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ZM3208

1119

Supersedes

New

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



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REPAIR MANUAL

7020 & 7021 PROGRESSING CAVITY GRINDER 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 submersible grinder pumps.

This manual incorporates the parts list and repair instructions into one document to aid in the ownership of a Zoeller® submersible grinder 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 ZM2607 for owner's manual on 7020 and 7021 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
- System Voltage
- Replacement Reference 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 ZM2607 - 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.

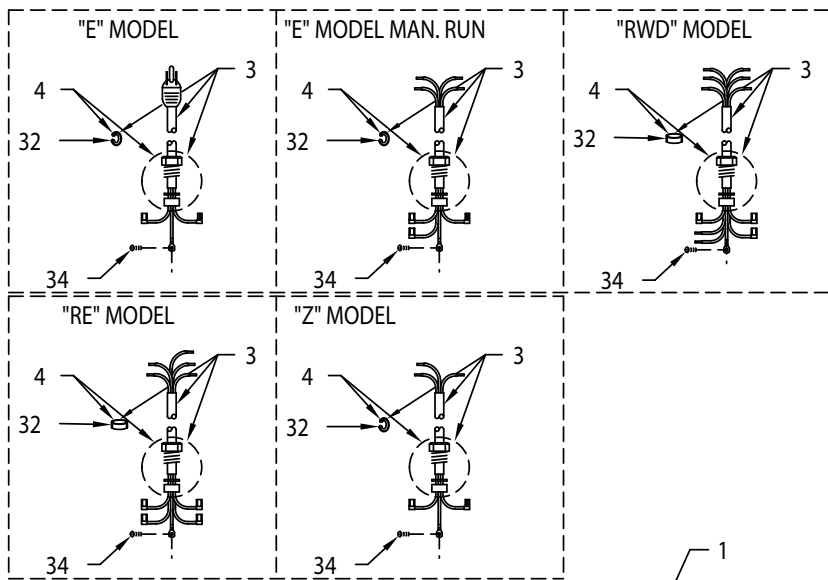
▲ WARNING Warns of hazards that **CAN** cause serious personal injury, death or major property damage.

