

COPILLOT™

OZONATOR 3

Next Generation Corona Discharge Installation & Operation Manual



AUTOPILOT®
SALT CHLORINE GENERATORS

IMPORTANT SAFETY INSTRUCTIONS

READ & FOLLOW ALL INSTRUCTIONS

- Read this manual completely before attempting installation. Failure to install in accordance with the installation instructions could void warranty and result in injury or death.
- The CoPilot electrical connection is to be attached to the pool controls, be sure the pool controls are protected by a Ground Fault Circuit Interrupter (G.F.C.I.). If the CoPilot is connected to an independent electrical supply, then a G.F.C.I. must be installed between the CoPilot and the electrical supply.
- **WARNING** - To reduce the risk of electrical shock, this device must be mounted such that it is inaccessible to a person in the pool.
- A pressure wire connector is provided on the outside of the unit, marked "BONDING LUGS" to permit connection to a minimum No. 6 AWG (13.3 mm²) solid bonding conductor between this point and any metal equipment, metal enclosures of electrical equipment, metal water pipes, or within five (5) feet (1.5m) of the unit or as needed to comply with local requirements.
- Install at least 5 feet (1.5 meters) from wall of pool using nonmetallic tubing. Install ozone generator no less than one (1) foot above maximum water level to prevent water from contacting electrical equipment. Install in accordance with the installation instructions.
- Follow all applicable electrical codes.
- **WARNING** - Electric shock hazard. Be sure to turn power OFF and disconnect from power source before any routine maintenance is performed. Failure to do so could result in serious injury or death.
- The CoPilot must be installed in an outdoor location, or indoors in a forced air ventilated room, and installed so that the orientation is exactly as shown in Figure 1. Install to provide water drainage of generator to protect electrical components.
- Mount the CoPilot so that it is inaccessible to anyone in the pool. Never attempt any servicing while unit is wet.
- Plastic ozone supply tubing is supplied with the CoPilot. Never replace this tubing with metal tubing.
- **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.
- For your safety, do not store or use gasoline, chemicals or other flammable liquids or vapors near this or any other appliance.
- **WARNING** - To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.
- A terminal marked G is located inside the supply terminal box or compartment. To reduce the risk of electric shock, this terminal must be connected to the grounding means provided in the electric supply service panel with a continuous copper wire equivalent in size to the circuit conductors supplying this equipment.
- At least two lugs marked "BONDING LUGS" are provided on the external surface or on the inside of the supply terminal box or compartment. To reduce the risk of electric shock, connect the local common bonding grid in the area of the hot tub or spa to these terminals with an insulated or bare copper conductor not smaller than No. 6 AWG.

SAVE THESE INSTRUCTIONS!

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SECTION 1. Overview

1A. Description

The CoPilot Series Ozone Generators described in this manual are designed to provide the benefits of ozonated water in an environmentally safe and effective manner. The high quality, specially engineered components ensure efficient ozone output and reliable performance.

As a result of proper use of the CoPilot Ozone Generators, unpleasant effects of traditional chemical use are virtually eliminated. The CoPilot Ozone Generators are safe and harmless to your equipment when installed properly.

1B. Specifications

Power Requirements:

CoPilot..... 110-250V, 0.10A max, 50-60 Hz

CoPilot XL 110-250V, 0.20A max, 50-60 Hz

Location Requirements:

Mounting: Wall mount in a clean, protected area.

Ambient Temp.: 30°F - 120°F (0°C - 50°C)

1C. Warranty Summary

Limited Warranty: See the Warranty Card Supplied with Manifold Assembly.

Warning: Failure to perform annual replacement of the Ozone Check Valve and Tubing Assembly may void the second year of your warranty.

Accessory Kit Contents:

