

IMPORTANT SAFETY INSTRUCTIONS

When using this electrical equipment, basic safety precautions should always be followed, including the following:

READ AND FOLLOW ALL INSTRUCTIONS in this manual before attempting installation

- A wire connector is provided on this unit to connect (Marked "Bonding Lug") a minimum 8 AWG (8.4 mm²) solid copper conductor (min. 6 AWG in Canada) between this unit and any metal equipment, metal enclosures of electrical equipment, metal water pipe, or conduit within 5 feet (1.5m) of the unit.
- Follow all applicable electric codes.
- All permanent electrical connections should be performed by a qualified electrician.
- For cord and plug connected units:
"Risk of electric shock. Connect only to properly grounded, grounding type receptacle."
- For cord and plug connected units:
"Do not bury cord."
- For cord and plug connected units:
"Warning – To reduce the risk of electric shock, replace damaged cord immediately."
- If electrically connecting this unit directly to pool controls ensure the controls are protected by a (G.F.C.I.) Ground Fault Circuit Interrupter.
- Install at least 5 ft from wall of pool water using nonmetallic plumbing. Install ozone generator no less than 1 ft above the maximum water level to prevent water from contacting electrical equipment.

Install in accordance with the installation Instructions.

- Mount the unit so that it is not accessible by anyone in the pool.
- Mount the unit with Ozone hose barb facing up and power cords facing down.
- **Electric Shock Hazard.** Disconnect unit from power source before attempting service.
- **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: UV Light is harmful to eyes and exposed skin.** Do not look directly at the Ozone producing lamp used in this device.

SAVE THESE INSTRUCTIONS

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OO₃ Advanced Oxidation System Installation and Operation Guide





Section 1

General Information

This guide will provide recommendations for installing **Blue Square QO₃**™ Advanced Oxidation Systems. The recommendations in this document are for Venturi Injected applications. All **Blue Square QO₃**™ brand residential swimming pool ozonators utilize high output Very Ultra Violet lamp technology for the production of Ozone. The following **Blue Square QO₃**™ models are covered by this guide:

QO₃ 30,000 Gallon Primary, 50,000 Gallon Supplementary

Ozone Overview

Ozone is a gas which is produced in nature or by man. Ozone gas has a very short life cycle and must be produced on site. Because of this short life cycle a residual sanitizer must be maintained, however normally at a greatly reduced level. Ozone is thousands times faster than Chlorine in oxidizing organic load in water. Ozone has been used in water treatment since the 1890's, and has been used in all International Olympics Swimming Pools since 1984. There are many benefits to installing an **Blue Square QO₃**™ Advanced Oxidation Systems on swimming pools. To name a few; improved water clarity, reduction of chemicals, better overall swimming experience and reduction/elimination of odors, red burning eyes, itchy skin, bleached clothing, "ring-around-the- tub" oils.

Product Description

Blue Square QO₃™ brand ozonators utilize High Output (VUV) Very Ultra Violet lamps to facilitate the production of ozone and are available for use in 110v or 220v 50/60 power applications. **Caution should be used as looking directly at UV lamps will cause eye damage.** There are no moving parts to service. The models referenced in this document are designed for indoor or outdoor use on residential above ground and in-ground swimming pools.

Specifications

QO₃ Advanced Oxidation System

Enclosure Material:..... Aluminum
Unit Size: 10" L x 8" W x 6" H
Shipping Box Size: 14" x 10" x 8"
Shipping weight:with Kit 10 pounds
Shipping weight: ...without Kit 7 pounds

Power Specifications

Electronic Ballast
Universal 120-277V 50/60Hz Voltage
Max. Input Current .21A/25W @ 120V
Max. Input Current .10A/25W @ 277V
Surge Protection 3KV
Thermal Protection 180 degrees F



Section 2

Installation

Pool Water Chemistry

To achieve optimal performance from the **Blue Square QO₃**™ Advanced Oxidation System, it is recommended the following be performed prior to initial start-up:

- BACKWASH or Clean Filter
- Test and Adjust water chemical balance to recommendations in the chart below (if possible)

Test	Ideal Range
Free Available Chlorine (FAC)	1.0 ppm (Minimum)
Total Chlorine (TC)	Up to 0.5 ppm above FAC Reading
Bromine	2.0 ppm
pH	7.2 - 7.8
Total Alkalinity (TA)	80 – 120 ppm
Calcium Hardness (CH)	200 – 300 ppm
Total Dissolved Solids (TDS)	300 – 1200 ppm

