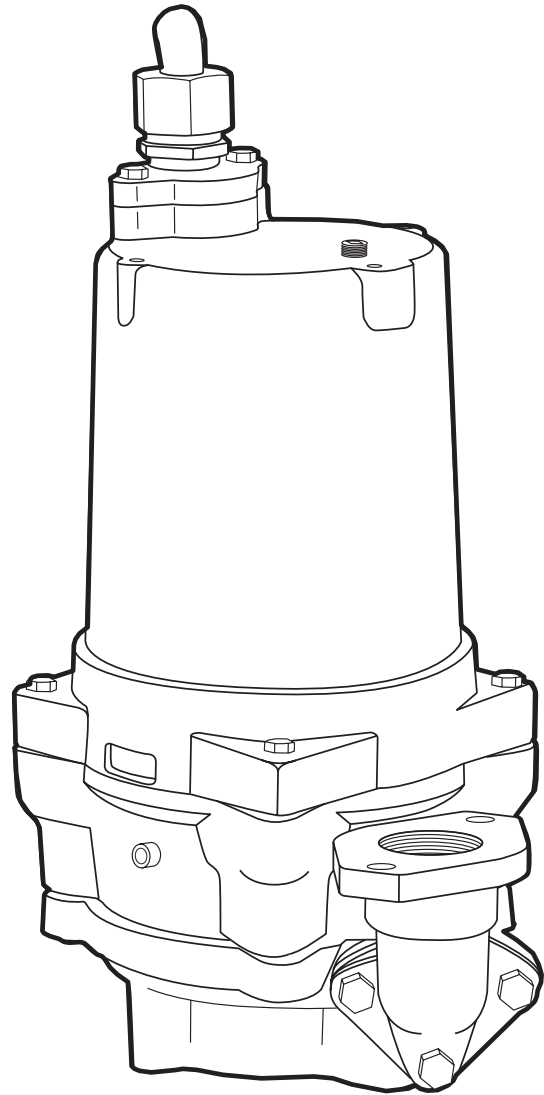




HYDROMATIC®



MODEL HPG200 ADVANCED SUBMERSIBLE GRINDER PUMP

INSTALLATION AND SERVICE MANUAL



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

General Information

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. Reasonable care and safe methods should be practiced. Check local codes and requirements before installation.

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 Cautions and Warnings

CALIFORNIA PROPOSITION 65 WARNING:

▲ WARNING This product and related accessories contain chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

DANGER: Risk of Electrical Shock or Electrocution. May result in serious injury or death or fire hazard. Installer must disconnect all electrical sources prior to installation, handling or servicing. Only qualified personnel may install this system. NFPA 70: National Electric Code® (NEC) or local codes must be followed. System must be properly grounded according to NEC. Do not lift pump by power cord.

DANGER: Biohazard Risk. Once wastewater source has been connected to system, biohazard risk

exists. Installer(s) and/or service personnel must use proper personal protective equipment and follow handling procedures per OSHA 29 CFR 1910.1030 when handling equipment after wastewater source has been connected to system.

DANGER: Risk of Asphyxiation. Installer(s) and/or service personnel must use proper personal protective equipment and follow OSHA 29 CFR 1910.146 or OSHA 29 CFR 1926. Pump may be installed in a location classified as a confined space.

DANGER: Risk of Fire or Explosion. Do not smoke or use open flames in or around this system. HPG200 systems are not intended for use in hazardous locations per NFPA 70: National Electric Code. Do not pump flammable liquids.

DANGER: Cutting Risk. Risk of serious cutting or amputation exists. Disconnect all power sources prior to servicing pump or grinding mechanism. Pump may start without warning. Grinding mechanism is extremely sharp. Use caution when handling grinder mechanism.

DO NOT modify the cord strain relief. When wiring to a system control, connect the pump ground lead to the system ground.

DO NOT run the pump dry. Dry running can overheat the pump (causing burns to anyone handling it) and will void the warranty.

The pump normally runs hot. To avoid burns, allow it to cool for 30 minutes after shutdown before handling it.

Submersible grinder pumps are not approved for use in swimming pools, recreational water installations, decorative fountains or any installation where human contact with the pumped fluid is

common. This specialized pump is designed to incorporate a grinding mechanism to remove wastewater particulate and pump the resulting slurry from a residential structure to a collection system.

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

DO NOT exceed manufacturers recommendation for maximum performance, as this could cause the motor to overheat.

