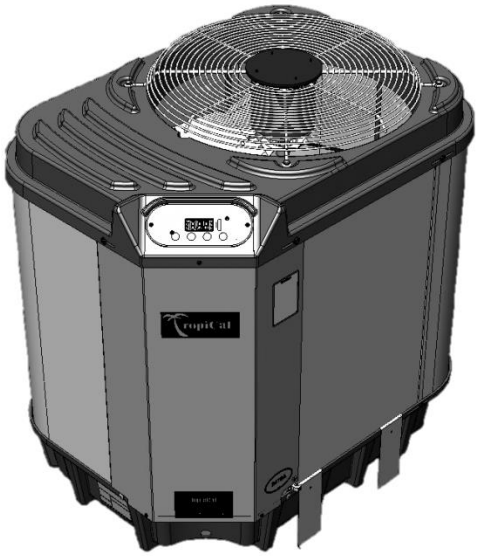
AquaCal®
Installation Manual

TropiCool™
WATER CHILLER



Important

Read this document before operating / installing this product

For additional product manuals and operation / installation procedures, please visit www.AquaCal.com

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 chiller model and serial number available. See "Identifying Model Specifications" on page 26.

Website	www.AquaCal.com
Request Service Online	www.AquaCal.com/request-heat-pump-service/
Phone	(1) 727-823-5642
Hours	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 chiller 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 chiller 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 chiller 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 chiller 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 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.

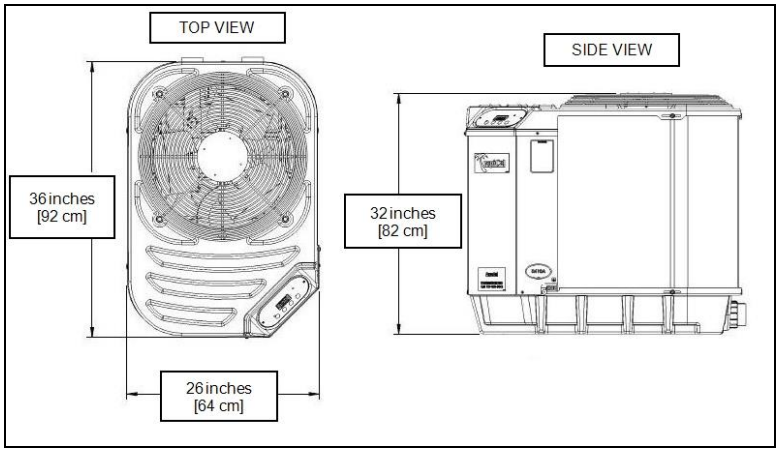
- Installation of this equipment by anyone other than a qualified installer can result in a safety hazard. The information contained throughout the "Installation" section is intended for use by qualified installation technicians familiar with the swimming Pool / Spa safety standards.

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

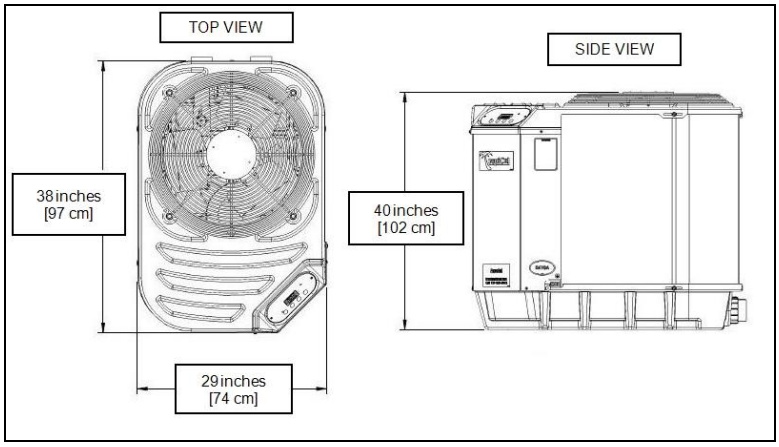
- Failure to protect equipment against corrosive conditions will adversely affect the life of the equipment and will void equipment warranty.

3.1 Dimensions

Dimensions (TropiCool™ TC500)



Dimensions (TropiCool™ TC1000)



3.2 Positioning Equipment

3.2.a Controlling Irrigation and Rainwater Runoff

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

3.2.b Planning for Condensation

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

- Install the chiller with enough height to allow for water drainage.
- Plan for water drainage disposal as needed.

3.2.c Mounting Pad Requirements

- Build the chiller pad out of concrete or another code-approved material.
- Confirm the pad can support the weight of the chiller. 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 chiller base in all directions.
- Do not install the chiller on soil or grass.
- Do not allow the chiller base to touch the buildings foundation.
- Do not place the chiller 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.

3.2.d Anchoring to Pad

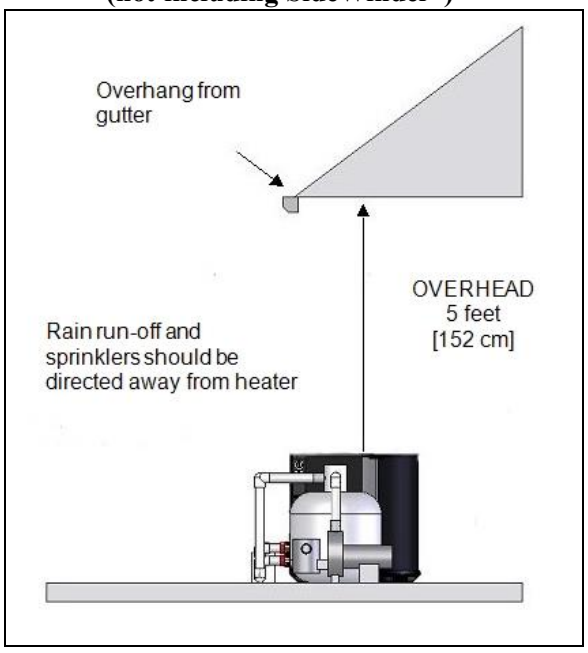
- Follow all applicable local, state, and national requirements regarding wind load anchoring.
- If needed, contact AquaCal® Customer Support to obtain the correct anchoring kit information. Please have the chiller model number and serial number when requesting support. See "Identifying Model Specifications"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

3.3 Plumbing

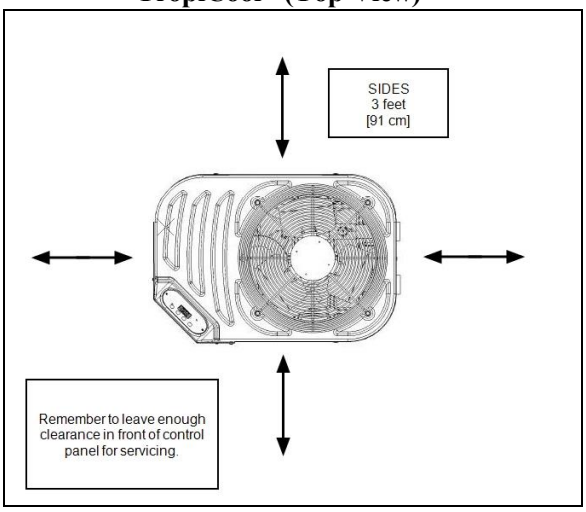
3.3.a Clearances

- Proper air circulation is required for the chiller to operate efficiently. Avoid placing objects near or on top of the chiller. 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.

