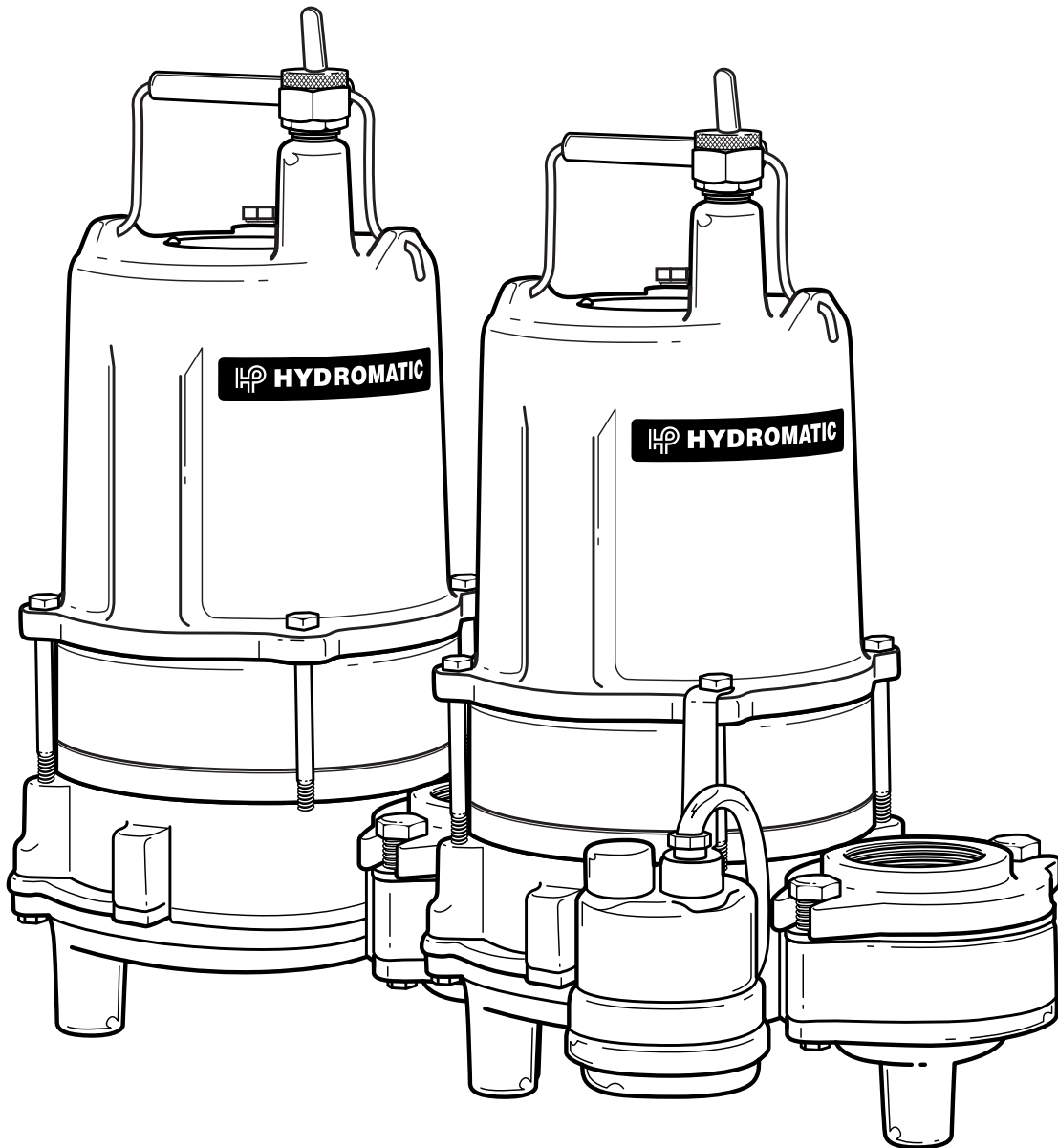




HYDROMATIC®

SPD50H/100H

Submersible Effluent Pump



NOTE! To the installer: Please make sure you provide this manual to the owner of the pumping equipment or to the responsible party who maintains the system.



