CalderaSpas™

Pure Comfort

Highland Series Portable Spa

Owner's Manual

Olympia | Cascade | Teton

TABLE OF CONTENTS

WELCOME

CalderaSpas™

Pure Comfort

Congratulations on your decision to enjoy the finest spa available...
Welcome to the growing family of Caldera™ Spa owners.

Watkins Manufacturing Corporation

Owner's Manual

This Owner's Manual will acquaint you with your new spa's operation and general maintenance. We suggest that you take some time to carefully review all sections. Please keep this manual available for reference.

If you have any questions about any aspect of your spa's set-up, operation or maintenance, contact your authorized Caldera™ Spa dealership. They are trained professionals who are familiar with the product as well as new spa ownership concerns. Their expertise will facilitate the enjoyment of your new Caldera™ Spa.

The Serial Number/Identification label is located within the equipment compartment of your Caldera™ Spa. The serial number should also be documented on the delivery receipt from your dealer.

IMPORTANT: Watkins Manufacturing Corporation reserves the right to change specifications or design without notification and without incurring any obligation.

DATE PURCHASED: _____

DATE INSTALLED: _____

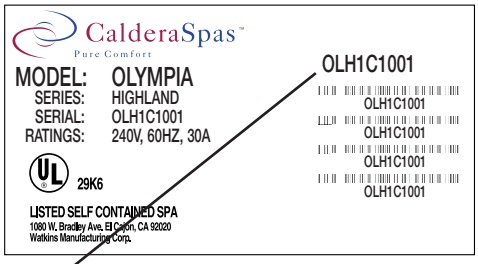
DEALER: _____

ADDRESS: _____

TELEPHONE: _____

SPA MODEL/SERIAL NUMBER: _____

COVER SERIAL NUMBER: _____



NOTE: This is an example. Your spa's label will contain different information. Peel off top sticker and place here.

In most cities and counties, permits will be required for the installation of electrical circuits or the construction of exterior surfaces (decks and gazebos). In addition, some communities have adopted residential barrier codes which may require fencing and/or self-closing gates on the property to prevent unsupervised access to a pool (or spa) by children under 5 years of age. Your Caldera™ Spa is equipped with a locking cover that meets the ASTM F1346-91 Standard for Safety Covers and as a result, is usually exempt from most barrier requirements. As a general practice, your local Building Department will inform you of any applicable barrier requirements at the time a permit is obtained for the installation of an electrical circuit. Your Caldera™ Spa Dealer can provide information on which permits may be required.

I. SAFETY INFORMATION

IMPORTANT SAFETY INSTRUCTIONS
READ AND FOLLOW ALL INSTRUCTIONS

AVOIDING THE RISK TO CHILDREN

DANGER:

- **RISK OF CHILD DROWNING.** Extreme caution must be exercised to prevent unauthorized access by children. To avoid accidents, ensure that children cannot use a spa unless they are supervised at all times.

WARNING:

- To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.
- To reduce the risk of injury, lower water temperatures are recommended for young children. Children are especially sensitive to hot water.

DO:

- Make sure you always lock the child resistant locks after using the spa for your children's safety. Every Caldera™ Spa is equipped with a locking cover that meets the ASTM F1346-91 Standard for Safety Covers.
- Test the water temperature with your hand before allowing your child to enter the spa to be sure that it's comfortable. Children are especially sensitive to hot water.
- Remind children that wet surfaces can be very slippery. Make sure that the children are careful when entering or exiting the spa.

DON'T:

- Allow children to climb onto the spa cover.
- Allow children to have unsupervised access to the spa.

AVOIDING THE RISK OF ELECTROCUTION

Risk of electrocution

- Connect only to a grounded source.
- Do not bury the power cord. A buried power cord may result in death or serious personal injury due to electrocution if direct burial-type cable is not used, or if improper digging occurs.
- A ground terminal (pressure wire connector) is provided on the control box inside the unit to permit connection of a minimum No. 8 AWG solid copper bonding conductor between this point and any metal equipment, metal water pipe, metal enclosures of electrical equipment, or conduit within five feet (1.5 m) of the unit as needed to comply with local requirements.

WARNING:

- To reduce the risk of electrical shock, replace a damaged cord immediately. Failure to do so may result in death or serious personal injury due to electrocution.
- Your spa is provided with a Ground Fault Circuit Interrupter for user and equipment protection. To ensure proper operation of this important safety device, test according to the following instructions per electrical configuration.

  Cord-Connected 115 volt, 20 amp models: The GFCI is located at the end of the power cord. Before each use, with the unit operating, push the TEST button. The unit should stop operating and the GFCI power indicator will go out. Wait 30 seconds and then reset the GFCI by pushing the RESET button. The GFCI power indicator will turn on, restoring power to the spa. If the interrupter does not perform in this manner, there may be an electrical malfunction and with it, the possibility of an electric shock. Disconnect the power until the problem has been corrected.

  230 volt, permanently installed or converted models:
- A ground terminal is provided on the terminal block located inside the control box. To reduce the risk of electric shock, connect this terminal to the grounding terminal of your electrical service or supply panel with a continuous green, insulated copper wire. The wire must be equivalent in size to the circuit conductors supplying the equipment. In addition, a bonding terminal (pressure wire connector) is provided on the outside of the control box for bonding to local ground points. To reduce the risk of electric shock, this connector should be bonded with a No. 8 AWG solid copper wire to any metal ladders, water pipes, or other metal within 5 feet (1.5 m) of the spa to comply with local requirements. The means of disconnection must be readily accessible, but must be installed at least 5 feet (1.5 m) from the spa.
- Your spa is provided with a suitably rated circuit breaker to open all ungrounded supply conductors.
- Your spa uses ground fault circuit interrupters in the electrical subpanel. Before each use of the spa and with the unit operating, push the Test button on each breaker. The switch should click over to the "Trip" position. Wait 30 seconds and reset each GFCI breaker by switching it completely off and then completely on. The switch should then stay on. If either of the interrupters does not perform in this manner, it is an indication of an electrical malfunction and the possibility of an electric shock. Disconnect the power until the fault has been identified and corrected.

IMPORTANT SAFETY INSTRUCTIONS

DANGER: RISK OF ELECTRICAL SHOCK

- Install at least 5 feet (1.5 m) from all metal surfaces. A spa may be installed within 5 feet of a metal surface if each metal surface is permanently connected by a minimum No. 8 AWG solid copper conductor attached to the wire ground connector on the terminal box that is provided for this purpose if in accordance with National Electrical Code ANSI/NMFPA70-1993.
- Do not permit any electrical appliances, such as a light, telephone, radio, or television within 5 feet (1.5 m) of a spa. Failure to maintain a safe distance may result in death or serious personal injury due to electrocution if the appliance should fall into the spa.
- Install your spa is such a way that drainage is away from the electrical compartment and from all electrical components.

DO:

- Be sure your spa is connected to the power supply correctly - use a licensed electrical contractor.
- Disconnect the spa from the power supply before draining the spa or servicing the electrical components.
- Test the Ground Fault Circuit Interrupter(s) before each use.

DON'T:

- Use the spa with the equipment compartment door removed.
- Place electrical appliances within 5 feet (1.5m) of the spa.
- Use an extension cord to connect the spa to its power source. The cord may not be properly grounded and the connection is a shock hazard. An extension cord may cause a voltage drop, which will cause overheating of the jet pump motor and motor damage.
- Attempt to open the electrical control box. There are no user serviceable parts inside.

RISKS TO AVOID

DANGER: RISK OF INJURY

- To reduce the risk of injury to persons, DO NOT remove floating weir, basket and filter located in the filter compartment while the spa is running.
- The suction fittings in the spa are sized to match the specific water flow created by the pump. Should the need arise to replace the suction fittings or the pump, be sure that the flow rates are compatible.
- There is a danger of slipping and falling. Remember that wet surfaces can be very slippery. Take care when entering or exiting the spa.

Increased side effects of medication

- The use of drugs, alcohol or medication before or during spa use may lead to unconsciousness with the possibility of drowning.
- Persons using medications should consult a physician before using a spa; some medication may cause a user to become drowsy, while other medication may affect heart rate, blood pressure and circulation.
- Persons taking medications which induce drowsiness, such as tranquilizers, antihistimines or anticoagulents should not use the spa.

Health problems affected by spa use

- Pregnant women should consult a physician before using spa.
- Persons suffering from obesity or with a medical history of heart disease, low or high blood pressure, circulatory system problems or diabetes should consult a physician before using spa.

Unclean water

- Keep the water clean and sanitized with correct chemical care. The recommended levels for your Caldera™ Spa are:

Free Available Chlorine (FAC):	3.0-5.0 ppm
Water pH:	7.4-7.6
Total Alkalinity:	125-150 ppm
Calcium Hardness:	150-200 ppm

  (Refer to Water Quality and Maintenance section for complete instructions.)

  IMPORTANT: Turn on the jet pump for a least ten minutes after adding ANY spa water chemicals into the filter compartment.
- Clean the filter cartridges at least monthly to remove debris and mineral buildup which may affect the performance of the hydromassage jets, limit the flow, or trip the high limit thermostat which will turn off the entire spa.