Equipment Location

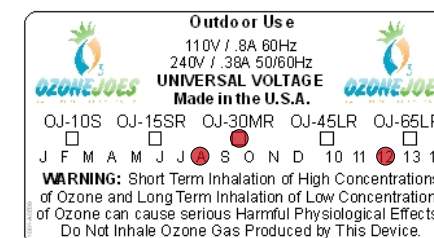
Mount the **Blue Square QO₃**™ Advanced Oxidation System to a post or wall within 6 feet of 110v or 220v timer, electrical box or 120v receptacle. The unit should be mounted at least one foot above maximum water level and preferably out of direct sunlight. The Oxidation System should also be located no closer than 5 feet from a body of water.

Electrical

All permanent electrical connections should be performed by a certified electrician in accordance with electrical codes. **Blue Square QO₃**™ Advanced Oxidation System ship from the factory as 120-277V Universal Voltage units with 3 prong NEMA connector. The electrical connection should be such that the Oxidation System is supplied power only when power is supplied to the pool filter/circulation pump. A permanent Ground Bonding connector is provided on this unit and should be used to connect a minimum 8 AWG solid copper wire conductor to any metal equipment, metal enclosures of electrical equipment, metal water pipe, or conduit within 5 feet of unit.

Voltage

Blue Square QO₃™ Advanced Oxidation Systems are 120V/277V 50-60Hz Universal Voltage. Units are supplied with a 3-Prong NEMA Plug for easy 120V hookup and for testing. To wire the Ozonator to a 220V power supply, just cut the NEMA Plug and strip the wires to connect to the proper terminals. Voltage, specifications, system and production date are labeled on the cord end of the Ozonator. Identities are identified with a hole punch as seen on the graphic to the right.



Mounting

Mount the **Blue Square QO₃**™ Advanced Oxidation System to a post or wall using the four mounting screw holes in the enclosure base. The unit may be mounted Horizontally or Vertically. It is recommended that the vent holes not face upwards and be directly exposed to rainfall.

Section 2 (Continued)

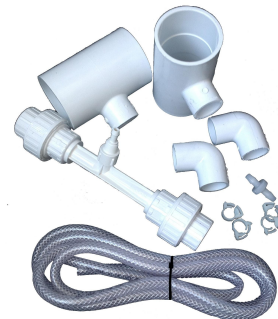
Installations

Installation in Figure 1 below is a suitable for all filter types, and is the recommended method when plumbing space is available after the filter and heater. Figure 1 is also required with low-speed or variable speed pumps.

The purpose of the bypassing the filter and/or pool heater is to create water flow through the injector using the natural back pressure of the filter and/or pool heater. The injector needs sufficient flow to cause a venturi or suction action to draw air flow through the **Blue Square QO₃**™ Advanced Oxidation Systems lamp chamber.

Installation Kit Components:

- (2) 2" x 2" x 3/4" Schedule 40 PVC Reducing Tees
- (1) 88S Venturi with 3/4" PVC Unions
- (2) 3/4" Schedule 40 Soc. PVC Elbows
- (1) 1/4" Viton Seal Check Valve
- (4) 1/4" Handy Clamps
- (1) 8' Section of Polybraided Tubing



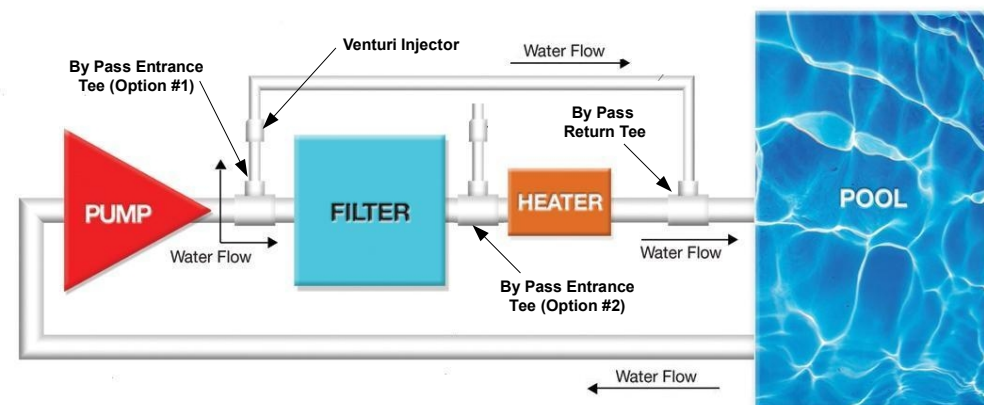
- Ensure 1/4" x 1/4" Kynar Check Valve is installed where air flow is allowed toward the injector. Air direction can be tested by blowing into the 1/4" I.D. Polybraided Tubing, if correct you will see air bubbles enter one of the returns in the pool.

