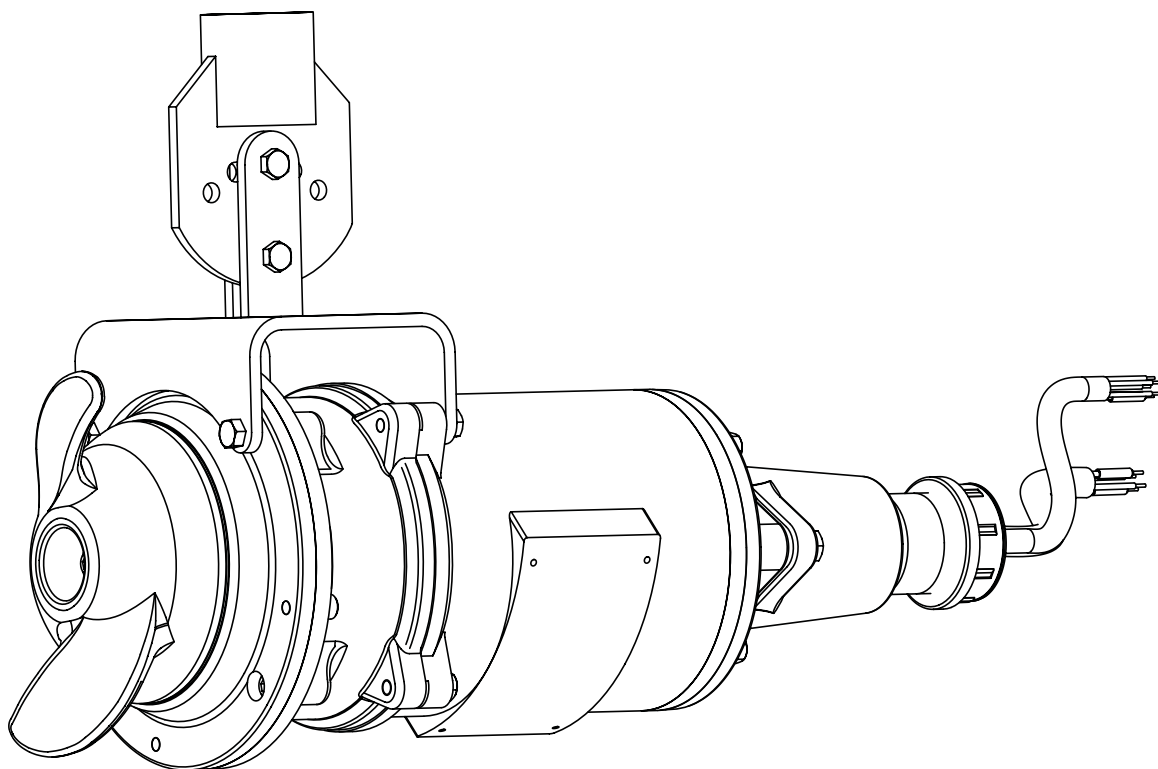




HYDROMATIC®



HBM200/HBMX200* SERIES

*For use in Hazardous Locations Class I, Division 1, Groups C & D

SUBMERSIBLE BASIN MIXER

INSTALLATION AND SERVICE MANUAL



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

General Information

Attention:

This manual contains important information for the safe use of this product. Read this manual completely before using this product and refer to it often for continued safe product use. Do not throw away this manual. Keep it in a safe place so that you may refer to it often.

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

WARNING: Before handling electrical equipment, always disconnect the power first. Do not smoke or use sparkable electrical devices or flames in a septic (gaseous) or possible septic sump.

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.

CAUTION: To reduce risk of electrical shock, do not remove cord or strain relief. Do not connect conduit to mixer. Electrical installations shall be in accordance with the National Electrical Code and all applicable local codes and ordinances.

For use with maximum 140°F water.

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.

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

The Mixer

Description:

The integral stainless steel 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. 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 includes the leads for both heat sensors (motor protection) and the seal sensor lead for seal leakage detection.

Application:

The submersible basin mixer is used to break up crusts and solids that float at the top of a solids handling basin. The unit can also be used for mixing and stirring applications in industrial areas and waste management facilities.

Mixer Installation

Unpacking:

Remove 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 mixers are installed in an existing basin or concrete sump, they may either be connected permanently or rails and brackets can be furnished for mounting to walls of basin. 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.

SENSOR LEADS

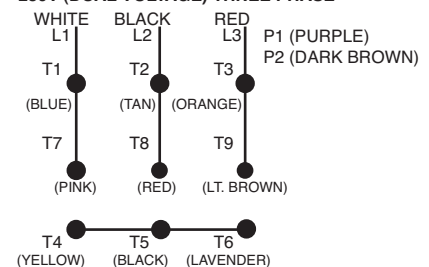
WHITE W/BLACK STRIPE - P1
BLUE - P2
ORANGE - SEAL PROBE

MOTOR LEADS

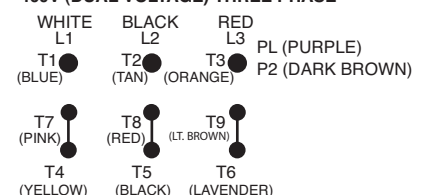
200V



230V (DUAL VOLTAGE) THREE PHASE



460V (DUAL VOLTAGE) THREE PHASE



Electrical Connections:

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

NOTE: Hydromatic® built control panels supply the correct circuitry for moisture and heat sensor connections. Failure to install the correct circuitry with proper connection would negate warranty and factory mutual approval.

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

Mixer Operations

Starting the Mixer:

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

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

If mixer is three phase, the rotation of the propeller must first be checked. Lift mixer from sump, lay it down, and quickly turn on and then off.

The propeller 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 mixer is single phase, no rotation check is necessary.

After installing mixer in basin in desired location, run water into basin until mixer is covered.

Turn mixer on and observe mixing action at the surface of the water. If required, adjust

position of mixer mounting brackets until desired mixing action is achieved in the basin.

If problems occur check the power source. Make sure a separate supply line is available. Verify the voltage supply.

Mixer Maintenance

Disassembly, Inspection, Reassembly:

For Hazardous Location Service:

These pumps are to be used for handling sewage, wastewater and storm water only. Do not use in other hazardous locations. These motors must be repaired and serviced only at Hydromatic® authorized service centers or at the factory. Any unauthorized field repair voids the warranty and the hazardous location rating.

Turn off circuit breaker.

Remove mixer from sump.

Replacing Seals:

Drain the oil in the seal chamber by removing the drain plug on the side of the unit. 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.

Remove the propeller after first removing center set screw at the end of the motor shaft.

Using a pair of snap ring pliers, remove the snap ring that secures the lower seal. Remove the lower seal rotating elements by sliding the spring off the shaft. Then

using two screwdrivers, slide the carbon assembly off by prying on the retaining ring.

Loosen and remove the cap screws that hold on the seal housing, then remove the seal housing. Using a socket that will fit onto the back of the seal, tap the stationary seal assembly out of the seal housing.

Using a pair of snap ring pliers, remove the snap ring that secures the upper seal. Remove the spring retainer and spring from the shaft, and using the same method as used for the lower seal, remove the carbon seal assembly.

With a pair of screwdrivers, pry up on the seal/bearing plate. Remove the seal/bearing plate until you have access to the seal sensor wire, then carefully pull the seal sensor wire off the seal probe which will allow the complete removal of the seal/bearing plate.

Take a socket and tap out the stationary portion of the seal from the seal/bearing plate in the same manner as used for the lower stationary seal.

After checking both of the O-rings, replace the seal bearing plate in the motor housing, making sure that the seal sensor wire has been reattached to the seal probe. Use O-ring lube to prevent cutting in assembly.

Take the stationary portion of the new seal, and lube the rubber material with a good quality dielectric oil. Press the stationary portion of the new seal into the seal/bearing plate.

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

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

Carefully place the seal housing onto the seal bearing plate, replace the cap screws, and evenly tighten.

Using a pressure gauge with a fill stem, pressurize the motor housing to no more than 7 psi 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 the bubbles do not stop within a few seconds, the seal is either not properly installed or is damaged.

Following the same procedure outlined previously to install the lower seal assembly. Replace the impeller using a removable locking adhesive.

Reassemble the propeller set screw onto mixer.

Refill all chambers with a good quality dielectric oil. Fill the motor housing so that the tops of the motor windings have been covered (2500 ml), but leave an air gap to allow for expansion of the oil. Fill the seal chamber with 700 ml of oil so that an air gap also exists.