AVOIDING THE RISK OF HYPERTHERMIA

Prolonged immersion in hot water can result in HYPERTHERMIA, a dangerous condition which occurs when the internal temperature of the body reaches a level above normal (98.6°F). The symptoms of hyperthermia include unawareness of impending hazard, failure to perceive heat, failure to recognize the need to exit the spa, physical inability to exit the spa, fetal damage in pregnant women, and unconsciousness resulting in a danger of drowning.

WARNING:

The use of alcohol, drugs, or medication can greatly increase the risk of fatal hyperthermia in hot tubs and spas.

IMPORTANT SAFETY INSTRUCTIONS

TO REDUCE THE RISK OF INJURY:

- The water in the spa should never exceed 104°F. Water temperatures between 100°F and 104°F are considered safe for a healthy adult. Lower water temperatures are recommended for extended use (exceeding 10 minutes) and for young children. Extended use can cause hyperthermia.
- Pregnant or possibly pregnant women should limit spa water temperatures to 100°F. Failure to do so may result in permanent injury to your baby.

AVOIDING THE RISK OF SKIN BURNS:

- To reduce the risk of injury, before entering a spa the user should measure the water temperature with an accurate thermometer, since the tolerance of temperature-regulating devices may vary by as much as ±5°F.
- Test the water with your hand before entering the spa to be sure it's comfortable.

SAFETY SIGN

Each Caldera™ Spa is shipped with a SAFETY SIGN in the owner's package. The sign, which is required as a condition of Product Listing, should be permanently installed where it is visible to the users of the spa. To obtain additional SAFETY SIGNS, contact your Caldera™ Spa Dealer and request Part #003021

IMPORTANT SPA INSTRUCTIONS

The following contains important spa information, and we strongly encourage you to read and apply them.

DO:

- Use and lock the cover when the spa is not in use, whether it is empty or full.
- Follow the Spa Care and Maintenance recommendations stated in this manual.
- Use only approved accessories and recommended spa chemicals and cleaners.

DON'T:

- Leave the Caldera™ Spa exposed to the sun without water or the cover in place. Exposure to direct sunlight can cause solar distress of the shell material.
- Roll or slide the spa on its side. This will damage the siding.
- Lift or drag the cover by using the cover lock straps; always lift or carry the cover by using the handles.
- Attempt to open the electrical control box. There are no user serviceable parts inside. Opening of the control box by the spa owner will void the warranty. If you have an operational problem, carefully go through the steps outlined in the Troubleshooting section. If you are not able to resolve the problem, contact your authorized Caldera™ Spa Dealer. Many problems can easily be diagnosed over the telephone by an Authorized Service Technician.

SAVE THESE INSTRUCTIONS

INSTALLATION

SITE SELECTION

Because of the combined weight of the spa, water and users, it is extremely important that the base upon which the spa rests is capable of uniformly supporting this weight, without shifting settling, for the entire time the spa is in place. If the spa is placed on a base which does not meet this requirement, damage to the cabinet and/or the spa shell may result. Damage caused by improper support is not covered under warranty. It is the spa owner's responsibility to ensure the integrity of the spa's support over time.

We recommend a 4-inch thick poured, reinforced concrete slab for the spa's base. Wood decking, pre-cast concrete slabs, concrete blocks or other materials may also be suitable if they meet the requirements outlined above. Consult with a qualified contractor or engineer if you are in doubt. To be certain your deck can support your spa, you must know the deck's maximum load capacity. Consult a qualified building contractor or structural engineer. To find the weight of your spa, its contents and occupants, refer to the Spa Specifications for your model. This weight per square foot must not exceed the structure's rated capacity, or serious structural damage could result.

Your spa must be installed so as to provide drainage away from the spa. Placing the spa in a depression without provisions for proper drainage could allow rain, overflow and other casual water to flood the equipment and/or create a wet condition in which the spa would sit.

When considering an installation site, allow a minimum of thirty inches for access to the spa's equipment compartment for future service if necessary. If accessory items will be installed on or around the spa (cover lifter, gazebo, steps or planters), allow for additional space around the spa's perimeter.

Please note that some cities and counties may require a permit for installation of electrical circuits or the construction of exterior structures (decks and gazebos). In addition, some counties may require permits for the installation of a portable spa. Check your local codes for compliance.

To ensure you can use your spa soon after delivery, it is important that you select the voltage prior to setting your spa in place and have a licensed electrician install the wiring, if necessary.

SELECTING THE VOLTAGE FOR YOUR SPA

Your spa is designed to operate at either 115 or 230 volts, 60 Hz unless it is the Olympia model which requires a 230 volt power supply. When the spa is connected to 115 volts, the heater will provide approximately 1000 watts of heat only when the pump is operating in LOW speed and the thermostat is calling for heat. When the spa is connected to 230 volts, the heater will provide approximately 4000 watts of heat when the pump is operating in LOW or HIGH speed and the thermostat is calling for heat.

All electrical connections must be made in accordance with the wiring information contained in the electrical control box or on the back of the field wiring access panel of the equipment module.

115 VOLT INSTALLATION

Spas provided with a factory- installed power supply cord are to be plugged into a grounded, grounding type, 115 volt, 15 ampere receptacle (Teton model) or 20 ampere receptacle (Cascade model). No other electrical appliance or fixture can be used on this circuit.

IMPORTANT: Under NO circumstances should an extension cord be used. Use of an extension cord will seriously degrade the performance of the equipment module and can create an electrical hazard.

230 VOLT INSTALLATION

When using 230 volt power supply, installation of a 40 amp dedicated circuit is required. Your spa must be hardwired direct to a GFCI-protected sub panel by a licensed electrician. A wiring diagram is provided inside the equipment module showing where the connections are to be made.

START-UP AND REFILL PROCEDURES

Your Caldera™ Spa has been thoroughly tested during the manufacturing process to ensure reliability and long-term customer satisfaction. A small amount of water may have remained in the plumbing after testing and, as a result, may have spotted the spa shell or the spa siding prior to delivery. Before filling the spa, wipe the spa shell clean with a soft rag.

The following instructions must be read and followed exactly to ensure a successful start-up or refill.

CAUTIONS

- **Do not fill the spa with hot water, as tripping of the high-limit thermostat may result.**
- **Do not connect power to an empty spa. Power to the spa automatically activates critical components within the spa, such as Controls, Heater, Circulation Pump and other systems. If power is supplied to these components prior to the spa being filled, the components will be damaged, and this may result in a non-warranty component failure.**
- **Do not use your spa after filling until all of the steps listed below are completed.**
- **Do not add chlorine if treating your spa with polyhexamethylene biguanide (Biguanide, PHMB, eg. BaquaSpa™) sanitizer.**
- **Before filling your spa for the first time, remove the equipment compartment door and check to ensure that the unions on either side of the pump and heater are hand-tight. Also, install the pump's drain plug if necessary by screwing the plug into the threaded hole in the face of the pump. (The drain plug is removed for shipping in the winter months. If your drain plug is not present, a notice will be found attached to the control box, and the plug will be found in your Owner's Packet.)**

1. Close all drains and fill the spa with water by removing the skimmer basket, weir and filter. Then insert the end of a garden hose into the filter hole and begin filling the spa. The water level of your Caldera™ Spa should be maintained at a level one inch above the highest jet in the spa. Reinstall the skimmer basket, weir and filter once the spa is filled.

   IMPORTANT: Watkins Manufacturing Corporation does not recommend that the spa be filled with "softened" water, as this may damage the spa's equipment.

2. **AFTER** the spa has been filled with water and the equipment compartment door is secured, power must be applied to the spa.
   - **115 volt models:** Connect the GFCI to the waterproof receptacle and push the Reset button on the GFCI.
   - **230 volt models:** Open the door of the electrical subpanel and reset the GFCI breaker. Close and secure the subpanel door.
3. The jet pump(s), heating system and all internal plumbing will achieve a partial prime as the spa is filled. To check the operation of the jet system and to purge any remaining air from the heating system, push the Jets button on the control pad twice to make the jet pump run on high speed for one minute. Once the jet system is fully operational (as indicated by strong, non-surging jets), priming of the spa is complete. If you do not feel a steady stream of water from your jets, refer to the instructions for priming the pump in the SPA TROUBLESHOOTING section in the back of this manual.
4. Adjust Total Alkalinity (TA) to 125 ppm, Calcium Hardness (CH) to 150 ppm, then spa water pH to between 7.2 and 7.4. These procedures are listed in the "Water Quality and Maintenance" section.

