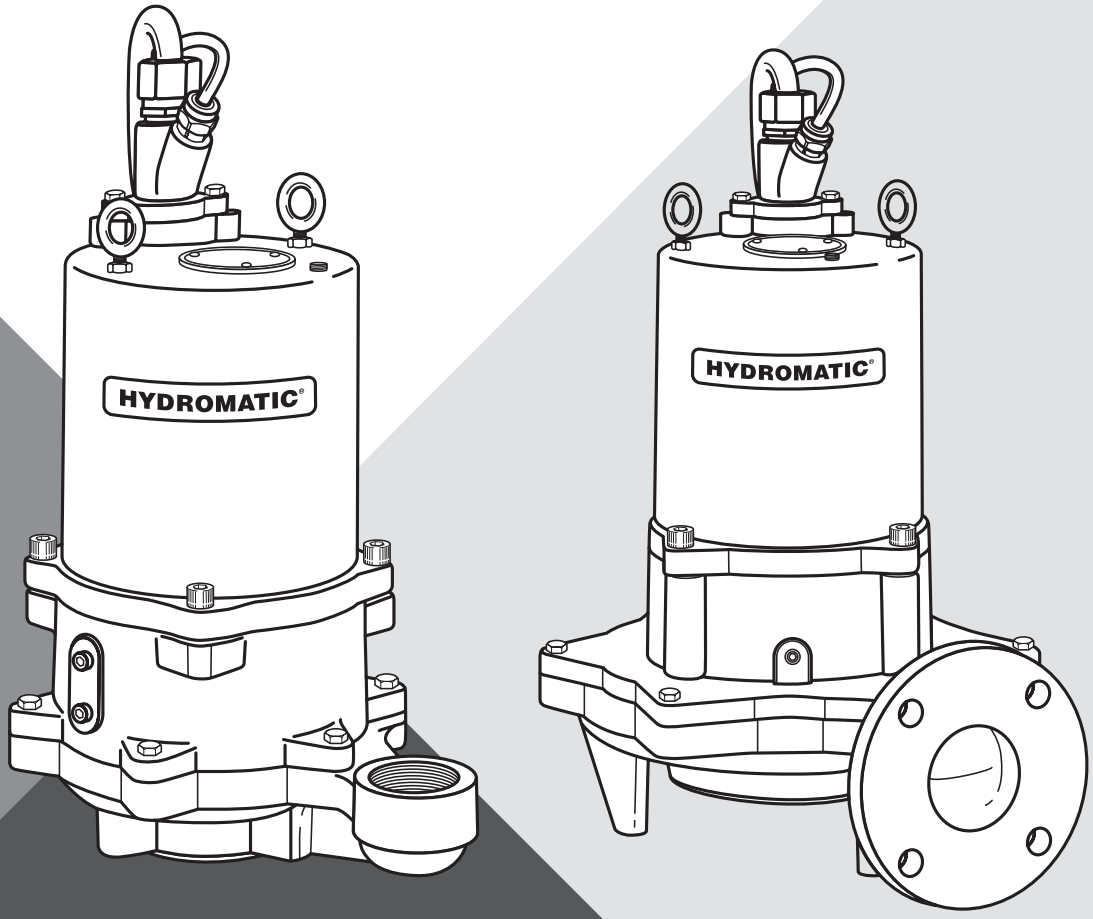
PENTAIR HYDROMATIC

SUBMERSIBLE GRINDER PUMP

HPGF, HPGFH, HPGH, HPGHH



FM APPROVED

OWNER'S MANUAL

pentair.com/hydromatic

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SAFETY INFORMATION

SAFETY SYMBOLS

⚠ This is the safety alert symbol. When you see this symbol on your pump or in this manual, look for one of the following signal words and be alert to the potential for personal injury:

⚠ DANGER warns about hazards that will cause serious personal injury, death or major property damage if ignored.

⚠ **WARNING** warns about hazards that can cause serious personal injury, death or major property damage if ignored.

