



Clear
Comfort

Swim Happy.™

Clear Comfort's CCW50 Sanitation System

Installation, Operations & Maintenance
Manual



IMPORTANT SAFETY INSTRUCTIONS

For further assistance contact us:

303.872.4477

support@clearcomfort.com

clearcomfort.com

V.1.0.20



**Clear
Comfort**

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clearcomfort.com/spa-manual

Clear Comfort Residential Spa Sanitation System Installation, Operations and Maintenance

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Clear Comfort warrants all Equipment to be free from defects in material or workmanship under normal use and service. Clear Comfort, LLC at its discretion may repair or replace the Equipment or parts thereof. The Company's warranty does not cover any Equipment that has been altered or changed in any way by any person not authorized by Clear Comfort, LLC.

THIS CONSTITUTES THE SOLE WARRANTY MADE BY CLEAR COMFORT, LLC EITHER EXPRESSED OR IMPLIED. THERE ARE NO OTHER WARRANTIES EXPRESSED OR IMPLIED WHICH EXTEND BEYOND THE FACE HEREOF, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT WILL CLEAR COMFORT, LLC BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES AND CUSTOMER'S REMEDIES ARE LIMITED TO REPAIR OR REPLACEMENT OF NONCONFORMING CLEAR COMFORT SystemS OR PARTS.

This equipment was inspected before shipment from our plant. To original purchasers of this equipment, Clear Comfort Water LLC ("Clear Comfort"), warrants its Clear Comfort Systems to be free from defects in materials and workmanship for a period of THREE (3) years from the date of purchase. Replacement Cartridges and cylinders are warranted for a period of ONE (1) year from the date of purchase.

Parts which fail or become defective during the warranty period, except as a result of freezing, negligence, improper installation, use, or care, shall be repaired or replaced, at our option, without charge, within 30 days of the receipt of defective product, barring unforeseen delays.

To obtain warranty replacements or repair, defective components or parts should be returned, transportation paid, to the place of purchase, or to the nearest authorized Clear Comfort service center. For further Clear Comfort dealer or service center information, contact Clear Comfort customer service department.

Clear Comfort shall not be responsible for cartridge, removal and/or re-installation labor or any other such costs incurred in obtaining warranty replacements.

The Clear Comfort Products warranty does not apply to components manufactured by others. For such products, the warranty established by the respective manufacturer will apply.

This warranty shall be voided if at any time: (i) Customer attempts to make any internal changes to any of the components of the Equipment; (ii) the power supplied to any part of the Equipment exceeds the Equipment's operating parameters; (iii) any external device attached by Customer creates conditions exceeding the Equipment's operating parameters; (iv) the Equipment is tampered with; or (v) the serial number is covered, removed or defaced. Clear Comfort, LLC reserves the right to seek damages if its system is tampered with, reverse engineered, or if Customer takes any other actions to interfere with the operation or integrity of the Clear Comfort system.

No Other Warranties

To the maximum extent permitted by applicable law, Clear Comfort disclaims all other warranties, either expressed or implied, including, but not limited to, implied warranties of merchantability and fitness for a particular purpose, with regard to the product(s), part(s) and/or any accompanying written materials.

Procedure for Obtaining Performance

In order to obtain the benefits of this warranty, the customer who made the original retail purchase must contact the Clear Comfort Technical Service Department as soon as possible after discovery of the product-related issue, but in no event later than the expiration date of the respective warranty periods provided herein. Upon receipt of this communication, Clear Comfort will promptly notify the customer of the address to which the product may be shipped. The customer shall then ship the product, freight prepaid, to the address indicated, together with a "RETURN GOODS AUTHORIZATION" form obtained from Technical Service and a brief description of the problems encountered. Unauthorized returns will not be accepted. Freight must be prepaid by customer.

Warranties or Representations by Others

No third party has any authority to make any warranties or representation concerning Clear Comfort or its products. Accordingly, Clear Comfort is not responsible for any such warranties or representations.

To activate & validate your warranty, you must submit your warranty card or fill out our warranty form on clearcomfort.com/ warranty within 1 year of your ship date from Clear Comfort.

IMPORTANT SAFETY INSTRUCTIONS

1. READ AND FOLLOW ALL INSTRUCTIONS.

2. For cord connected/convertible units: DANGER – Risk of injury.

- A. Replace damaged cord immediately.
- B. Do not bury cord.
- C. Connect to a grounding type receptacle only.

