

FLYGT MP-3067 PUMP

Safety Precautions

Before starting work on the pump, make sure that the pump is isolated from the power supply and cannot be energized.

NOTE! This applies to the control circuit as well.

The following points are important in connection with work on the pump:

- Make sure the pump has been thoroughly cleaned.
- Observe good personal hygiene.
- Beware the risk of infection.
- Follow local safety regulations.

The pump is designed for use in liquids which can be hazardous to health. In order to prevent injury to the eyes and skin, observe the following points when working on the pump:

- Always wear goggles and rubber gloves.
- Rinse the pump thoroughly with clean water before starting work.
- Rinse the components in water after disassembly.
- The oil housing may be under pressure. Hold a rag over the oil casing screw (oil plug) and the inspection screw to prevent splatter.

Proceed as follows if you get hazardous chemicals in your eyes:

- Rinse immediately in running water for 15 minutes. Hold your eyelids apart with your fingers.
- Contact an eye specialist.

On your skin:

- Remove contaminated clothes.
- Wash your skin with soap and water.
- Seek medical attention, if required.

Make sure the pump cannot roll or fall over and injure people or damage property.

Inspection

Regular inspection and preventive maintenance ensure more reliable operation.

The pump should be inspected at least once a year, but more frequently under severe operation conditions.

Under normal operating conditions, the pump should have a major overhaul in a service shop at least every third year for permanent installation and every year for portable pumps.

If the pump is new or if the seals have been replaced, inspections is recommended after one week of operation.

Regular check of the condition of the lifting handle and chain is important.

Inspection of hot water applications

Pumps in hot water applications shall undergo inspection or overhaul at a service shop as follow, depending on the time they have been submerged in the hot water:

Temp.	Mode of Operation	Inspection	Shop Overhaul
≤ 70°C (160°F)	Continuous	1000 hours	4000 hours
≤ 70°C (160°F)	Intermittent	Twice a Year	Once a year
≤ 90°C (195°F)	Cont./Int.	6 times a year	Twice a year

Recommended Inspections

Inspection of

Visible parts on pump
and installation

Action

Replace or fix worn and damaged parts.
Make sure that all screws, bolts and nuts are tight.

Check the condition of carrying handle/lifting eyes, chains and wire ropes.

Check that the guide bars are vertical.

Pump casing and impeller

Replace worn parts if they impair function.

Wear on the outlet flange on the pump casing usually causes wear on the discharge connection.

Wear on the impeller and parts around it necessitates fine adjustment of the impeller or replacement of worn parts. See “Replacing the impeller”.

Oil quantity

WARNING. If the seal leaks, the oil casing may be under pressure. Hold a rag over the oil casing screw in order to prevent splatter. See “Safety Precautions” for additional information.

Check that the oil reaches up to the oil hole. Add oil as needed. See “Changing the Oil.”

Condition of the oil

A check of the condition of the oil can show whether there has been an increase leakage. Note: Air/oil mixture can be confused with water/oil mixture.

Insert a tube (or hose) into the oil hole. Cover the top end of the tube and take up a little oil from the bottom.

Change the oil if it contains too much water, i.e., is heavily emulsified (cream-like), or if the oil housing contains separated water. See “Changing the Oil”. Check again once week after changing the oil.

If the oil contains too much water again, the fault may be:

- that an oil screw is not sufficiently tight.
- that an O-ring or its sealing surface is damaged.
- that the lower mechanical seal is damaged.

Liquid in the stator casing

WARNING. If there has been leakage, the stator casing may be under pressure. Hold a rag over the inspection screw in to prevent splatter. See “Safety Precautions” for additional information.

Turn the pump so the inspection hole faces downwards.

Tilt the pump so that any liquid in the stator casing can run out through the hole.

If there is water in the stator casing, the cause may be:

- that an O-ring is damaged.
- that the cable entry is leaking.

If there is oil in the stator casing, the cause may be:

- that the inner mechanical seal is damaged.

Inspection of

Cable Entry

Action

Make sure that the cable clamps are tight.

If the cable entry leaks:

- check that the entry is firmly tightened into its bottom-most position.
- cut a piece of the cable off so that the seal sleeve closes around a new position on the cable.
- replace the seal sleeve.
- check that the seal sleeve and the washers conform to the outside diameter of the cables.

Cables

Replace the cable if the outer jacket is damaged. Make sure that the cables do not have any sharp bends and are not pinched.

Level sensors or other level equipment

Check function. Clean, adjust, replace or repair damaged level sensing equipment. Follow the instructions for the level sensing equipment in question.

NOTE. The level sensor contains a mercury switch. Damaged sensors should be disposed of in a proper manner.

Starter equipment
Monitoring equipment
(should be checked often)

If faulty, contact an electrician.

Check:

- signals and tripping function.
- that relays, lamp, fuses and connections are intact.

Replace defective equipment.

Rotation direction of pump
(requires voltage)

Transpose two phase leads if the impeller does not rotate clockwise as viewed from above. Rotation in the wrong direction reduces the capacity of the pump and the motor may be overloaded. Check the direction of rotation, during non-load every time the pump is reconnected.

Pipes, valves and other peripheral equipment

Repair faults.

Insulation resistance in the stator

Use insulation tester. With a 1000 V-DC megger the insulation between the phases and between any phase and ground should be $> 1 \text{ M}\Omega$.

Maintenance

Changing the Oil

Oil casing

WARNING. If the seal leaks, the oil casing may be under pressure. Hold a rag over the oil plug to prevent splatter.

1. Lay the pump on its side on a bench or over two supports.
2. Unscrew the oil casing screw.
3. Turn the pump so that the oil hole faces downwards. In order to get out all the oil, the pump must be raised upright for a short while during drainage.
4. Fill up with 0.18 quarts of SAE 10W-30 motor oil. Always replace the O-rings of the oil hole screws. Put the screws back and tighten them.
5. A paraffin oil approved by authorities (e.g. Mobil Whiterex 309) is recommended for raw or clean water pumping.

Replacing the wear ring

When the clearance between the impeller skirt and the pump casing exceeds 0.08 in, the following replacement must be made.

Replacing the wear ring in the pump casing

1. Disconnect and lift off the motor section from the pump casing.
2. Knock out the wear ring using a chisel.
3. Remove the wear ring.
4. Drive in the new wear ring. Use a rubber mallet or wooden block to prevent deformation.

The work will proceed more easily if the pump casing is first heated and/or the wear ring cooled.

Replacing the impeller

Removing the impeller

WARNING. Worn impellers often have very sharp edges.

1. Remove bolts and lift the motor section of the pump casing.
2. Lay the motor section on its side.
3. Remove the impeller screw.
4. Pull off the impeller. (Use impeller puller or two strong screwdrivers.)

Installing the impeller

1. Make sure that the end of the shaft is clean and free of burrs. Polish off any flaws with fine emery cloth.
2. Clean and oil all sealing surfaces and O-rings.
3. Check that the conical sleeve is seated on the shaft.
4. Grease end of shaft and impeller hub.
5. Mount the impeller and tighten the impeller screw.
6. Check that the impeller can be rotated by hand.
7. Fit the motor section to the pump casing. Make sure that the pump casing has the right orientation.

Troubleshooting

A universal instrument (VOM), a test lamp (continuity tester) and a wiring diagram are required in order to carry out troubleshooting on the electrical equipment.

Troubleshooting shall be done with the power supply disconnected and locked off, except for those checks which cannot be performed without voltage.

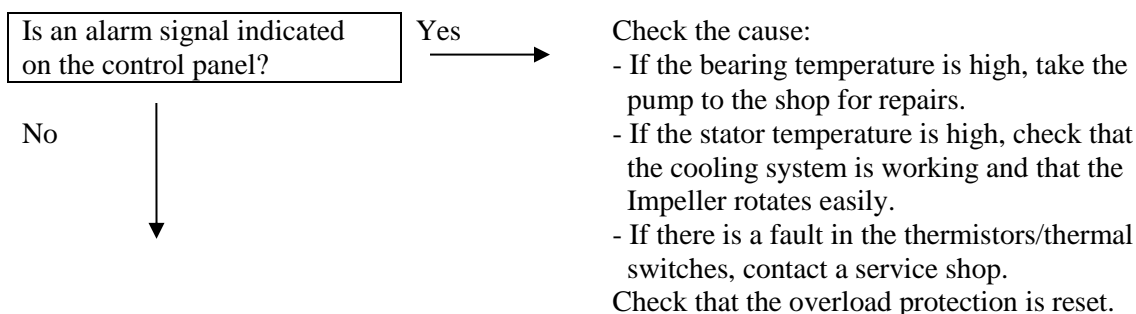
Always make sure that there is no one near the pump when the power supply is turned on.

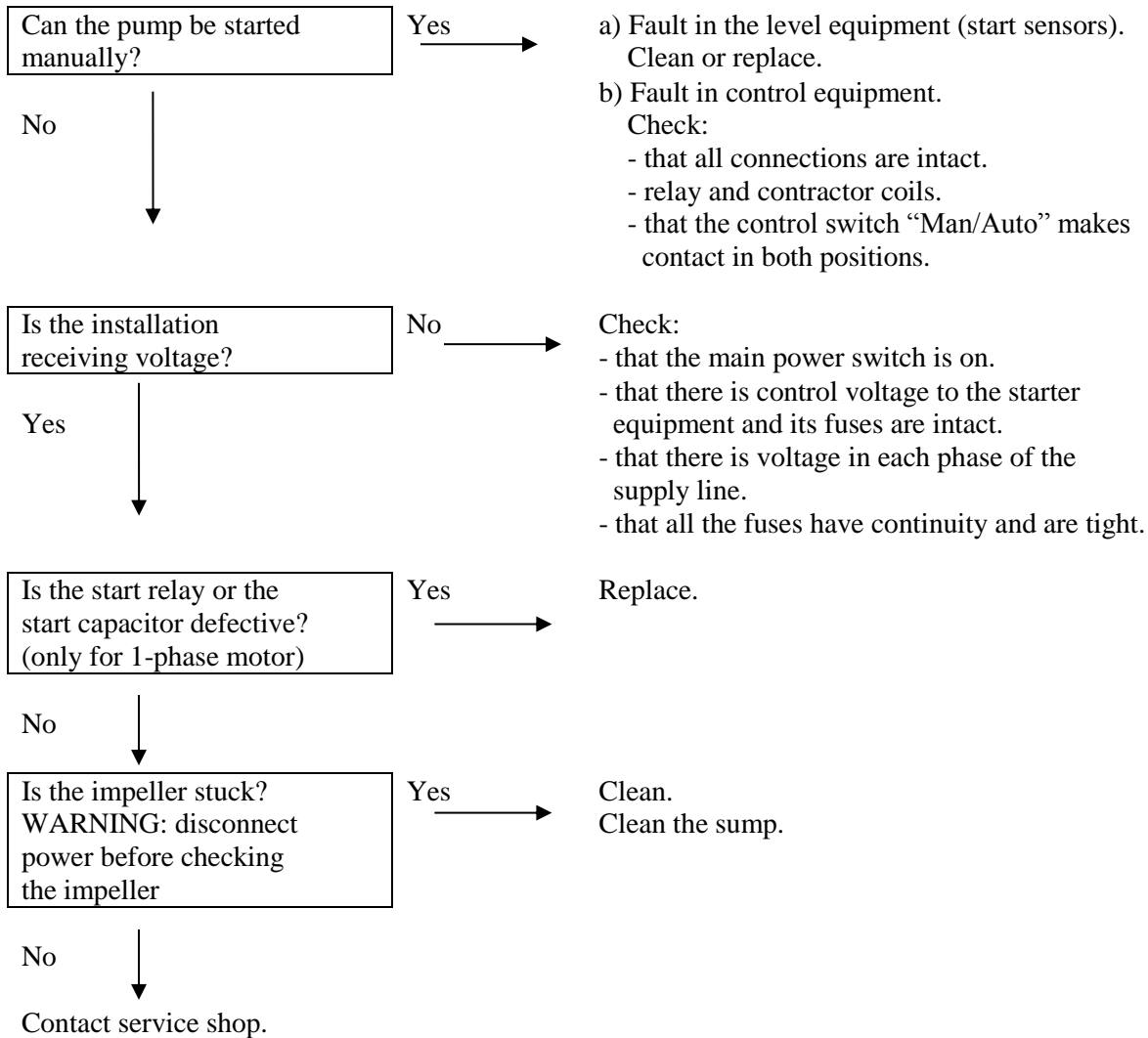
Use the following checklist as an aid to troubleshooting. It is assumed that the pump and installation have formerly functioned satisfactorily.

