

COMPLETE SANITATION SYSTEM

Natural Spa Water Treatment

CSS5 - Residential Spas up to 1,000 Gallons

*INSTALLATION GUIDE and
OPERATION MANUAL*

*Prozone has combined ozone and salt together
in one Complete Sanitation System for Spas*



T-O₃ NATURAL TECHNOLOGY

Reduces Chemical Usage,
Improves Sanitation
Produces Crystal Clear Water

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IMPORTANT SAFETY INSTRUCTIONS

Read and Follow All Safety Instructions

- Read and be familiar with this manual before installing or operating your new CSS 5.
- Voltage must be determined before unit is installed.
- Replace damaged cord immediately.
- Do not bury cord.
- Connect only to a properly grounded, grounding type receptacle.
- Wear safety glasses when drilling and tapping holes for installation of unit.

WARNING: Short term inhalation of high concentrations of ozone and long term inhalation of low concentrations of ozone can cause serious harmful physiological effects. Do not inhale ozone gas produced by this device.



WARNING: Disconnect all power to pool equipment prior to installation, maintenance, or removal of the CSS 5.



WARNING: Do not permit children to operate this product



WARNING: To avoid risk of electric shock, fire, or injury, service should only be performed by a qualified pool service professional.



WARNING: Installation must be performed in accordance with the National Electric Code and any applicable local or state installation codes.



WARNING: When mixing acid with water, ALWAYS ADD ACID TO WATER, NEVER WATER TO ACID.

NOTE: The instructions in this document provide general installation guides. Consult your dealer for specific installation instructions. Additional information is available at www.prozoneint.com. Check system for any visible shipping damage. If damage has occurred, contact the delivery company and your dealer immediately. Before beginning installation, please turn to the Installation Kit Inventory Section and verify that all listed parts are on hand.

Tools Needed: Power Drill, Philips Screw Driver, Flat Screw Driver, Pliers, Knife

SAVE THESE INSTRUCTIONS

INTRODUCTION TO OZONE

Your CSS 5 System produces both ozone and chlorine. The Ozone Generator produces ozone with light energy, the way the sun does. Therefore it is only emitting pure O₃ ozone that has no harmful by-products, unlike other ozone generators that use corona technology which produce nitrous acid compounds and other harmful byproducts. Ozone is a molecule of oxygen that is formed when three atoms of oxygen are bound together instead of the normal two atoms. The extra oxygen atom makes ozone the most powerful, naturally occurring oxidizer and sanitizer readily available. Pioneers of the original ozone generator cartridge, produced the first Ultraviolet Ozone Generating cartridge in 1977 for the swimming pool and spa industry. The O₃, naturally produced ozone, generated by the CSS 5 System serves as the primary sanitizer and oxidizer, however, a small residual of free available chlorine is required at all times to control algae growth and provide a residual sanitizer requirement. The CSS 5 System provides the necessary chlorine residual for your spa. A measured amount of pool grade salt is dissolved in the spa water. The Chlorine is made by passing a very low voltage electric current through the salt water as it flows through the Cell and back in to the spa. The CSS 5 System (Advanced Oxidation Processor™) produces and combines ozone and chlorine. These super oxide compounds, even stronger oxidizers than ozone or chlorine alone, are injected in to the spa water through a patented Venturi Injection system.

PREPARING YOUR SPA

Draining and refilling of your spa is recommended, but not required unless bromine or Baquaspa was previously used. Shock spa to 20 ppm with chlorine shock. DO NOT use non-chlorine shock.