Pentair
Water™

General Information

Thank you for purchasing your Hydromatic® pump. To help ensure years of trouble-free operation, please read the following manual carefully.

Before Operation:

Read the following instructions carefully. Reasonable care and safe methods should be practiced. Check local codes and requirements before installation.

Attention:

This manual contains important information for the safe use of this product. Read this manual completely before using this product and refer to it often for continued safe product use. **DO NOT THROW AWAY OR LOSE THIS MANUAL.** Keep it in a safe place so that you may refer to it often.

WARNING: Before handling these pumps and controls, always disconnect the power first. Do not smoke or use sparkable electrical devices or flames in a septic (gaseous) or possible septic sump.

Pump Warning

To reduce risk of electrical shock:

1. Risk of Electrical Shock:

This pump has not been investigated for use in swimming pool areas.

2. Risk of Electrical Shock:

Connect only to a properly grounded receptacle.

Septic tank to be vented in accordance with local plumbing codes.

Do not smoke or use sparkable electrical devices or flame in a septic (gaseous) or possible septic sump.

If a septic sump condition exists and if entry into sump is necessary, then (1) provide proper safety precautions per OSHA requirements and (2) do not enter sump until these precautions are strictly adhered to.

Do not install pump in location classified as hazardous per N.E.C., ANSI/NFPA 70 - 2001.

Failure to heed above cautions could result in injury or death.

Pump Installation

These important instructions must be followed for satisfactory performance of your pump:

1. Provide proper sump (recommended minimum sump diameter is 30").
2. Do not set pump directly on the bottom of sump if it is not solid. Raise the pump by using bricks or concrete blocks underneath it.
3. Make sure sump is free of string, cloth, nails, gravel, etc. before installing pump.
4. Risk of electrical shock — connect only to a properly grounded receptacle.
5. Do not remove ground pin from electrical plug.
6. Do not use an extension cord.

7. For proper automatic operation, make sure the pump power cord is plugged into the piggyback receptacle on the diaphragm switch cord.
8. Connect to separate electrical circuit taken directly from main switch.
9. Use steel or plastic pipe for all connecting lines between pump and sewer outlet.

Note: Some city regulations do not allow installing a pump with plastic pipe. Check local regulations.

10. In applications in which the pump may sit idle for months at a time, it is recommended that the pump(s) be cycled every month to ensure the pumping system is working properly when needed.
11. Hydromatic check valve should be installed in discharge pipe.
12. An audible alarm system such as the Q Alert (indoor use only) for high water conditions should be installed in every pump for greater protection. Contact your Hydromatic distributor for additional panel applications.

Warning: When using the automatic diaphragm switch, the vent tube in the plug must be clear of obstructions.

Do not bend cord. This will cause a crimp in the vent tube and switch failure will occur. Pump should be plugged into a single outlet, where vent tube can "breathe." Blocking tube or bending cord will void the warranty.

Pump Servicing

Read the following instructions carefully before replacing any parts. Reasonable care and safe methods should be practiced. Check local codes and requirements before installation. Only a competent electrician should make the installations.

Tools Required

General shop 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 piggy-back 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 or control panel
 - b. water in the motor housing
 - c. insufficient amp capacity of wiring or breakers
 - d. improper panel wiring
5. Tripped overload. If 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 miswired 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 Cord

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 piggy-back switch with the float raised or the diaphragm switch pressed into the start position, replace the complete piggy-back switch assembly and retest with new assembly.