⚠ **CAUTION** warns about hazards that will or can cause minor personal injury or property damage if ignored.

The word ***NOTICE:*** indicates special instructions that are important but not related to hazards.

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.

GENERAL SAFETY

- ⚠ **CAUTION** Do not touch an operating motor. Modern motors can operate at high temperatures. To avoid burns when servicing pump, allow it to cool for 30 minutes after shutdown before handling.
- Follow all applicable local and state codes and regulations.
- Submersible pumps are not approved for and should not be used in swimming pools, recreational water installations, decorative fountains or any installation where human contact with the pump fluid is common. Pump is designed for municipal and commercial wastewater applications.
- Keep safety labels in good condition, replacing any missing or damaged labels.
- **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 is permanently lubricated. No oiling or greasing is required in normal operation.
- Periodically inspect pump and system components.
- Wear safety glasses at all times when working on pumps.
- Keep work area clean, uncluttered and properly lighted. Store all unused tools and equipment.
- **DO NOT** use to pump flammable liquids.
- ⚠ **DANGER** **RISK OF FIRE OR EXPLOSION**. Can cause severe personal injury, property damage or death. Do not smoke or use open flames in or around this 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** **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.
- ***NOTICE*:** FM rated models are only to be used in 60hz applications.

ELECTRICAL SAFETY

⚠ **DANGER** **HAZARDOUS VOLTAGE. CAN SHOCK, BURN, OR KILL.** When installing, operating, or servicing this pump, follow the safety instructions listed below.

- ⚠ **DANGER** **ELECTROCUTION HAZARD:** Must be installed by a qualified professional. Disconnect all electrical power before attempting service.
- **DO NOT** modify the cord. When wiring to a system control, connect ground lead to the system ground.
- **DO NOT** splice the electrical power cord.
- **DO NOT** allow the power leads on the end of the electrical cords to be submerged.
- **DO NOT** handle or service the pump while it is connected to the power supply.

⚠ **WARNING** A water test must be taken before installation of any water treatment equipment. The water quality can significantly influence the life of your system. You should test for corrosive elements, acidity, total solids and other relevant contaminants, including chlorine and treat your water appropriately to ensure satisfactory performance and prevent premature failure.

GENERAL INFORMATION

NOTICE 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.

Carefully read and follow all safety instructions in this manual and on pump.

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. Reasonable care and safe methods should be practiced. Check local codes and requirements before installation. DO NOT DISCARD OR LOSE THIS MANUAL.

⚠ 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 Electrical Code (NEC) or local codes must be followed. System must be properly grounded according to National Electrical Code (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 Cutting Risk. Risk of serious cutting or amputation exists. Disconnect all power sources prior to servicing pump. Pump may start without warning.

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.

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.

THE PUMP

Shipping:

When unpacking unit check for concealed damage. Claim for damage must be made upon receipt through the delivering carrier. Damage cannot be processed from the factory.

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.

The motor winding, rotor, and ball bearings are mounted in a housing sealed and filled wit hoil to lubricate the bearing and transmit the heat from motor winding to outer shell.

The power cord is sealed into the motor housing with a cord grip, and the individual conductors are sealed into the cord cap with epoxy sealing compound.

Application:

These pumps are designed for either home or industrial sewage discharge applications with a pH ranging from 6 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

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 nonclog 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.

⚠ WARNING Be sure ground wire is connected to a good ground such as a water pipe. This is important for safety.

PUMP OPERATION

Starting the Pump:

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

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

   The impeller 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 piped-in permanently and inlet cannot be observed, rotation will have to be checked.

   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.

   If pump is piped in permanently, it may be necessary to break union at pump discharge to clear air.

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 and turns on when level is about 2 inches above motor.

PUMP MAINTENANCE

Replacing Grinder Parts:

1. Close gate valve at pump discharge.
2. Turn off circuit breaker.
3. Remove pump from sump.
4. Unscrew cap screws and remove cutter ring retainer.
5. Unscrew hex head cap screws and remove volute case. Cutter ring can now be removed from volute.
6. Radial cutter and axial cutter are now exposed. If checking for clogging, these parts can now be cleaned without removing them from the shaft.
7. If necessary to replace cutters, remove cap screw, washer, and radial cutter from shaft.