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

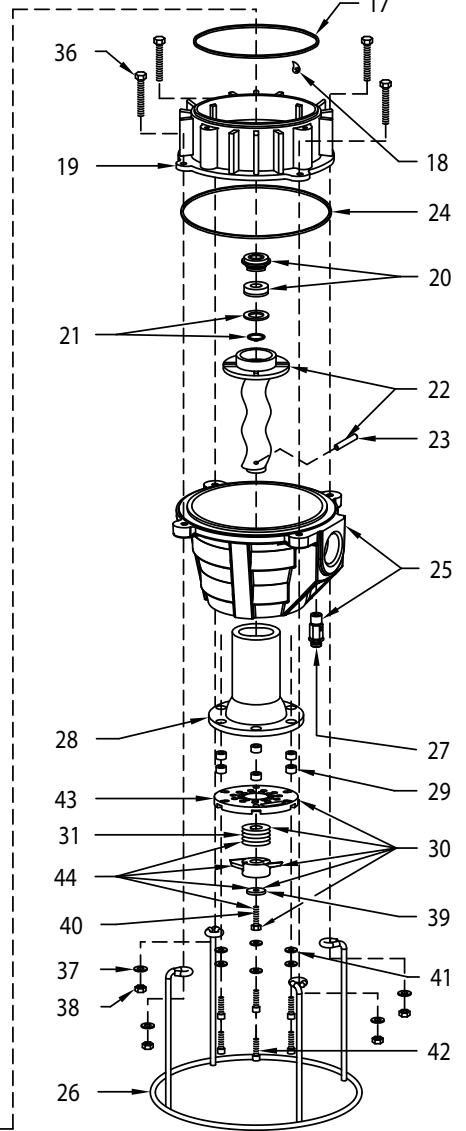
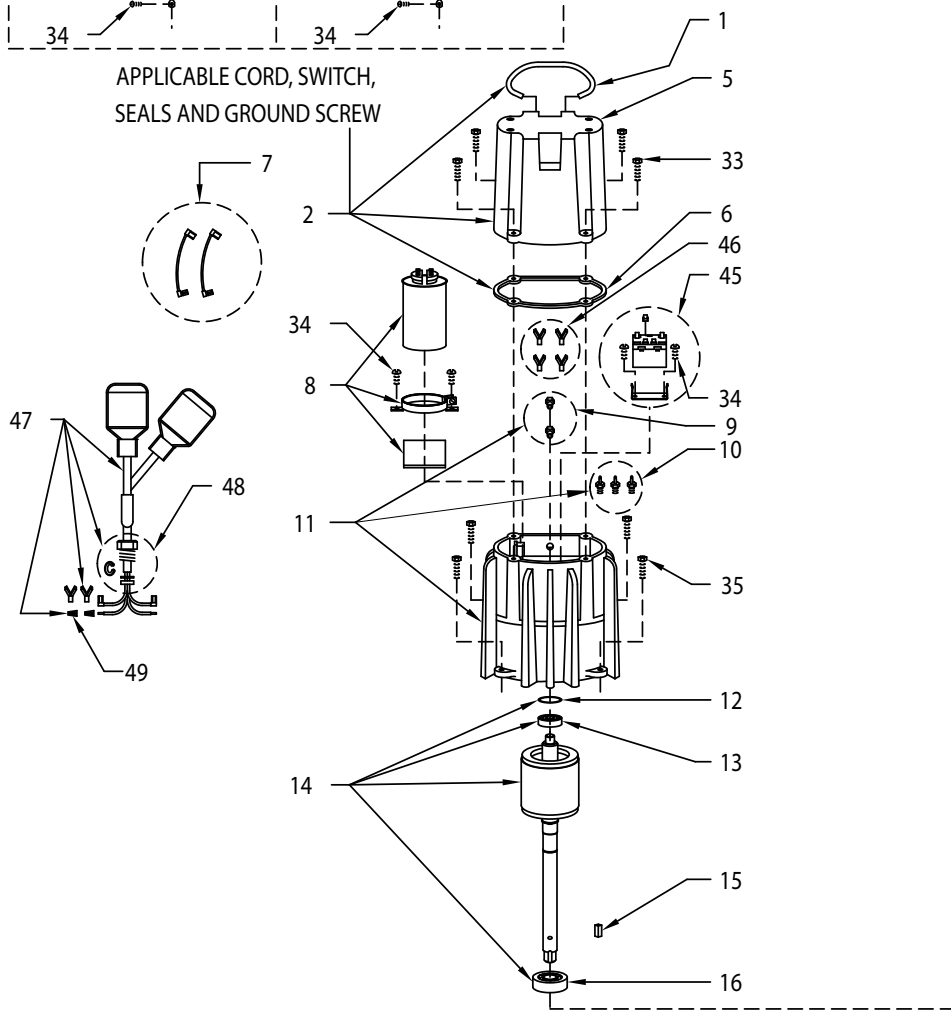
▲ NOTICE INDICATES SPECIAL INSTRUCTIONS WHICH ARE VERY IMPORTANT AND MUST BE FOLLOWED.

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

MAINTAIN ALL SAFETY DECALS.



