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SECTION: Z2.30.170

ZM3013

0325

Supersedes

0119

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Product information presented here reflects conditions at time of publication. Consult factory regarding discrepancies or inconsistencies.

ZEP®, The Built To Order Division Of Zoeller Company.



REPAIR MANUAL

64 HD SERIES HEAVY DUTY SOLIDS HANDLING PUMPS

Since 1939 the name Zoeller has represented the standard for submersible dewatering and sewage pumps. The same high quality workmanship and easy maintenance design has been incorporated into this line of heavy-duty solids-handling submersible sewage pumps.

This manual incorporates the parts list and repair instructions into one document to aid in the ownership of a Zoeller submersible non-clog wastewater product. Please read and review this manual before repairing

the product. Follow the steps and procedures listed on ZM1074 for a proper start-up upon installation. Many items contained within, when followed correctly, will not only ensure a long and problem-free life for the pump, but also save time and money during installation. Reference ZM3014 for owner's manual on 64 HD Series Pumps. Should further assistance be necessary please call our Product Support Department at 1-800-928-PUMP (7867).

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To Order Replacement Parts

PLEASE FURNISH THE FOLLOWING INFORMATION:

- Model Number
- Part Number of Pump
- Serial Number
- System Voltage
- Replacement Part Number and Description (refer to pages 2 & 3).

Short Term Storage

Storage of six months or less will not damage the submersible pump. However, to ensure the best possible protection, the following is advised:

- Store pump inside whenever possible or cover with some type of protective covering.
- Tape or seal in plastic bag the terminal ends of wire leads.
- Spray coat unpainted surfaces with rust-inhibiting oil.
- See ZM3014 Owner's Manual before start-up.

Safety Instructions

TO AVOID SERIOUS OR FATAL PERSONAL INJURY OR MAJOR PROPERTY DAMAGE, READ AND FOLLOW ALL SAFETY INSTRUCTIONS IN THIS MANUAL AND ON THE PUMP.

THIS MANUAL IS INTENDED TO ASSIST IN THE INSTALLATION AND OPERATION OF THIS UNIT AND MUST BE KEPT WITH THE PUMP.



This is a **SAFETY ALERT SYMBOL**.

When you see this symbol on the pump or in the manual, look for one of the following signal words and be alert to the potential for personal injury or property damage.

▲ DANGER Warns of hazards that **WILL** cause serious personal injury, death or major property damage.