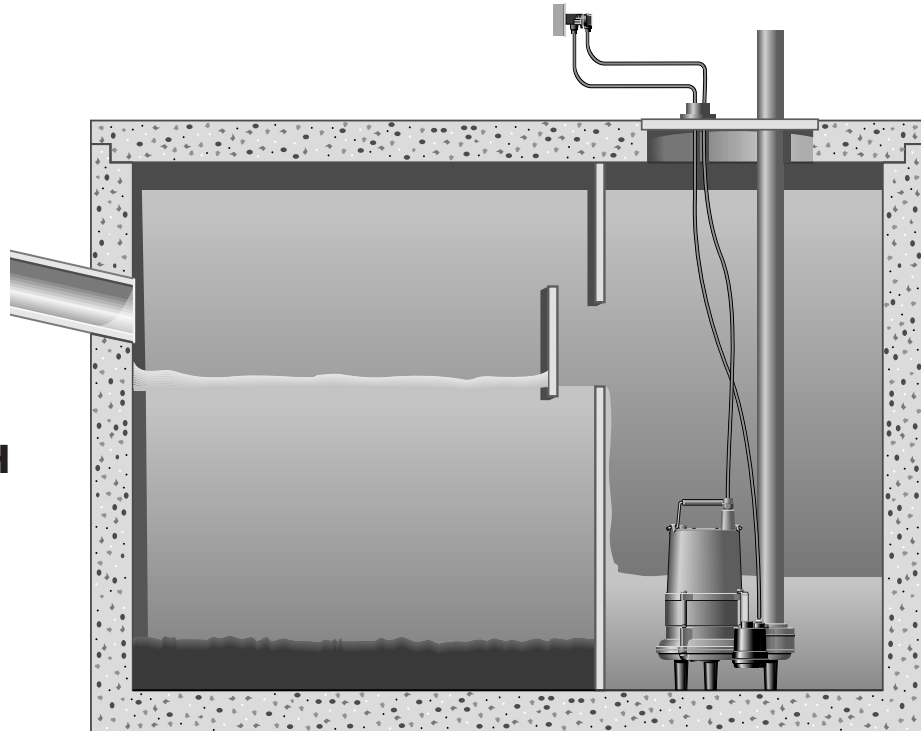
2. If motor does not run when tested as described above, the capacitor and/or stator must be checked.

Disconnect from power supply.

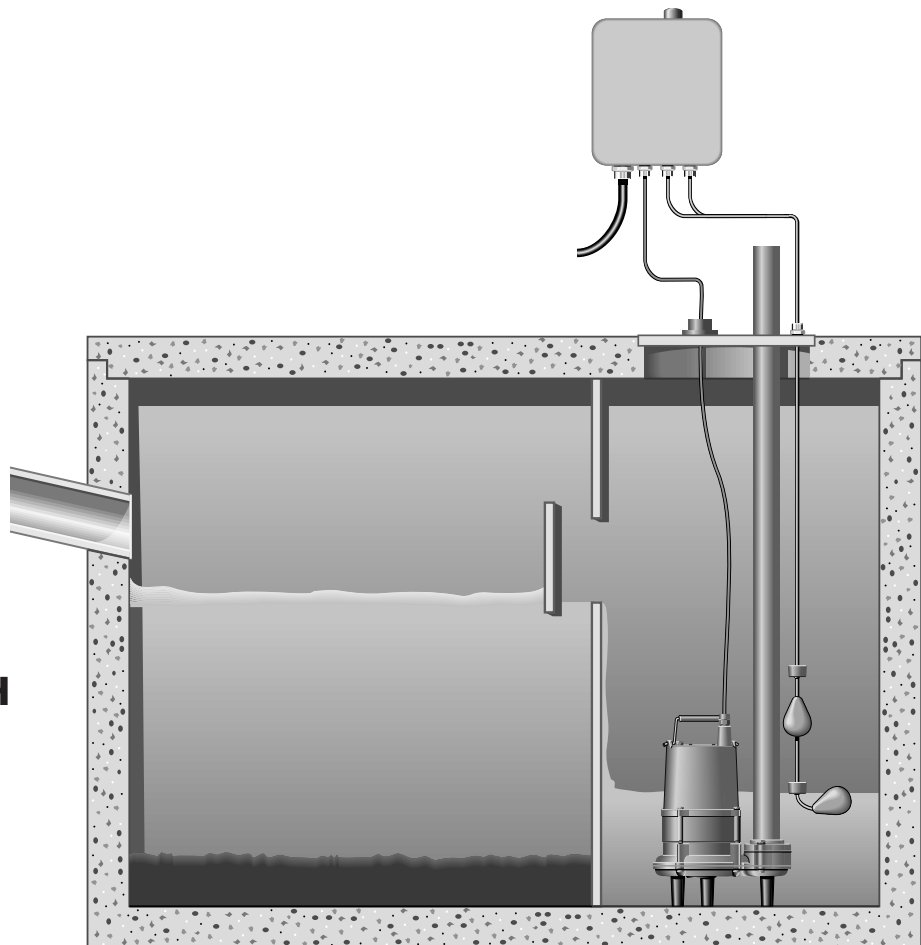
Remove plug (#6) from top of housing and pour oil into container, preferably clear, so that oil can be observed.

