

# AquaCal®

## Installation Manual

# GBB

GREAT BIG BOPPER



### 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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## SECTION 1 - CONTACTING AQUACAL AUTOPILOT, INC.

For further assistance, please contact AquaCal AutoPilot, Inc. Technical Support. To better assist you, please have the heat pump model and serial number available. See "Identifying Model Specifications" on page 26.

<b>Website</b>	www.AquaCal.com
<b>Request Service Online</b>	<a href="http://www.AquaCal.com/request-heat-pump-service/">www.AquaCal.com/request-heat-pump-service/</a>
<b>Phone</b>	(1) 727-823-5642
<b>Hours</b>	8-5 pm, Eastern M-F

## SECTION 2 - 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® Technical Support. See "Contacting AquaCal AutoPilot, Inc." on page 1.

### **SAFETY SIGNALS**

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



**WARNING** - signals relate to personal safety.



**CAUTION** - signals promote avoiding damage to the equipment.

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



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

- Installation and repairs must be performed by a qualified technician.
- 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.
- The heat pump utilizes high voltage and rotating equipment. Use caution when servicing.
- Electrical installation and service should be performed by a Licensed Electrician only.
- Improper water chemistry can present a serious health hazard. To avoid possible hazards, maintain pool / spa water per standards detailed in this document.
- Prolonged immersion in water warmer than normal body temperature may cause a condition known as Hyperthermia. The symptoms of Hyperthermia include unawareness of impending hazard, failure to perceive heat, failure to recognize the need to exit the spa, and unconsciousness. The use of alcohol, drugs, or medication can greatly increase the risk of fatal Hyperthermia. In addition, persons having an adverse medical history, or pregnant women, should consult a physician before using a hot tub or spa. Children and the extreme elderly should be supervised by a responsible adult.
- Prolonged immersion in water colder than normal body temperature may cause a condition known as Hypothermia. The symptoms of Hypothermia include shivering (although as hypothermia worsens, shivering stops), clumsiness or lack of coordination, slurred speech or mumbling, confusion and poor decision-making, drowsiness or low energy, lack of concern about personal welfare, progressive loss of consciousness, weak pulse and slow or shallow breathing. In addition, persons having an adverse medical history, or pregnant women, should consult a physician before immersing in a cold body of water. Children and the extreme elderly should be supervised by a responsible adult.

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

- Maintain proper water chemistry in order to avoid damage to pump, filter, pool shell, etc.
- Water flow exceeding maximum flow rate requires a bypass. Damage due to excessive water flow will void warranty.

**SAVE THESE INSTRUCTIONS**

## SECTION 3 - INSTALLATION

**⚠ WARNING** - Failure to heed the following may result in injury or death.

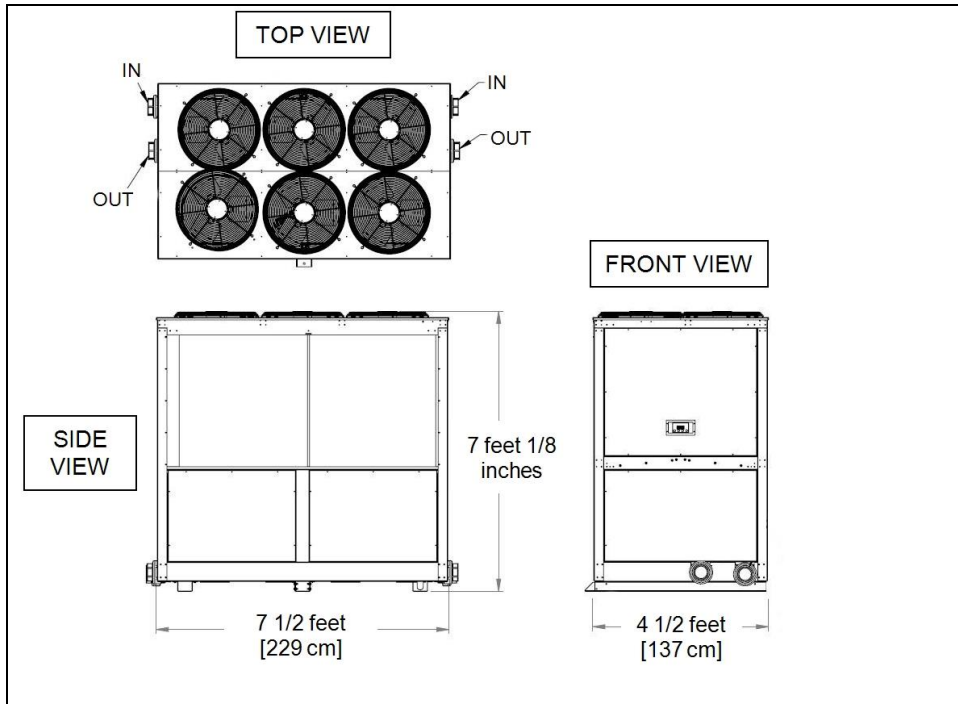
- Installation of this equipment by anyone other than a qualified installer can result in a safety hazard. The information contained throughout the "Installation" section is intended for use by qualified installation technicians familiar with the swimming Pool / Spa safety standards.

**⚠ CAUTION** - Failure to heed the following may result in equipment damage.

- Failure to protect equipment against corrosive conditions will adversely affect the life of the equipment and will void equipment warranty.

### 3.1 Dimensions

#### Dimensions (Great Big Bopper<sup>®</sup>)



## 3.2 Positioning Equipment

### Controlling Irrigation and Rainwater Runoff

- Irrigation water may damage heat pump components. Have irrigation water directed away from the heat pump.
- The heat pump will withstand normal rainfall. Do not allow a roof slope to direct rainwater onto the heat pump. Have a gutter installed on the roof edge to direct this water away from the heat pump. Or install the heat pump in another location.

### Planning for Condensation

The heat pump can produce a large amount of water in the form of condensation. The amount of water depends on air temperature and humidity.

- Install the heat pump with enough height to allow for water drainage.
- Use the provided hose connection to direct this water from equipment. This connection is under the lower access panel.
- Plan for water drainage disposal as needed.

### Mounting Pad Requirements

- Build the heat pump pad out of concrete or another code-approved material.
- Confirm the pad can support the weight of the heat pump. See "Weights" on page 27.
- Elevate the pad enough to allow for drainage.
- Make sure the pad is flat and level.
- Have the pad extend at least 6 inches from the heat pump base in all directions.
- Do not install the heat pump on soil or grass.
- Do not allow the heat pump base to touch the buildings foundation.
- Do not place the heat pump directly on a concrete floor inside a building. This can cause noisy equipment vibration. Install vibration dampeners between the heat pump base and floor.
- Equipment pad must meet all requirements of authorities having code-related jurisdiction.

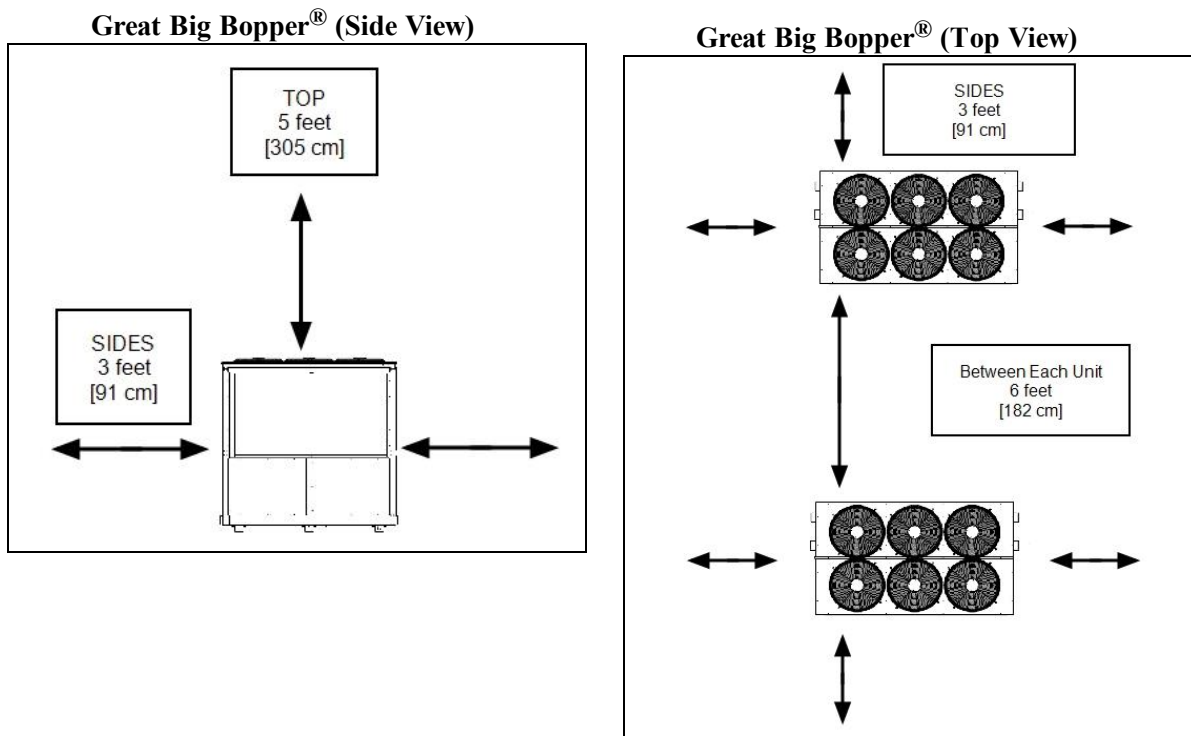
### Anchoring to Pad

- Follow all applicable local, state, and national requirements regarding wind load anchoring.
- If needed, contact AquaCal® Customer Support to obtain the correct anchoring kit information. Please have the heat pump model number and serial number when requesting support. See "Identifying Model Specifications" on page 26.