3. For all permanently connected units intended for use on 15 or 20 ampere, 125V or 230V, single phase branch circuits: WARNING – Risk of Electric Shock. Connect only to a branch

circuit protected by a ground-fault circuit-interrupter (GFCI). Contact a qualified electrician if you cannot verify that the circuit is protected by a GFCI.

4. For all cord connected units other than storable spa pumps: WARNING – Risk of Electric Shock. Connect only to a grounding type receptacle protected by a ground-fault circuit interrupter (GFCI). Contact a qualified electrician if you cannot verify that the receptacle is protected by a GFCI.

5. For all permanently connected units: WARNING – Risk of Electric Shock. Connect only to a branch circuit protected by a ground-fault circuit-interrupter (GFCI). Contact a qualified electrician if you cannot verify that the receptacle is protected by a GFCI.

6. For units intended for above-ground storable swimming spas: Do not bury cord. Locate cord to minimize abuse from lawn mowers, hedge trimmers, and other equipment.

7. For all cord and plug connected units: WARNING – To reduce the risk

of electric shock, replace damaged cord immediately.

8. For units intended for above ground storable swimming spas: WARNING – To reduce the risk of electric shock, do not use extension cord to connect unit to electric supply; provide a properly located outlet.

9. CAUTION: At low or no flow conditions, gas may accumulate – ensure system is off when backwashing or when water is not being treated to prevent an unsafe gas buildup. Pressure switches, flow switches and other safety equipment to prevent unsafe gas buildup is recommended.

10. When the modified air is introduced into the spa water via the existing plumbing, the biocide is produced. Some of the remaining activated atoms either keep minerals dissolved in the water or remove minerals that were previously deposited.

11. This unit is to be installed in accordance with the installation instructions, the applicable plumbing and building codes, the applicable state and local laws and regulations, and the requirements of the Authority Having Jurisdiction.

12. When installing and using this equipment, basic safety precautions should always be followed including the following.

13. WARNING - To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.

14. WARNING - Do not sit or stand on unit.

15. SAVE THESE INSTRUCTIONS.

ELECTRICAL SAFETY

- Do not service the machine when the power is ON.
- The power supply wire gauge and insulation must meet the temperature and power requirements.
- To avoid personal injury never touch exposed electrical connections or components while the power is ON.
- Do not install/service the Clear Comfort system if you or the machine is standing in water with the power ON.
- Protect the power cord from being walked on or pinched, particularly at plugs and the point where they exit from the system.
- The device must be properly connected to the correct power source (either 60Hz 120V or 230V) using the supplied power cord in accordance with the local electrical code. If possible the unit should be hardwired to the pump circuit and controlled by the pump circuit (rather than hardwiring, an appropriate 120V or 230V receptacle outlet and plug may be used to connect to

the pump controlled circuit). If the unit is being wired to standalone AC power (i.e., not through the pump circuit on either 120V or 230V) it should be installed with its own timer circuit and plugged in through a Ground Fault Circuit Interrupt (GFCI) and the timer should be set to reflect the spa or tub's hours of operation. Regardless if hardwired or standalone connected, the electrical connection must be made in accordance with the local electrical code.

GROUNDING

The Clear Comfort, LLC system must be properly grounded. An electrical ground connection to a reliable earth ground is essential for safe operation. Without an electrical ground, all accessible conductive components (including knobs and controls that appear insulated) can render an electrical shock.

GENERAL SAFETY

Use personal protective equipment (steel toe shoes, hearing protection, eye protection) when installing the Clear Comfort system. Follow ladder safety requirements.



KEY FEATURES

This manual describes how to install, operate and maintain the standard Clear Comfort system. The installation takes only a few hours and can be installed with little or no disruption to a facility's recirculation or electrical systems. The Clear Comfort system immediately starts to work on a facility of any size, replaces the need to add toxic chemicals in most operating situations and replaces the need for a day-to-day residual sanitizer. The spa water still needs to be tested, as would be done with a traditional chemical system.

OPERATING RANGES

Power: 120V or 230V receptacle with approximately 10 watts.

