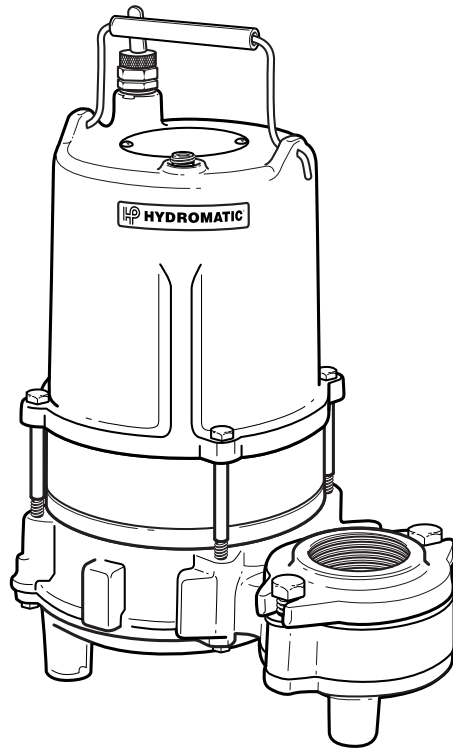
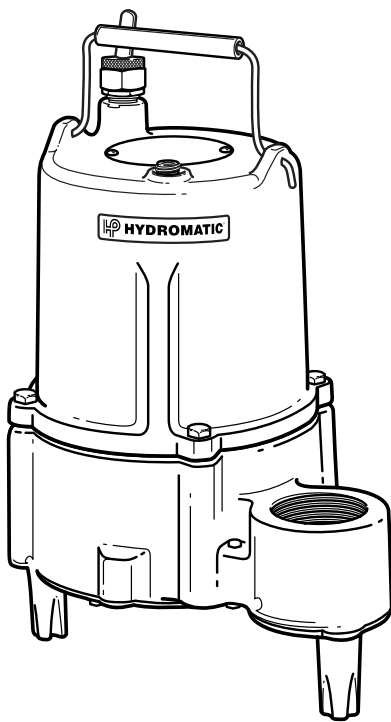




HYDROMATIC®

SHEF50/SHEF100

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 is 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 may exist 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 24" for SHEF50 & 30" for SHEF100).
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 or as your local code requires.
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.

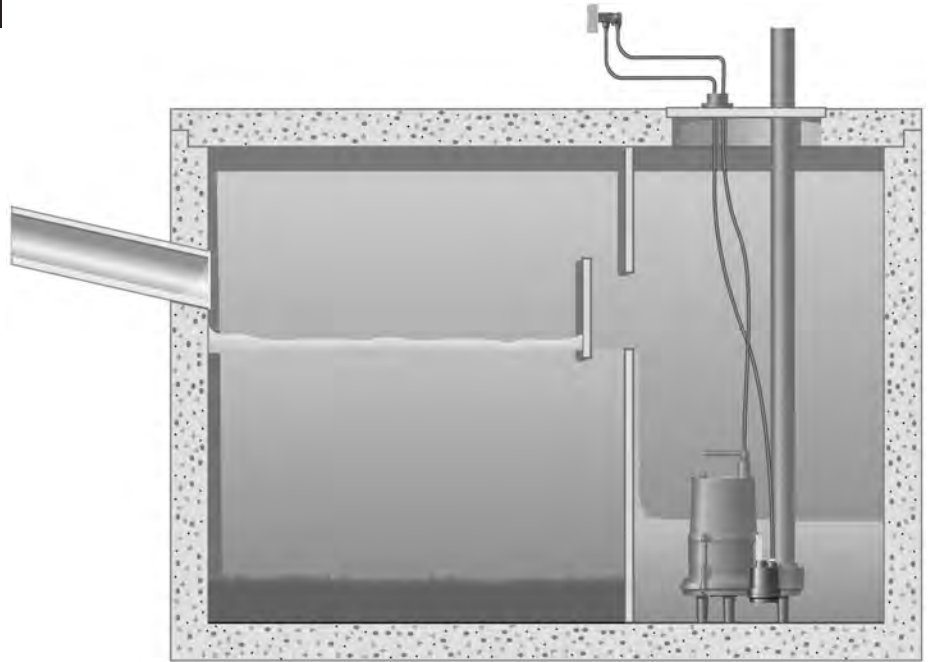
5. Do not remove ground pin from electrical plug.
6. Do not use an extension cord.
7. For proper automatic operation, make sure the pump power cord is plugged into the piggyback (1ø only) receptacle on the wide angle switch cord. 3ø proper panel connections required.
8. Connect to separate electrical 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 code regulations.