Troubleshooting

Below is a list of troubles and their probable causes:

Insufficient mixing

1. Mixer orientation needs adjusted
2. Wrong rotation
3. Speed too low

Mixer overloads motor

1. Wrong rotation
2. Specific gravity or viscosity of liquid too high
3. Speed too high
4. Mixer clogged
5. Defective bearings

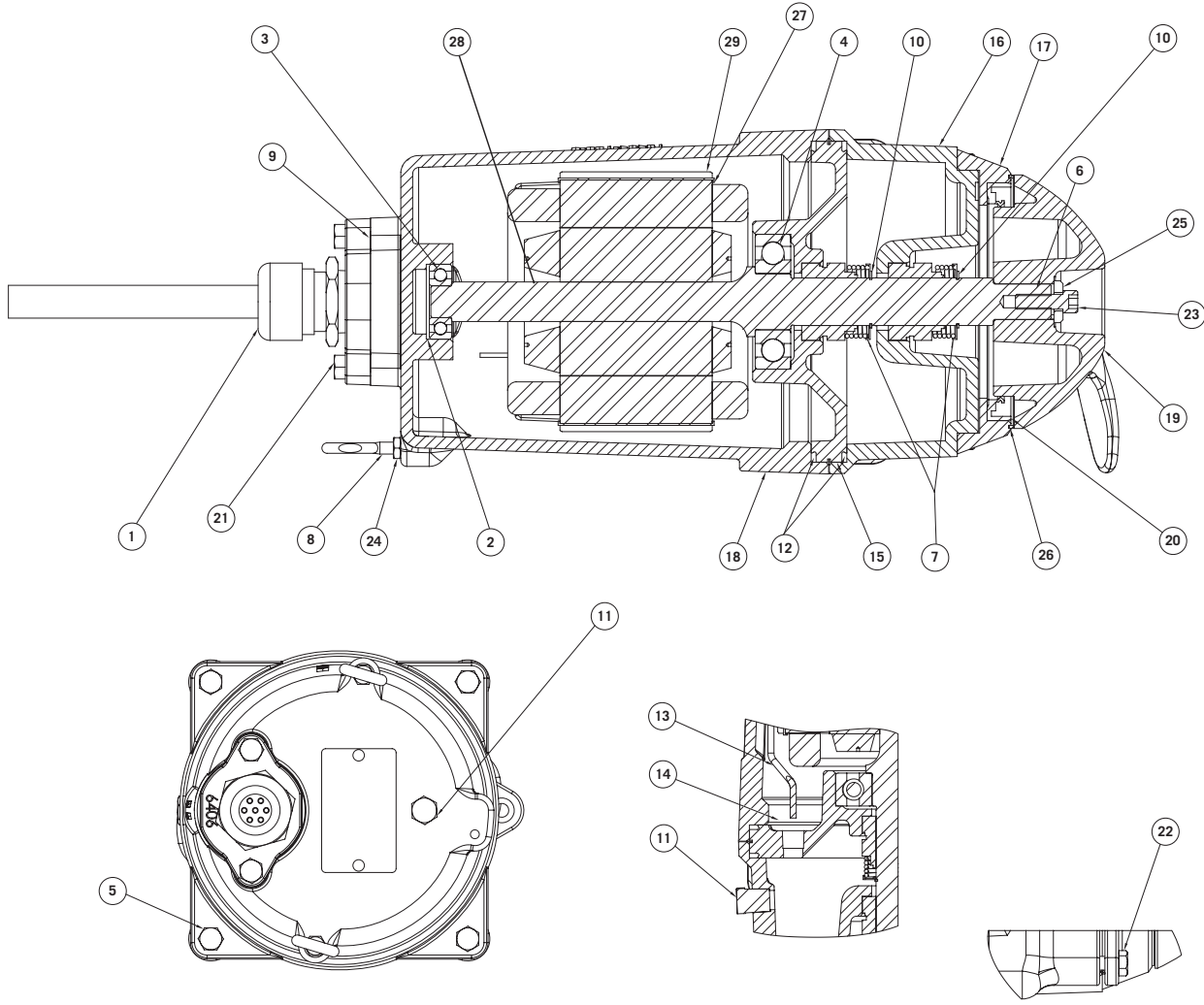
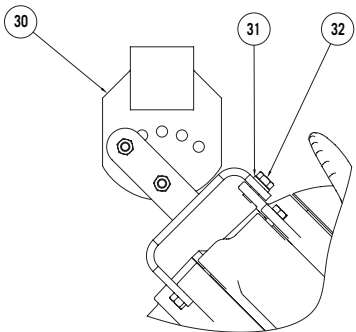
Mixer is noisy

1. Defective bearings
2. No axial clearance between propeller and seal housing

HBM200 Parts List

Item	Eng. No.	Part Description	Qty.
1	144240115	Cord Assembly	1
2	000640011	Spring – Bearing Adj.	1
3	000650011	Bearing – Ball (Upper)	1
4	000650271	Bearing – Ball (Lower)	1
5	001010111	Screw – HHC 5/16-18 x 1-3/4	4
6	101020011	Key	1
7	003000001	Seal – Shaft 1"	2
8	005890101	Bolt – Eye 1/4-20	2
9	008340151	O-ring 3/32 Dia. 1.737 I.D.	1
10	009750021	Ring – Retaining	2
11	05022A092	Plug-Pipe 1/4	2
12	05876A120	O-ring 1/8 Dia. 6-1/4 I.D.	2
13	060000141	Wire w/Terminal 14 Ga Red	1
14	084720015	Seal Failure Ass'y	1
15	134880002	Plate/Bearing Seal	1
16	134890012	Housing – Seal	1
17	134893002	Housing – Lip Seal	1
18	134941002	Housing – Motor	1

Item	Eng. No.	Part Description	Qty.
19	152120002	Propeller – Mixer	1
20	152220001	Seal – Lip 4"	1
21	19100A004	Screw – Cap 5/16 SST x 3/4	2
22	19100A029	Screw – Cap 5/16 SST x 1	4
23	001780041	Screw – Cap 5/16 SST x 1	1
24	19109A077	Nut – Hex 1/4	2
25	005190001	Washer	1
26	27755A000	Teflon Ring Seal	1
27	001450291	Stator bolt, 1750 rpm	4
	001450101	Stator bolt, 1150 rpm	4
28	152150111	Rotor & Shaft 1750 rpm	1
	152230111	Rotor & Shaft 1150 rpm	1
29	152150031	Stator 1750 rpm	1
	152230031	Stator 1150 rpm	1
30	526033035	Bracket - Lower Mixer	1
31	05454A015	Washer – Lock SST 3/8	1
32	19101A003	Screw – Cap 3/8-16	1