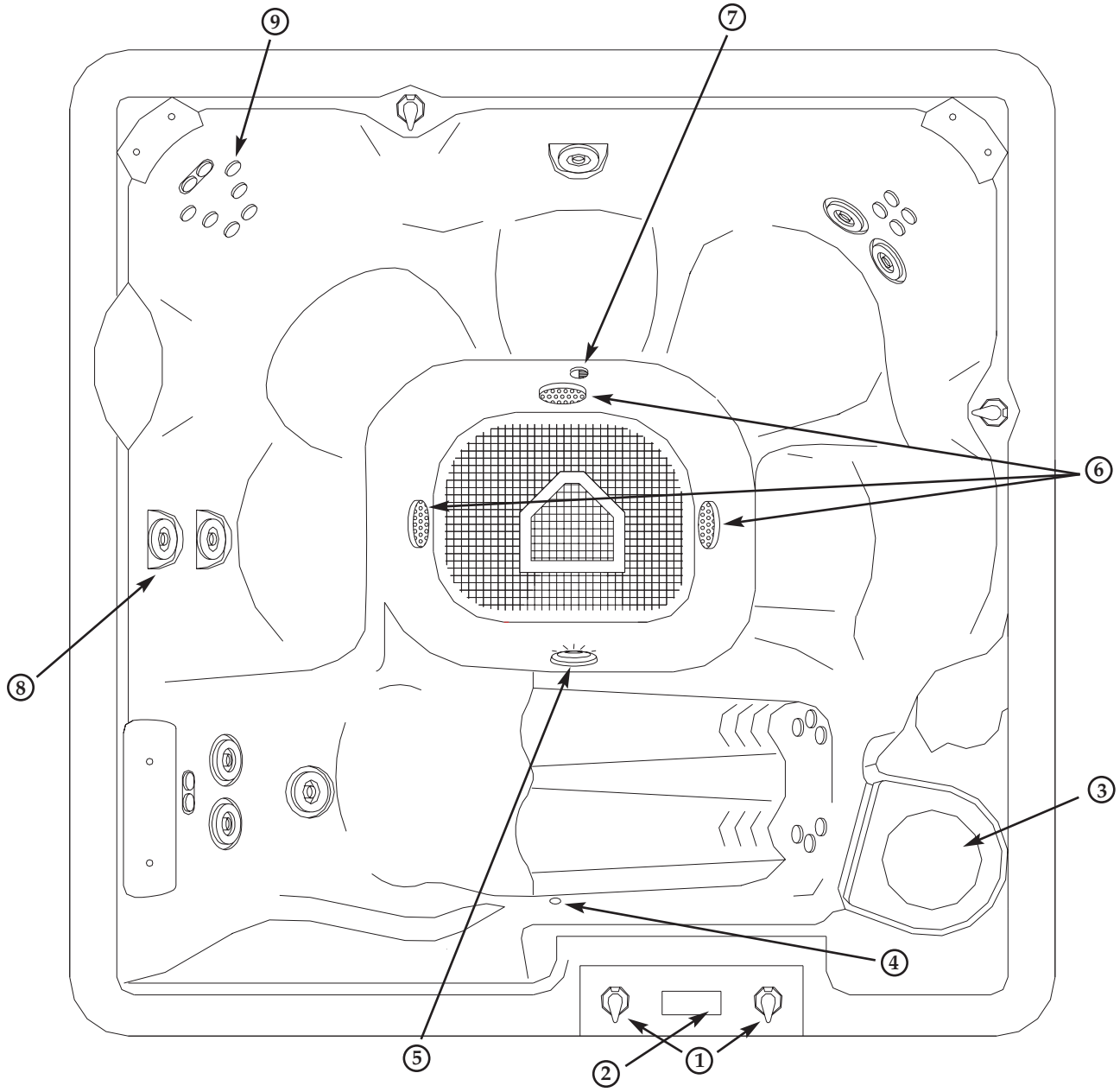
   IMPORTANT: Add spa water chemicals directly into the filter compartment with the jet pump on high speed for at least ten minutes.

   OPERATION NOTE: Adjusting the Total Alkalinity as the first step is important, as out-of balance TA will affect your ability to adjust the pH correctly and will prevent the sanitizer from operating effectively.
5. Superchlorinate the spa water by adding 1-1/2 teaspoons of chlorine (sodium dichlor) per 250 gallons of spa water. The jet pump should be running on high speed when adding the chlorine, and remain on high to circulate the spa water for a ten-minute period.
6. Set the temperature control to the desired temperature (between 100°F and 104°F), then place the thermal cover on the spa and allow the water temperature to stabilize (approximately 24 hours). Make sure you secure the cover in place using the cover locks. Periodically check the spa water temperature. When the water temperature climbs above 90°F, proceed to the next step.
7. Press the Jets button twice and run the pump on high for 10 minutes to circulate the spa water. After the clean cycle is complete, test the spa water for Free Available Chlorine (FAC) residual. If the residual is between 3 and 5 ppm on the test strips (found in the test kit) go on to the next step. If the residual is less than 3 ppm, superchlorinate the spa water by adding 1-1/2 teaspoons of chlorine (sodium dichlor) per 250 gallons of spa water, while the jet pump is running on high. Run the jet pump on high ro circulate the spa water for a ten-minute period.
8. Recheck the Total Alkalinity (TA) at 125 ppm, Calcium Hardness (CH) at 150 ppm, then spa water pH at between 7.2 and 7.4.

   OPERATION NOTE: Make sure you adjust your Total Alkalinity first, as an out-of-balance condition will affect your ability to adjust the pH correctly, and will prevent the sanitizer from operating effectively. **The spa is ready for use when the spa water has circulated and the chlorine level remains between 3 ppm and 5 ppm.**

11. The spa temperature is pre-programmed to reach 100°F, and will normally do so within 18 to 24 hours. You may raise the water temperature by pressing the **Warm** button on the control panel, or lower it by pressing **Cool** button. After a few hours, the water temperature will remain within 1-1/2 degrees of your selected temperature.

SPA FEATURES



1. Air control
2. Spa-side control panel
3. Filter compartment
4. Temperature sensor
5. Spa light
6. Drain/suction fitting
7. Inlet for optional ozone
8. Magna Jets
9. Euro Jets

OLYMPIA MODEL SHOWN.
FEATURES AND LOCATIONS MAY VARY IN OTHER MODELS.

OPERATING INSTRUCTIONS

SPA-SIDE CONTROL OPERATION

Your spa-side control system consists of an LED display and convenient touch pads that allow you to set the water temperature and adjust the skim/filter cycle settings, as well as control the hydrotherapy jets and mood light from spa-side.

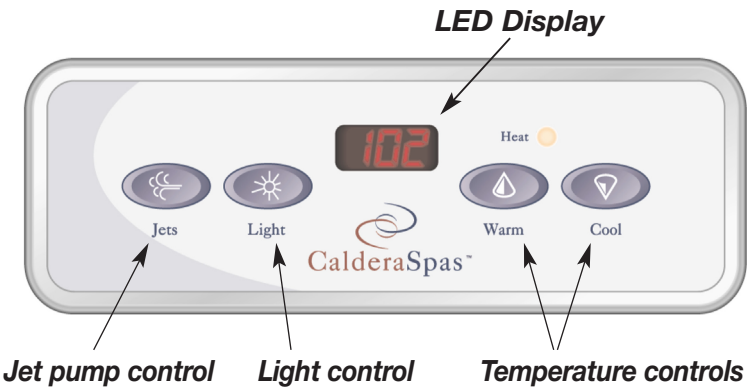
LED DISPLAY

The LED display on your spa's control panel continually shows the spa's actual water temperature. In certain situations, it will also display other messages. See LED MESSAGES in the SPA TROUBLESHOOTING section.

TEMPERATURE CONTROL

When initially powered, your spa is automatically set to achieve a water temperature of 100°F. To view the set temperature, press the **Warm** or **Cool** touch pad once. The set temperature will be displayed for four seconds. To adjust the set temperature, press the **Warm** or **Cool** touch pad again while the set temperature is displayed. This will increase or decrease the set temperature, depending on which direction was chosen. Each successive press will change the set temperature by one degree in the chosen direction. Minimum temperature setting is 80°F; maximum is 104°F.

SPA-SIDE CONTROLS



LIGHT CONTROL

Pressing the Light touch pad once will turn the mood light on. Pressing it again will turn it off.

JET PUMP CONTROL

Pressing the Jets touch pad changes the jet pump functions, depending on the number of presses:

Oympia Spa only:

1st press:	Two-speed jet pump runs on low speed
2nd press:	Two-speed jet pump runs on high speed
3rd press:	One- and two-speed jet pumps run on high speed
4th press:	One-speed jet pump runs on high speed
5th press:	Both jet pumps off

Cascade and Teton Spas only:

1st press:	Two-speed jet pump runs on low speed
2nd press:	Two-speed jet pump runs on high speed
3rd press:	Jet pump off

- During filter cycles or when the thermostat is calling for heat, the pump's low speed operates automatically and cannot be turned off by pressing the **Warm** or **Cool** touch pad.
- The pump on high speed automatically turns off after operating for 30 minutes. The pump on low speed automatically turns off after operating for 2 hours.
- The light automatically turns off after 4 hours.

FILTER CYCLES

Your spa will automatically turn on to filter the water twice each day. The first filter cycle begins one minute after the power is initially supplied to the spa. The second filter cycle begins twelve hours after the start of the first cycle. Each filter cycle is preprogrammed to operate for two hours in duration. During filtration, the pump's low speed runs continuously.