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 (#22) from the motor housing (#2). With power cord loose, remove the four wire nuts and screws (#4) and carefully lift off the motor housing (#2) exposing the capacitor (#28) (1Ø only) and the motor assembly.

SPD50H



SPD100H



Pump Servicing

5. On single phase (1Ø) units, check capacitor (#28) 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 knob 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 to 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 given below, the stator is defective and the motor assembly must be replaced.

Reconnect the wires as they were removed.

RESISTANCE						
SPD50H			SPD100H			
	To Start	To Main	3ø Bal.	To Start	To 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 (#22) by cutting the butt connection and wire nuts (#32) 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 clear 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 (#14) and the upper seal (#5) 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 paraffinic SE-40 process oil. The same oil is used in the seal housing (#20) between the two mechanical seals. To check the seals, remove the lower housing pipe plug (#8) 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 (#9) holding the base (#12) 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

Pump Servicing

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 (#5), the base (#12), impeller (#11), lower mechanical seal (#14), and volute (#7) must be removed first. Drain the seal oil from the housing by removing pipe plug (#8).
2. The rotating carbon ring and stainless steel spring are held in place by a snap ring (#27) and washer (#10). Remove these.
3. Remove the four hex head stator bolts and lift the stator (#3). 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 (#20), 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 manufacture as the existing rotor, or vice versa. Replace the four stator bolts.
6. Remove the old O-ring (#19), 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 Locktite 222 to the shaft and screw the impeller on hand-tight. The impeller (#11) will force the rotating seal half into position.
11. Set the seal housing (#20) and motor housing (#2) assembly into the volute case (#7) and secure with four hex head screws (#4).
12. To replace the power cord (#22) on single phase pumps, as determined on page 5, 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. Referring to wiring diagrams in this manual, 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 ¼" NPT tap on the top of the motor cover and seal chamber.

Note: Too much pressure will damage the seal.

