

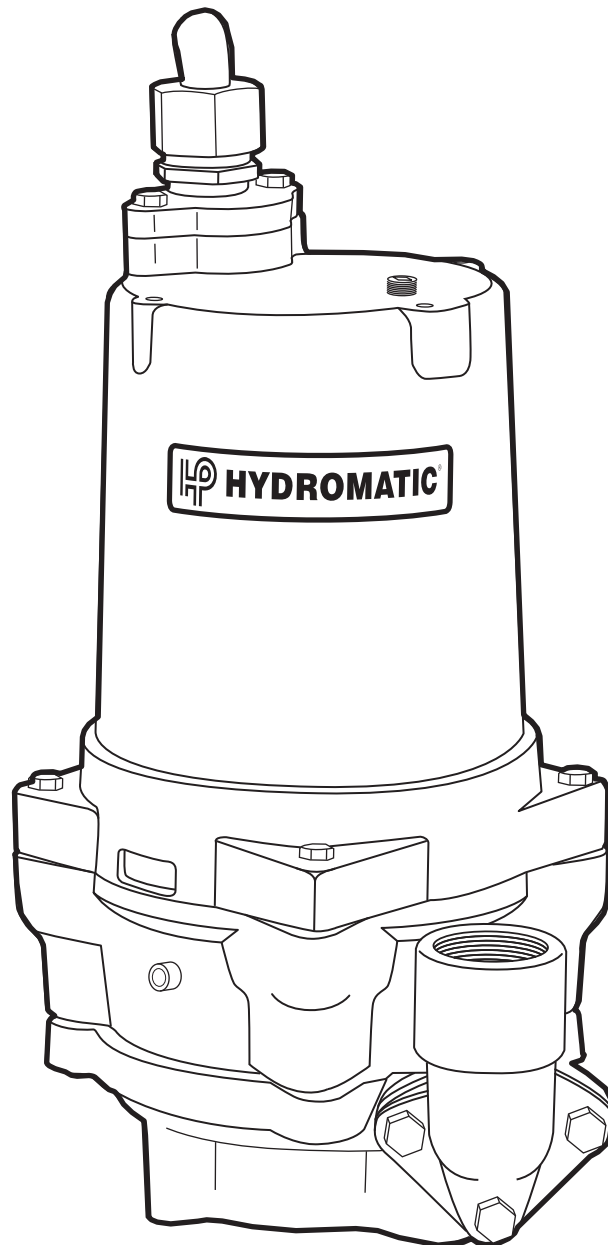
Installation and Service Manual

ADVANCED SUBMERSIBLE GRINDER PUMP

Model HPG200



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

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

Warning:

Only qualified personnel shall install or service this pump.

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 Cautions and Warnings

1. **CAUTION** – To reduce risk of electrical shock, pull plug before servicing this pump.

2. **WARNING** – Risk of electrical shock—this pump has not been investigated for use in swimming pool areas.
3. **WARNING** – See installation and service manual for proper installation.
4. **WARNING** – To reduce risk of electrical shock, pump is provided with grounding wire. Be certain that it is connected to ground.
5. **WARNING** – Hazardous moving parts. To reduce the risk of injury, disconnect power before servicing pump.
6. **CAUTION** – To reduce the risk of electrical shock, **DO NOT** remove cord or strain relief. **DO NOT** connect conduit to pump. Electrical installations shall be in accordance with the National Electrical Code and all applicable local codes and ordinances.
7. For use with maximum 140°F water.
8. Septic tank should be vented in accordance with local plumbing codes and should not be installed in locations classified as hazardous, in accordance with the National Electrical Code, ANSI/NFPA 70-1999.
9. **CAUTION** – Risk of electrical shock. Do not remove cord and strain relief. Do not connect conduit to pump.
10. **WARNING** – Severe injury may result from accidental contact with moving cutters. Keep clothing, hands and feet away from cutters any time power is connected to the pump.
11. **CAUTION** – Never work on pump with power on. Make sure that the ground wire is securely connected and that the unit is properly grounded in accordance with local 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.