The filter cycle may be programmed to run for 2, 3, 4 or 5 hour cycles by changing the setting. To change the setting press or + to initiate the program, then press or to change the cycle time. The LED on the control panel will illuminate an **F** followed by the number **2, 3, 4, or 5** illustrating the amount of hours the program is set for. Press to exit the program.

To change the filter cycle start time, turn the power off and back on at the time of day you want the first cycle to begin.

IMPORTANT: Whenever the spa's power is turned off, the filter cycle program will default back to 2 hours (F2).

OPERATING INSTRUCTIONS

ECONOMY/STANDARD OPERATING MODE

When you turn on electrical power to your spa, it will automatically run in the “STANDARD” operating mode. This means that the heater and the pump’s low speed will turn on as needed to reach and maintain the set temperature--the same way your refrigerator does.

If you prefer, you may set your spa for the “ECONOMY” operating mode. In this mode, the spa will heat only during filter cycles and, if connected to 230V, when you manually turn the pump on--it will not turn on to maintain heat between filter cycles.

To change to “ECONOMY” mode, simply press the  or  +  button. “EC” will flash alternately with the temperature to let you know your spa is now set for the “ECONOMY” operating mode. Repeat this process to return to “STANDARD” mode.

AIR CONTROL

The Air Control on the rim of your spa allows you to change the power of the jets by regulating the amount of air that is mixed with the water coming out of the jets.

HYDRO JETS

Magna Jets - The larger jets in your spa allow you to re-direct the jet stream by changing the position of the nozzle.

You can also regulate the force of the massage by rotating the fascia ring clockwise to reduce the force or counter-clockwise to increase the force. Notice that turning off the flow to some jets increases the flow to the other jets. To avoid damage to your spa’s plumbing and components, **do not turn off more than half of these jets at the same time.**

MagnaSsage rotating nozzles and dual-port nozzles are available from your Caldera dealer, to replace the directionally adjustable nozzles in the Magna Jets.

Euro Jets - The small euro jets deliver a direct, precision massage. You may purchase “Euro-Pulse” assemblies from your Caldera dealer that twist onto the Euro jets to provide a pulsating, rotary massage.

V. Water Quality And Maintenance

It's important to have clean water. Water maintenance is one of the least understood, yet most important areas of spa ownership. Your dealer can guide you through the process of achieving and maintaining perfect water in your spa, given your local conditions. Your program will depend on your water's mineral content, how often you use your spa, and how many people use it.

GENERAL INFORMATION

THE THREE FUNDAMENTAL AREAS OF WATER MAINTENANCE:

- ***Water Filtration***
- ***Chemical Balance/pH Control***
- ***Water Sanitation***

Water Sanitation is the responsibility of the spa owner, achieved through the regular and periodic (daily, if necessary) addition of an approved sanitizer. The sanitizer will chemically control the bacteria and viruses present in the fill water or introduced during use of the spa. Bacteria and viruses can grow quickly in undersanitized spa water.

The water's chemical balance and pH control are also the responsibility of the spa owner. You'll have to add chemicals to maintain proper levels of Total Alkalinity (TA), Calcium Hardness (CH) and pH. Proper water balance and pH control will minimize scale buildup, extend the life of the spa, and allow the sanitizer to work at top efficiency.

METHODS FOR TESTING THE SPA WATER

Accurate water testing and analysis is an important part of effectively managing your spa water. You must have the ability to test for:

- Total Alkalinity (TA)
- Calcium Hardness (CH)
- pH
- Sanitizer

Two types of testing methods are recognized and recommended by Watkins:

The Reagent Test Kit is a method which provides a high level of accuracy. The reagents come in either liquid or tablet form.

Test Strips are a convenient testing method used by many spa owners. Keep in mind that test strips are susceptible to heat and moisture contamination, which will result in inaccurate readings.

IMPORTANT: Always read and carefully follow the directions included with the Test Kit or Test Strips to ensure the accuracy of the test results.

BASIC CHEMICAL SAFETY

When using chemicals, read the labels carefully and follow directions precisely. Though chemicals protect you and your spa when used correctly, they can be hazardous in concentrated form. Always observe the following guidelines:

- Allow only a responsible person to handle spa chemicals. Keep them out of the reach of children.
- Accurately measure the exact quantities specified, never more. Do not overdose your spa.
- Handle all containers with care. Store in a cool, dry, well ventilated place.
- Always keep chemical containers closed when not in use. Replace caps on their proper containers.
- Don't inhale fumes or allow chemicals to come in contact with your eyes, nose, or mouth. Wash your hands immediately after use.
- Follow the emergency advice on the product label in case of accidental contact, or if the chemical is swallowed. Call a doctor or the local Poison Control Center. If a doctor is needed, take the product container along so that the substance can be identified.
- Don't let chemicals get on surrounding surfaces or landscaping.
- Don't use a vacuum cleaner to clean up chemical spills.
- Never smoke around chemicals. Some fumes can be highly flammable.
- Don't store any chemicals in the spa equipment compartment.

HOW TO ADD CHEMICALS TO THE WATER

IMPORTANT: All spa water chemicals, including granulated dichlor, granulated pH increaser or decreaser, granulated total alkalinity increaser, calcium hardness increaser, liquid stain and scale inhibitor, and liquid de-foamer must always be added directly into the filter compartment while the jet pump is running in high speed mode, and it must run for a minimum of ten minutes.

To Administer Spa Water Chemicals:

1. Fold back the cover. Carefully remove and set aside the filter compartment cover (if applicable).
2. Push the JET button twice to turn the jet pump on in its high speed mode.
3. Carefully measure the recommended amount of chemical and slowly pour it into the filter compartment. Use care not to splash chemicals on your hands, in your

eyes, on the spa shell surface or on the siding.

4. Replace the filter compartment cover (if applicable). After ten minutes, shut off the jet pump and close and lock the cover to complete the procedure. **Risk of Drowning:** Never leave an open spa unattended!

WARNING: High sanitizer levels can cause discomfort to the user's eyes, lungs and skin. Always allow the sanitizer level to fall to the recommeded range before using the spa.

IMPORTANT "SUPER CHLORINATION/NON-CHLORINE SHOCK TREATMENT" NOTE: After administering a super chlorination treatment or non-chlorine shock to your spa, leave the cover open for a minimum of 20 minutes to allow the oxidizer gas to vent. A high concentration of trapped oxidizer gas which may exist as a result of the shock treatment (not daily sanitation) may eventually cause discoloration or vinyl degradation to the bottom of the cover. This type of damage is considered chemical abuse and is not covered under the terms of the limited warranty.

THE CALDERA™ SPA WATER MAINTENANCE PROGRAM

Each step in your water maintenance program is dependent on the completion of the previous steps. Omitting a step or failing to reach the recommended range may cause an imbalance in your water's chemistry. Unbalanced water chemistry can damage the spa and its components as well as cause discomfort for the user.

BALANCING THE TOTAL ALKALINITY (TA)

A. The recommended Total Alkalinity (TA) for your spa water is 125-150 ppm.

B. Total Alkalinity is a measure of the total levels of carbonates, bicarbonates, hydroxides, and other alkaline substances in the water. TA is referred to as the water's "pH buffer". In other words, it's a measure of the ability of the water to resist changes in pH level.

C. If the TA is too low, the pH level will fluctuate widely from high to low. Fluctuations in pH can cause corrosion or scaling of the spa components. **Low TA can be corrected by adding sodium bicarbonate.**

D. If the Total Alkalinity is too high, the pH level will tend to be high and may be difficult to bring down. **It can be lowered by using sodium bisulfate.**

E. Once the TA is balanced, it normally remains stable, although the addition of more water with a high or low alkalinity will raise or lower the TA reading of the water.

F. When the Total Alkalinity is within the recommended range, proceed to the next step.

BALANCING THE CALCIUM HARDNESS (CH)

A. The recommended Calcium Hardness (CH) level for your spa is 150-200 ppm.

B. Calcium Hardness is a measure of the total amount of dissolved calcium in the water. Calcium helps control the corrosive nature of the spa's water. That's why calcium-low water (commonly known as "soft" water) is not recommended. It is very corrosive to the equipment, and can cause staining of the spa shell.

C. If the CH is too high (commonly known as "hard water"), formation of scale on the spa's shell surface and equipment can result. **CH can be decreased by dilution–a mixture of 75% hard and 25% soft water will usually yield a reading within the correct range.** If soft water is not available or practical for you, a stain and scale control should be added to the spa water, according to instructions on its label.

D. Once the CH is balanced, it normally remains stable, although the addition of more water with a high or low calcium content will raise or lower the CH reading of the water.