Overhead Clearance
(not including SideWinder™)



TropiCool™ (Top View)



3.3.b Water Flow Rates

Maintain water flow rates as indicated. Please note, these specifications relate to the chiller 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
TC500	Titanium Tube-in-Tube	20 GPM	45 GPM
TC1000	Titanium ThermoLink®	30 GPM	70 GPM

If water flow through the chiller is reduced, performance will suffer and internal safety devices may deactivate the chiller with error codes LP or LPS.

- Operate water filtration devices per manufacturer's specifications. Dirty filters can cause reduced water flow to the chiller. 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 chiller, will cause insufficient water flow through the chiller.
- The maximum static (or operating pressure) is 50 pounds-per-square-inch (PSI) unless a special "high-pressure" unit has been ordered. These specifications relate to the chiller only. Code-specified whole system turnover rates must be satisfied.

3.3.c 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 chiller must receive water flow within the specified minimum ranges under worst-case conditions such as a fouled water filter. See "Water Flow Rates" on page 4.

- Water flow exceeding maximum flow rates may damage chiller and will not be covered under equipment warranty. See "Water Flow Rates" on page 4.
    - Install a bypass valve whenever water-flow may exceed maximum rating.
        - See "5 lb Bypass Valve Kit (Kit STK0135)" on page 27.
        - For additional guidance testing water flow rates, please contact AquaCal® Technical Support.

3.3.d Plumbing Diagrams

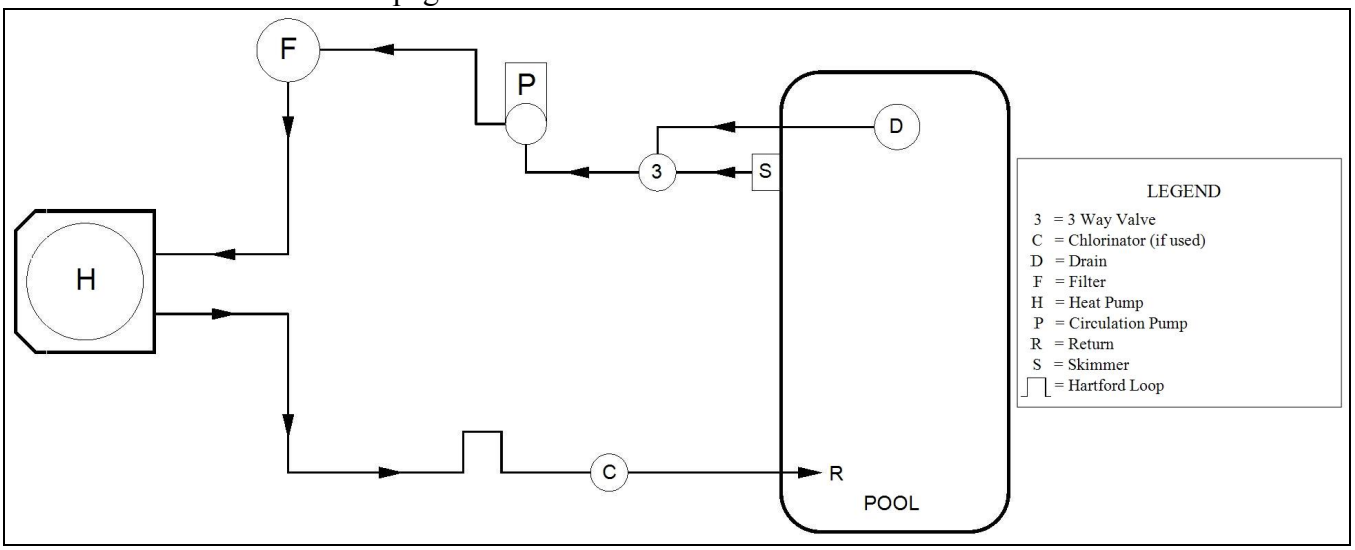
Plumbing diagrams are provided in this section as a planning guide to the sequence of equipment, valves, and fittings.

- 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.

Air Source Chiller Plumbing Diagrams

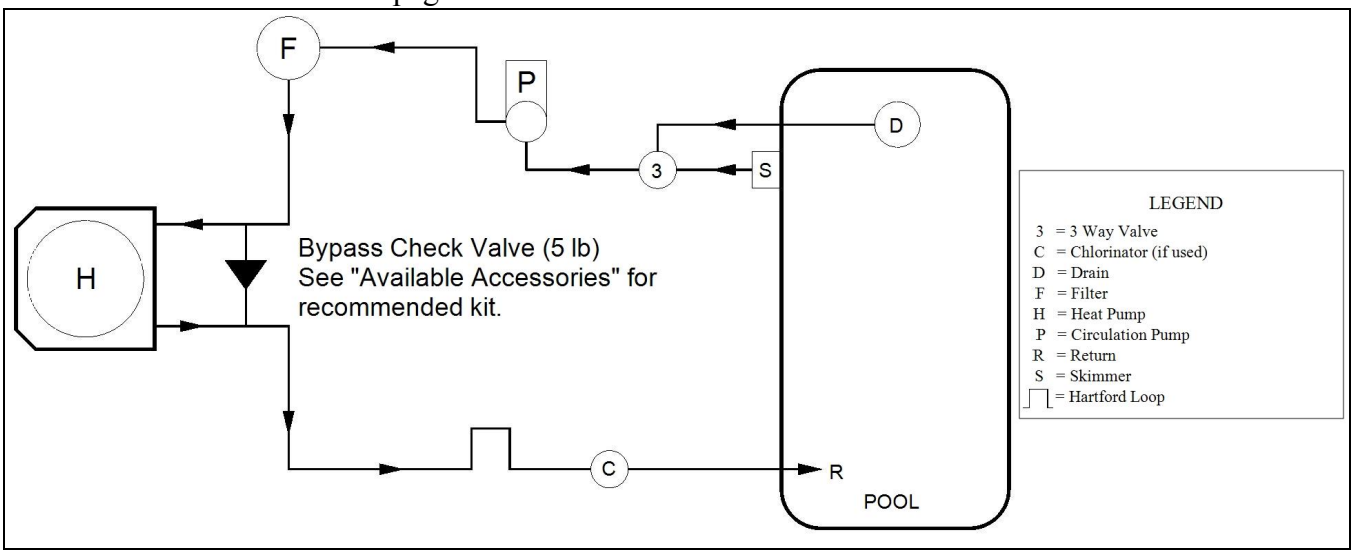
Chiller with water flows equal or less than maximum listed flow rate

See "Water Flow Rates" on page 4.



Chiller with water flows greater than maximum listed flow rate

See "Water Flow Rates" on page 4.