Installation & Operation Manual 1 ea

Hose Clamps 5 ea

Tube Adapter 1 ea

Flowmeter 1 ea

Flow Control Assembly 1 ea

Check Valve and Tubing Assembly 1 ea

Mounting Hardware (Screws and Plastic Anchors) 3 ea

Leak Test Cap (installed on manifold) 1 ea

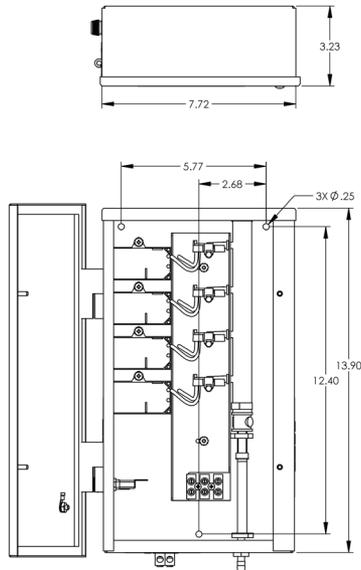
SECTION 2. Installation

2A. Location

The CoPilot units are designed for wall mounting. Mount generator in a clean, protected area, either indoors or outdoors (preferably out of direct sunlight). Locate generator out of reach of sprinklers or drainage spouts. Allow sufficient access for maintenance, all tubing, and electrical wires. Ozone generator should be installed at least (not less than) one foot above the maximum water level.

Note: Remove and discard the foam packaging from inside the enclosure before mounting the unit.

2B. Wall Mounting



Copilot and CoPilotXL

Figure 1: Mounting Hole Dimensions

1. Open the Enclosure Door and locate the three mounting holes on the back wall of the Enclosure. There will be two holes located near the top on the left and right and one located in the center near the bottom. Refer to Figure 1 for clarification.
2. Install screws (or other hardware appropriate for the mounting surface) through the two mounting holes near the top of the

enclosure. Install the last screw through the mounting hole near the bottom of the enclosure. Mounting hardware must be driven until the head fully contacts the enclosure wall. Mounting hardware head must not be smaller than 0.25 inches (6.3 mm) in diameter and the threads of the hardware must be smaller than 0.25 inches (6.3 mm) in diameter.

2C. Electrical

WARNING: Risk of electric shock.

2C-1. Main Power

This device is intended to be installed by a certified electrical technician, in accordance with local electrical codes. Connect the CoPilot to the pool timing clock so that the CoPilot operates simultaneously with the pool pump. The CoPilot has three available Knockouts for a 1/2 inch conduit fitting, two on each side and one on the bottom. Remove only the ideal Knockout and install the proper conduit fitting. Open the Enclosure and locate the Terminal Block. Connect Line 1, Line 2, and Ground to the Terminal Block as indicated by the label on the inside of the enclosure door. Refer to the IMPORTANT SAFETY INSTRUCTIONS at the beginning of this manual for important wiring information.

2C-2. Earth Grounding Lug

Using an 6 AWG (13.3 mm²) conductor, connect the Grounding lug on the bottom of the CoPilot, marked to an appropriate earth contact.

2D. Plumbing

Ozone gas is introduced to the pool circulation line using a venturi injector installed in the AutoPilot Combination Bypass Manifold. Suction developed by the venturi allows the CoPilot generator to operate safely under vacuum.

Note: Water must not travel back to the CoPilot ozone generator. Mounting the unit above the water line and scheduled check valve replacement will keep water from entering the CoPilot.

2D-1. Plumbing the Manifold

The AutoPilot Combination Manifold must be installed in the pool's main return line after all other pool equipment (pump, filter, heater, and cleaner). Follow the instructions in your Pool Pilot Controller Manual and AutoPilot Cell/Manifold Assembly Installation Instructions.

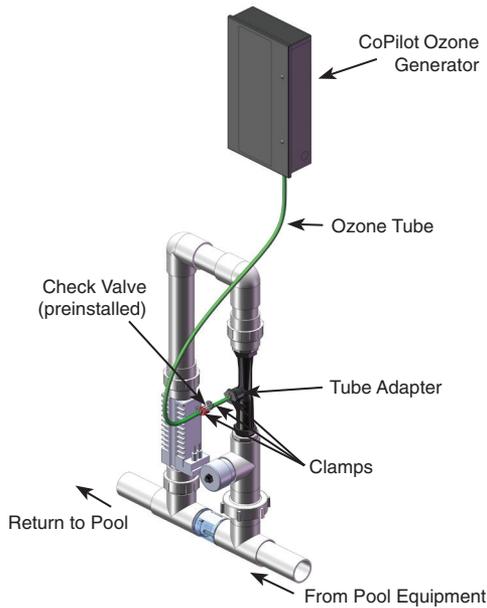


Figure 2: Installation Diagram

Locate an appropriate section of the return line and install the injector manifold with PVC cement. Be very careful to observe and follow the correct water flow direction (as indicated by the arrow on the injector manifold).