Electrical work shall be performed by an authorized electrician.

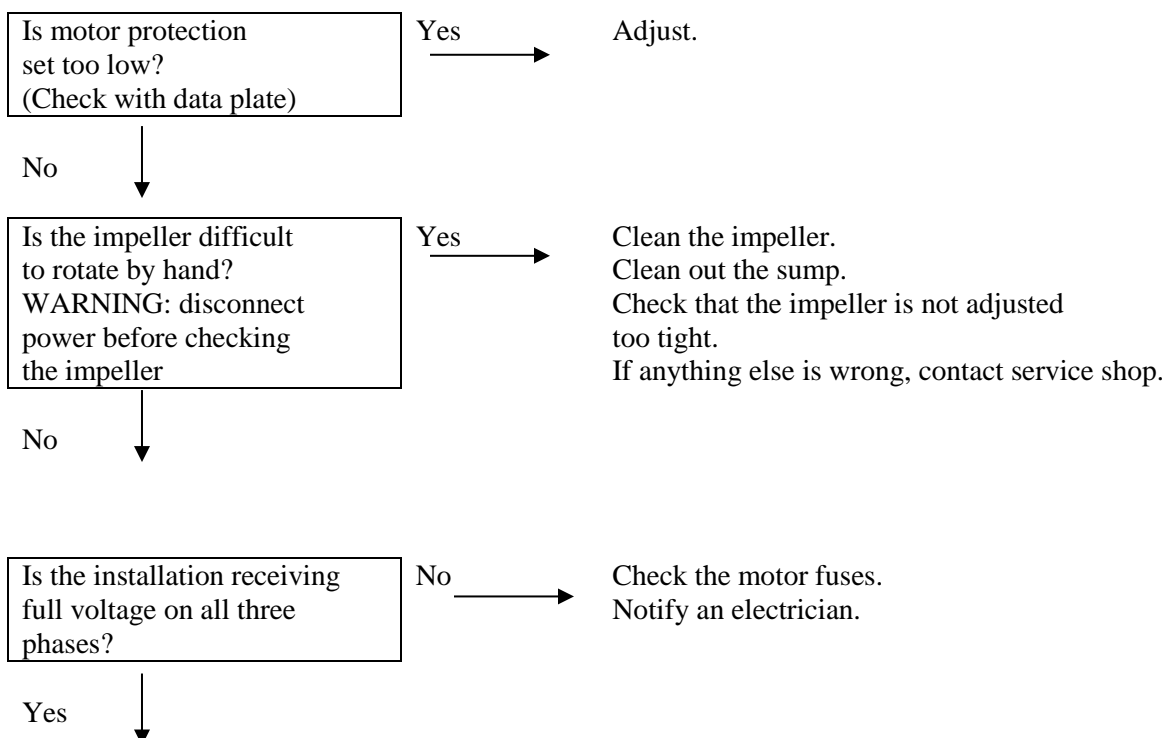
Follow local safety regulations and observe recommended safety precautions.

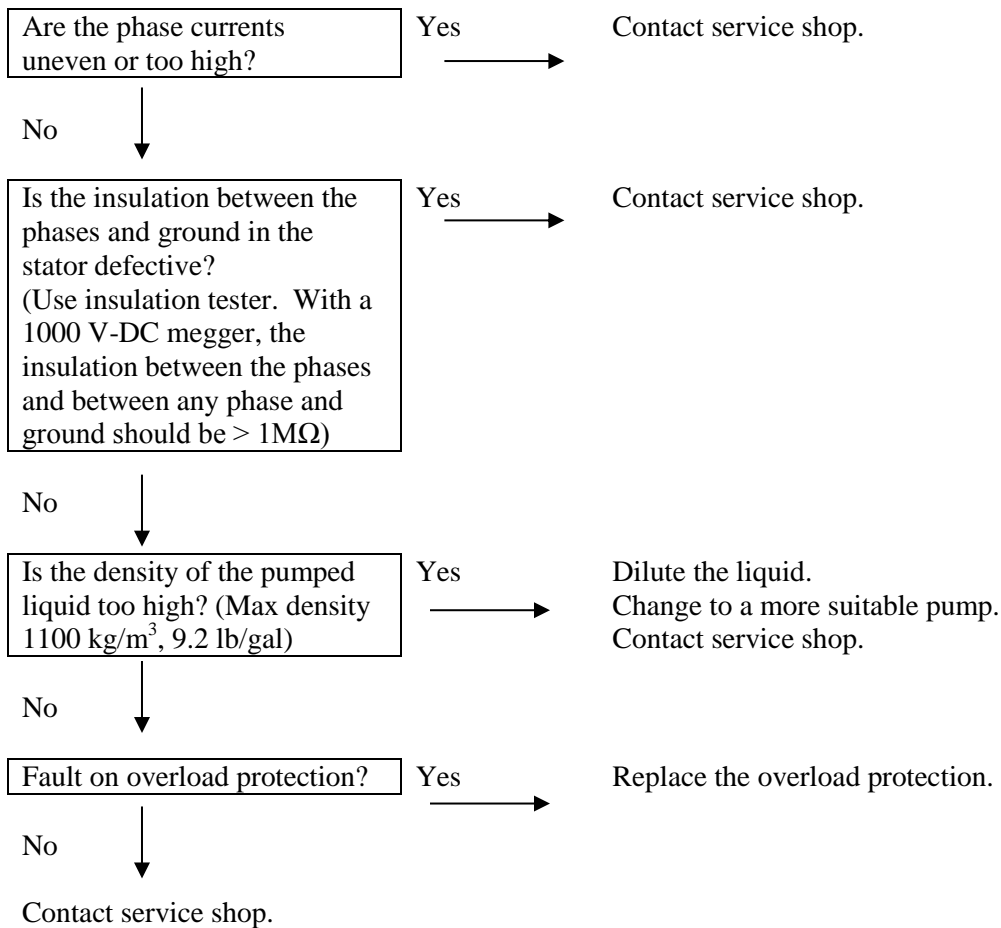
1. Pump fails to start



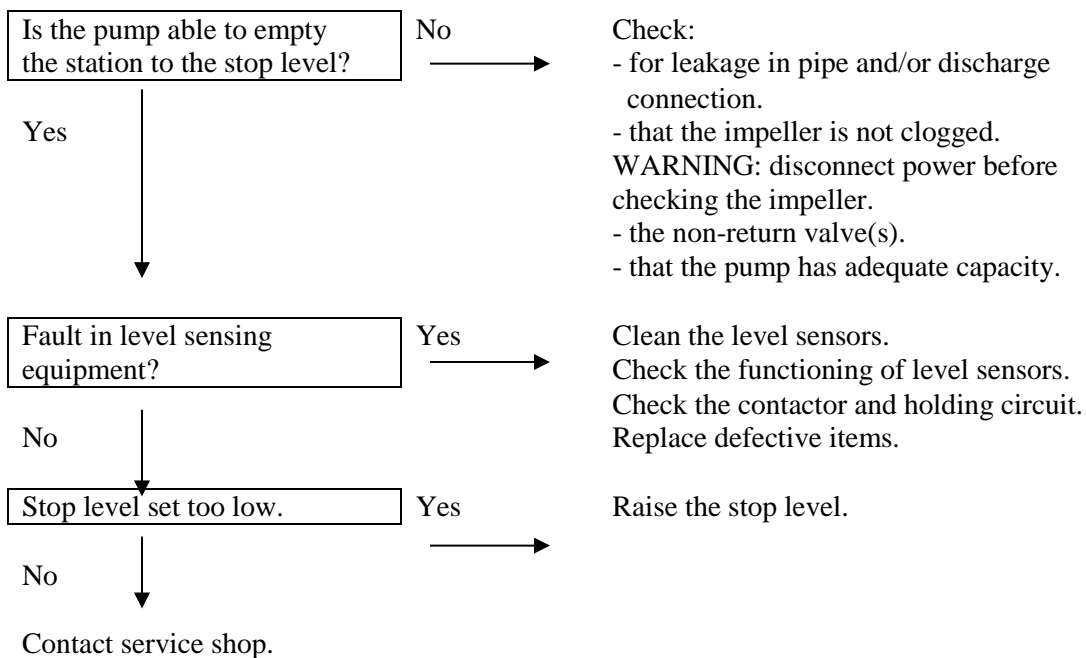


2. Pump starts but motor protection trips

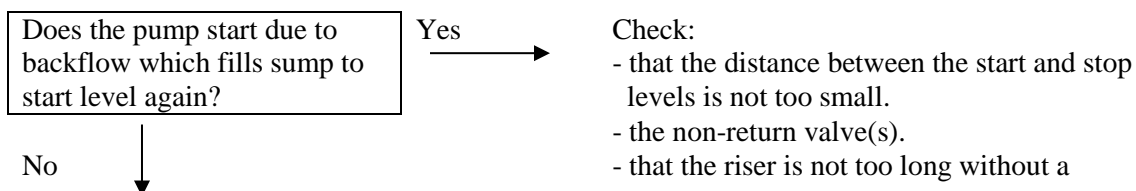




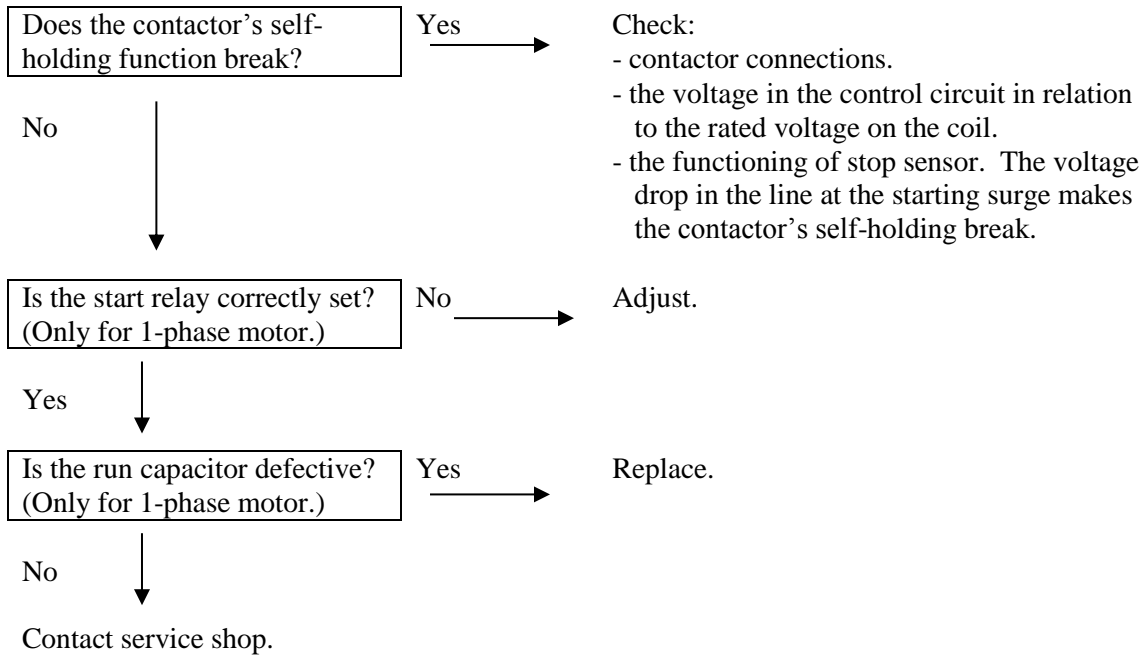
3. The pump does not stop.