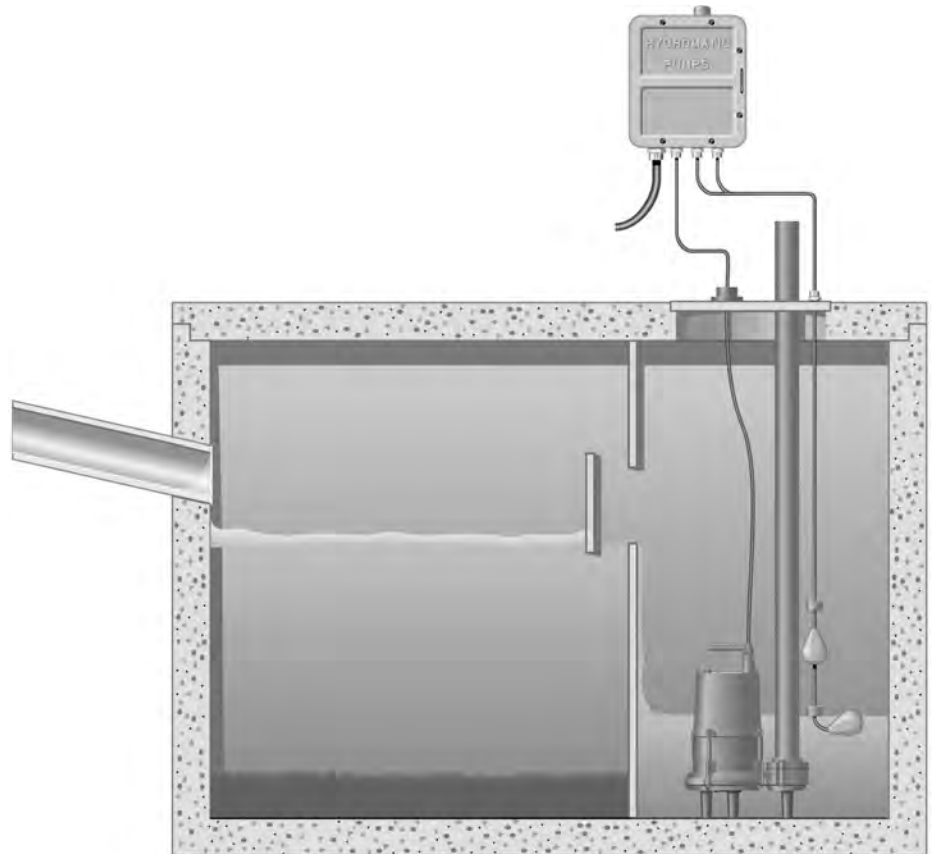
10. In applications where the pump may sit idle for months at a time, it is recommended that the pump(s) be cycled every month to ensure the pumping system is working properly when needed.
11. Hydromatic check valve should be installed in discharge pipe.
12. An audible alarm system such as the Q Alert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

Typical Installation

SHEF50



SHEF100



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 competent electrician should make the installations.

Tools Required:

General shop tools including 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 (control panel) - 3 ϕ and 1 ϕ manual pumps.
2. Miswiring of the float level controls into the panel.
3. Miswiring inside the control panel.
4. Tripped 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
 - e. low voltage supply
5. If automatic pump is used, unplug pump and switch in piggyback connection. Plug pump power cord in properly grounded receptacle. If pump

runs, replace switch. If pump does not run, disconnect power source and continue with check.

6. Tripped overload. If overload is manually reset and then trips off again, the problem could be:
 - a. pump or piping 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 lower than rating, pumping too much liquid
7. Air locked pump. Disconnect piping at union and run until all air bubbles are expelled.
8. Check for air lock. A sump pump is said to be air locked if water traps in the pump and it cannot get out, thus preventing pump from operating.

Hydromatic pumps have a small air vent hole in the impeller cavity to let out trapped air. If this hole becomes plugged, pump may air lock. To break the air lock, use a small screwdriver to clear hole in the impeller cavity.