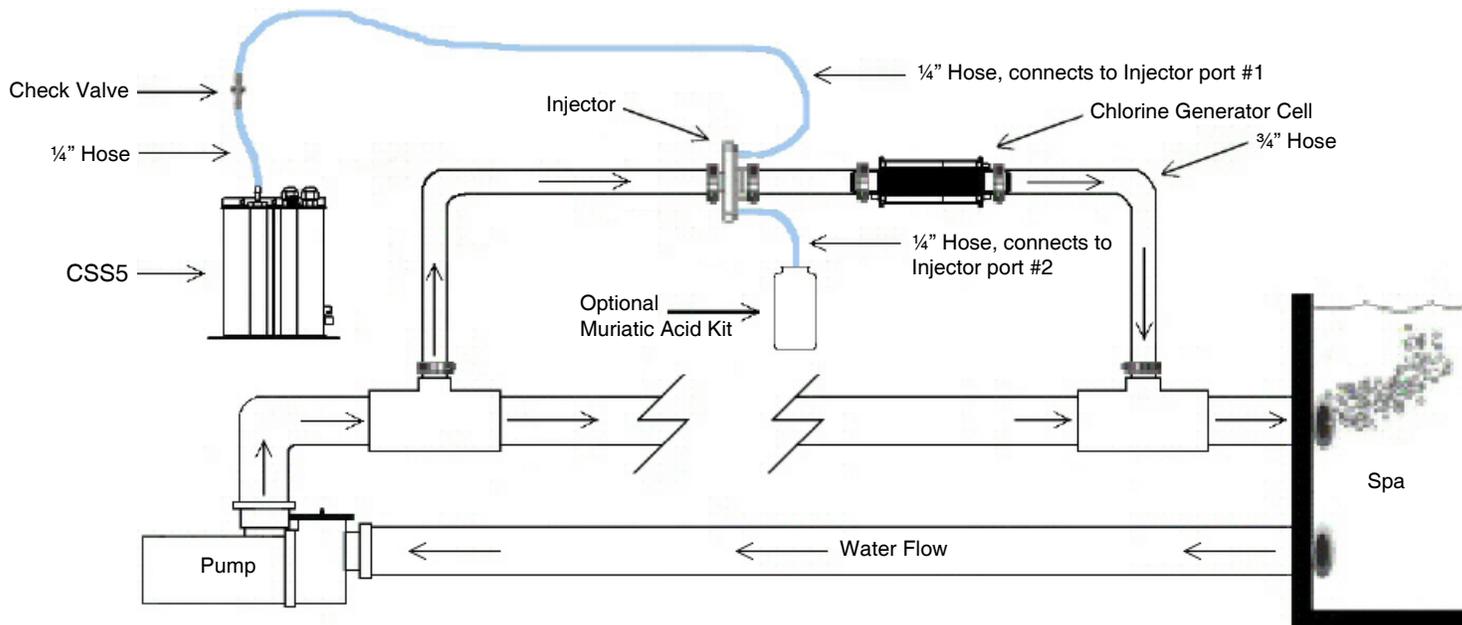
The Table below summarizes the levels that are recommended by The Association of Pool and Spa Professionals (APSP). It is important to maintain these levels in order to prevent corrosion or scaling and to ensure maximum enjoyment of the pool. Test your water periodically. Take a water sample in to be professionally tested by a Pool and Spa Professional at least once a month. See our web site for more information on Basic Pool Water Chemistry.

pH	7.2 – 8.0
Alkalinity	80 – 120 ppm
TDS	< 1,000
Cyanuric Acid	30 – 70 ppm
Free Chlorine	0.5 – 1.5 ppm
Calcium Hardness	< 300 ppm
Metals	0 ppm
Nitrates / Phosphates	< 30 ppm

ADDING SALT

Mix required amount of salt with warm water in a bucket or pitcher. Ensure it is thoroughly mixed and pour the mixture into the spa, distributing it evenly, away from the skimmers. Repeat as necessary to dissolve all salt required. Add salt when spa water temperature is 75 degrees or higher to ensure it dissolves fully. Use the chart below to determine the amount of salt required for your spa. It is recommended that 2,600 ppm be used as a starting point. If salt levels reach > 4,000 ppm, the unit will shut down automatically. CSS System should be reset, by turning the system off then back on again after 10 seconds, when salt is added to the spa. DO NOT USE: Table salt, Kosher salt, or any Food grade salt unless it specially states “for swimming pools”. Use ONLY swimming pool salt which may be purchased at pool and spa dealers or home improvement stores.