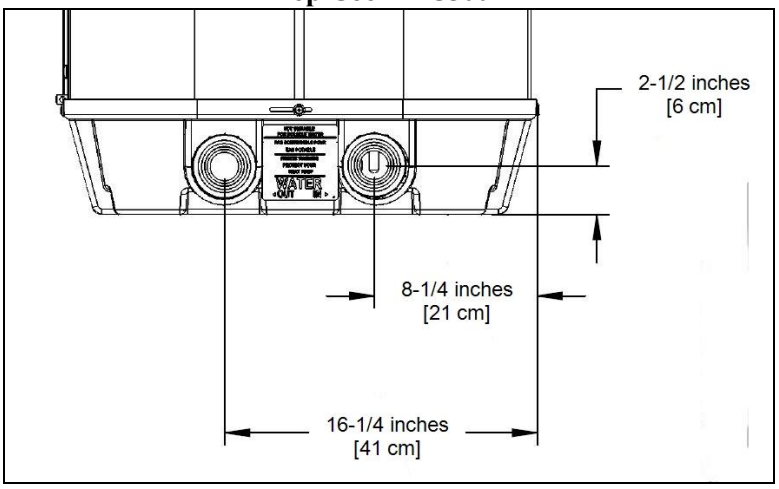
3.3.e Water Connections to Chiller

- Connections to site plumbing are made via PVC solvent cement to the female slip socket of the plumbing unions.
- The Chiller uses 2-inch union connections.
- These unions are available from AquaCal®. See "Available Accessories" on page 27.

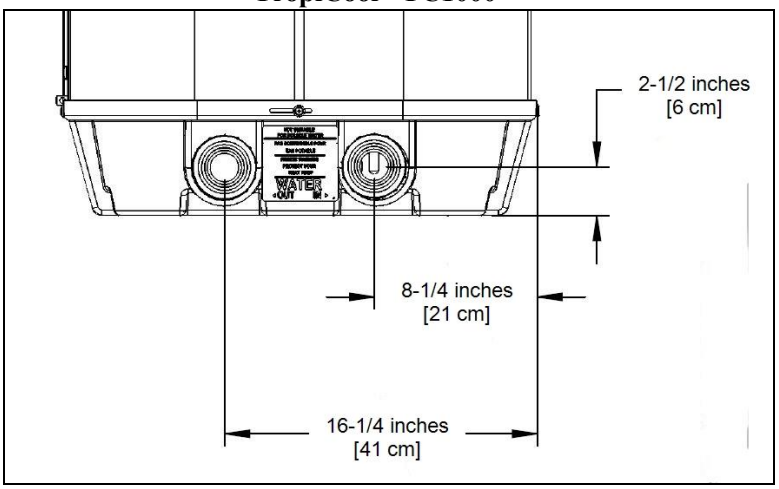
⚠ CAUTION - Failure to heed the following may result in equipment damage.

- 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.

TropiCool™ TC500



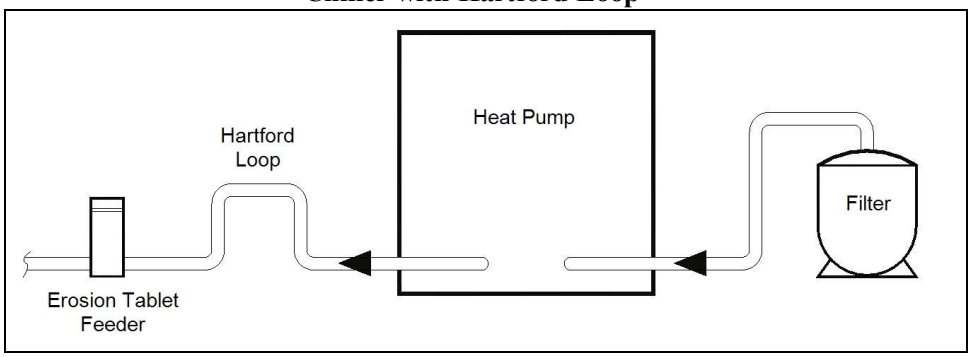
TropiCool™ TC1000



3.3.f In-Line Chlorine Feeders

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

Chiller with Hartford Loop



3.3.g 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 chiller from being properly winterized.

The unions can be used to decouple the chiller 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. See "Winterizing" on page 19.

3.3.h Adjusting Water Pressure Switch

Adjust water pressure switch when chiller 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.

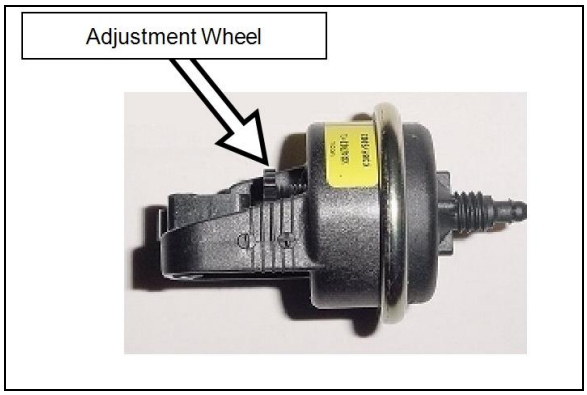
- If after water pressure switch adjustment the chiller continues to operate with the filter pump off, readjust water pressure switch to ensure chiller will not run without water flow.

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 chiller. See "Water Flow Rates" on page 4.
- FLO code is displayed (or displays intermittently).

Adjusting Water Pressure Switch:

1. Remove chiller access panel. See "Access Panels" on page 27.
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 chiller.
5. Slowly rotate adjustment wheel on switch until the FLO code just disappears.
6. Deactivate filter pump. If correctly adjusted, the chiller will deactivate and display FLO.
7. Re-install chiller access panel.
    - If chiller continues to operate without water flow, contact AquaCal® Technical Support.
    - Site-specific factors may require the installation of an external flow switch. See "Available Accessories" on page 27.



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 chiller as possible. Always satisfy applicable codes and standards.
- Never mount power-disconnects directly to the chiller.
- In sizing power wiring, be especially aware of up-sizing requirements necessary due to wiring distances. Always satisfy applicable codes and standards.
- Multiple chillers installed at the same site may benefit from automatic sequencing controllers (ASC) to avoid excessive power drops at start-up. See "Available Accessories" on page 27.
- AquaCal® chillers are designed for copper conductors, only. Do not use aluminum wire.

3.4.b Electrical Standards

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

Table 1 - Standards

3.4.c Grounding and Bonding

Follow local code requirements for properly grounding and bonding chiller equipment.

3.4.d Surge Suppression

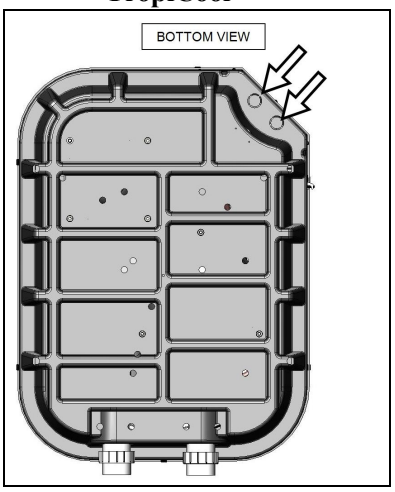
The use of approved commercial surge protectors is strongly recommended.