## 3.3 Plumbing

### 3.3.a Clearances

- Proper air circulation is required for the heat pump to operate efficiently. Avoid placing objects near or on top of the heat pump. This includes shrubbery and lawn furniture. These objects will also hinder maintenance access.
- Avoid storing chemical containers near the heat pump. The chemicals can cause equipment damage.



### 3.3.b Water Flow Rates

Maintain water flow rates as indicated. Please note, these specifications relate to the heat pump only. Code-specified whole system turnover rates must be satisfied.

**⚠ CAUTION** - Failure to heed the following may result in equipment damage.

- Water flow exceeding maximum flow rate may damage heat exchanger; such damage will not be covered under the equipment warranty

MODEL	HEAT EXCHANGER TYPE	FLOW RATES	
		MINIMUM	MAXIMUM
<b>BB500 50 Hz 380 - 415 V</b>	Titanium ThermoLink®	120 GPM	280 GPM
<b>BB500 60 Hz 208 - 230 V</b>	Titanium ThermoLink®	120 GPM	280 GPM
<b>BB500 60 Hz 460 V</b>	Titanium ThermoLink®	120 GPM	280 GPM

If water flow through the heat pump is reduced, performance will suffer and internal safety devices may deactivate the heat pump with error codes **HP** and **HPS**, or (if equipped) an **LP** and **LPS**.

- Operate water filtration devices per manufacturer's specifications. Dirty filters can cause reduced water flow to the heat pump. An increase of 7-10 psi higher than the clean filter pressure typically reduces flow rates. This requires the filter to be cleaned or back-washed
- Keep baskets free of debris. Similar to a dirty filter, large volumes of debris in the pump and skimmer baskets can reduce water flow.
- Check for improper valve settings. A partially closed valve after the filter, or a full-open bypass around the heat pump, will cause insufficient water flow through the heat pump.
- The maximum static (or operating pressure) is 50 pounds-per-square-inch (PSI). These specifications relate to the heat pump only. Code-specified whole system turnover rates must be satisfied.

### 3.3.c Adjusting Water Flow Using $\Delta T$ (Delta-T)

The Delta-T is the temperature difference between the water temperatures entering and leaving the heat pump. The equipment can be fine-tuned for maximum performance by balancing water flow rates to maintain an ideal  $\Delta T$ .

- Installed Temperature / Pressure probes and ports are required to perform the following procedures.
- **This adjustment procedure is to be completed with the unit in HEA mode only;** ACH and CDD discharge temperatures are not shown.

**PLEASE NOTE -**

*Temperature / Pressure ports are required for all Great Big Bopper® installations on both inlet and outlet piping.*

1. Adjust heat pump thermostat to its lowest setting while in HEA mode.
2. Deactivate the water filtration pump.
3. Adjust valves to a halfway open position leading to the heat pump.
4. Adjust valves to a fully open position leading away from the heat pump.
5. Activate the pool water filtration pump.
6. Slowly turn the thermostat up until the heat pump activates.
  - After a four-minute delay, the heat pump compressor will start.
7. With the heat pump running, confirm water filtration pump is operating properly with adequate flow and no short cycling. If needed, clean filters leading to the heat pump.
8. Wait for water and refrigerant pressure to stabilize (approximately 5 minutes).
9. Adjust valves in the following order:
  - A. Adjust valve leading away from the heat pump to correct temperatures measured with a temperature pressure probe.
  - B. Allow pressure to stabilize . Then check temperature again. Re-adjust valve leading away from the heat pump as needed.
10. Mark valves at these positions for future reference.

**Temperature / Pressure Port  
(Shown with Probe)**



Temperature differences are based on pool temperatures of 72° (+ or – 3° F). For water temperatures outside this range, contact AquaCal® Technical Support.

MODEL	TEMPERATURE
BB500 50 Hz 380 - 415 V	3° to 7° F
BB500 60 Hz 208 - 230 V	4° to 8° F
BB500 60 Hz 460 V	4° to 8° F

Table 1 - Temperature Chart



### 3.3.d Plumbing Requirements

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

- Do not use glue on the threaded portion of the equipment's unions. A glued-in-place union will prevent the equipment from being properly winterized.
- The heat pump must receive water flow within the specified minimum ranges under worst-case conditions such as a fouled water filter.
- Water flow exceeding maximum flow rates may damage heat pump and will not be covered under equipment warranty. See "Water Flow Rates" on page 5.
- Temperature / pressure ports with PVC tees and a test thermometer are also provided in selected models. This must be installed between the unions and the bypass valves. The preferred location of the port is 6" from the heat pump union. See "Adjusting Water Flow Using  $\Delta T$  (Delta-T)" on page 6.

### 3.3.e Plumbing Diagrams

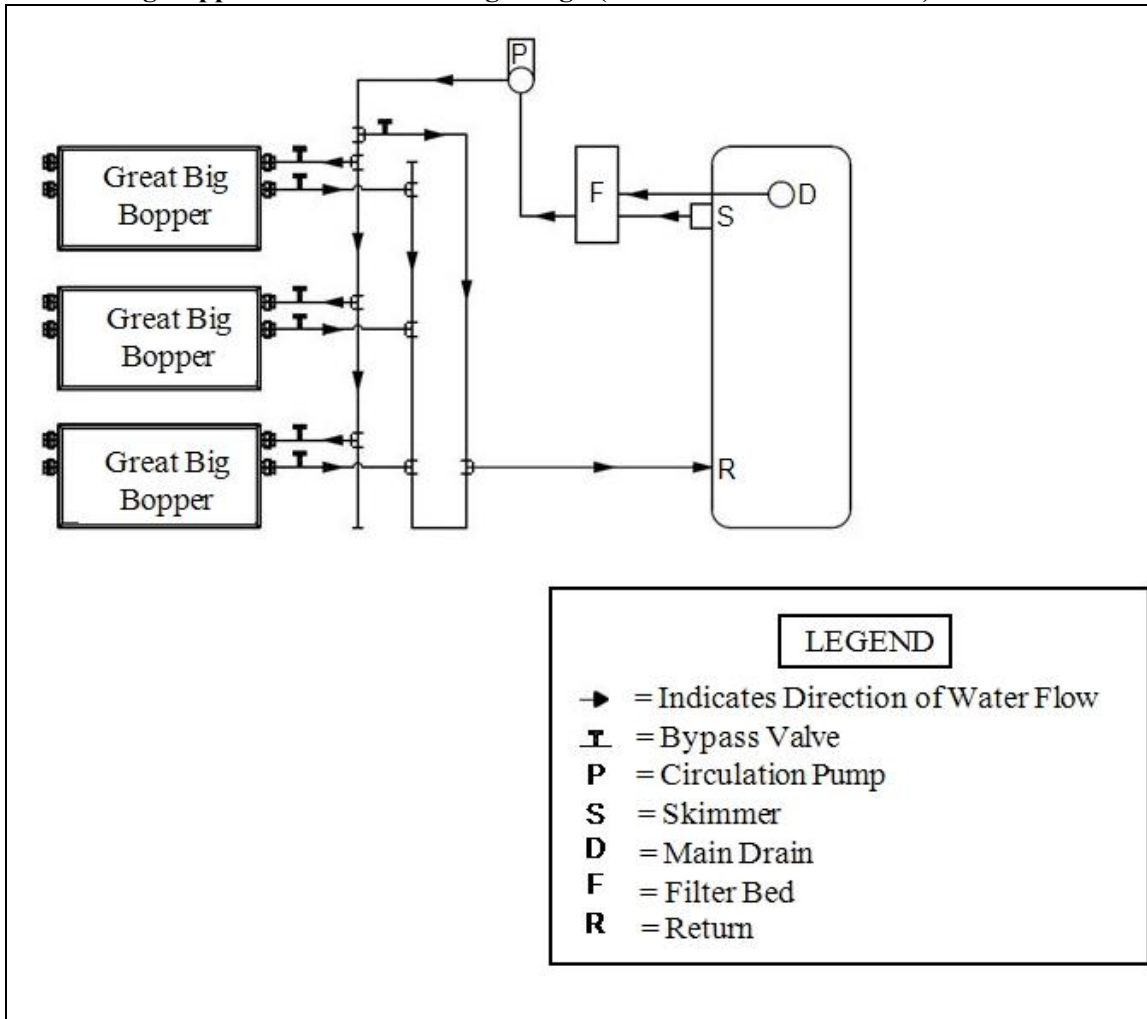
Plumbing diagrams are provided in this section as a planning guide to the sequence of equipment, valves, and fittings.