4. The pump starts-stops-starts in rapid sequence



non-return valve.



5. Pump runs but delivers too little or no water.

Check:

- direction of rotation pump.
- that valves are open and intact.
- that pipes, impeller and strainer are not clogged.
- that the impeller rotates easily.
- that the suction lift has not been altered.
- for leakage in the pump installation.
- for wear on wear ring, impeller, pump casing/flange, suction bottom, diffuser, disc, diffuser.

See also under "Inspection".

Do not override the motor protection repeatedly if it has tripped.

FLYGT MP-3102 & 3127 PUMP

Safety Precautions

Before starting work on the pump, make sure that the pump is isolated from the power supply and cannot be energized.

NOTE! This applies to the control circuit as well.

The following points are important in connection with work on the pump:

- Make sure the pump has been thoroughly cleaned.
- Observe good personal hygiene.
- Beware the risk of infection.
- Follow local safety regulations.

The pump is designed for use in liquids which can be hazardous to health. In order to prevent injury to the eyes and skin, observe the following points when working on the pump:

- Always wear goggles and rubber gloves.
- Rinse the pump thoroughly with clean water before starting work.
- Rinse the components in water after disassembly.
- The oil housing may be under pressure. Hold a rag over the oil casing screw (oil plug) and the inspection screw to prevent splatter.

Proceed as follows if you get hazardous chemicals in your eyes:

- Rinse immediately in running water for 15 minutes. Hold your eyelids apart with your fingers.
- Contact an eye specialist.

On your skin:

- Remove contaminated clothes.
- Wash your skin with soap and water.
- Seek medical attention, if required.

Inspection

Regular inspection and preventive maintenance ensure more reliable operation.

The pump should be inspected after 2000 hours of operation or at least once a year, more frequently under severe operation conditions.

Under normal operating conditions, the pump should have a major overhaul in a service shop after 6000 hours of operation or every three years.

When the pump is new or when the seals have been replaced, inspections are recommended after one week of operation.

Recommended Inspections

Inspection of

Visible parts on pump
And installation

Action

Replace or fix worn and damaged parts.
Make sure that all screws, bolts and nuts are tight.

Check the condition of carrying handle/lifting eyes, chains and wire ropes.

Check that the guide bars are vertical.

Pump casing and impeller

Replace worn parts if they impair function.

If the clearance between the impeller skirt and the pump casing exceeds 0.08 in, see "Replacing the wear ring".

Inspection of

Action

	<p>Wear on the outlet flange on the pump casing usually causes wear on the discharge connection.</p>
Oil quantity	<p>WARNING. If the seal leaks, the oil casing may be under pressure. Hold a rag over the oil casing screw in order to prevent splatter. See “Safety Precautions” for additional information.</p> <p>Check that the oil reaches up to the oil hole when the pump is lying down.</p> <p>Add oil as needed. See “Changing the Oil.”</p>
Condition of the oil	<p>A check of the condition of the oil can show whether there has been an increase leakage. Maximum permissible leakage of 0.05 ml/h (0.0017 oz/h). (Note: Air/oil mixture can be confused with water/oil mixture.)</p> <p>Insert a tube (or hose) into the oil hole. Cover the top end of the tube and take up a little oil from the bottom.</p> <p>Change the oil if it contains too much water, i.e., is heavily emulsified (cream-like), or if the oil housing contains separated water. See “Changing the Oil”. Check again once week after changing the oil.</p> <p>If the oil contains too much water again, the fault may be:</p> <ul style="list-style-type: none">▪ that an oil screw is not sufficiently tight.▪ that an oil screw O-ring or its sealing surface is damaged.▪ that an O-ring or its sealing surface is damaged.▪ that the lower seal is damaged.
Cable Entry	<p>Make sure that the gland screw is tight.</p> <p>If the cable entry leaks:</p> <ul style="list-style-type: none">▪ check that the entry is tightened so it bottoms out.▪ cut a piece of the cable off so that the seal sleeve closes around a new position on the cable.▪ replace the seal sleeve.▪ check that the seal sleeve and the washers conform to the outside diameter of the cables.
Cables	<p>Replace the cable if the outer jacket is damaged. Make sure that the cables do not have any sharp bends and are not pinched.</p>
Level sensors or other level equipment	<p>Check function. Clean, adjust, replace or repair damaged level sensing equipment. Follow the instructions for the level sensing equipment in question.</p> <p>NOTE! The level sensor contains a mercury switch. Damaged sensors should be disposed of in a proper manner.</p>
Starter equipment	<p>If faulty, contact an electrician.</p>
Monitoring equipment (should be checked often)	<p>Check:</p> <ul style="list-style-type: none">- signals and tripping function.- that relays, lamp, fuses and connections are intact. <p>Replace defective equipment.</p>

Inspection of

Rotation direction of pump
(requires voltage)

Action

Transpose two phase leads if the impeller does not rotate clockwise as viewed from above. Rotation in the wrong direction reduces the capacity of the pump and the motor may be overloaded. Check the direction of rotation every time the pump is reconnected.

Pipes, valves and other
Peripheral equipment

Repair faults.

Insulation resistance in the stator

Use insulation tester. With a 1000 V-DC megger the insulation between the phases and between any phase and ground should be $> 1 \text{ M}\Omega$.

Maintenance

Changing the Oil

Oil casing

WARNING. If the seal leaks, the oil casing may be under pressure. Hold a rag over the oil plug to prevent splatter.

1. Lay the pump on its side on a bench or over two supports.
2. Unscrew the oil casing screw (OIL OUT).
3. Turn the pump so that the oil hole faces downwards. It is easier to drain the oil if the other oil hole screw is also removed.
4. Fill up with 1.06 quarts (3102), 2.45 quarts (3127) of new oil (OIL IN). Always replace the O-rings under the oil casing screw. Put the screws back and tighten them.

Use the following oil or their equivalent:

BP, Energol TOU 10W-30

Castrol, Castrolite 10W-30

Esso Extra Motor Oil 10W-30

Gulf Multi G 10W-30

Mobil Delvac Oil 1210

Delvac special 10W-30

Shell, Tractor Oil Universal 10W-30

Tellus T Oil 27

Shell Clavus Oil 27

Texaco Havoline Motor Oil 10W-40

Mobil Whiterex 309 or an equivalent paraffin oil is recommended for raw or clean water pumping.

Replacing the wear ring

When the clearance between the impeller skirt and the pump casing exceeds 0.08 in, the following replacement must be made.

Replacing the wear ring in the pump casing.

1. Disconnect and lift off the motor section from the pump casing.
2. Knock out the wear ring using a chisel.
3. Drive in the new wear ring. Use a rubber mallet or wooden block to prevent deformation.

The work will proceed more easily if the pump casing is first heated and/or the wear ring cooled.

Assembly

Before assembling the pump, check the O-ring and fit it in place.

Replacing the impeller

Removing the impeller

WARNING. Worn impellers often have very sharp edges.

1. Remove bolts and lift the motor section of the pump casing.
2. Lay the motor section on its side.
3. Remove the impeller screw.
4. Pull off the impeller. (Use impeller puller.)

Installing the impeller

1. Make sure that the end of the shaft is clean and free of burrs. Polish off any flaws with fine emery cloth.
2. Clean and oil all sealing surfaces and O-rings.
Check:
 - that the key is seated in the keyway on the shaft (3127).
 - that the conical sleeve is seated in the impeller hub (3102).
3. Push the impeller onto the shaft.
4. Place washer on the impeller screw.
5. Tighten the impeller screw.

Installing the impeller, 3102 LT and LL version

Check that the whole sleeve is seated inside the impeller hub.

Push the impeller onto the shaft only so far as to allow the screw and washer to be screwed onto the shaft end.

Press the impeller onto the shaft with the impeller screw and tighten to the right torque.

Check that the impeller can be rotated by hand.

Fit the motor section to the pump casing. Make sure that the pump casing has the right orientation.

Don't forget the O-ring.

Replacing the impeller on HS 3127

Removing the impeller (HS 3127)

WARNING. Worn impellers often have very sharp edges.

1. Lay the pump on its side.
2. Remove the nuts.
3. Remove the lower diffuser.
4. Remove the impeller screw.
5. Pull off the impeller by screwing a screw into the threaded washer.

Fitting the impeller (HS 3127)

Make sure that the end of the shaft is clean and free of burrs. Polish off any flaws.

1. Grease the end of the shaft and impeller hub.
2. Press the impeller onto the shaft with the impeller screw.
3. Tighten the impeller screw.

Adjusting the impeller (HS 3127)

1. Screw the adjusting nuts down toward the bottom of the studs.
2. Press the lower diffuser against the impeller.
3. Screw the adjusting nuts so that they lie flush against the lower diffuser.

4. Back off all adjusting nuts another half-turn (anti-clockwise).
5. Place the lower nuts on the studs.
6. Tighten the lower nuts evenly all around.

The clearance between the impeller and the lower diffuser shall be as little as possible.

Check that the impeller can easily be rotated by hand.

In order for the pump to perform at maximum capacity, the impeller must be adjusted regularly.

Troubleshooting

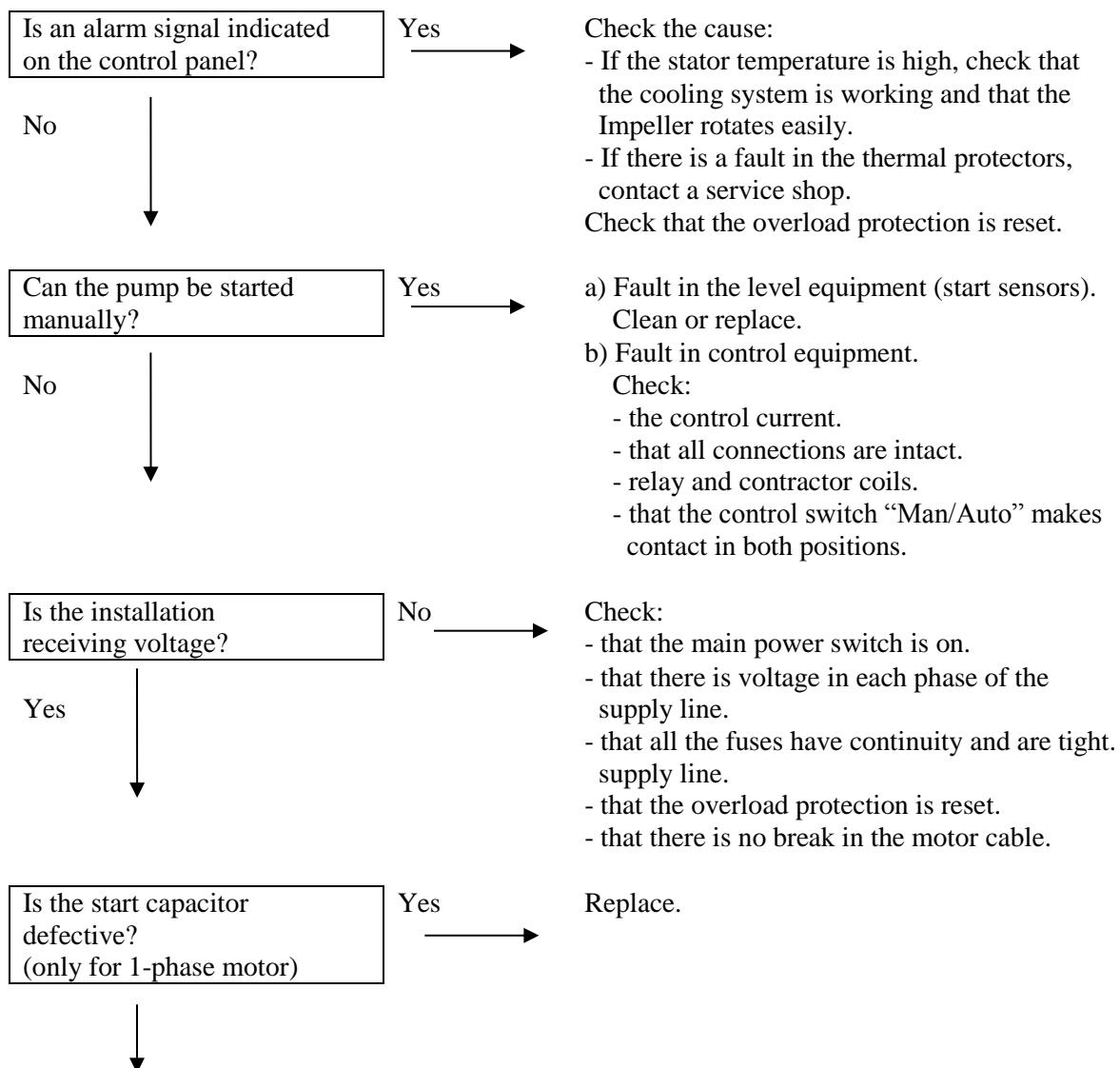
A universal instrument (VOM), a test lamp (continuity tester) and a wiring diagram are required in order to carry out troubleshooting on the electrical equipment.