As a secondary precaution in installations of this type — 1/16" hole should be drilled in the discharge pipe below the check valve. The check valve should be 12 to 18 inches above pump discharge. Do not put check valve directly into pump discharge opening.

NOTE: In sumps where the pump is operating daily, air locking rarely occurs.

9. Wrong impeller rotation (3 ϕ only). Rotation should be counterclockwise 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.

10. Closed discharge gate valve.
11. Plugged impeller or pipeline.
12. Discharge head may be too high. Check elevation against design point of pump (65' SHEF50, 90' SHEF100).
13. Floats not hanging free in the sump.
14. 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 panel (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 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, replace the complete piggyback switch assembly and retest with new assembly.

- 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.

- 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.
- After draining oil, carefully loosen the power cord assembly (#22) from the motor housing (#2). With power cord loose, remove the screws (#4) and carefully lift off the motor housing (#2) exposing the motor assembly.
- On single phase (1 ϕ) units, check capacitor (#28) using ohmmeter. With ohmmeter scale set at R x 1000, attach meter leads to capacitor leads. The meter needle should go to zero and come back slowly. If it does not, the capacitor should be replaced.
- To check motor stator, remove power cord leads from terminals on top of motor (1 ϕ) or remove splice connectors (3 ϕ). If stator is visibly burned, motor assembly must be replaced.

- 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 the 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. Repeat for each leg or wire lead.

- 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 meter 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					
	SHEF50			SHEF100		
	1 ϕ Start	1 ϕ Main	3 ϕ Bal.	1 ϕ Start	1 ϕ Main	3 ϕ Bal.
115V	6.53	1.90	—	—	—	—
230V	6.53	3.80	—	5.06	3.06	9.7
460V	—	—	—	—	—	9.7

- For three phase pumps, remove the power cord assembly (#22) by cutting the butt connection (#21) and remove the power cord from the pump.
- 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.
- 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:

The pump is equipped with a mechanical seal. The seal (#14) consists of a ceramic stationary seat and a carbon rotating ring. To check seal, remove bottom plate (12) and impeller (11).

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 mechanical seal.

There are approximately two quarts of oil in the motor housing. This is a paraffinic “SE-40” process oil.

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

Pump Servicing

Seal:

1. To remove and replace the mechanical seal (#14), the bottom plate (#12) and the impeller (#11) must be removed first.
2. Remove the rotating carbon ring and stainless steel spring.
3. Remove the 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 or rubber 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. 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 placed 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 (#7) and bearing pockets in the volute. 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 wavy washer.
6. 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 stator bolts.
7. 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.

8. Reattach power wires and ground.

9. Clean the motor housing thoroughly, then position it onto the seal plate.

10. 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.

11. Reassemble the lower seal as described.

12. Add a drop of Loctite 222 to the shaft and screw the impeller on hand tight. The impeller (#11) will force the rotating seal half into position.

13. Install bottom plate (#12) and gasket (#15).

14. To replace the power cord (#22) on single phase pumps, as determined on page 2, 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.

15. 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 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 plug (#6).

16. 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 or terminal block.
4. If pump is using the series cord plug, the two plugs may not be plugged tight 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 an authorized Hydromatic 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 (SHEF50) 65' or (SHEF100) 90' 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 (SHEF50H) 65' or (SHEF100) 90' 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.