Start-Up Salt Requirements					
Spa Size (Gallons)					
	200	300	400	450	600
Salt (ppm)	Pounds of salt required if starting at 0 ppm				
1,600	2.7	4.0	5.3	6.0	8.0
1,800	3.0	4.5	6.0	6.8	9.0
2,000	3.3	5.0	6.7	7.5	10.0
2,200	3.7	5.5	7.3	8.3	11.0
2,400	4.0	6.0	8.0	9.0	12.0
2,600	4.3	6.5	8.7	9.8	13.0
2,800	4.7	7.0	9.3	10.5	14.0
3,000	5.0	7.5	10.0	11.3	15.0
3,200	5.3	8.0	10.7	12.0	16.0
3,400	5.7	8.5	11.3	12.8	17.0
3,600	6.0	9.0	12.0	13.5	18.0
3,800	6.3	9.5	12.7	14.3	19.0
4,000	6.7	10.0	13.4	15.0	20.0



1. Turn pump OFF.
2. Install the CSS5 System under the skirt of the spa or immediately next to it. The unit should be mounted on a solid surface with wood or sheet metal screws. Make sure the screws do not penetrate the exterior of the spa skirt.
3. Most spa's come equipped with a factory installed, capped or plugged bypass system. Locate the two capped or plugged 3/4" hoses and uncap/unplug them.
4. Insert the Venturi Injector into the 3/4" hose, coming from the pump, with the INLET side of the Venturi Injector facing towards the pump and secure with a metal clamp.
5. Cut a 6" length of 3/4" hose.
6. Connect one end of this 6" length of 3/4" hose to the outlet side of the Venturi Injector and secure with a metal clamp.
7. Insert one end of the Chlorine Generator Cell into the other end of the 6" length of 3/4" hose and secure with a metal clamp.
8. Connect other end of the Chlorine Generator Cell to the 3/4" hose going back into the spa return and secure with a metal clamp.
9. Cut a 6" length of 1/4" polybraid hose and connect one end to the open ozone port (Marked #1) on the Venturi Injector and the other end to the OUTLET side of the Check Valve, (Make sure you can blow air through the Check Valve towards the Injector port). Secure both ends with a plastic clamps.
10. Connect the remaining section of 1/4" polybraid hose to the INLET side of the Check Valve and the other end to the barb on the top of the CSS5 unit. Secure both ends with black plastic clamps.
11. Connect the two wires, in the gray casing, to the terminals on the Chlorine Generator Cell and cover with heat shrink tubing.
12. Connect the power cable to the controller unit on your spa.
13. Electrical Installation: Your Prozone CSS5 System is designed to operate on either 120 or 240 VAC, 50/60 HZ. Wire Prozone CSS5 System to the control box on your spa or to the circulation pump or a timer. Use N.E.C. or local code grounding and installation procedures for pool and spa equipment.

NOTE: If the optional muriatic acid kit is to be installed, port #2 on the Injector must first be drilled out before 1/4" hose is connected.

CAUTION: Make sure the voltage is the same as prescribed on the side of the Prozone ozone generator. Overvoltage will void customer warranty.

START-UP

After salt has been added to your spa, it is recommended that the system be run for 48 hours to ensure adequate amount of chlorine is generated. For outdoor spas, the addition of cyanuric acid will help stabilize the chlorine level as chlorine is unstable and will evaporate out of the water over time. Verify the ozonator is working by checking for a blue glow around the top and/or bottom of the gaskets between the end plates and body of the unit. Monitor the filter closely during the initial start-up period. Depending on water quality, the ozonation process may generate considerable amounts of precipitants which must be removed by filtration and may clog filter if not cleaned often during this stage. After the 48 hour start-up period, backwash or clean the filter and perform a Cell cleaning.

NORMAL OPERATION

CSS5-1: Chlorine levels are adjusted by increasing or decreasing the salt level in the spa.

CSS5-2: Chlorine levels are adjusted using the adjustment knob on top of the unit and maintaining recommended salt levels.

The recommended run time to generate adequate amounts of chlorine is 6-8 hours per day. Increased run times of 12 hours per day are recommended for highly loaded spas. The system will generate chlorine and ozone ONLY when the spa pump is running.

The CSS System is designed to produce a low level of chlorine that ensures the spa has adequate disinfection. This quantity of chlorine can be as much as 90 percent less than what is required in a chlorine-only spa with no ozonator.

