

# AquaCal<sup>®</sup>

## Options (Controllers) P<sub>5</sub>

**CONFIGURING HEAT PUMP TO WORK WITH AN EXTERNAL CONTROLLER**  
*(To a Heat Pump with a Five (Push) Button Display (HP11 control board))*

### Important

Read this document before operating / installing this product

For additional product manuals and operation / installation procedures, please visit [www.AquaCal.com](http://www.AquaCal.com)

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MODEL / SERIAL NUMBER



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## Contacting AquaCal AutoPilot, Inc.

For further assistance, please contact the distributor or installer of this product.

If unavailable, please contact AquaCal® for a service partner in your area. To better assist you, please have the heat pump model and serial number available.

Product Information:	
Website	www.AquaCal.com
Phone	(1) 727-823-5642
Hours	8-5 pm, Eastern M-F

Service Information:	
Website	www.AquaCal.com/request-heat-pump-service/

## SAFETY

- For personal safety, and to avoid damage to equipment, follow all safety instructions displayed on the equipment and within this manual. Repair and service of heat pump must be performed by an authorized service center.
- Warranties may be voided if the equipment has been improperly installed, maintained or serviced.
- If service is deemed necessary, please contact AquaCal.

### SAFETY SIGNALS

Throughout this document, safety signals have been placed where particular attention is required.



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



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



Failure to heed the following may result in damage to equipment.

When installing and using your heat pump basic safety precautions must always be followed, including the following:



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

- The heat pump utilizes high voltage and rotating equipment. Use caution when servicing.
- 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.

- The Heat Pump contains refrigerant under pressure. Repairs to the refrigerant circuit must not be attempted by untrained and / or unqualified individuals. Service must be performed only by qualified HVAC technicians. Recover refrigerant before opening the system.
- Improper water chemistry can present a serious health hazard. To avoid possible hazards, maintain pool / spa water per standards as detailed in the product's operation manual.
- Sudden or prolonged immersion in water warmer than normal body temperature may cause a condition known as Hyperthermia and related injuries.
  - Hyperthermia occurs when the internal temperature of the body reaches a level several degrees higher than the normal body temperature of 98.6° F (37° C).
  - The symptoms of Hyperthermia include, but are not limited to, a failure to perceive heat, slurred speech or mumbling, slow, shallow breathing, weak pulse, clumsiness, drowsiness or low energy level, confusion, poor decision-making, lack of concern about personal welfare; progressive loss of consciousness resulting in danger of drowning.
  - The effects of Hyperthermia include failure of the nervous system, respiratory system and heart; failure to recognize the need to exit spa; unawareness of impending hazard; physical inability to exit the spa; progressive loss of consciousness resulting in danger of drowning.
  - Persons having an adverse medical history. or pregnant women, should consult a physician before immersing in a warm body of water. Children and the elderly should be supervised by a responsible adult.
  - When pregnant, soaking in warm water for long periods of time can harm the fetus.
  - The use of alcohol, drugs, or medication can greatly increase the risk of fatal Hyperthermia.
  - Exit immediately if uncomfortable, dizzy, or sleepy.
- Sudden or prolonged immersion in water colder than normal body temperature may cause a condition known as Hypothermia and related injuries.
  - Hypothermia occurs when the internal temperature of the body reaches a level several degrees below the normal body temperature of 98.6° F (37° C).
  - The symptoms of Hypothermia include, but are not limited to, shivering (although as hypothermia worsens, shivering stops), slurred speech or mumbling, slow, shallow breathing, weak pulse, clumsiness, drowsiness or low energy level, confusion, poor decision-making, lack of concern about personal welfare, unconsciousness, and bright red, cold skin (in infants).
  - The effects of Hypothermia include failure of the nervous system, respiratory system and heart; failure to recognize the need to exit spa or cold plunge; unawareness of impending hazard; fetal damage in pregnant women; physical inability to exit the spa or cold tub; progressive loss of consciousness resulting in danger of drowning.
  - Persons having an adverse medical history. or pregnant women, should consult a physician before immersing in a cold body of water. Children and the elderly should be supervised by a responsible adult.
  - When pregnant, soaking in cold water for long periods of time can harm the fetus.
  - The use of alcohol, drugs, or medication can greatly increase the risk of fatal Hypothermia.
  - Exit immediately if uncomfortable, dizzy, shivering, or sleepy.
- This appliance is not to be used by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.
- Children must be supervised and are not to play with the appliance.
- The information contained in this section is intended for use by qualified electricians familiar with electrical Service-industry safety standards and methods.
- Locate the equipment disconnect as near to the heat pump as possible. Always satisfy applicable codes and standards.
- Never mount power-disconnects directly to the heat pump.
- In sizing power wiring, be especially aware of up-sizing requirements necessary due to wiring distances. Always satisfy applicable codes and standards.
- AquaCal AutoPilot, Inc. heat pumps are designed to use copper conductors, only. Do not use aluminum wire.

