

# AquaCal®

## APPLICATION BULLETIN #0003

***CONNECTING AND USING A PENTAIR (OR STA-RITE) VARIABLE SPEED  
CIRCULATION PUMP***

***REQUIRED FIRMWARE - EQUIPMENT***

Heat Pump with an HP9 Control Board

Firmware Version 2.000 or higher

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# 1 - Connect the Pentair (Sta-Rite) 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 7.
  - 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 group needs to exist in order to use a circulation pump. If a group does not exist, see document #LTP0167 (Expansion Board Upgrade Manual) for information on creating groups.
4. An RS-485 communication cable (included with the circulation pump).

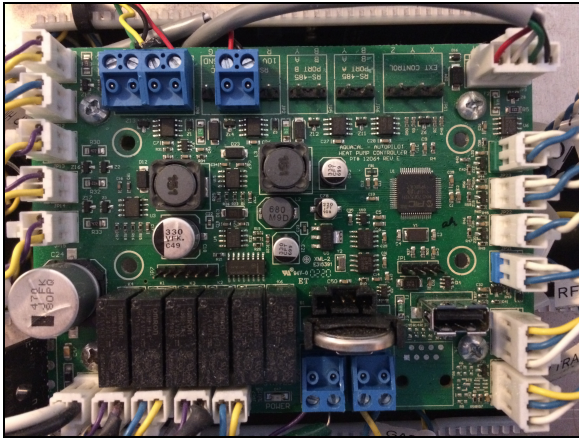


Figure 1 - HP9 Board

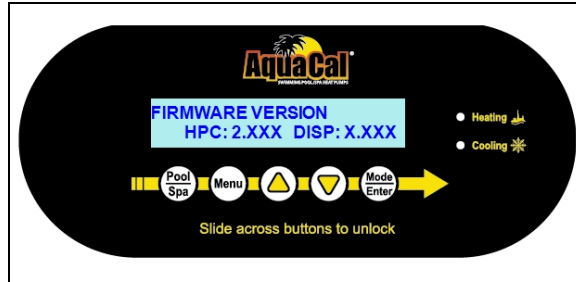


Figure 2 - Firmware Version

## Wiring

### **DANGER**

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.

### **WARNING**

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. Wait two (2) minutes for power to discharge from heat pump's capacitors.
3. Connect RS-485 communication cable to circulation pump. See Figure 3.
4. Follow pump manufacturer recommendations for routing wiring out of the circulation pump.
5. Remove heat pump's access panels.
6. Route communication cable to heat pump's electrical enclosure.



Figure 3 - RS-485  
Communication Cable

7. Connect the communication cable to the heat pump's control board (RS-485 Port "B") See Figure 4.
  - The blue connector can be removed for ease in wiring and to properly identify the correct port. See Figure 5.
  - Connect the green wire to "B" and the yellow wire to "Y". (Note: The colors may vary.)

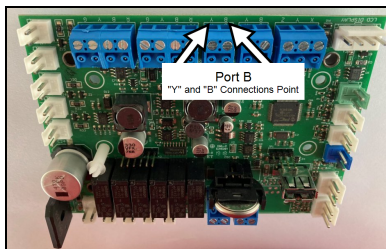


Figure 4 - Control Board Port  
"B"

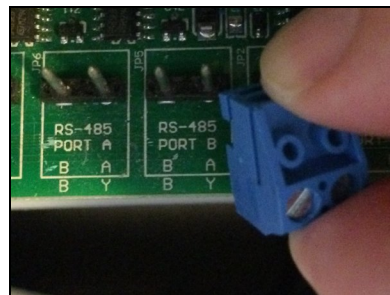


Figure 5 - Removing Blue  
Connector From Port "B"

8. Turn on power to heat pump and circulation pump.

9. A maximum of four (4) circulation pumps can be connected to the heat pump. Each circulation pump requires its own address. At the circulation pump, set the address to be used by the heat pump in the circulation pump menus. There are two main methods shown on setting an address in the circulation pump.

### ***TWO PENTAIR CIRCULATION EXAMPLES***

- **Pentair VSF**

1. Be sure that the pump is powered on and the green power LED is on.
2. Press the Stop buttons to stop the pump.
3. Press and hold both the Start and Stop buttons until the red LED starts flashing, then press one of the four speed buttons to select which address to assign the pump.
4. Press and hold both the Start and Stop buttons to save the address.
5. Write the number to be used in the circulation pump settings chart.

- **Pentair IntelliFlo®**

1. Be sure the green power LED is on and the pump is stopped.
2. Press Menu.
3. Press Select to select "Settings".
4. Use the Up or Down arrows to scroll to "Device".
5. Press Select.
6. Use the Up or Down arrows to scroll to "Pump Address".
7. Press Select.
8. Press Up or Down arrows to change the address number from 1 to 4.
9. Press Save to save.
10. Press Back to exit.
11. Write the number to be used in the circulation pump settings chart.