   Radial cutter and impeller are slip fitted onto shaft. If necessary, pry at two opposite points on back of impeller while tapping with a plastic hammer to loosen. Disassemble radial cutter and axial cutter from the impeller by removing socket head cap screws.
8. Clean all parts thoroughly before proceeding with assembly, replace impeller, axial cutter and radial cutter and secure together with socket head cap screws. Make sure impeller key is in place between shaft and impeller.
9. Replace cutter ring and cutter ring retainer. It may be necessary to loosen hex head cap screws in pump case and tap with a hammer to get proper clearance on O.D. of radial cutter.
10. Plug pump into power and operate for a few seconds only to be sure parts are not rubbing.

Replacing Seals:

1. Remove pipe plug from the top of the housing and two pipe plugs from the side. The lower pipe plug drains the seal housing while the other drains the motor housing. Check for water in the oil drained from motor chamber. If there is some water in this oil, the stator should be replaced.
2. Remove cutters, impeller and pump parts.
3. Remove socket head cap screw in seal plate and screw two of the screws into the tapped back-off holes to force seal plate from seal housing. Pulling this plate off will also force lower seal from shaft. Remove lower seal from seal plate.
4. Remove snap ring and pull upper seal from shaft. Use a screwdriver to break the upper stationary ceramic seal ring so that it can be removed easily.

⚠ WARNING Do not use any old seal parts. Replace all parts with new pieces. Mixing old and new parts will cause immediate seal failure.

5. When cleaning all parts before replacement, check to be sure sleeve bearing or shaft is not worn. Be sure all O-rings are in excellent condition without cuts or nicks. If not, replace them. Use O-ring lube to prevent cutting at assembly.
6. After all parts are replaced and before final assembly of impeller and cutters, refill seal chamber and motor chamber with oil. Lay pump on side to fill seal chamber. Do not fill completely. Allow about 1⁄2 inch below fill plug so that there will be an air space for expansion. Set pump upright, and replace the upper and side drain plugs before filling motor chamber. Again fill so that oil level is just over the top of winding to allow air space for expansion.
7. Use only a high grade transformer oil in the motor chamber and in the seal chamber.

Replacing Motor Stator:

1. If necessary to replace stator, completely dismantle pump.
2. Remove shaft rotor assembly. If the ball bearing feels rough when turned, it should be replaced. Pressing on the outer face will ruin the bearing. When shaft rotor assembly is removed, motor leads can be disconnected through the cord cap bore. Do not tape leads when replacing stator as oil will deteriorate the tape and cause motor failure. Use only twist on wire nuts.
3. Remove motor housing bolts and lift off housing.
4. Remove stator screws and stator clamping ring and set housing on hardwood blocks. Bump housing up and down on hardwood block to loosen stator which should drop out.
5. Thoroughly clean housing and other parts and install new stator.
6. Connect leads through housing bore and tuck leads back behind the stator windings to prevent rubbing on rotor. Use only butt splice connectors.
7. In reassembly replace any O-rings that are defective.
8. Completely reassemble, air test and fill with oil as described under replacing seals.
9. Always run pump for a few seconds after assembly work to be sure all parts run smoothly and are correctly adjusted before replacing in sump. Check again for correct rotation. Pump should rotate counterclockwise when viewed from the suction.

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 Always keep hands away from the pump cutter area after the circuit breaker is reconnected.