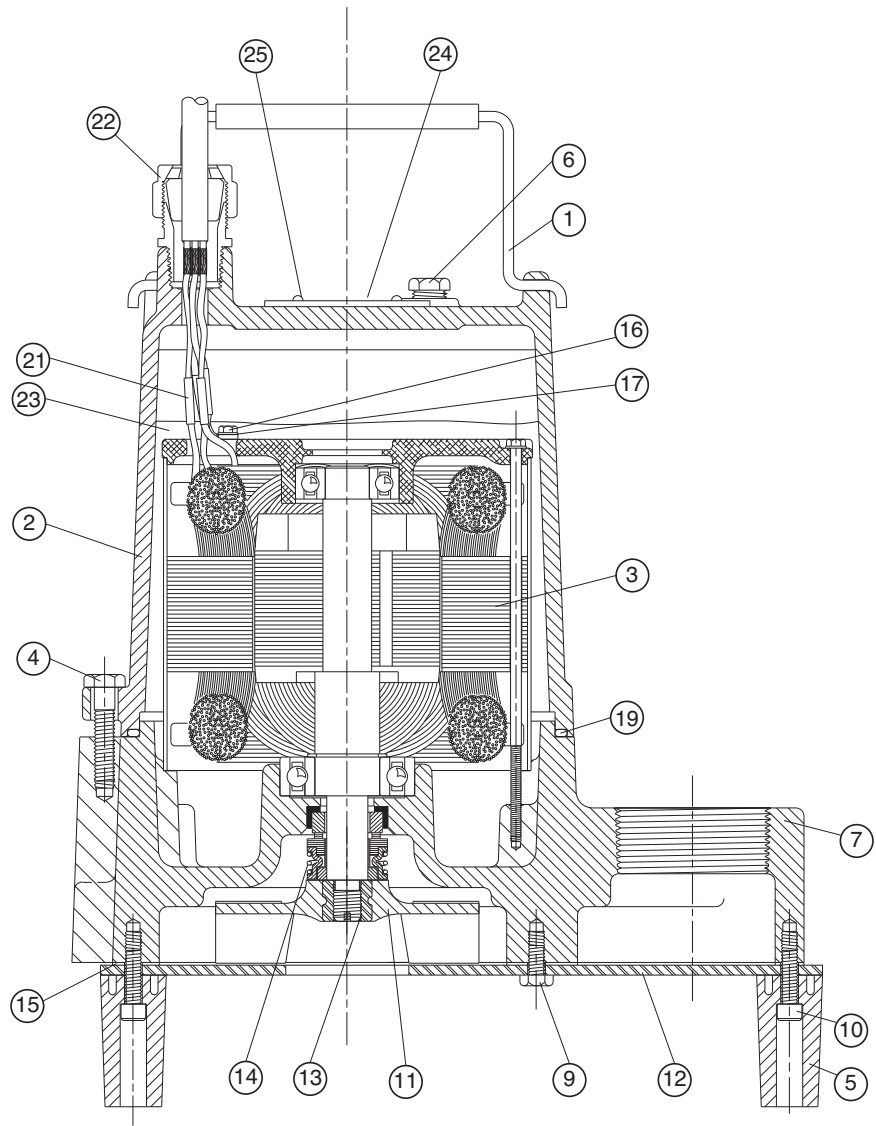
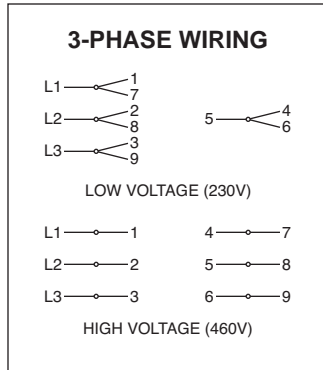
Motor runs for short time then stops. Then after short period starts again. Indicates tripping overload caused by symptom shown.

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.

SHEF50/100 Parts List

50 (51867-004-7)
100 (51871-002-7)