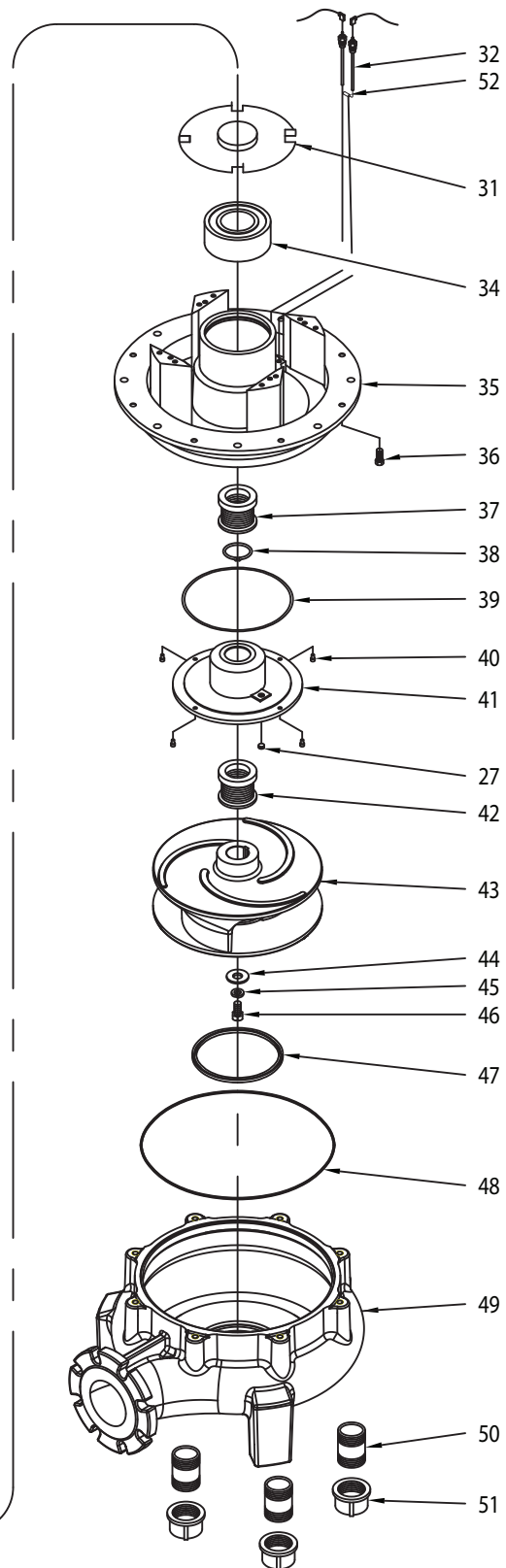
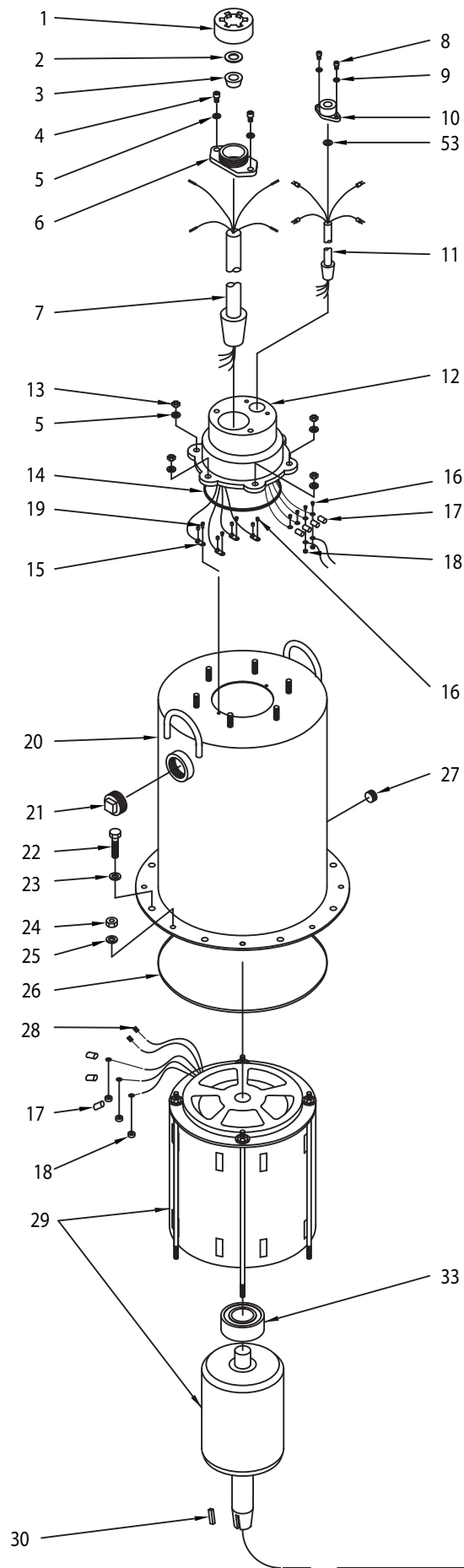
▲ WARNING Warns of hazards that **CAN** cause serious personal injury, death or major property damage.

▲ CAUTION Warns of hazards that **CAN** cause personal injury or property damage.

▲ NOTICE INDICATES SPECIAL INSTRUCTIONS WHICH ARE VERY IMPORTANT AND MUST BE FOLLOWED.

