

AquaCal[®]

APPLICATION BULLETIN

#0004

CONNECTING AND USING A HAYWARD VARIABLE SPEED CIRCULATION PUMP

REQUIRED FIRMWARE - EQUIPMENT

Heat Pump with an HP9 Control Board

Firmware Version 2.000 or higher

Table of Contents

- 1 - Connecting The Hayward Circulation Pump To The Heat Pump ----- 1**
- 2 - Manually Configuring The Heat Pump To Use The Circulation Pump ----- 5**
- 3 - Add The Circulation Pump To A Group ----- 7**
- 4 - Appendix ----- 8**
 - 4.1 Viewing System Information 8

1 - Connecting the Hayward Circulation Pump to the Heat Pump

What is Required

1. Heat Pump with an HP9 Control Board. See Figure 1.
2. Heat Pump firmware with a revision number of 2.000 or higher. See Figure 2.
 - If unsure about firmware version, see "*Viewing System Information*" on page 8.
 - The firmware can be upgraded if necessary. Check with an AquaCal Customer Support representative for a USB firmware upgrade drive if needed.
3. At least one equipment group needs to exist in order to use a circulation pump. If an equipment group does not exist, see document #LTP0167 (Expansion Board Upgrade Manual) for information on creating groups.
4. A two-conductor wire (shielded 300V, twisted pair) of sufficient length to run from the circulation pump to the heat pump. Confirm with circulation pump manufacturer manual for size and type of wires.

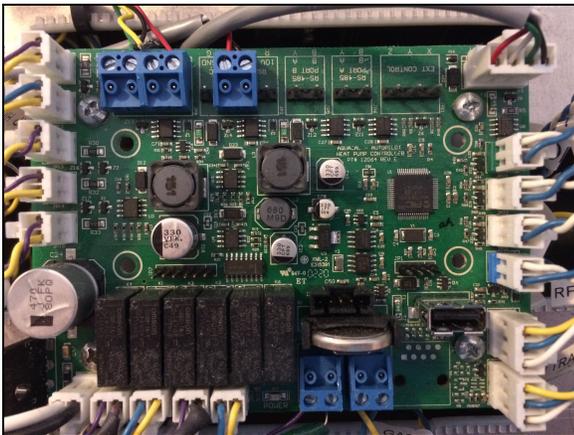


Figure 1 - HP9 Control Board

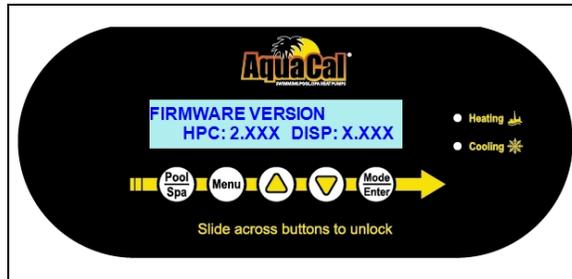


Figure 2 - Firmware Version

Wiring



Failure to heed the following will result in injury or death.

- Deactivate power while routing wiring to control board.
- RISK OF ELECTRICAL SHOCK FROM ENERGY STORED IN CAPACITORS - MODELS EQUIPPED WITH VARIABLE FREQUENCY COMPRESSOR DRIVES STORE ELECTRICITY EVEN AFTER THE POWER HAS BEEN DEACTIVATED AT THE POWER BREAKER. ***Wait for 2 minutes after the shut down of equipment before servicing.***
- Follow all National Electric Codes (NEC) and/or State and Local guidelines.



Failure to heed the following may result in injury or death.

- Installation of this equipment by anyone other than a qualified installer can result in a safety hazard.
- The information contained throughout the "Installation" section is intended for use by qualified installation technicians familiar with the swimming Pool/Spa safety standards.

1. Turn off power to heat pump and circulation pump at breaker panel.
2. Verify power is off.
3. Wait two (2) minutes for power to discharge from heat pump's capacitors.
4. Open display door on circulation pump. Remove top cover. See Figure 4, Figure 5, and Figure 6.



Figure 3 - Circulation Pump



Figure 4 - First Display Screw



Figure 5 - Second Display Screw



Figure 6 - Display Removed

5. Remove inner cover plate and wire cover. See Figure 7 and Figure 8.



Figure 7 - Inner Cover



Figure 8 - Inner Cover Removed

- Remove display wires from RS485 port. The circulation pump's display will no longer be connected to the circulation pump. This circulation pump will be controlled remotely by the heat pump. See Figure 9.



Figure 9 - Remove Existing Display Wires from Connector

- Connect wire to run to the heat pump from connection points "A" and "B". See Figure 10.
 - Run wire to the heat pump through the circulation pump chassis per circulation pump manufacturer recommendations.
 - Be sure to secure the wires running to the heat pump so they aren't a tripping hazard.
- Set DIP switches on circulation pump to allow for external control. Check circulation pump manual for specifics. As of this writing, the settings were as follows on the unit described here:
 - DIP switch 1 ON
 - DIP switch 2 ON
 - DIP switch 3 OFF
 - DIP switch 4 OFF
 - DIP switch 5 OFF
- The address for the circulation pump will be set to "1".