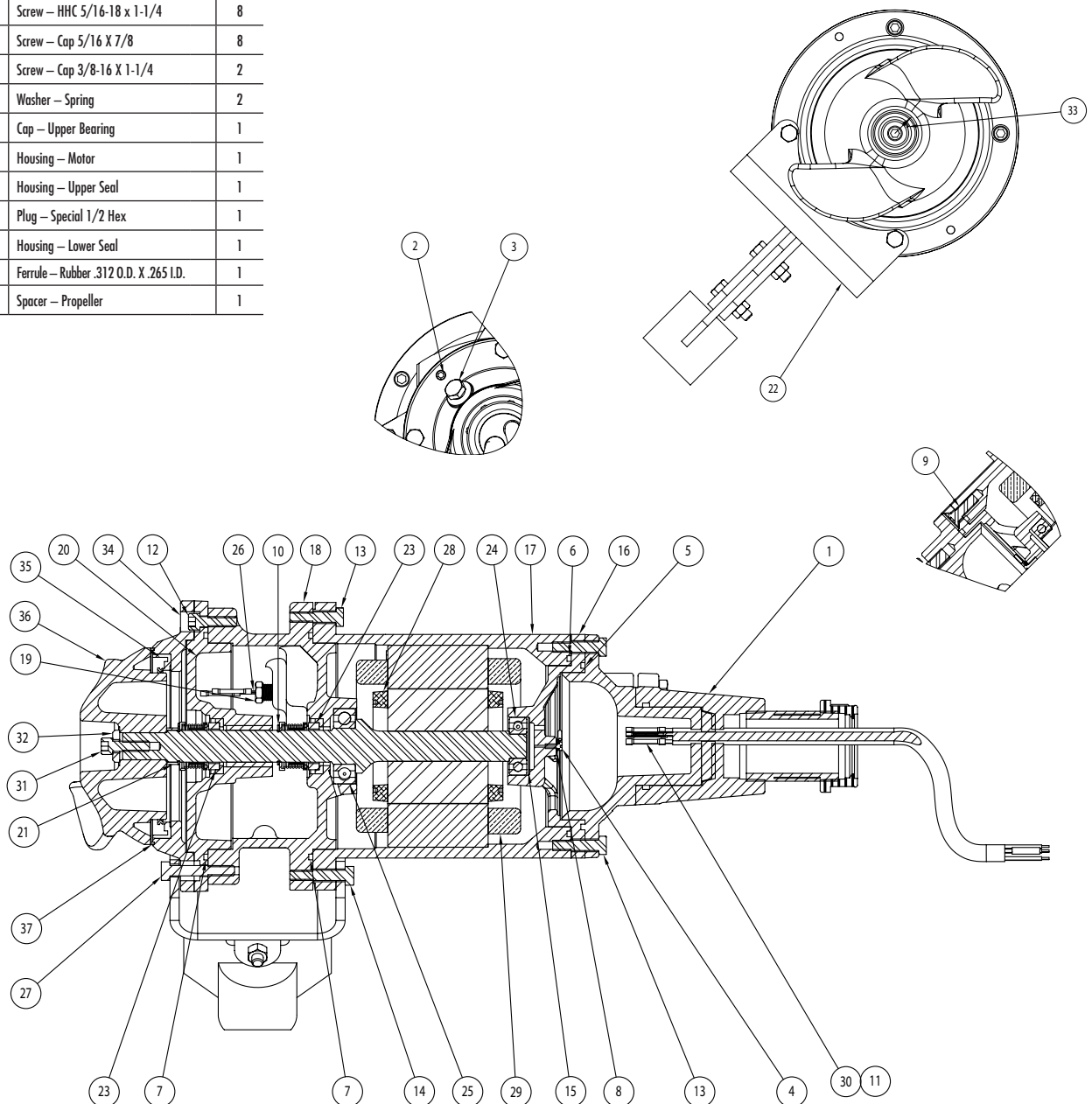


HBMX200 Parts List

Item	Eng. No.	Part Description	Qty.
1	22407C607	Cord Cap – 35 Ft.	1
2	05013A027	Screw – Set 5/16-18	2
3	05022A092	Plug – Pipe 1/4	2
4	05434A043	Screw – Machine 10-24 X 3/8	1
5	05876A122	O-ring	1
6	05876A123	O-ring	1
7	05876A125	O-ring	2
8	06107A015	Washer – Lock	1
9	07597A017	Screw – Machine 5/16-18 X 1	2
10	12558A006	Ring – Retaining	1
11	12672A002	Connector – Butt 22-16	2
12	19100A012	Screw – HHC 5/16-18 x 1-1/4	8
13	19100A033	Screw – Cap 5/16 X 7/8	8
14	19101A017	Screw – Cap 3/8-16 X 1-1/4	2
15	19331A005	Washer – Spring	2
16	21570B100X	Cap – Upper Bearing	1
17	21571D100X	Housing – Motor	1
18	21574D100X	Housing – Upper Seal	1
19	21577A000	Plug – Special 1/2 Hex	1
20	21578C100X	Housing – Lower Seal	1
	22579A000	Ferrule – Rubber .312 O.D. X .265 I.D.	1
21	27799A000	Spacer – Propeller	1

Item	Eng. No.	Part Description	Qty.
22	526033065	Bracket – Mixer	1
23	21576A010	Seal – 7/8"	2
24	08565A013	Bearing – Ball	1
25	08565A018	Bearing – Ball	1
26	22578A003	Electrode – with Resistor	1
27	001010111	Screw – HHC 5/16 – 18UNC x 1-3/4	2
28	152260111	Rotor/Shaft – 1750 rpm	1
	152270111	Rotor/Shaft – 1150 rpm	1
29	152260031	Stator – 1750 rpm	1
	152270031	Stator – 1150 rpm	1
30	12672A001	Connector	3

Item	Eng. No.	Part Description	Qty.
31	001780041	Screw – Cap 5/16-18	1
32	005190001	Washer – Propeller	1
33	101020011	Key 3/16 Sq. X .69	1
34	134894002	Housing – Lip Seal	1
35	152220001	Lip Seal	1
36	152120002	Propeller	1
37	27755A000	Ring – Propeller	1



THIS PAGE INTENTIONALLY LEFT BLANK

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.



HYDROMATIC®

740 EAST 9TH STREET
ASHLAND, OHIO, USA 44805
419-289-1144

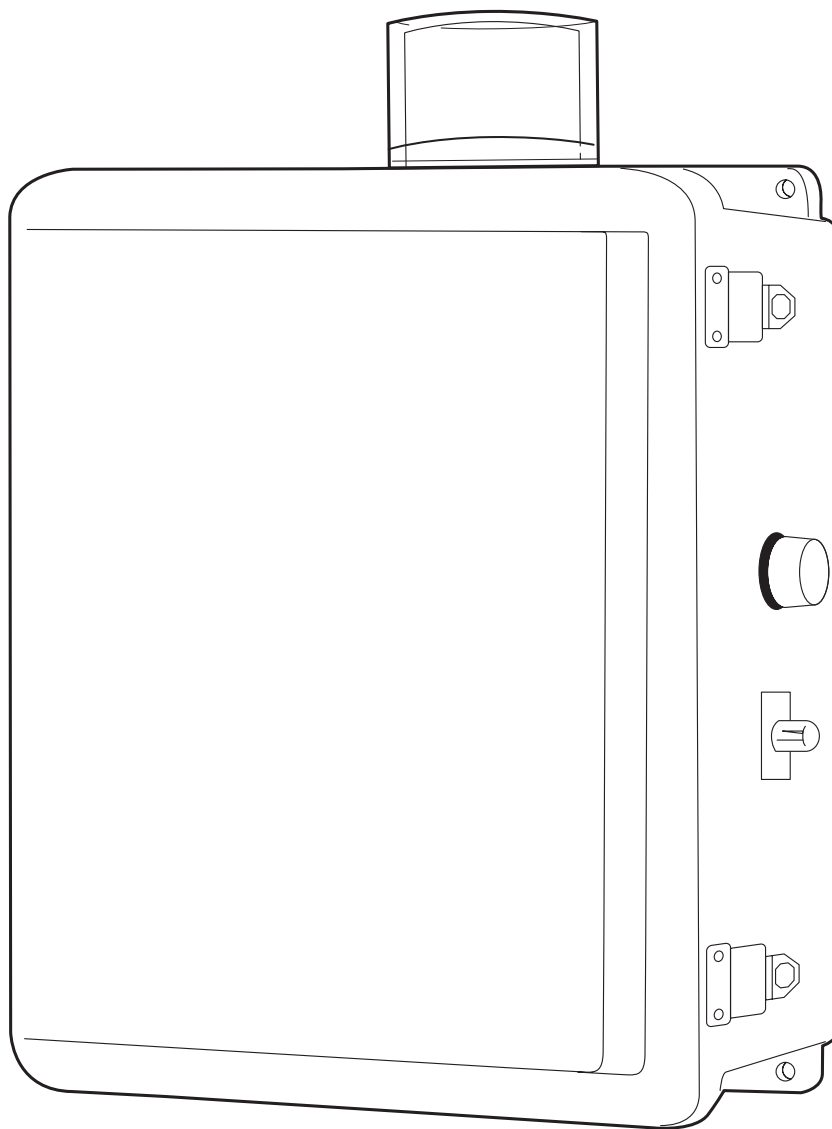
490 PINEBUSH ROAD, UNIT #4
CAMBRIDGE, ONTARIO, CANADA N1T 0A5
800-363-PUMP

WWW.HYDROMATIC.COM

Warranty Rev. 12/13



HYDROMATIC®



MODELS HBM200/HBMX200

BASIN MIXER CONTROL PANEL

INSTALLATION AND SERVICE MANUAL



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

General Information

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

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.

Unpacking Panel:

Remove panel 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.

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.

Power Supply

WARNING: Do not attempt to wire this control box unless you have a good working knowledge of electricity and are familiar with the state and local codes. If you are in doubt about anything, contact a qualified electrician.

Do not attempt to operate this unit on any other voltage or power distribution other than for which it was originally designed (check nameplate). Failure to comply with this will result in the immediate cancellation of all warranties and claims.

It is advisable to put the panel on its own circuit using a circuit breaker adequately sized to protect the mixer. Check state and local codes for the correct wire size and circuit protection to use. The wire should be sized large enough to handle the full load current of the mixer you are operating and any voltage drop that might occur due to long service runs.

Run power supply lines to the control box and secure (knockouts are not supplied in this box). Select a convenient location on the bottom to enter the box with the power supply. Cut a hole with a chassis punch. Caution should be taken not to get metal chips in the components while cutting hole. After the hole is cut, any metal particles must be removed from the box. Failure to do so may result in premature component failure.

Connect incoming power to the terminal blocks per the included schematic and all necessary ground wires to the ground lug at

the bottom right of the box. The ground lug should be fastened to a good driven earth ground by one of the methods described in the National Electric Code. NEC does not permit using ground as a current-carrying conductor, therefore a neutral must be provided for 115 volt 1 phase, 208 volt 1 phase, 230 volt 1 phase, or 208 volt 3 phase systems.

WARNING: Before handling these mixers 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.

Electrical Connections:

The contractor must conform to the latest requirements of the National Electrical Code. All conduit and cables shall be in accordance with NEC Code NFPA #70. To maintain UL and CSA ENCL rating, use the same type UL and CSA weatherproof conduit hubs when connecting to this enclosure. Prior to conducting any installation, repair or service with regard to the control panel, refer to the schematic appropriate for that panel. The schematic will provide guidance with regard to the terminal block connections.

CAUTION: A nonmetallic enclosure does not provide grounding conduit connections. Use grounding bushing and jumper wires.

Make the Following Electrical Connections:

- Connect the mixer leads to the control panel.
- Connect the mixer heat sensor and seal failure leads (if available on the mixer) to the

appropriate terminal blocks in the control panel.

c. Before connecting power to the control panel, make sure all control switches (e.g. H-O-A switch) and protective devices (e.g. breakers) are in the Off position. Now connect power to the terminal block or the circuit breaker as directed by the schematic.

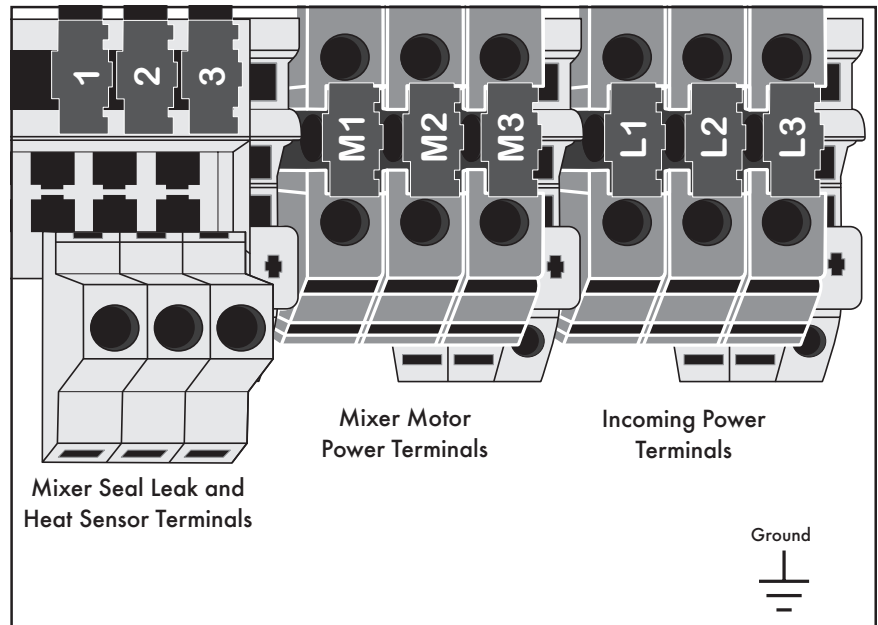
d. Control panel must be grounded properly per NEC and/or local codes. To facilitate this, a ground lug is provided on the control panel.