E. When the Calcium Hardness is within the recommended range, proceed to the next step.

BALANCING THE PH

A. The recommended pH level for your spa water is 7.4-7.6.

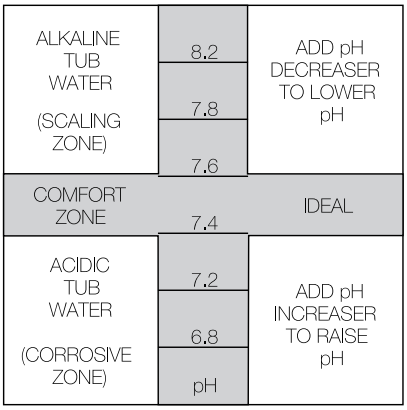
B. The pH level is the measure of acidity and alkalinity. Values above 7 are alkaline; those below 7 are acidic. Maintaining the proper pH level is extremely important for:
- Optimizing the effectiveness of the sanitizer.
- Maintaining water that is comfortable for the user.
- Preventing equipment deterioration.

C. If the spa water's pH level is too low, the following may result:
- The sanitizer will dissipate rapidly.
- The water may become irritating to spa users.
- The spa's equipment may corrode.

If the pH is too low, it can be increased by adding sodium hydrogen carbonate to the spa water.

D. If the pH level is too high, the following may result:
- The sanitizer is less effective.
- Scale will form on the spa shell surface and the equipment.
- The water may become cloudy.
- The filter cartridge pores may become obstructed.

If the pH is too high, it can be decreased by adding sodium bisulfate to the spa water.



NOTE: After adding sodium carbonate or sodium bisulfate, **wait two hours** before testing the water for pH. Measurements taken too soon may not be accurate.

E. It is important to check the pH on a regular (weekly) basis. The pH will be affected by the bather load, the addition of new water, the addition of various chemicals,

and the type of sanitizer used.

F. When the pH is within the recommended range, proceed to the final step.

MAINTAINING THE SANITIZER LEVEL

A. Sanitizer is extremely important for killing algae, bacteria and viruses, and preventing unwanted organisms from growing in the spa. At the same time, you don't want too high a sanitizer level, or it can irritate your skin, lungs and eyes.

B. Always maintain the sanitizer level in your spa at the recommended level for each type of sanitizer.

C. Watkins recommends only the following sanitizers:

- Sodium Dichloro-s-Triazinetrione (Sodium Dichlor or Chlorine)
- Baqua Spa™ (please consult your Baqua Spa™ manual for instructions on the use of this product).
- Brominating Concentrate™ (One Step Granular Bromine)

WARNING: DO NOT use tri-chlor chlorine, bromo-chloro-dimethyl-hydantoin (BCDMH), or any type of compressed bromine or chlorine, acid or any type of sanitizer which is not recommended by Watkins.

THE WATKINS WATER MAINTENANCE QUICK REFERENCE GUIDE

		Ideal Range (ppm)		What Chemicals to Use	
	Steps	Minimum	Maximum	To Raise	To Lower
1	Total Alkalinity	125	150	Sodium Hydrogen Carbonate, or Sodium Bicarbonate	Sodium Bisulfate
2	Calcium Hardness	150	200	Calcium Hardness Increaser	Use a mixture of 75% hard water and 25% soft water or use a Stain and Scale Inhibitor
3	pH	7.4	7.6	Sodium Hydrogen Carbonate	Sodium Bisulfate
4	Sanitizer	See section on Maintaining the Sanitizer Level			

CHLORINE (SODIUM DICHLOR)

A. Sanitizing chemicals, such as chlorine, are oxidants that kill bacteria and viruses in the water. The Free Available Chlorine (FAC) is a measure of the amount of unused chlorine available to sanitize the spa. The recommended FAC for your spa water is 3.0-5.0 ppm.

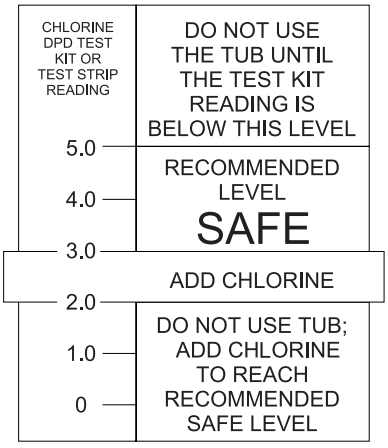
B. Watkins Manufacturing Corporation recommends the use of Sodium Dichlor type granulated chlorine for sanitizing the water. Sodium Dichlor is preferred because it is totally soluble, dissolves quickly and is nearly pH neutral.

C. Maintaining the proper level of chlorine during use is extremely important.

D. If the FAC is too low, bacteria and viruses can grow rapidly in the warm water. **Increase the FAC by adding granulated Sodium Dichlor.**

E. If the FAC is too high, the water can cause discomfort to the user's eyes, lungs and skin. **Simply allow some time to pass. The FAC level will drop naturally over time.**

F. When the Free Available Chlorine is within the recommended range, the spa is ready to be enjoyed.



WARNING: There are several forms of stabilized chlorine available for use in spas and swimming pools and each form has specific chemical characteristics. It is extremely important that the one you choose is specifically designed for use in spas. Use of an incorrect product such as tri-chlor, which has a very low pH (2.6), dissolves too quickly in hot water resulting in extremely high levels of chlorine, and is designed for concrete or plaster swimming pools, WILL cause damage to your spa. Use of a liquid or any type of compressed bromine or chlorine, acid or any type if sanitizer which is not recommended by Watkins Manufacturing Corporation WILL damage your spa and is specifically not covered under the terms of the limited warranty.

IMPORTANT: Granulated chlorine (Sodium Dichlor) will degrade if stored improperly. We recommend purchasing chlorine in one or two pound containers and storing it in a cool, dry place to maintain its potency.

WATER QUALITY AND MAINTENANCE

SUPER CHLORINATION

Super Chlorination is designed to "burn-off" the build-up of chloramines (used chlorine), to eliminate the chlorine smell and to allow the proper level of free chlorine to be maintained.

When giving your water a super chlorination treatment, open the cover at least half way for twenty minutes to allow the chlorine gas to vent off. The high concentration of chlorine gas which may exist as a result of super chlorination (not daily sanitation) may eventually cause discoloration or degradation to the bottom of the cover or the tile grouting, which would not be covered under the terms of your warranty.

IMPORTANT: Always allow the Free Available Chlorine to fall to 5 ppm before using the spa.

WARNING: Never leave an open spa unattended, especially if there are children present!

BUILDING A SANITIZER ROUTINE

During the first month of ownership, measure the sanitizer residual daily in order to establish standards for User Load and Usage Time versus Sanitizer Needed.

- The User Load of the spa is the number of times anyone enters the spa.
- The Usage Time is simply the amount of time a user spends in the spa.
- Sanitizer Needed is the amount of Free Available Chlorine (FAC) needed to accommodate the number of users and their combined usage time.

For example, two spa users who regularly use the spa once an evening for twenty minutes create a specific and somewhat consistent demand on the sanitizer. During the first month of ownership, these two users can determine exactly how much sanitizer to use in order to maintain the proper residual. If, at any time, the user load and/or usage pattern changes dramatically (invited guests), the amount and frequency of sanitizer required increases dramatically.

The greater the usage time or the bather load, the faster the residual value is diminished.

CALDERA™ WATER TREATMENT GUIDE	
At spa startup or refill	Follow spa Start-Up and Refill Procedures.
Prior to each use (Test before adding any chemicals; do not add any chemicals if proper or higher levels are found.)	Add one-half (1/2) teaspoon of sodium dichlor per 250 gallons.
Once a week	Add one and one half (1-1/2) teaspoons of sodium dichlor per 250 gallons.
Every four months	Drain and refill your spa. Follow spa Start-Up and Refill Procedures.
As needed (If water is hazy, cloudy or has an odor)	Add one and one half (1-1/2) teaspoons of sodium dichlor per 250 gallons.

SUPPLEMENTAL WATER MAINTENANCE

Proper water sanitation and mineral balance (pH control) are absolutely essential for a complete spa water maintenance program. Here are three other popular water additives that are optional:

Mineral Deposit Inhibitors

As water evaporates from your spa and new water is added, the amount of dissolved minerals will increase. (Minimize evaporation by keeping the cover on the spa whenever possible.) The spa water may eventually become "hard" (Calcium Hardness too high) enough to damage the heater by calcifying its surface. Proper pH control can minimize this.

Normal soap build-up will require water replacement regularly enough that mineral deposits normally are not a problem.

Occasionally, high iron or copper content in the water may produce green or brown stains on the spa. A mineral deposit inhibitor may help to reduce these metals.

NOTE: Well water may contain high concentrations of minerals. The use of a low water volume, extra-fine pore water filter will help to remove many of the larger particles during the filling of the spa.

Foam Inhibitors

Spa water requires changing due to the buildup of soap in the water. Typically, soap will cause the spa water to foam when the jets are used. Soap is introduced into the spa water from two sources: users' bodies, which retain a soap residue after showering, and swimming apparel, which retains soap after washing.

Foam inhibitors can suppress foam, but cannot remove soap from the water. Soap is very difficult to remove from the water because soap is not oxidized by any chemical added to the spa. Only ozone can oxidize soap.

Eventually the soap build-up in the water will be concentrated, resulting in an unclean feeling on the bather's skin which is impossible to remedy. When this occurs, it's time to drain and refill the spa. Depending on the soap input, the water should last about 4 months before needing to be drained.