THOROUGHLY REVIEW ALL INSTRUCTIONS AND WARNINGS PRIOR TO PERFORMING ANY WORK ON THIS PUMP.

MAINTAIN ALL SAFETY DECALS.



REPLACEMENT PARTS LIST FOR MODELS

6424 - 6425 - 6426 - 6427 - 6428, 3 PHASE

REF. NO.	DESCRIPTION	QTY	NOTES	5/17 thru Current
1	Lead Clamp Cap	1		007155
2	Washer	1		007156
3	Lock Ring	1		151483
4	Hex Head Screw	2		007400
5	Lock Washer	8		007132
6	Lead Clamp	1		007158
7	Lead Wire Assembly	1	1	007424
8	Hex Head Screw	2		002608
9	Lock Washer	2		006402
10	Lead Clamp	1		008021
11	Sensor Wire Assembly	1	1	006503
12	Lead Housing	1		007420
13	Nut	6		007390
14	O-Ring	1	2	007129
15	Wire Connector	4		007130
16	Screw	10		008038
17	Shrink Tubing Sensor	8		007204
	Shrink Tubing Motor	12		016933
18	Nut	10		001822
19	Screw	1		007545
20	Motor Housing	1		007394
21	Pipe Plug	1		007392
22	Hex Head Cap Screw	8		007402
23	Lock Washer	8		006404
24	Nut	8		001809
25	Lock Washer	8		007132
26	O-Ring	1	2	007127
27	Pipe Plug	2		006460
28	Temperature Sensor	1		007190
29	Motor	1		SEE JOB FILE
30	Impeller Key	1		007408
31	Fan	1		008223
32	Moisture Probe Assembly	1		008026
33	Upper Bearing	1		008225
34	Lower bearing			007415
35	Bearing Housing	1		008224
36	Screw	8		008451
37	Rotary Seal (upper) Carbon/Ceramic	1	2	007131
	Optional SiliconeCarbide/SiliconeCarbide			011139
38	Snap Ring	1		007126
39	O-Ring 267	1	2	007589
40	Screw 1/4" - 20 x .375"	4		006456
41	Seal Retainer	1		007506
42	Rotary Seal (lower) Carbon/Ceramic	1	2	007131
	Optional SiliconeCarbide/SiliconeCarbide			011139
43	Impeller	1	3	SEE JOB FILE
44	Impeller Washer	1		007410
45	Lock Washer 3/4" S/S	1		006455
46	Screw 3/4" - 16 UNF x 1.38"	1		007434
47	Wear Ring 4" Discharge	1	2	154627
	U-Cup Packing 6" Discharge	1	2	007169
48	O-Ring 281	1	2	007128
49	Pump Housing 4" or 6" Discharge	1		SEE JOB FILE
50	Pipe Nipple	3		007133
51	Pipe Cap	3		007406
52	Resistor	1		013740
53	Washer	1		158849

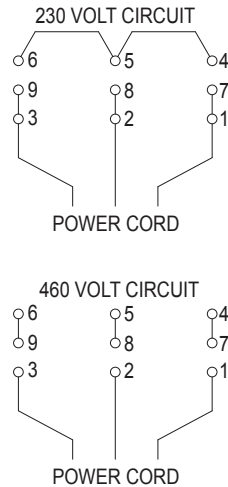
NOTES:

- 1) Consult factory for cords over 25 feet.
- 2) If pump was ordered with special seals, consult factory.
- 3) If pump was equipped with a trimmed impeller, consult factory.

Disassembly Procedures

230/460 pump stators are wound so they can be wired either 230 or 460 volt. New pumps are shipped connected for specific voltage ordered.

To change the voltage, remove the six nuts (13) that secure the lead wire housing (12). Lift off the lead wire housing being careful not to damage the seal ring (14) assembly. Change wiring as required per the following diagram (See section D3 - D6).