Troubleshooting shall be done with the power supply disconnected and locked off, except for those checks which cannot be performed without voltage.

Always make sure that there is no one near the pump when the power supply is turned on.

Use the following checklist as an aid to troubleshooting. It is assumed that the pump and installation have formerly functioned satisfactorily. Electrical work shall be performed by an authorized electrician. Follow local safety regulations and observe recommended safety precautions.

1. Pump fails to start



No

Is the impeller stuck?
WARNING: disconnect power before checking the impeller

Yes

Clean.
Clean the sump.

No

Contact service shop.

2. Pump starts but motor protection trips

Is motor protection set too low?
(Check with data plate)

Yes

Adjust.

No

Is the impeller difficult to rotate by hand?
WARNING: disconnect power before checking the impeller

Yes

Clean the impeller.
Clean out the sump.
Check that the impeller is not adjusted too tight.
If anything else is wrong, contact service shop.

No

Is the installation receiving full voltage on all three phases?

No

Notify an electrician.

Yes

Are the phase currents uneven or too high?

Yes

Contact service shop.

No

Is the insulation between the phases and ground in the stator defective?
(Use insulation tester. With a 1000 V-DC megger, the insulation between the phases and between any phase and ground should be $> 1M\Omega$)

Yes

Contact service shop.

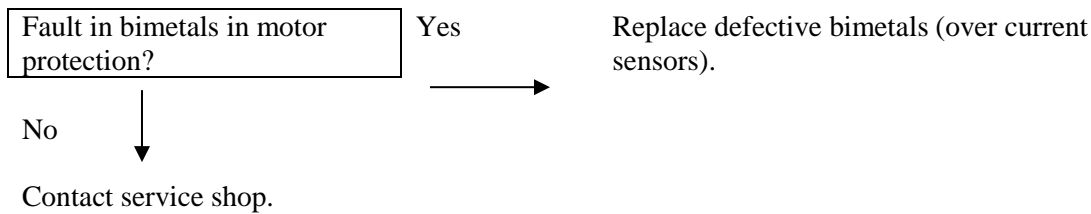
No

Is the density of the pumped liquid too high? (Max density 1100 kg/m^3 , 70 lb/ft^3)

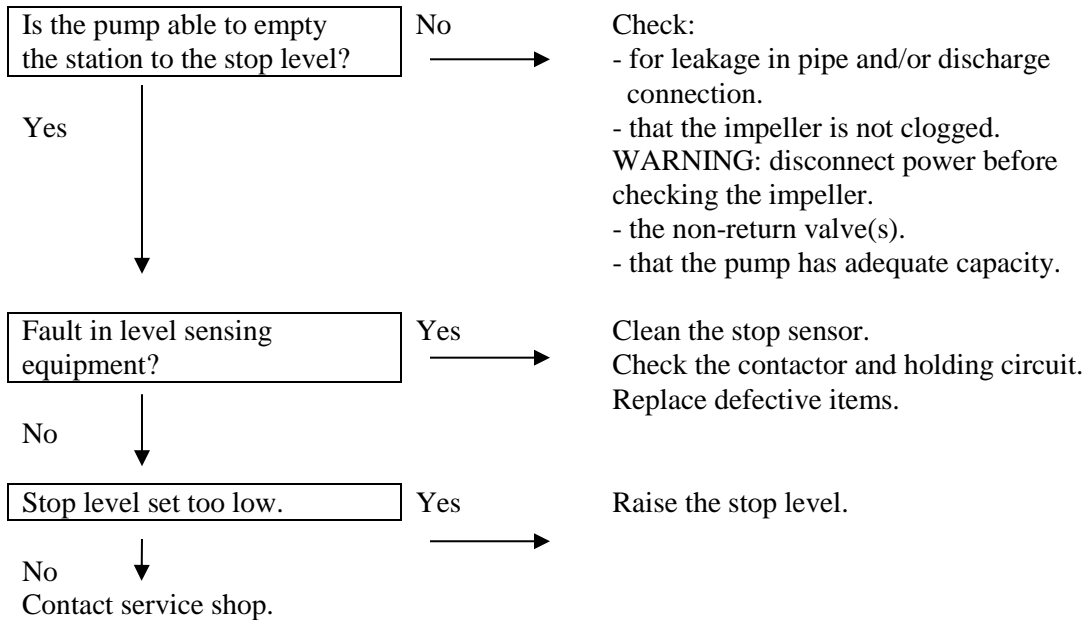
Yes

Dilute the liquid.
Change to a more suitable pump.
Contact service shop.

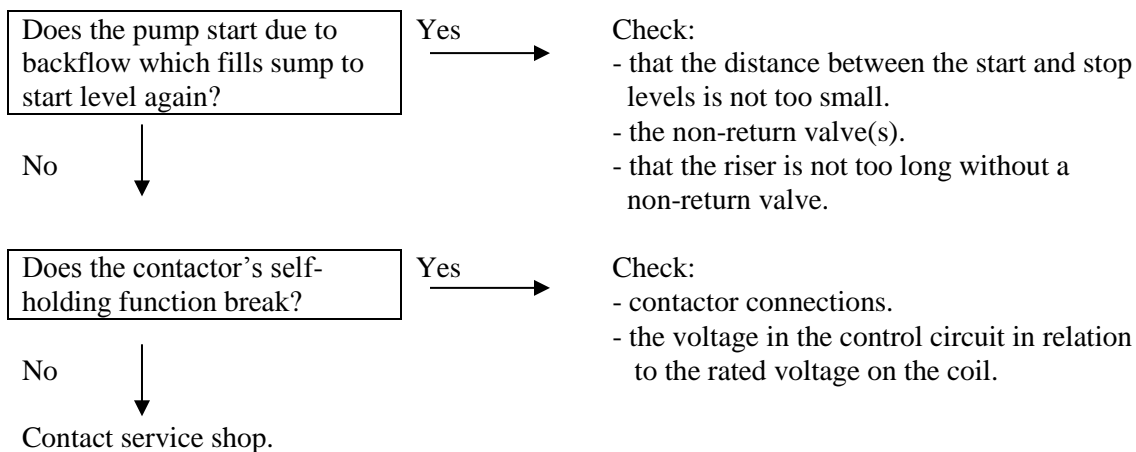
No



3. The pump does not stop.



4. The pump starts-stops-starts in rapid sequence



5. Pump runs but delivers too little or no water.

Check:

- direction of rotation pump.
- that valves are open and intact.
- that pipes, impeller and strainer are not clogged.
- that the impeller rotates easily.
- that the suction lift has not been altered.
- for leakage in the pump installation.
- for wear on wear ring, impeller, pump casing/flange, suction bottom, diffuser, disc, diffuser.

See also under "Inspection".

Do not override the motor protection repeatedly if it has tripped.

HYDROMATIC SPD50H/100H PUMP

Pump Servicing

Read the following instructions carefully before replacing any parts. Reasonable care and safe methods should be practiced.

Tools Required

General tools include socket wrenches and a bearing puller. An ohmmeter is required to thoroughly check motor and wiring.

For proper automatic operation, make sure the pump power cord is plugged into the piggyback receptacle on the float switch cord.

Before removing the pump from its installation for repairs, check first to see if the trouble is caused by:

1. Miswiring of the pump into the terminal block.
2. Miswiring of the float level controls into the panel.
3. Miswiring inside the control panel.
4. Trip circuit breaker. If the breaker is manually reset and then trips off again, the problem could be:
 - a. short circuit in motor of control panel
 - b. water in the motor housing
 - c. insufficient amp capacity of wiring or breakers
 - d. improper panel wiring
5. Tripped overload. If the overload is manually reset and then trips off again, the problem could be:
 - a. pump or piping is clogged
 - b. pump motor or bearings may be defective
 - c. start capacitor in motor may have failed
 - d. pump may be misfired to terminal block
 - e. head is lower than rating, pumping too much liquid
6. Air locked pump. Disconnect piping at union and run until all air bubbles are expelled.
7. Wrong impeller rotation. Rotation should be counter-clockwise when looking at the impeller. Correct improper rotation on three phase pumps by reversing any two line leads. No rotation check is necessary on single phase pumps.
8. Closed discharge gate valve.
9. Plugged impeller or pipeline.
10. Discharge head may be too high. Check elevation against design point of pump.
11. Floats not hanging free in the sump.
12. Malfunctioning floats.

Disconnect power supply.

Checking Power Chord

To be sure wires are not burned off or broken in cord, use ohmmeter for check. Set ohmmeter scale pointer to R x 1 scale and attach one meter lead to white cord wire and one meter lead to black cord wire, then place a screwdriver blade across terminals of plug. If cord is OK, meter needle will go to zero and stay there. If meter needle does not move, this will indicate an open wire and cord must be replaced.

Motor

Warning: Be certain power to pump is off! Disconnect pump power cord from terminals in control panels (manual pump models) and power source (automatic models) and remove pump from sump.

1. Clean any dirt or trash from the outside of the pump before dismantling.

If the unit is being operated by float or diaphragm switch, unplug the pump from the piggyback receptacle and plug the pump directly into the power source. If the pump starts each time it is plugged directly into the receptacle and does not start each time when plugged into the piggyback switch with the float raised or the diaphragm switch pressed into the start position, replace the complete piggyback switch assembly and retest with new assembly.

2. If motor does not run when tested as described above, the capacitor and/or stator must be checked.

Disconnect from power supply.

Remove plug from top of housing and pour oil into container, preferable clear, so that oil can be observed.

3. If oil is clear, it will indicate motor is not burned and there has been no water leak into the motor. If oil is cloudy, it will indicate water in motor, or, if oil is black, it will indicate a burned stator.
4. After draining oil, carefully loosen the power cord assembly from the motor housing. With power cord loose, remove the four wire nuts and screws and carefully lift off the motor housing exposing the capacitor (1Ø only) and motor assembly.
5. On single phase (1Ø) units, check capacitor using ohmmeter. With ohmmeter scale set at R x 1000, attach meter leads to capacitor. The meter needle should go to zero and come back slowly. If it does not, the capacitor should be replaced.
6. To check motor stator, remove power cord leads from terminal bushings on top of motor (1Ø only; 3Ø remove wire nuts). If stator is visibly burned, motor assembly must be replaced.
7. *Ground check* on stator should be performed using ohmmeter with scale set at R x 100 and checking meter by putting both meter leads together and adjusting the needle know until meter reads zero. If meter cannot be adjusted to zero, it will indicate that batteries in meter must be replaced. Always make this test with the meter when scale pointer is set to a new scale before making any checks on the motor.