- The basic plumbing configurations for typical installations are shown.
- If the installation does not closely follow any of the supplied plumbing diagrams, AquaCal® Technical Support is available for installation advice and guidance.

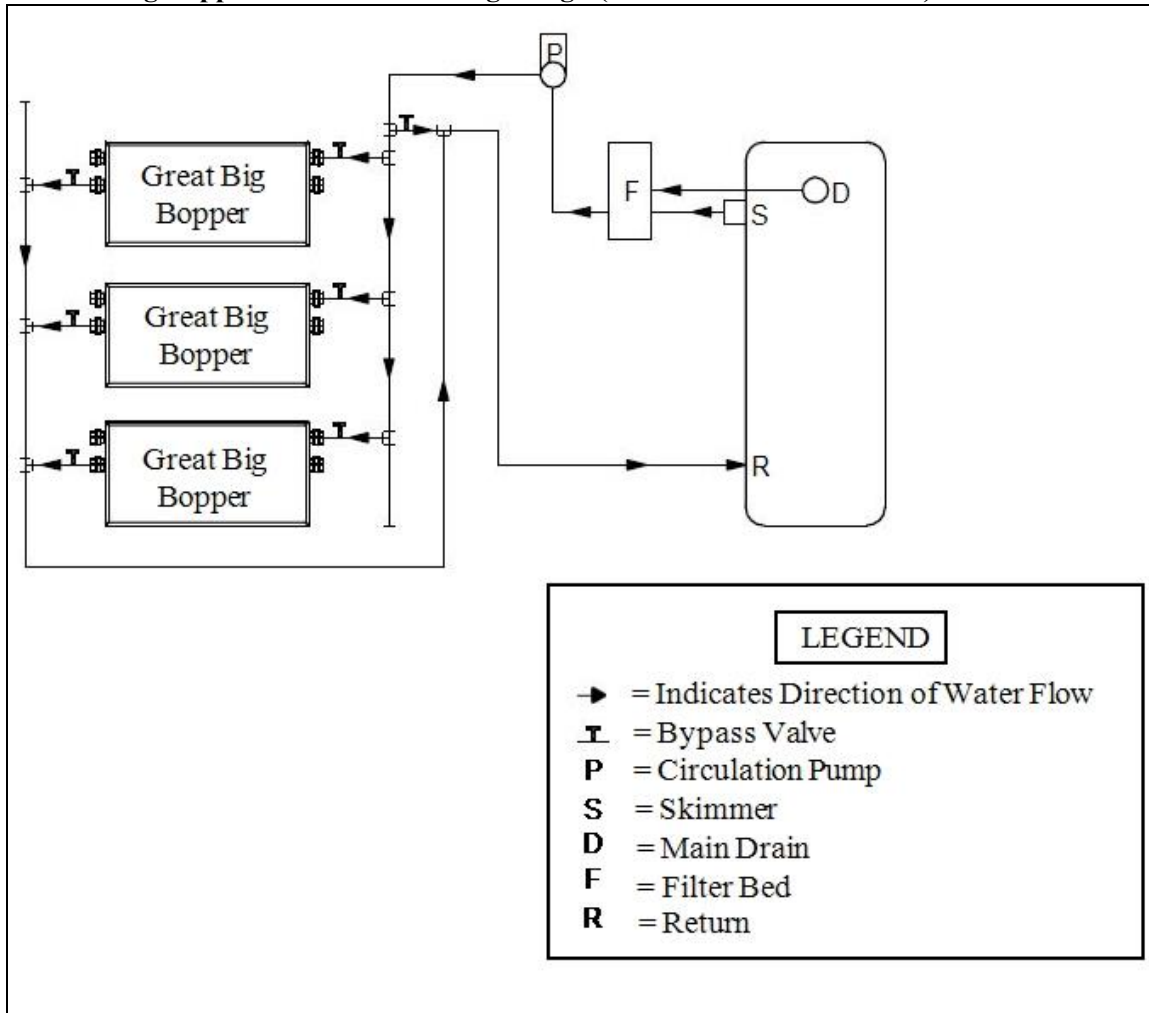
## Great Big Bopper® Heat Pumps

While multiple Great Big Bopper® heat pumps are shown in the following diagrams, it is not a requirement. Sizing requirements will determine the number of required heat pumps.

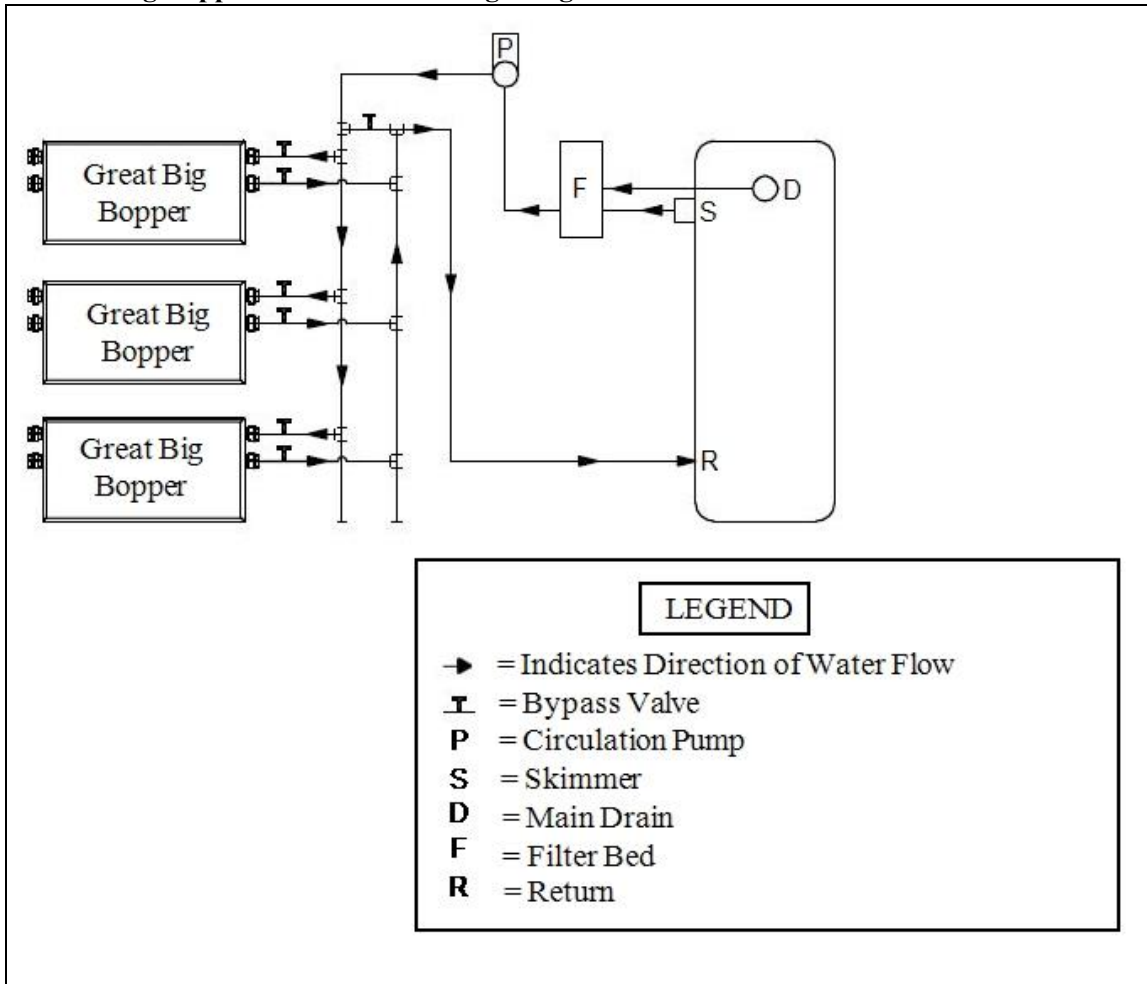
### Great Big Bopper® Z-Flow Plumbing Design (PREFERRED METHOD)