- If multiple heat pumps are on-site, confirm that the multiple heat pump configuration has been utilized. This will prevent multiple heat pumps attempting to start at the same time, causing an excessive power drop at start-up.
- Multiple heat pumps installed at the same site may benefit from automatic sequencing controllers (ASC) to avoid excessive power draws at start-up.

**NOTICE**

Failure to heed the following may result in damage to equipment.

- Maintain proper water chemistry to avoid damage to the pump, filter, pool shell, etc.
- Water flow exceeding the maximum flow rate requires a bypass. Damage due to excessive water flow will void the warranty.
- Failure to protect equipment against corrosive conditions will adversely affect the life of the equipment and will void equipment warranty.

**SAVE THESE INSTRUCTIONS**

**1 - Connecting External Controllers**

To support a direct connection to an external controller, AquaCal® heat pumps are equipped with removable terminal blocks on the control board. The control board is located on the low-voltage side of the electrical enclosure.

**PLEASE NOTE**

*If using an external control device, other than a PoolSync®, the AquaCal heat pump will not directly control a circulation pump. (Presets for that option will not be shown if a third party external control device is configured).*

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**1.1 PoolSync®**




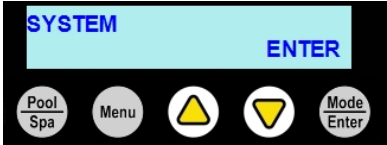
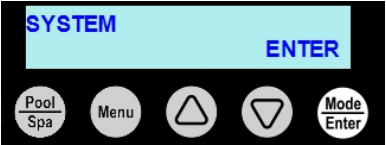
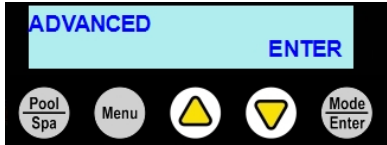








Select heat pumps will automatically allow for WI-FI capabilities using a PoolSync® .

- The PoolSync® device will allow direct control of the heat pump from a mobile device.
- Contact installing dealer to order this product.
- Go online and download the PoolSync® manual for information on connecting and using this device with an AquaCal heat pump.  
<https://www.aquacal.com/accessories/>
- Confirm the PoolSync® has been set as an active external control device. See "Confirm PoolSync® is set to operate" on the facing page.

**Confirm PoolSync® is set to operate**

The heat pump has this device active by default. In this example, however, the heat pump is reconfigured to use the PoolSync® device instead of a prior configuration of a "SMART" external controller.

Enter "Advanced" menus, then proceed

<b>A</b> <b>PRESS MENU BUTTON</b> 	<b>B</b> <b>USE ARROWS TO "SYSTEM"</b> 	<b>C</b> <b>PRESS "ENTER"</b> 
<b>D</b> <b>USE ARROWS TO "ADVANCED"</b> 	<b>E</b> <b>PRESS "ENTER"</b> 	<b>1</b> <b>USE ARROWS TO "EXTERNAL CONTROL"</b> 
<b>2</b> <b>ENTER TO SELECT</b> 	<b>3</b> <b>ARROWS TO MODE</b> 	<b>4</b> <b>ENTER TO EDIT</b> 
<b>5</b> <b>ARROWS TO "POOLSUNC"</b> 	<b>6</b> <b>ENTER TO SELECT</b> 	<b>MENU TO EXIT, PRESS &amp; HOLD TO STATUS</b> 

**1.2 FS2 (Pool-Spa)**

A direct connection to an external flow or relay switch (FS2 Controller) has been provided on the control board.