Replacing Bearings:

1. Drain all oil from motor chamber as described.
2. Remove cutters and impeller as described earlier.
3. Remove bolts that hold motor housing to bearing housing. Remove bolts that hold bearing housing to volute. Remove screws holding seal plate to bearing housing.
4. Remove rotating assembly (rotor, shaft and impeller) from pump case and place horizontally on bench. With hardwood block, tap end of impeller to loosen from shaft.
5. Use bearing puller to remove bearings. Replace with new bearings. Press only on inner face of bearing when replacing. Pressing on outer face can damage the bearing. Bearings are standard size that can be obtained from any bearing supply house or can be obtained from Hydromatic factory.
6. Thoroughly clean all castings before replacing bearings. Examine all O-rings for nicks before reusing.
7. Use Locktite on socket head locking screw in end of shaft.
8. Completely reassemble, air test and fill with oil.
9. Always check all leads with high voltage or with Megger for grounds before operating the pump.

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 partially 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

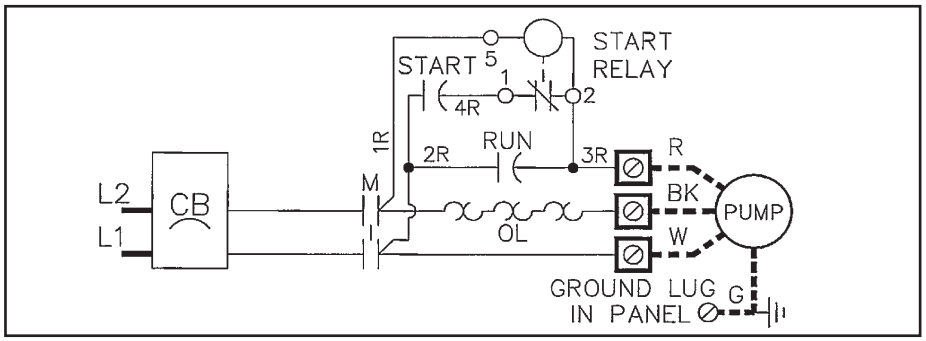
Pump Overloads Motor:
1. Wrong rotation
2. Specific gravity or viscosity of liquid too high
3. Speed too high
4. Head lower than rating, pumping too much liquid
5. Pump clogged
6. Defective bearings
7. Defective impeller

Pump is Noisy:
1. Defective bearings.
2. No axial clearance between impeller and volute.
3. No axial clearance between cutter ring and axial cutter.
4. No diametral clearance between radial cutter and cutter ring.

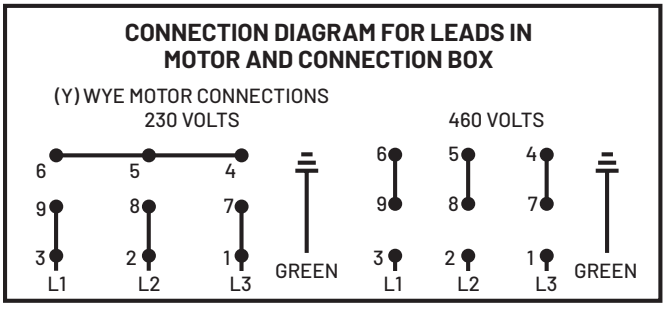
If the cause of the trouble cannot be determined and corrected as outlined above, contact an authorized Hydromatic service facility.