2D-2. Special considerations for the AutoPilot Combination Manifold

Under normal operation, a small amount of gas is introduced into the pool system by the injector. Plumb the Manifold so that these bubbles do not interfere with the operation of pool equipment. For example:

1. Install the manifold after any Pressure Pool Cleaners (such as a Polaris 360).

2D-3. Water Check Valve

If the pool equipment is mounted above the water line, a check valve must be installed between the pump outlet and the Injector Manifold. This will prevent the pump from draining and losing its prime (when not in use).

Note: If a 1/3# DELCheck™ is used, do not install immediately after chlorine feeders.

2D-4. Pressure Test

If a pressure test is required, it should be performed prior to connecting the Ozone Gas Line. Install the 3/4" pipe cap provided onto the Injector for the pressure test.

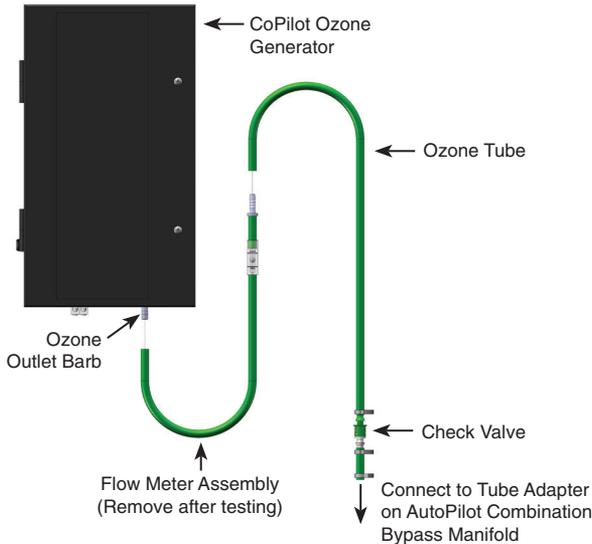


Figure 3: Flow Test Assembly

2D-5. Flow Test - Refer to Figure 3.

1. Install Tube Adapter on Injector using preferred thread sealant. If Teflon® tape is used, ensure that no tape enters the Injector.
2. Connect the end of the Ozone Tube with the check valves installed onto the Tube Adapter with the tube clamp provided.
3. Connect the longer end of the Flow Meter Assembly to the Ozone Outlet Barb.
4. Connect the remaining ends of the Ozone Tube and the Flow Meter Assembly together.
5. Hold the Flow Meter Assembly so that the clear plastic chamber is vertical with the longer tubing toward the bottom.
6. Turn on the pool's circulation system as this allows the Injector Assembly to pull a vacuum. Under normal operation, the ball in the Flow Meter Assembly will be floating in between its Max and Min line. Under worst-case system conditions the flowmeter ball should indicate at least a small amount of air flow. Flow may be adjusted as described below.

7. After the system has been set for the correct flow rate. **Remove the Flow Meter Assembly** and connect the remaining end of the Ozone Tube to the Ozone Outlet Barb on the CoPilot unit with the tube clamp provided. Cut off the excess tubing so that the line from the injector to the CoPilot is as straight and free from dips and loops as possible.

SECTION 3 Operation

3A. General

To achieve optimal performance from the ozone system, the pool must be as clean as possible to start with. Refer to the “Pool Water Preparation” section of your Pool Pilot manual.

3B. Initial System Start-Up

Upon completing all of the generator system connections and cleaning the pool as outlined above, you are ready to start the ozone generator.

1. Check electrical connections.
2. Check for proper voltage.
3. Turn on pool circulation system.

3C. Normal Operation

1. Indicator Lights: When the pool’s circulation system starts, the Eclipse will power up and the green indicator lights on the ozone cells will illuminate. Open the Enclosure Door to verify that all indicator lights are green. The CoPilot and CoPilot XL should show 2 and 4 indicators, respectively.

3D. System Shut-Down

The following sequence of steps must be followed for servicing or for storage.

1. Disconnect the power to the ozone generator.
2. After the generator has been shut down, the pool water circulation pump may be turned off.
3. If the system is to be shut down for an extended period, disconnect the Ozone Tube from the unit.

3E. Water Chemistry

Regular chlorine or bromine testing should be performed as normal. Ozone will be eliminating the majority of contaminants. Therefore, only a small amount of chemicals will need to be added - just enough to maintain a minimum of residual level of 0.5 - 1.0 ppm chlorine or 1.0 - 2.0 ppm bromine. Ozone is pH neutral thus minimizing pH adjustments.

