HYDROMATIC®

STANDARD ELECTRICAL CONTROL PANEL

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

Pentair Water™

General Information

Thank you for purchasing your Hydromatic® 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.

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

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: Nonmetallic enclosures do not provide grounding conduit connections. Use grounding bushing and jumper wires.

Make the Following Electrical Connections:

a. **Connect the pump leads to the control panel.** ***If pump is single phase and the panel has start capacitor, start relay and run capacitor, it is critical that the pump leads be connected properly. The White, Black, and Red pump leads must be connected to the appropriate terminals as directed by the panel schematic and the label on the back panel below the terminals.***

b. Connect the pump heat sensor and seal failure leads (if available on the pump) to the appropriate terminal blocks in the control panel. If the heat sensor lead from the pump is wired as indicated, remove jumpers as defined by the schematic.

c. Connect all the float control leads to the appropriate panel terminals. Contractor must be very careful in locating the floats at the proper elevations. The maximum distance from the control panel to the floats is the lesser of l00 feet, or the maximum distance recommended for the pump.

d. *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.*

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

Pump Operation

1. Check junction box for moisture. Moisture may cause chattering of relays/contactors.
2. **If pump is single phase with start capacitor, start relay and run capacitor in panel. Check that pump White, Black, and Red power wires are connected to panel correctly.**
3. **WARNING!** *Live voltage can kill!* Check incoming power voltage to make sure that it is correct for panel and pump model.
4. Energize control panel. (Turn on power to panel.)
5. Check overload relay and verify reset mode (if overload is supplied).
6. **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.

7. With H-O-A switch in hand, check discharge to verify the pump is running. Check for flow. On three phase power, check to see if each pump has proper rotation. Wrong rotation will give low flow.
8. Check full load current with amp probe and compare it with the nameplate rating. On three phase pumps, check all three phases. On single phase pumps, check black pump lead.
9. Check operation of start relay, if supplied on single phase panels, per procedure in Item #7 of Maintenance Instructions.
10. With H-O-A switch in Auto, check float operation and response to control panel to the float operation. For sequence of operation, refer to design specification.
11. Make sure H-O-A switch is left in the Auto position after start-up is completed.
12. **Make sure all conduits from wet well to panel are sealed below panel. Septic gases will damage components in panel.**

Pump Start-Up:

Refer to pump Installation and Service Manual.

Maintenance

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

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 two cycles. Be careful not to overexercise as the breaker is not a switching device. *Excessive operations tend to affect the trip curve of the breaker.*
2. Check contactors and relays for excessive humming. This can be accomplished by turning pumps on and off in the Hand mode with the H-O-A switch.
3. Check pump run light(s) by running pump(s) 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 pump full load amps.
7. Check the start relay by using an amp probe around the red wire (start winding). Amp probe should display a very brisk action from zero to locked rotor and back to operating load. This action occurs on pump start, and the action must show no lazy movement.
8. Check junction boxes for moisture. Moisture may cause chattering of relays and contactors.
9. Check for moisture inside control panel enclosure. Moisture can cause damage to electrical components. Check door gasket for proper seal.
10. Check labels to verify they have not been damaged.
11. Lubricate enclosure hinges.
12. Pull floats and check for proper operation and ensure there is no foreign buildup on them.

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.
2. Contactor.
3. Bulbs for any light requiring a bulb.
4. Control transformer.
5. Alternator relay or duplex alternator board, whichever is required.

Pump Troubleshooting

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

1. Pump does not run in Hand position.

a. Check pump circuit breaker and control fuse for tripping or blown condition.

b. Check incoming power voltage and control circuit voltage.

c. Check overload relay to see if it is tripped. Reset relay if tripped.

d. *With the power off*, check motor heat sensor continuity.

e. Check wiring of pump to control panel. It should agree with the schematic.

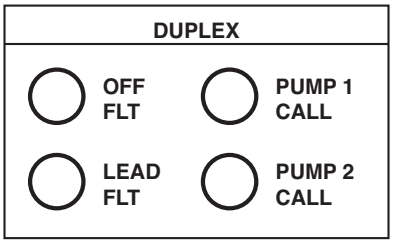
f. Check contactor coil resistance.