3.4.e Sizing the Electrical Service

Refer to equipment data plate for specific information required to size electrical service and over-current protection of chiller. 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.f Electrical Knockouts

TropiCool™



3.4.g 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 chiller damage. The following procedure will allow the installer to set the chillers transformer for the appropriate site voltage.

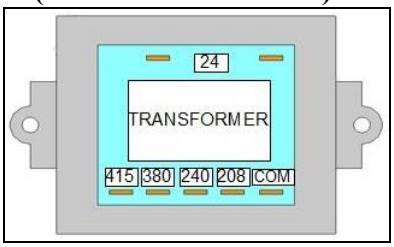
⚠ WARNING - Failure to heed the following may result in injury or death.

- 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.

1. Turn chiller on by adjusting the thermostat to call for heat. If more than one chiller is on site, turn them all on. Final adjustments must be made with all chillers 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 chiller transformer (Varies between models)



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

4. If a chiller is using three-phase incoming power, confirm voltage and settings are correctly set at the monitor. See "Three-Phase Adjustment" on page 9.

3.4.h 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.
- 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.
- Three-phase models may be equipped with a Standard Three-Phase Monitor (**Figure 1**) or the ICM Digital Three-Phase Monitor (**Figure 2**).

⚠ 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 chiller'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 chiller starts, disconnect power and verify off. Then confirm all line voltage connections are securely tightened. Reconnect power.
    - If chiller does not start, contact AquaCal® Technical Support.

Standard Three-Phase Monitor

Figure 1

ICM Digital Three-Phase Monitor

Figure 2

3.5 Programming

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

- Service Level Programming must only be attempted by authorized service personnel.
- Unauthorized adjustments in the Service Menu (beyond the LOC menu) may void the chiller's warranty.
- For further assistance, please contact AquaCal® Technical Support. See "Contacting AquaCal AutoPilot, Inc." on page 1.
- The compressor time delay should only be deactivated for diagnostic convenience, and must be reactivated prior to placing chiller back in service. Failure to reset time delay could result in permanent damage to the chiller compressor.
- 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. See "Reset to Factory Defaults Settings" on page 12.

> ***PLEASE NOTE -***
> Before changing multiple program options, it is recommended to disable the user lock option. The lockout option can be re-enabled after all changes are completed.

3.5.a Factory Defaults

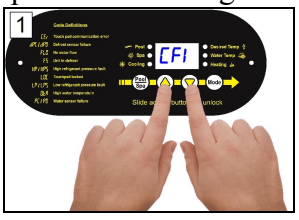
Certain programming options have been preset at the factory. These options can be overwritten for certain site-specific conditions.

CODE	DESCRIPTION	DEFAULT VALUE	RANGE
CFO	Call-Flex Options	0	Set to off at the factory.
dbP	Pool Dead-Band Differential	1°	Set at Factory. Do not adjust.
dbS	Spa Dead-Band Differential	1°	Set at Factory. Do not adjust.
dEL	Compressor Time Delay	1 (4 minutes)	0 = "OFF" 1 = "ON"
dSC	Defrost Sensor	Factory Calibrated	Set at Factory. Do not adjust.
dFd	Defrost Delay	Factory Calibrated	Set at Factory. Do not adjust.
FS2	Flow Switch / Auto T-Stat Switching Option	0	0 = "No Switch" 1 = "Enable Switch"
JAO	External Controller	0	0 = "No Controller" 2 = "Two Wire Controller" 3 = "Three Wire Controller"
LOC	Service Entry Point	50	00 - 99
tSC	Water Sensor	Factory Calibrated	Set at Factory. Do not adjust.

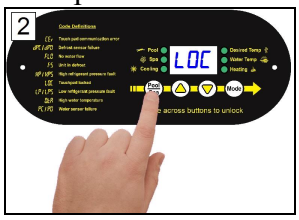
Table 2 - Default Program Parameters Chart

3.5.b Deactivate Time Delay

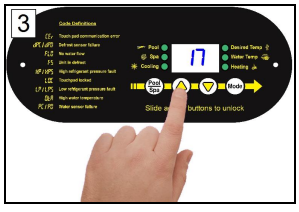
The time delay should only be deactivated by qualified HVAC technicians for diagnostic convenience, and must be re-activated prior to placing chiller back in service. Failure to reset time delay feature could result in permanent damage to the compressor.



Press "Up" and "Down" buttons simultaneously until CF I appears.

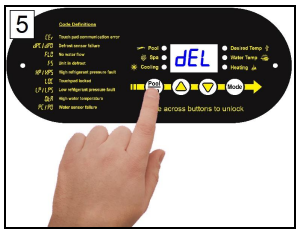


Press "Pool / Spa" button until LOC is displayed.

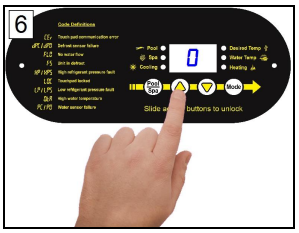


Press "Up" or "Down" to passcode. Default is "17".

Press "Pool / Spa" button once.



Press "POOL / SPA" button until dEL is displayed.



Press the "UP" or "DOWN" button

- "0" - disable
- "1" - activate

3.5.c 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 chiller.**
- 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 - OPERATION

4.1 Energizing Chiller

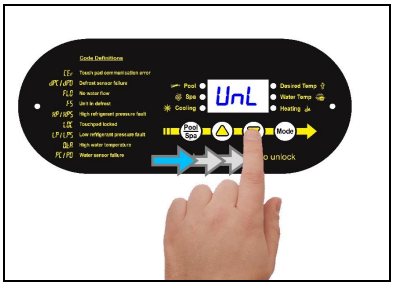
Turn power on at external fuse box or breaker disconnect.

- Controller performs a lamp test.
- The display reads 888.
- Controller then displays as normal. See "Display" on page 13.

4.2 Display Lock

The chiller has a display lock to protect against inadvertent setting changes. To activate display and controls, slide finger across the controls as shown from left to right.

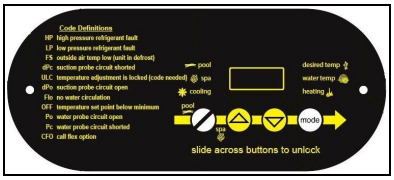
- The code UnL will briefly appear, then the set temperature or mode will display.
- This is different than a user-lock which requires a pass code. See "User Lock Option (Enable)" on page 15.



4.3 Control Panel

The following information outlines the operation for a standard installation.

Control Panel



4.4 Buttons

Buttons	Description
Display Lock	Sliding your finger across the buttons from left to right will temporarily disable the display lock.
Pool / Spa	Select either the pool or the spa thermostat.
Up Arrow	Used to increase temperature set point and navigate though menu options.
Down Arrow	Used to decrease temperature set point and navigate though menu options.
Mode	Select chiller's operating mode.

4.5 Indicator Lights

Indicators	Description
Pool	The Chiller is referencing the pool thermostat.
Spa	The Chiller is referencing the spa thermostat.
Cooling	Indicates the unit is cooling the water. Please note - the compressor must be operating before this light will illuminate.
Water Temp	Indicates current water temperature.
Desired Temp	Indicates temperature set point is displayed. This is displayed when "UP" or "DOWN" is selected.