SECTION 4. Maintenance

4A. System Electromechanical Overview

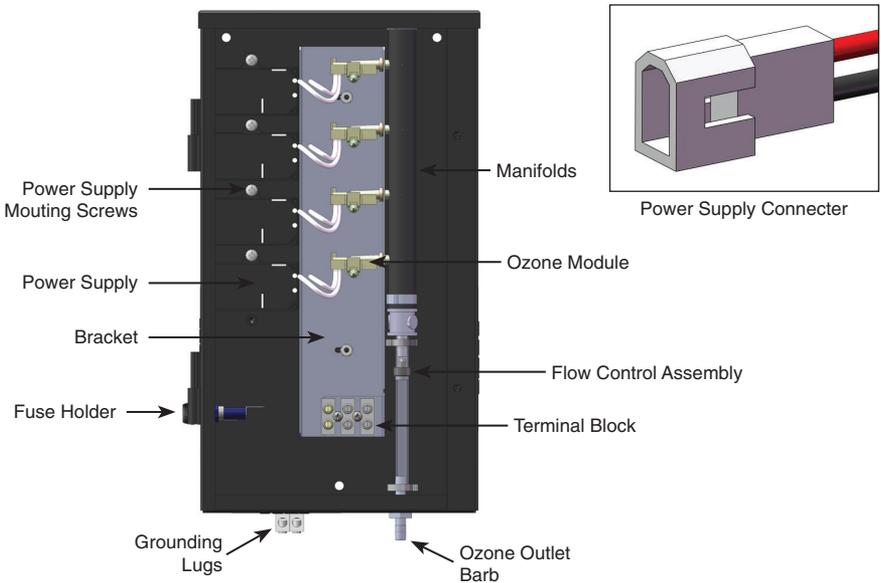


Figure 4: CoPilot Overview

4A-1. Ozone Module

The CoPilot ozone generators are constructed with high voltage plasma gap Ozone Modules. The CoPilot and CoPilot XL have 2 and 4 modules, respectively. Each module has an indicator light that signals it's working properly. If the light goes out, replace the module.

4B. System Maintenance

4B-1. The green indicator lights on the Ozone Modules located inside the enclosure indicates that the Power Supply is operating properly. When an indicator light goes out, replace the corresponding Ozone Module. Regularly check inside the unit to verify all the Ozone Modules are working.

4B-2. Each Ozone Module should be replaced after 15,000 hours of operation. Even if the green indicator light(s) are glowing, the Ozone Module may be producing less ozone after this period of time due to contamination within the plasma gap ozone chamber.

4B-3. Regularly reinstall and check the flowmeter for proper flow. Always remove the flow meter after confirming proper flow. Inspect Ozone Tube for cracks or wear and replace as necessary.

4B-4. Replace the Ozone Tube every year or sooner, if needed. If there is evidence of water leaking past the Check Valve toward the CoPilot, shut down the unit immediately and replace the Ozone Tube and Check Valve. If water entered the CoPilot, allow the unit to dry completely before restarting. Evidence of water in the CoPilot may void the warranty.

WARNING: Do NOT touch the ends of the Ozone Tube when replacing. Trace amounts of nitric acid may be present and could prove harmful if touched or ingested.

4B-5. While operating, check to see if bubbles are entering the pool. If an MDV is installed, check the MDV for bubbles.

4B-6. Clean or replace the Flow Control Assembly every year or sooner if needed.

4C. Generator Servicing - Refer to Figure 4

WARNING: Electric shock hazard. Be sure to turn power OFF and disconnect from power source before any routine maintenance is performed. Failure to do so could result in serious injury or death.

4C-1. Opening the Unit

The CoPilot ozone generator may be serviced on the wall without disconnecting any of the plumbing or wiring. Simply remove the two screws on the right side of the Enclosure Door to open the unit.

4C-2. Ozone Module Replacement

The CoPilot and CoPilot XL have 2 and 4 Ozone Modules, respectively. When the green indicator lights go out, the corresponding Ozone Module will need to be replaced.