2. Pump does not run in Auto position.

a. Check items (a.) through (f.) per Item #1 above.

b. Floats may be miswired to control panel. Check float type (N.O. or N.C.) and hook up by referring to the schematic. If the start and stop floats are hooked in reverse, pump will short cycle and will not pump the level down.

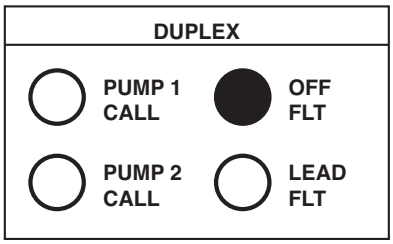
c. Check pump controller indicating lights.



No Lights On

(No call from the floats)

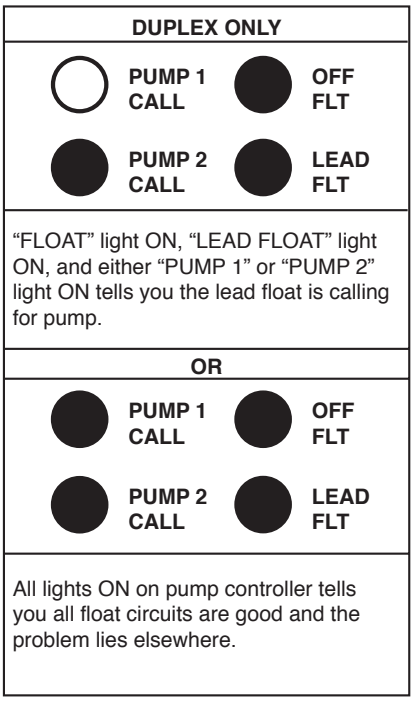
1. Make sure there is power to the controller.
2. Is water level in the system high enough to activate the floats?
3. If #1 and #2 check out, shut power off to the panel. Remove the OFF FLOAT wires and run a jumper between the OFF FLOAT connections. If OFF FLOAT light comes on, the float is "hung up" or the wiring connections are loose.



Off Float Light On

1. Is water level in the system high enough to activate the lead (ON) float?
2. If #1 checks out, shut off power to the panel. Remove the lead (ON) float wires and run a jumper between the LEAD FLOAT (ON FLOAT) connections. If one or two pumps start, check the lead (ON) float for "hang up" or loose wiring connections.

1. Check Hand-Off-Auto (H-O-A) switch for correct position.



2. Check for heat sensor trip in pump with a jumper between HEAT SENSOR 1 and HEAT SENSOR 2 terminals.
3. Reset overload(s) if tripped.
4. Reset circuit breakers if tripped.

3. **Pump runs, but run light does not energize.**
   a. Remove light and check with ohmmeter.
   b. Check run light wiring.
4. **Pump runs but does not pump down the wet well.**
   a. On three phase only, pump rotation may be wrong. Wiring of pump to control panel may be reverse sequenced.
   b. Impeller may be dragging in volute due to solids. High amperage draw would identify this.
   c. Refer to the pump manual for other possibilities such as closed discharge gate valve, etc.
5. **Severe humming/chattering of contactors and control relays.**
   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 contacters and relays.
   b. Contactor may have dust around magnet of coil structure. Dry or clean as required.
   c. Check voltage to the control panel. Contactors require a minimum of 85% 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. Make sure the floats are located away from any turbulence.
   e. Dry out the junction box (if furnished); moisture in the junction box may cause relays to energize intermittently.
6. **Short cycling pump.**
   a. Check float controls.
7. **Run light stays on.**
   a. Selector switch may be in the Hand position.
8. **Nuisance tripping of overload on motor starters or circuit breakers.**
   a. Check pump and draw with amp probe and compare to nameplate amps on pump.
   b. The impeller may be locked up due to excessive debris or solids.
   c. Possible motor failure (fault in windings).
   d. Pump may be miswired to terminal block.
   e. Voltage and current unbalance. Three phase only.

   Voltage unbalance on three phase power sources can cause motor current to become unbalanced and excessive heating will result. Tripping of the overload protectors and premature motor failures can be expected if the current unbalance exceeds five percent.

$$\text{Percent Current Unbalance} = \frac{\left(\begin{array}{c}\text{Maximum Current}\\ \text{Difference from}\\ \text{Average Current}\end{array}\right) \times 100}{\text{Average Current}}$$

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.

f. Connections and start components. Single phase only.