4.6 Display

Display	Description
75	The chiller is on and displaying the current water temperature. In this example 75° F is displayed.
FLO	No water flow is detected. The filter pump is off or chiller is not receiving correct water flow.
OFF	The chiller has been turned off via the mode selector button or the temperature set point has been lowered below 45° F.
888	The control program is initializing. This displays only as power is applied to the chiller. The program version number will then be displayed.

Display	Description
CF I	Select water temperature format (in either Celsius or Fahrenheit).
ULC	Enable chiller lockout feature.
ELC	Select passcode to lock the keyboard.
LOC	This is a Service Entry Point (not intended for use by the owner). The LOC code permits service personnel to enter a factory passcode to access adjustable calibration and site dependent setup parameters. Service adjustments are available to authorized installation and service personnel, only.

4.7 Factory Defaults

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

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

- Service Level Programming must only be attempted by authorized service centers.
- Unauthorized adjustments in the Service Menu (beyond the LOC menu) may void chiller's warranty.
- If the issue reoccurs, please contact AquaCal® Technical Support. See "Contacting AquaCal AutoPilot, Inc." on page 1.

Table 3 - Factory Defaults

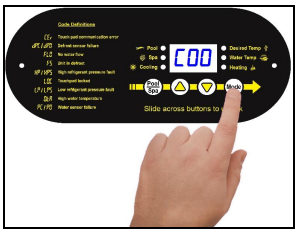
CODE	DESCRIPTION	DEFAULT VALUE	RANGE
OFF	Chiller is deactivated.	OFF	
HEA	**This is not an active feature on this equipment.**		
COO	Set to cool water to point set on thermostat.		
ACH	**This is not an active feature on this equipment.**		
CF I	Celsius / Fahrenheit Selection	1	0 = Celsius 1 = Fahrenheit
ELC	Enter Lock Code	0	0 - 99
ULC	User Lock Code	0	0 = "User Lock Disabled" 1 = "User Lock Enabled"

4.8 Setting Operating Mode

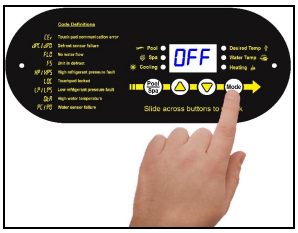
PLEASE NOTE

Do not attempt to operate chiller in heat modes HEA or ACH. This is not an active feature on this equipment.

Cool Mode

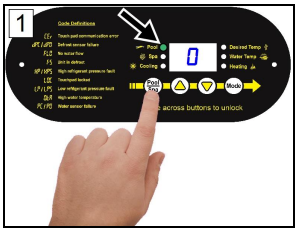


Deactivate Chiller

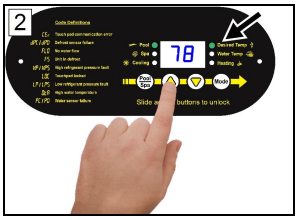


Heating / Cooling modes only available on select equipment. Confirm chiller features before setting a mode.

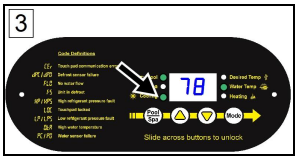
4.9 Setting Thermostats



Select "POOL" or "SPA"

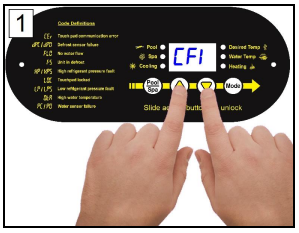


Press "UP" or "DOWN" to the desired temperature.

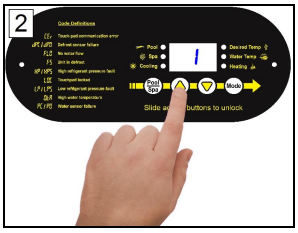


- The cooling indicator will illuminate when cooling the water.

4.10 Selecting Celsius or Fahrenheit



Hold "UP" and "DOWN" until CF 1 displays.

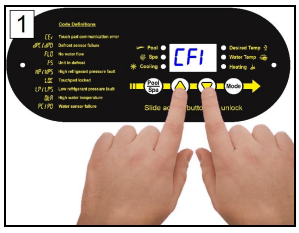


"0" - Celsius
"1" - Fahrenheit

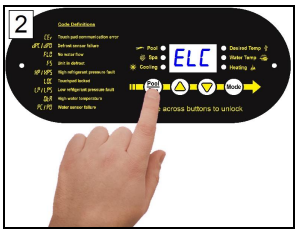
4.11 User Lock Option (Enable)

The user-lock feature allows the chiller control panel to be "locked"; preventing unauthorized temperature adjustments.

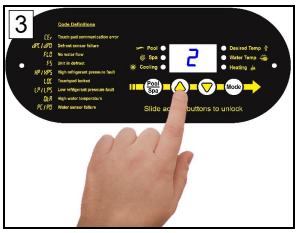
- Do not confuse a user-lock with the display lock. See "Display Lock" on page 12.
- If LOC is briefly displayed, followed by a "0", the chiller is already locked.



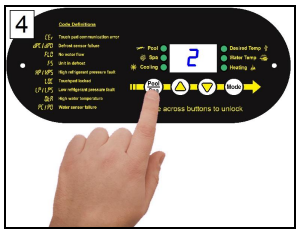
Hold "UP" and "DOWN" until CFI displays.



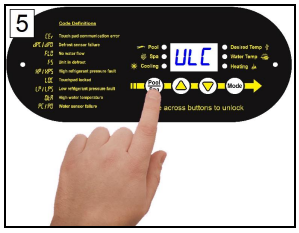
Press "POOL / SPA" button until ELC is displayed.



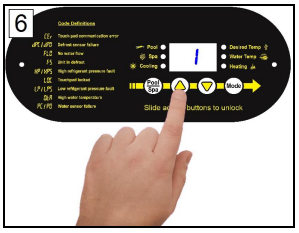
Press "UP or "DOWN" button to change or add a numerical password



Press "POOL / SPA" button to lock in the password.



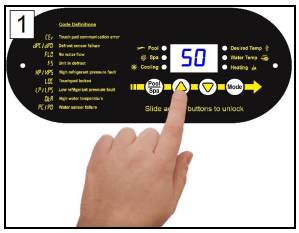
Press "POOL / SPA" button until ULC is displayed.



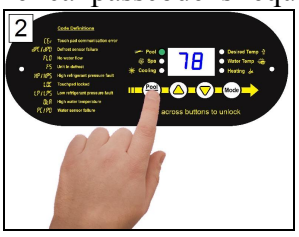
Press "Up" button till "1" is displayed to enable.

4.12 User Lock Option (Entering Pass Code)

If LOC is briefly displayed when attempting to change a chiller's settings followed by a "0", the chiller is in a user-lock mode. A numerical passcode is required to proceed.



Press "UP" or "DOWN" arrow to enter user lock code.

