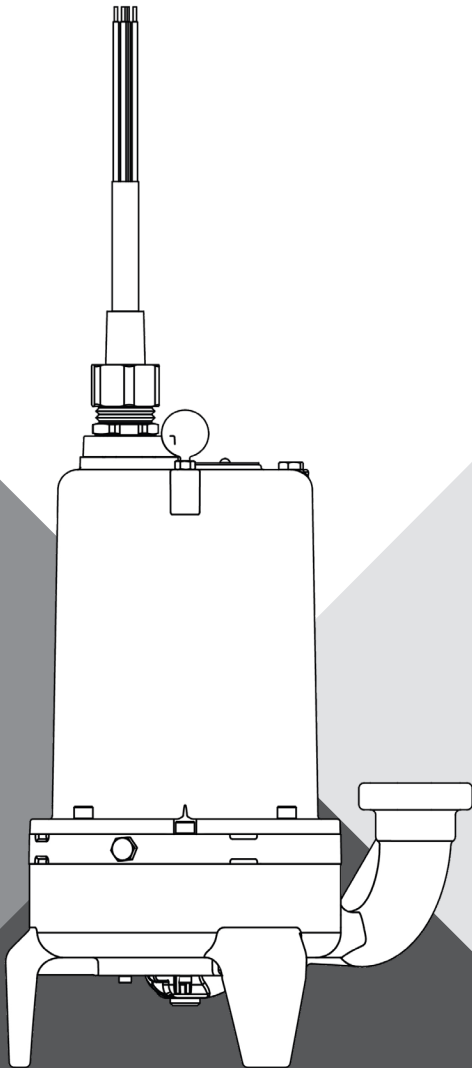




GRINDER PUMPS HV200 SERIES



INSTALLATION AND OPERATION MANUAL

pentair.com

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SAFETY INSTRUCTIONS

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:

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

GENERAL SAFETY

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.

On single and three-phase pumps, the motor protection must be provided by the installer. All three-phase pumps must be installed with magnetic starters having three-leg overload protection in accordance with the national electric code. For duplex installations, both pump motors must have separate overload protection. Seal leak detectors must be connected to the proper control circuitry.


Examine all lifting devices, rope or chain, for damage before and after each lift. Do not use any lifting devices that are not rated for and designed to lift the weights involved with these pumps.

Keep clear of suction and discharge openings and do not insert fingers in the pump with the power connected. Make sure lifting devices are securely fastened each time before lifting pump and do not lift pump by the power cord. Do not exceed manufacturer's recommendation for maximum performance, as this could cause the motor to overheat. Do not pump without safety devices in place.

Control Panels and Controls All Hydromatic control panels used on these grinders are UL listed and CSA certified. Intrinsically safe type float controls are recommended for all applications. An intrinsically safe control panel relay will limit the current and voltage to the level controls. Hydromatic control panels can be supplied with this type circuitry.

The float level controls maintain the basin sewage water level by controlling pump turn-on and turn-off level. The lower turn-off control should be set so that the pump stops at approximately the top of the pump. The upper turn-on control should be set above the lower turn-off control. The exact height between the two controls is determined by the number of pump starts desired and the depth of the basin. A maximum of 10 starts per hour should not be exceeded. The override control is set at a specified height above the upper turn-on control. The alarm control is set about 6" to 12" above the override control. No control should be set above the inlet invert.

Pump The HV200 pumps are equipped with 200 and 230 volt single-phase and 200, 230, 460 and 575 volt three-phase with seal leak detector. HV200 Series pumps are available in high flow, standard, or high head. This pump is intended to grind and pump all normal sewage.

 **CAUTION** Pump is only to be disassembled at Hydromatic factory or an authorized Hydromatic service facility.

Single-phase motors are capacitor start, capacitor run and the relays are mounted in the electrical control box. All single-phase motors must have a special electrical control box by Hydromatic. Installing single-phase motors with controls other than Hydromatic voids warranty.

Pump has two oil-filled chambers, the motor and ball bearings, and the seal chamber. The lower seal above the pump impeller acts as a buffer for the upper seal that holds oil in the motor chamber. The lower seal detection will alarm if water enters the seal chamber.