APPLICABLE CORD, SWITCH,
SEALS AND GROUND SCREW

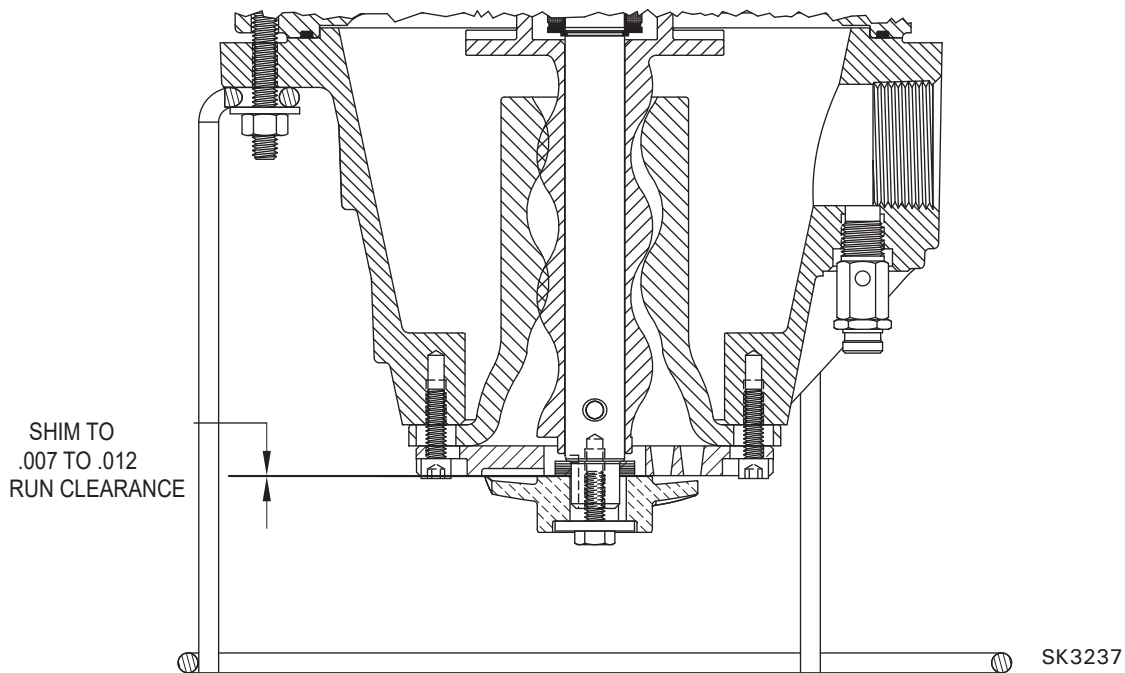


PARTS LIST FOR MODELS "7020, 7021"

REF NO.	DESCRIPTION	QTY	PART NUMBER	NOTES
1	• HANDLE	1	217069	
2	COVER & CORD	1		For replacement parts refer to ZM2637 for Model 7020 and ZM2638 for Model 7021
3	CORD, TERM & SEAL ASM	1		For replacement parts refer to ZM2637 for Model 7020 and ZM2638 for Model 7021
4	• SEAL, CORD-ASM & STR RLF	1		For replacement parts refer to ZM2637 for Model 7020 and ZM2638 for Model 7021
5	COVER-MACH.	1		For replacement parts refer to ZM2637 for Model 7020 and ZM2638 for Model 7021
6	• GASKET, CASE/COVER, VITON	1	012649	
7	• WIRE PKG.	1		For replacement parts refer to ZM2637 for Model 7020 and ZM2638 for Model 7021
8	CAPACITOR & CLAMP ASM	1		For replacement parts refer to ZM2637 for Model 7020 and ZM2638 for Model 7021
9	• PLUG, TEST	2	015023	
10	• SEAL, THRU WALL TERM	3	003402	
11	HOUSING, MTR- & STR	1		For replacement parts refer to ZM2637 for Model 7020 and ZM2638 for Model 7021
12	• SPRING, BEARING PRELOAD	1	017192	
13	• BEARING, UPPER 6201	1	006703	
14	ROTOR & BRG ASM	1		For replacement parts refer to ZM2637 for Model 7020 and ZM2638 for Model 7021
15	• KEY	1	017893	
16	• BEARING, LOWER 6204	1	012544	
17	• SEAL, MTR HSG, VITON	1	012648	
18	• OIL, DIELECTRIC-(57 OZ CAN)	1	009051	
19	ADAPTER-MACH.	1	017891	
20	• SEAL, SHAFT, SILICON CARBIDE/CARBON	1	155723	
21	• WASHER, SEAL LOCATING & SNAP RING	1	018913	
22	ROTOR, PUMP-HYDRAULIC & PIN	1	018915	
23	• PIN	1	018892	
24	• SEAL, PUMP HOUSING, VITON	1	151078	
25	HOUSING, PUMP-MACH. & PRESS. RLF VALVE	1		Model 7020 PN 019550 / Model 7021 PN 019551
26	LEG, WIREFORM	1	151920	
27	VALVE, PRESSURE RELIEF	1		Model 7020 PN 018432 / Model 7021 PN 018433
28	STATOR, HYDRAULIC	1	151617	
29	• INSERT, STATOR SS	6	018369	
30	CUTTER & DISC ASM	1		For replacement parts refer to ZM2637 for Model 7020 and ZM2638 for Model 7021
31	SHIM SET	1	012632	
32	CLAMP, STRAIN RELIEF	1		For replacement parts refer to ZM2637 for Model 7020 and ZM2638 for Model 7021
33	• SCREW, .25-20 X .75 HHM-SS	4	001916	
34	• SCREW, #6-32 X .25 RHM SL TC STLGR	**	001877	
35	• SCREW, .25-20 X 1 HHM-SS	4	007790	
36	• SCREW, .313-18 X 2 HH CAP FULL THREAD/SS	4	018186	
37	• WASHER, FLAT-SS .313	4	015914	
38	• NUT, .313-18 H-SS	4	001813	
39	• WASHER, RETAINING SS	1	008533	
40	• SCREW, .25-20 X .75 HH SS (NYLOCK)	1	009545	
41	• WASHER, FLAT-SS .25	**		For replacement parts refer to ZM2637 for Model 7020 and ZM2638 for Model 7021
42	• SCREW, .25-20 X .875 (1.125 LENGTH FOR PLATE W/O RECESS)	6		For replacement parts refer to ZM2637 for Model 7020 and ZM2638 for Model 7021
43	DISC, CUTTER	1		For replacement parts refer to ZM2637 for Model 7020 and ZM2638 for Model 7021
44	CUTTER/SHIM/ASM	1		For replacement parts refer to ZM2637 for Model 7020 and ZM2638 for Model 7021
45	RELAY	1		RE & RWD models only, for replacement parts refer to ZM2637 for Model 7020 and ZM2638 for Model 7021
46	INSULATION - INSULATOR	**		RE & RWD models only, for replacement parts refer to ZM2637 for Model 7020 and ZM2638 for Model 7021
47	SWITCH, FLTS - TERM & SEAL	**		RWD models only, PN 153383
48	• SEAL, CORD - FLT SWITCH	**		RWD models only, PN 094043
49	• CONNECTOR WIRENUT	**		RWD models only, PN 003753
□	REBUILD KIT			For replacement parts refer to ZM2637 for Model 7020 and ZM2638 for Model 7021