HBM (Pre December 2011)		
Terminal	Mixer Wire Color	Function
M1	White	Mixer Power
M2	Black	Mixer Power
M3	Red	Mixer Power
G	Green	Ground
1	Orange	Seal Leak Sensor
2	Blue	Heat Sensor
3	White w/Black Stripe	Sensor Common Wire

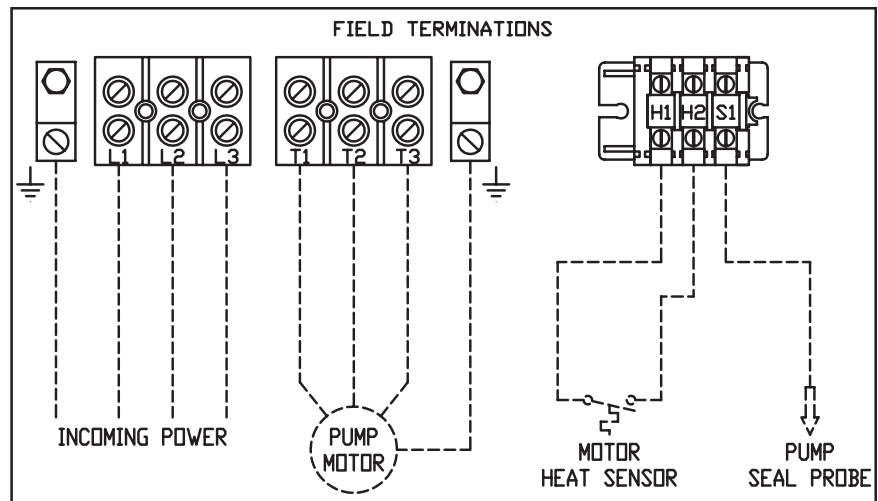
HBM (Post December 2011)		
Terminal	Mixer Wire Color	Function
T1	White	Mixer Power
T2	Black	Mixer Power
T3	Red	Mixer Power
G	Green	Ground
S1	Orange	Seal Leak Sensor
H1	Blue	Heat Sensor
H2	White w/Black Stripe	Sensor Common Wire

HBMX (Post December 2011)		
Terminal	Mixer Wire Color	Function
T1	White	Mixer Power
T2	Black	Mixer Power
T3	Red	Mixer Power
G	Green	Ground
S1	Red	Seal Leak Sensor
S2	Orange	Seal Leak Sensor
H1	Black	Heat Sensor
H2	White/Blue Tracer	Heat Sensor

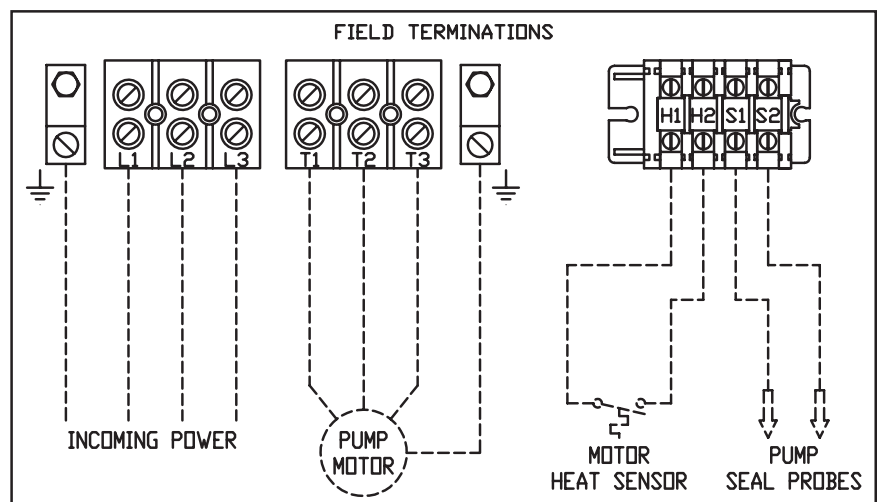
HBM (Pre December 2011)

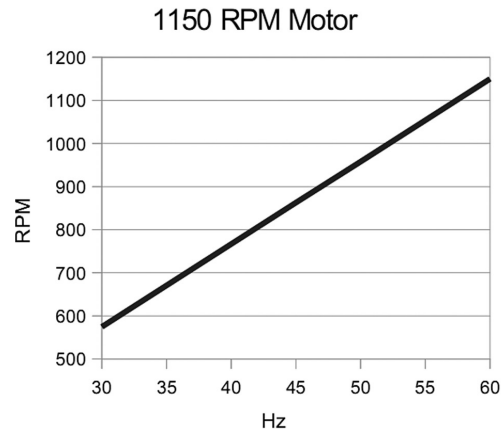
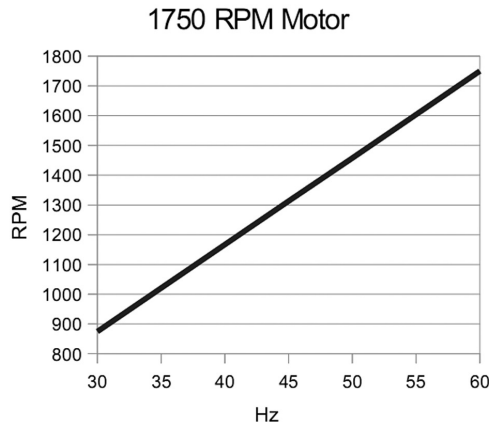


HBM (Post December 2011)



HBMX (Post December 2011)





Start-up Operation

1. Check junction box for moisture. Moisture may cause chattering of relays/contactors.
2. **WARNING! Live voltage can kill! Check incoming power voltage to make sure that it is correct for panel and mixer model.**
3. Energize control panel. (Turn on power to panel.)
4. **WARNING! Live voltage can kill! Check voltage to the panel and at secondary of control transformer using a voltmeter. If no transformer is supplied, check voltage at the circuit breakers.**
5. Set the application specific parameters for the VFD.
 - a. With power to the VFD and the H-O-A switch in the Off position, power

on hit the Menu button until the pointer is above main menu.

- b. Use up and down key to switch parameter groups. Hit OK to set a parameter group.
- c. Use up and down key to switch parameters. Hit OK to set a parameter group. Use up and down key to change parameters. After each change hit OK again to set the value.
- d. Use the back button to get back to the parameter groups.
- e. Parameters to be set at installation:
 - i. Set 1-24 motor current; see chart below.
 - ii. Set 1-25 motor nominal speed; 1150 or 1750; see chart below.

- iii. Set 1-29 AMT; set to 2 and follow instructions then set back to 0.

- iv. Set 3-02 speed in Hz; 30–60 Hz.

- f. Hit auto on button and move H-O-A switch to Auto position. When timer contact is closed motor should run.

WARNING: Do not exceed 60 Hz or go below 30 Hz. Exceeding 60 Hz will draw more horsepower from the motor than it was designed for. Running at lower than 30 Hz may not supply enough starting torque to the mixer unit.

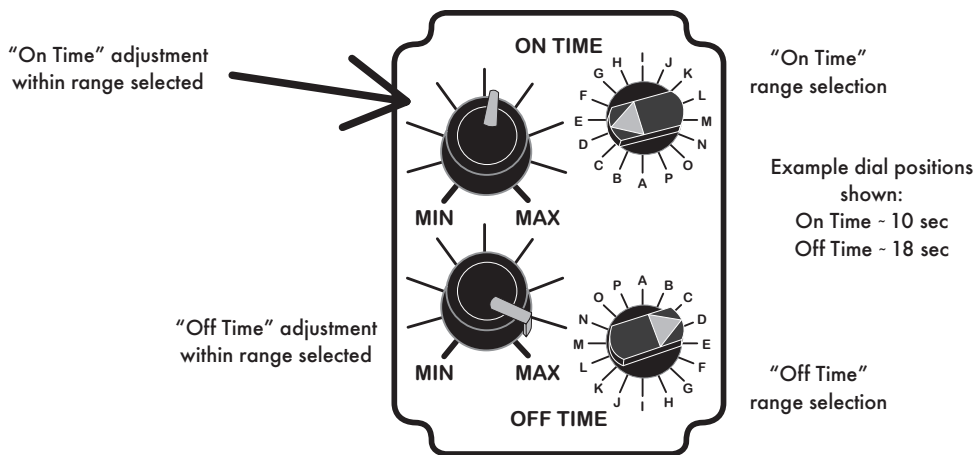
6. With H-O-A switch in Hand, check mixer to verify the mixer is running. On three phase power, check to see if each mixer has proper rotation.
7. Check full load current with amp probe and compare it with the nameplate rating. On three phase mixers, check all three phases. Use a true RMS meter to obtain accurate readings.

