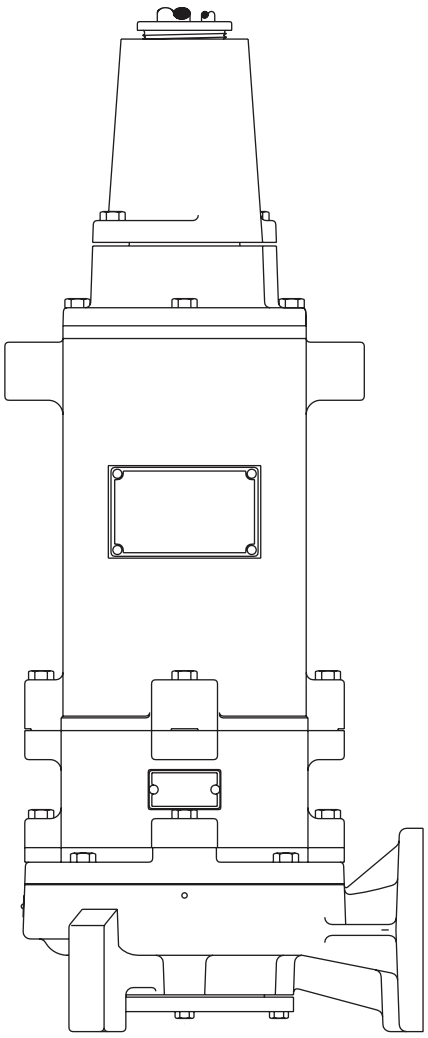
PENTAIR

HYDROMATIC®



MODEL HPGB750/1000/1500 and HPGBX750/1000/1500

SUBMERSIBLE GRINDER PUMPS

INSTALLATION AND SERVICE MANUAL

For use in hazardous locations with FM approved Class I, Division 1, Groups C & D.

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.

Item # E-03-617 | Part # 23833A617 | © 2018 Pentair plc | 05/18/18

CAUTION: Read these safety warnings first before installing, servicing, or operating any pump. Only qualified persons shall conduct services and installations of this pump. The pump must be wired by a qualified electrician, using an approved starter box and switching device.

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:

1. Most accidents can be avoided by using COMMON SENSE.
2. Read the operation and maintenance instruction manual supplied with the pump.
3. Do not wear loose clothing that can become entangled in the impeller or other moving parts.
4. This pump is designed to handle materials that could cause illness or disease through direct exposure.

Wear adequate protective clothing when working on the pump or piping.

Electrical:

5. To reduce the risk of electrical shock, pump must be properly grounded in accordance with the National Electric Code and all applicable state and local codes and ordinances.
6. To reduce risk of electrical shock, disconnect the pump from the power source before handling or servicing.
7. Any wiring to be done on pumps should be done by a qualified electrician.
8. Never operate a pump with a power cord that has frayed or brittle insulation.
9. Only pumps labeled for use in hazardous location may be used in hazardous locations. These motors must be repaired and serviced at the Hydromatic factory. Any unauthorized field repair voids both warranty and the FM hazardous location listing.
10. Never let cords or plugs lie in water.
11. Never handle connected power cords with wet hands.

Pumps:

12. Pump builds up heat and pressure during operation; allow time for pump to cool before handling or servicing.
13. Only qualified personnel should install, operate or repair pump.
14. Keep clear of suction and discharge openings. DO NOT insert fingers in pump with power connected.
15. Do not pump hazardous material not recommended for pump (flammable, caustic, etc.)
16. Make sure lifting handles are securely fastened each time before lifting.
17. Do not lift pump by the power cord.
18. Do not exceed manufacturer's recommendation for maximum performance, as this could cause the motor to overheat.
19. Secure the pump in its operating position so it cannot tip over, fall or slide.
20. Keep hands and feet away from impeller when power is connected.
21. 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.
22. Do not operate pump without safety devices in place.

General Information

IMPORTANT: Hydromatic® is not responsible for losses, injury or death resulting from a failure to observe these safety precautions, misuse or abuse of pumps or equipment.

Motor HP and Voltages:

These submersible grinder pumps are offered in three phase, 7-1/2, 10 and 15 HP. Voltages will vary according to the application. Three phase stators are available with dual voltage configurations that will allow either 230V or 460V internal connection.