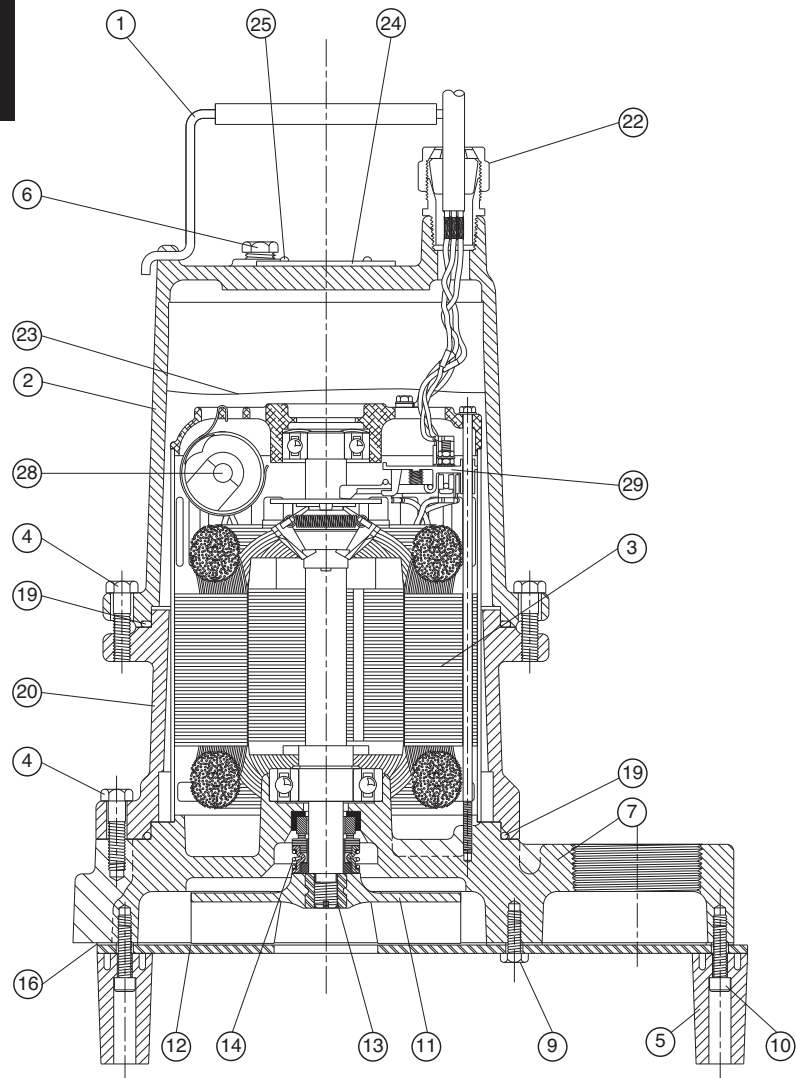
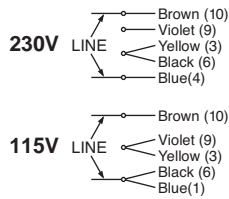
MODEL – SHEF50/SHEF100 THREE PHASE

Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
1	00060-000-5	Handle	1	13	01754-000-1	Loctite Sealant	—
2	00056-022-2	Housing, Motor	1	14	14525A010	Shaft Seal	1
3	13539-000-1	Motor Assembly, 230/460V, SHEF50	1	15	13562-000-1	Gasket, SHEF50	1
3	13541-000-1	Motor Assembly, 230/460V, SHEF100	1	15	13562-001-1	Gasket, SHEF100	1
3	13587-000-1	Motor Assembly, 575V, SHEF50	1	16	12845-001-1	Machine Screw, 8-32x.25	4
3	13588-000-1	Motor Assembly, 575V, SHEF100	1	17	00995-002-1	Lockwasher, #8 Star	4
4	00101-008-1	Screw, Hex Hd. 5/16-18x1.25, SHEF50	4	19	00077-003-1	O-Ring, SHEF50	1
4	00101-008-1	Screw, Hex Hd. 5/16-18x1.25, SHEF100	7	19	00077-003-1	O-Ring, SHEF100	2
5	13507-001-1	Leg, 2"	3	*	12709-000-2	Adapter, SHEF100	1
6	14981-001-1	Pipe Plug, 1/4 NPT	1	21	00073-001-1	Splice Connector	4
7	00202-002-2	Volute Case, SHEF50	1	22	11644-008-5	Power Cord Assembly, 20'	1
7	00202-004-2	Volute Case, SHEF100	1	22	11644-022-5	Power Cord Assembly, 30'	1
9	00176-003-1	Screw, Hex Hd., 1/4-20x.50	5	23		Oil	—
10	00517-010-1	Screw, Hex	3	24		Nameplate	1
11	09640-001-1	Impeller, SHEF50	1	25	04580-001-1	Drive Screw	2
11	09640-002-1	Impeller, SHEF100	1				
12	08521-004-1	Bottom Plate, SHEF50	1				
12	08521-005-1	Bottom Plate, SHEF100	1				

SHEF50/100 Parts List

50 (51867-008-7)
100 (51871-006-7)