Cords Pump models with a seal leak detector use a seven-conductor cord. The three power conductors are black, white and red. The orange conductor connects to the seal leak probe and the green conductor connects to the ground screw inside the cord cap the blue and the white w/black stripe conductors connect to the heat sensor.

Single-phase pumps use the black and white as main winding leads and the red for the start winding.

Cutters The HV200 grinder is equipped with an axial style cutter, a stationary plate and rotating cutter. To ensure proper operation of the cutting mechanism, the gap between the stationary plate and rotating cutter must be no more than .008". If the pump is ever disassembled, the gap must be checked before the pump can return to service. To check the gap, use a .008" feeler gauge. If the .008" feeler gauge does not fit between the surface of the stationary cutter and rotating cutter and the motor shaft turns freely, the gap is set properly. If the .008" feeler gauge fits between the surfaces, shims must be removed to close the gap.

Three-Phase Control Box: Hydromatic three-phase control equipment can be used for simplex or duplex operation. The overload heaters are in accordance with full load amp ratings.

If any amp readings are higher than listed, it indicates voltage may be higher or lower than normal, or that the pump may be clogged.

Resistance of Winding Every motor winding has a fixed resistance and windings must check close to the specification values. This winding resistance also indicates if the motor is connected for the voltage being used. Use ohmmeter to test and read output directly in ohms.

INSTALLATION AND OPERATION

INSTALLING PUMP IN SUMP

Before installing pump in sump, lay it on its side and rotate impeller. Impeller may be slightly stuck due to factory test water so it must be broken loose with a small bar or screwdriver in edge of vanes. The impeller should turn freely. Do not connect the power until after this test.

Clean all trash and sticks from sump and connect pump to piping. A check valve must be installed on each pump.

LOCATION

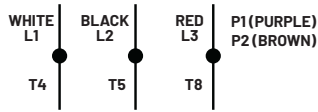
If pumps are installed in an existing basin or concrete sump, the piping can either be connected permanently or rails and brackets can be furnished for mounting to walls of basin. In either case, be sure the Hydromatic® solids handling ball check valve is used and that the pumps are submerged in a vertical position. The complete factory-built packaged system is recommended for the most satisfactory and economical installation.

MAKING ELECTRICAL CONNECTIONS

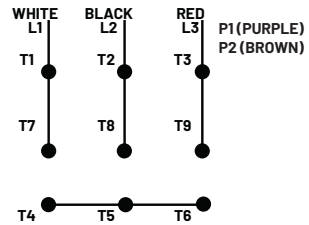
All electrical wiring must be in accordance with local code, and only qualified electricians should make the installations. All wires should be checked for shorts to ground with an ohmmeter or Megger after the connections are made. This is important, as one grounded wire can cause considerable trouble.

MOTOR LEADS

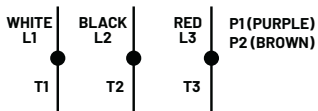
208 - 230V SINGLE PHASE



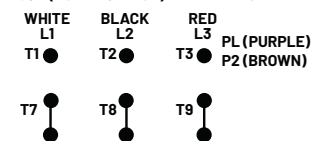
230V (DUAL VOLTAGE) THREE PHASE



200V AND 575V THREE PHASE



460V (DUAL VOLTAGE) THREE PHASE



IMPORTANT: If equipment is not properly wired and protected as recommended, Hydromatic warranty is void.

HEAT SENSOR AND SEAL FAILURE CONNECTIONS:

If a Hydromatic control panel is used, terminal blocks are provided for heat sensor and seal failure connections. If a control panel is supplied by others, it must allow heat sensor and seal failure terminations.

INSTALLING SUMP LEVEL CONTROL FLOAT CONTROLS

In either simplex, duplex or triplex systems the lower or turn-off control is to be set to maintain a minimum level in the sump. This level shall be no more than 31/4" from the top of the motor housing down to the surface of the sewage.