3 PHASE DUAL VOLTAGE WIRING DIAGRAM

ZEPA0037

After changing leads, lightly oil seal ring (14). Insure that wire leads will not be pinched and position the lead wire housing (12) on the motor housing (20) securing with nuts (13).

Before installing a pump, check the pump rotation. Insure that wiring has been completed to proper power source and that the green lead of power cord (see illustration) is connected to a valid ground. Momentarily energize the pump, observing the direction of kick back due to starting torque. Rotation is correct if kick back is in the opposite direction of rotation arrow on the pump casing. If rotation is not correct, switching of any two power leads other than ground will provide the proper rotation.

See page 7 for illustration for identification of wire leads in the sensor cord to make proper connections for the seal failure alarm and the motor temperature sensor circuit.

OPERATION

Before putting the pump into operation, the following items should be checked to insure that the pump is installed correctly.

- Electrical connections
- Pump rotation

DISASSEMBLY PROCEDURES

A. Before you begin...

1. Shut off pump.
2. Disconnect power source.
3. Remove pump from system.

B. When removing impeller (42)...

1. Complete Section A.
2. Remove the eight screws (22) and lock washers (23) from the flange of the motor housing (20).
3. Remove the pump housing (48), O-ring (47), and U-cup/wear ring packing (46).
4. Immobilize the impeller (42) by holding the vanes with a pipe wrench. Using a socket, remove the impeller bolt

(45), lock washer (44), and impeller washer (43).

5. Using two long-handled screwdrivers as levers, carefully pry the impeller (42) from the shaft.
6. Remove the square key (30) from motor shaft.

Note: Impeller hub serves as lower seal retainer. When impeller is removed, seal spring will fall free.

C. When removing rotary seals (36 and 41)...

1. Complete Sections A and B.

CAUTION

Do not touch sealing face of the rotating section or the stationary section of the rotary seal (36 or 41) when removing or installing seal. When seal replacement is required, cleanliness is of utmost importance. Seal replacement should be done in shop atmosphere if possible.

2. Remove the spring of the lower rotary seal (41) from the shaft. See rotary seal component placement diagram for part identification.
 3. Remove the pipe plug (27) in the bottom seal retainer (40) and drain oil from the chamber behind the retainer.
 4. Remove the four socket head cap screws (39) from the seal retainer (40).
 5. Remove the seal retainer (40) with remaining parts of the lower seal assembly (41).
 6. Press seal seat out of the seal retainer (40).
 7. Remove the seal ring (38) and inspect.
 8. Slowly remove the large pipe plug (21) from side of motor housing (20).
 9. Remove the lower pipe plug (27) from the side of motor housing (20) and drain the oil from the motor housing (20).
- Note:** Pump assembly will have to be tipped on its side to completely drain the oil.
10. Remove the snap ring (37) from the shaft and remove the spring holder and seal spring of the upper rotary seal (36) from the shaft.
 11. Using a bearing puller or other suitable tools, pull the rotating section of the upper rotary seal (36) from the rotor shaft. If needed, carefully pry rotating section loose with screwdrivers and pull off by hand.
 12. The stationary seat can be pried out of the bearing housing (34) with a screwdriver. Use care not to chip seat as chips may fall into motor.

D. When removing power cord and sensor cords (7 and 11)...

1. Complete Section A.
2. Remove six nuts (13) and lock washers (5), that secure the lead wire housing (12) to the motor housing (20).
3. Pry the lead wire housing (12) off using two screwdrivers.

CAUTION

Block the lead wire opening in the motor housing (20) to prevent any parts from falling down into the motor.

4. Cut shrink tubing (17) off wire connections. Remove hex nuts (18), and screws (16) as necessary to break connects between lead wire assy. (7) and motor (29). Tag wires as disconnecting. Break connection between sensor wire assy. (11) and sensor wires. Remove hex head screw (19) and disconnect ground wire.
5. If necessary, remove and replace wire connector (15).