Ballast: 120V or 230V

Electrical Requirements: 120V, 60Hz

Electrical Rating: 120V, 60Hz, 1.0Amp or 230V, 60Hz, 0.5Amp

NOTE: CLEAR COMFORT SHOULD ONLY RUN WHEN THE PUMP IS OPERATING

FRONT VIEW

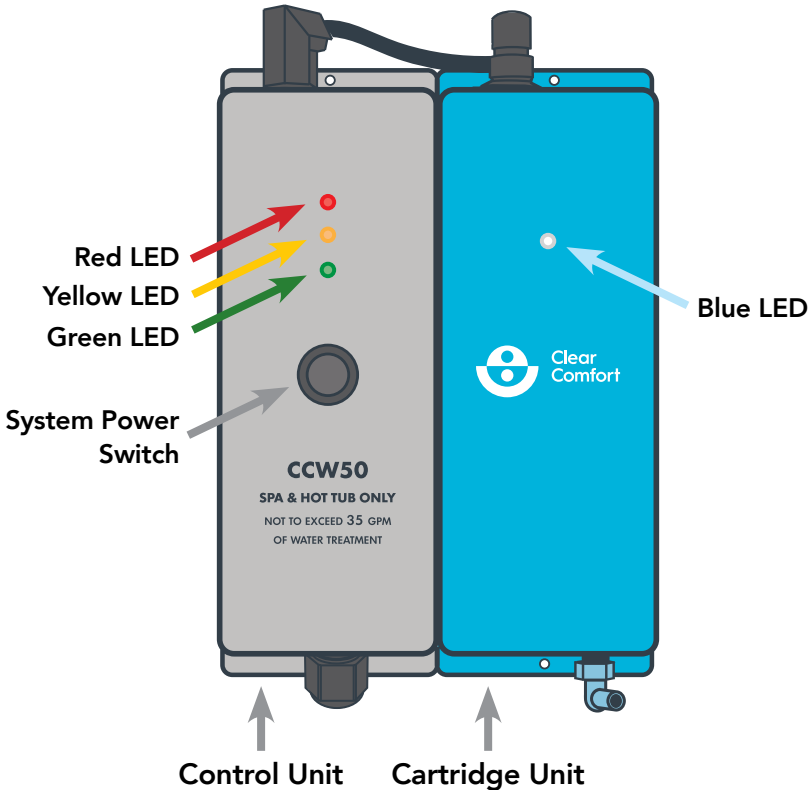


Figure 1: System Functions

LIGHT FUNCTIONALITY

Green Light: System is on and operating properly.

Yellow Light: Cartridge has reached 80 percent of its life expectancy (8,000 hours) and it's time to purchase a replacement cartridge.

Red Light: Cartridge has reached its life expectancy and needs to be replaced.

Blue Light: Operation light that should always be illuminated.

Prior to installation, a site survey should be performed to validate that the correct system parameters are in place and ready for installation. We recommend that you maintain compliance within the following operating ranges for well constructed and circulated spas.

PLEASE NOTE: Installation must be performed by your professional service provider.

- **Spa volume:** All volumes with less than 35 GPM (gallons per minute).
- **Type of spa filter:** Any ANSI 50 approved filtration.
- **Pump:** Sufficient to provide venturi air suction. If not possible, contact Clear Comfort to order a Booster Air Pump Kit.
- **Voltage of power supply:** 120V or 230V AC.
- **Maximum distance from injection point:** Air tubing length should be as short as possible with no more than 10 feet from the system to the venturi injector.
- **Indoors or outdoors:** Either is suitable. Install away from upward facing sprinklers is recommended.
- **Water quality at installation:** The water quality should be balanced prior to installing the Clear Comfort system.

CLEAR COMFORT CCW50 EQUIPMENT LIST

1. Air Check Valve
2. 10' Tubing
3. Flow Meter & Barbed Connector
4. Outlet Box & Lid
5. Conduit Connector

RECOMMENDED MATERIALS AND TOOLS

1. If needed, Clear Comfort's Booster Air Pump Kit.
2. A power drill and proper hardware for mounting the Clear Comfort system.
3. Proper plumbing materials and tools for venturi injector installation. See page 12 for detailed parts list.

SYSTEM INSTALLATION

1. Determine the best location to mount the Clear Comfort system. Screw in the top mounting bracket first, and then the bottom mounting bracket of the Control Unit (orange unit). Mount the Cartridge Unit (blue unit) by securely fastening the Cartridge Unit to the Control Unit using side keyed brackets, and screw in the top mounting bracket first, and then the bottom mounting bracket.
2. System must be installed no more than 10 feet from injection location.
3. Install a Hartford loop using the blue flexelene tubing between the CCW50 system and the venturi connection. See Figure 4 on page 11.