8. Set range and adjustment settings on timer.

- a. Select one of the 16 built-in time ranges by setting the rotary switch per a chart on

Mixer Model	Amps	Speed	Voltage
HBM200M6-4/HBMX200DC	8	1750	200
HBM200M3-4/HBMX200EC	7	1750	230
HBM200M4-4/HBMX200FC	3.5	1750	460
HBM200M6-6/HBMX200DB	5.5	1150	200
HBM200M3-6/HBMX200EB	4.8	1150	230
HBM200M4-6/HBMX200FB	2.4	1150	460

Speed charts – FOR REFERENCE ONLY.



Dial Setting	Timing Range
A	0.6 – 2.5 Sec.
B	1.5 – 5 Sec.
C	2.5 – 10.5 Sec.
D	5 – 21 Sec.
E	10 – 42 Sec.
F	0.4 – 1.4 Min.

Dial Setting	Timing Range
G	0.7 – 2.8 Min.
H	1.5 – 5.5 Min.
I	3 – 11 Min.
J	5.5 – 22.5 Min.
K	11 – 45 Min.

Dial Setting	Timing Range
L	0.4 – 1.5 Hr.
M	0.8 – 3 Hr.
N	1.5 – 6 Hr.
O	3 – 12 Hr.
P	6 – 24 Hr.

the unit and adjust within that range using the knob on top.

9. With H-O-A switch in Auto, check timer operation. For sequence of operation, refer to design specification.
10. Make sure H-O-A switch is left in the Auto position after start-up is completed.

Mixer Start-Up:

Refer to mixer Installation and Service Manual.

Mixer Maintenance

WARNING: Before handling these mixers 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.

The maintenance schedule will vary with operating and

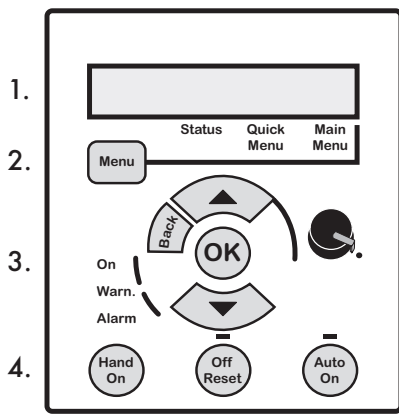
environmental conditions. It will also vary with the specific type of control supplied. The list herein is a guide only.

1. Exercise breaker through one cycle. Be careful not to overexercise as the breaker is not a switching device. Excessive operations tend to affect the trip curve of the breaker.

Programming with LCP12 keypad

The LCP is divided into four functional groups:

1. Numeric display
2. Menu key
3. Navigation keys
4. Operation keys and LEDs



2. Check relay for excessive humming. This can be accomplished by turning mixer on and off in the Hand mode with the H-O-A switch.
3. Check mixer run light by running mixer in Hand mode. Check bulb(s) in any other light(s).
4. With the power off, check continuity of all control fuses.
5. Check voltage at primary and secondary of control transformer.
6. Check the mixer full load amps.
7. Check junction boxes for moisture. Moisture may cause chattering of relays and contactors.
8. Check for moisture inside control panel enclosure. Moisture can cause damage to electrical components. Check door gasket for proper seal.

9. Check labels to verify they have not been damaged.
10. Lubricate enclosure hinges.

Spare Parts List:

The following is a list of recommended spare parts. However, conditions of service vary significantly and a general list may not in its entirety be applicable to a given installation. The user should exercise judgment in defining specific requirements based on this guide.

1. Fuses for control transformer primary and secondary. (If required.)
2. VFD.
3. Bulbs for any light requiring a bulb.
4. Control transformer. (If required.)
5. Control and time delay relay. (If required.)

Timer Controls

Your control panel is equipped with a repeat cycle time delay relay (On time first followed by Off time and repeating). The On and Off times have rotary switch selectable timing ranges and adjustment knobs for selecting the time within that range. Select one of the 16 built-in ranges by setting the rotary switch per a chart on the time delay relay and adjust within that range using the appropriate knob.

Seal Failure

Your mixer is equipped with a seal fail (moisture) sensor. The presence of water energizes the seal leak warning output. This activates a warning light or alarm only, and does not stop the motor. It indicates a leak has occurred and the mixer must be repaired.

For standard location mixers the resistance across the moisture seal (seal failure) probe and ground wire should be checked after a seal leak warning light has lit. For hazardous location mixers the resistance across the moisture seal (seal failure) probes should be checked after a seal warning light has lit. This can be done by disconnecting the control wires from the control panel and measuring the resistance with an ohmmeter between the wires. Refer to the control panel schematic for wire identification. For a standard, non-hazardous location mixer the reading should be 100,000 ohms or greater, and for a hazardous location mixer the reading should be above 33,000 ohms. If the measured values are below those indicated above, then the mixer may have a lower seal failure and require service.

On control panels for hazardous location applications the seal leak test switch tests the seal leak circuitry continuity. When pushed the seal leak test bulb should light. If the test bulb does not light, it means either the wiring circuitry to the seal leak probes has been broken or the bulb has burned out.

Temperature Failures

NOTE: Hydromatic® control panels supply the correct

circuitry for moisture and heat sensor connections.

Your mixer is equipped with temperature fail 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 mixer.

When the motor is stopped due to an overheated condition, it will not start until the motor has cooled and the heat sensor reset button is manually pushed on the front of the control panel.

NOTE: Failure to use proper circuitry and to connect the motor overheat protection in the control panel would negate all warranties and Factory Mutual Approval.

WARNING: Before handling the mixer 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.

Troubleshooting

1. Mixer does not run in Hand position.

- a. Check mixer circuit breaker and control fuse for tripping or blown condition.
- b. Check incoming power voltage and control circuit voltage.
- c. Check VFD to see if it is tripped. Reset VFD if tripped and check mixer current with ammeter.

- d. With the power off, check motor heat sensor continuity.
- e. Check wiring of mixer to control panel. It should agree with the schematic.

2. Mixer does not run in Auto position.

- a. Check items (a.) through (e.) per Item #1 above.
- b. Check knob settings on timer to ensure proper sequencing. Check both On and Off time range selector knobs as well as On and Off time adjustment knobs.
- c. If mixer does not run in Auto mode, check Auto circuit wiring in panel.

3. Mixer runs, but run light does not energize.

- a. Remove light and check with an ohmmeter.
- b. Check run light wiring.

4. Severe humming/chattering of control relay.

- a. There may be low voltage. Check voltage at primary and secondary of control transformer using a voltmeter. This low voltage condition may cause severe chattering and burnout of relay.
- b. Relay may have dust around magnet of coil structure. Dry or clean as required.
- c. Check voltage to the control panel. Relays require a minimum of 80% of full voltage to pull in without chatter. If the problem is a recurring one, measure voltage with recorder on a 24 hour basis.
- d. Dry out the junction box (if furnished); moisture

in the junction box may cause relays to energize intermittently.

5. Short cycling mixer.

- a. Check timer controls.

6. Run light stays on.

- a. Selector switch may be in the Hand position.

7. Nuisance tripping of overload on VFD or circuit breakers.

- a. Check mixer amp draw with amp probe and compare to nameplate amps on mixer.
- b. The propeller may be locked up due to excessive debris or solids.
- c. Possible motor failure (fault in windings).
- d. Mixer may be miswired to terminal block.
- e. Voltage and current unbalance. Voltage unbalance on three phase power sources can cause motor current to become unbalanced and excessive heating will result. Tripping of the overload protection and premature motor failures can be expected if the current unbalance exceeds five percent.

$$\text{Percent Current Unbalance} = \frac{\text{Maximum Current Difference from x 100}}{\text{Average Current}}$$

To determine if motor current unbalance is a function of the motor or the power supply:

1. Label the leads and the terminals 1, 2, and 3 respectively.
2. Record the amperage for each lead.
3. Move each lead to the next terminal (1 to 2, 2 to 3, 3 to 1).

4. Again read the amperage of each lead.
5. Move each lead to the next terminal (1 to 3, 2 to 1, 3 to 2).
6. Again read the amperage of each lead.
7. If the unbalance moves with the motor leads, the unbalance is caused by the motor. If the unbalance remains with the terminals, the unbalance is in the power supply.
8. If the current unbalance exceeds five percent, nuisance tripping or excessive heating will result.
9. Connect leads for the lowest percent of current unbalance.