The second, or turn-on control, is set above the lower turn-off control. The exact distance between the two floats must be a compromise between a frequent pumping cycle (10 starts per hr. max.) to control septicity, solids and a slower cycle for energy economy. This distance should be determined by the engineer or consulting engineer, depending on the conditions of the application.

PUMP OPERATIONS

⚠ WARNING Keep hands and clothing away from cutters and impeller!

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 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 in accordance with "Installing Sump Level Control Float Controls", page 3.

⚠ CAUTION Be sure ground wire is connected to a good ground. This is important for safety.

INSTALLATION AND OPERATION

PUMP MAINTENANCE

As the motors are oil filled, no lubrication or other maintenance is required.

If the heat sensor and seal failure are hooked up properly, no attention is necessary as long as the seal failure indicator light doesn't come on. To ensure continuity of the seal sensor leads, a test light is provided on intrinsically safe Hydromatic® panels as standard equipment. Pump should be checked every quarter for corrosion and wear.

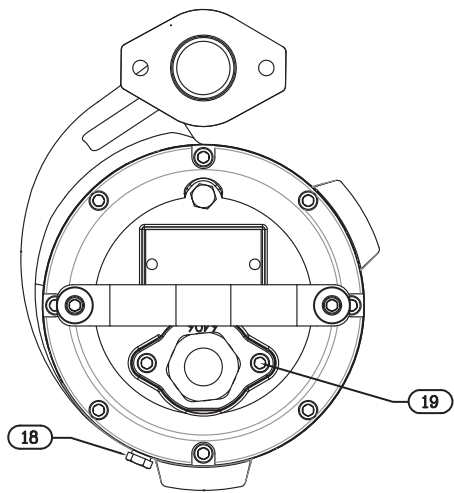
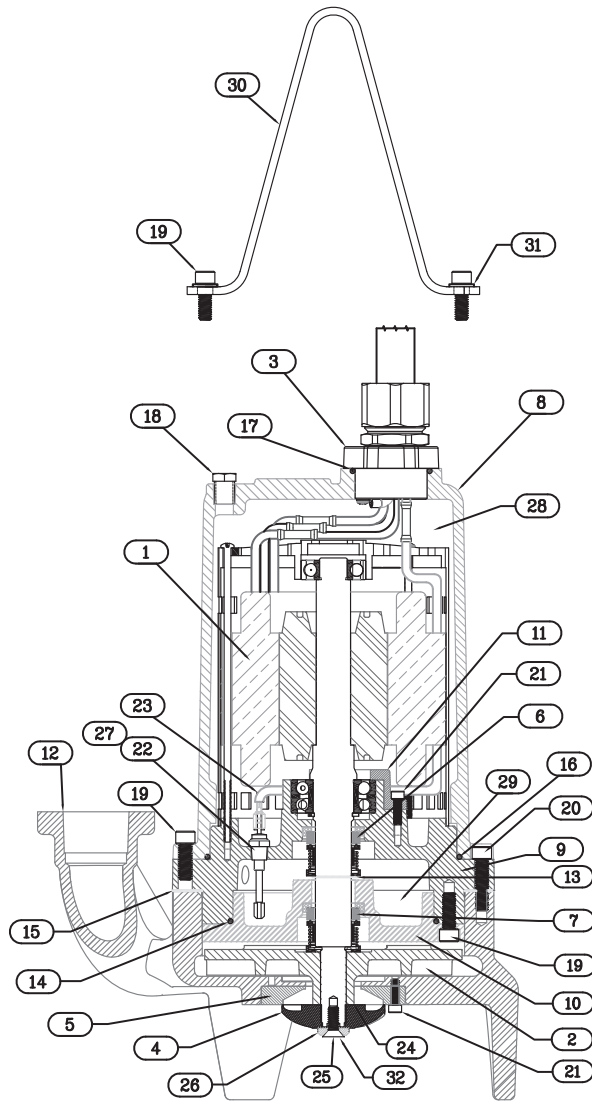
⚠ CAUTION If cord openings from sump to control panel are open, gases from sump could enter panel and an explosive condition could exist. Seal openings!

REPLACING CORDS:

The power cord and heat sensor/seal failure cord are potted into the connection box cap, forming the cord and cap assembly.