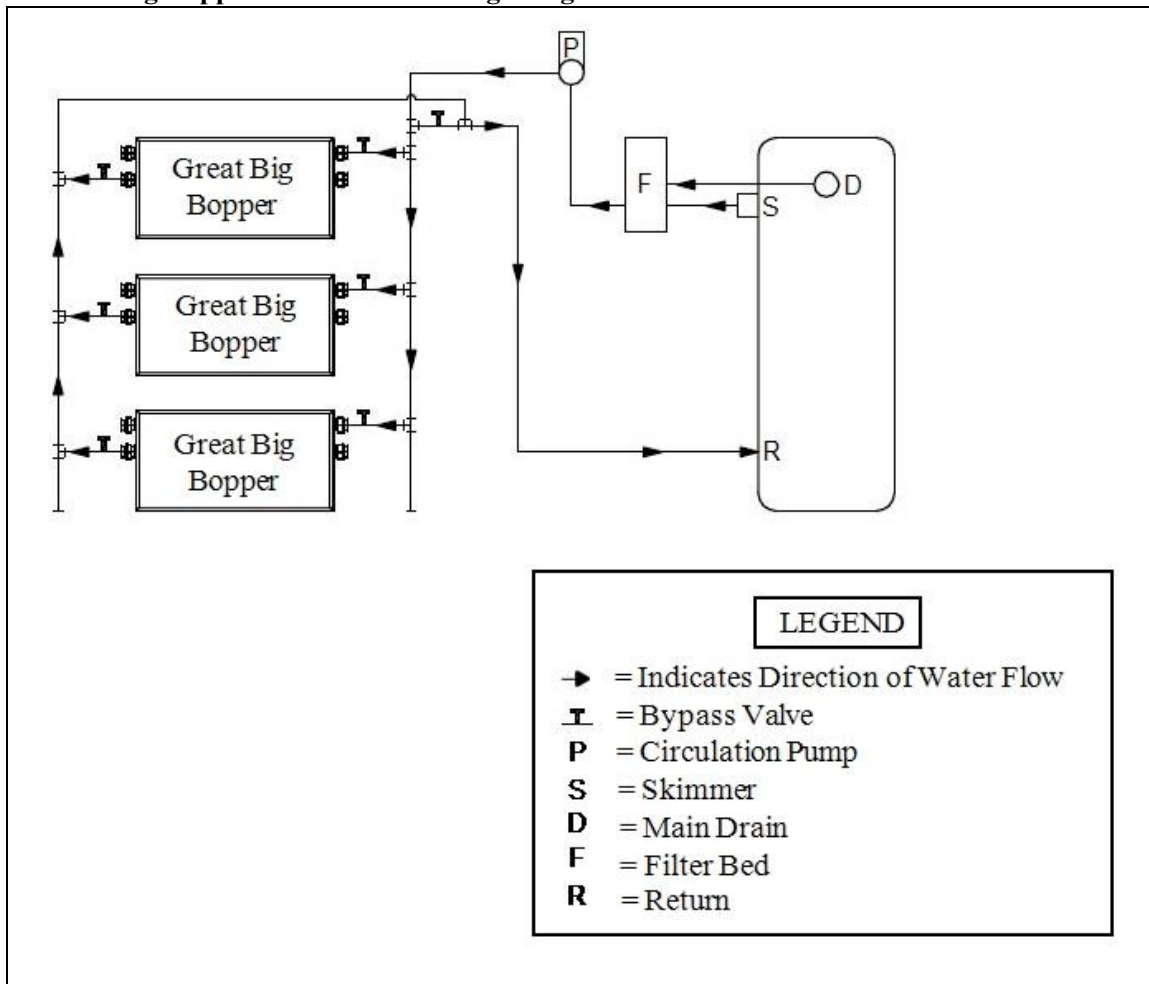
# Great Big Bopper® Z-Flow Plumbing Design (PREFERRED METHOD)



# Great Big Bopper® U-Flow Plumbing Design



### Great Big Bopper® U-Flow Plumbing Design



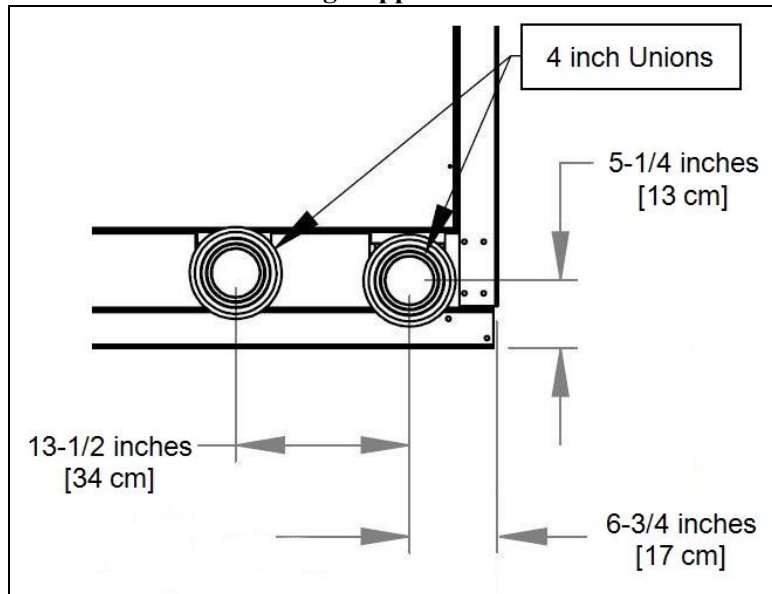
#### 3.3.f Water Connections to Heat Pump

- Connections to site plumbing are made via PVC solvent cement to the female slip socket of the plumbing unions.
- Heat Pump union sizes are specified on diagrams.
- Plumbing unions are available from AquaCal®.

**⚠ CAUTION** - Failure to heed the following may result in equipment damage.

- Do not use glue on the threaded portion of the equipment's unions. A glued-in-place union will prevent the equipment from being properly winterized.

## Great Big Bopper® BB500



### 3.3.g In-Line Chlorine Feeders

Place in-line chlorinators downstream from the heat pump and as low in elevation as possible. If an erosion type feeder is used, always install a Hartford Loop to protect internal heat pump components.

### 3.3.h Maintaining Ability to Winterize

**⚠ CAUTION** - Failure to heed the following may result in equipment damage.

- Do not use glue on the threaded portion of the equipment's unions. A glued-in-place union will prevent the heat pump from being properly winterized.

The unions can be used to decouple the heat pump from the plumbing system during hard freeze conditions. Do not defeat the function of the unions by using glue on the threaded portion of the unions.

### 3.3.i Adjusting Water Pressure Switch

Adjust water pressure switch when heat pump attempts to operate without water flow.

**⚠ WARNING** - Failure to heed the following may result in injury or death.

- Water Pressure Switch adjustment procedure to be performed by experienced service personnel only; procedure must not be attempted by individuals lacking adequate electrical and mechanical experience.

**⚠ CAUTION** - Failure to heed the following may result in equipment damage.

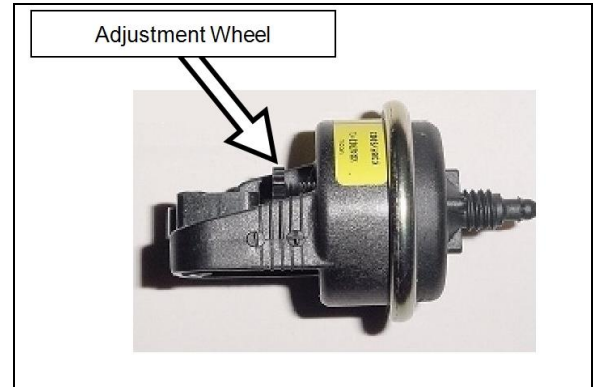
- If after water pressure switch adjustment the heat pump continues to operate with the filter pump off, readjust water pressure switch to ensure heat pump will not run without water flow.

**Confirm the following before attempting any adjustments:**

- The filter is clean.
- Filter pump is operating.
- Valves are set to direct appropriate amount of water through the heat pump. See "Water Flow Rates" on page 5.
- **FLD** code is displayed (or displays intermittently).

### Adjusting Water Pressure Switch:

1. Remove heat pump access panel.
2. Locate the water pressure switch. It will be outside and along the bottom edge of the electrical enclosure. Exact location varies by model.
3. Activate filter pump.
4. Apply power to heat pump.
5. Slowly rotate adjustment wheel on switch until the **FLO** code just disappears.
6. Deactivate filter pump. If correctly adjusted, the heat pump will deactivate and display **FLO**.
7. Re-install heat pump access panel.
  - If heat pump continues to operate without water flow, contact AquaCal® Technical Support.
  - Site-specific factors may require the installation of an external flow switch.



## 3.4 Electrical

### 3.4.a Electrical Requirements

- ⚠ WARNING** - Failure to heed the following may result in injury or death.
- 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.
  - Multiple heat pumps installed at the same site may benefit from automatic sequencing controllers (ASC) to avoid excessive power drops at start-up. See "Available Accessories" for more information.
  - AquaCal® heat pumps are designed to use copper conductors, only. Do not use aluminum wire.

## Electrical Standards

Standards	Title
<b>NFPA 70</b>	The electrical installation must conform to the current version of the NEC, and all applicable local and state codes
<b>NFPA 70 Article 440</b>	Standard for Safety for Electric Spas, Equipment Assemblies, and Associated Equipment
<b>NFPA 70 Article 680</b>	Standard for Safety for Swimming Pool Pumps, Filters, and Chlorinators
<b>IEC 60335-1-2001</b>	Household and similar electrical appliances - Safety - General Requirements
<b>IEC 60335-2-40 2006</b>	Household and similar electrical appliances - Safety – Particular requirements for electrical heat pumps, air-conditioners, and dehumidifiers
<b>UL1995 &amp; CSA C22.2 236-05</b>	Heating and cooling equipment

Table 2 - Standards

## Grounding and Bonding

Follow local code requirements for properly grounding and bonding heat pump equipment.

- A bonding lug has been provided on the lower left hand corner of the electrical access panel. See "Access Panels" on page 14.