Secure the pump in its operating position so it cannot tip over, fall or slide.

DO NOT pump without safety devices in place.

Basin must be vented in accordance with the local plumbing codes.

The Pump

Pump Description:

The Hydromatic® pumps covered by these instructions are submersible grinder pumps.

The cutter blades are on the suction side of the centrifugal pump impeller and discharge directly into the inlet of the impeller. The integral stainless steel pump motor shaft is sealed by two mechanical seals with an oil chamber between the seals to provide lubrication for both seal faces.

Two ball bearings are used to handle the loads in this design, similar to most of Hydromatic's solids handling pumps. The upper bearing takes radial load, while the larger lower bearing handles both thrust and radial loads. Both bearings are permanently lubricated by the dielectric oil in the motor housing. The motor is fixed within the motor housing and is completely submerged in the dielectric oil for maximum heat transfer. The motor housing and

seal chamber are completely sealed with O-rings located at mating part faces.

The power cord entry system is designed to give double sealing. The chamfered pilot of the motor housing mates with the molded cord end to form the first seal. The cord grip forms the second seal around the molded cord end and provides strain relief. The cable on the HPG model includes the leads for both heat sensors (motor protection) and the seal sensor lead for seal leakage detection.

The cutters are designed to be self adjusting and will not need to be shimmed or reset.

Application:

These pumps are designed for either residential or industrial sewage discharge applications with a pH ranging from 5 to 9, specific gravities from 0.9 to 1.1, viscosities ranging from 28 to 35 S.S.U., and temperatures up to 140°F.

Codes:

All local wiring codes must be observed. Consult the local inspector before installation to avoid costly delays that can occur due to rejection after job is finished.

Pump Installation

Unpacking Pump:

Remove pump from carton. When unpacking unit, check for concealed damage. Claims for damage must be made at the receiving end through the delivery carrier. Damage cannot be processed from the factory.

Location:

If pumps are installed in an existing basin or concrete sump, the piping can either be connected permanently or rails and brackets

can be furnished for mounting to walls of basin. In either case, be sure that the Hydromatic® solids handling check valve is used and that the pumps are submerged in a vertical position. The complete factory built packaged system is recommended for the most satisfactory installation and generally for the lowest cost where expensive installation labor is involved.

Electrical Connections:

Make all connections from motor to control panel to comply with local codes.

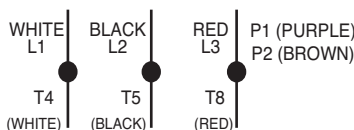
CAUTION: Make sure that the ground wire is securely connected and that the unit is properly grounded in accordance with local codes.

SENSOR LEADS

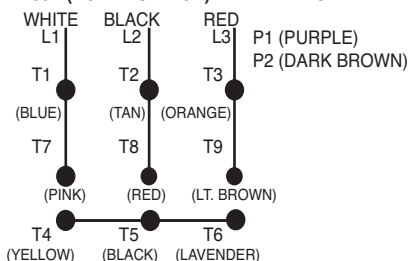
WHITE W/BLACK STRIPE - P1
BLUE - P2
ORANGE - SEAL PROBE

MOTOR LEADS

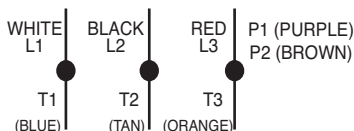
208 - 230V SINGLE PHASE



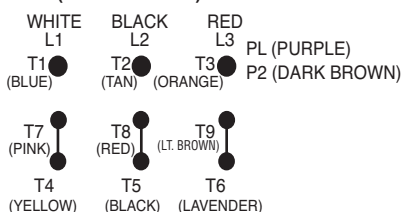
230V (DUAL VOLTAGE) THREE PHASE



200V AND 575V THREE PHASE



460V (DUAL VOLTAGE) THREE PHASE



ELECTRICAL CONNECTIONS		
	1 Phase	3 Phase
Green	Ground	Ground
Red	Start Power Line	Power Line
White	Main Power Line	Power Line
Black	Common Power Line	Power Line
Orange	Seal Failure	Seal Failure
Blue	Heat Sensor	Heat Sensor
White w/ black stripe	Heat Sensor	Heat Sensor

Pump Operations

To reduce the risk of electrical shock, install only on a GFCI protected circuit. See pump nameplate for electrical ratings.