Disassembly Procedures, continued

6. To replace sensor cord (11), remove screws (8), lock washers (9), lead clamp (10) and seal washer (53). Pull sensor cord (11) from lead wire housing (12).
7. To replace power cord (7), remove lead clamp cap (1), washer (2), and lock ring (3). Remove screws (4), lock washers (5) and lead clamp (6). Pull power cord (7) from lead wire housing (12).
8. Remove seal ring (14) from lead wire housing and inspect for damage.

E. When removing motor (29)...

1. Complete Sections A, B, C and D.
2. Remove the eight nuts (24), washers (25) and socket head screws (35) which secure the bearing housing (34) to the motor housing (20).
3. Set motor assembly vertical on blocks and lift the motor housing (20) off the bearing housing (34) and motor assembly. Be careful to lift the motor housing (20) straight off, so as not to damage the motor (29).
4. Remove the seal ring (26) from the bearing housing (34).
5. Remove four long hex head through bolts that attach motor (29) to bearing housing (34) and note which holes in bearing housing each one was removed from. Pry off top cap of motor and then remove stator and rotor separately. Be careful not to damage stator windings.
6. Using a bearing puller, bearing against the inner race, remove the double row bearing (33). Replace the bearing if needed.

Note: The bearing should be cleaned with volatile mineral spirits and relubricated with proper lubricants immediately after cleaning. Never dry bearings with compressed air, and never spin unlubricated bearings.

F. When removing sensor studs (32)...

1. Complete Sections A through E5.
2. Pull pin terminals of moisture sensor leads (32) loose from moisture sensors.
3. Unscrew moisture sensors and remove.

ASSEMBLY PROCEDURES

Pumps are reassembled in reverse order of disassembly. The following suggestions are offered.

Note: While pump is dismantled, all gaskets, seal rings and retaining rings should be checked for wear and deterioration. Replace all worn items. Insure that all parts are thoroughly cleaned before assembly.

A. Installing fan (31) (Applies to installation of new motor only)...

1. Press the fan (31) on the rotor shaft until seated against the rotor end ring. Note that the fan blades are bent away from the motor rotor.

B. Installing sensor studs (37 or 39)...

(Before S/N 00605)

1. Screw sensors (32) into bearing housing (34). Apply 34 in. lbs. of torque.
2. Push terminals of moisture sensor leads (32) onto moisture sensors (32).

C. Installing motor (29)...

Note: Before installing the bearing (33), wipe the bearing seat on the shaft clean and coat the seat with oil to prevent galling of the shaft as the bearing (33) is pressed onto the shaft. A properly sized pressing sleeve should be used to install bearing (33), with

Assembly Procedures

pressure being applied to only the inner bearing race.

1. Install the double row ball bearing (33) and the upper bearing on the shaft.
2. Install the rotor/bearing assembly into the bearing housing (34) then lower stator down over rotor and position motor cap. Secure motor (29) to bearing housing (34) with four long hex head through bolts (supplied with motor).

CAUTION

Do not damage motor windings.

3. Lightly oil and position the seal ring (26) around the pilot shoulder of bearing housing (34).
4. Set the motor assembly vertical with the bearing housing (34) down, resting on blocks. Lower the motor housing (20) over the motor assembly, pulling the sensor wires (32) between the housing (20) and motor stator as the housing (20) is lowered.
5. Pull the motor leads through the top of the housing (20).
6. Seat the motor assembly in the motor housing (20) and secure with eight screws (35), nuts (24), and lock washers (25).
7. Install the pipe plug (27) in the lower of the two holes in the side of the motor housing.