WIRING DIAGRAMS

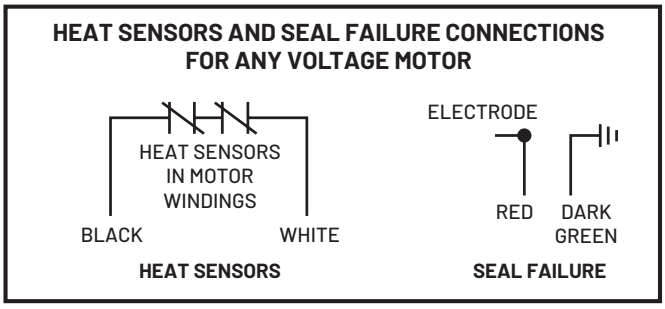
SINGLE PHASE POWER



THREE PHASE POWER



SENSOR CORD



PENTAIR HYDROMATIC HPGF/HPGFH, HPGH/HPGHH PARTS LIST

ITEM	ENG. NO.	PART DESCRIPTION	QTY.
1	152720335	35' Cord Assembly	1
	152720305	45' Cord Assembly 12-4	1
	152720315	35' Cord Assembly 10-4	1
	152720325	35' Cord Assembly 8-4 SOOW	1
	152720345	35' Cord Assembly 8-4 W	1
2	008340151	O-Ring	1
3	000640031	Spring - Brg.	1
4	000650211	Brg.	1
5	060000141	Seal Fail Wire - HPGH	1
	060000551	Seal Fail Wire - HPGF	
6	054540011	Pin - Roll	1
7	00650181	Brg.	1
8	001500571	O-Ring	1
9	084720015	Seal Fail - Assembly	1
10	05022A092	Pipe Plug	3
11	049160001	Mechanical Seal, Upper (CE-B)	1
12	19101A021	Screw - Cap	9
13		Volute	
	078920012	HPGH - Vertical Discharge	1
	078920032	HPGHH - Horizontal Discharge	1
	078910002	HPGF - Vertical Discharge	
	078910022	HPGFH - Horizontal Discharge	
14	005170081	Screw - Cap	4
15	079113041	Cutter Retainer - HPGH	1
	079070001	Cutter Retainer - HPGF	
16	19099A029	Screw - Cap	3
17	079090002	Cutter Axial - HPGH	1
	079040002	Cutter Axial - HPGF	
18	049160001	Mechanical Seal, Lower (CE-B*)	1
	049160011	Mechanical Seal, Lower (TC-B*)	1
	049160041	Mechanical Seal, Lower (TC-V*)	1
19	084220031	Washer - Impeller	1
20	148850011	Screw - Cap	1
21	065790031	Key - Square	1
22	079080002	Cutter Radial - HPGH	1
	079030002	Cutter Radial - HPGF	
23	06106A019	Screw - Cap	2
24	079100002	Cutter Stationary - HPGH	1
	079050002	Cutter Stationary - HPGF	
25	078933352	Impeller - 4.50" - HPGH	1
	078933272	Impeller - 5.50" - HPGH	1
	078933162	Impeller - 6.87" - HPGH	1
	078943432	Impeller - HPGF300	1
	078943182	Impeller - HPGF500	1
	078943212	Impeller - HPGF750	1
26	078891012	Plate - Seal - HPGH	1
	078891022	Plate - Seal - HPGF	1
27	001500361	O-Ring	1
28	001500191	O-Ring - HPGH	1
	001500371	O-Ring - HPGF	1
29	009750121	Snap Ring	1
30	24709110000	Oil - Paraffinic	1
31	078880032	Brg. Housing - HPGH	1
	07880022	Brg. Housing - HPGF	1
32	005680071	Screw - Cap	4
33	002990021	Ring - Ret. Stator	1

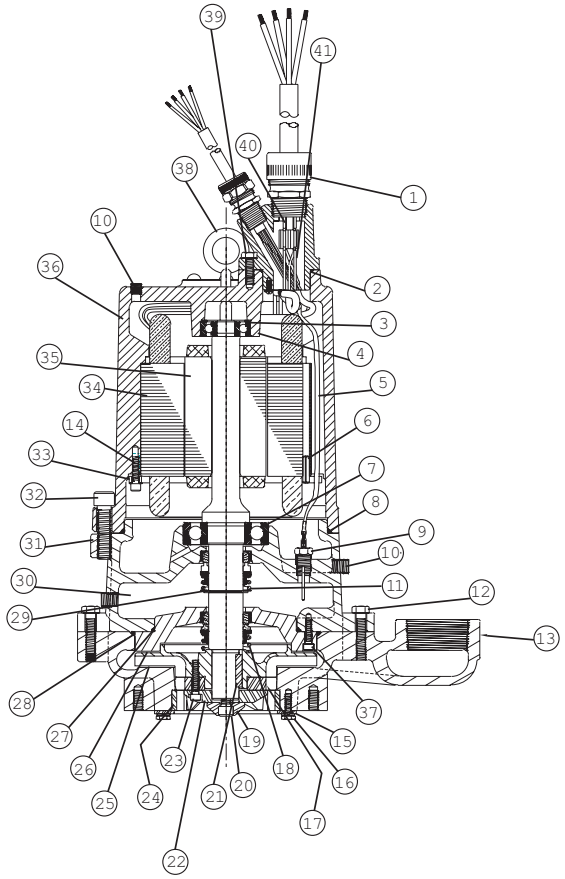
NOTES:

Fill oil to above motor windings.