Receiving Pump:

Inspect pumps on arrival for possible concealed damage in shipping. Any damage should be reported immediately to delivering carrier. Claims for damage must originate at the receiving end. Claims for shipping damage cannot be processed at the factory.

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 non-clog 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.

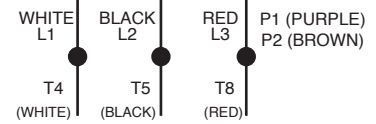
ELECTRICAL CONNECTIONS		
	1 Phase	3 Phase
Green	Ground	Ground
Red	Start Power Line	Power Line
White	Main Power Line	Power Line
Black	Common Power Line	Power Line
Orange	Seal Failure	Seal Failure
Blue	Heat Sensor	Heat Sensor
White w/ black stripe	Heat Sensor	Heat Sensor

SENSOR LEADS

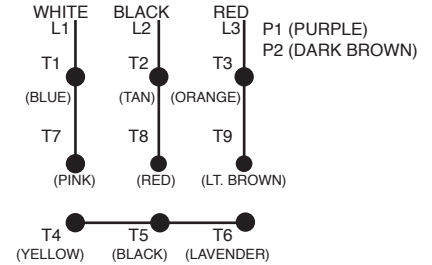
WHITE W/BLACK STRIPE - P1
 BLUE - P2
 ORANGE - SEAL PROBE

MOTOR LEADS

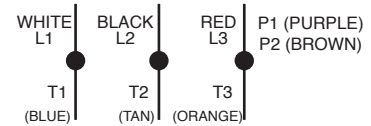
208 - 230V SINGLE PHASE



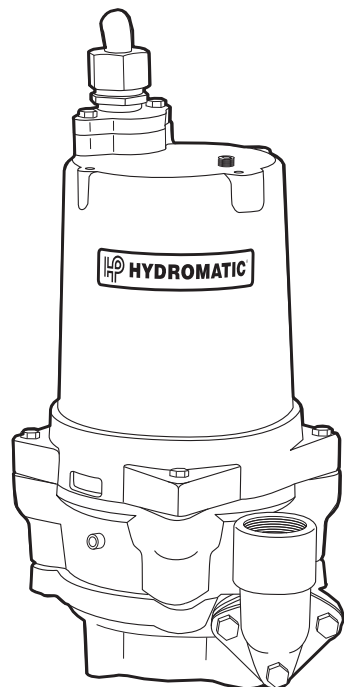
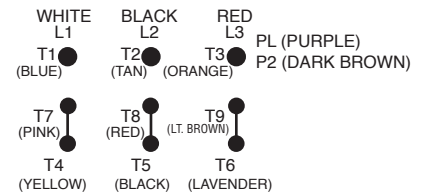
230V (DUAL VOLTAGE) THREE PHASE



200V AND 575V THREE PHASE



460V (DUAL VOLTAGE) THREE PHASE



Pump Operations

Starting the Pump:

WARNING: Severe injury may result from accidental contact with moving cutters. Keep clothing, hands and feet away from cutters any time power is connected to the pump.

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

1. If pump is 3 phase, the rotation of the cutters must first be checked. Lift pump from sump, lay it down, and quickly turn pump on and then off.

The cutter should turn counterclockwise when viewed from the suction. If rotation is wrong, turn off main breaker and interchange any two line leads to motor to correct rotation. If pump is single phase, no rotation check is necessary.

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. Then lift pump until sealing flange is open to vent off trapped air. Lower pump, open discharge valve, and start the pump again.
5. If pump is 3 phase, piped-in permanently, and still does not operate properly after venting, rotation is wrong and can be reversed by interchanging any two line leads.
6. Level controls 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.

7. If problems occur check the power source. Make sure a separate supply line is available. Verify voltage supply.
8. Check resistance windings (see chart). If not within guide lines, return pump to an authorized Hydromatic service center.

Pump Maintenance

Pump Disassembly, Inspection, Reassembly:

1. Close gate valve at pump discharge.
2. Turn off circuit breaker.

CAUTION: Never work on pump with power on. Make sure that the ground wire is securely connected and that the unit is properly grounded in accordance with local codes.