Now connect one meter lead to one terminal of stator and touch and other meter lead to motor stator shell. If needle on ohmmeter goes completely zero, the motor probably has a wire touching the stator at some point and the motor assembly will have to be replaced.

8. *Winding resistance test* should be performed if the ground test is satisfactory. Use ohmmeter with scale pointer set on R x 1 scale. On this scale, meter reads directly on ohms. Always check the meter with leads together as described above under Ground Check test before making a reading of the winding.

Connect one motor lead to the white wire terminal and the other meter lead to the black wire terminal. This reading is for the main winding. If the readings obtained do not agree with those give below, the stator is defective and the motor assembly must be replaced.

Reconnect the wires as they were removed.

	RESISTANCE					
	SPD50H			SPD100H		
	1Ø Start	1Ø Main	3Ø Bal.	1Ø Start	1Ø Main	3Ø Bal.
115V	6.53	1.90	-	-	-	-
230V	6.53	3.80		5.06	3.06	9.7
460V	-	-		-	-	9.7

9. For three phase pumps, remove the power cord assembly by cutting the butt connection and wire nuts and remove the power cord from the pump.
10. Twist the three leads of one end of the power cord together. Then at the other end, with an ohmmeter, check any two leads. Also check the third lead with either of the first two. If a zero reading is indicated for any wire, the wire is broken and a new power cord assembly must be ordered.
11. If the winding is grounded, remove the pipe plug in the top of the pump and drain the oil into a cleaner container. A milky appearance to the oil will indicate that water has entered through worn or damaged seals or O-rings. If this is the case, the mechanical seals and all O-rings will have to be replaced.

Seal Housing

The pump is equipped with two mechanical seals mounted in tandem. The lower seal and the upper seal consist of a ceramic stationary seat and a carbon rotating ring.

As noted, if water is detected in the motor housing, inspect the power cord connection, pipe plug connections, O-rings, the motor housing itself, and the two mechanical seals.

There are two quarts of oil in the motor housing. This is a paraffin SE-40 process oil. The same oil is used in the seal housing between the two mechanical seals. To check the seals, remove the lower housing pipe plug and pour the oil out into a clean, preferably glass, container. Look for the milky color as noted previously.

If the oil is clear, the lower seal is still good. If this seal is damaged, water will seep in and continue to stain the oil, changing it from clear, to slightly discolored, to cloudy, and finally to a milky white.

Except for very rare instances, the motor will continue to be protected by the upper mechanical seal.

Lower Seal

If water is found in the seal chamber, the lower seal must be replaced. Separate the volute by removing the three cap screws holding the base to the upper volute.

Insert a large screwdriver in the slotted pump shaft and strike the impeller sharply with a plastic or rubber headed hammer. The impeller should spin free. The impeller holds the rotation carbon ring of the lower mechanical seal against the stationary ceramic seat by compressing a stainless steel spring.

When the impeller is removed, the spring will relax, allowing the carbon ring to be removed. There is a rubber sleeve (bellows) inside the spring which grips the pump shaft. This often restricts the spring and must be pried or pulled loose.

With the carbon ring, spring, and rubber sleeve removed, wedge the ceramic seat out of the housing. Be sure not to scratch or mar the pump shaft.

Upper Seal

1. To remove and replace the upper mechanical seal, the base, impeller, lower mechanical seal, and volute must be removed first. Drain the seal oil from the housing by removing pipe plug.
2. The rotating carbon ring and stainless steel spring are held in place by a snap ring and washer. Remove these.
3. Remove the four hex head stator bolts and lift the stator. A screwdriver can be inserted under the stator shell in order to remove the stator.
4. Bump the end of the shaft with a plastic hammer. This will push the rotating half of the mechanical seal from the shaft and also push the lower bearing from the seal plate. Now remove the shaft, rotor, and bearing assembly from the seal plate.
5. If water was found in the oil, the rotating and stationary halves of the mechanical seal must be replaced. Remove the stationary seal half by inserting a screwdriver into seal plate from the top and tapping lightly with a hammer.
6. Turning the bearing by hand: if it feels rough when turned or looks rusted, it should be replaced. Obtain a bearing puller to remove the bearing. If a puller cannot be replaced over the bearing, remove the outer face by cracking in a vise. Now the outer face and balls can be removed, allowing the inner face to be pulled.

Reassembly

1. Thoroughly clean the seal plate, particularly the seal and bearing pockets. All sand and dirt must be removed.
2. If the stationary seal half was removed, use a plastic pusher to press it into the housing. Make sure the rubber ring goes in first. Do not use any sharp objects that may damage the seal.
3. When installing a replacement bearing, press only on the inner face and make sure the bearing is flush against the snap ring. If a press is not available, the bearing can be tapped onto the shaft using a sleeve that bears only on the inner face. Pressing on the outer face will ruin the bearing.
4. Push the shaft, rotor and ball bearing assembly into the seal plate, being careful not to chip the ceramic of the stationary seal half.
5. Replace the stator if it is visibly burned or if the ground resistance test or the winding resistance test has failed. Note that the replacement stator must be of the same manufacturer as the existing rotor, or vice versa. Replace the four stator bolts.
6. Remove the old O-ring regardless of condition, and replace. Place the new O-ring over the seal plate shoulder. Do not roll it. If twisted water may enter chamber and cause failure.
7. Clean the motor housing thoroughly, then position it onto the seal plate.
8. Press the rotating seal half onto the shaft with the rubber ring facing the impeller.

Caution: Mixing old and new seal parts will cause immediate seal failure. When replacing seal, replace both the rotating and the stationary seal halves.

9. Reassemble the lower seal as described.
10. Add a drop of Loctite 222 to the shaft and screw the impeller on hand-tight. The impeller will force the rotating seal half into position.
11. Set the seal housing and motor housing assembly into the volute case and secure with four hex head screws.
12. To replace the power cord on single phase pumps as determined, first slip the stator lead wires through the holes in the wire seal assembly. Coat the cord grip threads with pipe dope or apply Teflon tape and screw the new power cord assembly into the motor housing. Secure wires together. Do not tape leads together as the hot oil will deteriorate the tape and cause motor failure.
13. Before filling the motor housing with oil, an air test should be performed. Apply 7 to 8 pounds of air pressure in the 1/4" NPT tap on the top of the motor cover and seal chamber.

Note: Too much pressure will damage the seal.

Then submerge the pump in water and check for leaks. If a leak occurs, isolate where it is coming from and correct the sealing part. If there are no leaks, fill the motor and seal housing with high grade transformer oil, such as Sohio Factopure SE40 or equivalent, to at least one inch below top of housing. Do not fill the motor housing completely - allow air space for expansion. Replace oil plugs. Turn pump on side and fill seal chamber to 1" from top. Replace plug and stand pump up.

14. Connect power cord wires to terminals in panel, or connect power source, and check pump running. Motor should run smoothly and be free of vibration.

Pump does not run or hum.

1. Line circuit breaker may be off, or fuse, if used, may be blown or loose.
2. Water level in sump may be too low. Run in more water.
3. Pump cord plug may not be making contact in receptacle.
4. If pump is using the series cord plug, the two plugs may not be plugged tightly together.
5. Float may be stuck. Be sure float operates freely in basin.
6. If all symptoms check OK, motor winding may be open; take to service center for check.

Pump runs but does not deliver water.

1. Check valve may be installed backward. Arrow in valve points in direction of flow.
2. Discharge gate valve, if used, may be closed.
3. Pump may be air locked. Start and stop several times by plugging and unplugging cord. Check vent hole in pump case for plugging.
4. Pump head may be too high. Pump cannot deliver water over (SPD50H) 50' or (SPD100H) 64' vertical. Pump must be sized to operating conditions.
5. Inlet in pump base may be clogged. Remove pump and clean out openings.
6. Impeller or volute openings may be plugged or partially plugged. Remove pump and clean per maintenance instructions.

Pump runs and pumps out sump but does not stop.

1. Float is stuck in *up* position. Be sure float operates freely in basin. Diaphragm vent tube in power cord may be blocked or bent. Clear obstruction.

Pump runs but delivers only small amount of water.

1. Pump may be air locked. Start and stop several times by plugging and unplugging cord. Check vent hole in pump case for plugging.
2. Pump head may be too high. Pump cannot deliver water over (SPD50H) 50' or (SPD100H) 64' vertical. Horizontal distance does not affect pumping, except loss due to friction.
3. Inlet in pump base may be clogged. Remove pump and clean out openings.
4. Impeller or volute openings may be plugged. Remove pump and clean.
5. Pump impeller may be partially clogged causing motor to run slow, resulting in motor overload.

Fuse blows or circuit breaker trips when pump starts.

1. Inlet in pump base may be clogged. Remove pump and clean out openings.
2. Impeller or volute openings may be plugged or partially plugged. Remove pump and clean.
3. Pump impeller may be partially clogged causing motor to run slow, resulting in motor overload.
4. Fuse size or circuit breaker is too small.
5. Defective motor stator: return to authorized Hydromatic service center.

Motor runs for short time, stops, the after short period starts again. Indicates overload caused by symptom shown.

1. Inlet in pump base may be clogged. Remove pump and clean out openings.
2. Impeller or volute openings may be plugged or partially plugged. Remove pump and clean.
3. Pump impeller may be partially clogged causing motor to run slow, resulting in motor overload.
4. Defective motor stator, return to Hydromatic service center.

If symptom is not found on chart, call authorized Hydromatic distributor or repair center for assistance.

HYDROMATIC LIQUIDATOR 2 HP GRINDER PUMP

Models: SPGW200M2-2, SPGW200M3-2

OPERATION

Starting the pump

To start the pump, perform the following steps in order:

1. If the motor is three phase, the rotation of the impeller must first be checked. With the pump removed from the basin and lying on its side with the inlet in view, quickly turn the pump on and then off.

WARNING: Keep hands and clothing away from cutter elements at all times.

The impeller should turn counterclockwise when viewed from the suction inlet opening. If the rotation is wrong, turn off the main breaker and interchange any two line leads to the motor in the control panel to correct the rotation.

If the pump is piped in permanently and the inlet cannot be observed, rotation will have to be checked by pump operation described later.

If pump is single phase, not rotation check is necessary.

2. Run water into sump until motor is covered.
3. Open valve in discharge line.
4. Turn pump on. If the pump runs and the water does not pump down, stop the pump and close the valve in the discharge line. Lift the pump until the sealing flange just clears the sealing face to allow trapped air to be vented. Lower the pump to its normal operating position, open the discharge valve, and start the pump.

(If the pump is pipes in permanently it may be necessary to loosen the union at the pump discharge to vent trapped air.)

5. If the pump is three phase, and it is piped in permanently, and still does not operate properly after venting, rotation is wrong and can be reversed by interchanging two line leads. (See 1 above.)
6. The level controls should be set so that the pump turns off when the liquid level is approximately two inches above the inlet and turns on when the level is approximately two inches above the top of the motor.

NOTE: All wire connections should be made by a qualified electrician. All local wiring codes must be observed. Be sure ground wire is connected to a good ground such as a water pipe per NEC and local codes.

REPAIR

Replacing Grinder Parts

1. Close valve in discharge line.
2. Turn off circuit breaker.

WARNING: NEVER work on a pump with the power on.

3. Remove pump from sump.

4. Unscrew the four hex head cap screws and remove pump base. Use care not to damage O-ring if it is to be reused.
5. Radial cutter and axial cutter are now exposed. If checking for clogging, these parts can now be cleaned and inspected without removing them from the shaft.
6. Cutter ring and axial cutter can be inverted to bring into use new surfaces, if not previously done, to double the cutter life.