## Surge Suppression

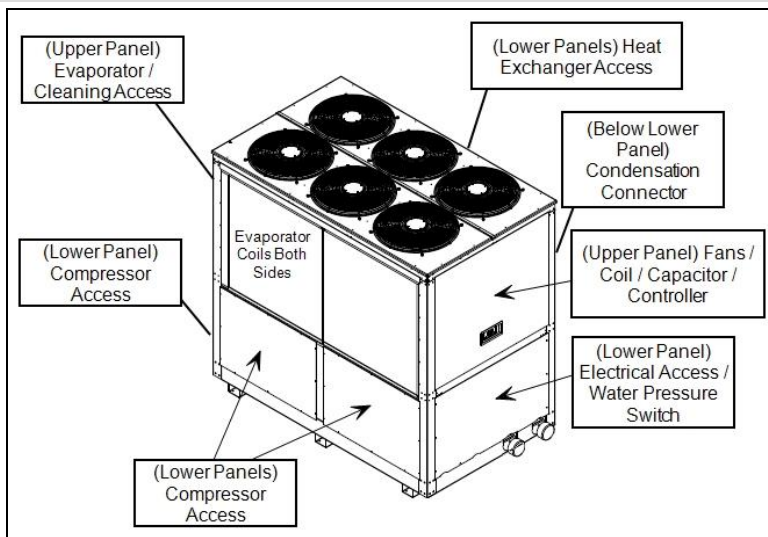
The use of approved commercial surge protectors is strongly recommended.

## Sizing the Electrical Service

Refer to equipment data plate for specific information required to size electrical service and over-current protection of heat pump. Sizing is based on data plate information, wire size, wiring devices, and over-current protection per applicable local codes and standards. See "Identifying Model Specifications" on page 26.

### 3.4.b Access Panels

#### Access Panels (Great Big Bopper®)



### 3.4.c Schematics

Schematics are located on the inside of the equipment access panel. Some schematics have been included in the appendix.

#### **PLEASE NOTE:**

- Specifications are subject to change without notice.
- Schematics are available by calling AquaCal® Customer Support.
  - Please have the complete model and serial number available.
  - See "Identifying Model Specifications" on page 26.

Schematic Document Numbers Chart		
Phase	Equipment Model Numbers	Schematic #
Three	GBB	LTM0214



### 3.4.d Verifying Transformer Setting

Transformer voltage settings must be confirmed and set correctly depending on the measured voltage found on the site. Incorrect settings may cause heat pump damage. The following procedure will allow the installer to set the heat pumps transformer for the appropriate site voltage.

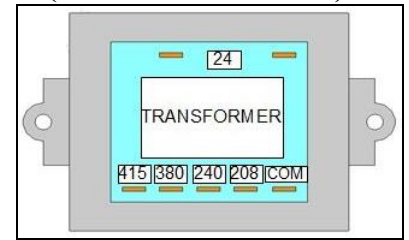
**⚠ WARNING** - Failure to heed the following may result in injury or death.

- The information contained in this section is intended for use by qualified electrical installation technicians, familiar with electrical service-industry safety standards and methods.

**⚠ CAUTION** - Failure to heed the following may result in equipment damage.

- Setting a voltage other than what is listed on the heat pump's data plate can damage equipment and is not covered under warranty.
  1. Turn heat pump on by adjusting the thermostat to call for heating or cooling. If more than one heat pump is on site, turn them all on. Final adjustments must be made with all heat pumps running.
  2. Measure the running site voltage.
  3. Confirm transformer tap is set for the measured site voltage. If more than one voltage tap is shown, select the voltage nearest to the running site voltage.

**Example of heat pump transformer  
(Varies between models)**



Please note: If more than one voltage is shown on the equipment's data plate, the factory default setting is usually the higher voltage on the transformer. As an example, a "208/230" voltage will be set to "240" from the factory.

### 3.4.e Three-Phase Adjustment

If a three-phase unit fails to operate at start up, the orientation of the line voltage "field" wiring may need to be adjusted.

- Three-phase models may be equipped with a Standard Three-Phase Monitor (**Figure 1**) or the ICM Digital Three-Phase Monitor (**Figure 2**).
- Units equipped with the ICM Digital Three-Phase Monitor will display a "Back Phase Rev" fault code. There is no display on the standard three-phase monitor.

**⚠ WARNING** - Failure to heed the following may result in injury or death.

- The information contained in this section is intended for use by qualified electrical installation technicians, familiar with electrical service-industry safety standards and methods.

**⚠ CAUTION** - Failure to heed the following may result in equipment damage.

- Setting a voltage other than what is listed on the heat pump's data plate can damage equipment and is not covered under warranty.
  1. Deactivate power to the unit. **Confirm that power is off to all three legs using an electrical test meter set for the correct voltage.**
  2. Switch position of the incoming power wires at each leg as follows, re-connect power, and attempt to restart the unit. If the unit fails to start, disconnect power. Verify off and proceed to next leg.
    - Switch incoming power wires at L1 and L2 on the line side to the contactor.
    - Switch incoming power wires at L1 and L3 on the line side to the contactor.
    - Switch incoming power wires at L2 and L3 on the line side to the contactor.
  3. When heat pump starts, disconnect power and verify off. Then confirm all line voltage connections are securely tightened. Reconnect power.
    - If heat pump does not start, contact AquaCal® Technical Support.

### Standard Three-Phase Monitor



Figure 1

### ICM Digital Three-Phase Monitor

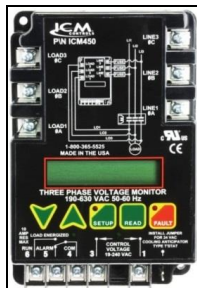


Figure 2

## 3.4.f Connecting Heat Pump to an External Controller

To support a direct connection to an external controller, AquaCal® heat pumps are equipped with optional terminal blocks. These terminals are on the microprocessor located on the low-voltage side of the electrical enclosure.

**⚠ WARNING** - Failure to heed the following may result in injury or death.

- This section is only for qualified installers who are familiar with swimming pool and spa safety standards.
- The installer must be familiar with service industry techniques.
- Deactivate power while routing wiring to control board.

**⚠ CAUTION** - Failure to heed the following may result in equipment damage.

- The wire size connecting the controller must be 16-gauge, 2-conductor or larger, low-voltage wire.
- Use direct connection (**dry contact**) provided on the microprocessor for external controllers.

Please confirm the type of external controller to be installed and follow the appropriate instructions.

- A **two-wire controller (with an internal thermostat)**. *The user can set and adjust the temperature at the controller's screen.*
- A **three-wire controller (with an "OFF" position)**. *The user adjusts the temperature at the heat pump. The user can select pool or spa mode or turn off the heat pump using the controller.*
- A **three-wire controller (without an "OFF" position)**. *The user adjusts the temperature at the heat pump. The user can select pool or spa mode, but must turn off the heat pump at the heat pump display panel.*

### Dry Contact Connection Points to the Microprocessor

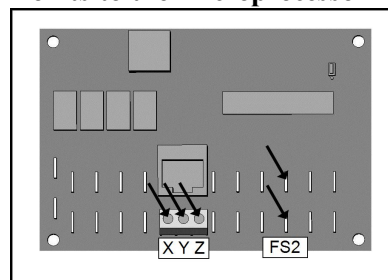


Figure 3

### Two-wire controller (with internal thermostat):

1. Deactivate power to heat pump.
2. Remove heat pump electrical access panel.
3. Route the control wiring to the low voltage side of the electrical enclosure. Follow all National Electric Codes (NEC) unless State or Local guidelines supersede.
4. Connect the controller wires to the microprocessor as follows:
  - Connect one wire to "Y". See Figure 3.
  - 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. Program heat pump for a two-wire controller. See "Using JAO interface" on page 18.
8. Test external controller.

### Three-wire controller (with "OFF" position):

1. Deactivate power to heat pump.
2. Remove heat pump electrical access panel.
3. Route the control wiring to the low voltage side of the electrical enclosure. Follow all National Electric Codes (NEC) unless State or Local guidelines supersede.
4. Connect the controller wires to the microprocessor as follows:
  - Connect "High" or "Spa" wire to "X". See Figure 3.
  - Connect "Common" wire to "Y".
  - Connect "Low" or "Pool" wire to "Z".
5. Reattach heat pump access panel.
6. Apply power to heat pump.
7. Program heat pump for a three-wire controller. See "Using JAO interface" on page 18.
8. Test external controller.

### Three-wire controller (without an "OFF" position):

1. Deactivate power to heat pump.
2. Remove heat pump electrical access panel.
3. Route the control wiring to the low voltage side of the electrical enclosure. Follow all National Electric Codes (NEC) unless State or Local guidelines supersede.
4. Connect the controller wires to the microprocessor as follows:
  - Connect "Common" wire to one terminal of "FS2". See Figure 3.
  - Connect "Spa" to other terminal of "FS2".
  - The third wire is not used.
5. Reattach heat pump access panel.
6. Apply power to heat pump.
7. Program heat pump for an external controller. See "Using FS2 interface" on page 19.
8. Test external controller.

## 3.5 Service Level Programming



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

- Service Level Programming must only be attempted by authorized personnel.
- Unauthorized adjustments in the Service Menu (beyond the **LOC** menu) may void the heat pump's warranty.
- Resetting the microprocessor to access a locked keypad will reset all settings to factory default including any installer-entered configuration. Re-programming all custom site condition settings will be required when using this reset.
- For further assistance, please contact AquaCal® Technical Support. See "Contacting AquaCal AutoPilot, Inc." on page 1.