3. Remove pump from sump.
4. Unscrew cap screws (21) and remove the volute (20) from the pump. Note: under certain circumstances it may be necessary to remove the discharge piping.

5. Remove the axial (12) and radial (13) 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 (17) for wear or damage. If the cutter requires removal, loosen the machine screw (18) in cutter retainer (19) 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 (10) for damage. If cracked or torn, replace with the proper Hydromatic part.
8. To reassemble the pump, place the cutters (13) and (12) on the splined shaft (29) and orient the cutters so that the axial cutter blades fall between the impeller vanes. Hold tension on the cutters and replace the volute (20) and cap screws (21), making sure the O-ring (10) is placed in the proper position. Evenly torque the cap screws.

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

Replacing Seals Dual Seal HPG200 Model:

1. Drain the oil in the seal chamber by removing the drain plug (9) 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 (11), secure the shaft by threading the radial cutter (12) 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 (22) that secures the lower seal (8). Remove the lower seal rotating elements by sliding the spring off the shaft (29). Then using two screwdrivers, slide the carbon assembly off by prying on the retaining ring.
5. Loosen and remove the cap screws (24) that hold on the seal housing, then remove the seal housing (23). Using a socket that will fit onto the back of the seal, tap the stationary seal assembly out of the seal housing (23).
6. Using a pair of snap ring pliers, remove the snap ring (22) that secures the upper seal (8). Remove the spring retainer and spring from the shaft, and 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 (5). Remove the seal/bearing plate until you have access to the seal sensor wire (4), then carefully pull the seal sensor wire off the seal probe (6) 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 (5) in the same manner as used for the lower stationary seal.
9. After checking both of the O-rings (7), replace the seal bearing plate (5) in the motor housing (31), making sure that the seal sensor wire (4) has been reattached to the seal probe (6). Use O-ring lube to prevent cutting in assembly.
10. Take the stationary portion of the new seal (8), and lube the rubber material with a good quality dielectric oil (30). Press the stationary portion of the new seal into the seal/bearing plate (5).
11. Using a good quality dielectric oil (30), lube the rubber material on the carbon seal assembly (8) and press it on the shaft. Place the spring and the seal retainer on the shaft as removed. Replace the snap ring (22).
12. Carefully place the seal housing (23) onto the seal bearing plate (5), replace

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

the cap screws (24), 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 (8). 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 (30). 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 (29) from the motor housing (31), making note

Pump Maintenance

that a wave washer (33) is used on the top of the upper bearing (32).

- Place motor housing vertically on the bench and remove the cord grip (1). Carefully remove the power cord (1) 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.
- Turn the motor housing over and remove the stator bolts (26) from the stator (28), then remove the stator from the motor housing (31).
- Place new stator (28) into the motor housing (31) while pulling the new leads through the power cord opening in the motor housing. Replace the stator bolts (26) and tighten. Replace the seal sensor wire (4) along the side of the stator.
- Attach the power cord (1) to the stator (28) leads and the sensor leads using insulated butt connector (2). 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 (31).
- Apply a sealant to the threads on the body of the cord grip (1) that will enter the motor housing (31), then slide onto the power cord (1) and tighten snugly.

DO NOT OVERTIGHTEN.

Attach the cord grip nut onto the cord grip and snug.

- Examine the bearings (32) and (25) on the shaft/rotor assembly (29). If when rotated they feel rough, replace. When reinstalling new bearings, press only on the inner ring of the bearing or damage may occur.
- Replace the wave washer (33) into the upper bearing pocket in the motor housing (31), then reinstall the rotor and shaft assembly (29).
- Follow the previously outlined steps to reassemble the pump from this point.
- 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.

WARNING: Severe injury may result from accidental contact with moving cutters. Keep clothing, hands and feet away from cutters any time power is connected to the pump.