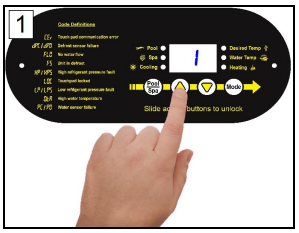


Press "POOL / SPA" button again to unlock.

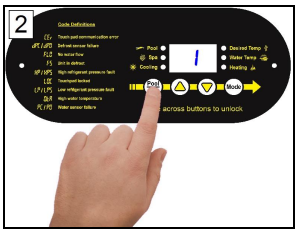
NOTE -

- After three seconds of inactivity, the chiller's slide lock will activate.
- If the user-lock code has been misplaced, the chiller must be reset to default factory settings. See "Reset to Factory Defaults Settings" on page 12.

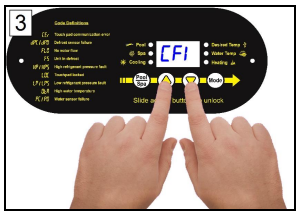
4.13 User Lock Option (Disable)



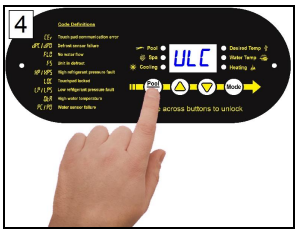
Use "UP" button to enter existing password.



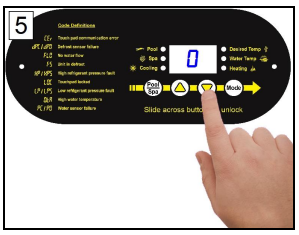
Press "Pool / Spa" button to unlock.



Hold "UP" and "DOWN" buttons until CF 1 is displayed.



Press "POOL / SPA" button until ULC is displayed



Press "DOWN" button until "0" is displayed.

SECTION 5 - MAINTENANCE

5.1 Water Chemistry

Check water chemistry regularly and maintain within recommended levels. Standards for commercial applications vary in different areas. Follow all local applicable codes.

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

- Do not allow water to flow through chiller when refinishing or acid washing a pool. Either use an installed bypass to route water away from chiller or deactivate filter pump.
- To avoid damage to equipment, monitor and maintain chemistry within recommended levels.

CHEMISTRY LEVEL CHART (RESIDENTIAL)		
CHEMICAL	**POOLS**	**SPAS**
Chlorine	1.0 – 3.0 ppm	3.0 – 5.0 ppm
Bromine	2.0 – 6.0 ppm	2.0 – 6.0 ppm
Cyanuric Acid	30 - 50 ppm	30 - 50 ppm
pH	7.4 – 7.6 ppm	7.4 – 7.6 ppm

CHEMISTRY LEVEL CHART (RESIDENTIAL)		
CHEMICAL	**POOLS**	**SPAS**
Total Alkalinity	80 – 120 ppm	80 – 120 ppm
Calcium Hardness	200 – 400 ppm	150 – 250 ppm
Total Dissolved Solids•	0 – 1,500 ppm	1,500 ppm above start-up total dissolved solids in spas

• Salt from a chlorine generator is not included in Total Dissolved Solids.

5.2 Cleaning Equipment After Installation

Installer - If you need to clean equipment after installation, please use the following guidelines.

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

- Possible electric shock hazard - Deactivate power to all electrical devices on the pad when washing chiller. Do not restore electrical power until equipment is completely dry.

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

- Do not use a pressure cleaner to wash chiller. Damage to chiller components may result. If using a hose-end spray nozzle adjust spray pattern to low strength only.
- Do not spray water directly into the interior of the chiller; damage to components may result.
- Do not use chemicals on the control panel.

Cleaning

1. Wash outside cabinet using a low-pressure water hose. A high-pressure water stream will cause damage to the aluminum fins of the chiller This damage is not covered under product warranty.
2. While the chiller is still wet, use an approved cleaning agent to clean the exterior of the chiller. **Do not use chemicals on the control panel.**
3. Use a detergent-dampened cloth to wipe the chiller's exterior cabinet.
4. Flush all exterior with fresh water using a low-pressure water hose.
5. Dry the exterior cabinet using a soft cloth being careful not to damage condenser fins.

APPROVED CLEANING AGENTS•
Fantastic®
Formula 409®
Cascade®
All Power Plain Detergent (3% Solution)

Table 4 - Cleaning Agents

Polishing

1. Polish the chiller's cabinet panels using an approved polishing agent and following the manufacturer's instructions. Do not use chemicals on the control panel.
2. Rinse the chiller panels with fresh water, wipe, and buff panels using a dry soft cloth.
3. Allow chiller interior and surrounding equipment to "air-dry" for several hours prior to restoring electrical power.

APPROVED POLISHING AGENTS•
Simoniz® Wax
AeroWax®
Glo-Coat®
Armor All® Protectant

Table 5 - Polishing Agents

• The trademarks used in approved cleaning and polishing agents are property of their owners and are not related to AquaCal®.

5.3 Winterizing

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

- Deactivate all electrical power to chiller before performing hard freeze procedures.

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

- Failure to winterize chiller may result in serious equipment damage. Freeze damage is not covered under the chiller warranty.
- While the plumbing connections are in the winterized condition (not fully tightened), it is imperative the pool and spa water not be circulated through the chiller. Loss of water through loose plumbing connections may result in damage to circulating pump, pool and spa structures, and other equipment.

Light Freeze Conditions

There are two freeze conditions requiring chiller attention. A light freeze is when the ambient air temperature falls below 32 degrees Fahrenheit for less than 8 hours. Typically during light freeze conditions circulating (moving) water will not freeze. Override time clocks and allow filtration system to run continuously during light freeze conditions.

Hard Freeze Conditions

A hard freeze is when the ambient air temperature falls below 32 degrees Fahrenheit for more than 8 hours. In areas where this condition is prevalent and sustained, the chiller MUST be winterized for hard freeze conditions. Follow the correct procedure depending on the type of heat exchanger found in the chiller.

Identify Exchanger:

1. Deactivate all electrical power to chiller.
2. Deactivate filter pump.
3. Remove front access panel.
4. Identify chiller exchanger from illustrations in this section. Then follow procedure for that chiller's exchanger.

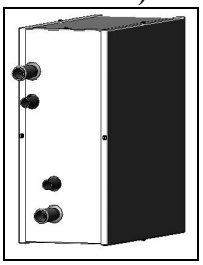
Titanium ThermoLink® Exchanger (with no Drain)

No Drain

1. Reinstall front access panel.
2. Disconnect the plumbing to the chiller at connection unions (removal is counter-clockwise).
3. Allow water to drain completely from the chiller. Expect to see a lot of water drain out at first, and then a small amount to continue to drain out over a long period.
4. After chiller is fully drained, reinstall front access panel.
5. Partially reconnect plumbing connection unions.
6. Winterizing is complete.
7. When ready to use chiller again, hand-tighten connection unions. Reconnect electrical power, and set the operating mode on the chiller. Activate filter pump.