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

1. When grinder pump is single phase, no rotation check is necessary. Correct rotation is counter-clockwise.
2. Run water into sump until motor is covered.
3. Open gate valve in discharge line.
4. Turn pump on. If pump runs and sump liquid does not pump down, stop pump and close discharge gate valve. Lift pump until sealing flange is open to vent off trapped air. Lower pump, open discharge valve, and start the pump again.

CAUTION: Positive displacement pump is designed to operate at minimum 5 GPM capacity. Running pump at shut-off condition or with gate valve closed can result in damage to the pumping stator boot and rotor.

5. Level control should be set so that pump turns off when level is about 2 inches above inlet of pump suction and turns on when level is about 2 inches above motor.

6. If problems occur, check power source. Make sure a separate supply line is available. Verify voltage supply.
7. Check resistance of windings. If not within guidelines, return pump to authorized factory service center.

As the motors are oil filled, no lubrication or other maintenance is required. Pump should be checked every quarter for corrosion and wear.

Pump Maintenance

Pump Disassembly, Inspection, Reassembly:

1. Close gate valve at pump discharge.
2. Turn off circuit breaker.
3. Remove pump from sump.
4. Unscrew cap screws and remove the volute from the pump. Note: under certain circumstances it may be necessary to remove the discharge piping.
5. Remove the axial and radial cutters from the shaft and inspect for excessive wear or damage. If the axial cutter is damaged or is excessively worn, flip the axial cutter to the unworn side and reattach to the radial cutter.
6. Inspect the stationary cutter for wear or damage. If the cutter requires removal, loosen the machine screw in cutter retainer and remove cutter retainer and slide the cutter out of the volute. If cutter is damaged or worn, reinstall on the opposite side, making sure to snug (DO

NOT OVERTIGHTEN) the Allen head screw. It is good practice to add a light coat of removable locking adhesive to the Allen screw.

7. Inspect the volute O-ring for damage. If cracked or torn, replace with the proper Hydromatic® part.
8. To reassemble the pump, place the cutters on the splined shaft and orient the cutters so that the axial cutter blades fall between the impeller vanes. Hold tension on the cutters and replace the volute and cap screws, making sure the O-ring is placed in the proper position. Evenly torque the cap screws.

Replacing Seals on Dual Seal HPG200 Model:

1. Drain the oil in the seal chamber by removing the drain plug on the side of the pump. If it contains water, the lower seal has failed and should be replaced. The motor housing should be drained and the upper seal replaced if the lower seal has failed, since foreign material in the seal chamber may have damaged the upper seal.

2. Remove the volute and cutters per the instructions listed under the **Pump Disassembly, Inspection, Reassembly** section in this manual.
3. To remove the impeller, secure the shaft by threading the radial cutter onto the shaft and holding it with a pair of pliers. Hold a wood block against the impeller vane and tap it with a hammer until it spins off.
4. Using a pair of snap ring pliers, remove the snap ring that secures the lower seal. Remove the lower seal rotating elements by sliding the spring off the shaft. Then using two screwdrivers, slide the carbon assembly off by prying on the retaining ring.
5. Loosen and remove the cap screws that hold on the seal housing, then remove the seal housing. Using a socket that will fit onto the back of the seal, tap the stationary seal assembly out of the seal housing.
6. Using a pair of snap ring pliers, remove the snap ring that secures the upper seal. Remove the spring retainer and spring from the shaft, and

hp	RPM	VOLT	PHASE	WINDING RESISTANCE IN OHMS		
				BLACK TO WHITE	BLACK TO RED	RED TO WHITE
2	3450	208	1	1.30	5.08	6.35
2	3450	230	1	1.57	8.00	9.57
2	3450	200	3	2.86	2.86	2.86
2	3450	230	3	3.31	3.31	3.31
2	3450	460	3	13.25	13.25	13.25
2	3450	575	3	28.2	28.2	28.2

MAXIMUM AMP & WINDING RESISTANCE VALUES

SINGLE PHASE
BLACK - COMMON
WHITE - MAIN
RED - START

THREE PHASE
BLACK - L₁
WHITE - L₂
RED - L₃

using the same method as used for the lower seal, remove the carbon seal assembly.