Pump Troubleshooting

Below is a list of troubles and their probable causes:

No liquid delivered

- Pump air bound
- Discharge head too high

- Pump or piping plugged
- Wrong rotation
- Speed too low

Insufficient liquid delivered

- Discharge head too high
- Impeller or cutters impartially plugged or damaged
- Wrong rotation
- Incorrect diameter impeller
- Speed too low

Insufficient discharge pressure

- Wrong rotation
- Air or gases in liquid
- Impeller damages
- Incorrect impeller diameter
- Speed too low

Pump overloads motor

- Wrong rotation
- Specific gravity or viscosity of liquid too high
- Speed too high
- Head lower than rating, pumping too much liquid
- Pump clogged
- Defective bearings
- Defective impeller

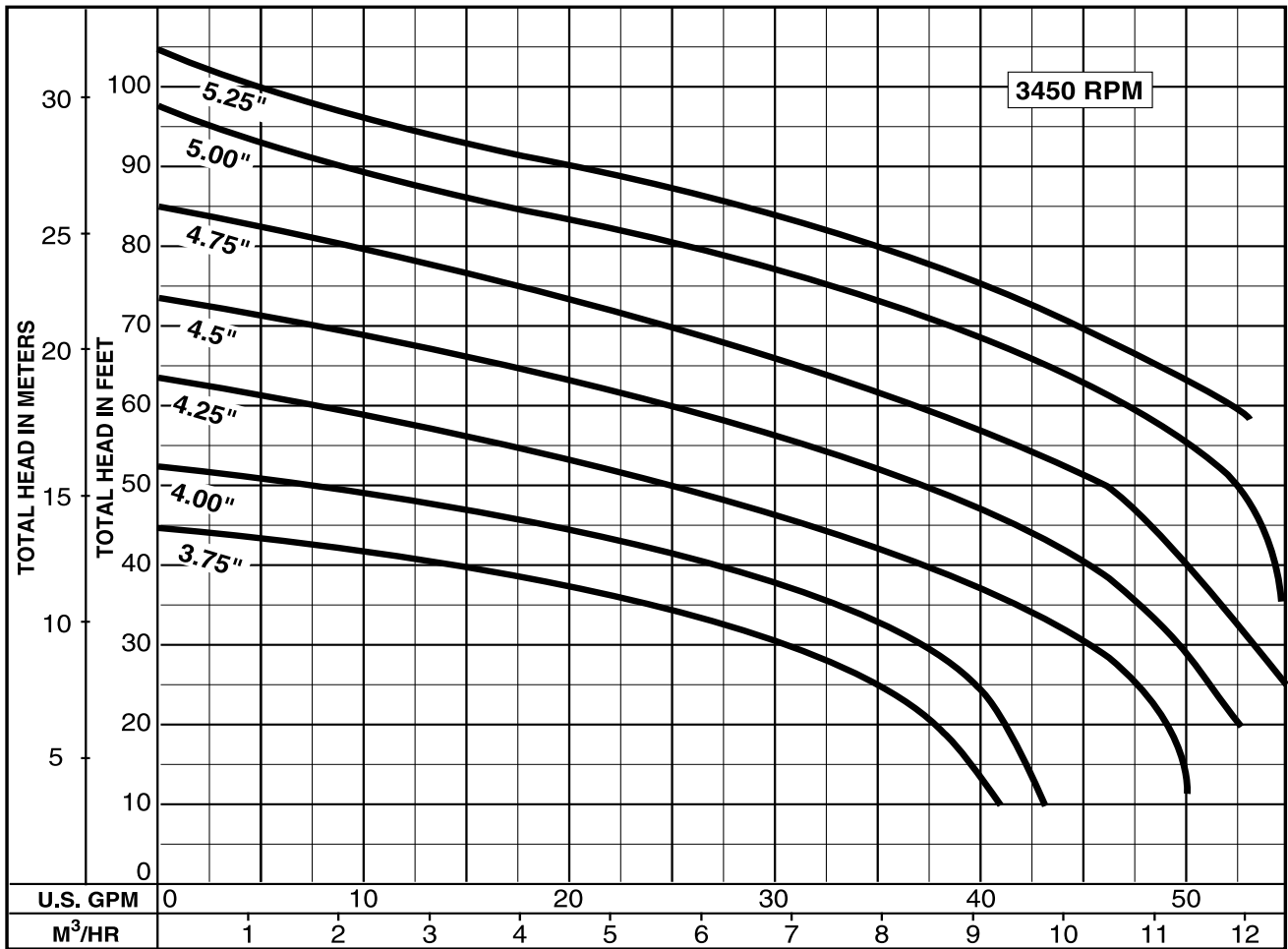
Pump is noisy

- Defective bearings
- No axial clearance between impeller and volute
- 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.