This pool / spa relay switch will automatically change between the pool and spa thermostat depending on the position of the plumbing valves.

- When water flows to the pool, the pool group will be used.
- When water flows to the spa, the spa group will be used.

**NOTICE** Failure to heed the following may result in damage to equipment.

- The wire size connecting the relay switch must be a minimum 22-gauge, 2-conductor, low-voltage wire.
- Use FS2 (**dry contact**) connection on the control board.

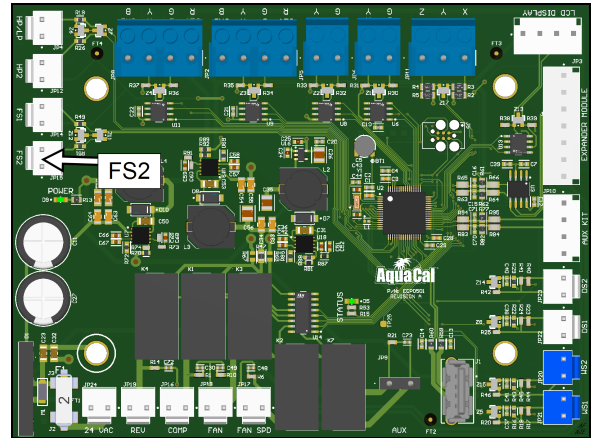
## Connecting Switch

### NOTE

*FS2 is a "Dry Contact". When the connected relay is "open" the heat pump will recognize the Pool group/ thermostat setting. When the connected relay is "closed" the heat pump will recognize the Spa group/ thermostat setting.*

1. Deactivate power to heat pump.
2. Plumb the switch as indicated in accessories installation instructions.
3. Remove heat pump electrical access panel.
4. Using two of the three wires from the installed switch, route wires to the low voltage side of the electrical enclosure. The third wire is not used. Follow all National Electric Codes (NEC) unless State or Local guidelines supersede.
5. Connect the wires to the jumper provided. Polarity is not important.
6. Reattach heat pump access panel.
7. Apply power to heat pump.
8. Configure the heat pump to accept the pool / spa relay switch. See "Configuring Switch" below.

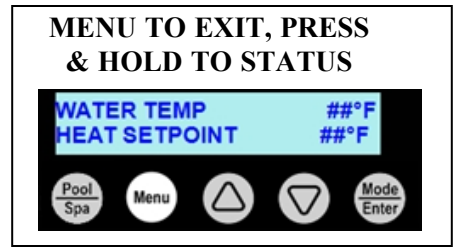
### Dry Contact Connection Points to the control board



## Configuring Switch

Enter "Advanced" menus, then proceed

<p><b>A</b> PRESS MENU BUTTON</p>	<p><b>B</b> USE ARROWS TO "SYSTEM"</p>	<p><b>C</b> PRESS "ENTER"</p>
<p><b>D</b> USE ARROWS TO "ADVANCED"</p>	<p><b>E</b> PRESS "ENTER"</p>	<p><b>1</b> USE ARROWS TO "EXTERNAL CONTROL"</p>
<p><b>2</b> ENTER TO SELECT</p>	<p><b>3</b> ARROWS TO MODE</p>	<p><b>4</b> ENTER TO SELECT</p>



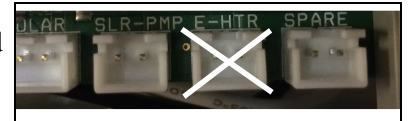
### 1.3 SMART Controllers

Smart Controllers include controllers with RS485 communication protocol like the Pentair IntelliCenter®, Pentair EasyTouch®, Pentair IntelliTouch®, Jandy AquaLink®, etc.

#### NOTICE

Failure to heed the following may result in damage to equipment.