If cords require replacement due to damage or cords being too short, cord and cap assembly must be replaced as a complete assembly from the factory. Check pump for proper rotation before returning to normal service.

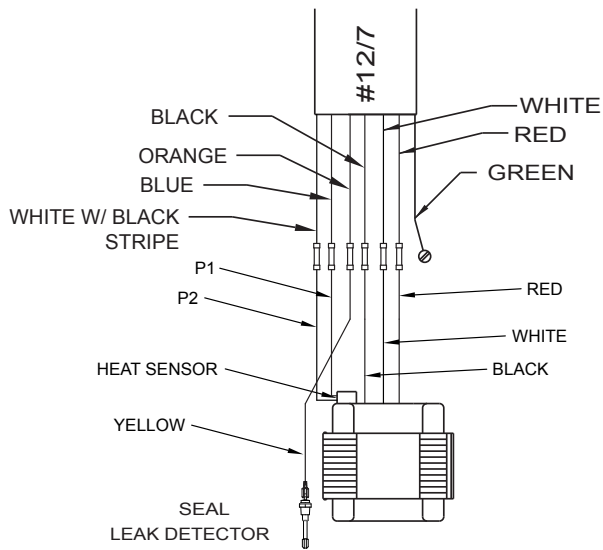
COMMON PARTS LIST



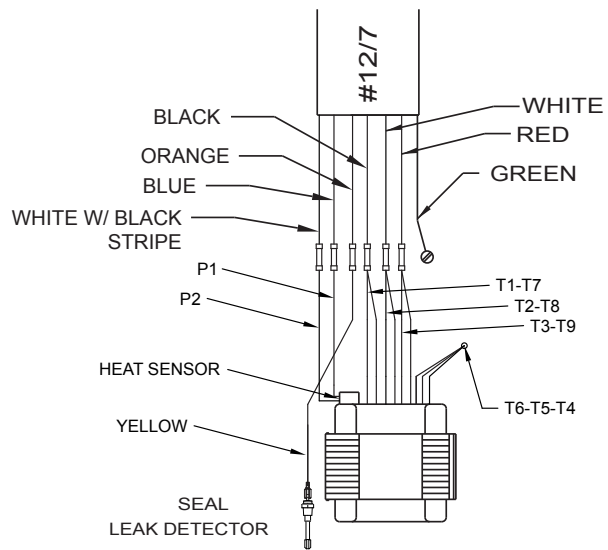
COMMON PARTS LIST

ITEM	ENGINEERING NO.	DESCRIPTION	QTY.
1	28139B000	230 V 1 Phase Motor Assembly	1
	28139B001	200 V 3 Phase Motor Assembly	1
	28139B002	230/460 V 3 Phase Motor Assembly	1
	28139B004	575 V 3 Phase Motor Assembly	1
	28139B003	200 V 1 Phase Motor Assembly	1
2	28228B000	Impeller, HVH200, 6.25" O.D.	1
	28228B001	Impeller, HVS200, 5.313" O.D.	1
	28228B003	Impeller, HVF200, 4.50" O.D.	
3	144240025	Cord Cap, Standard, 20' 12-7	1
	144240115	Cord Cap, Standard, 35' 12-7	1
4	28145B000	Rotating Cutter - HVH200/HVS200 models	1
	28187B000	Rotating Cutter - HVF200 models	
5	28227B000	Stationary Cutter - HVH200/HVS200 models	1
	28168B000	Stationary Cutter - HVF200 models	1
6	21576A010	Seal, 7/8" Shaft, Upper	1
7	21576A010	Seal, 7/8" Shaft, Lower	1
8	28132B000	Motor Dome	1
9	28135D000	Seal/Bearing Housing	1
10	28136D000	Lower Seal Plate	1
11	28154B000	Bearing Cap	1
12	28133D001	Volute	1
13	12558A006	Ring, Retaining	1
14	001500131	O-Ring, 1/8" X 4.12 I.D.	1
15	28229A100	Volute Shim; .005 Thickness	4
	28229A101	Volute Shim; .010 Thickness	1
	28229A102	Volute Shim; .020 Thickness	1
16	05876A125	O-Ring, 1/8" X 5.859 I.D.	1
17	05876A244	O-Ring, 3/32" X 1.737 I.D.	1
18	05022A088	Plug, 1/4" Pipe	2
19	001780081	Screw, Socket Head, 5/16" X .875"	12
20	001780051	Screw, Socket Head, 5/16" X 1.25"	4
21	048200061	Screw, Socket Head, 10-24 X .625"	7
22	109010001	Probe, Seal Fail	1
23	22578A102	ELECTRODE ASSY HV GRINDER	1
24	006280571	Shim, 1.00 O.D. X .625 I.D. X .002	1
	006280581	Shim, 1.00 O.D. X .625 I.D. X .005	2
25	011300021	SCREW-MACH(FL HD)1/4-20 X 3/4	1
26	21583A000	Washer, Retaining	1
27	000870081	Plug, 1/8" Pipe	1
28	132531001	Premium Oil, Motor	1.92 qts.
29	132531001	Premium Oil, Seal Chamber	.32 qts.
30	25371B010	Lifting Bail	1
31	001560231	Washer, Flat, 5/16" SST	2
32	001560711	Spacer, HVF200 models only	1