• Items included in Rebuild Kit.

** Quantity dependent on model of pump.



Disassembly Procedures

DISASSEMBLY PROCEDURES

A. Before you begin...

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

B. When removing cutter (44)...

1. Complete Section A.
2. Immobilize the cutter (44) by placing a brass or aluminum rod in one of the holes in the cutter plate (43). Turn the cutter until it is against the rod in the correct direction to remove the cutter screw (40).

NOTE: It may be necessary to heat the hex head screw with a propane torch to soften the thread compound.

CAUTION Do not chip or nick the cutter while using the rod to immobilize the cutter.

3. Using a socket remove the cutter screw (40) and washer (39)
4. Remove the cutter (44).
5. Remove the cutter shims (31).

NOTE: Count the number of shims removed so the same number and sizes can be installed upon reassembly.

C. When removing cutter plate (43)

1. Complete section A and B.
2. Remove the six screws (42) and washers (41).
3. Remove the cutter plate (43).

D. When removing hydraulic rotor & stator

1. Complete Sections A and B.
2. Remove four nuts (38) and washers (37) from pump stand (26)
3. Remove pump stand (26)
4. Remove four screws (36) from pump housing
5. Rock pump housing back and forth to work stator (28) from rotor (22)
6. Push pin (23) out of rotor with pin removal tool
7. Remove hydraulic rotor (22) from electric rotor (14)
8. Complete C. to remove cutter plate (43) and hydraulic stator (28)

E. When removing shaft seal (20)...

1. Complete Sections A, B and D.

WARNING Pump should be at room temperature. Seal and motor

housing may be pressurized. Care should be used in removing oil plugs (9) so that oil is not sprayed.

CAUTION Do not touch sealing face of the rotating section or the stationary section of the rotary seal (20) when removing or installing seal. Seal replacement should be done in shop atmosphere if possible.