To replace an Ozone Module:

1. Disconnect the Ozone Module from both Manifolds and pull the Ozone Module from the Bracket so it hangs by its wires.
2. Locate the Power Supply Connector and disconnect it from the wire harness.
3. Remove the Power Supply Mounting Screw; make sure to note plastic spacer and the star washer positions for proper reassembly. The Ozone Module and Power Supply can now be removed from the unit.
4. Install the new Ozone Module by reversing the above steps.

4D. Trouble Shooting

Knowledge of electrical applications is required for trouble shooting. Contact a certified electrician if you are unsure of your ability to service the equipment. Improper servicing will void generator warranty.

4D-1 Symptom: Module Indicator Lights not lit when pool system is on.

1. No power to the ozone generator from the power source:
 - a. Check circuit breaker at the power distribution box.
 - b. Check for loose connections or wiring breaks from the power distribution box to the generator.
 - c. The fuse in the unit has blown and needs to be replaced. The fuse is a replaceable glass, .25" x 1.25", 1 amp, slo-blo type.
2. G.F.C.I. has tripped.
 - a. Check power cord and reset G.F.C.I.

4D-2 Symptom: Flowmeter not indicating flow.

1. Injector not supplying adequate suction.
 - a. Check pump, filters, and skimmers to ensure water is flowing through injector.
 - b. Ensure that there is no debris clogged inside the injector.

2. Tubing is impaired.
 - a. Check for kinks or clogs.
 - b. Check for cracks or cuts.
 - c. Check connections.
 - d. Check that the check valve is installed with the arrow pointing towards the injector.
 - e. Be sure that the check valve has not become fouled with debris. Disconnect the Ozone Tube from the injector. With the pump running, cover the end of the injector with your thumb, and feel for suction. If there is sufficient suction without the check valve, replace the check valve with a new one.

4D-3 Symptom: Ozone Tube becomes yellow/brown and brittle.

1. The high concentration of ozone created by the CoPilot family of ozone generators, as well as environmental conditions like UV sunlight will tend to deteriorate the supplied Ozone Tube. This is normal and acceptable, as long as the tubing doesn't become cracked and leak. Because of this, the Ozone Tube and Check Valve should be replaced every year.

4D-4 Symptom: Can't get ball to stay in the center of flowmeter.

1. The flowmeter provided is a general tool to setup flow to the ozone generator. Flow will vary depending on pressures across the injector, and therefore can be affected by things such as filter or strainer loading. The ozone generator's efficiency is optimized near the center of the flow meter. The CoPilot ozone generator will still perform well at flows above and below the recommended range. However, the ball must be moving and not stuck on the bottom of the flowmeter.

4D-5 Symptom: Check Valve is leaking

1. Shut down the CoPilot ozone generator immediately and replace the Ozone Check Valve and Tubing Assembly.

4E. Contact Information

What we need to know if you need to contact us...

If you should need to call AquaCal AutoPilot for questions, service, or parts, please have the following information ready:

INSTALLER- Please record the following information prior to installation:

Installer:
Date of Installation:
CoPilot Model Type:
CoPilot Serial Number:

If you have any questions, please refer to our web site at www.autopilot.com for the latest manual revisions, additional information, and helpful service advice.

You can also call us at: (727) 823-5642. We are here to serve you from 8:00 A.M. to 5:00 P.M. Eastern time, Monday through Friday. If calling after hours, our voice mail system will handle your call. Please be sure to leave your name, a complete address, and your telephone number.

You may also reach us on the web at:

<http://www.autopilot.com/contact-us.html>

or

<http://www.aquacal.com/contact-us.html>

Or, if you prefer, you may FAX us at: (727) 824-0847. Be certain to provide your full address and daytime telephone number.

AquaCal AutoPilot, Inc.
2737 24th Street North
St. Petersburg, Florida 33713

SECTION 5. Replacement Parts

1. Ozone Module Kit APK0052 (9-1056-01)
Each ozone module should be replaced after 15,000 hours of use.
2. Ozone Tube Assembly APK0013 (9-0770-02)
The Ozone Tube Assembly (includes Ozone Tube and Check Valve) must be replaced once a year.
3. Fuse APK0055 (5-2148-01)
4. Flow Control Assembly APK0016 (9-0789-10)
5. Ozone Injector w/ Cap PLP0062 (9-0786-01)
6. Tube Adaptor for Injector APK0035 (71434-01)

Note: The warranty is void if the parts listed above are not replaced at recommended intervals.

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