If it is necessary to replace the cutters, (or invert them) remove the three screws and remove cutter ring from pump base.

Remove the screw, the washer and the radial cutter from the shaft. The axial cutter lifts off of the impeller and is made to rotate with the impeller by use of a roll pin. Remove impeller from shaft in same manner as radial cutter and remove shim(s). Remove snap ring.

7. Clean all parts thoroughly before proceeding with assembly. Replace shim(s), replace impeller, roll pin, axial cutter, radial cutter and secure with the washer and screw.
8. Proper clearance between pump base and impeller blades is .018 to .030. This spacing is controlled through use of shim(s).
9. Replace cutter ring in pump base and three screws. Tighten screws.
10. Replace O-ring in pump base and assemble to unit with the four capscrews, lockwashers and nuts.

WARNING: Keep hands and clothing clear of cutter elements at all times.

11. Turn power on and operate pump for a few seconds only to be sure parts are not rubbing.

Replacing Seals and Bearings

The Liquidator uses a water filled design motor. Seals should not require replacement until you replace the bearings or generally rebuild the motor due to normal wear.

1. Remove cutters, impeller and pump parts as described under "Replacing Grinder Parts".

NOTE: When volute with bearing or upper end cap are removed the motor fill fluid will spill out.

2. The two lip seals can now be removed using packing hooks. Check for wear of the sleeve bearing integrally molded into volute or wear on the shaft at journal areas of shaft/rotor assembly at this time. If wear indicates replacement of bearings or shaft, further disassembly is required. To replace the two lip seals at this time, assure that the parts are clean and place the seals in their proper location before reassembly.
3. To access the lower bearing in volute remove the four screws and washers. Remove the volute with bearing from the shaft. Just above the radial bearing will be found the thrust bearing assembly. It consists of a thrust shoe retainer, three thrust shoe segments, a carbon disc and a retainer washer. Note that two O-rings are used on the volute with bearing assembly.
4. The rotor and shaft assembly can now be removed. Note that there is an up-thrust washer(s) used on top of the rotor.

To access the upper bearing housing, remove the four capscrews and washers from the upper end cap. You will now be able to lift off the rubber breather diaphragm that contains the filter. Visible now will be the top of the motor shaft, if not removed earlier, and the bearing housing. Pull the bearing housing up to remove. (Some force may be required due to pressure of O-ring seals.) Note positions of O-rings. Note also that the stator is now free from all other parts.

Disassembly is now complete.

5. To reassemble, clean and inspect all parts. Replace any that show evidence of wear. Starting with the volute with bearing, insert the two lip seals in the housing. With the volute bearing not turned up, install the thrust shoe retainer, three thrust shoe segments, a carbon disc and retainer washer. Carefully insert rotor and shaft to prevent carbon disc damage, splined end down, through the thrust bearing group and the lip seals. On the top of the rotor shaft, replace the up-thrust washer(s) with the same thickness. Place O-rings in their proper grooves and lubricate to prevent cutting. Lower the stator over what is now the thrust bearing assembly (make sure that the cord receptacle is up). The stator must engage the bossed ring at one of the volute fastening through holes. Note this bossed ring will only engage one of two recesses in the stator bottom end ring.

WARNING: Failure to engage one of the two recesses, at fastening insert, 4 inserts total, will prevent proper assembly and cause bearing and cutter damage. Fasten from the bottom with four socket head capscrews and washers. Install O-ring in upper groove of stator. Install O-ring in groove bearing housing. Fill the motor with Hydromatic Liquidator Fill. (Water can be used if not allowed to freeze during storage or transportation.)

Rotate shaft during fill process to eliminate trapped air.

Insert bearing housing into stator and over shaft using care with placement of O-rings. Some fluid will be displaced by the bearing housing assuring complete filling.

NOTE: Do not allow fill fluid to remain in cable plug receptacle. This receptacle must remain completely dry at all times.

Install breather with filter over bearing housing. Place upper cap in line with receptacle opening and secure with four cap screws and washers. Install snap ring on shaft above spline and replace shims. Place impeller on shaft and push roll pin into opening of impeller. Place axial cutter on shaft and index to the roll pin. Add the radial cutter and secure with washer and screw. Place cutter ring into base and secure with three screws. Attach base with four cap screws, lock washers and nuts.

6. Plug pump into power and operate for two seconds maximum to be sure parts are not rubbing.

Trouble Check List

Below is a list of troubles and their probable causes.

Little or No Liquid Delivered

1. Pump air bound
2. Discharge head too high
3. Pump or piping plugged
4. Wrong rotation
5. Speed too low
6. Pump parts worn
7. Incorrect impeller diameter

Insufficient Discharge Pressure

1. Wrong rotation
2. Air or gases in liquid
3. Impeller damaged
4. incorrect impeller diameter
5. Speed too slow

Pump Overloads Motor

1. Wrong rotation
2. Specific gravity or viscosity of liquid too high
3. Head lower than rating; pumping too much liquid
4. Pump clogged
5. Defective bearings
6. Defective impeller

Pump is Noisy

1. No axial clearance between impeller and volute
2. No axial clearance between cutter ring and axial cutter
3. No diametrical clearance between radial cutter and cutter ring

It is recommended that the pump and system be inspected at least annually to assure proper and efficient operation.

Pump Motor Data

The following information should be completed at start up. It can also be used to locate trouble after unit is in service.

1. Never lift or carry the pump by using the power cord as a handle.
2. Inspect the equipment visually for any damage.
3. Check the nameplate to be sure of information.
4. Check the voltage and phase rating of the motor against the proposed power source.
5. Perform continuity and insulation tests with an ohmmeter according to the following steps:
 - a. Set selector knob on R x 1.
 - b. Clip leads together and adjust zero ohms knob until the needle is over the 0 (zero). Always “zero” the meter before every use and every time the selector switch is changed.
 - c. Unclip leads and clip to wires to be tested.
 - d. Attach ohmmeter leads to motor leads per chart below, and compare readings.
 - e. A reading more than three times shown indicates a possible burned (open) winding or a loose connection.
 - f. A considerably lower reading than shown indicates a possible shorted (burned together) winding.
 - g. Set selector knob on R x 100K.
 - h. Attach one ohmmeter lead to one motor lead.
 - i. Attach the other lead to the metal motor enclosure or ground wire connection.
 - j. Proper resistance will be greater than 1 on the R x 100k scale.
 - k. If possible, give the unit a short running test to determine if it is operating properly and there is no hidden damage.

The Liquidator pump uses a dual rated 208-230 volt motor and may be used on 208 volt systems. Voltage should be within 10% of motor rating and not less than 198 volts for 208 systems.

NOTE: Always protect for possible electric shock with rubber gloves and rubber soled shoes. Make the tests in a dry location, being certain motor is grounded to avoid serious electrical shock.

					RESISTANCE READINGS OHMMETER SETTING R x 1		
HP	Volts	Phase	Amps	Code	B-W	B-R	W-R
2	208-230	1	12.0	F	1.75-1.95	7.80-8.63	6.05-6.68
2	208-230	3	9.2	K	2.30-2.55	2.30-2.55	2.30-2.55

MYERS 4WHV & V4WHV NON-CLOG PUMPS

These instructions cover the service of the 4WHV and V4WHV series or non-clog pumps and guide rail systems for the horizontal discharge models. Both models are designed for handling raw sewage and waste water. Do not use for acid waste water. The pumps have 2-vane, non-clog impellers. The 4WHV and V4WHV will pass 3" dia. Solids and has a 4" std. flange discharge.

CAUTION: In the initial installation, before sewage is admitted to wet well, there is no danger on entering the sump, but after sewage has been in the sump there is **danger**. Sewage water gives off methane and hydrogen sulfide gases, both of which are highly poisonous. Never enter wet well unless cover is open and an outside blower is used to force fresh air into the wet well. Also, the man in the wet well should wear a harness with rope to surface so that he can be pulled out in case of asphyxiation. One man should not work alone.

SEAL FAILURE

The 4WHV and V4WHV pumps have a probe installed in the seal chamber so that any leakage past the lower seal is detected. A red warning light at the control panel comes on if water enters the seal chamber. This is an indicator only and does not stop the motor. It warns that seal should be replaced within 2 to 3 weeks. **LONGER RUNNING WITHOUT SEAL REPLACEMENT COULD DAMAGE MOTOR. MOTOR MUST GO TO AUTHORIZED SERVICE STATION FOR SEAL REPLACEMENT.**

HEAT SENSOR

All 4WHV and V4WHV single and three phase pumps have motor heat sensors which are externally wired to the control panel. Any motor temperature above the sensor rating will open the heat sensor and stop the motor. The sensor will automatically close upon cooling. It is important that the heat sensor wires and seal failure wires are connected at the panel terminal block. Warranty is void if wires are not connected or are jumped.

CAUTION: The single phase 4WHV and V4WHV pumps with automatic heat sensor rest will restart without warning as the motor cools. There, **never** do service work on the pump unless power supply is disconnected.

MOTOR POWER CABLE AND CONTROL CABLE

Each power cord has 4 conductors – white, black red and green. For 3 phase, the red, black and white conductors connect to the 3 line terminals and the green is connected to a good outside ground such as a ground rod at least 8 feet into soil. Interchange any tow of the three power conductors will reverse a 3 phase motor.

For single phase, the white and black leads connect to the two-line terminals and the red connects to the start winding terminal. The green is for ground and must be connected to a good outside ground. The control cable has 4 conductors – black, white, red and green. White and black connect to heat sensor terminals, red connects to the seal failure terminal and green connects to the ground terminal.

CAUTION: Never pull pump or work on control box until incoming power is disconnected. Never run motor until green ground conductor is connected to a good outside ground. Never pull on electrical cables to lift pump.

OIL FILLED MOTOR

The motor chamber and seal chamber are dielectric oil-filled for good heat transfer and lubrication of bearings and seals. The motor requires no other lubrication. Oil level in the motor housing should be to the bottom of the oil fill plug with the pump in a vertical position. Do not overfill the motor housing since some space is required for oil expansion. Oil level in the seal chamber of the 4WHV and V4WHV should be checked with the pump laying horizontally with the fill plug at the top. The oil level should be approximately $\frac{3}{4}$ " from the outside surface of the housing. Transformer oil SOHIO Factopure SE40 should be used.

AIR VENTING

Upon initial filling of the wet well with the water, air may be trapped in the pump volute. To vent off this air, a 5/32" diameter hole is located in the volute. **BE SURE THIS VENT HOLE IS CLEAN AFTER ANY SERVICE WORK ON PUMP.**

REMOVING PUMP CASE AND IMPELLER

In case of wear, damage due to dropping, plugged pump, or replacing a defective motor, the pump volute case and impeller can be removed in the field.

1. Remove bolts between seal housing flange and volute case. The motor and impeller can now be lifted off as a unit.
2. If necessary to remove impeller, lay pump on its side. With a screwdriver bend the tabs of the lockwasher away from the head of the hex head bolt.
3. Loosen and remove the bolt by turning counterclockwise. Since Loctite is used to secure the bolt and is applied to the shaft/impeller interface, heating of the shaft end to 450° to 500° F will usually be required.
4. Impeller is mounted by a straight fit with driving key. Pry evenly on opposite impeller sides with two large screwdrivers or small bars behind the impeller.
5. Set motor on end with shaft up after removing impeller so that oil will not drain past the seal.

REPLACING IMPELLER AND PUMP CASE

1. Apply Loctite #680 before assembly, in keyway, in the impeller bore (lower shaft O.D.) and on the threads of the hex head cap screw.
2. Before placing the impeller on the shaft, be sure the mechanical seal and its spring are in place.
3. Position retaining washer with long pin extension in keyway.
4. Obtain a new lockwasher and flatten two tabs located 180° from the locking projection on the inner edge of the washer. There should be one flattened tab on each side of the pin extending from the retaining washer.
5. Assemble hex head cap screw and tighten securely.
6. Bend lockwasher tabs up against hex head on the bolt, do not bend up the two tabs flattened of each side of the pin in the retaining washer.