2. Slowly remove the oil plug (9) from the side of the motor housing (11) (see warning above).
3. Turn the pump on it's side to drain the motor chamber oil.
4. Remove the seal snap ring (21) from the shaft and washer.
5. Using a bearing puller or other suitable tools, pull the rotating section of the rotary seal (20) from the rotor shaft. If needed, carefully pry rotating section loose and pull off by hand.
6. The stationary seal can be pried with a screw driver. Be careful not to chip as chips may fall into motor.

F. When removing the cover and power cord assembly (2)...

1. Complete section A.
 2. Remove the four screws (33) that secure the cover (2) to the motor housing (11).
 3. Remove the cover and cord (2) assembly from motor housing.
- NOTE: If cover does not immediately come loose, a gentle tap with dead blow hammer or rubber mallet may be necessary.*
4. Remove the power lead connections from the through wall terminals (10) in motor housing (11). Set cover and cord assembly aside.
 5. Remove seal gasket (6) from the cover and inspect for damage.
 6. To remove cord assembly, loosen and remove gland nut (4).
 7. Remove the ground screw and disconnect the ground wire from the inside of the cover.
 8. Cut away strain relief (32).
 9. Pulling on the power cord, remove from the cover. The entire length of the power cord will be pulled through the cover.

NOTE: It may take some wiggling and prying to loosen this assembly, because the rubber seal (3) will have taken a set.

10. Inspect the cord seal (4) for damage.

G. When removing motor rotor (14)...

1. Complete sections A, B, D and E. Section C and F may or may not be completed first.
2. Remove four screws (35) between motor housing (11) and adapter (19).

Assembly Procedures

3. Lift the motor housing (11) off the adapter (19). Be careful to lift the motor housing straight up, so as not to damage the stator windings or bearings.
4. Remove bearing pre-load washer (12) from motor housing (11) and inspect.
5. Remove rotor assembly (14) from adapter (19).
6. Using a bearing puller, against the inner race, remove the lower bearing (16) and upper bearing (13) from the shaft. Replace the bearings if needed.

NOTE: Bearings should be cleaned with volatile mineral spirits and relubricated with proper lubricants immediately after cleaning. Never dry bearings with compressed air, and never spin un-lubricated bearings.

H. Motor Stator...

NOTE: The motor housing and stator assembly removed in Section G number 3, is a factory assembled unit and must be replaced as such: it consists of the motor housing, the glued in stator, and the through wall electrical terminals for the power wires.

ASSEMBLY PROCEDURES

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

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

A. Assembly of rotor (14)...

1. Inspect rotor to see that the snap ring is in place and snapped in the groove. This snap ring serves as a locator for the lower bearings.
NOTE: Before installing the bearings, wipe the bearing seats on the shaft clean and coat the seats with oil to prevent galling of the shaft as the bearings are pressed onto the shaft. A properly sized pressing sleeve should be used to install bearings, with pressure being applied to only the inner bearing race.
2. Install the lower ball bearing (16) and the upper ball bearing (13) on the rotor shaft (14).
3. Set the adapter (19) on blocks to allow the rotor shaft to clear the work surface when installed.
4. Install the rotor/bearings assembly into the adapter housing (19). Make sure the lower bearing is seated in the bearing pocket.

B. Installing the motor housing/stator (11)...

NOTE: The motor housing/stator assembly is furnished from the factory as a glued-in unit. The assembly will include the motor housing, the stator prewired to installed through wall terminals (10).

1. Lightly oil and position the seal ring (17) around the pilot shoulder of the adapter (19).
2. Install the pre-load washer (12) in the upper bearing pocket of the housing/stator unit (11). The pre-load washer should be stretched a little to allow it to remain in the pocket when turned upside down.
3. With the rotor/adapter assembly in the vertical position suspend the motor housing/stator unit over it. Slowly lower the unit aligning the rotor and stator opening.
4. Secure the motor housing/stator (11) to the adapter (19) with four screws (35)
5. Torque screws to 63-67 in/lbs.

C. Installing cord and cover assembly...

NOTE: The cord will come from the factory as a cord terminal and seal

assembly(3). The assembly consists of the power cord, the wire terminals, and the cord seal assembly.