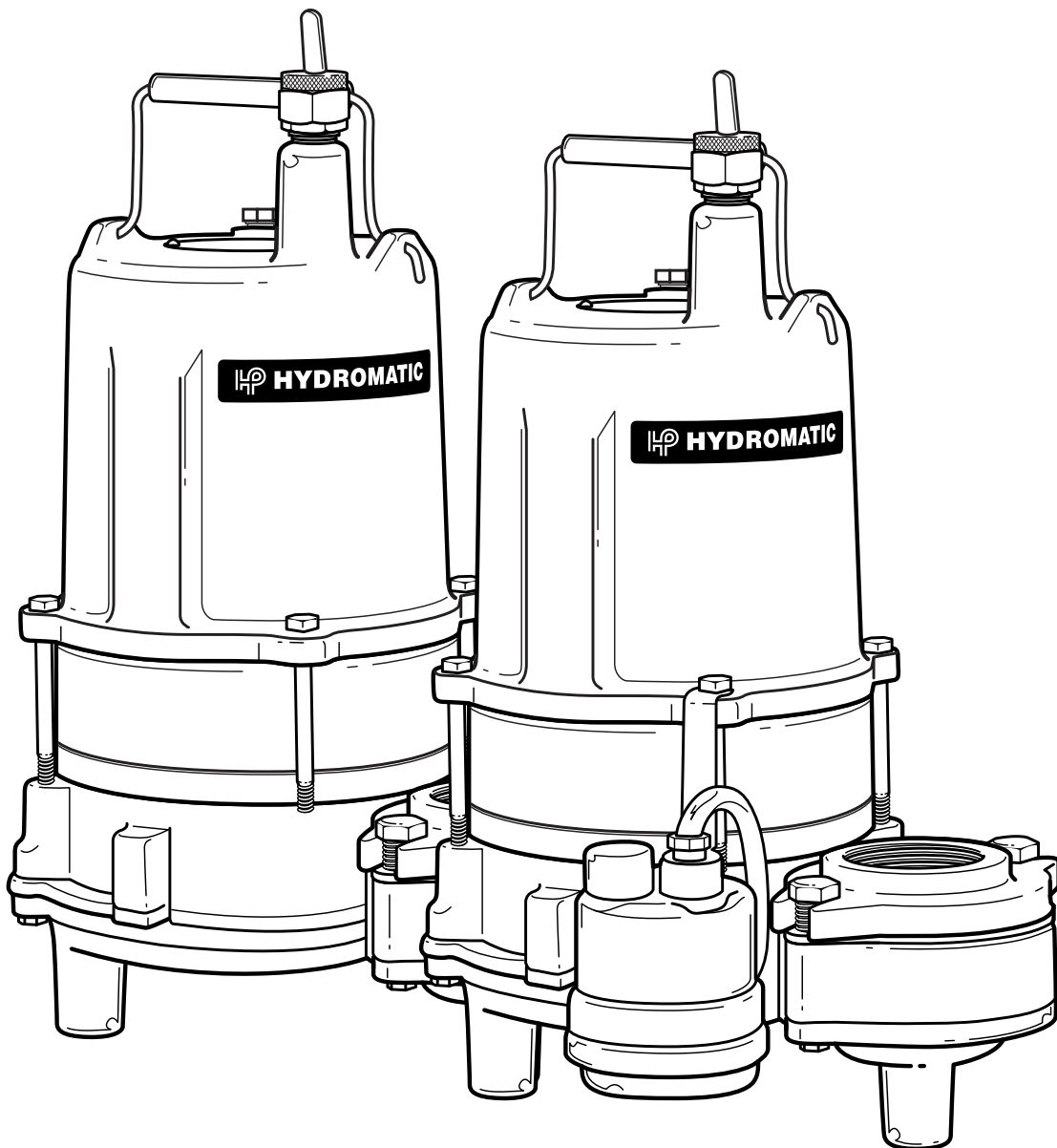
Then submerge the pump in water and check for leaks. If a leak occurs, isolate where it is coming from and correct the problem by replacing the sealing part. If there are no

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 (#6). Turn pump on side and fill seal chamber to 1" from top. Replace plug (#8) 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 Troubleshooting

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 or partially plugged. Remove pump and clean per maintenance instructions.
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 per maintenance instructions.
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, then after short period starts again. Indicates tripping 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 per maintenance instructions.
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.

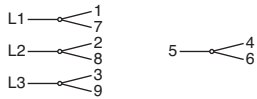
If symptom is not found on chart, call authorized Hydromatic distributor or repair center for assistance.

Pump Notes

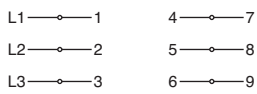
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SPD50H/100H Three Phase