*CE-B: Carbon Ceramic / Buna-N

*TC-B: Tungsten Carbide / Buna-N

*TC-V: Tungsten Carbide / Viton



ITEM	ENG. NO.	PART DESCRIPTION	QTY.
34		Stator	
	28286C200	HPGH(H)300 - 230/1	1
	28286C201	HPGH(H)300 - 208,230,460/3	1
	28286C202	HPGH(H)500 - 230/1	1
	28286C203	HPGH(H)500 - 208,230,460/3	1
	28286C204	HPGH(H)500 - 575/3	1
	28286C205	HPGH(H)750 - 208,230,460/3	1
	22574C217	HPGH(H)750 - 575/3	1
	28287C403	HPGF(H)300 - 230/1	1
	28287C404	HPGF(H)400 - 208,230,460/3	1
	28287C405	HPGF(H)300 - 575/3	1
	28287C406	HPGF(H)500 - 230/1	1
	28287C407	HPGF(H)500 - 208,230,460/3	1
	28287C408	HPGF(H)500 - 575/3	1
	28287C409	HPGF(H)750 - 208,230,460/3	1
	28287C410	HPGF(H)750 - 575/3	1
35		Rotor/Shaft	
	28290D607	HPGH(H)300 - 230/1	1
	28289D607	HPGH(H)300 - 208,230,460/3	1
	28289D607	HPGH(H)500 - 230/1	1
	28291D607	HPGH(H)500 - 208,230,460,575/3	1
	28292D607	HPGH(H)750 - 208,230,460,575/3	1
	28293D901	HPGF(H)300/500 - 230/1	1
	28293D901	HPGF(H)300 - 208,230,460,575/3	1
	28293D901	HPGF(H)500 - 208,230,460,575/3	1
	28293D901	HPGF(H)750 - 208,230,460,575/3	1
36	002940032	Housing - Motor	1
37	005170051	Screw - Cap	4
38	005890021	Bolt - Eye	2
39	19100A029	Screw - Cap	2

ITEM	ENG. NO.	PART DESCRIPTION	QTY.
40	12672A001	Wire Connector	
		HPGH(H) - 3 HP except 460/3	6
		HPGH(H)500 - 208,230,575/3	6
		HPGH(H)750 - 230,575/3	6
		All HPGH(H) - 460/3	9
		HPGH(H)500 - 208/1, 230/3	3
		HPGH(H)750 - 208/3	3
		HPGF(H) - 3 HP except 460/3	6
		HPGF(H)500 - 208,230/3, 575/3	6
		HPGH(H)750 - 575/3	6
		HPGF(H)300,500 - 460/3	9
		HPGH(H)500 - 208/1, 230/3	3
		HPGH759 & HPGHH759 - 208,230/3, 460/3	3
41	060060011	Wire Connector	
		HPGH(H) - 3 HP, 5 HP, 7.5 HP 230/3	1
		HPGH(H)500 - 208,230/1	3
		HPGH(H)750 - 230/3	3
		HPGF(H) - 3 HP, 5 HP 230/3	1
		HPGF(H) - 5 HP 208,230/1; 7.5 HP 208/3	3
		HPGF(H) - 7.5 HP 230/3	4
		HPGF(H) - 7.5 HP 460/3	6
	006280501	HPGF/HPGH Impeller Shim .005"	
	006280511	HPGF/HPGH Impeller Shim .010"	
	006280521	HPGF/HPGH Impeller Shim .020"	
	006280461	HPGF Cutter Shim .005"	
	006280491	HPGH Cutter Shim .005"	

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.

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