Do Not Suck on the 1/4" I.D. Tubing when connected to the Oxidation System.

Issues that may be encountered with Figure 1 Installation

The potential issue, when using hard plumbing installations is it hard to visually see the frothing action directly after the injector. Ozone, however, can be monitored at the pool return. Alternatively, an air flow meter may be temporarily placed in the 1/4" Polybraided tubing from the Oxidation System to the Venturi Injector. When using a flow meter, the proper range of air flow should be between 4-7 SCFH.

If no bubbles appear at the return of the pool, there may not be enough back pressure from the equipment (filter, heater, etc.). In this case a ball valve may have to be installed after the first tee of the bypass and before the returning tee of the bypass. A slight closure of this ball valve will create enough water diversion to activate the Venturi Injector.



Section 3

What to expect after installing a QO₃ Advanced Oxidation System

There are several considerations as to the different stages the pool may encounter before becoming sparkling and crystal clear and odor free. Factors as how long has the water been in the pool, what sanitizer is or has been used, what is the pump cycle time, and what is the filter media will be discussed.

The amazing thing with using a **Blue Square QO₃**™ Advanced Oxidation System on a swimming pool if it is sized correctly and working properly is how absolutely great the water clarity becomes. The pool "Deep End" regardless of depth appears to be quite shallow. The name on the drain can be identified versus just seeing the drain. The oils often found on the surface such as suntan oils causing the pool to have a dull look are destroyed and the dullness is replaced with a sparkling colorful surface similar to a diamond ring in a jewelry store under a bright light. Additionally, the "ring around the tub" so typical of suntan and other oils is addressed. The water will have a softer feel to it. Swimming pool odors are eliminated.

All of these great things occur, but the time it takes to get there will vary and range from 1 day to a week and a half or so depending upon the pre-Ozone condition of the water to be purified. There are observable changes that will occur from the moment a **Blue Square QO₃**™ Advanced Oxidation System is correctly installed and powered on.

If the swimming pool has had the same water in it for a long period, and has accumulated a lot of TDS over time due to small debris passing through filters in varying sizes, you can expect the first few days to be pretty rough. The swimming pool will become very murky around days two-three and should show significant signs of clearing by day four. As the ozone flocculates the debris into larger pieces, although they were always there, they become quite noticeable. The Ozone is working its magic. This debris will eventually be trapped in the filter and additional backwashing, cleaning of cartridge filters, or cleaning and recharging DE filters will be required, so **keep an eye on the filter** pressure. This process is temporary and handling of the filter will be as usual after the first week.

What to expect with different sanitizers:

Note: Chlorine, bromine and Salt Chlorine Generator pools will experience the above. Biquanides have additional observations.

Chlorine: Shock the pool just prior to installing a **Blue Square QO₃**™ Advanced Oxidation System. Keep the same chlorine dose as used prior to installing an Ozonator for the first week, then adjust amount used to maintain between .5 and 1.0 ppm available chlorine. Do not shock during the period that flocculation is in process or you will be back at the starting point. Let the **Blue Square QO₃**™ Advanced Oxidation System do its work.

Bromine: Same recommendations as for chlorine. You may find that if the reason for using the more expensive Bromine as a sanitizer was due to chlorine allergies, you may be able to revert to chlorine as the sanitizer as lesser levels are required. It is also likely that chloramines were the culprit to allergies, and chloramines should no longer be an issue. Swimming pools using Bromine as the sanitizer may require a larger sized Ozonator.

Biquanides: Arch Chemicals, manufacturer of Baquacil, has tested Ozone compatibility and assures they are compatible. In addition to the observations listed above, pools that currently use Biquanides based products or pools that previously used them and have converted back to chlorine or bromine have a tendency to produce brownish colored foam. Consider this foam as proof the Ozonator is doing its job. Sometimes the foam is quite noticeable, but it does normally subside and is eliminated in a week or so.