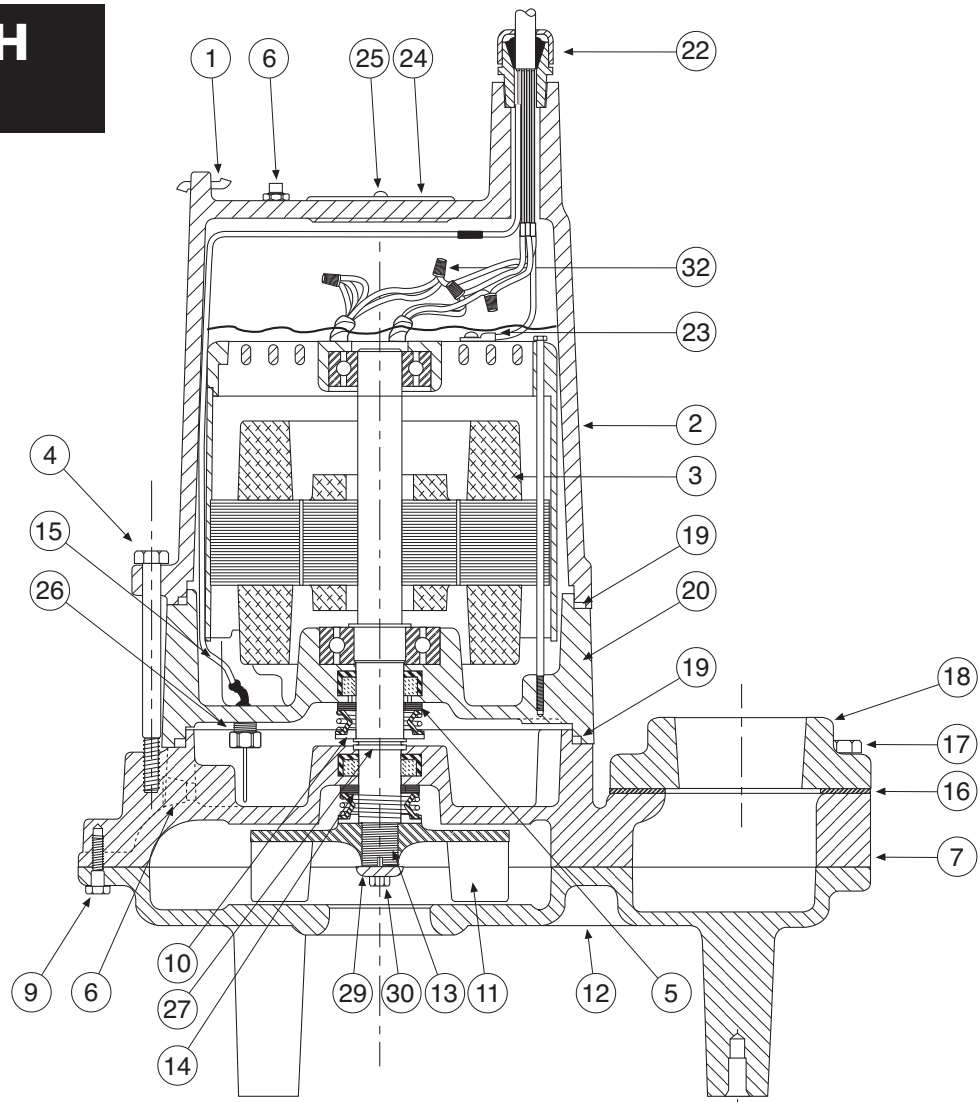
3-PHASE WIRING



LOW VOLTAGE (230V)



HIGH VOLTAGE (460V)

