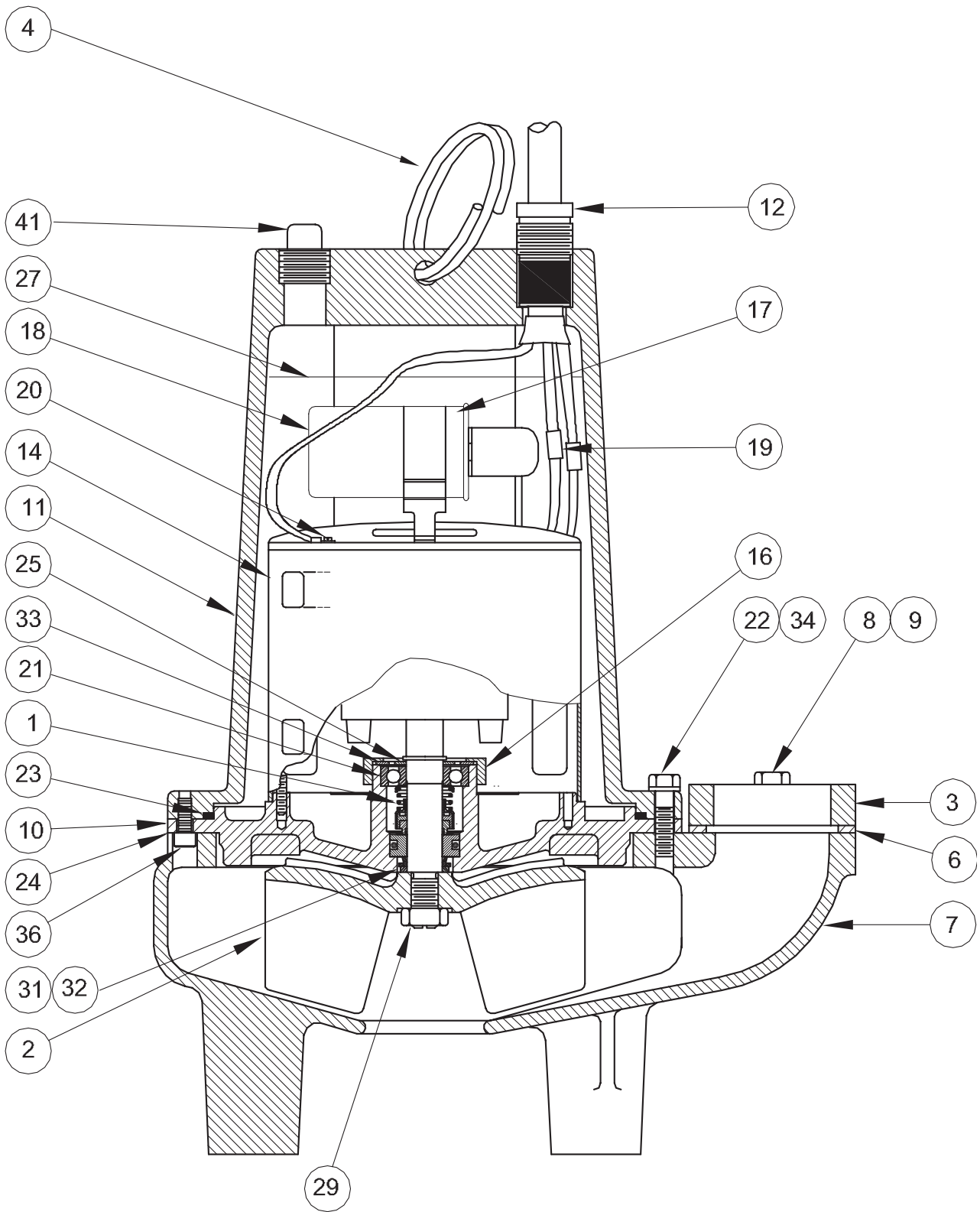


FIGURE 10

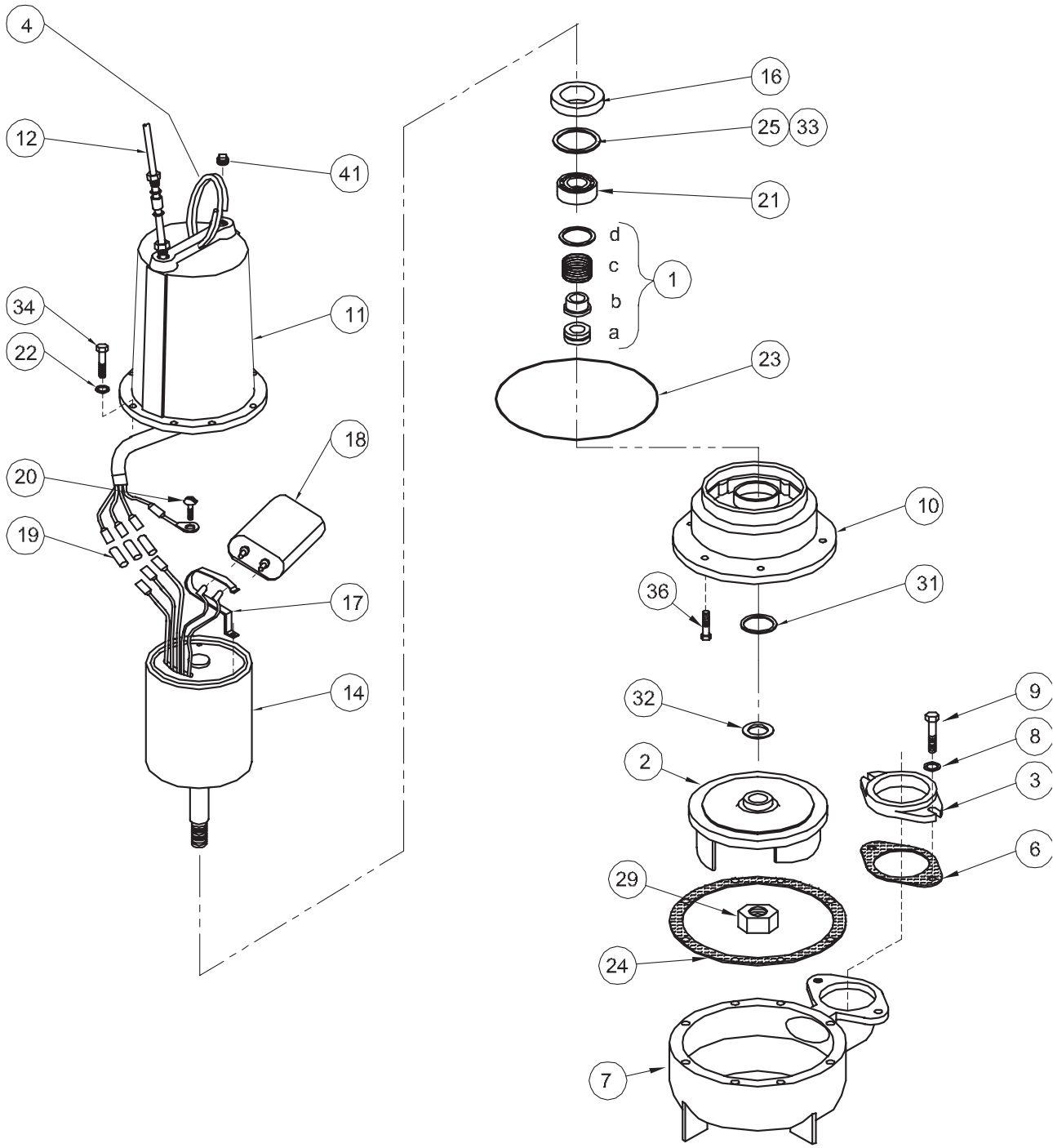


FIGURE 11

PARTS KITS

Seal Kit P/N: 085204 (†) 1, 6, 8, 12c, 23, 24, 29, 31, 32
Overhaul Kit P/N: 085207 (◇) 1, 6, 12c, 16, 19, 21, 23, 24, 29, 31, 32, 33
Seal Tool Kit TL: 21355
Pressure Gauge Kit P/N: 085343

PARTS LIST

ITEM	QTY	PART No.	DESCRIPTION	
1	1	023701	†◇ Shaft Seal - (STD) Carbon/Ceramic/Buna-N	
		023701SB	Tungsten/Tungsten/Buna-N	
		023701SD	Silicon/Silicon/Buna-N	
		023701SF	Carbon/Ceramic/Viton	
		023701SH	Tungsten/Tungsten/Viton	
		023701SK	Silicon/Silicon/Viton	
		023701SM	Silicon/Tungsten/Buna-N	
		023701SN	Carbon/Ni-Resist/Buna-N	
		023701SP	Carbon/Ni-Resist/Neoprene	
2	1	029777TF	Impeller, 5.25" Dia.	
3	1	026210	Flange 2" NPT	
4	1	027271	Handle	
6	1	069140	†◇ Gasket	
7	1	055400	Volute	
8	2	082727	† Flat Washer	3/8, Stainless
9	2	1-36-1	Hex Hd Cap Screw	3/8-16 x 1.25" Lg, Stainless
10	1	026205	Lower End Bell	
11	1	051538	Motor Housing	
12	1	093291	Cord Set Assembly, 15Ft	
12a	1	051762	* Gland Nut	
12b	2	021531	* Friction Ring	
12c	1	051764	*†◇ Grommet	
14	1	030369	Motor - SE51	