ELECTRICAL INSTALLATION - GENERAL

1. Follow all local and national electric codes.
2. Determine if the Clear Comfort system will be powered by 120V or 230V. NOTE: All units are factory set to 230V.
3. Set the switch on the ballast on the orange Control Unit: Remove plug in the left side of the Control Unit. With a small screwdriver, slide the switch in the appropriate direction according to the label on the Control Unit. Re-install the plug. See Figure 2.
4. The Clear Comfort system comes with a 12 inch section

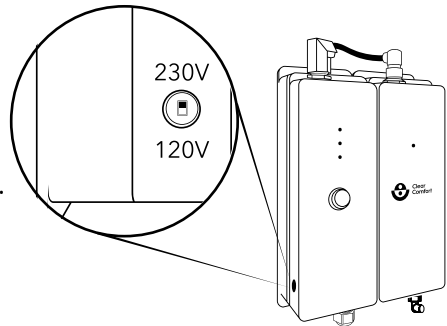


Figure 2: Ballast Electrical Switch

- of 1/2 inch flexible conduit, a water-tight conduit fitting, and a conduit body that may be easily converted into the shape preferred for the particular installation.
5. If 12 inches is too long, cut to the desired length. Slide the wires from the Clear Comfort system through the conduit, insert the conduit into the water tight connector on the Clear Comfort system, and tighten down.
 6. Configure the conduit body as needed for the installation into the desired shape (LL, LB, LR, or C), and attach the water-tight conduit fitting to the body.
 7. Slide the conduit and wire into the conduit body and tighten down the water-tight connection.
 8. Run wire (and conduit, if required by local code) from the pump

circuit to the conduit body using water-tight fittings.

9. Using appropriately sized wire nuts inside the conduit body, connect the switched power to the Clear Comfort system.

NOTE: CLEAR COMFORT SHOULD ONLY RUN WHEN THE PUMP IS OPERATING

ELECTRICAL INSTALLATION - DIRECTLY TO PUMP CIRCUIT (RECOMMENDED)

1. Unit must be hardwired to the spa control board at the ozone connector location.
2. The device must be properly connected to the correct power source (either 60Hz, 120V or 230V) using the supplied power cord, in accordance with the local electrical code.
3. Toggle ballast switch between 120V and 230V to match required voltage. See Figure 2. Ensure white marked saddle switch matches correct voltage.
4. If hard wired, cord supplied must be hard wired in accordance to the National Electrical Code and in accordance with local regulations.
5. Test for proper grounding and secure connections.

NOTE: WIRE THE SYSTEM TO RUN ONLY WHEN THE PUMP IS RUNNING

PLEASE NOTE: If there are any questions or discrepancies, please contact Clear Comfort at 303.872.4477 or support@clearcomfort.com.

ELECTRICAL INSTALLATION - WALL OUTLET

1. If the unit is being wired to standalone 120V AC power (i.e., not through the spa control board), connect Clear Comfort system to the spa timing clock so that the system operates simultaneously with spa pump through a Ground Fault Circuit Interrupt (GFCI). In either case, the electrical connection must be made in accordance with the local electrical code.
2. Remove protective ballast switch cover. Toggle the ballast switch between 120V and 230V to match required voltage. See Figure 2.
3. Test for proper grounding and secure connections.

CARTRIDGE CONNECTION

Gently align the notched outdent on the front of the Cable Connector with the keyed indent of the front of Cartridge Connector, as shown with the arrow in Figure 3. Seat the Cable Connector down onto the Cartridge Connector and turn the Cable Connector's Collar a quarter-turn clockwise to lock the Cable and Cartridge Connector together. If a strange light pattern occurs, disconnect cable assembly and reconnect.