D. Installing sensor cord (11) and power cord (7)...

1. Apply light coating of oil on the molded part of both the power cord (7) and sensor cord (11), and install the two cords in the tapered bores of the wire housing (12).
2. To install the sensor cord (11), slide the seal washer (53) and sensor cord clamp (10) over the cord and secure to lead wire housing (12) with lock washers (9) and screws (8).
3. To install the power cord (7), slide the lead clamp (6) over the power cord and secure to lead wire housing (12) with lock washers (5) and screws (4). Press lock ring (3) over power cord (7) and seat in lead clamp (6). Install washer (2) and cap (1) over clamp (6).
4. Install the seal ring (14) on the lead wire housing (12).
5. Connect lead wire terminals to motor lead terminals in the proper arrangement as per wiring diagram using screws (16) and nuts (18) and shrink tubing (17). Place shrink tubing (17) over wires, make up connections, then place shrink tubing in proper location and shrink. Be careful not to burn through shrink tubing. Install ground wire to motor housing (20) with hex head screw (19).
6. Connect sensor wire assy. (11) to sensor wires per wiring diagram using the same method and components as the lead wires.

Note: Tighten nuts securely.

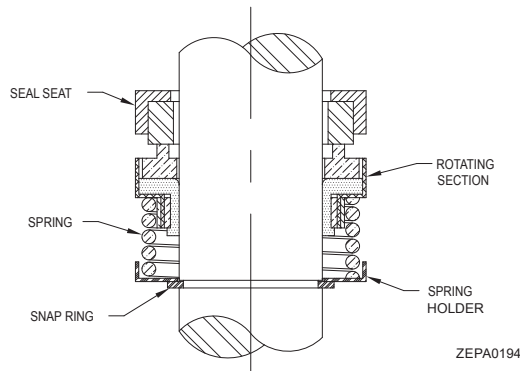
7. Install the lead wire housing (12) in proper position on the pump assembly, securing with the nuts (13) and lock washers (5).

E. Installation of rotary seals (36 and 41) and seal retainer (40)...

CAUTION

Make sure all seal faces remain free of dirt particles. Apply a light coat of oil to seal faces before installing.

Assembly Procedures, continued



UPPER ROTARY SEAL COMPONENT PLACEMENT DIAGRAM

(Lower rotary seal is same except impeller hub serves as spring holder and snap ring)

1. Refer to rotary seal component placement diagram for relative positioning of seal parts.
2. Apply a coating of oil to the seal seat and the bore of bearing housing (34), and using a nonmetallic sleeve press the seat into position in the bearing housing (34).
3. Apply 80-90 weight gear oil to the shaft and to the inside diameter of the rotating section of rotary seal. Push the rotating section onto the shaft in a continuous motion until the seal faces meet.
4. Install the spring and spring holder over the shaft and seat against the rotating section. Compress the spring as necessary and install retaining ring (37) in groove of motor shaft.

Leak Test

(Before oiling pump) Perform a leak test on the pump seals by installing a regulated air supply into the oil fill holes. Both the motor chamber and seal chamber must be checked. The pressure of the air supply should be set at approximately 9 PSI. Submerge the pump in clear water watching for small air bubbles around square ring seals, rotary seal, cord connection, and oil fill plugs. NOTE: Make certain that the pump is placed in the water so that no areas are present that would trap air (such as the cavity around the lower rotary seal), not allowing the bubbles to rise to the water surface.

If it is not possible to leak test the pump using the submersion method, a regulated air supply with a (0-15 PSI) air gage can be installed in the fill holes. Stabilize the pressure inside the pump to 9 PSI. After removing the air supply, the pressure should not drop more than 1/2 PSI in a 24 hour period.

Note: When leak testing the lower seal chamber, the lower seal (41) must be in place and tension on the spring to the point the impeller would hold it.

5. Install seal ring (38) on the seal retainer (40).
6. Press the seal retainer (40) into the bearing housing (34) and secure with the four socket head screws (39).

Note: Make certain that the seal retainer (40) is centered so that the ceramic seal is not in contact with the shaft.

7. Install the seal seat and rotating section of the lower rotary seal assembly (41) into the seal housing (40) in the same manner described in steps 2 and 3 above.
8. Position the unit so that the seal retainer (40) is up. Fill the

cavity behind the seal retainer (40) with an antiwear, non-detergent, rust inhibiting, paraffinic oil of approximately 100 SUS. (See table below for acceptable types of oil.)