7. With a pair of screwdrivers, pry up on the seal/bearing plate. Remove the seal/bearing plate until you have access to the seal sensor wire, then carefully pull the seal sensor wire off the seal probe which will allow the complete removal of the seal bearing plate.
8. Take a socket and tap out the stationary portion of the seal from the seal/bearing plate in the same manner as used for the lower stationary seal.
9. After checking both of the O-rings, replace the seal bearing plate in the motor housing, making sure that the seal sensor wire has been reattached to the seal probe. Use O-ring lube to prevent cutting in assembly.
10. Take the stationary portion of the new seal, and lube the rubber material with a good quality dielectric oil. Press the stationary portion of the new seal into the seal/bearing plate.

CAUTION: Do not reuse old seal parts. Replace all parts with new. Mixing old and new parts could cause immediate seal failure.

11. Using a good quality dielectric oil, lube the rubber material on the carbon seal assembly and press it on the shaft. Place the spring and the seal retainer on the shaft as removed. Replace the snap ring.
12. Carefully place the seal housing onto the seal bearing

plate, replace the cap screws, and evenly tighten.

13. Using a pressure gauge with a fill stem, pressurize the motor housing to no more than 7 psig with dried air and check for leaks. If after several minutes the gauge reads the same, the seal is good and you can continue with assembly.

NOTE: It is normal to observe some air bubbles in the seal area initially as the seal seats. If bubbles do not stop within a few seconds, the seal is either not properly installed or is damaged.

14. Following the same procedure outlined in steps 10 through 13, install the lower seal assembly. Replace the impeller using a removable locking adhesive.
15. Reassemble the cutters and volute as outlined in the **Pump Disassembly, Inspection, Reassembly** section of this manual.
16. Refill all chambers with a good quality dielectric oil. Fill the motor housing so that the tops of the motor windings have been covered (2500 ml), but leave an air gap to allow for expansion of the oil. Fill the seal chamber with 700 ml of oil so that an air gap also exists.

Replacing Motor Stator:

1. If the replacement of the stator is necessary, first follow the disassembly steps outlined in the previous sections of the manual.

2. Remove the shaft rotor assembly from the motor housing, making note that a wave washer is used on the top of the upper bearing.
3. Place motor housing vertically on the bench and remove the cord grip. Carefully remove the power cord from the pump, making sure that the wires are not damaged. Clip the power cable leads, taking note of the wire connections, and then remove the power cable.
4. Turn the motor housing over and remove the stator bolts from the stator, then remove the stator from the motor housing.
5. Place new stator into the motor housing while pulling the new leads through the power cord opening in the motor housing. Replace the stator bolts and tighten. Replace the seal sensor wire along the side of the stator.
6. Attach the power cord to the stator leads and the sensor leads using insulated butt connector. Once attached, carefully tuck the wires into the motor housing making sure that they will not come in contact with the rotor. Press the power cord molded end into chamber in the motor housing.
7. Apply a sealant to the threads on the body of the cord grip that will enter the motor housing, then slide onto the power cord and tighten snugly. **DO NOT OVERTIGHTEN.** Attach the cord grip nut onto the cord grip and snug.

8. Examine the bearings on the shaft/rotor assembly. If when rotated they feel rough, replace. When reinstalling new bearings, press only on the inner ring of the bearing or damage may occur.
9. Replace the wave washer into the upper bearing pocket in the motor housing, then reinstall the rotor and shaft assembly.
10. Follow the previously outlined steps to reassemble the pump from this point.
11. Always run pump for a few seconds after assembly work to be sure all parts run smoothly before replacing it in the sump. Check again for correct rotation. Pump should rotate counterclockwise when viewed from the suction end.

NOTE: When applying power, be sure the pump is restrained from turning by holding the pump at the motor housing, or by clamping it in a holding fixture.

Pump Troubleshooting

Below is a list of troubles and their probable causes:

No liquid delivered

1. Pump air bound
2. Discharge head too high
3. Pump or piping plugged
4. Wrong rotation
5. Speed too low

Insufficient liquid delivered

1. Discharge head too high
2. Impeller or cutters impartially plugged or damaged
3. Wrong rotation
4. Incorrect diameter impeller
5. Speed too low