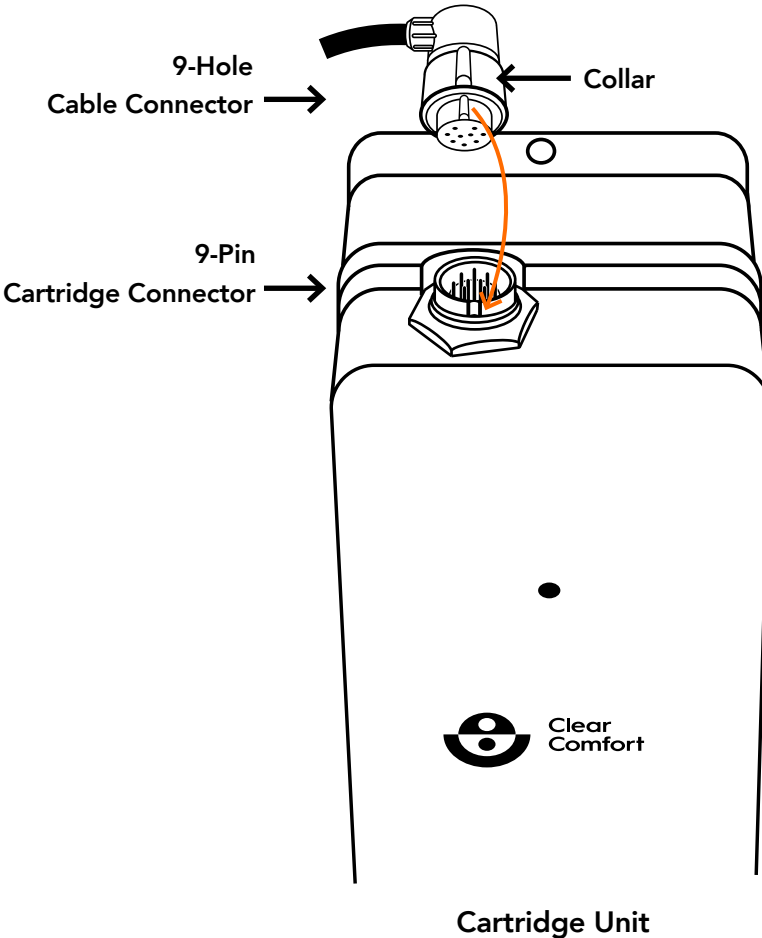


Figure 3: Cartridge Connection

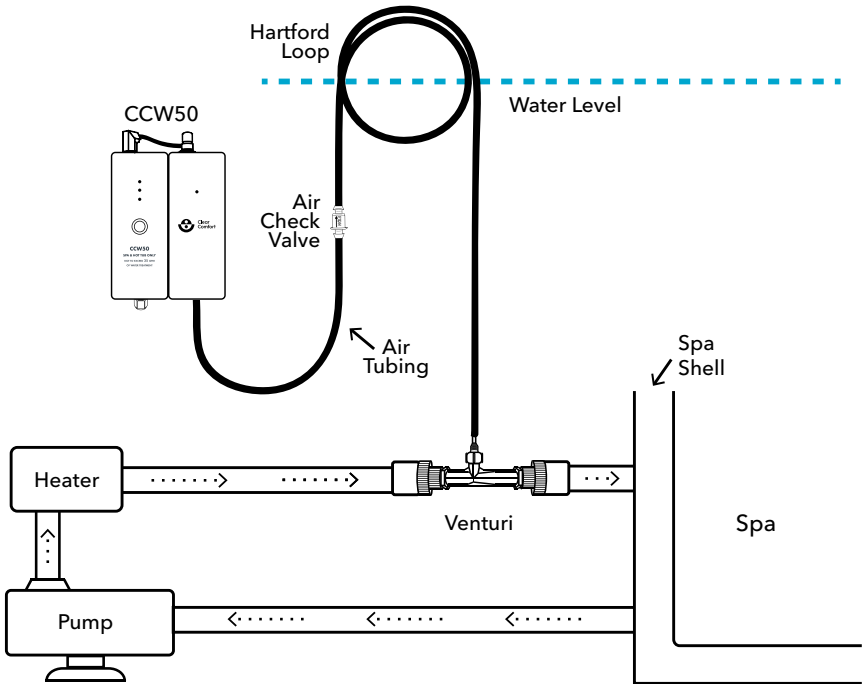


Figure 4: Full System Diagram

IMPORTANT NOTE: This is Clear Comfort’s general recommended installation diagram. If you are not getting enough air flow, we recommend ordering Clear Comfort’s Booster Air Pump Kit.

To order a Booster Air Pump Kit or for specific installation instructions for your spa, please call 303. 872.4477 or email support@clearcomfort.com.