- **Do not use an electric heater connection on external controllers for heat pump wiring.** This can cause damage to external controllers, heat pumps, and pad equipment. This damage is NOT covered by warranty.
- The wire size connecting the external controller to the heat pump must be 22-gauge, 2-conductor, low-voltage wire.
- Use the two middle data lines on the external controller's standard communication port (RS-485). Do not use the outside power or ground connection on the port.



#### External Controller

Program External Controller per the manufacturers instructions before attempting to establish communication and proceeding with heat pump connections and programming. See manufacturer's manual for the external controller device.

#### External Controller Communication Port

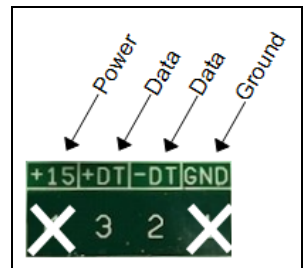


Figure 1

Typically a smart controller will have four (4) wires for interfacing with the heat pump. The power and ground (usually the 1st and 4th wire) are not used.

#### Wire Connections

1. Deactivate power to heat pump and external controller.
2. Remove electrical access panels on the heat pump and external controller.
3. Route 22-gauge, 2-conductor, low-voltage wires from the external controller communication port (com port) to the low voltage side of the heat pump's electrical enclosure. Do not use the power or ground wire.
  - It is OK to double up wires at the external controller connection if necessary.

4. Connect control wires to the heat pump's "Port B" of the control board as indicated. See Figure 3.
  - If, for example, the external controller is using the data port for an indoor controller, add wires to the existing configuration. *Connectors can be removed from terminals for ease in connecting wires.*

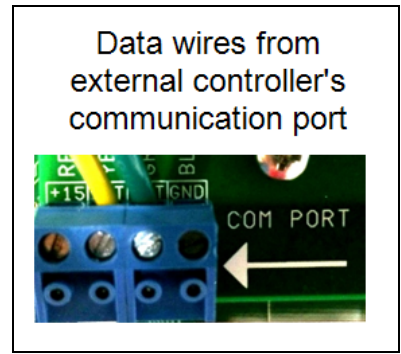


Figure 2

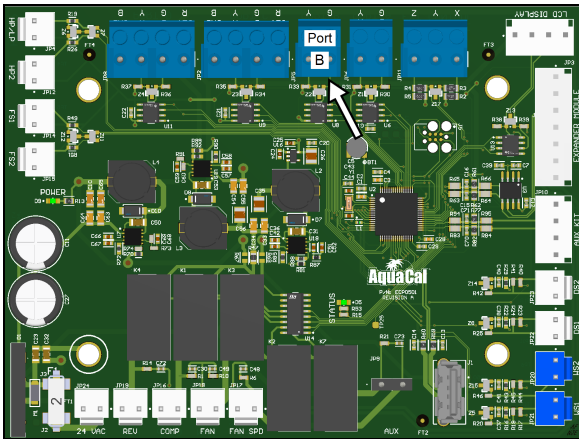


Figure 3

5. If dip-switch settings are required, configure them on the external controller now.

**DANGER**

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

- Deactivate power to the external controller while setting dip-switches

**Example - Jandy AquaLink® :**

*This external controller has dip switches. Confirm they are properly positioned to operate a heat pump.*

- Set dip-switch "S2" #1 to "ON". The solar option is to be used for the heat pump.
- Check Jandy documentation for any further dip switch settings.



- If additional sensors are required on the external controller, install them on the external controller now.

**Example - Pentair EasyTouch® and Pentair IntelliTouch® :**

*Some controllers require an additional sensor be connected to the external controller's power supply circuit board at the solar connection point. The sensor is not used but will show an error if not connected.*

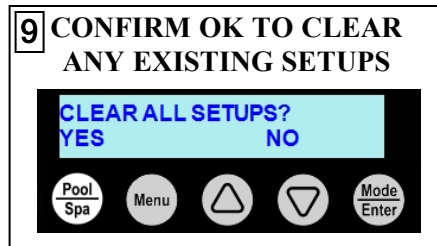


- Reinstall electrical access panels on both the heat pump and external controller.
- Reactivate power to heat pump and external controller.
- Configure the heat pump to accept external controller signal. See "Configure for Smart Controller" below.