10. 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. Turn off power to heat pump and circulation pump at breaker panel.
  - ii. Wait two (2) minutes for power to discharge from heat pump's capacitors.
  - iii. Reverse the wires connected to the "B" and "Y" leads on the heat pump.
  - iv. Turn on power to both devices and confirm no faults occur.
11. Turn off power to heat pump and circulation pump at breaker panel.
12. Wait two (2) minutes for power to discharge from heat pump's capacitors.
13. Replace access panels.

## 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
ENTER HERE	Port Address To Use	Multiple circulation pumps can be controlled by the heat pump. Each pump is required to have its own address. Available ports are 1,2,3, and 4 for a variable speed circulation pump. The default is usually address "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**

<p><b>3</b> USE ARROWS TO "PUMP"</p> 	<p><b>4</b> ENTER TO SELECT</p> 	<p><b>5</b> USE ARROWS TO MENU DEVICE NAME</p> 
<p><b>6</b> ENTER TO SAVE</p> 	<p><b>7</b> USE ARROWS TO SELECT PUMP TYPE</p> 	<p><b>8</b> ENTER TO SAVE</p> 
<p><b>9</b> USE ARROWS TO SELECT DEVICE'S PORT</p> 	<p><b>10</b> ENTER TO SELECT</p> 	<p><b>11</b> USE ARROWS TO SET MINIMUM RPM SPEED</p> 
<p><b>12</b> ENTER TO SAVE</p> 	<p><b>13</b> USE ARROWS TO SET MAXIMUM RPM SPEED</p> 	<p><b>14</b> ENTER TO SAVE</p> 
<p><b>15</b> USE ARROWS TO SET PRIMING TIME</p> 	<p><b>16</b> ENTER TO SAVE</p> 	<p><b>17</b> USE ARROWS TO SET PRIMING SPEED</p> 
<p><b>18</b> ENTER TO SAVE</p> 	<p><b>19</b> USE ARROWS TO SET HEAT / COOL SPEED</p> 	<p><b>20</b> ENTER TO SAVE</p> 
<p><b>21</b> PRESS BUTTON UNDER "YES" TO SAVE SETUP</p> 	<p>MENU TO EXIT, PRESS &amp; HOLD TO STATUS</p> 	

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

### 3 - Add the Circulation Pump to a Group



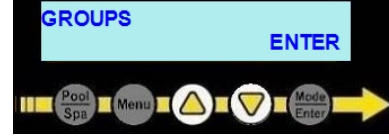






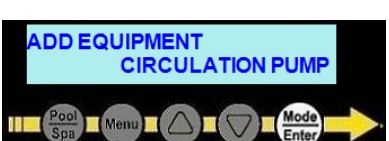
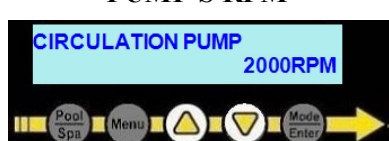
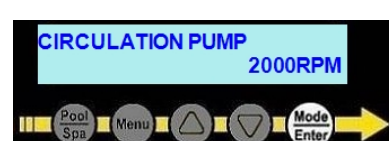

The example below shows the "POOL" group being edited to add a variable speed circulation pump.

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><b>IF UNIT IS ASLEEP, SWIPE TO WAKE UP</b></p> 	<p><b>A PRESS "MENU" BUTTON</b></p> 	<p><b>B USE ARROWS TO "GROUPS"</b></p> 
<p><b>C PRESS "ENTER"</b></p> 	<p><b>1 USE ARROWS TO GROUP TO EDIT</b></p> 	<p><b>2 ENTER TO EDIT</b></p> 
<p><b>3 USE ARROWS TO "ADD EQUIPMENT"</b></p> 	<p><b>4 ENTER TO SELECT</b></p> 	<p><b>5 USE ARROWS TO CHOOSE EQUIPMENT</b></p> 
<p><b>6 ENTER TO SELECT</b></p> 	<p><b>7 USE ARROWS TO SET PUMP'S RPM</b></p> 	<p><b>8 ENTER TO SAVE</b></p> 
<p><b>MENU TO EXIT, PRESS &amp; HOLD TO STATUS</b></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.

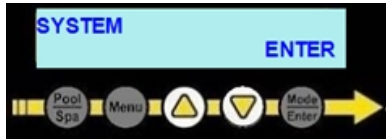
**IF UNIT IS ASLEEP, SWIPE TO WAKE UP**




**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**