TROUBLE CHECK LIST

Troubles listed generally pertain to the pump and auxiliary components. Other troubles can occur from a faulty control box, these will be listed with the control box instruction.

CONDITION

Pump runs but does not pump liquid from basin.

PROBABLE CAUSE

1. Pump impeller may be air locked, this occasionally occurs on a new installation. Start and stop pump several times to purge air. Be sure air vent hole in volute case is clean.
2. Run additional water into basin so that pump will be submerged deeper to clear water.
3. If pump is three phase, rotation may be wrong.
4. If pump has been installed for some time and does not pump, it may be clogged at inlet.
5. Discharge gate valve may be closed.
6. Discharge check valve may be clogged or have a broken clapper or spring.
7. Discharge head may be too high. Check elevation.
8. If above checks do not locate trouble, motor rotor may be loose on shaft which allows motor to run but will not run impeller or only at low RPM.

CONDITION

Red light comes on at control box.

Overload trips at control box and alarm buzzer or flashing red light comes on due to high water level in basin.

Yellow run light stays on continuously.

Circuit breaker trips.

Pump is noisy and pump rate is low.

Grease and solids have accumulated around pump and will not pump out of basin.

PROBABLE CAUSE

This indicates some water has leaked past the lower seal and has entered the seal chamber and made contact with the electrode probe. Pump must be removed from basin within approximately two (2) weeks for replacement of lower seal. This preventive repair will save the motor.

1. Push in on red reset button to reset overload. If overload trips again after short run, pump has some damage and must be removed from basin for checking.
2. Trouble may be from clogged impeller causing motor to overload or could be from a failed motor.
3. Trouble may be from faulty component in control box. Always check the control box before removing the pump.

1. Indicates H-O-A switch may be in the hand position.
2. Level control switch may have failed causing pump to continue to operate when water is below lower control.
3. Impeller may be partially clogged, causing pump to operate at very reduced capacity.
4. Gate valve or check valve may be clogged causing low pump flow.
5. Pump may be air logged. Lift arm on check valve to vent off air. Also, check that the 5/32" vent hole in the volute is open.

1. Reset breaker by pushing clear down on handle then back to on position. If breaker trips again in a few seconds, it indicates excessive load which is probably caused by a short in the motor or control box. Check out instructions given with control box before pulling pump.
2. If this condition happens after an electrical storm motor or control box may be damaged by lightning.
3. Resistance reading of the motor with lead wires disconnected from the control box can determine if trouble is in motor or control box.

1. Impeller may be partially clogged with some foreign objects causing noise and overload on the motor.
2. Impeller may be rubbing on wear ring due to a bent shaft or misalignment.
3. Pump may be operation too close to shut-off. Check head.

1. Lower control which may be set too high.
2. Run pump on manual operation for several minutes with a small amount of water running into basin to clean out solids and grease. This allows pump to break suction and surge, breaking up the solids. If lever switch is set properly, this condition generally will not occur.
3. Trash and grease may have accumulated around floats causing pump to operate erratically.

MYERS WG30 GRINDER PUMPS

STARTING THE SYSTEM

1. Open gate valves on discharge piping.
2. Set pump switches at control box to auto position and turn on power. Fill sump with water until controls start pump. Allow pump to operate until level drops, stopping pump.
3. If system is duplex turn both pump switches to off and fill sump above upper control. Turn both pump switches to auto position. Both pumps should run and pump sump down to lower control.
4. Leave both switches in auto-position and pump is ready for automatic operation.
5. A small hole is drilled in the pump case to prevent air lock so some water flows from this hole when pump is operating.

IN CASE OF TROUBLE CHECK THE FOLLOWING

- A. Pump runs but does not deliver water.
1. May be air locked. Lift pump and reseal on lower casting.
 2. Discharge shut-off valve may be closed.
 3. If pump is 3 phase, may be running in wrong direction. Pump should be checked before installing in sump for proper rotation.

ROTATION: Counterclockwise when looking into pump inlet.

CAUTION: KEEP HANDS AND FINGERS AWAY FROM GRINDER IMPELLER WHEN MAKING THIS CHECK.

If 3 phase rotation is wrong, interchange any two line leads at the control box to reverse motor.

CAUTION: BE SURE CONNECTED POWER AGREES WITH DATA ON PUMP NAME PLATE.

- B. Check valve seal fitting leaks.
1. "O" Ring seal may be cut.
 2. Trash may be caught under flange. Lift out and reseal. It may be necessary to run pump lifted out of seal casting to flush trash away from seal inlet.
- C. Proper setting of level controls. Controls should be set so that pump stops when level is about 3 inches above pump inlet.

If controls are set too high, trash and grease will accumulate on the surface and may cause clogging.

CAUTION: NEVER WORK ON PUMPS OR CONTROLS UNLESS POWER IS TURNED OFF. IF PUMP IS REMOVED FROM CONTROL BOX, DISCONNECT WIRES TO PUMPS TO BE CERTAIN POWER CANNOT BE TURNED ON. THIS MEANS ALL WIRES INCLUDING CONTROL WIRES. NEVER PUT HANDS NEAR GRINDER IMPELLER ON ANY RUN CHECKS.

MAXIMUM AMP & WINDING RESISTANCE VALUES

MODEL	HP	SPEED	VOLTS	PHASE	WINDING RESISTANCE IN OHMS			MAX AMPS.
					BLACK TO WHITE	BLACK TO RED	RED TO WHITE	
WG30-21	3	3450	230	1	.47	3.14	3.61	36
WG30-03	3	3450	200	3	.72	.72	.72	20.5
WG30-23	3	3450	230	3	.72	.72	.72	17.8
WG30-43	3	3450	460	3	2.9	2.9	2.9	8.9
WG30-53	3	3450	575	3	6.5	6.5	6.5	7

If amp readings are higher than listed, it indicates voltage may be higher or lower than normal or that pump grinder may be clogged with trash causing extra load on motor.

CHECK LIST IF PUMP DOES NOT OPERATE PROPERLY

CHECKING FOR MOISTURE IN MOTOR – Use ohmmeter and set on highest scale. Readings on the large power cord between any of the conductors red, black, white to green conductor or motor shell should be more than 500,000 ohms. Motor probably will run with a lower reading, but if pump is out of service and reading is below 500,000 ohms the motor housing and stator should be removed and baked in a drying oven at 220°F. To be serviced only at authorized service station.

Readings should be taken with line leads disconnected from terminal strip.

RESISTANCE OF WINDINGS – Every motor winding has a fixed resistance and winding must check close to the values given below to operate properly. This winding resistance also shows if motor is connected for voltage being used.

Use ohmmeter for this test and set on scale to read directly in ohms.

TROUBLE CHECK LIST

Troubles listed are generally caused by the pump. Other troubles can occur from a faulty control box. These will be listed with the control box instruction.

CONDITION

Pump runs but does not pump liquid from basin.

PROBABLE CAUSE

1. Pump impeller may be air locked, this occasionally occurs on a new installation. Start and stop pump several times to purge air.
2. Run additional water into basin so that pump will be submerged deeper to clear water.
3. If pump is three phase, rotation may be wrong.
4. If air does not clear it may be necessary to lift pump out of sealing elbow and start motor to allow pump to pump for a few seconds. Air vent hole is provided in pump case, so some water will flow from this hole when pump is operating. If vent hole gets clogged, clean out.
5. If pump has been installed for some time and does not pump, it may be clogged at the grinder inlet.
6. Discharge gate valve may be closed.
7. Discharge check valve may be clogged or have a broken clapper.
8. Discharge head may be too high. Check elevation.
9. If above checks do not locate trouble, motor rotor may be loose on shaft which allows motor to run but will not run impeller or only at low RPM.

Red light comes on at control box.

This indicates some water has leaked past the lower seal and has entered the seal chamber and made contact with the electrode probe. Pump must be removed from basin within approximately two (2) weeks for replacement of lower seal. This preventive repair will save the motor.

Overload trips at control box and alarm buzzer or flashing red light comes on due to high water level in basin.

1. Push in on red reset button to reset overload. If overload trips again after short run, pump has some damage and must be removed from basin for checking.
2. Trouble may be from clogged grinder causing motor to overload or could be from a failed motor.
3. Trouble may be from faulty component in control box. Always check the control box before removing the pump.

CONDITION

Yellow run light stays on continuously.

PROBABLE CAUSE

1. Indicates H-O-A switch may be in the hand position.
2. Level control switch may have failed causing pump to continue to operate when water is below lower control.
3. Grinder assembly may be partially clogged causing pump to operate at very a reduced capacity.
4. Gate valve or check valve may be clogged causing low pump flow.
5. Pump may be air logged.

Circuit breaker trips.

1. Reset breaker by pushing clear down on handle then back to on position. If breaker trips again in a few seconds, it indicates excessive load which is probably caused by a short in the motor or control box. Check out instructions given with control box before pulling pump.
2. If this condition happens after an electrical storm motor or control box may be damaged by lightning.
3. Resistance reading of the motor with lead wires disconnected from the control box can determine if trouble is in motor or control box.

Pump is noisy and pump rate is low.

1. Grinder may be partially clogged with some foreign objects causing noise and overload on the motor.
2. Grinder impeller may be rubbing on wear ring due to a bent shaft or misalignment.

Grease and solids have accumulated around pump and will not pump out of basin.

1. Lower weight of level switch may be set too high. Set bottom of lower weight even with bottom of inlet flange to grinder.
2. Run pump on manual operation for several minutes with a small amount of water running into basin to clean out solids and grease. This allows pump to break suction and surge, breaking up the solids. If lever switch is set properly, this condition generally will not occur.
3. Trash and grease may have accumulated around lower weight causing pump to turn off too soon. Clean trash from weight and suspension cable.

REPLACING GRINDER IMPELLER AND GRINDER SHREDDING RING

STANDARD TOOLS REQUIRED:

1. Allen head socket set.
2. Standard socket wrench set.
3. Set of open end wrenches.
4. Plastic hammer.
5. Vise Grip pliers.
6. Large screwdriver 5/8" wide blade. Heavy handle.
7. Wire brush.
8. Three cornered file.
9. Several smaller screwdrivers.

IMPORTANT – Pump should be thoroughly cleaned of trash and deposits before starting disassembly operations.

CAUTION – **DISCONNECT ALL POWER AND CONTROL WIRES TO MOTOR AT CONTROL PANEL BEFORE STARTING DISASSEMBLY OPERATIONS. NEVER RELY ON OPENING CIRCUIT BREAKER ONLY.**

DISASSEMBLY OF SHREDDING RING AND IMPELLER

1. Remove screws from holding ring and remove ring.
2. Use two screwdrivers, one each on opposite side of ring and pry on snap ring that holds shredding ring in place. Remove shredding ring.
3. Hold impeller by prying against impeller cutting bar and remove cap screw from end of shaft.
4. Use large screwdriver in slot in end of shaft and bump on cutter vane with plastic hammer. Bump in counterclockwise direction as thread is right hand. It may take several bumps to loosen impeller.

If impeller cannot be loosened it will be necessary to take unit to service station for service. **DON'T CONTINUE TO POUND ON IMPELLER AS IMPELLER AND SHAFT CAN BE DAMAGED.**

5. If impeller comes off easily, clean up and replace if worn.
6. Be sure pump impeller has not loosened when grinder impeller is removed. This can be checked on reassembly of grinder impeller and shredding ring. Tips of impeller cutter vanes should extend about 1/8" below bottom of shredding ring. If more than 1/8" extends below ring it means pump impeller has loosened.