DOS AND DON'TS

- DON'T use swimming pool (muriatic) acid to lower pH.
- DON'T splash pH increaser additives on the siding.
- DON'T use Compressed Sanitizers.

The use of bromine sticks or tablets in floaters, which may become entrapped in a lounge or cooling seat (or sink to the spa floor), have been shown to cause discoloration of or surface distress to a spa's shell.

- DON'T use a floater type sanitization system as a low or no maintenance solution to your spa maintenance program.

The spa shell can easily withstand the effects of a properly administered sanitizer. Floating dispensers can become trapped in one area and cause an over-sanitization (or chemical burn) of that particular area.

If the dispenser setting is too high, the high concentration can discolor the spa shell and damage the underside of the cover.

Automatic floating dispensers have a tendency to either over-brominate or under-brominate as the rate of erosion varies greatly. Damage to the spa and cover can occur very quickly.

WARNING: Watkins Manufacturing Corporation DOES NOT recommend the use of any floating chemical dispenser. Damage to the spa shell or components caused by a floating chemical dispenser is specifically not covered under the terms of the limited warranty.

- DON'T use a sanitizer which is not designed for spas.
- DON'T use Household Bleach (liquid sodium hypochlorite).
- DON'T broadcast or sprinkle the chemicals onto the water surface. This method may cause chemically-induced spa surface blistering (chemical abuse).
- DO add all chemicals slowly into the filter compartment with the jet pump operating on high speed for ten minutes.
- DO use special care if using baking soda to clean either the interior or exterior plastic surfaces.
- DO use only a granular form of sanitizer (chlorine).

WATER QUALITY AND MAINTENANCE

COMMON WATER CHEMISTRY QUESTIONS

Question: Why can't I use a floater to sanitize my spa water?

Answer: Watkins does not recommend the use of a floater for three reasons.

1. The floater is unable to control the rate at which sanitizer is dissolved into the water. When a floater is first placed in a spa, the sanitizer level can be extremely high. High sanitizer levels can chemically burn or discolor the spa's shell or the underside of the cover. Then, after a period of time, the sanitizer level dispensed by the floater will fall to near zero. A low sanitizer level will allow viruses, bacteria or algae to grow.
2. Floaters tend to stay in one area of the spa most of the time (usually over the cool down seat), causing this area to be exposed to extreme sanitizer levels.
3. The floater may allow pieces of the highly concentrated sanitizer to fall out and settle on the floor or seat of the spa shell. These pieces of sanitizer will chemically burn (blister) the spa shell. Although your spa shell is specifically designed to resist the effects of spa chemicals, no spa surface can withstand this type of highly concentrated chemical. Remember, chemical abuse is specifically not covered under the terms of the warranty.

Question: When I open my spa, I smell chlorine. How do I get rid of this smell?

Answer: There are two types of chlorine in your spa. The first is the Free Available Chlorine, which is the chlorine available to sanitize your spa. This available free chlorine does not have an odor. The second is Chloramine, which is residue from chlorine already expended. Chloramines have a strong chlorine odor. The smell from Chloramines can be eliminated by "shocking" the water. If you smell chlorine in the water, your spa is reminding you to add a shock treatment.

Question: Why can't I fill my spa with soft water?

Answer: Soft water is essentially the same as regular water except that most or all of the calcium has been replaced by sodium. Soft water may be corrosive to the heater and other components. Replacement of spa components damaged by soft water is extremely expensive.

Question: I am trying to reduce the number of chemicals to which my family is exposed. Do I really need to use so many chemicals and in such large amounts?

Answer: While over-exposure to any chemical can be unhealthful, many low levels of chemicals are effective and beneficial. In the case of spa water, the chemicals recommended in the Caldera™ Spa Water Maintenance program are needed to protect the user from water-borne pathogens (disease-causing microbes) and to prevent corrosion of spa components.

Question: Why isn't water chemistry damage covered by the warranty?

Answer: The chemical levels and water quality of the water in the spa are under your direct control. With proper basic care, the spa will provide many years of hot water relaxation. If you are unsure about any chemical or its usage in the spa, contact your Authorized Caldera Dealer or Watkins Manufacturing.

WATER TERMINOLOGY

The following chemical terms are used in this Water Quality and Maintenance section. Understanding their meaning will help you to better understand the water maintenance process.

Bromamines: Compounds formed when bromine combines with nitrogen from body oils, urine, perspiration, etc. Unlike chloramines, bromamines have no pungent odor and are effective sanitizers.

Bromine: A halogen sanitizer (in the same chemical family as chlorine). Bromine is commonly used in stick, tablet, or granular form. See the DO's and DON'Ts of Spa Water Maintenance for additional information.

Calcium Hardness: The amount of dissolved calcium in the spa water. This should be approximately 150-200 ppm. High levels of calcium can cause cloudy water and scaling. Low levels can cause harm to the spa equipment.

Chloramines: Compounds formed when chlorine combines with nitrogen from body oils, urine, perspiration, etc. Chloramines can cause eye irritation as well as having a strong odor. Unlike bromamines, chloramines are weaker, slower sanitizers.

Chlorine: An efficient sanitizing chemical for spas. Watkins Manufacturing Corporation recommends the use of Sodium Dichlor-type granulated chlorine. This type is preferred because it is totally soluble and nearly pH neutral.

Chlorine (or Bromine) Residual: The amount of chlorine or bromine remaining after chlorine or bromine demand has been satisfied. The residual is, therefore, the amount of sanitizer which is chemically available to kill bacteria, viruses and algae.

Corrosion: The gradual wearing away of metal spa parts, usually caused by chemical action. Generally, corrosion is caused by low pH or by water with levels of TA, CH, pH or sanitizer which are outside the recommended ranges.

DPD: The preferred reagent used in test kits to measure the Free Available Chlorine.

Halogen: Any one of these five elements: fluorine, chlorine, bromine, iodine and astatine.

Oxidizer: The use of an oxidizing chemical is to prevent the buildup of contaminants, maximize sanitizer efficiency, minimize combined chlorine and improve water clarity.

Pathogen: A microorganism such as bacterium that cause disease.

pH: The measure of the spa water's acidity and alkalinity. The recommended pH for the spa water is 7.4 to 7.6. Below 7.0 (considered neutral), the spa water is too acidic and can damage the heating system. Above 7.8, the water is too alkaline and can result in cloudy water and scale formation on the shell and heater.

ppm: The abbreviation of "parts per million", the standard measurement of chemical concentration in water. Identical to mg/l (milligrams per liter).

Reagent: A chemical material in liquid, powder or tablet form for use in chemical testing.

Sanitizer: Sanitizers are added and maintained at recommended residuals to protect bathers against pathogenic organisms which can cause disease and infection in spa water.

WATER QUALITY AND MAINTENANCE

Scale: Rough calcium-bearing deposits that can coat spa surfaces, heaters, plumbing lines and clog filters. Generally, scaling is caused by mineral content combined with high pH. Additionally, scale forms more readily at higher water temperatures.

Shock Treatment: Also known as "super-chlorination" when chorine is used. Shock treatment is a process of adding significant doses of a quick dissolving sanitizer (sodium dichlor is recommended) to oxidize non-filterable organic waste and to remove chloramines and bromamines.

Total Alkalinity: The amount of bicarbonates, carbonates, and hydroxides present in spa water. Proper total alkalinity is important for pH control. If the TA is too high, the pH is difficult to adjust. If the TA is too low, the pH will be difficult to hold at the proper level. The desired range of TA in spa water is 125 to 150 ppm.

SPA WATER MAINTENANCE TROUBLESHOOTING GUIDE

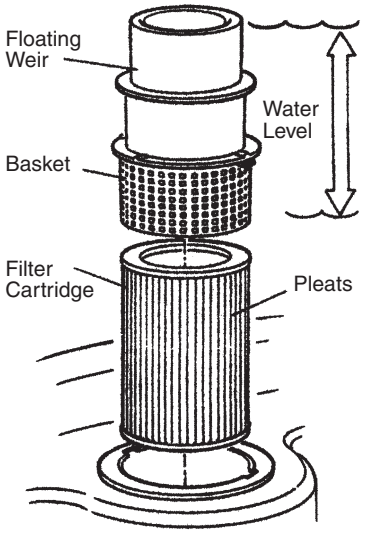
Problem	*Probable causes*	*Solutions*
Cloudy Water	• Dirty filters • Excessive oils / organic matter • Improper sanitization • Suspended particles / organic matter • Overused or old water	• Clean filters • Shock spa with sanitizer • Add sanitizer • Adjust pH and/or alkalinity to recommended range • Run jet pump(s) and clean filters • Drain and refill the spa
Water Odor	• Excessive organics in water • Improper sanitization • Low pH	• Shock spa with sanitizer • Add sanitizer • Adjust pH to recommended range
Chlorine Odor	• Chloramine level too high • Low pH	• Shock spa with sanitizer • Adjust pH to recommended range
Musty Odor	• Bacteria or algae growth	• Shock spa with sanitizer – if problem is visible or persistent, drain, clean and refill the spa
Organic buildup / scum ring around spa	• Buildup of oils and dirt	• Wipe off scum with clean rag – if severe, drain the spa, use a spa surface and tile cleaner to remove the scum and refill the spa
Algae Growth	• High pH • Low sanitizer level	• Shock spa with sanitizer and adjust pH • Shock spa with sanitizer and maintain sanitizer level
Eye Irritation	• Low pH • Low sanitizer level	• Adjust pH • Shock spa with sanitizer and maintain sanitizer level
Skin Irritation / Rash	• Unsanitary water • Free chlorine level above 5 ppm	• Shock spa with sanitizer and maintain sanitizer level • Allow free chlorine level to drop below 5 ppm before spa use
Stains	• Total alkalinity and/or pH too low • High iron or copper in source water	• Adjust total alkalinity and/or pH • Use a metal deposit inhibitor
Scale	• High calcium content in water – total alkalinity and pH too high	• Adjust total alkalinity and pH – if scale requires removal, drain the spa, scrub off the scale, refill the spa and balance the water