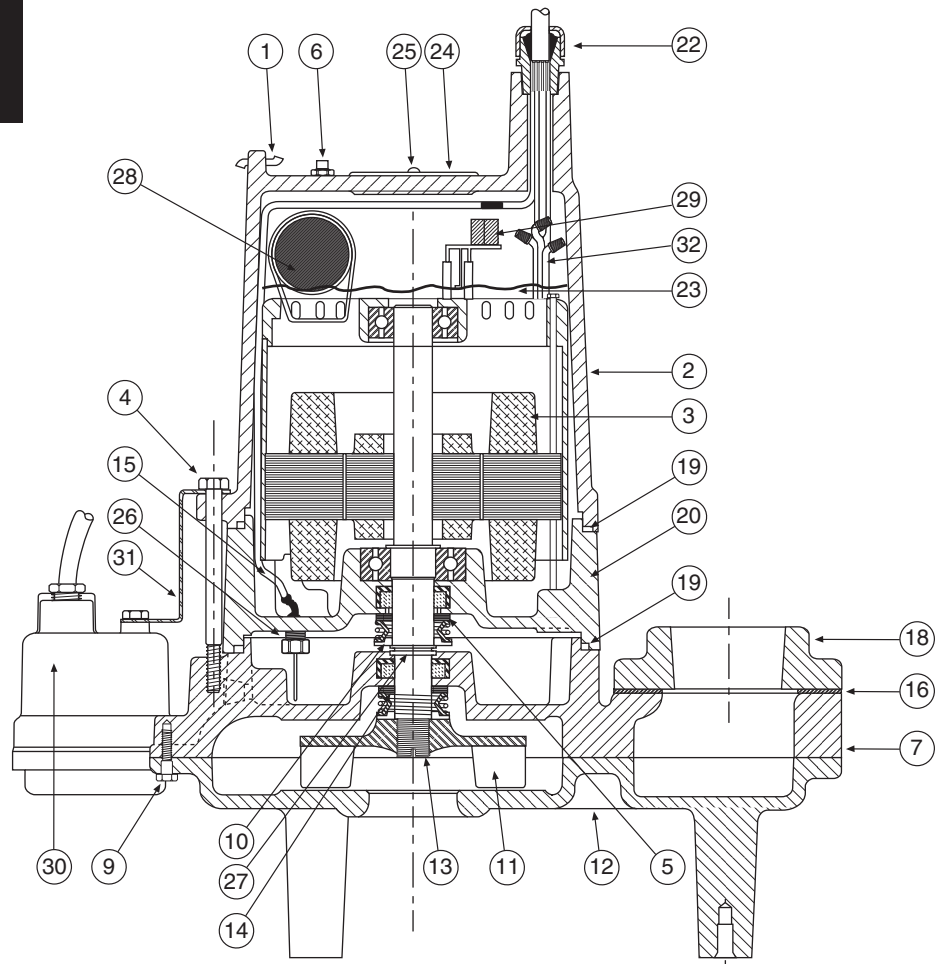
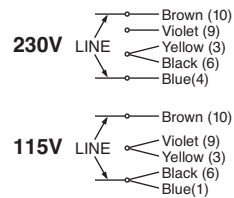


MODEL – SPD50H/SPD100H THREE PHASE

Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
1	60-000-5	Handle	1	16	324-001-1	Gasket	1
2	56-023-2	Housing, Motor	1	17	19103A052	Screw, Hex Hd.	2
3	12625-000-1	Motor Assembly, 230/460V	1	18	208-000-2	Discharge Flange	1
4	12625-600-1	Motor Assembly, 575V	1	19	77-003-1	O-Ring	2
5	101-017-1	Screw, Hex Hd.	4	20	12596-001-2	Housing, Seal/Bearing	1
6	17048-000-1	Shaft Seal – Upper	1	22	11644-018-5	Power Cord Assembly, 20' w/S.F., 230/460/575V	1
7	14981-001-1	Pipe Plug, 1/4 NPT	1	23	*	Oil	—
8	202-005-2	Volute Case	1	24		Nameplate	1
9	176-005-1	Screw, Hex Hd.	6	25	4580-001-1	Drive Screw	2
10	156-052-1	Washer	1	26	8472-007-5	Seal Failure Assembly	1
11	370-000-2	Impeller – SPD100	1	27	975-001-1	Snap Ring	1
11	8155-000-2	Impeller – SPD50	1	29	518-001-1	Washer, Impeller	1
12	404-002-2	Suction Bottom	1	30	111-008-1	Screw, Impeller	1
13	*	Locktite Sealant	—	32	73-001-1	Connector	5
14	14525A010	Shaft Seal	1				
15	6000-056-1	Wire – Terminal Assembly	1				