Electrical Controls:

All of these pump models must be used with a control panel. Hydromatic built control panels are designed to supply the correct electrical controls, motor starting equipment and include the circuitry for moisture and heat sensors. It is recommended that a Hydromatic built control panel be used so that all warranties apply.

General Construction:

The motor chamber and seal chamber are filled with a high dielectric type oil for improved lubrication and heat transfer of the bearings and motor. Since the bearings have been designed for 50,000 hours of life, the oil should never require replacement under normal operating conditions. An air space above the oil level in both the seal and motor chambers is provided to allow for the expansion of the oil when at operating temperature. The power and control lines are sealed and strain relieved on the outside entrance with a standard cord grip, and internally through the use of a dielectric potting resin surrounding the electrical wires. All of the pump fasteners and shafts are made from corrosion resistant stainless steel, while the pump castings are made of ASTM A-48 Class 30 cast iron, and the multi-vane vortex impellers are made from ductile iron.

General Installation:

Various configurations and methods of plumbing this series of solids handling pumps may be used; however, for ease of installation and service a Hydromatic rail lift-out system is recommended.

Motor:

Each motor is provided with heat sensor thermostats attached directly to the motor windings. The thermostats open if the motor windings see excessive heat and, in turn, open the motor contactor in the control panel, breaking the power to the pump.

When the motor is stopped due to an overheat condition, it will not start until the motor has cooled and the heat sensor reset button is manually pushed on the front of the Hydromatic control panel. This circuitry is provided in the Hydromatic control panel designs.

The pumps are equipped with internal thermostats to meet Class H heat rise of 356°F (180°C).

Motor Seal Failure Warning:

The seal chamber is oil filled and provided with moisture sensing probes to detect water leakage through the lower shaft seal. The probes can also detect moisture present in the upper motor housing.

The presence of water energizes a red seal leak warning light at the control panel. This is a warning light only, and does not stop the motor. It indicates a leak has occurred and the pump must be repaired. Normally, this indicates the outboard seal has leaked. Allowing the unit to operate after the warning may cause upper seal leakage along with motor failure.

The resistance across the moisture sensing (seal failure) probes should be checked after a seal leak warning light has lit. This can be done by disconnecting the red and orange control wires from the control panel and measuring the resistance with an ohmmeter between the wires.

If the measured values are below specification, the pump may have a lower seal failure and require service.

Motor Power Cord, Control Cord and Cord Cap Assembly:

Each motor power cord has four conductors: white, black, red and green. For a three phase motor the red, black and white conductors connect to the three line leads, and the green is connected to a good ground. Interchanging any two line leads will reverse the rotation of the motor.

NOTE: Rotation should be clockwise when observed from the top of the pump. This can be checked by noting which direction the pump torques upon initial starting. A properly rotating pump will torque counterclockwise upon start.

The control cable has five conductors: black, white, red, orange and green. White and black connect to the heat sensor terminals in the control panels; red and orange connect to the seal failure terminals in the control panel; and the green connects to the ground in the control panel.

The cord cap is epoxy potted. The cord cap provides for a sealed wire connection with terminals so that connections can be made without breaking the motor seal. This allows the cord cap, with cords, to be removed from the motor.

NOTE: Each cable has a green ground wire and must be properly grounded per the National Electric Code and local codes.

Electrical Motor Controls:

All electrical controls and motor starting equipment should be as specified in these instructions. Consult factory for any acceptable alternatives.

Level Sensing Controls:

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.

The float level controls maintain the basin sewage water level by controlling pump turn-on and turn-off levels.

1. The lower turn-off control should be set so that the pump stops with the water covering the entire motor housing. Consult the factory for any settings below this point.
2. 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.
3. The override control is set at a specified height above the upper turn-on control.
4. The alarm control is set about 6" to 12" above the override control.
5. No control should be set above the inlet invert.

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 failure of the pump, control panel or cause personal injury.

Caution: The 230 volt 3 phase pump has a dual marked nameplate. Voltage may be rewired by the manufacturer or a Class I Div 1 equipment qualified electrician. Once the voltage is changed, the factory cord tag indicating 230 volt 3 phase must be removed.