MAINTENANCE

FILTER MAINTENANCE

At least once a week, check and clean the skimmer basket and weir to ensure proper filter flow. Remove leaves, foreign matter and debris. It is very important to keep your spa filter cartridge clean and free of particles to ensure proper water flow. A clean filter permits the hydrotherapy system to function properly and also allows more efficient filter cycles. Depending on how frequently your spa is used, we recommend cleaning the spa filter cartridge every four weeks. If this is not done, the filter may clog and restrict water flow, which causes improper filtration and poor jet performance.

WARNING: The frequency and duration of use, and the number of occupants all contribute to determining the appropriate time between filter cleanings. More use means that more frequent filter cleanings will be required.



FILTER CARTRIDGE REMOVAL AND CLEANING

Turn the spa OFF or turn the power to the spa OFF, then proceed as follows:

1. Push down slightly and turn filter basket counterclockwise to unlock, then pull the basket and weir out.
2. Carefully pull up the filter cartridge and bring it out of the spa.
3. Rinse cartridge using a garden hose. Rotate and separate filter pleats while spraying water to remove all debris possible. Let the filter dry and then look for calcium deposits (scaling) or an oil film. If you find these, you will need to deep clean your filter cartridge with a “spa filter cleaning” solution to break down and remove mineral deposits and oils.
4. To return basket and weir, insert and rotate clockwise to lock into position.

SPA LIGHT LENS INSTALLATION

Colored lenses are included for the spa light. To install or remove lenses, simply push ON or pull OFF of the spa light.

SPA LIGHT BULB REPLACEMENT

To replace the spa light bulb turn all power to the equipment module OFF. Locate the rear of the spa light and remove the bulb socket by turning it counterclockwise 1/4 turn. Pull the bulb from the socket and replace by reversing the above steps.

CAUTION: The replacement bulb must be the same rating as the factory-installed bulb or standard automotive type #912.

CARE OF THE SPA PILLOWS

The spa pillows used on the Olympia™ and Cascade™ models will provide years of comfort if treated with care. They have been positioned above the water level to minimize the bleaching effects of chlorinated water and other spa water chemicals. To extend their life, whenever the spa shell is being cleaned, the spa pillows should be removed and cleaned. Body oils can be removed with a mild soap and water solution. ALWAYS rinse off the spa pillows thoroughly to remove any soap residue. If the spa is not going to be used for a long period of time (that is during a vacation or if the spa is winterized), or when the spa water is being super-chlorinated, the spa pillows should be removed until the next use of the spa.

To remove and replace the spa pillows:

1. Carefully place your hand in the upper corner of the pillow between the spa shell and the pillow. Carefully pull the pillow away from the shell until the pillow unsnaps from the spa.
2. Repeat step 1 with the other upper corner.
3. To replace the pillow, simply snap both of the upper corners back into the spa shell.

CARE OF THE EXTERIOR

SPA SHELL

Your Caldera™ Spa has a Quarite Select® shell. Stains and dirt generally will not adhere to your spa’s surface. A soft rag or a nylon scrubber should easily remove most dirt. Most household chemicals are harmful to your spa’s shell. Watkins Manufacturing Corp. recommends Soft Scrub® and Windex®. These are the only products which have passed the manufacturer’s tests. Sodium bicarbonate (baking soda) can also be used for minor surface cleaning. Always thoroughly rinse off any spa shell cleaning agent with fresh water.

SERVICE NOTES:

1. Iron and copper in the water can stain the spa shell if allowed to go unchecked. Ask your Caldera™ Dealer for a Stain and Scale Inhibitor to use if your spa water has a high concentration of dissolved minerals.
2. The use of alcohol or any household cleaners other than those listed to clean the spa shell surface is NOT recommended. DO NOT use any cleaning products containing abrasives or solvents since they may damage the shell surface. **NEVER USE HARSH CHEMICALS!** Damage to the shell by the use of harsh chemicals is not covered under the warranty.

   IMPORTANT: Some surface cleaners contain eye and skin irritants. Keep all cleaners out of the reach of children and use care when applying.

MAINTENANCE

CARE OF THE SPA COVER

WARNING: The cover is a manual safety cover that meets or exceeds all prevailing requirements of ASTM Standards for spa safety covers when installed and used correctly as of the date of manufacture. Non-secured or improperly secured covers are a hazard. Open the cover to its fully open position before use.

VINYL COVER

The vinyl spa cover is an attractive, durable foam insulation product. Monthly cleaning and conditioning are recommended to maintain its beauty.

To clean and condition the vinyl cover:

1. Remove the cover from the spa and gently lean it against a wall or fence.
2. With a garden hose, spray the cover to loosen and rinse away dirt or debris.
3. Using a large sponge and/or a soft bristle brush, and using a very mild soap solution (1 teaspoon dishwashing liquid with 2 gallons of water) or baking soda (sodium bicarbonate), scrub the vinyl top in a circular motion. Do not let the vinyl dry with a soap film on it before it can be rinsed clean.
4. Scrub the cover's perimeter and side flaps. Rinse clean with water.
5. Rinse off the underside of the cover with water only (use no soap), and wipe it clean with a dry rag.

   SERVICE NOTE: To remove tree sap, use cigarette lighter fluid (not charcoal lighter fluid). Use sparingly, and rinse with a saddle soap solution immediately afterwards, then wipe dry.

Important reminders:

- **DO** remove snow buildup to avoid breakage of the foam core from the additional weight of the snow.
- **DO** lock cover lock straps to secure the cover when the spa is not in use.
- **DO NOT** drag or lift the spa cover using either the flaps or the cover lock straps.
- **DO NOT** walk, stand, or sit on the cover.
- **DO NOT** place any metal or heat transferring object on the cover or place any type of plastic tarp or drop cloth over the cover as this may result in a melted foam core, which would not be covered under the warranty.
- **DO NOT** use any lifting mechanisms, chemicals or cleaners except those recommended by Watkins Manufacturing Corporation or its Authorized Sales and Service Dealer

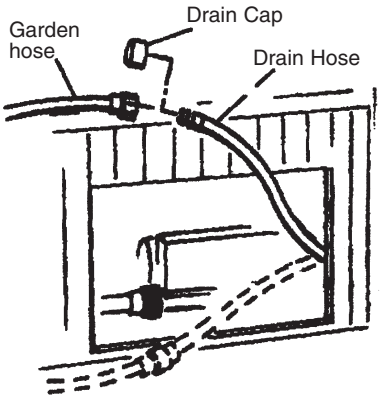
REDWOOD SPA CABINET

The spa cabinet on the Caldera™ Spas is constructed of high-quality redwood. The redwood cabinet is factory-sealed with a lightly tinted stain for beauty and protection. As with all wood products, prolonged exposure will cause discoloration and drying. Do not use wood sealers or wood furniture-type oils such as tung, teak or lemon to seal the cabinet, as they will cause the redwood to blacken. Discoloration or aging of the redwood cabinet is considered natural and is not covered by the limited warranty.

NOTE: Always test a small area (such as one or two vertical corner boards) or your spa cabinet for stain compatibility before applying a non-recommended stain..

MAINTENANCE

DRAINING YOUR SPA



1. Turn off or disconnect power from the spa.
2. Remove the equipment compartment access door.
3. Locate the drain cap. Lift drain hose above the water level.(requires cutting plastic tie the first time.)
4. Unscrew and remove the drain cap.
5. Attach drain hose to garden hose and direct to an appropriate draining area. Maintain hose below water line.
6. After your spa is empty, clean the shell and filter cartridge (see instruction on page 10).
7. After cleaning, remove garden hose and put drain cap back in place.
8. Replace the equipment compartment access door.

NON-OPERATION IN COLD CLIMATE

If the spa is to be left unused for an extended period of time in areas where FREEZING TEMPERATURES DO NOT OCCUR, it may be desirable to turn the heater to the lowest temperature. The automatic filter cycles will keep the spa water clean and sparkling. When preparing the spa for use, check the water chemistry to assure correct chlorine or bromine and pH levels. Consult your Chemical Handbook.