**Configure for Smart Controller**

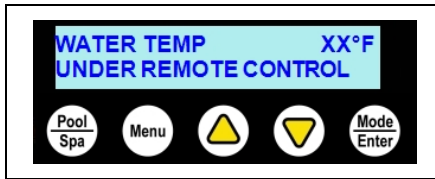
Enter "Advanced" menus, then proceed

<p><b>A</b> PRESS MENU BUTTON</p>	<p><b>B</b> USE ARROWS TO "SYSTEM"</p>	<p><b>C</b> PRESS "ENTER"</p>
<p><b>D</b> USE ARROWS TO "ADVANCED"</p>	<p><b>E</b> PRESS "ENTER"</p>	<p><b>1</b> USE ARROWS TO "EXTERNAL CONTROL"</p>
<p><b>2</b> ENTER TO SELECT</p>	<p><b>3</b> ARROWS TO MODE</p>	<p><b>4</b> ENTER TO EDIT</p>
<p><b>5</b> ARROWS TO "SMART"</p>	<p><b>6</b> ENTER TO SAVE</p>	<p><b>7</b> USE ARROWS TO SET LOCAL ADDRESS</p>



**PLEASE NOTE:**  
*This action will wipe all previous settings in favor of the new configuration. This includes external controller settings, optional device settings, groups, equipment, schedules, and site specific settings. Additional site specific settings may need to be put in place.*

The system will restart. If successful, the heat pump should now display "Under Remote Control".



10. If after 45 seconds, the heat pump displays a "**SMART COMM FAULT**":
  - A. **Confirm dip switches** - If external controller uses dip switches, confirm switches are in the correct position. Otherwise, proceed to confirm wiring.
    - a. Deactivate power to the external controller.
    - b. Remove access panel on external controller.
    - c. Check the external controller manual for proper dip switch positioning and confirm dip switches.
    - d. Reinstall electrical access panel.
    - e. Reactivate power to the controller.
    - f. If the fault persists, proceed to confirm wiring.
  - B. **Confirm wiring** - Confirm wires are oriented properly on the heat pump's "Port B" of the control board.
    - a. Deactivate power to heat pump and external controller.
    - b. Remove the access panel on the heat pump.
    - c. Reverse wires on "Port B".
    - d. Reinstall electrical access panel.
    7. Reactivate power to the controller.
    8. Reactivate power to the heat pump.
  - C. If fault continues to occur, check with the manufacturer of the external controller for additional advice on using a heat pump with the controller.
11. After establishing a connection from the external controller to the heat pump, further programming will be required at the external controller.
  - See external controller manuals or contact installer or manufacturer of that product.

## 1.4 2-wire Controllers (Pool-Spa)

### PLEASE NOTE

2-Wire controllers are not designed to control chiller operation.

For full functionality, the Heat and Cool, and Cool Only heat pumps must use an external SMART controller. Check with the external controller manufacturer for more information.

### NOTICE

Failure to heed the following may result in damage to equipment.

- Confirm equipment connected to heat pump before selecting this option . All existing configurations will be cleared.

1. Deactivate power to heat pump.
2. Remove heat pump electrical access panel.
3. Route 22-gauge (minimum), 2-conductor, low-voltage wires from the controller to the low voltage side of the heat pump's electrical enclosure. Follow all National Electric Codes (NEC) unless State or Local guidelines supersede.
4. Connect the controller wires to the control board port labeled "Ext Controller" with the terminals labeled "Y" and "Z" as follows. See Figure 4.
  - Connect one wire to "Y".
  - Connect other wire to "Z".
  - The polarity of the wire is not important.
5. Reattach heat pump access panel.
6. Apply power to heat pump.
7. Configure the heat pump to accept a 2-wire external controllers signal as shown. See "Configure 2-wire controller" below.