Refiner	Product Name
Arco	Duro 32
Exxon	Teresstic 32
or acceptable equal	

9. Install the pipe plug (27) in the seal retainer (40).

F. Installing the impeller (42)...

1. Install the spring of the lower rotary seal (41), on the exposed end of the rotor/shaft.

Note: Spring holder not required on lower rotary seal.

2. Install the square key (30) in the groove in the shaft.
3. Install the impeller (42), impeller washer (43), lock washer (44), and secure the impeller by immobilizing it using a pipe wrench to grip the vanes and installing the impeller bolt (45) in the end of the shaft.

Note: Apply thread locking compound to impeller bolt (45).

4. Using waterproof rubber adhesive sealant (i.e. liquid silicone), secure U-cup packing (46) to groove inside suction opening of pump housing (48). Wear ring for 4" discharge is a light press fit; no sealants required.
5. Install O-ring (47) on flange of bearing housing (34). Attach pump housing (48) to pump with screws (22) and lock washers (23).
6. If removed, install the pipe nipples (49) and pipe caps (50), being sure the motor housing sits level when caps are installed.

G. Final assembly...

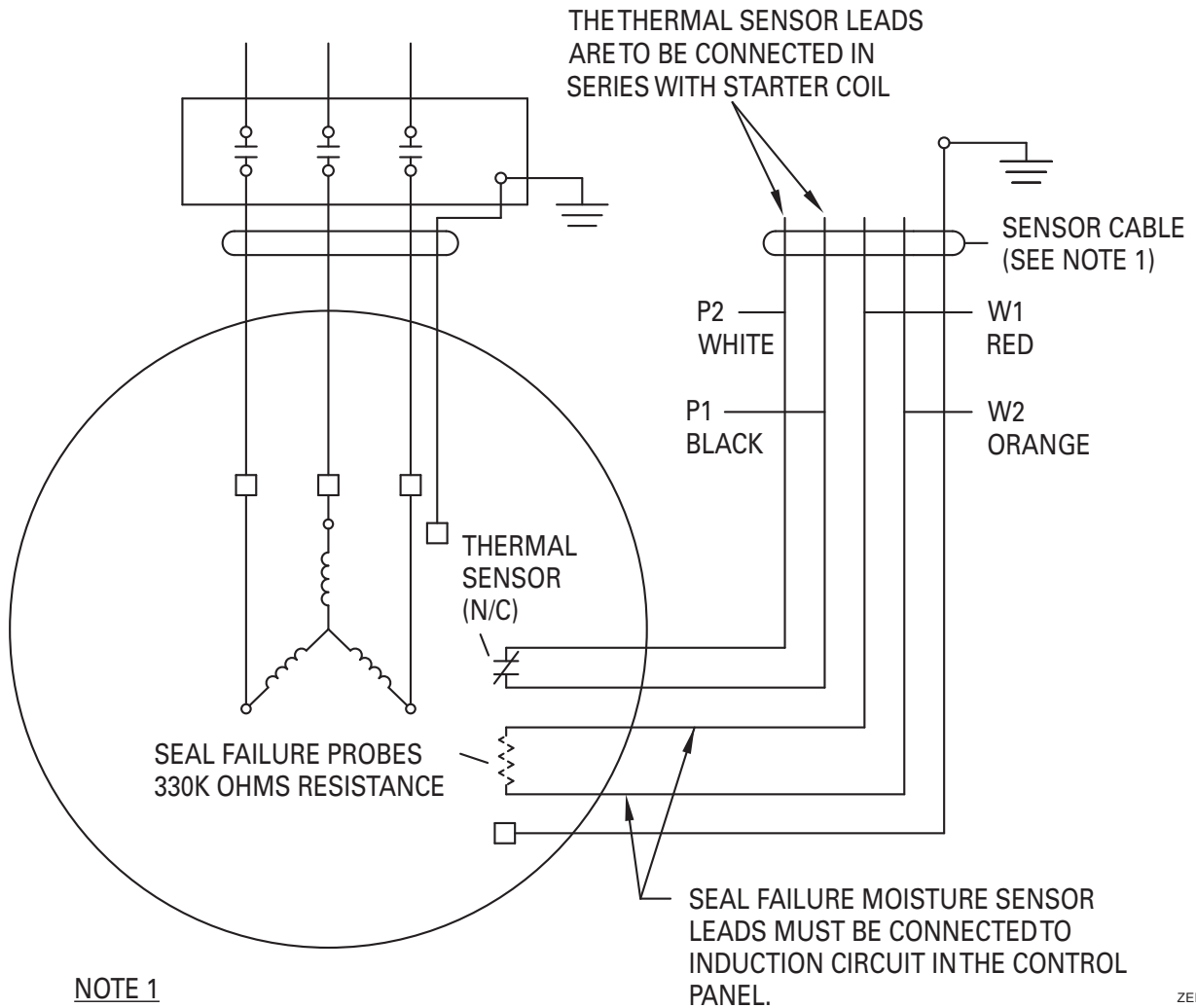
1. Fill the motor housing (20) with the same oil used to fill the seal retainer cavity in step E.8. above. Fill until oil is level with the upper plug (20) in the side of the motor housing (20).