1. Unroll the cord of the cord terminal and seal assembly (3)
2. Install gasket (6) on top of motor housing (11).
3. Suspend the cord and cover assembly over the motor housing and make wiring connections per the proper wiring diagram (page 7).
4. Tuck the wires in the cover assembly as installing the cover into place.
5. Secure the cover (5) to the motor housing (11) with four screws (33).
6. Torque screws to 63-67 in-lbs.

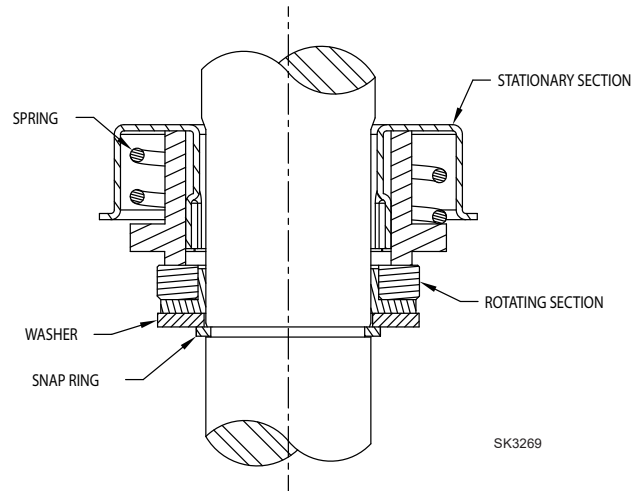
NOTE: Align the straight (non circular) surface of cover with the straight surface of motor housing.

D. Installation of rotary seals and seal retainer...

▲ CAUTION Make sure all seal faces remain free of dirt particles.

Apply a light coat of oil to seal faces before installing.

1. Refer to rotary seal component placement diagram for relative positioning of seal parts.
2. Apply Loctite # 609 to OD of SS seal cup, and using a nonmetallic sleeve, press the seat into position in the adapter.
3. Apply oil (18) to the shaft and to the inside diameter of the rotating section of rotary seal (20). Push the rotating section onto the shaft in a continuous motion until the seal faces meet.
4. Install washer and retaining ring (21) in the groove of the rotor shaft.



**ROTARY SEAL COMPONENT PLACEMENT
DIAGRAM**

E. Installing the hydraulic rotor...

1. Slide hydraulic rotor (22) onto electric rotor shaft (14)
2. Align holes in rotor to press in pin (23)
3. Use pin tool (156797) with installation driver to start pin. Drive the pin (23) flush with hydraulic rotor.

Assembly Procedures (continued)

F. Installing hydraulic stator and pump housing...

1. Place hydraulic stator (28) in pump housing (25)
2. Make sure all 6 stator inserts (29) are in place
3. Place cutter plate (43) on stator
4. Install 6 screws (42) and washers (41)
5. Torque screws to 63-67 in-lbs
6. Cover rotor (22) in red all purpose grease
7. Place square ring (24) in groove, use all purpose grease to hold in place if necessary.
8. Slide assembled pump housing (25) stator (28) unit over rotor, rocking back and forth until seated against adapter (19)
9. Install four screws (36). Torque to 125-130 in-lbs

G. Installing the cutter (30)...

1. Install the proper amount of shims (31) on the shaft to obtain the proper running clearance between the cutter plate (43) and cutter (44).
2. Install the cutter (44) onto the shaft.
3. Install the screw (40), and flat washer (39) using thread-locking compound and torquing to 71-75 in/lbs.

Note: Immobilize the cutter by placing a aluminum or brass rod in one of the holes in the cutter plate.

▲ CAUTION Do not chip or nick the cutter while using the rod to immobilize the cutter.

4. With the pump in the vertical position to remove end play, measure the running clearance between cutter (44) and cutter plate (43) using a feeler gauge. Repeat 1 thru 3 until .007" to .012" clearance is obtained. (See cutter clearance diagram on page 4).

Leak Test

(Before oiling pump) Perform a leak test on the pump seals by installing a regulated air supply into the holes (1/8" NPT access). The motor chamber, and cover 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. The pump to be pressurized and held at 9 PSI. After removing the air supply, the pressure should not drop more than ½ PSI in a 24 hour period.