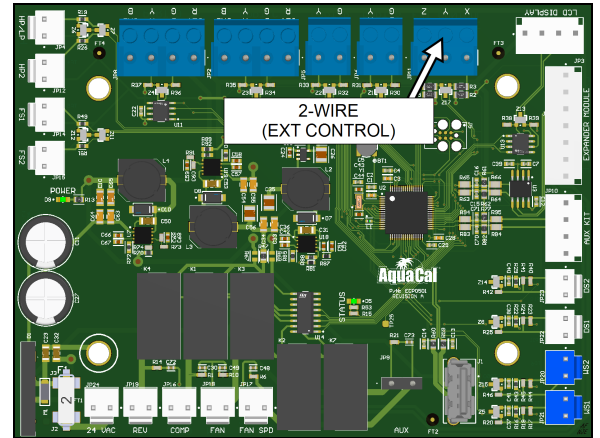


Figure 4

### Configure 2-wire controller

Enter "Advanced" menus, then proceed

<p><b>A</b> PRESS MENU BUTTON</p>	<p><b>B</b> USE ARROWS TO "SYSTEM"</p>	<p><b>C</b> PRESS "ENTER"</p>
<p><b>D</b> USE ARROWS TO "ADVANCED"</p>	<p><b>E</b> PRESS "ENTER"</p>	<p><b>1</b> USE ARROWS TO MENU "EXTERNAL CONTROL"</p>

**2 ENTER TO SELECT**

**3 USE ARROWS TO MODE**

**4 ENTER TO EDIT**

**5 USE ARROWS TO CHANGE TO "2WIRE"**

**6 ENTER TO SAVE**

**7 PRESS BUTTON UNDER "YES"**

**PLEASE NOTE:**  
*This action will wipe all previous settings in favor of the new configuration. This includes external controller settings, optional device settings, groups, equipment, schedules, and site specific settings. Additional site specific settings may need to be put in place.*

**1.5 3-wire Controllers (Pool-Off-Spa)**

1. Deactivate power to heat pump.
2. Remove heat pump electrical access panel.
3. Route 22-gauge (minimum), 2-conductor, low-voltage wires from the controller to the low voltage side of the heat pump's electrical enclosure. Follow all National Electric Codes (NEC) unless State or Local guidelines supersede.
4. Connect the controller wires to the control board as follows:
  - Connect "Low" or "Pool" wire to "X".
  - Connect "Common" wire to "Y" (for 3-wire controllers with an "Off" position).
  - Connect "High" or "Spa" wire to "Z".
5. Reattach heat pump access panel.
6. Apply power to heat pump.
7. Configure heat pump to accept a 3-wire external controller signal as shown.

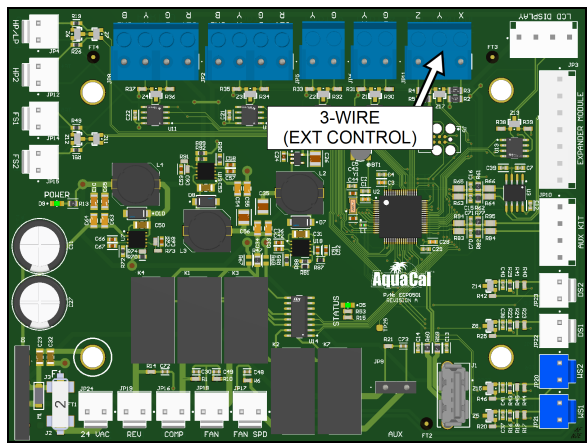


Figure 5

Enter "Advanced" menus, then proceed

**A PRESS MENU BUTTON**

**B USE ARROWS TO "SYSTEM"**

**C PRESS "ENTER"**

**D** USE ARROWS TO "ADVANCED"

**E** PRESS "ENTER"

**1** USE ARROWS TO MENU "EXTERNAL CONTROL"

**2** ENTER TO EDIT

**3** USE ARROWS TO MODE

**4** ENTER TO EDIT

**5** USE ARROWS TO "3WIRE POOL-OFF-SPA"

**6** ENTER TO SAVE

MENU TO EXIT, PRESS & HOLD TO STATUS