CONNECTING CLEAR COMFORT SYSTEM TO VENTURI INJECTION

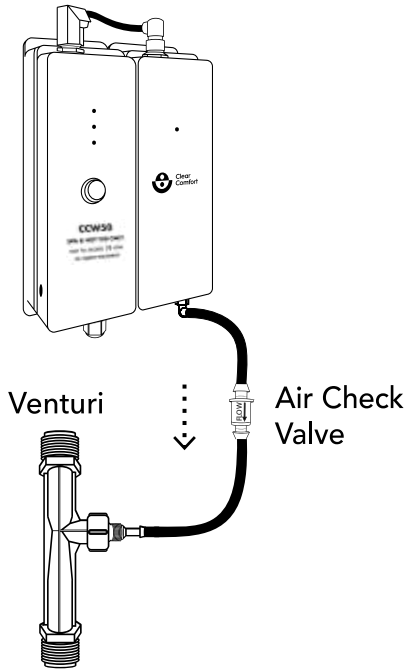


Figure 5: Venturi Connection

NOTE: Air Check Valve should be installed to flow in a vertical, downward direction below the exit from the system. See Figure 6 on next page.

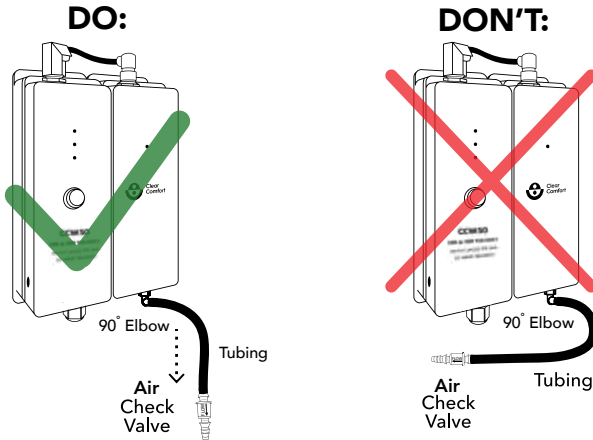


Figure 6: Air Check Valve Position

INSTALLING THE CLEAR COMFORT INJECTION ASSEMBLY

1. Run provided 1/4-inch tubing from the venturi injection port to the straight barb fitting. Length of tube should be less than 10 feet. Shorten and cut tubing as possible. See Figure 5.
2. If the unit is installed below the water line, install a loop in the 1/4-inch line known as a Hartford loop. Loop the hose so that at some point, tubing is above water level.
3. Install 1/4-inch one-way air check valve (supplied) to eliminate any potential water back flow. See Figure 5.
4. Gas exiting the Clear Comfort system to the venturi connector port should flow easily.
5. Measure air suction using an air flow meter and set venturi air suction to draw between 3 - 5 LPM. See Figure 8 for details.

NOTE: If 3 - 5 LPM cannot be achieved, please call Clear Comfort support at 303.872.4477.

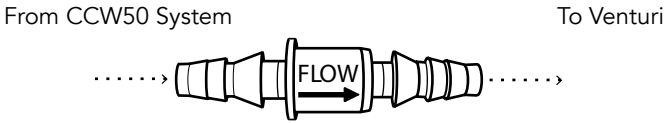


Figure 7: 1/4" One-Way Air Check Valve

AIR FLOW METER

1. Measure the air flow rate from the venturi in circulation mode.
2. If 3 LPM is not achieved, contact Clear Comfort for options for your particular spa.
3. If 3 LPM is achieved, disconnect flow meter and reconnect tubing to check valve.

OPERATING INSTRUCTIONS

1. Install plumbing according to Figure 4.
2. Ensure bypass 3-way port valve is OPEN before turning pumps ON.
3. Turn spa pump and filtration systems on.
4. Set venturi air suction to draw between 3 - 5 LPM.
5. To increase the draw of air from venturi system, adjust or slowly close bypass 3-way port valve.
6. Toggle Clear Comfort system switch to the ON position.
7. Water entering the spa should have bubbles exiting from at least one of the returns on to the body of water.