Insufficient discharge pressure

1. Wrong rotation
2. Air or gases in liquid
3. Impeller damages
4. Incorrect impeller diameter
5. Speed too low

Pump overloads motor

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

Pump is noisy

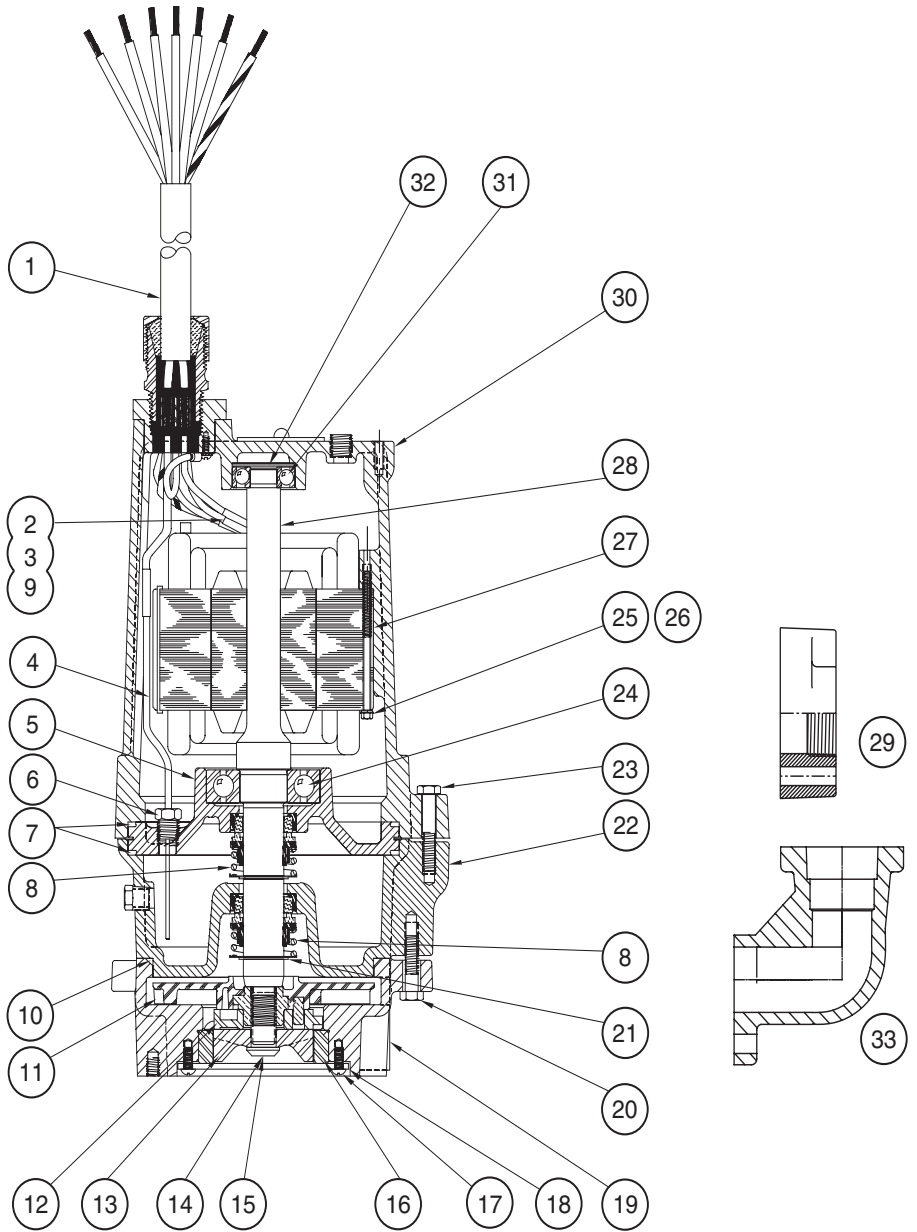
1. Defective bearings
2. No axial clearance between impeller and volute
3. No diametral clearance between radial cutter and cutter ring

If the cause of the trouble cannot be determined and corrected as outlined above, contact your nearest factory representative.

HPG200 Parts List

ORDERING REPLACEMENT PARTS: Product improvements are made from time to time. The latest part design will be furnished as long as it is interchangeable with the old part. When ordering replacement parts, always furnish the following information: (1) pump serial number, (2) pump model and size, (3) part description, (4) part number, (5) impeller diameter (if ordering impeller), (6) quantity required and (7) shipping instructions.