Pump Performance

PERFORMANCE CURVE



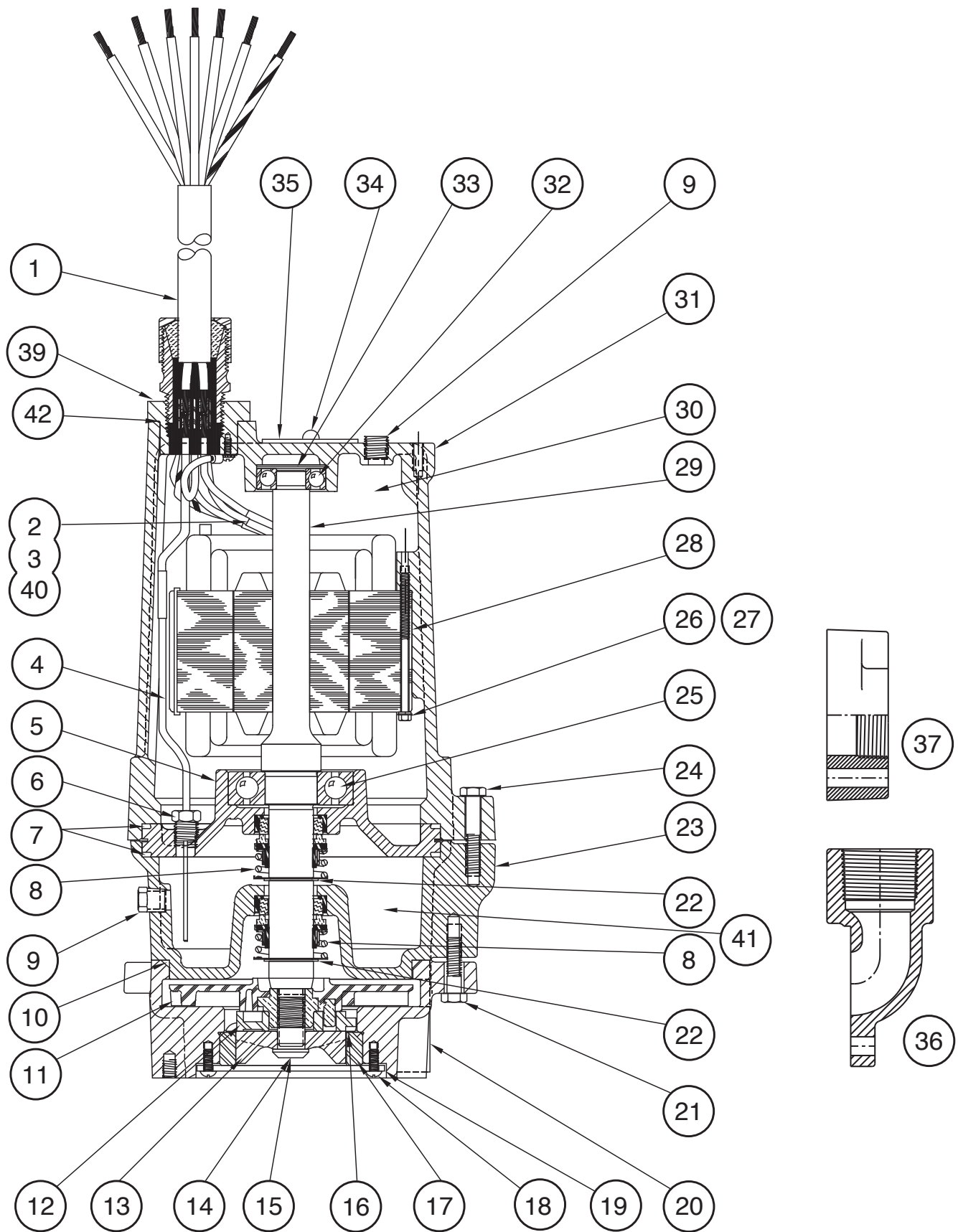
HPG200 Parts List

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.	Ref. No.	Part No.	Part Description	Qty.	Ref. No.	Part No.	Part Description	Qty.
1	14424-002-5	POWER CORD 20'	1	14	14885-000-1	MACHINE SCREW	1	29	10832-100-5	ROTOR/SHAFT 1 PHASE	1
1	14424-011-5	POWER CORD 35'	1	15	05570-005-1	IMPELLER WASHER	1		10823-100-5	ROTOR/SHAFT 3 PHASE	1
2	11675-000-1	BUTT CONNECTOR		16	13188-000-1	SHIM	1	30	24709110000	PARAFFINIC OIL	0.88
		230-1, 200-1, 575-3, 200-3	6	17	05505-000-2	STATIONARY CUTTER	1	31	13494-100-2	MOTOR HOUSING	1
		230-3	3	18	00030-004-1	MACHINE SCREW	3	32	08565A013	BALL BEARING	1
		460-3	9	19	07763-000-1	CUTTER RETAINER	1	33	00064-001-1	WAVE SPRING	1
3	11691-000-1	BUTT CONNECTOR	3	20	13500-100-2	VOLUTE CASE	1	34	04580-001-1	DRIVE SCREW	2
4	6000-014-1	WIRE w/TERMINAL	1	21	19100A012	HEX HEAD CAP SCREW – 5/16	4	35	13425-075-1	NAMEPLATE	1
5	13488-000-2	SEAL/BEARING PLATE	1	22	00975-002-1	RETAINING RING	2	36	13496-000-2	VERTICAL ADAPTER (std)	1
6	08472-001-5	SEAL FAILURE ASS'Y	1	23	13489-001-2	SEAL HOUSING	1	37	13495-000-2	HORIZONTAL ADAPTER	1
7	05876A120	O-RING	S 2	24	00101-011-1	HEX HEAD CAP SCREW – 5/16	4	38	19101A010	HEX HEAD CAP SCREW – 3/8	3
8	00300-000-1	SHAFT SEAL 1"	S 2	25	00065-027-1	BALL BEARING	1	39	19100A004	HEX HEAD CAP SCREW – 3/8	3