#### ***PLEASE NOTE -***

Before changing multiple program options, it is recommended that the user lock option be disabled.

The lockout option can be re-enabled after all changes are completed.

## Service Level Factory Defaults

Certain programming options have been preset at the factory. These options can be overwritten for certain site-specific conditions.

Table 3 - Default Program Parameters Chart

CODE	DESCRIPTION	DEFAULT VALUE	RANGE
<i>CF0</i>	Call-Flex Options	0	Set to off at the factory.
<i>dbP</i>	Pool Dead-Band Differential	1°	Set at factory. Do not adjust.
<i>dbS</i>	Spa Dead-Band Differential	1°	Set at factory. Do not adjust.
<i>dEL</i>	Compressor Time Delay	1 (4 minutes)	Set to on (at 4 minutes) at the factory. Do not adjust.
<i>dSC</i>	Defrost Sensor	Factory Calibrated	Set at factory. Do not adjust.
<i>dFd</i>	Defrost Delay	Factory Calibrated	Set at factory. Do not adjust.
<i>F52</i>	Flow Switch / Automatic Thermostat Switching Option	0	0 = "No Switch" 1 = "Enable Switch"
<i>JAO</i>	External Controller	0	0 = "No Controller" 2 = "Two Wire Controller" 3 = "Three Wire Controller"
<i>LOC</i>	Service Level Entry Point	50	00 - 99
<i>tSC</i>	Water Sensor	Factory Calibrated	Set at factory. Do not adjust.

### Programming for an External Controller

Configure heat pump for external control.

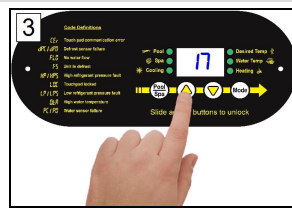
#### Using *JAO* interface



Press "Up" and "Down" buttons simultaneously until *CF 1* appears.



Press "Pool / Spa" button until *LOC* is displayed.



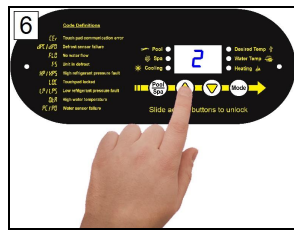
Press "Up" or "Down" to passcode. Default is "17".



Press "Pool / Spa" button once.



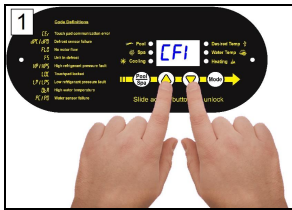
Press the "Pool / Spa" button until **JAO** is displayed.



Press "Up" or "Down" button.

- "0" - none
- "2" - two-wire
- "3" - three-wire

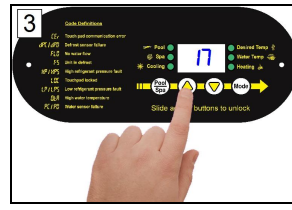
## Using F52 interface



Press "Up" and "Down" buttons simultaneously until **CF 1** appears.



Press "Pool / Spa" button until **LOC** is displayed.



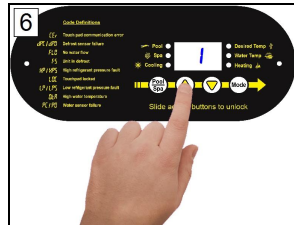
Press "Up" or "Down" to passcode. Default is "17".



Press "Pool / Spa" button once.



Press the "Pool / Spa" button until **F52** is displayed.

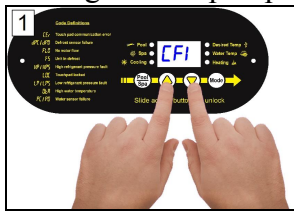


Press "Up" or "Down" button.

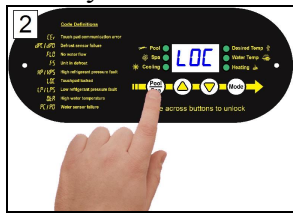
- "0" - none
- "1" - External

## Programming for a Relay Switch

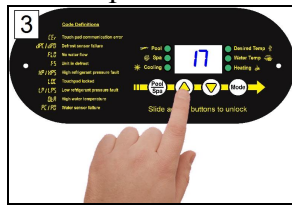
Configure heat pump for a relay or flow switch. This can provide automatic pool/ spa thermostat switching.



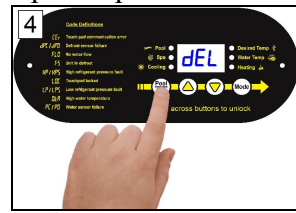
Press "Up" and "Down" buttons simultaneously until **CF 1** appears.



Press "Pool / Spa" button until **LOC** is displayed.



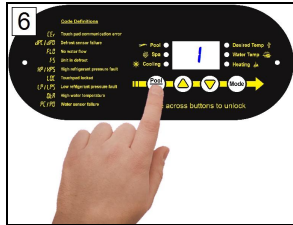
Press "Up" or "Down" to passcode. Default is "17".



Press "Pool / Spa" button once.



Press the "Pool / Spa" button until **F52** is displayed.



Press the "Up" or "Down"  
• "0" - not active  
• "1" - enable

Once the **F52** feature has been activated the "POOL / SPA" button will no longer function. The relay or flow switch is used to change between the pool and spa temperature settings.

## Reset to Factory Defaults Settings

**! CAUTION** - Failure to heed the following may result in equipment damage.

- Using this option will reset **ALL** settings to their factory defaults including external controller settings and sensor calibrations. **DO NOT** perform this operation if unsure of site specific settings or how to reset them on the heat pump.
- If a qualified technician is unavailable, please contact AquaCal® Technical Support. See "Contacting AquaCal AutoPilot, Inc." on page 1.

1. Simultaneously Press "Pool / Spa" button and "Up" button until the display shows **888**.
2. Release buttons. Reset is complete.



## SECTION 4 - TROUBLESHOOTING

### 4.1 Fault Codes

A fault code indicates a specific issue or condition that will require action before the equipment can resume operating.

Please perform the following troubleshooting.

If the issue reoccurs, please contact AquaCal® Technical Support. See "Contacting AquaCal AutoPilot, Inc." on page 1.

**⚠ WARNING** - Failure to heed the following may result in injury or death.

- Repairs must not be attempted by untrained or unqualified individuals.
- The heat pump contains refrigerant under high pressure. Repairs to the refrigerant circuit must not be attempted by untrained or unqualified individuals. Service must be performed only by qualified HVAC technicians. Recover refrigerant before opening the system.

**⚠ CAUTION** - Failure to heed the following may result in equipment damage.

- Service by unauthorized personnel will void the heat pump warranty.

### **FLO** Indicator

#### **ISSUE**

Low or no water detected.

#### **RESOLUTION**

1. Confirm the filter pump is on.
2. If a multiple-speed filter pump is being used, run at a higher speed to determine if the error persists. Do not exceed maximum flow rate for your model.
3. Confirm water is not being diverted away from the heat pump.
  - See "Water Flow Rates" on page 5.
  - See "Adjusting Water Flow Using  $\Delta T$  (Delta-T)" on page 6.

### **CEr** Indicator

#### **ISSUE**

This can indicate a loose or damaged communication cable.

#### **RESOLUTION**

A qualified technician should check the cable from control board to display assembly for a loose connection or visible damage.

### **CSE** Indicator

#### **ISSUE**

This is a control system error.

#### **RESOLUTION**

Deactivate then reactivate power to reset controls.

### **dPC or dPD** Indicator

#### **ISSUE**

Shorted or open defrost sensor.

#### **RESOLUTION**

A qualified technician should replace the defrost sensor.

## **PC or PO Indicator**

### **ISSUE**

Shorted or open water sensor.

### **RESOLUTION**

A qualified technician should replace the water sensor.

## **HP Indicator**

### **ISSUE**

The refrigerant system's high-pressure switch is showing as open.

### **RESOLUTION**

If the heat pump is a reversing unit, place it in **HEA** mode and perform the following troubleshooting.

Determine if an insufficient amount of water is being supplied to the equipment.

1. Confirm the filter pump is on.
2. If a multiple-speed filter pump is being used, run filter pump at a higher speed. Do not exceed maximum flow rate for the model.
3. Confirm water is not being diverted away from the heat pump.
  - See "Water Flow Rates" on page 5.
  - See "Adjusting Water Flow Using  $\Delta T$  (Delta-T)" on page 6.
4. The water pressure switch may be incorrectly calibrated. See "Adjusting Water Pressure Switch" on page 12.

## **HP5 Indicator**

### **ISSUE**

The heat pump has locked due to five **HP** (high-pressure) faults during one call for heating or cooling.

### **RESOLUTION**

1. Deactivate then reactivate power to the heat pump to clear error.
2. Troubleshoot the high-pressure issue causing the error. See "HP Indicator" on page 22.

## **LP Indicator**

### **ISSUE**

The refrigerant system's low-pressure switch is showing as open.

### **RESOLUTION**

If the heat pump is a reversing unit, place it in **HEA** mode and perform the following troubleshooting.