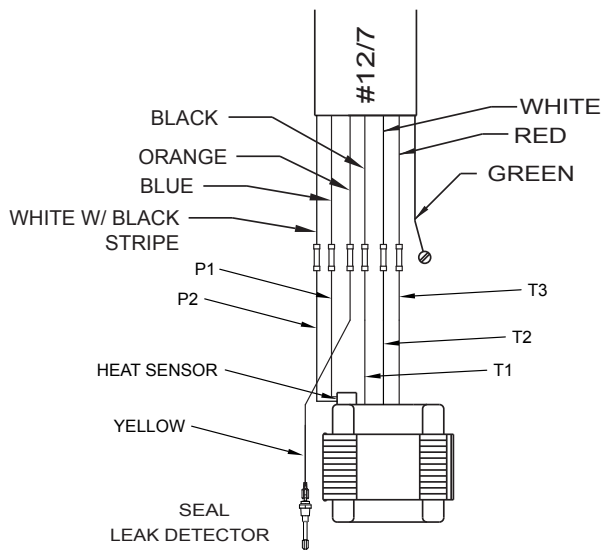
MOTOR WIRING DIAGRAM



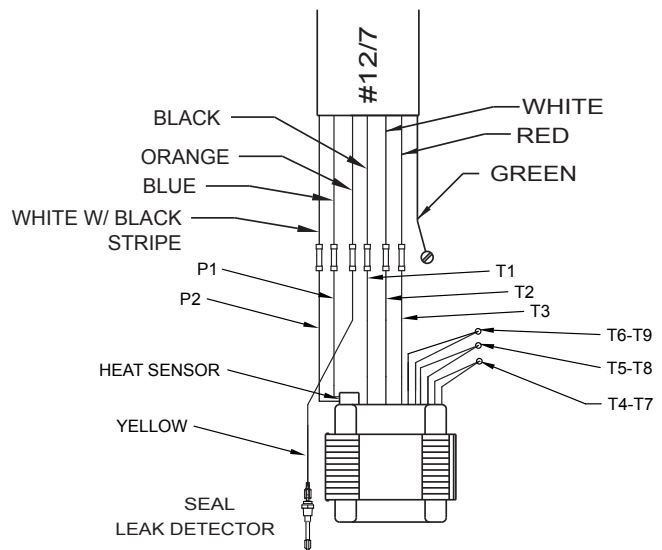
2HP, 200V AND 230V 1PH
WITH SEAL LEAK DETECTOR
& 12/7 COND. CORD



2HP, 230V 3PH WITH
WITH SEAL LEAK DETECTOR
& 12/7 COND. CORD



2HP, 200V AND 575V 3PH
WITH SEAL LEAK DETECTOR
& 12/7 COND. CORD



2HP, 460V 3PH WITH
WITH SEAL LEAK DETECTOR
& 12/7 COND. CORD

MOTOR	RESISTANCE MAIN (OHMS)	RESISTANCE START (OHMS)
230/1/60	1.27	7.35
200/3/60	1.74	-
230/3/60	2.23	-
460/3/60	8.67-8.80	-
200/1/60	1.03	3.58
575/3/60	8.55-8.80	