For record keeping purposes, we suggest the pump be marked externally with the new voltage and qualified personnel that performed the change. Pumps shipped from the factory as 460 volt 3 phase cannot be rewired to any other voltage.

To Re-wire the pump from 230V to 460V 3 phase: Only a 230V pump from the factory is considered dual voltage, a cord label clearly states the factory wound voltage.

Remove bolts securing cord assembly then raise the cord cap assembly enough to slip a prying instrument on opposite sides between the cord cap casting and the junction box. Take care to not damage the o-ring or the machined surfaces of the castings. Doing so could void FM agency certifications. While prying evenly on both sides; separate the cord cap casting from the motor housing, the assembly is airtight and will have a vacuum effect when disassembling. Once separated, the cord cap can be inverted and rotated to the outside of the pump assembly, and a bolt can be re-used to secure the upside down cord cap to the motor housing for ease of rewiring.

Refer to the wiring diagram within this manual for wiring details. Once all electrical connections are finished and secure (a crimped electrical connector is best to prevent issues due to vibration if required), the cord cap should be re-attached reversing the steps above. Ensure the o-ring is in place and perform a hi-pot test for safety once ever thing is complete.

Pump:

The fluid end of the pump is field serviceable and can be disassembled in case of wear, damage, plugging or outboard seal failure.

Pump Troubleshooting

Checking For Moisture in Motor

Use ohmmeter or a megger and set on highest scale. Readings on the large power cord between any of the conductors red, black, or white to green conductor or to the motor housing should be greater than 1,000,000 ohms (1 megohm). Service work should be done only at an authorized service station.

Readings should be taken with line leads disconnected from the control panel.

Resistance of Windings

Every motor winding has a fixed resistance and winding must check close to specification values. Verification of the proper wiring of a dual voltage motor can also be checked by measuring the motor winding resistance.

Trouble Checklist

Troubles listed are generally caused by the pump. Other trouble can occur from faulty control box operation.

Pump runs but does not pump liquid from basin.

1. Pump impeller may be air locked; this occasionally occurs on a new installation. Start and stop pump several times to purge air.
2. Run additional water into basin so that pump will be submerged deeper to clear air.
3. If pump is three phase, rotation may be wrong. See instructions for checking proper rotation.
4. 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.

   Air vent hole is provided in pump case, so some water will flow from this hole when pump is operating. If vent hole gets clogged, clean out.
5. If pump has been installed for some time and does not pump, it may be clogged at grinder inlet.
6. Discharge gate valve may be closed.
7. Discharge check valve may be clogged or have a broken clapper.
8. Discharge head may be too high. Check elevation.
9. If above checks do not locate trouble, motor rotor may be loose on shaft which allows motor to run but will not turn impeller or only at low RPM.

Red light comes on at control box.

1. 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 immediately from basin for replacement of lower seal. This preventive repair will save an expensive motor.

Overload trips at control box and alarm buzzer or flashing red light comes on due to high water level in basin.

1. Push in on red reset button to reset overload. If overload trips again after short run, pump has some damage and must be removed from basin for checking.
2. Trouble may be from clogged grinder causing motor to overload or could be from failed motor.
3. Trouble may be from faulty component in control box. Always check control box before removing pump.

Yellow run light stays on continuously.

1. Indicates H-O-A switch may be in the Hand position.
2. Level control switch may have failed causing pump to continue to operate when water is below lower weight, or lower weight may have dropped off.
3. Grinder assembly may be partially clogged causing pump to operate at very reduced capacity.
4. Gate valve or check valve may be clogged causing low pump flow.
5. Pump may be air logged.

Circuit breaker trips.

1. Reset breaker by pushing completely down on handle then back to On position. If breaker trips again in a few seconds it indicates excessive load probably caused by a short in the motor or control box. Check instructions given with control box before pulling pump.
2. If this condition happens after an electrical storm, motor or control box may be damaged by lightning.
3. Resistance reading of the motor with lead wires disconnected from the control box can determine if trouble is in motor or control box.

Pump is noisy and pump rate is low.