H. Oiling and final assembly.

Refiner	Product Name
Arco	Duro 22 or 32
Exxon	Teresstic 22 or 32 or acceptable equal
Chevron	Clarity Hydraulic Aw ISO22 or ISO32

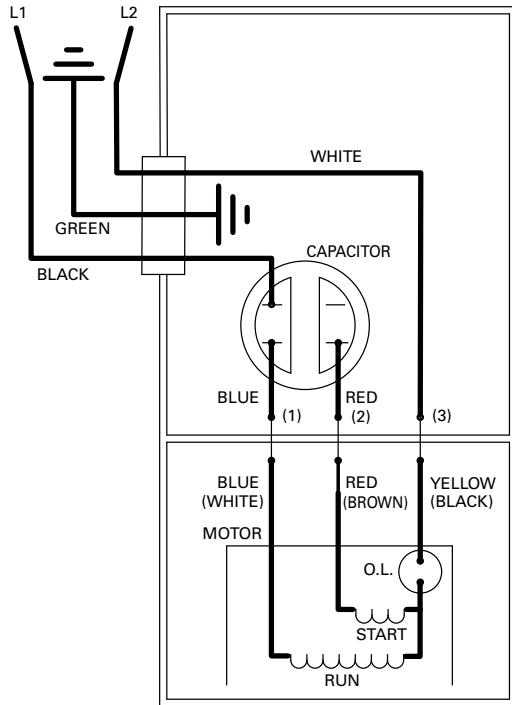
1. While pump is on its side pour (18) in motor housing.

▲ WARNING Do not over fill.

2. Clean pipe plugs and reapply pipe dope or teflon tape. Install pipe plugs (9) in motor housing (11)
3. **▲ CAUTION** Do not operate an unsubmerged progressing cavity pump. Dry pump operation may damage the hydraulic stator due to lack of lubrication. Do not run dry.

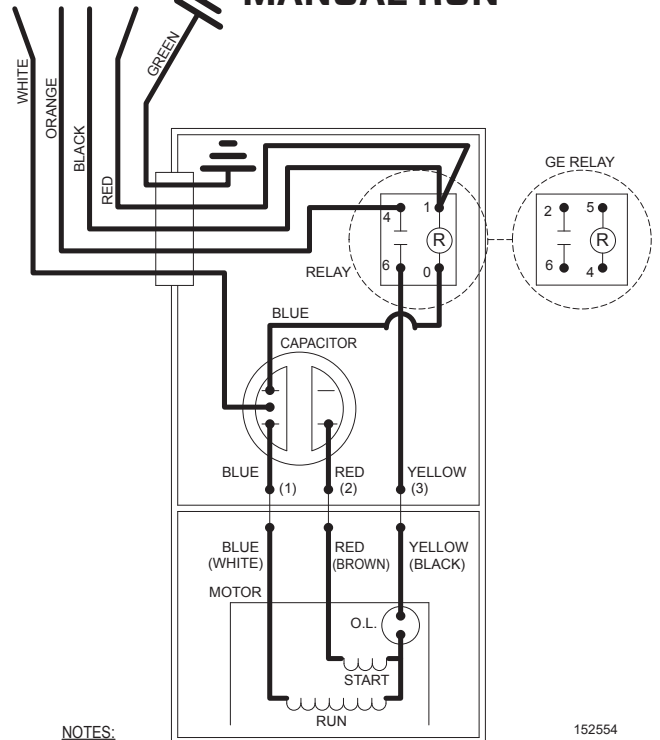
Wiring Diagrams

"E 7020 & E 7021"



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"RE 7020 & RE 7021" WITH MANUAL RUN