Factory Set Parameters for VFD

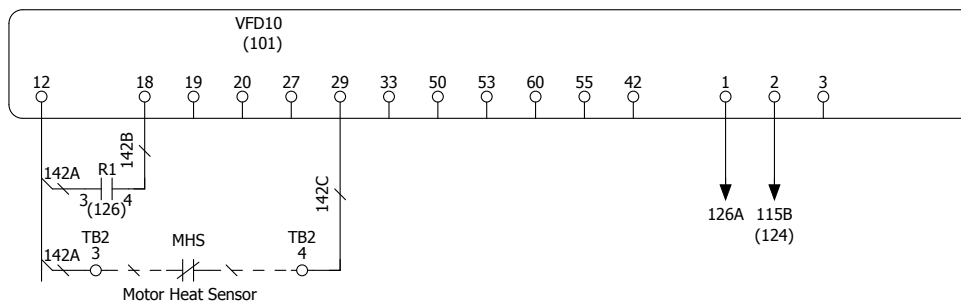
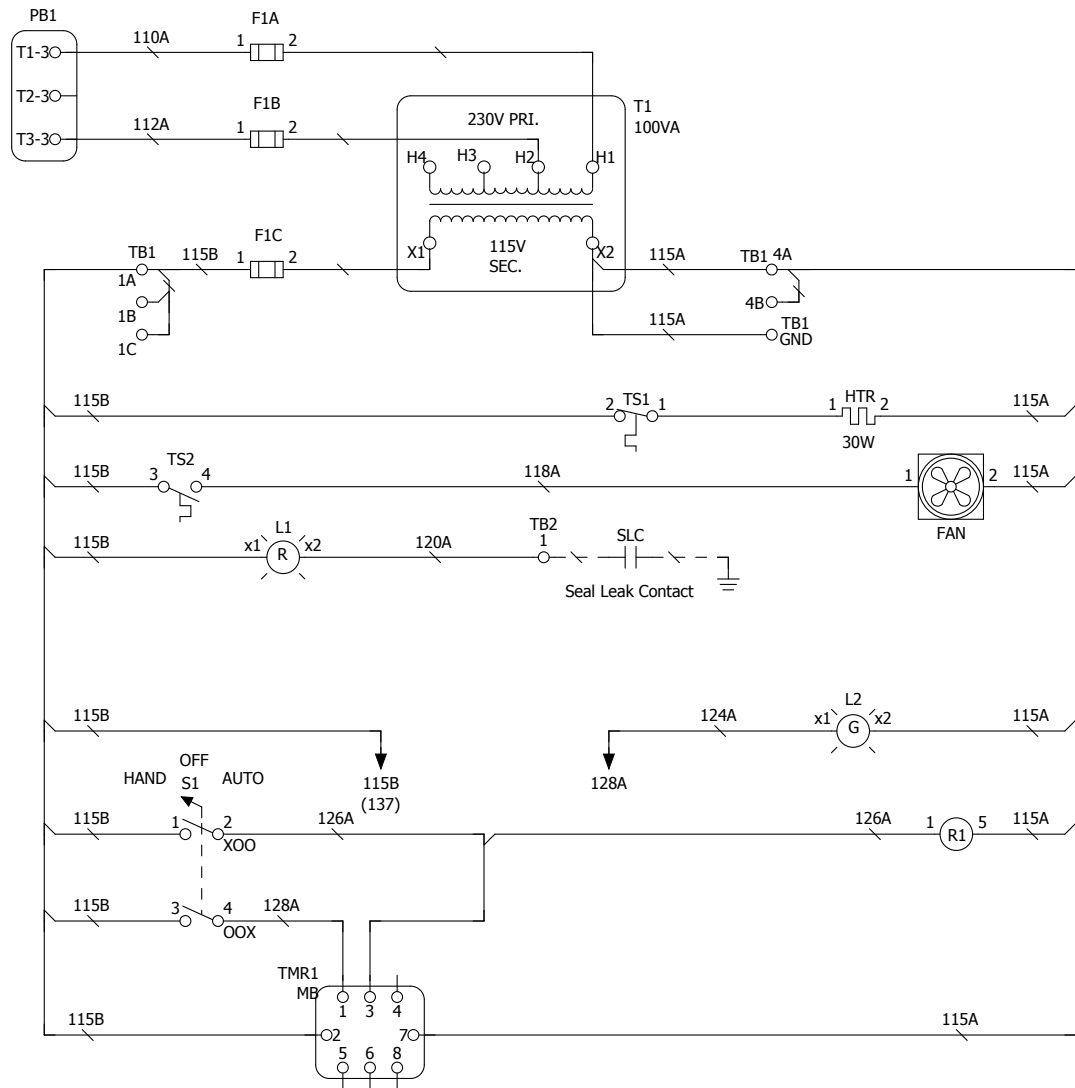
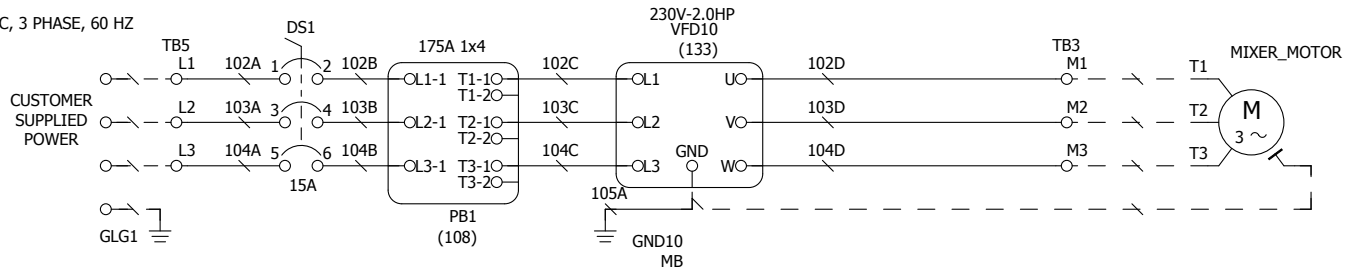
Parameters set at factory for 230V panels	
1) Set 1-20 motor power	1.5 kW or 2 HP
2) Set 1-22 motor voltage	230 volts
3) Set 1-24 motor current	4.8 amps
4) Set 1-25 motor nominal speed	1150
5) Set 3-02 min. speed in Hz	30
6) Set 3-03 max. speed in Hz	60
7) Set 3-15	0
8) Set 3-16	0
9) Set 3-41 ramp up time	3.00 sec.
10) Set 3-42 ramp down time	3.00 sec.

Parameters set at factory for 460V panels	
1) Set 1-20 motor power	1.5 kW or 2 HP
2) Set 1-22 motor voltage	460 volts
3) Set 1-24 motor current	2.4 amps
4) Set 1-25 motor nominal speed	1150
5) Set 3-02 min. speed in Hz	30
6) Set 3-03 max. speed in Hz	60
7) Set 3-15	0
8) Set 3-16	0
9) Set 3-41 ramp up time	3.00 sec.
10) Set 3-42 ramp down time	3.00 sec.

HBM (Pre December 2011)

230V, 3 Phase, 60 Hz Wiring Schematic

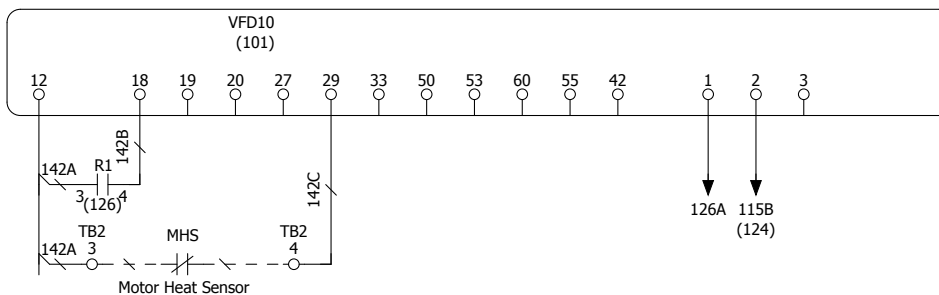
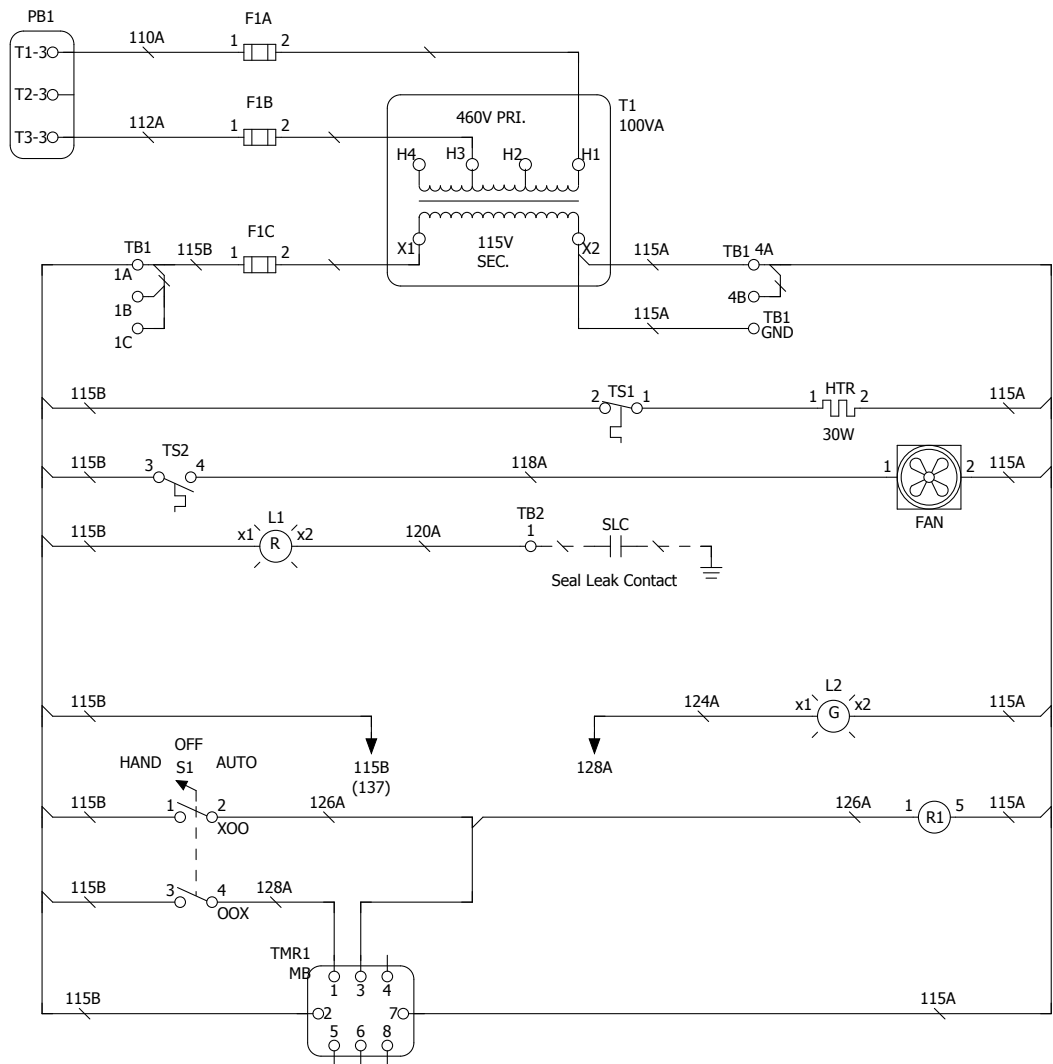
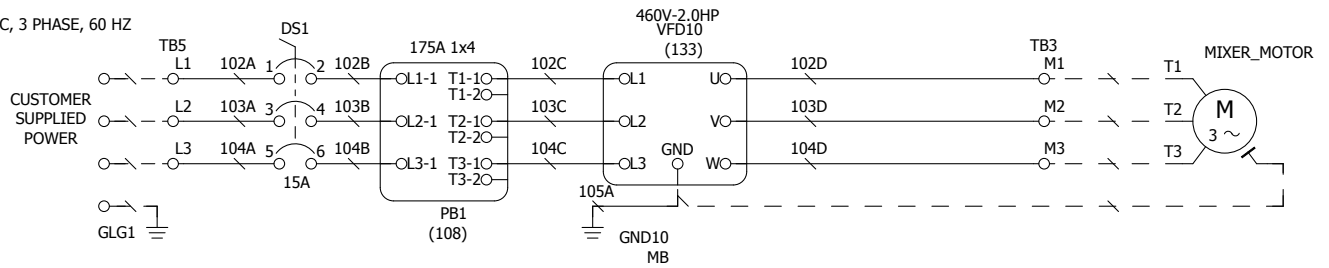
230 VAC, 3 PHASE, 60 HZ