1. Grinder assembly may be partially clogged with some foreign objects causing noise and overload on the motor.
2. Grinder impeller may be rubbing on grinder ring due to bent shaft or misalignment.

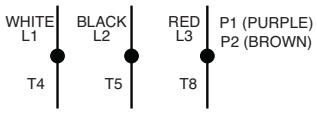
Grease and solids have accumulated around pump and will not pump out of basin.

1. Lower weight of level switch may be set too high.

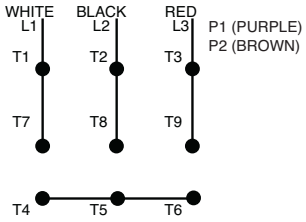
   Set bottom of lower weight even with bottom of inlet flange to grinder.
2. Run pump on hand operation for several minutes with small amount of water running into basin to clean out solids and grease. This allows pump to break suction and surge which will break up the solids. If level switch lower weight is set properly this condition generally will not occur.
3. Trash may have accumulated around lower weight causing pump to turn off too soon. Clean trash from weight and suspension cable.

MOTOR LEADS

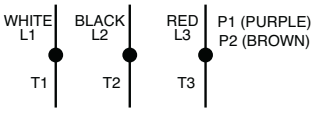
208 - 230V SINGLE PHASE



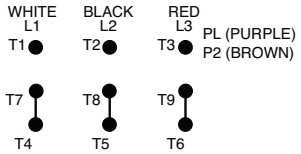
230V (DUAL VOLTAGE) THREE PHASE



200V AND 575V THREE PHASE



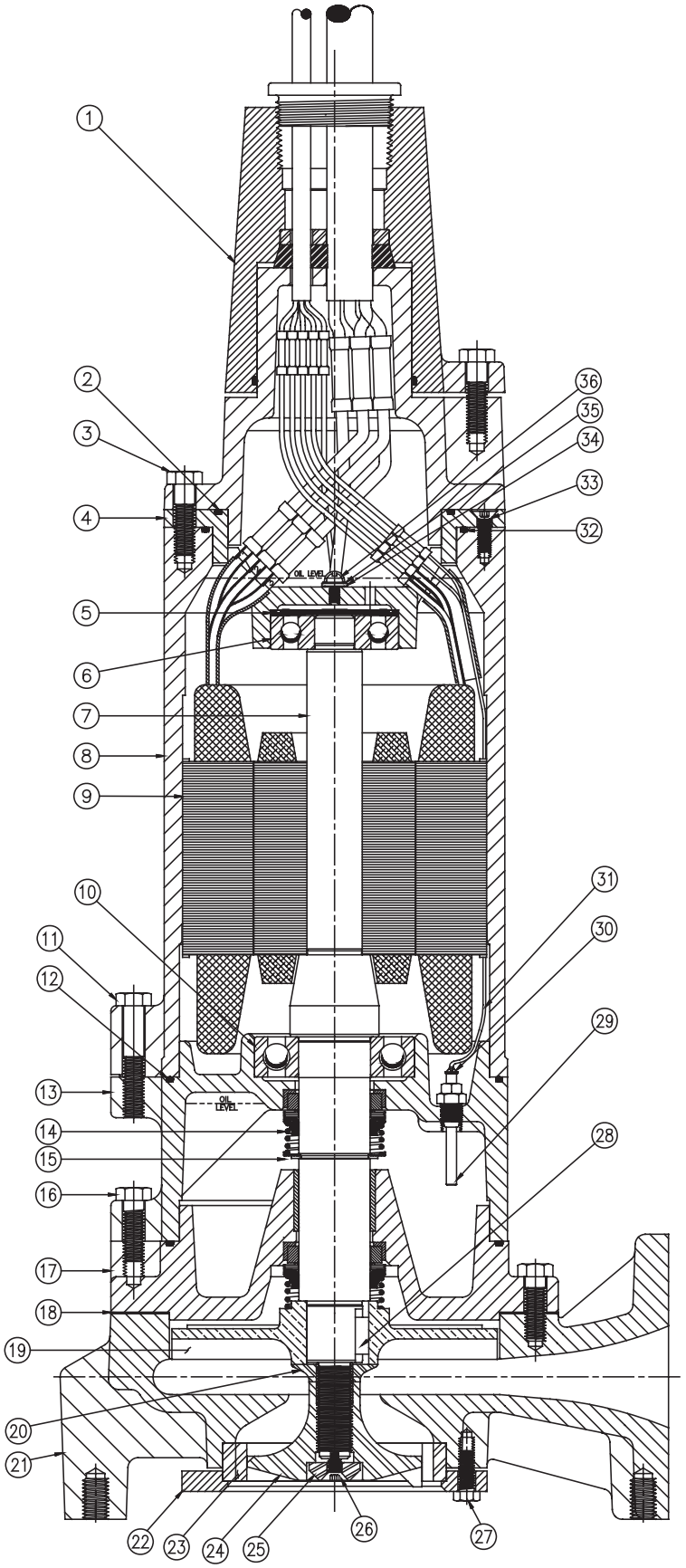
460V (DUAL VOLTAGE) THREE PHASE

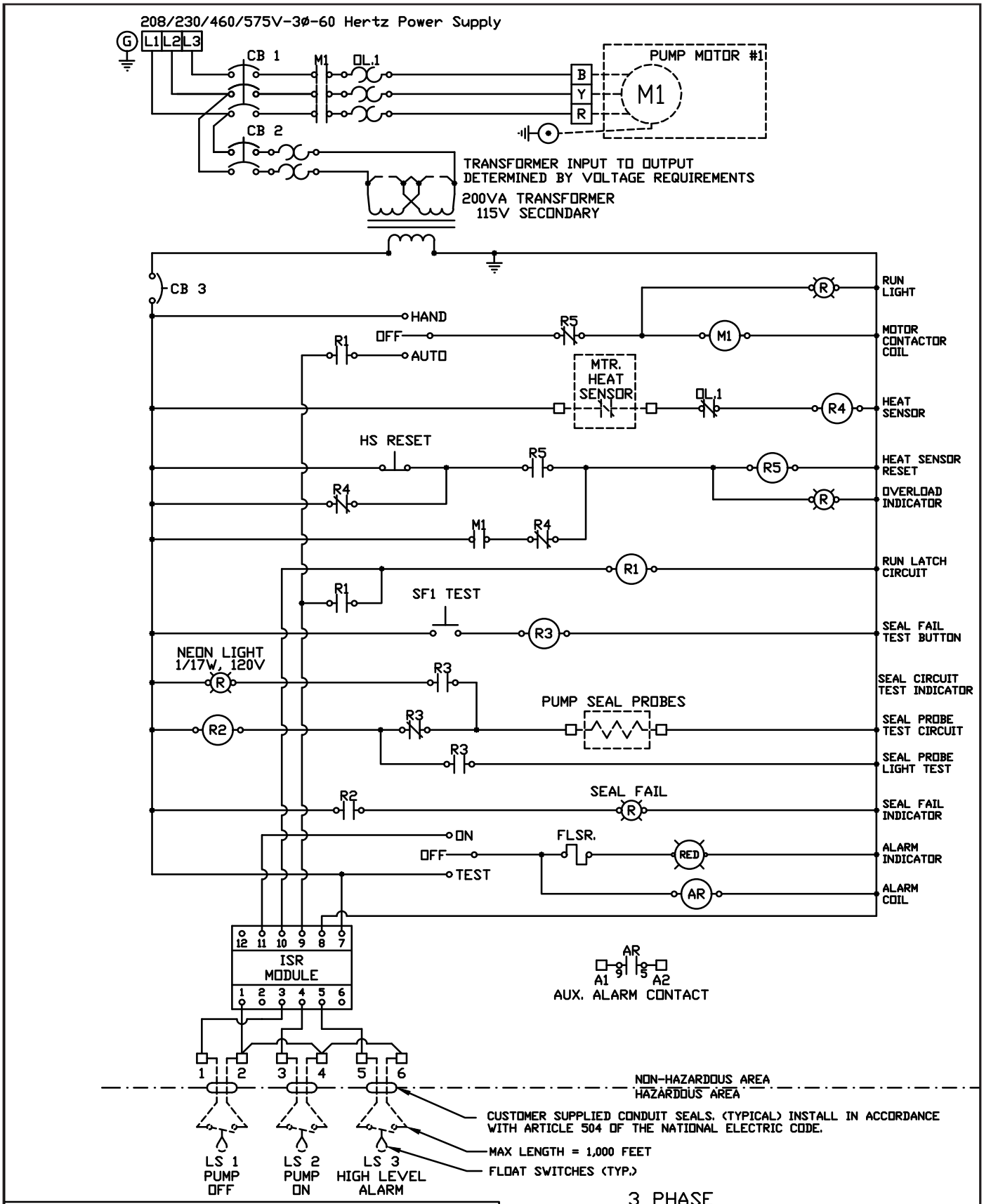


HPGB750/1000/1500 and HPGBX750/1000/1500 PARTS LIST