9	14981-001-1	PIPE PLUG	2	26	00025-009-1	MACHINE SCREW PER B/M	4	40	00073-001-1	WIRE CONNECTOR 230-3	1
10	00150-042-1	O-RING	S 1	27	05454A009	LOCK WASHER	4	41	24709110000	PARAFFINIC OIL	
11	07033-002-3	IMPELLER 5.00	1	28	21573C100	STATOR 230V 1 PHASE	1	42	834-015-1	O-Ring	S 1
11	07033-004-3	IMPELLER 4.50	1		21573C102	STATOR 230–460V 3 PHASE	1	*	51700-402-7	Seal Kit	
11	07033-006-3	IMPELLER 4.00	1		10823-603-1	STATOR 575V 3 PHASE	1				
12	05506-002-2	AXIAL CUTTER	1		21573C101	STATOR 200V 3 PHASE	1				
13	05405-001-2	RADIAL CUTTER	1		21573C104	STATOR 200V 1 PHASE	1				

Notes: S – Parts in Seal Kit
– Fill Oil to above the Top of Motor Windings

HPG200



STANDARD LIMITED WARRANTY

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

During the warranty period and subject to the conditions set forth, Hydromatic, at its discretion, will repair or replace to the original user, the parts which prove defective in materials and workmanship. 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. Warranty is effective only if 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. Hydromatic will only cover the lower seal and labor thereof for all dual seal pumps. Under no circumstance will 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 Hydromatic service facility.