1. Check for proper fan operation. If fan is not operating, contact AquaCal® Technical Support.
2. Check for obstructed air flow around the heat pump. See "Clearances" on page 4.
3. Check for dirty or blocked evaporator coil.
4. Check for signs of ice buildup on the coil.

## **LPS Indicator**

### **ISSUE**

The heat pump has locked due to five **LPS** (low-pressure) faults during one call for heating or cooling.

### **RESOLUTION**

1. Deactivate then reactivate power to the heat pump to clear error.
2. Troubleshoot the low-pressure issue causing the error. See "LP Indicator" on page 22.



## **DEA Indicator**

### **ISSUE**

Incoming water temperature exceeded 110° F and the unit is locked with an **DEA** over temperature alarm. The heat pump will not operate until incoming water temperature drops to 100° F or lower.

### **RESOLUTION**

1. Determine if another heat source (gas heater, solar heater, etc.) is heating water being sent directly to the heat pump with the **DEA** indicator. This situation will need to be corrected before continuing.
2. Rule out an incorrect reading from the water temperature sensor. Verify existing water temperature with an accurate thermometer. If heat pump's sensor is inaccurate, the water temperature sensor may require replacement.

## **4.2 Issues and Resolutions**

**⚠ WARNING** - Failure to heed the following may result in injury or death.

- Repairs must not be attempted by untrained or unqualified individuals.
- The heat pump contains refrigerant under pressure. Repairs to the refrigerant circuit must not be attempted by untrained or unqualified individuals. Service must be performed only by qualified HVAC technicians. Recover refrigerant before opening the system.

**⚠ CAUTION** - Failure to heed the following may result in equipment damage.

- Service by unauthorized personnel will void the factory warranty.

Please perform the following troubleshooting.

For further assistance, please contact AquaCal® Technical Support. See "Contacting AquaCal AutoPilot, Inc." on page 1.

## **Display Panel Not Responding**

1. If the heat pump is controlled by an external controller, confirm the external controller settings.
2. If the issue is still occurring, disconnect external controller from the heat pump. Then check operation at heat pump.
  - If display panel responds, the problem lies with the external controller or its installation. Contact the manufacturer of the external control device.

## **Heat Pumps Not Running**

1. Confirm equipment is receiving power. Is the heat pump display illuminated?
  - If not, confirm the main breaker (located at the power supply panel) and the disconnect switch (located near the heat pump) are both turned on.
  - If the display still does not illuminate, it is recommended that the heat pump installer or electrician confirms heat pump is receiving power.
2. Confirm correct mode is selected.
3. Confirm thermostat is set correctly.
  - If heating the water, the thermostat should be set above the current water temperature.
  - If cooling the water, the thermostat should be set below the current water temperature.
4. If an error code is displayed, diagnose and correct the cause of the code. See "Fault Codes" on page 21.
5. If the heat pump is using an external controller, the heat pump may not be set correctly to accept the controller's signal.
  - See "Connecting Heat Pump to an External Controller" on page 16.

## **Heat Pumps Tripping Breaker**

1. Have an electrician confirm breakers are in good condition and properly sized for the heat pump.
2. Multiple heat pumps installed at the same site may benefit from special automatic sequencing controllers to avoid excessive power drops at start-up.
3. If a fault occurs immediately when the compressor starts, a qualified technician should evaluate the system.

## Heat Pump Won't Shut Off

### **PLEASE NOTE**

*When heat pump is set to "OFF", the display will show either the water temperature or **FLD**.*

1. Confirm the heat pump has reached the desired temperature set on the thermostat. The heat pump will continue to run until the set temperature is reached.
2. If the heat pump is using an external controller, it may not be set correctly.
  - See Operation Manual for setting external controls at the heat pump. Then confirm settings at the controller.

## Heat Pump Is Running, Not Heating

1. If the heat pump is using an external controller, confirm it is set correctly.
  - See operation manual for operating heat pump with an external controller.
  - If the heat pump is still not running correctly with this device, contact the installer of the external controller device or the device's manufacturer for further assistance.
2. Confirm heat pump mode is set to **HEA** operating mode.
3. Confirm thermostat is set to the desired water temperature.
4. Confirm valves are correctly positioned to heat the correct body of water (either the pool or the spa). If heating a spa that overflows into a pool, confirm the spa is isolated when being heated (not flowing into the pool).
5. Confirm heat pump is transferring heat into the water.
  - Measure the temperature of air discharge coming out of heat pump fan. If discharge air is between 8° to 10° colder than the outside ambient air (entering air), then the heat pump is moving heat into the water.
6. If an error code is displayed, diagnose and correct cause of code. See "Fault Codes" on page 21.
7. Confirm that filter pump has a sufficient run-time. The heat pump will not run (or heat the water) without water flow. Great Big Bopper<sup>®</sup> equipment will generally be set to run 24 hours a day in commercial applications.
8. If heating a spa, deactivate air blower or venturi (if equipped) to allow for quicker heating times. For pools, deactivate water features, such as slides, waterfalls, or fountains to allow water to retain heat. Use of a liquid pool blanket product, such as an Aqua Blanket<sup>™</sup>, can also compensate for excessive heat loss.

## Heat Pump Is Running, Not Cooling (Reversing Models)

1. If the heat pump is using an external controller, confirm the heat pump is programmed properly to allow for cooling.
  - See operation manual for operating heat pump with an external controller.
2. Confirm the heat pump mode is set to **COO** operating mode.
3. Confirm the thermostat is set below the current water temperature.
4. Confirm valves are correctly positioned to cool the correct body of water (either the pool or the spa). If cooling a spa that overflows into a pool, confirm the spa is isolated when being cooled (not flowing into the pool).
5. If an error code is displayed, determine and correct the condition causing the code. See "Fault Codes" on page 21.
6. Confirm heat pump is transferring heat out of the water.
  - Measure the temperature of air discharge coming out of heat pump fan. If discharge air is between 8° to 10° warmer than outside ambient air (not coming out of heat pump), then the heat pump is moving heat out of the water.
7. Confirm that filter pump has a sufficient run-time. The heat pump will not run (or cool the water) without water flow. Great Big Bopper<sup>®</sup> equipment will generally be set to run 24 hours a day in commercial applications.

## **Water Coming From Heat Pump**

The water may be normal condensation produced as a by-product of the heat pump's refrigeration process. The heat pump can produce 8 to 10 gallons of condensation per day depending on the humidity of the ambient air. Determine if the water is condensation or a possible leak.

1. If using chlorine or bromine as a pool / spa sanitizer, use a test strip in the water at heat pump to determine if sanitizer is present. If sanitizer is present, a leak may exist.
2. Deactivate heat pump, leaving the filter pump on. After several hours, determine if water is still coming from the heat pump.