Remove grinder impeller and ring as described above and remove bolts from pump case and remove case. Use back off screws in motor mounting plate to pry loose from pump case.

7. After case is removed, wrap emery paper around shaft and hold with vise grip pliers. Use cloth on impeller and screw up against shoulder. Now pump can be reassembled.
8. Clean all threads with wire brush and file smooth any threads that may be nicked.
9. Use Never-Seeze or other graphite compound on threads before replacing grinder impeller.
10. Be sure cap screw in bottom of shaft is tight. Hold impeller with screwdriver between cutter bar and teeth of shredding ring while tightening cap screw.
11. Be sure impeller turns free by hand after reassembly. Some drag will occur due to seals but there should be no binding or tight spots when turning the grinder impeller.
12. **ALWAYS** use a rag on the impellers when turning to prevent cutting hands on the sharp corners of shredding ring.

MYERS WGL20 GRINDER PUMP

CAUTION: Read these safety warning first before installation, servicing or operating any pump. These instructions are written with the understanding that the individual(s) have experience in building wet wells and installing and servicing grinder pumps and pumping equipment. Only qualified persons shall conduct services and installations of this pump. The pump must be wired by a qualified electrician using an approved starter box and switching device.

DANGER!

HAZARDOUS MOVING PARTS. To reduce risk of injury disconnect power before servicing. Never put fingers near grinder impeller or in pump inlet when pump cord is connected or pump is operating.

In the initial installation, before sewage is admitted to basin, there is no danger on entering the basin, but after sewage has been in the basin there is danger. Sewage water gives off methane and hydrogen sulfide gases, both of which are highly poisonous. A breathing device may be required. Never enter basin unless cover is open and an outside blower is used to force fresh air into the basin. Also, the worker in the basin should wear a harness with rope to surface so that he can be pulled out in case of asphyxiation. Never work alone!

Do not exceed working load limit of lifting rope or chain. Do not use lifting rope or chain where failure could result in loss of life.

Examine all lifting devices, rope or chain for damage before and after each lift.

Do not use any lifting devices that are not rated for and designed to lift the weights involved with these pumps.

Do not install or remove pump with person(s) in basin.

GENERAL:

1. Most accidents can be avoided by using common sense.
2. Do not wear loose clothing that can become entangled in the impeller or other moving parts.
3. This pump is designed to handle materials which could cause illness or disease through direct exposure.

Wear and use protective clothing when working on the pump or piping.

ELECTRICAL:

1. To reduce risk of electrical shock, pump must be properly grounded in accordance with the National Electric Code and all applicable state and local codes and ordinances.
2. To reduce risk of electrical shock, disconnect the pump from the power source before handling or servicing.
3. Any wiring to be done on pumps should be done by a qualified electrician.
4. NEVER operate a pump with a power cord that has frayed or brittle insulation.
5. NEVER let cords or plugs lay in water.
6. NEVER handle connected power cords with wet hands.

PUMPS:

1. Pump builds up heat and pressure during operation, allow time for pump to cool before handling or servicing.
2. Only qualified personnel should install, operate or repair pump.
3. Keep clear of suction and discharge openings. DO NOT insert fingers in pump with power connected.
4. DO NOT pump hazardous material not recommended for pump (flammable, caustic, etc).
5. Make sure lifting devices are securely fastened each time before lifting pump.
6. DO NOT lift pump by the power cord.
7. DO NOT exceed manufacturer's recommendation for maximum performance, as this could cause the motor to overheat.
8. Secure the pump in its operation position so it cannot tip over, fall or slide.
9. Keep hands and feet away from impeller when power is connected.
10. DO NOT pump without safety devices in place.

Air Venting:

Air tends to trap in the pump volute when water raises in the sump or when the pump is lowered into water after service. To vent off this air, a small hole is drilled into the pump volute. Be sure this vent hole is clean after any service work on pump.

Motor Overload Protection – The motor is provided with an on-winding overload switch. If motor overloads or overheats for any reason, the switch opens stopping motor. As soon as the motor cools to normal temperature the switch closes and restarts the motor.

MAXIMUM AMP & WINDING RESISTANCE VALUES

HP	SPEED	VOLTS	PHASE	WINDING RESISTANCE IN OHMS			MAX AMPS.
				BLACK TO WHITE	BLACK TO RED	RED TO WHITE	
2	3450	208	1	1.27	6.25	7.52	15.0
2	3450	230	1	1.56	7.84	9.40	12.0
2	2875	*380	3	12.6	12.6	12.6	5.1
2	3450	208	3	2.91	2.91	2.91	9.5
2	3450	230	3	3.15	3.15	3.15	8.4
2	3450	460	3	12.6	12.6	12.6	4.2

*50 Hz

If amp readings are higher than listed, it indicates voltage may be higher or lower than normal or that pump grinder may be clogged with trash causing extra load on motor.

CHECK LIST IF PUMP DOES NOT OPERATE PROPERLY

CHECKING FOR MOISTURE IN MOTOR – Use ohmmeter and set on highest scale. Readings on the large power cord between any of the conductors red, black, white to green conductor or motor shell should be more than 500,000 ohms. Motor probably will run with a lower reading, but if pump is out of service and reading is below 500,000 ohms the motor housing and stator should be removed and baked in a drying oven at 220°F. To be serviced only at authorized service station.

RESISTANCE OF WINDINGS – Every motor winding has a fixed resistance and winding must check close to the values given below to operate properly. This winding resistance also shows if motor is connected for voltage being used. Use ohmmeter for this test and set on scale to read directly in ohms.

TROUBLE CHECK LIST

Troubles listed are generally caused by the pump. Other troubles can occur from a faulty control box. Those will be listed with the control box instruction.

CONDITION

Pump runs but does not pump liquid from basin.

PROBABLE CAUSE

1. Pump impeller may be air locked, this occasionally occurs on a new installation. Start and stop pump several times to purge air.
2. Run additional water into basin so that pump will be submerged deeper to clear water.
3. If air does not clear it may be necessary to lift pump out of sealing elbow and start motor to allow pump to pump for a few seconds. If discharge is piped in with union, slightly break union and start pump to clear air. Air vent hole is provided in pump case, so some water will flow from this hole when pump is operating. If vent hole gets clogged, clean out.
4. If pump has been installed for some time and does not pump, it may be clogged at the grinder inlet.
5. Discharge gate valve may be closed.
6. Discharge check valve may be clogged or have a broken clapper.

CONDITION

PROBABLE CAUSE

	<p>7. Discharge head may be too high. Check elevation. Maximum pump head at zero flow is 70 feet.</p> <p>8. If above checks do not locate trouble, motor rotor may be loose on shaft which allows motor to run but will not run impeller or only at low RPM.</p>
Red light comes on at control box.	This indicates some water has leaked past the lower seal and has entered the seal chamber and made contact with the electrode probe. Pump must be removed from basin within approximately two (2) weeks for replacement of lower seal. This preventive repair will save the motor.
Overload trips at control box and alarm buzzer or flashing red light comes on due to high water level in basin.	<ol style="list-style-type: none">1. Push in on red reset button to reset overload. If overload trips again after short run, pump has some damage and must be removed from basin for checking.2. Trouble may be from clogged grinder causing motor to overload or could be from a failed motor.3. Trouble may be from faulty component in control box. Always check the control box before removing the pump.
Yellow run light stays on continuously.	<ol style="list-style-type: none">1. Indicates H-O-A switch may be in the hand position.2. Level control switch may have failed causing pump to continue to operate when water is below lower float.3. Grinder assembly may be partially clogged causing pump to operate at a very reduced capacity.4. Gate valve or check valve may be clogged causing low pump flow.5. Pump may be air logged.
Circuit breaker trips.	<ol style="list-style-type: none">1. Reset breaker by pushing clear down on handle then back to on position. If breaker trips again in a few seconds, it indicates excessive load which is probably caused by a short in the motor or control box. Check out instructions given with control box before pulling pump.2. If this condition happens after an electrical storm motor or control box may be damaged by lightning.3. Resistance reading of the motor with lead wires disconnect from the control box can determine if trouble is in motor or control box.
Pump is noisy and pump rate is low.	<ol style="list-style-type: none">1. Grinder assembly may be partially clogged with some foreign objects causing noise and overload on the motor.2. Grinder impeller may be rubbing on grinder ring due to a bent shaft or misalignment.
Grease and solids have accumulated around pump and will not pump out of basin.	<ol style="list-style-type: none">1. Pump "ON" switch may be set too high.2. Run pump on hand operation for several minutes with a small amount of water running into basin to clean out solids and grease. This allows pump to break suction and surge which will break up the solids.3. Trash and grease may have accumulated around lower weight causing pump to turn off too soon. Clean trash from weight and suspension cable.

REPLACING GRINDER IMPELLER AND GRINDER SHREDDING RING

STANDARD TOOLS REQUIRED:

1. Allen head socket set.
2. Standard socket wrench set.
3. Set of open end wrenches.
4. Plastic hammer.
5. Wise Grip pliers.

6. Large screwdriver with heavy handle.
7. Wire brush.
8. Three cornered file.

IMPORTANT – Pump should be thoroughly cleaned of trash and deposits before starting disassembly operations.

CAUTION – DISCONNECT ALL POWER AND CONTROL WIRES TO MOTOR AT CONTROL PANEL BEFORE STARTING DISASSEMBLY OPERATIONS. NEVER RELY ON OPENING CIRCUIT BREAKER ONLY.

DISASSEMBLY OF SHREDDING RING AND IMPELLER

1. Remove three screws from grinder ring flange. Grinder ring is pressed into flange for easy removal.
2. Thread two screws into tapped back-off holes in flange and evenly tighten screws to back grinding ring out of pump housing.
3. Hold grinder by prying against impeller cutting bar and remove cap screw from end of shaft.
4. Use large screwdriver in slot in end of shaft and bump on cutter vane with plastic hammer. Bump in counterclockwise direction as thread is right hand. It may take several bumps to loosen impeller.

If impeller cannot be loosened it will be necessary to take unit to service station for service. **DON'T CONTINUE TO POUND ON IMPELLER AS IMPELLER AND SHAFT CAN BE DAMAGED.**

5. If impeller comes off easily, clean up and replace if worn.
6. Be sure pump impeller has not loosened when grinder impeller is removed. This can be checked on reassembly of grinder impeller and shredding ring. Tips of impeller cutter vanes should extend about 1/8" below bottom of shredding ring. If more than 1/8" extends below ring it means pump impeller has loosened, and if it is less, it means the shredding ring is not properly seated.

If the pump impeller has loosened, remove grinder impeller and shredding ring as described above and remove bolts from volute case and remove case. Plastic hammer can be used to bump on casing discharge to loosen. Place gasket in oil to prevent drying out. **DO NOT** loosen the pump impeller further – it is the seat for the lower seal spring.

7. After case is removed, wrap emery paper around shaft and hold with vise grip pliers. Use cloth on impeller and screw up against shoulder. Now pump can be reassembled.
8. Clean all threads with wire brush and file smooth any threads that may be nicked.
9. Use Never-Seeze or other graphite compound on threads before replacing grinder impeller.
10. Be sure cap screw in bottom of shaft is tight. Hold impeller with screwdriver between cutter bar and teeth of shredding ring while tightening cap screw.
11. Be sure impeller turns free by hand after reassembly. Some drag will occur due to seals but there should be no binding or tight spots when turning the grinder impeller.
12. If impeller rubs or drags on shredding ring, loosen bolts in shredding ring plate and tap with plastic hammer to loosen, retighten screws. Be sure to pull screws down evenly, applying pressure on all three screws. **DO NOT TIGHTEN ONE SCREW CLEAR DOWN BEFORE ADJUSTING OTHER SCREWS.**
13. **ALWAYS** use a rag on the impellers when turning to prevent cutting hands on the sharp corners of shredding ring.