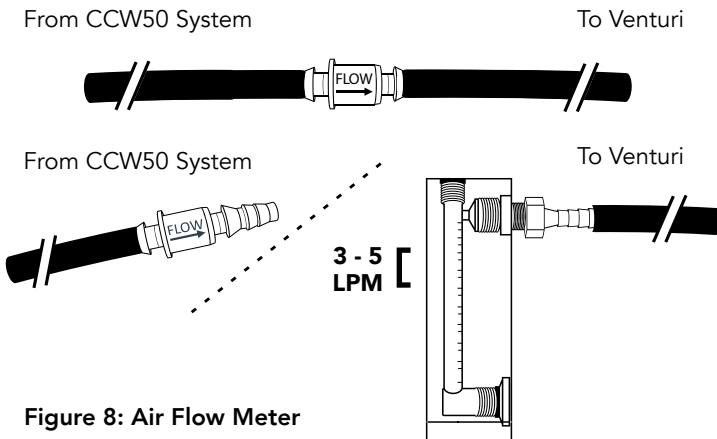
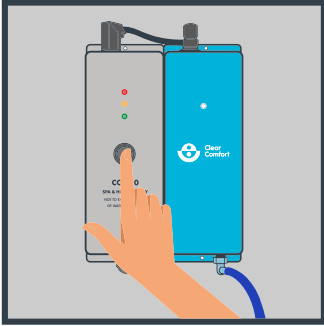


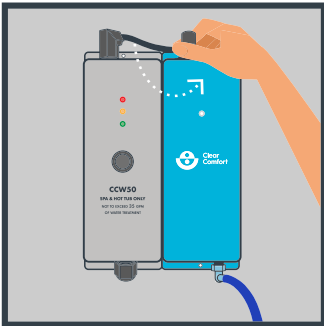
Figure 8: Air Flow Meter

CARTRIDGE REPLACEMENT

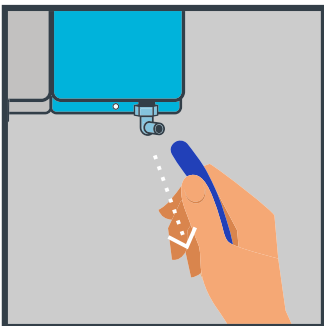
The Cartridge Unit must be replaced annually. No other maintenance is required. If the yellow OR red LED light is illuminated, the cartridge must be replaced.



1. Turn off and disconnect power to Clear Comfort system. Never attempt to service unit while it is wet. Ensure all LEDs on system front are off.



2. To remove the cartridge, disconnect Cartridge Unit from Control Unit by rotating the able Connector's Collar base quarter turn and gently pulling up.

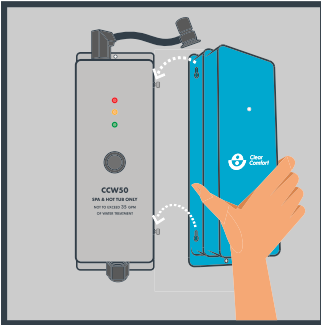


3. Remove the air tubing from bottom of Cartridge Unit.

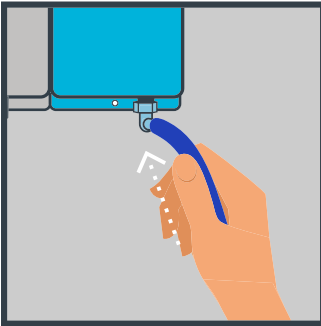


4. Remove Cartridge Unit from Control Unit.

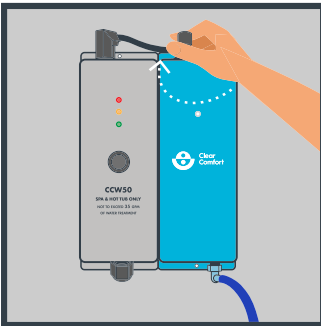
Note: Please return old cartridge to Clear Comfort for proper recycling. For sustainability purposes, Clear Comfort provides a return-shipping label so the cartridge can be properly recycled.



5. To install the replacement cartridge, securely fasten the Cartridge Unit to the Control Unit using the side keyed brackets.



6. Reconnect the air tubing to bottom of the Cartridge Unit.



7. Reconnect top connection wire by inserting the Cable Connector into Cartridge Connector and turning a quarter turn, see Figure 3 for detailed instructions. If cable is properly connected, the system can be safely turned ON.

See Figure 1 for proper LED function. If strange light pattern occurs, disconnect cable assembly and reconnect.

- **How is the Clear Comfort system different from traditional non-chlorine water treatment systems?**

The Clear Comfort system is the first product to provide complete protection for spas (biocide, scale control and corrosion control) without adding toxic chemicals. Traditional water treatment systems require the purchase, transport, storage and application of toxic chemicals.