WARNING
DO NOT OVERFILL

2. Install the pipe plug (21).

Pump Wiring Diagram

SUBMERSIBLE MOTOR TYPICAL 3 PHASE WIRING DIAGRAM



ZEPA0038

Service Checklist & Trouble Shooting



⚠ WARNING ELECTRICAL PRECAUTIONS Before servicing a pump, always shut off the main power breaker to the panel and then disconnect the pump - making sure you are wearing insulated protective sole shoes and are not standing in water. Under flooded conditions, contact your local electric company or a qualified licensed electrician for disconnecting electrical service prior to pump removal.

⚠ WARNING Submersible pumps contain oils which become pressurized and hot under operating conditions - **allow 2-1/2 hours after disconnecting before attempting service.**

CONDITION

A. Pump will not start or run.

Steps	Check Voltage At	If No Voltage	If Voltage
No. 1	Line terminals in pump's control panel L1 - L2 - L3 (3 Phase).	Check Disconnect switch, line fuse, and/or circuit breakers in power supply circuit.	Proceed to No. 2.
No. 2	Pump motor terminals in pump's control panel T1 - T2 - T3.	Check for control circuit voltage. Check out magnetic starter contacts, thermal overloads, and float switches.	Check starting relay and capacitor (1 phase units). Check pump for ground, and binding impeller.

COMMON CAUSES

B. Motor overheats and trips overload or blows fuse.

- Incorrect Voltage
- Unbalanced power source
- Incorrect motor rotation
- Negative or low head
- Excessive water temperature
- Impeller or seal mechanically bound
- Defective capacitor or relay
- Motor shorted
- Lost one line in a Three Phase unit

C. Pumps starts and stops too often.

- Check valve stuck open
- Level controls out of adjustment
- Temperature sensor tripping
- Thermal overload switch out of adjustment or defective
- Pit too small

D. Pump will not shut off.

- Debris under float switch
- Float travel obstructed
- Defective or damaged float switch
- Magnetic starter contacts shorted
- Air lock - check vent hole

E. Pump operates but delivers little or no water.

- Check for plugged Pump housing, discharge pipe or sticking check valve
- Vent hole clogged or not drilled
- Discharge head exceeds pumps capacity
- Low or incorrect voltage
- Incorrect motor rotation
- Defective capacitor

F. Drop in head and/or capacity after a period or use.

- Increase Pipe Friction
- Clogged line or check valve
- Abrasive material & chemical, deteriorated impeller and pump housing

If the above check list does not uncover the problem, consult the factory - Do not attempt to service or otherwise disassemble pump.