Cupronickel Tube in Tube Exchanger

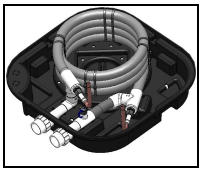
Cupronickel (Orientation depends on model)



1. Reinstall front access panel.
2. Disconnect the plumbing to the chiller at connection unions (removal is counter-clockwise).
3. Place a garden hose into the inlet side of the chiller; wrap a clean rag around the hose to form a temporary seal.
4. Turn on the garden hose water supply.
5. Allow water to run through the heat exchanger for 2-3 minutes; fresh water should be seen exiting the pool's out-port.
6. Place a garden hose into the outlet side inlet of the chiller; wrap a clean rag around the hose to form a temporary seal.
7. Turn on the garden hose water supply.
8. Allow water to run through the heat exchanger for 2-3 minutes; fresh water should be seen exiting the pool's in-port.
9. Place an air hose into the pool inlet of the chiller; wrap a clean rag around the hose to form a temporary seal.
10. Push all water from the water circuit using compressed air at approximately 50 psig. The residual water should be forced out of the chiller pool outlet.
11. Allow compressed air to blow into the chiller inlet for at least 15-20 seconds after the water stops coming out.
12. Repeat process on the outlet side.
13. Partially reconnect plumbing connection unions.
14. Winterizing is complete.
15. When ready to use chiller again, hand-tighten connection unions. Reconnect electrical power, and set the operating mode on the chiller. Activate filter pump.

Titanium Tube-in-Tube Exchanger

Titanium Tube-in-Tube



1. Disconnect the plumbing to the chiller at connection unions (removal is counter-clockwise).
2. Allow water to drain completely from the chiller. Expect to see a lot of water drain out at first, and then a small amount to continue to drain out over a long period.
3. Place an air hose into the pool inlet of the chiller; wrap a clean rag around the hose to form a temporary seal.
4. Push all water from the water circuit using compressed air no stronger than 50 psig. The residual water should be forced out of the pool outlet. Allow compressed air to blow into the chiller inlet for at least 15-20 seconds after the water stops coming out.
5. Repeat process on the outlet side of the chiller.
6. Partially reconnect plumbing connection unions.
7. Winterizing is complete.
8. When ready to use chiller again, hand-tighten connection unions. Reconnect electrical power, and set the operating mode on the chiller. Activate filter pump.

SECTION 6 - TROUBLESHOOTING

6.1 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 chiller 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 chiller 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 chiller.
   - See "Water Flow Rates" on page 4.
   - See "Adjusting Water Flow Using ΔT (Delta-T)" for more information.

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
1. Deactivate then reactivate power to reset controls.
2. If the issue reoccurs, please contact AquaCal® Technical Support. See "Contacting AquaCal AutoPilot, Inc." on page 1.

dPC or dPO 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 defrost sensor.

HP Indicator

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

RESOLUTION
1. Determine if an insufficient amount of water is being supplied to the equipment.
    a. Confirm the filter pump is on.
    b. If a multiple-speed filter pump is being used, run filter pump at a higher speed. Do not exceed maximum flow rate for your model.
    c. Confirm water is not being diverted away from the chiller.
        - See "Water Flow Rates" on page 4.
        - See "Adjusting Water Flow Using ΔT (Delta-T)" for more information.
2. If the issue reoccurs, please contact AquaCal® Technical Support. See "Contacting AquaCal AutoPilot, Inc." on page 1.

HPS Indicator

ISSUE

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

RESOLUTION

1. Deactivate then reactivate power to the chiller to clear error.
2. Troubleshoot the high-pressure issue causing the error. See "HP Indicator" on page 22.
3. If the issue reoccurs, please contact AquaCal® Technical Support. See "Contacting AquaCal AutoPilot, Inc." on page 1.

LP Indicator

ISSUE

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

RESOLUTION

1. Check for obstructed air flow around the heater. See "Clearances" on page 3.
2. Check for dirty or blocked evaporator coil. See "Cleaning Equipment After Installation" on page 18.
3. Check for signs of ice buildup on the coil.
4. For further assistance, please contact AquaCal® Technical Support. See "Contacting AquaCal AutoPilot, Inc." on page 1.

LPS Indicator

ISSUE

The chiller has locked due to five LP (low-pressure) faults during one call for heating or cooling.

RESOLUTION

1. Deactivate then reactivate power to the chiller to clear error.
2. Troubleshoot the low-pressure issue causing the error. See "LP Indicator" on page 23.

OtA Indicator

ISSUE

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

RESOLUTION

1. Rule out an incorrect reading from the water temperature sensor. Verify existing water temperature with an accurate thermometer. If chiller's sensor is inaccurate, the water temperature sensor may require replacement.

6.2 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 chiller 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.

Control Panel Not Responding

1. If the chiller is controlled be an external controller, confirm the external controller settings. See "Operating Chiller (With an External Controller)" on page 1.
2. If the issue is still occurring, disconnect external controller from the chiller.
    - Then check operation at heat pump.
    - If control panel responds, the problem lies with the external controller or its installation. Contact the manufacturer of the external control device.
3. For further assistance, please contact AquaCal® Technical Support. See "Contacting AquaCal AutoPilot, Inc." on page 1.

Chillers Not Running

1. Confirm equipment is receiving power. Is the chiller display illuminated?
    - If not, confirm the main breaker (located at the power supply panel) and the disconnect switch (located near the chiller) are both turned on.
    - If the display still does not illuminate, it is recommended that the chiller installer or electrician confirms chiller is receiving power.
2. Confirm correct mode is selected. See "Setting Operating Mode" on page 15.
3. Confirm thermostat is set correctly. See "Setting Thermostats" on page 15.
    - 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. For further assistance, please contact AquaCal® Technical Support. See "Contacting AquaCal AutoPilot, Inc." on page 1.

Chillers Tripping Breaker

1. Have an electrician confirm breakers are in good condition and properly sized for the chiller.
2. Multiple chillers installed at the same site may benefit from special automatic sequencing controllers to avoid excessive power drops at start-up.See "Automatic Sequencing Controller" on page 27.
3. If a fault occurs immediately when the compressor starts, a qualified technician should evaluate the system.

Chiller Won't Shut Off

1. If the chiller is incorrectly set to HEA or ACH mode, the unit will not deactivate. See "Setting Operating Mode" on page 15.

Chiller Is Running, Not Cooling (Reversing Models)

1. Confirm the chiller mode is set to COO operating mode.
2. Confirm the thermostat is set below the current water temperature.
3. Confirm chiller is transferring heat out of the water.
    - Measure the temperature of air discharge coming out of chiller fan. If discharge air is between 8° to 10° warmer than outside ambient air (not coming out of chiller), then the chiller is moving heat out of the water.
4. If an error code is displayed, determine and correct the condition causing the code. See "Fault Codes" on page 21.
5. 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).
6. Confirm that filter pump has a sufficient run-time. The chiller will not run (or cool the water) without water flow. See "Initial Cooling Recommendations" on page 27.

Water Coming From Chiller

The water may be normal condensation produced as a by-product of the chiller's refrigeration process. The chiller 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.