Ref. No.	Part No.	Part Description	Qty.
1	144240025	POWER CORD – 20'	1
	144240115	POWER CORD – 35'	1
2	116750001	BUTT CONNECTOR	
		230, 1 ϕ ; 200, 1 ϕ ; 575, 3 ϕ ; 200, 3 ϕ	6
		230, 3 ϕ	3
		460, 3 ϕ	9
3	116910001	BUTT CONNECTOR	3
4	060000141	WIRE w/TERMINAL	1
5	134880002	SEAL/BEARING PLATE	1
6	084720015	SEAL FAILURE ASSY.	1
7	05876A120	O-RING	S
8	003000001	SHAFT SEAL – 1"	S
9	000730011	WIRE CONNECTOR – 230, 3 ϕ	1
10	001500421	O-RING	S
11	070330023	IMPELLER – 5.00"	1
	070330043	IMPELLER – 4.50"	1
	070330063	IMPELLER – 4.00"	1
12	055060022	AXIAL CUTTER	1
13	054050012	RADIAL CUTTER	1
14	148850001	MACHINE SCREW	1
15	055700051	IMPELLER WASHER	1
16	055050002	STATIONARY CUTTER	1
17	000300041	MACHINE SCREW	3
18	077630001	CUTTER RETAINER	1
19	135001002	VOLUTE CASE	1
20	19100A012	HEX HEAD CAP SCREW – 5/16	4
21	009750021	RETAINING RING	2
22	134890012	SEAL HOUSING	1
23	001010111	HEX HEAD CAP SCREW – 5/16	4
24	000650271	BALL BEARING	1
25	000250091	MACHINE SCREW PER B/M	4
26	05454A009	LOCK WASHER	4
27	21573C100	STATOR – 230V, 1 ϕ	1
	21573C102	STATOR – 230–460V, 3 ϕ	1
	21573C103	STATOR – 575V, 3 ϕ	1
	21573C101	STATOR – 200V, 3 ϕ	1
	21573C104	STATOR – 200V, 1 ϕ	1
28	108321005	ROTOR/SHAFT – 1 ϕ	1
	108231005	ROTOR/SHAFT – 3 ϕ	1
29	134950002	HORIZONTAL ADAPTER	1
30	134941002	MOTOR HOUSING	1
31	08565A013	BALL BEARING	1
32	000640011	WAVE SPRING	1
33	134962002	VERTICAL ADAPTER (std.)	1
*	517004027	SEAL KIT	
	131880001	CUTTER SHIM	As Req'd.
	006280391	IMPELLER SHIM	As Req'd.



Notes: S – Parts in Seal Kit
 – Fill oil to above motor windings

STANDARD LIMITED WARRANTY

Pentair Hydromatic® warrants its products against defects in material and workmanship for a period of 12 months from the date of shipment from Pentair Hydromatic or 18 months from the manufacturing date, whichever occurs first – provided that such products are used in compliance with the requirements of the Pentair Hydromatic catalog and technical manuals for use in pumping raw sewage, municipal wastewater or similar, abrasive-free, noncorrosive liquids.

During the warranty period and subject to the conditions set forth, Pentair Hydromatic, at its discretion, will repair or replace to the original user, the parts that prove defective in materials and workmanship. Pentair Hydromatic reserves the right to change or improve its products or any portions thereof without being obligated to provide such a change or improvement for prior sold and/or shipped units.

Start-up reports and electrical schematics may be required to support warranty claims. Submit at the time of start up through the Pentair Hydromatic website: <http://forms.pentairliterature.com/startupform/startupform.asp?type=h>. Warranty is effective only if Pentair Hydromatic authorized control panels are used. All seal fail and heat sensing devices must be hooked up, functional and monitored or this warranty will be void. Pentair Hydromatic will cover only the lower seal and labor thereof for all dual seal pumps. Under no circumstance will Pentair Hydromatic be responsible for the cost of field labor, travel expenses, rented equipment, removal/reinstallation costs or freight expenses to and from the factory or an authorized Pentair Hydromatic service facility.

This limited warranty will not apply: (a) to defects or malfunctions resulting from failure to properly install, operate or maintain the unit in accordance with the printed instructions provided; (b) to failures resulting from abuse, accident or negligence; (c) to normal maintenance services and parts used in connection with such service; (d) to units that are not installed in accordance with applicable local codes, ordinances and good trade practices; (e) if the unit is moved from its original installation location; (f) if unit is used for purposes other than for what it is designed and manufactured; (g) to any unit that has been repaired or altered by anyone other than Pentair Hydromatic or an authorized Pentair Hydromatic service provider; (h) to any unit that has been repaired using non factory specified/OEM parts.

Warranty Exclusions: PENTAIR HYDROMATIC MAKES NO EXPRESS OR IMPLIED WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. PENTAIR HYDROMATIC SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR ANY PARTICULAR PURPOSE.

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