1. *Disconnect all power from the panel before making these checks.*
2. Motor winding resistance readings.
   a. Disconnect all three motor leads from panel terminal blocks.
   b. Using a volt-ohmmeter, with the scale set on RX1, measure the resistance between the leads with the chart below.

Winding	Typical Motor Leads	Resistance Reading
Main	Black to White	Lowest
Start	Black to Red	Next Lowest (Middle)
Both	White to Red	Highest (Main & Start)

Pump Troubleshooting

3. Capacitor check.
   a. Make sure the capacitor is discharged. Use extreme caution as a spark might occur.
   b. Disconnect the capacitor leads and connect an analog-type volt-ohmmeter to the capacitor terminals.
   c. Set the meter on the RX1,000 scale to check the start capacitor. Set the meter on the RX10,000 scale to check the run capacitor.
   d. The meter should indicate low ohms when it is first connected, but as the capacitor becomes charged (by the meter), it will return to a reading of infinity (open circuit).
4. Start relay check.
   a. Check the start relay coil resistance. It should be 3,000 to 15,000 ohms.
   b. Install a clamp on amp meter around the start winding lead.
   c. Set the amp meter scale to at least 2 times the pump motor full load current.
   d. Place the H-O-A switch in the Hand position to start the pump.
   e. The meter should read approximately 2 times full load current during starting.
   f. After the motor has started (within one second) the current should drop to a value much less than full load current.
5. Motor voltage check:

Component	Typical Motor Lead	Mode	Voltage Reading
Main Winding	Black to White	Start	Line Voltage
Main Winding	Black to White	Run	Line Voltage
Start Winding	Black to Red	Start	Line Voltage
Start Winding	Black to Red	Run	120% Line Voltage

Pump Notes

WARRANTY

Hydromatic® warrants to the original purchaser of each Hydromatic product(s) that any part thereof that proves to be defective in material or workmanship within one year from date of installation or 18 months from manufacture date, whichever comes first, will be replaced at no charge with a new or remanufactured part, F.O.B. factory. Purchaser shall assume all responsibility and expense from removal, reinstallation and freight. Any item(s) designated as manufactured by others shall be covered only by the express warranty of the manufacturer thereof. This warranty does not apply to damage resulting from accident, alteration, design, misuse or abuse. The pump must be installed, operated and maintained in accordance with the published instructions of the appropriate Installation & Service Manual.

All dual seal non-clogs and 3–5 HP grinders must have seal failure and heat sensors attached and functional for Warranty to be in effect. If a seal failure should occur, Hydromatic will cover only the lower seal and labor thereof. Labor is based on Authorized Service Center contract allowance. If the heat sensor is not attached and functional, Warranty is void. If the seal failure sensor is not attached and functional, Warranty is void.

If the material furnished to the Buyer shall fail to conform to this contract or to any of the terms of this written warranty, Hydromatic shall replace such nonconforming material at the original point of delivery and shall furnish instruction for its disposition. Any transportation charges involved in such disposition shall be for the Buyer's account. The Buyer's exclusive and sole remedy on account or in respect of the furnishing of material that does not conform to this contract or to this written warranty, shall be to secure replacement thereof as aforesaid. Hydromatic shall not in any event be liable for the cost of any labor expended on any such material or for any incidental or consequential damages to anyone by reason of the fact that such material does not conform to this contract or to this written warranty.

ALL IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, ARE DISCLAIMED TO THE SAME EXTENT AS THE EXPRESS WARRANTY CONTAINED HEREIN. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

MANUFACTURER EXPRESSLY DISCLAIMS AND EXCLUDES ANY LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY ARISING IN CONNECTION WITH THIS PRODUCT, INCLUDING WITHOUT LIMITATION, WHETHER IN TORT, NEGLIGENCE, STRICT LIABILITY CONTRACT OR OTHERWISE. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

HYDROMATIC®
Pentair Water

– Your Authorized Local Distributor –

USA
740 East 9th Street, Ashland, Ohio 44805
Tel: 419-289-3042 Fax: 419-281-4087

www.hydromatic.com

CANADA
269 Trillium Drive, Kitchener, Ontario, Canada N2G 4W5
Tel: 519-896-2163 Fax: 519-896-6337

Part # 5625-000-1 Item # H-03-000 12/06