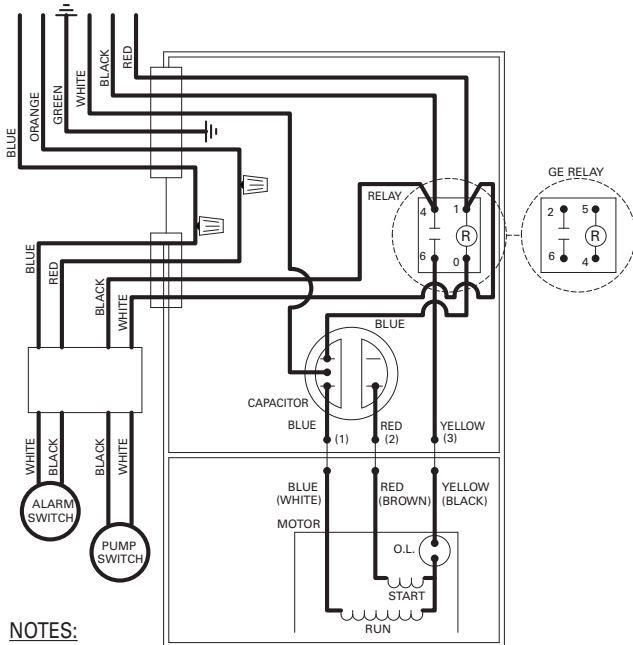


NOTES:

- 1) INSULATORS REQUIRED ON GE RELAY TERMINALS 2 & 5; OMRON RELAY TERMINALS 1 & 4.

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"RWD 7020 & RWD 7021" WITH MANUAL RUN

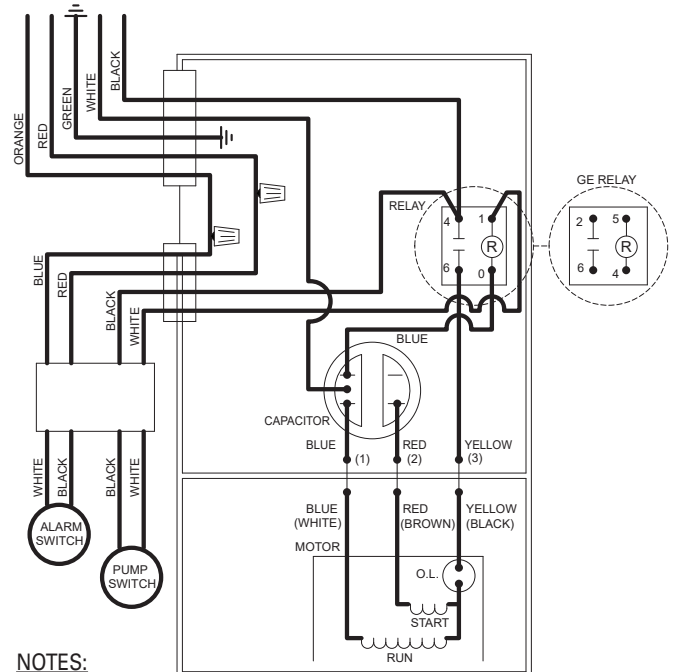


NOTES:

- 1) INSULATORS REQUIRED ON GE RELAY TERMINALS 2 & 5; OMRON RELAY TERMINALS 1 & 4.

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"RWD 7020 & RWD 7021" WITHOUT MANUAL RUN



NOTES:

- 1) INSULATORS REQUIRED ON GE RELAY TERMINALS 2 & 5; OMRON RELAY TERMINALS 1 & 4.

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Service Checklist & Trouble Shooting

⚠ CAUTION Do not operate an unsubmerged progressing cavity pump. Dry pump operation may damage the hydraulic stator due to lack of lubrication. Do not run dry.



⚠ 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 control panel L1 - L2	Check disconnect switch, line fuse, and/or circuit breakers in power supply circuit.	Proceed to No. 2
No. 2	Pump motor terminals in pump control panel T1 - T2	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 bound cutter

COMMON CAUSES

B. Motor overheats and trips overload or blows fuse.

- Incorrect voltage
- Unbalanced power source
- Negative or low head
- Excessive water temperature
- Hydraulic stator and rotor or seal mechanically bound
- Defective capacitor or relay
- Motor shorted

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

E. Pump operates but delivers little or no water.

- Closed valve or curb stop
- 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
- Damaged hydraulic stator or rotor
- Defective capacitor

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

- Increased pipe friction
- Clogged line or check valve
- Abrasive material & chemical, deteriorated hydraulic rotor or stator

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