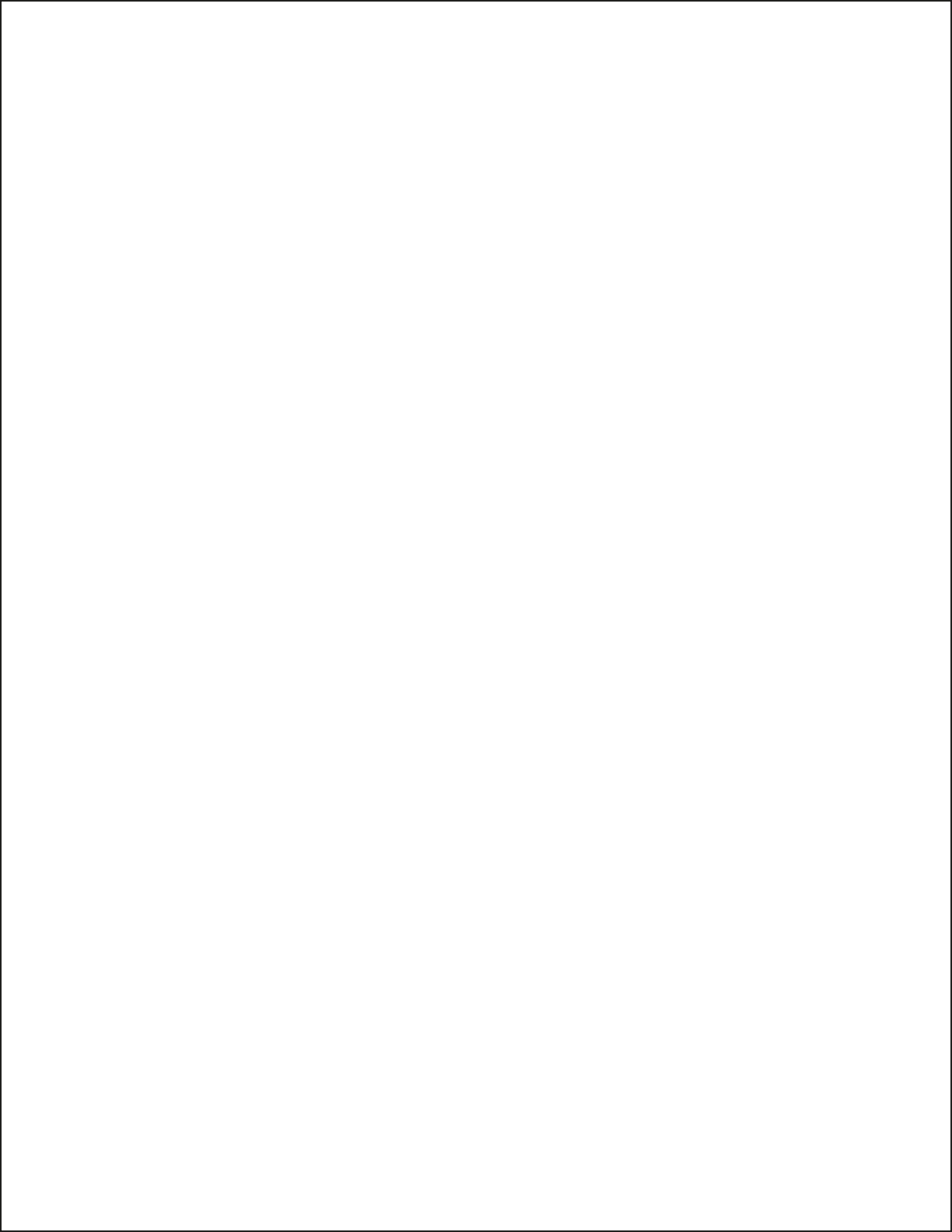
This limited warranty will not apply: (a) to defects or malfunctions resulting from failure to properly install, operate or maintain the unit in accordance with the printed instructions provided; (b) to failures resulting from abuse, accident or negligence; (c) to normal maintenance services and parts used in connection with such service; (d) to units which 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 which has been repaired or altered by anyone other than Hydromatic or an authorized Hydromatic service provider; (h) to any unit which has been repaired using non factory specified/OEM parts.