Ref. No.	Part No.	Part Description	Qty.
1	RTF	35' Cord assembly	1
2	05876A119	O-ring	1
3	19103A045	HHCS 1/2"-13 UNC x 1-3/4"	4
4	22873C000	Upper bearing cap	1
5	191331A007	Load spring	2
6	08565A032	Ball bearing, upper	1
7	see ch art	Rotor/shaft assembly	1
8	22874D000	Motor housing	1
9	see chart	Stator	1
10	08565A026	Ball bearing, lower	1
11	19103A048	HHCS 1/2"-13 UNC x 2-1/2"	4
12	05876A121	O-ring	2
13	22882D010	Seal housing, upper	1
14	22883A000	Shaft seal	2
15	12558A017	Retaining ring	1
16	19103A043	HHCS 1/2"-13 UNC x 1-1/2"	8
17	25991D010	Seal housing, lower	1
18	05231A084	Gasket	1
19	see chart	Impeller	1
20	27099A000	Impeller washer	1
21	27095E000	Volute	1
22	22587C000	Shredder ring clamp	1
23	22586B010	Shredder ring	1
24	22584C000	Grinder impeller	1
25	22585A000	Impeller retainer	1
26	07597A021	Impeller retaining screw	1
27	19101A010	HHCS 3/8"-16 UNC x 1"	1
28	05818A067	Key	1
29	25343A100	Seal leak probe	2
30	05454A025	Machine screw #6	2
31	22578A100	Electrode wire	2
32	05876A120	O-Ring	1
33	07597A017	Machine screw 5/16"-18 UNC x 1"	2
34	06107A016	Lock washer	1
35	05030A241	Washer	1
36	05028A002	Machine screw 1/4"-20 UNC x 1/2"	1

Catalog No.	Rotor/Shaft Assembly	Stator	Housing w/ Stator	Impeller