# SECTION 5 - APPENDIX

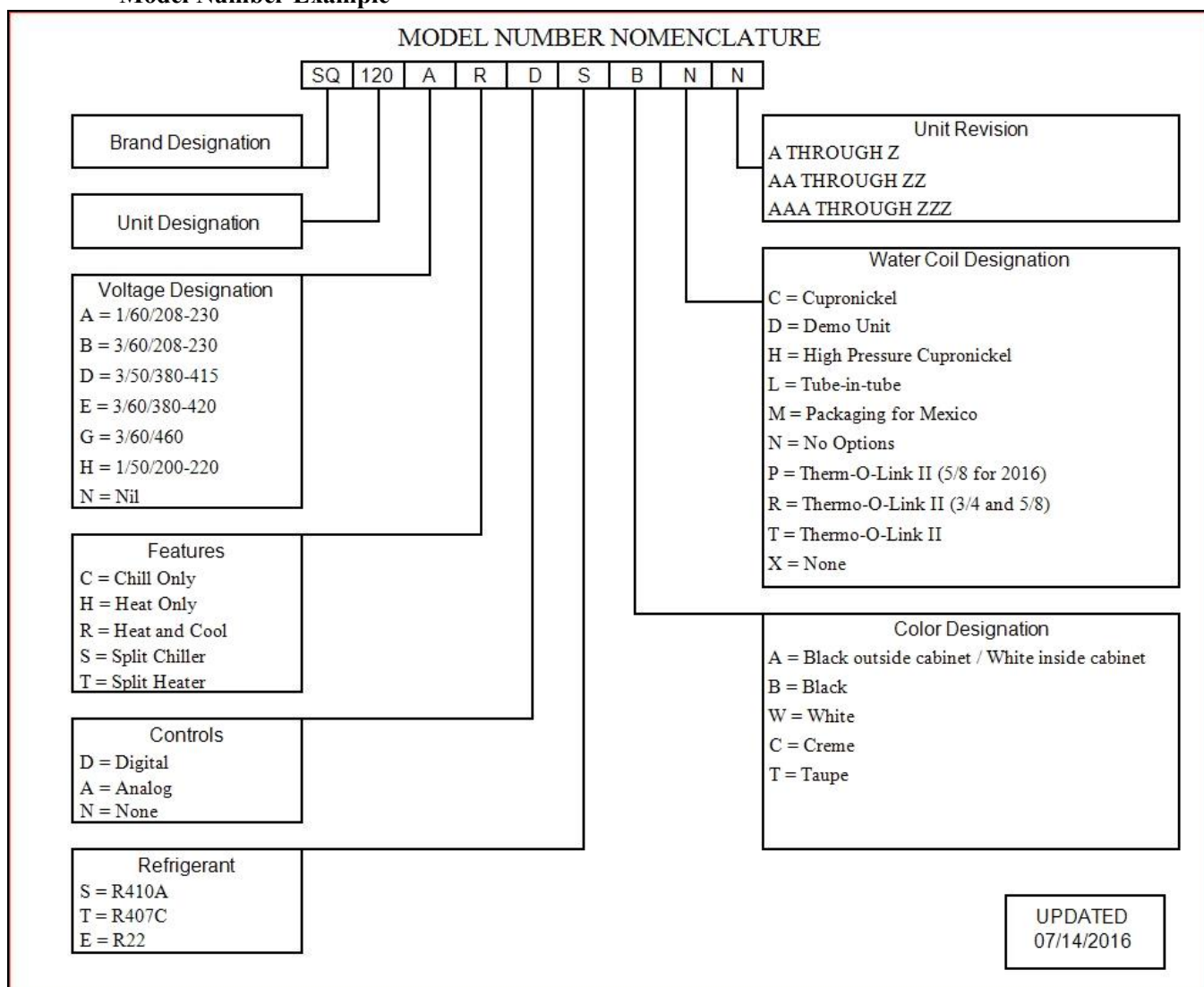
## 5.1 Identifying Model Specifications

1. Find Data Plate - The data plate is usually posted on the side of the equipment or the inside of the heat pump's access plate.
2. Find the model number on the data plate. The first letters and numbers indicate the model type.
3. The complete model number identifies the equipment's specifications.

### Data Plate Example

MINIMUM CIRCUIT AMPACITY	<input type="text"/>	MADE IN THE USA
ELEC. SERVICE: VOLTS	<input type="text"/>	PH <input type="text"/> HZ <input type="text"/>
MAXIMUM TIME DELAY FUSE OR HACR BREAKER <input type="text"/> 5		
COMPRESSOR VOLTS	R.L.A. <input type="text"/>	L.R.A. <input type="text"/>
FAN MOTOR VOLTS	H.P. <input type="text"/>	F.L.A. <input type="text"/>
REFRIGERANT: Circuit - Factory charged <input type="checkbox"/> Only oz/Kg <input type="text"/>		
Tested to <input type="checkbox"/> psig High side / <input type="checkbox"/> psig Low side		
OUTDOOR USE		
AQUA CAL, INC A TEAM HORNER COMPANY 2737 24 <sup>TH</sup> STREET NORTH ST. PETERSBURG, FL 33713 FACTORY SERVICE 727-523-5642		MODEL NUMBER <input type="text"/> <b>IIIBAR CODEIII</b> SERIAL NUMBER <input type="text"/> <b>IIIBAR CODEIII</b>

### Model Number Example



## 5.2 Weights

**NOTE:**

*Specifications subject to change.*

Model Type	Model Number	Install Weight
Great Big Bopper®	BB500	1540 Pounds

Table 4 - Equipment Weight

## 5.3 Initial Heating Recommendations

The following recommendations will reduce the amount of time required to heat a pool. **If unsure of equipment heating capability, review equipment data plate.** See "Identifying Model Specifications" on page 26.

1. Confirm heat pump mode has been set to **HEA**.
2. Set thermostat to desired water temperature.
3. Temporarily override the filter pump's time-clock for continuous operation.
  - This will allow the Heat Pump the time required to heat the water at start-up.
  - After the water has reached the desired temperature, the time-clock can be reset to normal operating time-frames.

## 5.4 Initial Cooling Recommendations

The following recommendations will reduce the amount of time required to cool a pool or cold plunge application. **If unsure of equipment cooling capability, review equipment data plate.** See "Identifying Model Specifications" on page 26.

1. Confirm heat pump mode has been set to **COO**.
2. Set thermostat to desired water temperature.
3. Temporarily override the filter pump's time-clock for continuous operation.
  - This will allow the Heat Pump the time required to cool the water at start-up.
  - After the water has reached the desired temperature, the time-clock can be reset to normal operating time-frames.

## 5.5 Schematics

Schematics are located on the inside of the equipment access panel.  
Some schematics have been included in the appendix.

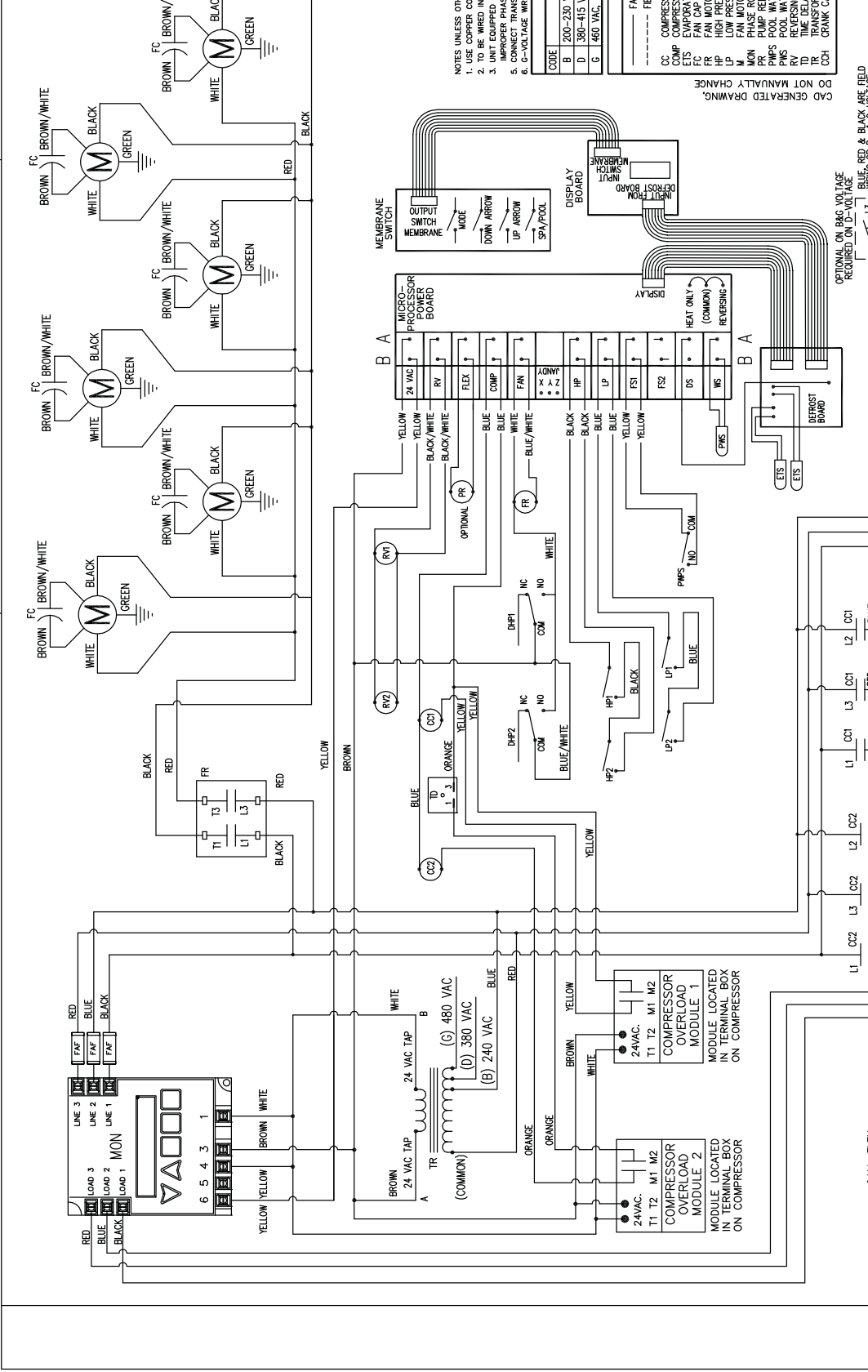
**PLEASE NOTE:**

- Specifications are subject to change without notice.
- Schematics are available by calling AquaCal® Customer Support.
  - Please have the complete model and serial number available.
  - See "Identifying Model Specifications" on page 26.

Schematic Document Numbers Chart		
Phase	Equipment Model Numbers	Schematic #
Three	GBB	LTM0214



REV.	DESCRIPTION	CHG	DATE
REL-C	RE-DRAWN ON B-SIZE	DKS	9/30/11
REL-E	ADDED FREEZE BOARD, FAN LOGS	TD	10/30/13
REL-F	REMOVED PHASE ROTATION MONITOR NOTES	TD	7/28/14



**Autocal**  
The Innovative Leader in Pool & Spa Water Treatment Equipment  
2737 24th St. N. St. Petersburg, FL 33713

**BB500 SCHEMATIC, B,D&G-VOLT, R-410A**

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES. TELEPHONE ARE

MODEL BY: N/A | DRAWN BY: TD | DATE: 5/23/13 | PROJECT ENG/CK: S/C/S BY: -  
 DATE: N/A | DIM. NO. | SCALE: 1/8"=1'-0"  
 MATERIAL: N/A | FINISH: N/A | REVISION: LTM0214  
 DO NOT SCALE DRAWING | CAD FILE: LTM0214 | SHEET 1 OF 1  
 Last Revision: 07/28/11