SPD50H/100H Single Phase

1-PHASE WIRING



MODEL – SPD50H/SPD100H SINGLE PHASE

Ref. No.	SPD50H Part No.	SPD100H Part No.	Description	Qty.	Ref. No.	SPD50H Part No.	SPD100H Part No.	Description	Qty.
1	60-000-5	60-000-5	Handle	1	22	13216-002-5	13216-022-5	Power Cord Assembly, 20' w/plug, 230V	1
2	56-023-2	56-023-2	Housing, Motor	1	22	11644-006-5	n/a	Power Cord Assembly, 10' w/S.F., 115V	1
3	13225-000-1	n/a	Motor Assembly, 115V	1	22	11644-007-5	n/a	Power Cord Assembly, 20' w/S.F., 115V	1
3	13225-000-1	12624-000-1	Motor Assembly, 230V	1	22	11644-005-5	11644-005-5	Power Cord Assembly, 10' w/S.F., 230V	1
4	101-017-1	101-017-1	Screw, Hex Hd.	4	22	11644-008-5	11644-008-5	Power Cord Assembly, 20' w/S.F., 230V	1
5	17048-000-1	17048-000-1	Shaft Seal-Upper	1	23	*	*	Oil	—
6	14981-001-1	14981-001-1	Pipe Plug, 1/4 NPT	1	24	13425-069-1		Nameplate	1
7	202-005-2	202-005-2	Volute Case	1	25	4580-001-1	4580-001-1	Drive Screw	2
9	176-005-1	176-005-1	Screw, Hex Hd.	6	26	8472-007-5	8472-007-5	Seal Failure Assembly	1
10	156-052-1	156-052-1	Washer	1	27	975-001-1	975-001-1	Snap Ring	1
11	8155-000-2	370-000-2	Impeller	1	28	13208-000-1	13208-000-1	Capacitor	1
12	404-002-2	404-002-2	Suction Bottom	1	29	13209-000-1	n/a	Solid State Switch, 115V	1
13	*	*	Locktite Sealant	—	29	13209-002-1	13209-001-1	Solid State Switch, 230V	1
14	14525A010	14525A010	Shaft Seal	1	30	51752-403-7	51752-403-7	Diaphragm Switch Kit (Auto) 10'-115V	1
15	6000-056-1	6000-056-1	Wire – Terminal Assembly	1	30	51752-404-7	51752-404-7	Diaphragm Switch Kit (Auto) 20'-115V	1
16	324-001-1	324-001-1	Gasket	1	30	51752-405-7	51752-405-7	Diaphragm Switch Kit (Auto) 20'-230V	1
17	19103A052	19103A052	Screw, Hex Hd.	2	31	13421-001-3	13421-001-3	Bracket – Float Switch	1
18	208-000-2	208-000-2	Discharge Flange	1	32*	73-001-1	73-001-1	Wire Nuts	4
19	77-003-1	77-003-1	O-Ring	2					
20	12596-001-2	12596-000-2	Housing, Seal/Bearing	1					
22	13216-000-5	n/a	Power Cord Assembly, 10' w/plug, 115V	1					
22	13216-001-5	n/a	Power Cord Assembly, 20' w/plug, 115V	1					

LIMITED WARRANTY

HYDROMATIC warrants to the original consumer purchaser ("Purchaser" or "You") of HYDROMATIC Sump Pumps, Effluent Pumps, Sewage Pumps (other than 2-1/2"), and Package Systems, that they will be free from defects in material and workmanship for the Warranty Period of 36 months from date of manufacture.

Our warranty will not apply to any product that, in our sole judgement, has been subject to negligence, misapplication, improper installation, or improper maintenance. Without limiting the foregoing, operating a three phase motor with single phase power through a phase converter will void the warranty. Note also that three phase motors must be protected by three-leg, ambient compensated, extra-quick trip overload relays of the recommended size or the warranty is void.

Your only remedy, and HYDROMATIC's only duty, is that HYDROMATIC repair or replace defective products (at HYDROMATIC's choice). You must pay all labor and shipping charges associated with this warranty and must request warranty service through the installing dealer as soon as a problem is discovered. No request for service will be accepted if received after the Warranty Period has expired. This warranty is not transferable.

EXCEPTIONS: Hydromatic Special Application Pumps, Battery Back-Up Sump Pumps, Filtered Effluent Pumps, Grinder Pumps, and 2-1/2" Sewage Pumps are warranted for a period of 12 months from date of purchase or 18 months from date of manufacture, whichever comes first.

HYDROMATIC SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, OR CONTINGENT DAMAGES WHATSOEVER.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE FOREGOING WARRANTIES SHALL NOT EXTEND BEYOND THE DURATION EXPRESSLY PROVIDED HEREIN.

Some states do not allow the exclusion or limitation of incidental or consequential damages or limitations on the duration of an implied warranty, so the above limitations or exclusions may not apply to You. This warranty gives You specific legal rights and You may also have other rights which vary from state to state.

This warranty supersedes and replaces all previous warranty publications.

HYDROMATIC

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