- **Is the Clear Comfort system a non-chlorine device?**

The Clear Comfort system creates hydroxyls and hydrogen peroxide when the system's treated air is injected into the water.

- **How does the Clear Comfort system work?**

Using a proprietary and patented technology, the Clear Comfort system creates a gas that, when added to water, forms hydroxyl radicals and safe amounts of hydrogen peroxide, which destroys aquatic microorganisms and controls organic material. The Clear Comfort system produces an excellent biocide, which kills bacteria, protozoa and viruses.

- **How long does installation take?**

Typically, installation should take a few hours. As soon as it is installed, it starts treating the water immediately.

- **Where does the Clear Comfort system get installed?**

The Clear Comfort system needs to be within 10 feet of the spa venturi injection site. It can be installed either indoors (as long as there is access for the air handling) or outdoors on the spa. The system's venturi is installed directly into the spa plumbing.

- **Is the Clear Comfort system affected by temperature? Hot or cold?**

No, the Clear Comfort system is weatherproof for outdoor conditions.

- **Does the Clear Comfort system treat the water even when the system isn't in operation?**

When the system is turned off, it stops producing the hydroxyls. However, a residual hydrogen peroxide will remain in the water for some time.

NOTE: This electrical connection must be made in accordance with the local electrical code.

Wiring to pump electrical circuit (preferred method)

The device must be properly connected to the correct power source (either 60Hz, 120V or 230V) using the supplied power cord in accordance with the local electrical code. The unit should be hardwired to the pump circuit and controlled by the pump circuit.

Wiring to a standalone electrical outlet (use when pump continuously operates)

If the unit is being wired to standalone AC power (i.e., not through the pump circuit on either 120V or 230V) it should be installed to operate only when the pump is operating with its own timer circuit and plugged in through a Ground Fault Circuit Interrupt (GFCI) and the timer should be set to reflect the spa pump hours of operation. The unit should not run when the pump is off. For questions regarding this operational mode please contact Clear Comfort at 303.872.4477.

230V power supply cord supplied and must be field wired in accordance to the NEC (ONLY FOR 230V).

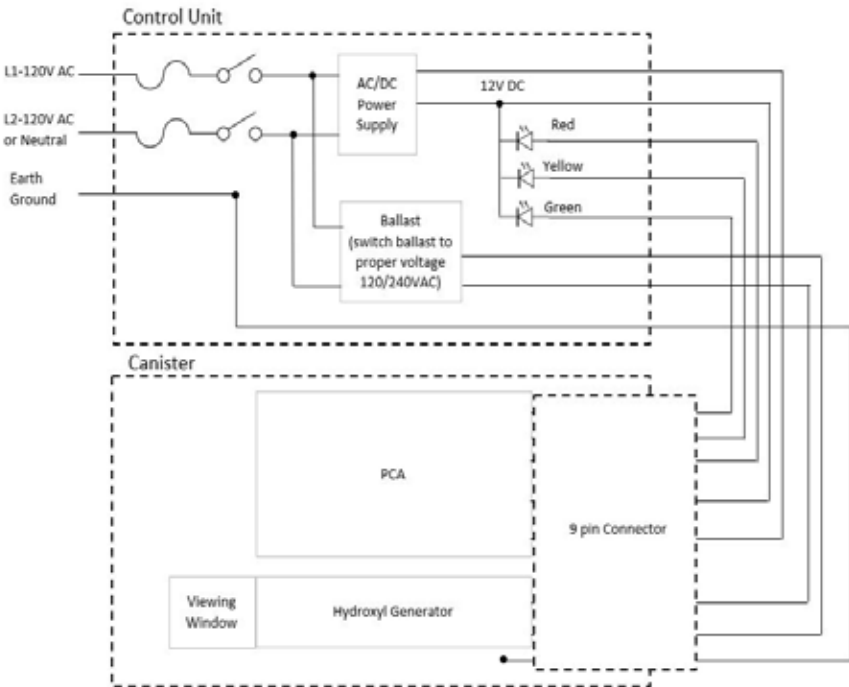


Figure 9: Wiring Diagram

HEAD LOSS (WITHOUT BOOSTER PUMP)

Flow (gpm)	7.80	14.57	21.81	29.17
Head Loss (psi)	0.57	5.92	17.96	34.83

Figure 10: Head Loss Table



For the latest version, please visit:
clearcomfort.com/spa-manual

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