	1	030370	SE52	
16	1	035601	◇ Conduit Bushing	
17	1	039858	Capacitor Bracket	1 Phase Only
18	1	070963	Capacitor	370V, 20MFD, 1 Phase Only
19	2	079318	◇ Connector Terminal	1 Phase
20	1	016660	Self Tapping Screw	#8-32, Steel
21	1	017414	◇ Ball Bearing	
22	5	026322	Lockwasher	5/16, Stainless
23	1	027269	†◇ Tetra Seal	
24	1	027344	†◇ Gasket	
25	1	027345	Washer	Stainless
27	128oz	029034	Cooling Oil	
29	1	030068	†◇ Hex Jam Nut	1/2-20, Stainless
31	1	056789	†◇ V ring	.625"
32	1	059648	†◇ Spacer	
33	1	084263	◇ Washer	Stainless
34	4	1-131-1	Hex Hd Screw	5/16-18 x 1.25" Lg, Stainless
36	2	11-29-1	Socket Hd. Screw	1/4-20 x .625" Lg, Stainless
41	1	003204	Pipe Plug	.75" NPT, Galv.

(*) Included with item 12

BARNES®



burks®

WEINMAN®

DEMING®

PROSSER®

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.**

No rights extended under this warranty shall be assigned to any other person, whether by operation of law or otherwise, without our prior written approval.

CRANE

PUMPS & SYSTEMS

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Fax: (905) 457-2650

**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.**