Figure 10 - New Wires from Circulation Pump to Heat Pump and DIP switches

10. Remove the heat pump's access panels.
11. Route the wires from the circulation pump to the heat pump's electrical enclosure.

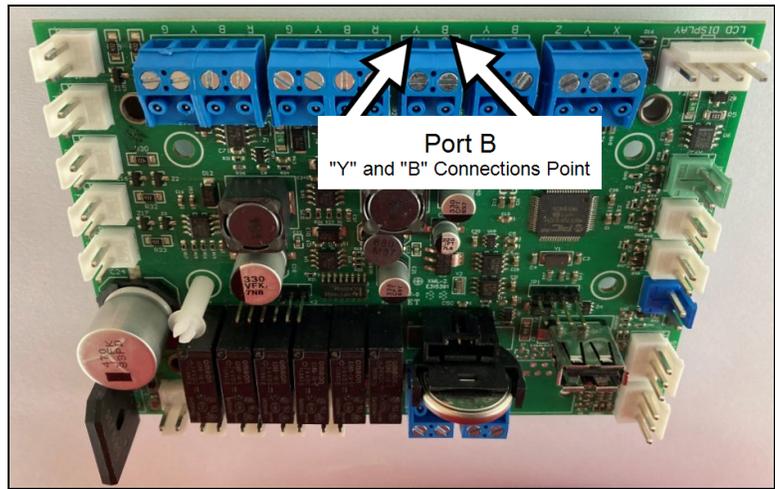


Figure 11 - Wires to Port "B" on HP9

12. Connect the wire to the heat pump's control board (RS-485 Port "B") as specified below. See Figure 11.
 - The blue connectors can be removed for ease in wiring and to properly identify the correct port. See Figure 12.
 - Connect the circulation pump wire "A" to the heat pump's "B" connection point (Port "B").
 - Connect the circulation pump wire "B" to the heat pump's "Y" connection point (Port "B").

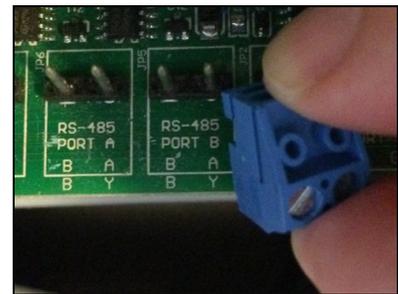


Figure 12 - Removing Blue Connector From Port "B"

13. Turn on power to heat pump and circulation pump.
14. Configure heat pump to use circulation pump. See *"Manually Configuring the Heat Pump to use the Circulation Pump"* on the facing page.
15. Confirm the heat pump is communicating with the circulation pump. *No faults should display on the heat pump.* If the heat pump displays "**CIRCULATION PUMP FAULT**", then communication to the circulation pump failed.
 - i. Confirm both devices are receiving power.
 - ii. Confirm circulation pump address is correctly entered in the heat pump's configuration.
 - iii. If fault continues to occur, turn off power to heat pump and circulation pump at breaker panel.
 - iv. Wait two (2) minutes for power to discharge from heat pump's capacitors.
 - v. Reverse the wires connected to the "B" and "Y" leads on the heat pump.
 - vi. Turn on power to both devices and confirm no faults occur.
 - vii. If a fault continues to occur, power off equipment and wait two (2) minutes. Then use a ground wire with a 100 ohm resistor at both ends of the wire. Run the wire from the heat pump's port C ("G") connection to the circulation pump's ("COM") connection. Follow recommended RS-485 communication standards regarding ground insertion resistors.
 - viii. Turn on power to both devices and confirm no faults occur. If a fault continues to occur, contact AquaCal[®] technical support.
16. Turn off power to heat pump and circulation pump at breaker panel.
17. Wait two (2) minutes for power to discharge from heat pump's capacitors.
18. Replace access panels on heat pump and circulation pump.

2 - Manually Configuring the Heat Pump to use the Circulation Pump

Circulation Pump Settings Chart

Use this chart when entering parameters in the configuration.

PLEASE NOTE

Some circulation pumps will not allow for an address other than address "1". Review circulation pump documentation for capabilities of changing circulation pump addresses (and dip switches) if needed.

To Configure:	Parameter	Usage
1	Port Address To Use	The default address is "1".
ENTER HERE	Minimum Allowed RPM	As stated in the circulation pump manual.
ENTER HERE	Maximum Allowed RPM	As stated in the circulation pump manual.
ENTER HERE	Priming Speed RPM	As stated in the circulation pump manual.
ENTER HERE	Heat / Cool Speed RPM	This is the required RPM for the heat pump to operate properly when actively heating or cooling the water. Make sure not to exceed the RPM requirements of the circulation system and heat pump.

Configuration at the Heat Pump

At this point, the only things being entered are the capabilities of the circulation pump and heat pump. The user will be given a chance to set preferred RPMs (Revolutions per minute) in group settings.