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

Liability Limitation: IN NO EVENT SHALL HYDROMATIC BE LIABLE OR RESPONSIBLE FOR CONSEQUENTIAL, INCIDENTAL OR SPECIAL DAMAGES RESULTING FROM OR RELATED IN ANY MANNER TO ANY HYDROMATIC PRODUCT OR PARTS THEREOF. PERSONAL INJURY AND/OR PROPERTY DAMAGE MAY RESULT FROM IMPROPER INSTALLATION. HYDROMATIC DISCLAIMS ALL LIABILITY, INCLUDING LIABILITY UNDER THIS WARRANTY, FOR IMPROPER INSTALLATION. HYDROMATIC RECOMMENDS INSTALLATION BY PROFESSIONALS.

Some states do not permit some or all of the above warranty limitations or the exclusion or limitation of incidental or consequential damages and therefore such limitations may not apply to you. No warranties or representations at any time made by any representatives of Hydromatic shall vary or expand the provision hereof.

 HYDROMATIC®	- Your Authorized Local Distributor -
USA 740 East 9th Street, Ashland, Ohio 44805 Tel: 419-289-3042 Fax: 419-281-4087	CANADA 269 Trillium Drive, Kitchener, Ontario, Canada N2G 4W5 Tel: 519-896-2163 Fax: 519-896-6337
www.hydraulic.com	



Distributor: _____ Order No.: _____
Installing Contractor: _____ Phone: _____
Sales Contact: _____ Phone: _____
Customer: _____
Location: _____

1. SYSTEM INFORMATION

Size of Wet Well: _____ Manufacturer: _____
Discharge from Bottom of Basin: _____ Discharge Location: _____
Inlet from Bottom of Basin: _____ Inlet Location: _____
Type of Check Valves: _____ Type of Piping: _____
Does System Have Suction Gauges? Yes No Suction Pressure Reading: _____
Does System Have Discharge Gauges? Yes No Discharge Pressure Reading: _____
Liquid Being Pumped: _____ Temperature (F°): _____ Pct. of Solid (%): _____
Is a Sketch or Photograph of System Available? Yes No *If So, Please Attach.*
Any Additional Comments on System: _____

2. ELECTRICAL INFORMATION

Control Panel Part Number: _____ Panel Rated Amps: _____
Manufacturer: _____ Voltage: _____ Phase: _____
Heater Size: _____ Location of Panel to Wet Well: _____
Incoming Line Voltage: _____ Actual? _____
Voltage to Pumps: _____ Actual? _____
Type of Junction Box: _____ Manufacturer of Junction Box: _____
Are Floats Installed in Wet Well? Yes No Are Floats Set to Engineer's Specs? Yes No
Are Floats Wired for Proper Sequencing? Yes No Are Heat Sensors Hooked Up? Yes No
Is the Seal Leak Detection Hooked Up? Yes No
Any Additional Comments on Electrical: _____

3. PUMP INFORMATION

Type of Pump: _____ Serial Number of Pump: _____
Voltage of Pump: _____ Phase: _____ RPM: _____ Amps: _____
Impeller Size: _____ C.O.S. TDH: _____ GPM: _____
Voltage Supplied from Panel: _____ Actual? _____
Actual Amperage (All Phases): Phase 1 Amps: _____ Phase 2 Amps: _____ Phase 3 Amps: _____
Define the Rotation of the Pump: Clockwise Counterclockwise
Method Used to Check Rotation: Viewed from the Top Viewed from the Bottom
Any Additional Comments on Pumps: _____

4. ACKNOWLEDGE

Acknowledge that all information is accurate and proper procedures have been followed.

Customer: _____ Date: _____
Start-up Technician: _____ Date: _____

Send to Warranty Manager, 1101 Myers Parkway, Ashland, OH 44805
or Fax to 419-207-3344

or email to startupreport@hydromatic.com

or submit online at <http://forms.pentairliterature.com/startupform/startupform.asp?type=h>