Section 3 (Continued)

What to expect with different sanitizers (continued):

Salt Chlorine Generator: Users of salt chlorine generators state how clear and how soft the water feels. What can be expected is similar to chlorine and bromine based pools as far as the transition phase. The water clarity will actually improve. After about a week, the salt generator equipment may need to be turned down as the available or free chlorine will have increased if the settings are unchanged. You may also find that the adjustment of pH levels is not as frequent.

What to expect with different filter types

It is very important to keep a watchful eye on the pool filter for the first week regardless of starting water condition.

Sand filters: The filter will have more debris that is large enough to trap during the first week. If sand filters are not backwashed as needed during this initial period they will eventually wind up with crevices (canyons) in the sand media which allows the now larger flocculated debris to keep re-circulating to the pool. Water under pressure has to go somewhere, and when the sand is clogged with debris, it will make a path. After the first week, the filters can be treated as usual.

Cartridge filters: One must be careful during the first week with cartridge filters. The additional debris load that is now large enough to be trapped in the filter will restrict the water flow. The filter must be cleaned of this debris or it is possible that the filter will become perforated and require replacement. The water will make a path, and the path it makes in a cartridge filter is by puncturing a hole.

Diatomaceous Earth DE filters: DE filters may experience perforation of a grid, or crevices of the media described above under sand and cartridge filters. The good news is that much of the smaller debris that normally would pass through other filter types have been addressed, so the flocculation is not as severe. This being the case, there may still be issues of filters clogging during the first week. One thing that should also be pointed out here is that using the bypass with venturi injection install technique in figure 2 (discussed later) will allow some of the DE to be introduced to the pool when recharging unless a cutoff valve is placed in the bypass line.

Section 4

Maintenance & Service

Visual Inspection

Periodically inspect to ensure the unit is functioning correctly by observing the end plate gaskets for a light blue glow while the recirculation pump is running (if permanently wired to the timer or if the unit is plugged in by 3-Prong NEMA Plug). To check to ensure that the venturi injector and bypass are working correctly simply observe to see if small bubbles are entering the pool. Periodically check the unit intake vent holes/plug for unlikely event of debris accumulation.

Do no look directly into the vent holes when lamp is operating.



Section 4 (Continued)

Visual Inspection (Continued)

Perform visual inspection to determine if both the plumbing and electrical are working. Repair accordingly.

Plumbing issues: minor adjustment of the ball valve (if installed) may be required to divert water through the Venturi Injector. This especially may be true with two speed or variable speed pumps. Adjust the ball valve to accommodate flow through the Venturi Injector on low speed. If a Mazzei® brand injector is installed, access to the internal check valve is via the connection at the Polybraided hose barb nut. In the unlikely event this area becomes clogged, it may be cleaned by removing the nut/barb and a retaining rubber seal. Care should be used to not lose the internal ball and spring while taking the rubber seal off. Clean and reinstall in the reverse order of disassembly.

Electrical issues: If there is no emitted light blue glow observed either a power source issue or a lamp/ballast issue exists. Check power source for correct voltage. If correct supply voltage is observed contact joe@ozonejoes via email or call 256-489-2896 to determine if unit is under warranty and for further assistance.

Section 5

Warranty

Initial One Year Warranty Term:

This **Blue Square QO₃**™ Advanced Oxidation product is warranted against defects in materials and workmanship for a period of one year from date of Warranty Registration. During the warranty period **Blue Square**, at its option, either repair or replace products that prove to be defective. All warranty correspondence should go through the **Blue Square** warranty station at the address listed below.

All equipment must be registered with the included Warranty Registration Card prior to any warranty service.

If equipment fails the Customer or Reseller shall notify Ozone Joe's and request a Return Material Authorization (RMA) number. For warranty service or repair, this product must be returned to Ozone Joe's. All returns to Ozone Joe's **MUST** have a valid RMA number written clearly on the outside of the box or the shipment will be refused.

Most warranty issues involve the VUV Ozone Lamp. Should your unit fail, 1 replacement Lamp will be sent to your location within 48 hours of notification. Should the unit require additional service, a replacement system will be sent along a return label for the failed system.

After the one-year warranty period, additional parts can be purchased through Ozone Joe's.

Warranty and Service Contact Info:

Ozone Joe's
1300 Meridian Street
Suite 7
Huntsville, AL 35801
www.ozonejoes.com