Normal test kits measure chlorine residual (combined chlorine, which is chlorine combined with bather load). Since ozone will normally keep bather load at very low levels, combined chlorines will be at very low levels, making detection difficult. For water testing, DPD liquid test kits work the best, as opposed to test strips. The best indication of proper operation is water clarity. If cloudy or odorous conditions persist, drain or shock spa, check filter and operate complete sanitation system continuously for 48 hours. To get an accurate chlorine reading, a water sample should be taken to your pool/spa dealer for testing (test strips will not be accurate enough for this). Water should be tested every two weeks to maintain maximum water quality and enjoyment.

Salt chlorine generators may naturally increase the pH of the spa. Monitor pH regularly and adjust if it is not between 7.2 and 7.6.

NOTE: The pH value is a very important factor for ensuring maximum chlorine readings. As pH increases above 8.0, chlorine readings will decrease rapidly. Optimum pH is 7.6. Muriatic acid is used to reduce pH value and when added to the spa, using the optional acid injection kit, will help to keep the Chlorine Generator Cell plates clean.

Water with high calcium levels will result in scaling of the Chlorine Generator Cell plates (high pH will worsen the effect of high calcium).

Shocking the spa is required periodically (normally about every 30-60 days) using dichloride. DO NOT use non-chlorine shock or calcium hypo-chloride.

CSS System should be reset, by turning the system off then back on again after 10 seconds, when salt is added to the spa.

Chlorine Generator Cell should be checked periodically for blockages or obstructions and cleaned as necessary.

CLEANING THE CELL

The auto reversing feature of your CSS System will help to keep the Chlorine Generator Cell clean and will also generate precipitants. Calcium build-up can occur on the edges of the chlorine generation plates. This is normal as long as it is not sufficient to block flow. If it appears that calcium build-up will affect the water flow pattern, then the Cell can be cleaned as follows:

1. Detach ozone feed line to the Injector from the Check Valve.
2. Insert this end into a small bottle (4-6 oz) of DILUTED Muriatic acid while the spa is operating.
3. Allow suction to draw 4-6 ounces of acid into the Cell and shut off circulation pump.
4. Allow system to sit for 5-10 minutes.
5. Reconnect ozone tube to Check Valve.
6. Restart system.
7. Alternately, Cell can be removed and dropped into a container of Muriatic acid.

WATER TREATMENT PROCESS

Water treatment is accomplished by two processes: Oxidation and Disinfection.

Oxidation: Oxidation is a process by which chlorine or ozone react with contaminants in the spa (referred to as bather loading). Bather loading consists of sweat, mucus, oils, urine, cosmetics, and other contaminants shed by spa users. They worsen water quality and provide an environment which promotes the growth of microorganisms. In a chlorine only spa, this reaction creates combined chlorines, which are the source of odors and irritation. Combined chlorines are normally removed by a process called breakpoint chlorination (shocking). Upwards of 90 percent of chlorine can be consumed in oxidation reactions. Ozone, which is the most powerful oxidant available, replaces chlorine as the primary oxidant in the spa. Ozone reacts with bather loading and precipitates it so that it can be removed by filtration and generates breakpoint oxidation continually on the combined chlorine.

Disinfection: Disinfection is the process by which microorganisms are killed. Although most people associate water treatment with disinfection, it actually consumes relatively little chlorine. Ozone is the most powerful sanitizer readily available.

Water Treatment: Water treatment equals oxidation plus disinfection. The CSS System provides both functions: Ozone for oxidation and chlorine for disinfection. The system is designed so that ozone does most of the work in the water treatment process, at the point of contact. The chlorination level is set so that only enough of a residual is produced to kill remaining microorganisms in the spa. The amount of chlorine required for this process is very low, less than 0.5 ppm.