HPGB750M3-2	27098D100	141450031	22874D362K	27096D002
HPGB750M4-2	27098D100	141450031	22874D362K	
HPGB1000M3-2	27098D100	141450031	22874D363K	27096D001
HPGB1000M4-2	27098D100	141450031	22874D363K	
HPGB1500M3-2	27098D100	141460031	22874D377K	27096D000
HPGB1500M4-2	27098D100	141460031	22874D377K	





Notes:
1) Level Switches Must Be Rated a Minimum of 2 Amps at 120 Volts
2) Torque all white field wiring terminals to 20 In.Lbs.
3) Field Wiring Must Be 60°C Copper Wire Minimum.
4) -------- = Items Not Supplied In Control Panel.
5) Pump power, heat sensor, and seal probe cables must pass through approved NEC 501.15 conduit seals.

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.

Liability Limitation: IN NO EVENT SHALL PENTAIR HYDROMATIC BE LIABLE OR RESPONSIBLE FOR CONSEQUENTIAL, INCIDENTAL OR SPECIAL DAMAGES RESULTING FROM OR RELATED IN ANY MANNER TO ANY PENTAIR HYDROMATIC PRODUCT OR PARTS THEREOF. PERSONAL INJURY AND/OR PROPERTY DAMAGE MAY RESULT FROM IMPROPER INSTALLATION. PENTAIR HYDROMATIC DISCLAIMS ALL LIABILITY, INCLUDING LIABILITY UNDER THIS WARRANTY, FOR IMPROPER INSTALLATION. PENTAIR 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 Pentair Hydromatic shall vary or expand the provision hereof.

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