HBM (Pre December 2011)

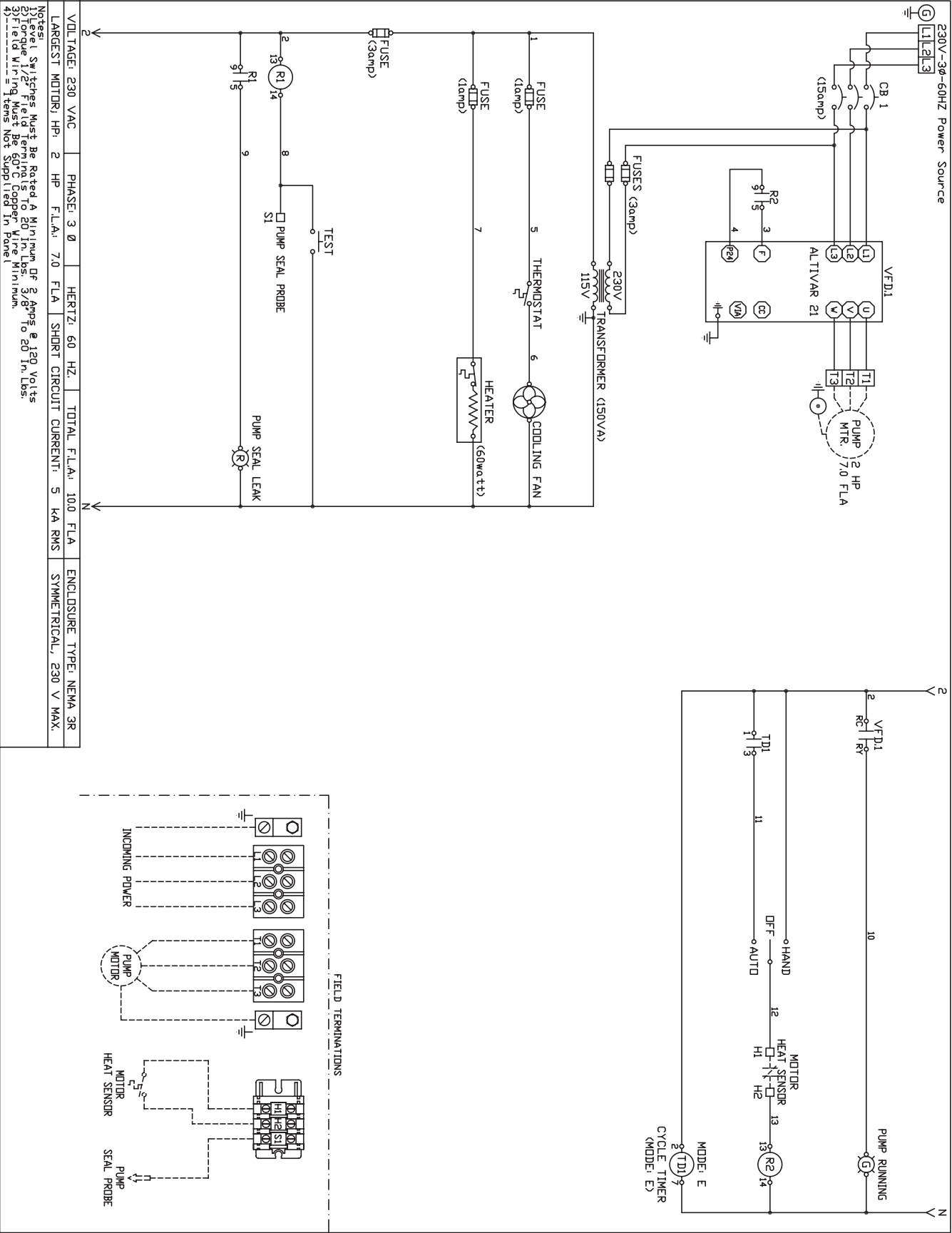
460V, 3 Phase, 60 Hz Wiring Schematic

460 VAC, 3 PHASE, 60 HZ



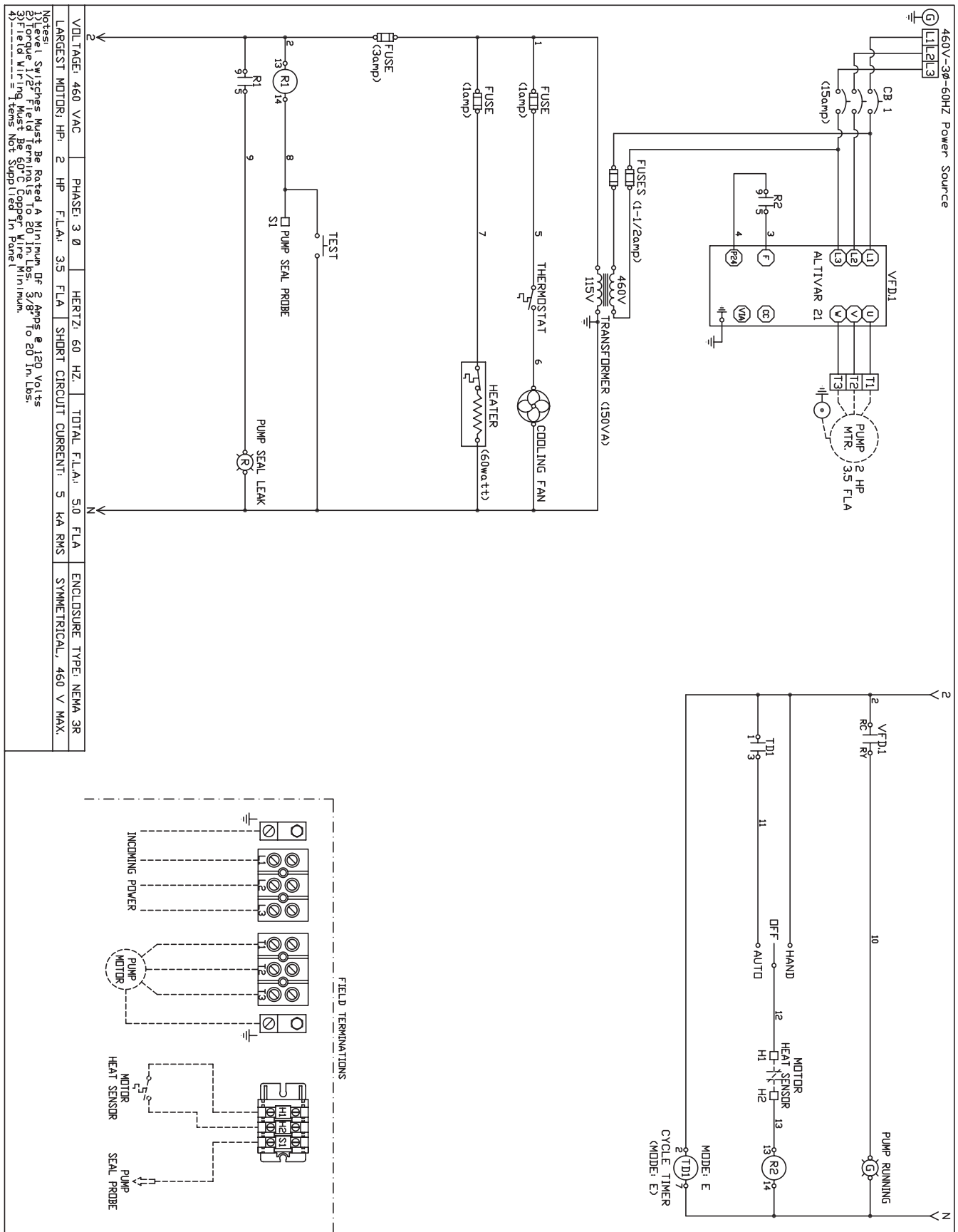
HBM (Post December 2011)