INSTALLATION KIT INVENTORY

P28 Installation Kit

Description	Part Number	Quantity
684 Venturi Injector	600002	1
Plastic Clamp 1/2"	20185	2
Metal Clamp 1 1/4"	20067	4
Polybraid Hose 1/4"	20260	72"
Polybraid Hose 3/4"	20264	96"
Check Valve	20214	1
Screw #8 x 3/4" PPSMS	20109	4

TROUBLESHOOTING GUIDE

PROBLEM	PROBABLE CAUSE	REMEDY
No light from Prozone unit	Loose wiring	Check all wiring connections
	No power to unit	Check voltage compatibility Check power source
	Defective lamp or other internal component	Return unit to dealer
No bubbles from injector or no evidence of ozone in spa	Excessive back pressure	Check for kinks or clogs in hose or plumbing
	Leak in fitting	Replace fitting
	Filter not working	Check filter
Water in Ozone Generator	Check Valve failure	Verify Check Valve is installed properly with syphon loop
Cloudy water; foamy water; scum	Water chemistry out of balance	Check readings and balance accordingly
	Total Dissolved Solids (TDS) level too high	Refer to dealer for proper water testing
	Filter not working	Clean or replace filter

NOTE: Cloudy water may occur when the ozone generator is started. Filter and backwash as necessary.

INSTALLATION KIT INVENTORY

P12 Installation Kit PZ2-4V Bypass with Saddle Clamps

Description	Part Number	Quantity
784 Venturi Injector	600207	1
Plastic Clamp 1/2"	20185	2
Plastic Clamp 5/8"	20186	4
Metal Clamp 1-1/4"	20067	2
PVC Pipe 1/2" x 3"	20314	1
Polybraid Hose 1/4"	20260	12"
Clear Vinyl Hose 3/4"	20264	96"
Polybraid Hose 3/8"	20261	144"
Check Valve - 1/2"	20215	1
Check Valve - 3/8"	20730	1
Fitting 1/2" MPT x 1/4" HB	20230	1
Fitting 1/2" MPT x 3/8" HB	20231	1
Saddle Clamp, Outer Top	201155-4	2
Saddle Clamp, Outer Bottom	201155	2
Saddle Clamp, Inner Top	201155-2	2
Saddle Clamp, Inner Bottom	201155-3	2
Saddle Clamp Gasket	400076	2
Saddle Clamp Bushing	201155-5	2
Screw #14 x 1-1/2" PPMS	201863	4
Nut 1/4-20	20703	4

P33 Installation Kit PZ2-4V Bypass with PVC Tees

Description	Part Number	Quantity
784 Venturi Injector Assembly	600207	1
Plastic Clamp 1/2"	20185	2
Plastic Clamp 5/8"	20186	4
Metal Clamp 1-1/2"	20068	2
Polybraid Hose 1/4"	20260	12"
Clear Vinyl Hose 3/4"	20264	96"
Polybraid Hose 3/8"	20261	144"
Check Valve - 1/2"	20215	1
Check Valve - 3/8"	20730	1
Fitting 1/2" MPT x 1/4" HB	20230	1
Fitting 1/2" MPT x 3/8" HB	20231	1
PVC Tee 2" SL x 3/4" FPT	201095	2
PVC Fitting 2" SP x 1-1/2" SL	201114	4
PVC Fitting 3/4" MPT x HB	20678	2

Note: For pools with Diatomaceous Earth filter and Bypass / Venturi Injector installation, add (1) 3/4" Ball Valve, (2) 3/4" MPT x HB fittings, and (2) 1 1/4" metal clamps.

TROUBLESHOOTING GUIDE

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No light from Prozone unit	Loose wiring	Check all wiring connections
	No power to unit	Check voltage compatibility Check power source
	Defective lamp or other internal component	Return unit to dealer
No bubbles from injector or no evidence of ozone in pool	Excessive back pressure	Check for kinks or clogs in hose or plumbing
	Leak in fitting	Replace fitting
	Filter not working	Check filter
Water in Ozone Generator	Check Valve failure	Verify Check Valve in Venturi is operating properly
Cloudy water; foamy water; scum	Water chemistry out of balance	Check readings and balance accordingly
	Total Dissolved Solids (TDS) level too high	Refer to dealer for proper water testing
	Filter not working	Clean or replace filter

NOTE: Cloudy water may occur when the ozone generator is started. Clean filter and backwash as necessary.

Run the circulation system for 48-72 hours before reverting to your normal cycle.