TROUBLESHOOTING

CONDITION	PROBABLE CAUSE
Pump runs but does not pump liquid from basin.	<ul style="list-style-type: none"> ◆ Pump impeller may be air locked; this occasionally occurs in a new installation. Start and stop pump several times to purge air. ◆ Run additional water into basin so that the pump will be submerged deeper to clear air. ◆ If air does not clear, it may be necessary to lift pump out of sealing elbow and start motor to allow pump to pump for a few seconds. If discharge is piped in with union, slightly break union and start pump to clear air. ◆ If pump has been installed for some time and does not pump, it may be clogged at grinder inlet. ◆ Discharge gate valve may be closed. ◆ Discharge check valve may be clogged or have a broken clapper. ◆ Discharge head may be too high. Check elevation.
Red light comes on at control box.	<ul style="list-style-type: none"> ◆ This indicates some water has leaked past the lower seal and has entered the seal chamber and made contact with the electrode probe. Pump must be removed from basin immediately for replacement of lower seal.
Overload trips and high water level alarms.	<ul style="list-style-type: none"> ◆ Push in red reset button to reset overload. If overload trips again after short run, remove pump and check for damage. ◆ Check grinder for clogged material as this can cause an overload condition on the motor ◆ A faulty component in the control box could exist.
Yellow run light stays on continuously.	<ul style="list-style-type: none"> ◆ Indicates H-O-A switch may be in the Hand position. ◆ Level control switch may have failed causing pump to continue to operate when water is below lower float. ◆ Grinder assembly may be partially clogged causing pump to operate at very reduced capacity. ◆ Check valve may be clogged causing low pump flow. Gate valve may be in Off position. ◆ Pump may be air locked.
Circuit breaker trips.	<ul style="list-style-type: none"> ◆ Reset breaker by pushing clear down on the handle, then put back to the On position. If breaker trips again in a few seconds, that indicates excessive load probably caused by a short in the motor or control box. ◆ If condition happens after an electrical storm, motor or control box may be damaged by lightning. ◆ A resistance reading of the motor with the lead wires disconnected from the control box can determine if the trouble is in the motor or control box.
Pump is noisy and pump rate is low.	<ul style="list-style-type: none"> ◆ Grinder assembly may be partially clogged with foreign objects causing overload on the motor. ◆ Grinder impeller may be rubbing due to bent shaft or misalignment.
Grease and solids have accumulated around pump and will not pump out of the basin	<ul style="list-style-type: none"> ◆ Pump On switch may be set too high. ◆ Run pump on Hand operation for several minutes with small amount of water running into basin to clean out solids and grease. This allows pump to break suction and break up the solids. ◆ Trash may have accumulated around lower weight causing pump to turn off too soon. Clean the trash from the weight and suspension cable.

INTENTIONALLY LEFT BLANK

WARRANTY

Pentair Hydromatic warrants its HV and HVR series grinders against defects in material and workmanship for a period of 24 months from the manufacturing date, or 36 months from the manufacturing date with completion of a start-up report within 30 days of installation. Product must be properly installed, serviced and operated in compliance with the manufacturer's instruction manuals.

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>. All seal fail and heat sensing devices must be connected, 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 failures resulting from excessive sand, lime, cement, gravel or other abrasive materials
- d) To failures caused by scale or corrosion build-up due to excessive hydrocarbons or chemical content
- e) To normal maintenance services and parts used in connection with such service;
- f) To units that are not installed in accordance with applicable local codes, ordinances and good trade practices;
- g) If the unit is moved from its original installation location;
- h) If unit is used for purposes other than for what it is designed and manufactured;
- i) To any unit that has been repaired or altered by anyone other than Pentair Hydromatic or an authorized Pentair Hydromatic service provider;
- j) To any unit that has been repaired using non factory specified/OEM parts.

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