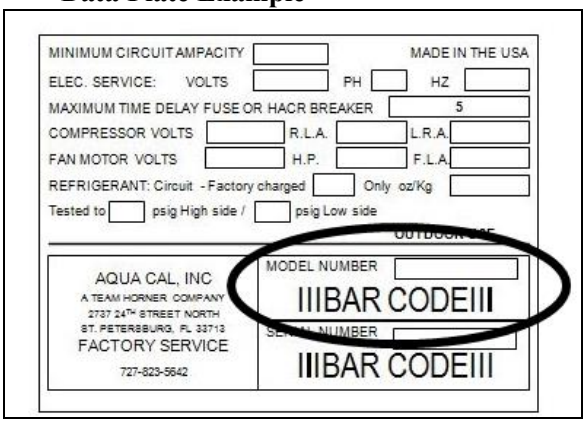
1. If using chlorine or bromine as a pool / spa sanitizer, use a test strip in the water at chiller to determine if sanitizer is present. If sanitizer is present, a leak may exist.
2. Deactivate chiller, leaving the filter pump on. After several hours, determine if water is still coming from the chiller.
3. If the issue reoccurs, please contact AquaCal® Technical Support. See "Contacting AquaCal AutoPilot, Inc." on page 1.

SECTION 7 - APPENDIX

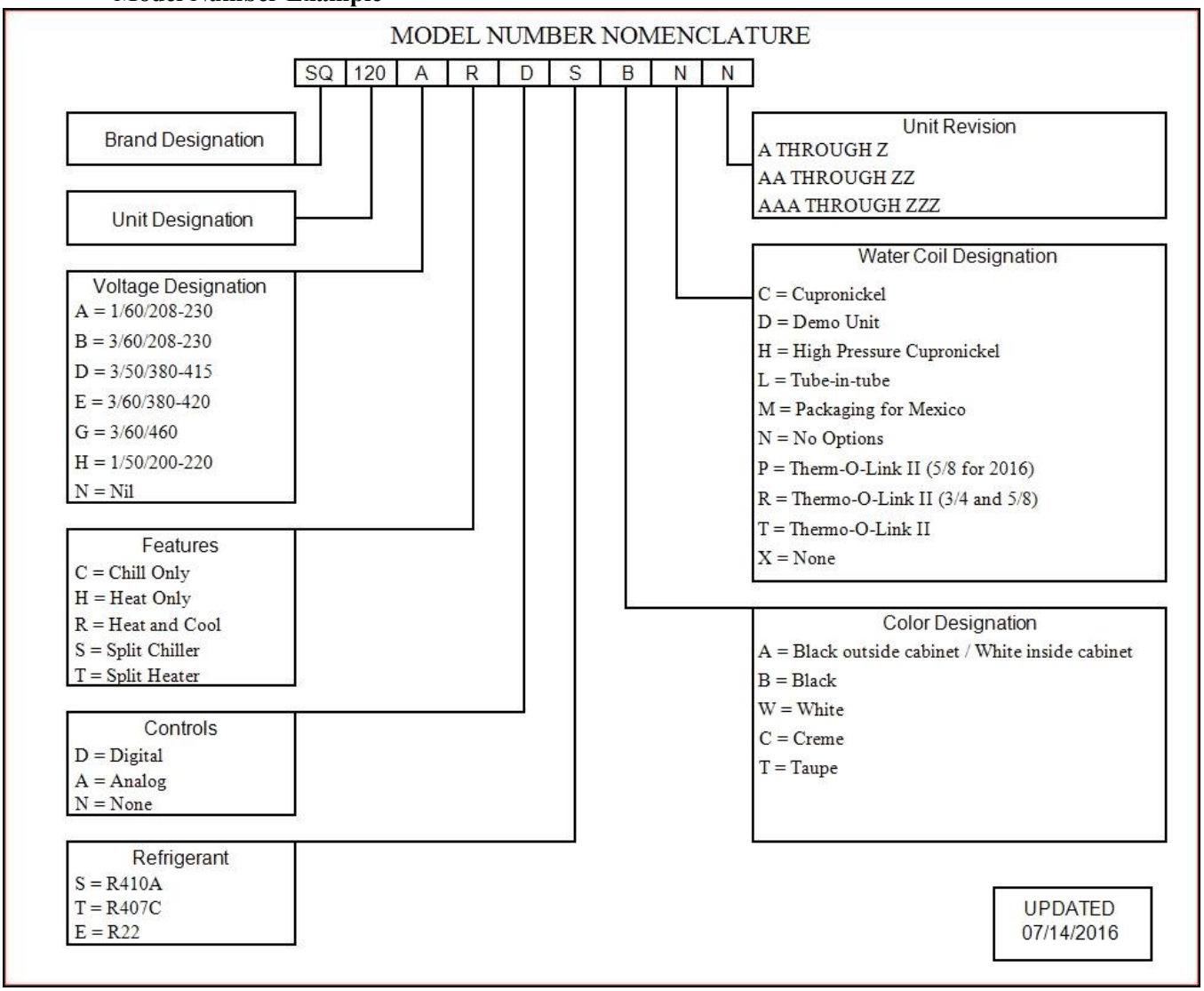
7.1 Identifying Model Specifications

1. Find Data Plate - The data plate is usually posted on the side of the equipment or on the control panel 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



Model Number Example



7.2 Weights

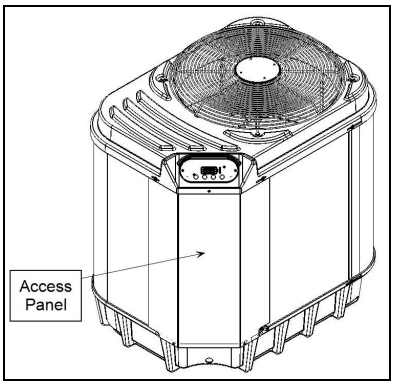
NOTE:
Specifications subject to change.

Model Type	Model Number	Install Weight
TropiCool™	TC500	215 Pounds

Table 6 - Equipment Weight

7.3 Access Panels

Access Panels (TropiCool™)



7.4 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 chiller 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 Chiller 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.

7.5 Available Accessories

Automatic Sequencing Controller

- An Automatic Sequencing Controller (ASC) provides easy control of all units from one lead unit and prevents the simultaneous start-up of multiple chillers.
- Site voltage drop is minimized and utilities are not subjected to large in-rush demands of electrical current.
- Part number is based on number of chiller's to be controlled. Call AquaCal® Customer Support for assistance with correct configuration.

5 lb Bypass Valve Kit (Kit STK0135)

- When high flow rates are outside recommended tolerances, please use this kit or an alternative bypass valve system.
- This kit can be used to control excessive water flow through the chiller. It provides automatic flow adjustments for most applications.

External Flow Relay (Grid Flow) Switch Kit (0040s)

- Used when the pool / spa elevation is higher than the chiller.
- Used when a variable two-speed filter pump set on low-speed mode does not provide enough water pressure to activate a chiller's water pressure switch.
- Also used for automatic pool / spa thermostat switching.

Remote Control Kit (STK0070)

- A remote (wired) control kit allows for full control of the chiller from up to 100 feet from the equipment.

Plumbing Unions:

SIZE	PART NUMBER
2 INCH	2627