1-PHASE WIRING



MODEL – SHEF50/SHEF100 SINGLE PHASE

Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
1	00060-000-5	Handle	1	16	13562-000-1	Gasket, SHEF50	1
2	00056-023-2	Housing, Motor 115V	1	16	13562-001-1	Gasket, SHEF100	1
2	00056-022-2	Housing, Motor 230V	1	19	00077-003-1	O-Ring, SHEF50	1
3	13538-000-1	Motor Assembly, 115/230V, SHEF50	1	19	00077-003-1	O-Ring, SHEF100	2
3	13540-000-1	Motor Assembly, 230V, SHEF100	1	20	12709-000-2	Adapter, SHEF100	1
4	00101-008-1	Screw, Hex Hd. 5/16-18x1.25, SHEF50	4	22	13216-001-5	Power Cord Assembly w/plug, 20', 115V, SHEF50	1
4	00101-008-1	Screw, Hex Hd. 5/16-18x1.25, SHEF100	7	22	13216-004-5	Power Cord Assembly w/plug, 30', 115V, SHEF50	1
5	13507-001-1	Leg, 2"	3	22	13216-002-5	Power Cord Assembly w/plug, 20', 230V	1
6	14981-001-1	Pipe Plug, 1/4 NPT	1	22	13216-005-5	Power Cord Assembly w/plug, 30', 230V	1
7	00202-002-2	Volute Case, SHEF50	1	23	—	Oil	—
7	00202-002-4	Volute Case, SHEF100	1	24	—	Nameplate	1
9	00176-003-1	Screw, Hex Hd. , 1/4-20x.50	5	25	04580-001-1	Drive Screw	2
10	00517-010-1	Screw, Hex Soc. Hd. Cap, 1/4-20x1	3	28	—	Capacitor (Motor Assy)	1
11	09640-001-1	Impeller, SHEF50	1	29	—	Solid State Switch (Motor Assy)	1
11	09640-002-1	Impeller, SHEF100	1	*	13503-001-1	Float Switch Assy, 20', 115V, SHEF50	1
12	08521-004-1	Suction Bottom, SHEF50	1	*	13503-005-1	Float Switch Assy, 30', 115V, SHEF50	1
12	08521-005-1	Suction Bottom, SHEF100	1	*	13503-003-1	Float Switch Assy, 20', 230V	1
13	01754-000-1	Locktite Sealant	—	*	13503-004-1	Float Switch Assy, 30', 230V	1
14	14525A010	Shaft Seal	1				

WARRANTY

Hydromatic® warrants to the original purchaser of each Hydromatic product(s) that any part thereof that proves to be defective in material or workmanship within one year from date of installation or 18 months from manufacture date, whichever comes first, will be replaced at no charge with a new or remanufactured part, F.O.B. factory. Purchaser shall assume all responsibility and expense from removal, reinstallation and freight. Any item(s) designated as manufactured by others shall be covered only by the express warranty of the manufacturer thereof. This warranty does not apply to damage resulting from accident, alteration, design, misuse or abuse. The pump must be installed, operated and maintained in accordance with the published instructions of the appropriate Installation & Service Manual.

All dual seal non-clogs and 3–5 HP grinders must have seal failure and heat sensors attached and functional for Warranty to be in effect. If a seal failure should occur, Hydromatic will cover only the lower seal and labor thereof. Labor is based on Authorized Service Center contract allowance. If the heat sensor is not attached and functional, Warranty is void. If the seal failure sensor is not attached and functional, Warranty is void.

If the material furnished to the Buyer shall fail to conform to this contract or to any of the terms of this written warranty, Hydromatic shall replace such nonconforming material at the original point of delivery and shall furnish instruction for its disposition. Any transportation charges involved in such disposition shall be for the Buyer's account. The Buyer's exclusive and sole remedy on account or in respect of the furnishing of material that does not conform to this contract or to this written warranty, shall be to secure replacement thereof as aforesaid. Hydromatic shall not in any event be liable for the cost of any labor expended on any such material or for any incidental or consequential damages to anyone by reason of the fact that such material does not conform to this contract or to this written warranty.

ALL IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, ARE DISCLAIMED TO THE SAME EXTENT AS THE EXPRESS WARRANTY CONTAINED HEREIN. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

MANUFACTURER EXPRESSLY DISCLAIMS AND EXCLUDES ANY LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY ARISING IN CONNECTION WITH THIS PRODUCT, INCLUDING WITHOUT LIMITATION, WHETHER IN TORT, NEGLIGENCE, STRICT LIABILITY CONTRACT OR OTHERWISE. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion 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.



HYDROMATIC®

Pentair Water

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