230V, 3 Phase, 60 Hz Wiring Schematic

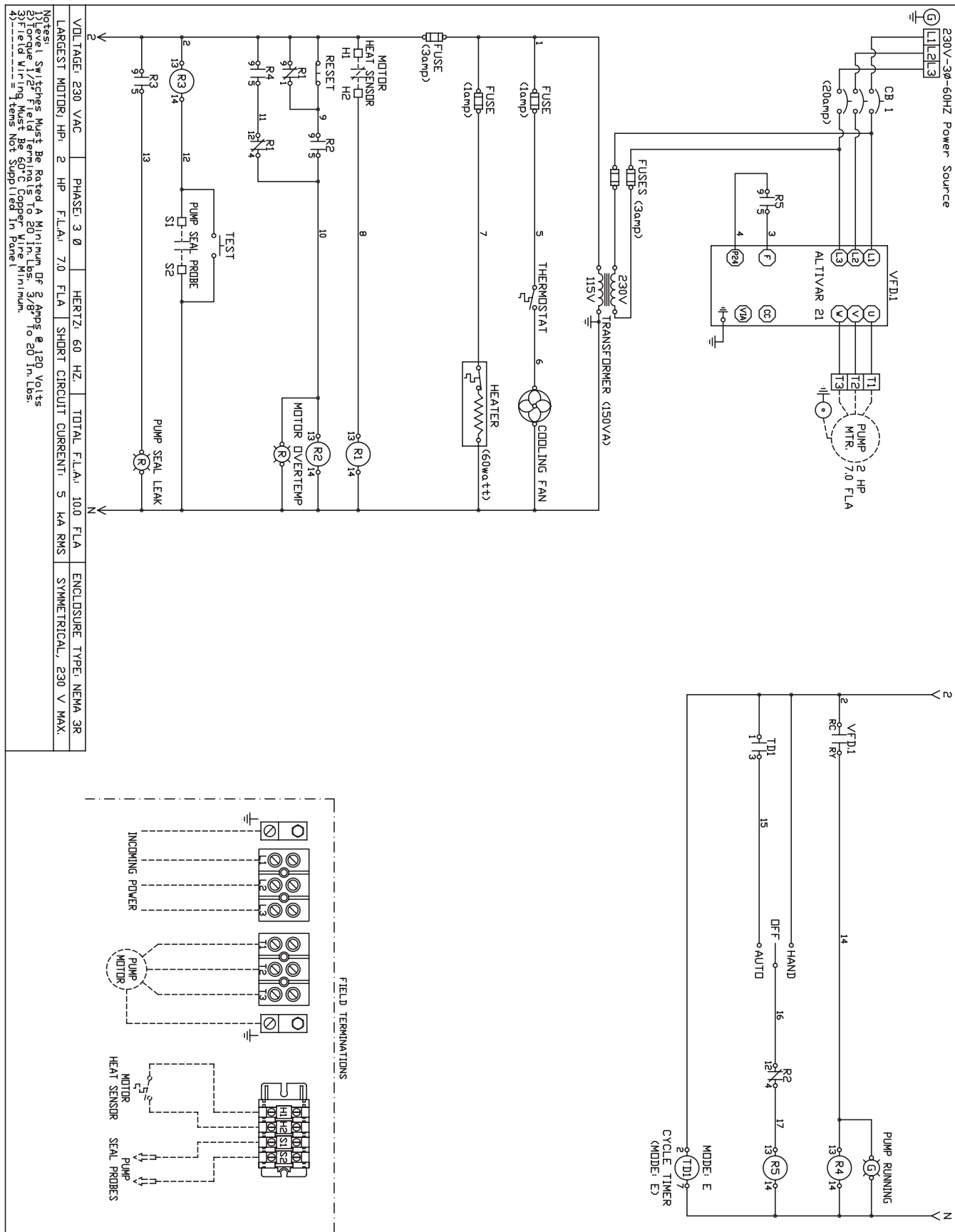


HBM (Post December 2011)

460V, 3 Phase, 60 Hz Wiring Schematic

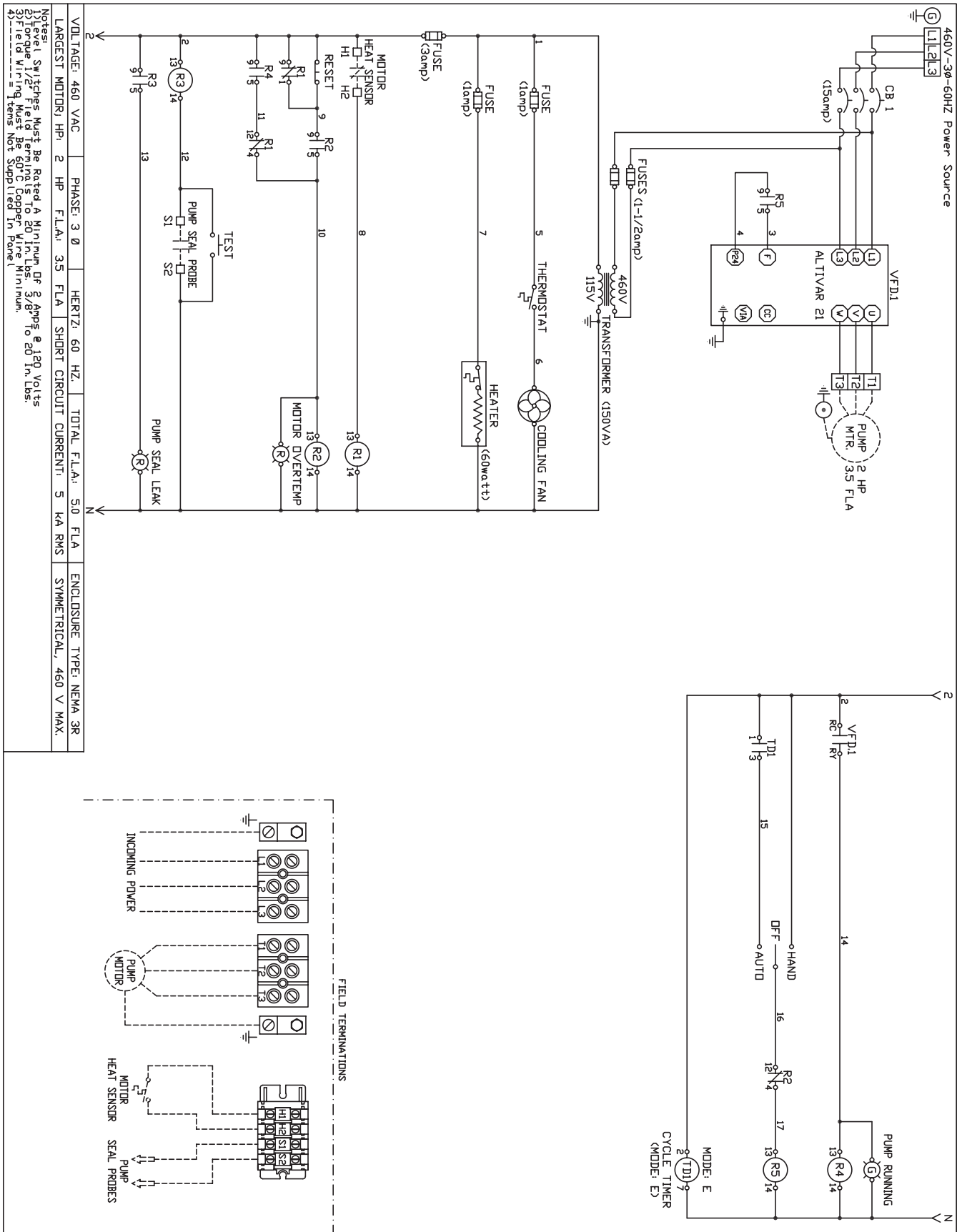


HBMX (Post December 2011) 230V, 3 Phase, 60 Hz Wiring Schematic



HBMX (Post December 2011)

460V, 3 Phase, 60 Hz Wiring Schematic



THIS PAGE INTENTIONALLY LEFT BLANK

THIS PAGE INTENTIONALLY LEFT BLANK

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.



HYDROMATIC®

740 EAST 9TH STREET
ASHLAND, OHIO, USA 44805
419-289-1144

490 PINEBUSH ROAD, UNIT #4
CAMBRIDGE, ONTARIO, CANADA N1T 0A5
800-363-PUMP

WWW.HYDROMATIC.COM