IF UNIT IS ASLEEP, SWIPE TO WAKE UP



A PRESS MENU BUTTON



B USE ARROWS TO "EQUIPMENT"



C PRESS "ENTER"



1 USE ARROWS TO MENU "NEW EQUIPMENT"



2 ENTER TO SELECT



3 USE ARROWS TO "PUMP"

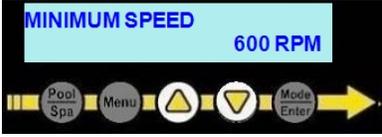
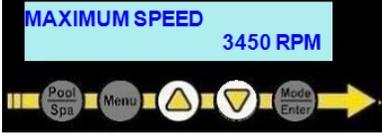


4 ENTER TO SELECT



5 USE ARROWS TO MENU DEVICE NAME



<p>6 ENTER TO SAVE</p> 	<p>7 USE ARROWS TO SELECT PUMP TYPE</p> 	<p>8 ENTER TO SAVE</p> 
<p>9 USE ARROWS TO SELECT DEVICE'S PORT</p> 	<p>10 ENTER TO SELECT</p> 	<p>11 USE ARROWS TO SET MINIMUM RPM SPEED</p> 
<p>12 ENTER TO SAVE</p> 	<p>13 USE ARROWS TO SET MAXIMUM RPM SPEED</p> 	<p>14 ENTER TO SAVE</p> 
<p>15 USE ARROWS TO SET PRIMING TIME</p> 	<p>16 ENTER TO SAVE</p> 	<p>17 USE ARROWS TO SET PRIMING SPEED</p> 
<p>18 ENTER TO SAVE</p> 	<p>19 USE ARROWS TO SET HEAT / COOL SPEED</p> 	<p>20 ENTER TO SAVE</p> 
<p>21 PRESS BUTTON UNDER "YES" TO SAVE SETUP</p> 	<p>MENU TO EXIT, PRESS & HOLD TO STATUS</p> 	

The configured device will now be available for insertion into a group.

3 - Add the Circulation Pump to a Group

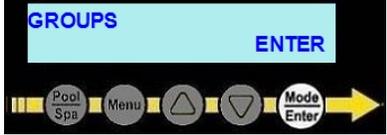
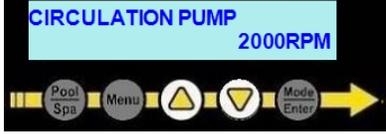
The example below shows the "POOL" group being edited to add a variable speed circulation pump.

If a group does not exist, see document # LTP0167 (Expansion Board Upgrade Manual) for information on creating groups.

PLEASE NOTE

The user will be prompted for the variable speed circulation pump's operating RPMs (Revolutions per minute) within the group.

- The RPM speed is set after the circulation pump has finished it's priming operation (configured in the equipment setup).
- This will be the regular operating speed of the circulation pump when the heat pump's compressor is off and not actively heating or cooling the water. Code-specified whole system turnover rates must be satisfied.

<p>IF UNIT IS ASLEEP, SWIPE TO WAKE UP</p> 	<p>A PRESS "MENU" BUTTON</p> 	<p>B USE ARROWS TO "GROUPS"</p> 
<p>C PRESS "ENTER"</p> 	<p>1 USE ARROWS TO GROUP TO EDIT</p> 	<p>2 ENTER TO EDIT</p> 
<p>3 USE ARROWS TO "ADD EQUIPMENT"</p> 	<p>4 ENTER TO SELECT</p> 	<p>5 USE ARROWS TO CHOOSE EQUIPMENT</p> 
<p>6 ENTER TO SELECT</p> 	<p>7 USE ARROWS TO SET PUMP'S RPM</p> 	<p>8 ENTER TO SAVE</p> 
<p>MENU TO EXIT, PRESS & HOLD TO STATUS</p> 	<p>The configured group is ready to be used by either pressing the "POOL / SPA" button, or setting a schedule.</p>	

4 - Appendix

4.1 Viewing System Information

The heat pump model, serial number, and firmware version can be viewed in the information menus.

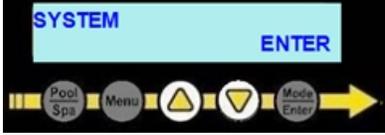
IF UNIT IS ASLEEP, SWIPE TO WAKE UP



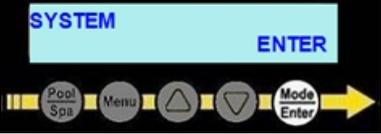
A PRESS MENU BUTTON



B USE ARROWS TO "SYSTEM"



C PRESS "ENTER"



1 USE ARROWS TO MENU "INFORMATION"



2 PRESS ENTER TO VIEW



3 USE ARROWS TO VIEW "UNIT SERIAL NUMBER"



4 USE ARROWS TO VIEW "UNIT MODEL NUMBER"



5 USE ARROWS TO VIEW "FIRMWARE VERSION"



MENU TO EXIT, PRESS & HOLD TO STATUS