You can keep the water in the spa during the time of year when freezing at the spa location may occur. If a freeze condition is detected, the pump and heater will be activated automatically to circulate the water in low speed. However, CAUTION must be used with this approach. In the event of electrical power interruption, regardless of the cause, the heater and pump will stop operating and freeze protection will be lost, possibly resulting in freeze damage to the spa, spa plumbing and/or components. Such damage is not covered by warranty.

WINTERIZING YOUR SPA

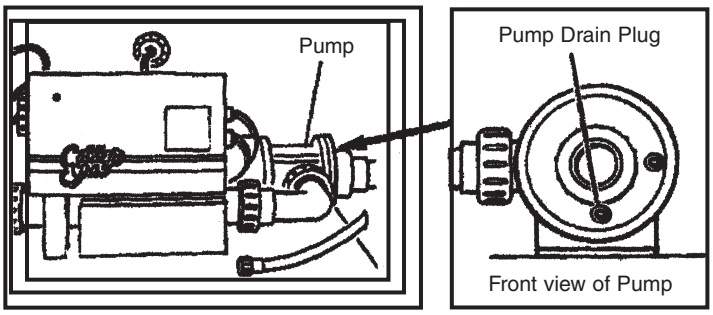
If the spa is located where freezing temperatures occur, and you do not intend to use your spa for an extended period, follow steps 1 through 7 outlined in "DRAINING YOUR SPA" then complete the following steps:

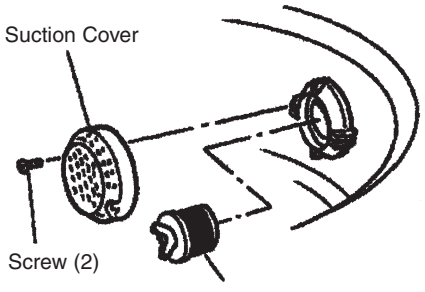
NOTE: Make certain all power to the spa is OFF and all water has been drained from the spa before you continue.

1. Use a wrench to remove the Pump Drain Plug located on the front of the pump housing. Allow all water to drain out, then replace the Pump Drain Plug.
2. It is necessary to remove all water from interior plumbing. Remove the two screws securing the suction cover, then remove the suction cover.
3. Close the suction with a 1-1/2" NPT "freeze plug" (available at your local hardware store). Then use a shop vacuum to blowout the water by inserting the hose in the bottom of the filter canister forcing water back through the jets.
4. Loosen union on pump and leave them loose.

   NOTE: Tighten unions before filling spa.

WARNING: When not in use, the spa must be covered with an insulating spa cover. Damage caused by either sun exposure or freezing is not covered under warranty.





SPA TROUBLESHOOTING

If your spa doesn't seem to be working the way you believe it should, please review the "START-UP" and "OPERATION" instructions in this manual. If this doesn't help you correct the problem, follow the appropriate instructions below. If the problem still is not resolved, call your Caldera dealer.

SYMPTOM	PROBABLE CAUSE	SOLUTIONS
Nothing works, Blank LED Display	• Circuit breaker or GFCI tripped or OFF.	• Reset circuit breaker. • Reset GFCI.
Pump motor will not function	• Motor overload condition. • Control switch failure.	• Let cool for 1 hour. Motor overload will reset automatically. If problem persists, contact your Caldera dealer. • Disconnect spa and contact your Caldera dealer.
Noisy pump or Motor	• Low water level.	• Add water to normal level (1 inch above highest jet).
Pump motor runs, but low or no jet pressure	• Air control closed. • Low water level. • Dirty filter cartridge. • Jet blocked. • Clogged suction or skimmer basket.	• Open or clean air valve. • Add water to normal level (1 inch above highest jet). • Clean filter cartridge. • Remove jet face eyeball and clear orifice. • Clean suction cover or skimmer basket.
Priming the pump	Upon filling or refilling the spa, if the pump is operating and water is not flowing from any of the jets, the pump may not be properly primed. To correct, perform the following procedures: • Turn off power to the spa at the breaker and remove the equipment compartment door. • Loosen the union on the top of the pump to allow the air to escape. When water is present, hand-tighten the union. • Turn power back on, activate the pump and check to make sure union is tight enough to keep it from leaking. Re-install equipment door.	
Spa not heating properly	• Temperature set too low. • Spa cover improperly positioned. • Dirty filter cartridge.	• Set control panel to a higher temperature. • Align spa cover. • Clean filter cartridge.

LED MESSAGES

OH Water has overheated. DO NOT ENTER THE WATER. Turn off all power to the spa and contact your dealer or service organization.

FL Pressure Switch error detection (stuck Pressure Switch) – contact your dealer or service organization.

Sn The high-limit or water temperature sensor has malfunctioned. Contact your dealer or service organization.

CALDERA™ UV OZONE SYSTEM

The optional Ozone Generator operates during filter cycles to disburse ozone into the spa through an ozone jet located in the footwell of the spa. Water flow from the ozone system should be checked periodically; small bubbles should be seen rising from the ozone jet.

SERVICE

ACTS INVALIDATING WARRANTY

The limited warranty is void if the Caldera™ Spa has been subjected to alteration, misuse or abuse, or if any repairs on the spa are attempted by anyone other than an authorized representative of Watkins Manufacturing Corporation. Alteration is defined as any component or plumbing change, electrical conversion, or the addition of any non-approved sanitation or water purification device or heating system which contributes to a component failure, unit failure or unsafe operating condition. Misuse and abuse shall include any operation of the spa other than in accordance with Watkins Manufacturing Corporation printed instructions, or use of the spa in an application for which it is not designed; specifically: use of the spa in a non-residential application; damage caused by operation* of the spa at water temperatures outside the range of 35°F and 115 °F; damage caused by a dirty, clogged or calcified filter cartridge; damage to the spa surface caused by the use of Tri-Chloro Chlorine, BCDMH, chemical tablets in a floater, acid, or any other spa chemicals or spa surface cleaners which are not recommended by Watkins Manufacturing Corporation; damage caused by allowing undissolved spa sanitizing chemicals to lie on the spa surface (no spa surface material can withstand this kind of abuse); damage to components or spa surface caused by improper water chemistry maintenance; and damage to the spa surface caused by leaving the spa uncovered while empty of water and in direct exposure to sunlight (this may cause solar heating distress in warm weather regions). These are considered abuses and may invalidate this warranty.

*Operation of the spa does not mean “use” of the spa! Watkins Manufacturing Corporation does not recommend using the spa if the water temperature is above or below the spa’s control panel temperature range.

DISCLAIMERS

Watkins Manufacturing Corporation shall not be liable for loss of use of the Caldera™ Spa or other incidental or consequential costs, expenses or damages, which may include but are not limited to, the removal of a permanent deck or other custom fixture. Any implied warranty shall have a duration equal to the duration of the applicable warranty stated above. Under no circumstances shall Watkins Manufacturing Corporation or any of its representatives be held liable for injury to any person or damage to any property, however arising.

WATKINS CUSTOMER SERVICE

If you have any questions about any aspect of your Caldera™ Spa set-up, operation or maintenance that have not been answered by this manual, consult your Caldera™ Spa Dealer.

Watkins Manufacturing Corporation can be reached at: 800-669-1881 (Extension 432), Monday through Friday, 8 am to 5 pm Pacific Standard Time (PST), or e-mail at Custserv@watkinsmfg.com.

NOTES

HIGHLAND SERIES SPA SPECIFICATIONS

	Footprint dimensions	Height	Effective filter area	Heater (Watts)	Water capacity	Dry weight	Filled weight*	Dead weight*	Electrical Requirements
Olympia	7'7" x 7'7"	36"	100 Square feet	4,000	360 Gallons	706 Lbs.	4,744 Lbs.	100 Lbs. per square foot	230 volt, 50 amp Single phase GFCI circuit
Cascade	7'2" x 6'2"	32"	75 Square feet	1,000 or 4,000	275 Gallons	590 Lbs.	3,748 Lbs.	85 Lbs. per square foot	110 volt, 20 amp Dedicated GFCI protected cord or 230 volt, 50 amp Single phase GFCI circuit
Teton	6'7" x 6'7"	36"	75 Square feet	1,000 or 4,000	250 Gallons	450 Lbs.	3,225 Lbs.	75 Lbs. per square foot	110 volt, 15 amp Dedicated GFCI protected cord or 230 volt, 50 amp Single phase GFCI circuit

CAUTION: Watkins Manufacturing Corporation suggests a structural engineer or contractor be consulted before the spa is placed on an elevated deck.

* **NOTE:** The "Filled weight" and "Dead weight" of the spa includes the weight of the occupants (assuming an average occupant weight of 175 lbs).

This manual contains installation, operating, maintenance and service information for the following Caldera™ Spa models:

MODELS	EFFECTIVE DATE
OLYMPIA	12/00
CASCADE	12/00
TETON	12/00

Watkins
The Home Relaxation Specialists

Watkins Manufacturing Corporation
Vista, California
USA

PART #39275, REV. A (12/00)