



COPILOT OZONATOR 3

Corona Discharge Ozone Generators **INSTALLATION & OPERATION MANUAL**

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IMPORTANT SAFETY INSTRUCTIONS

Read and Follow All Instructions

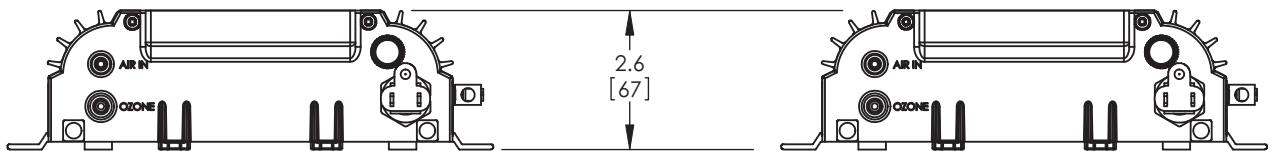
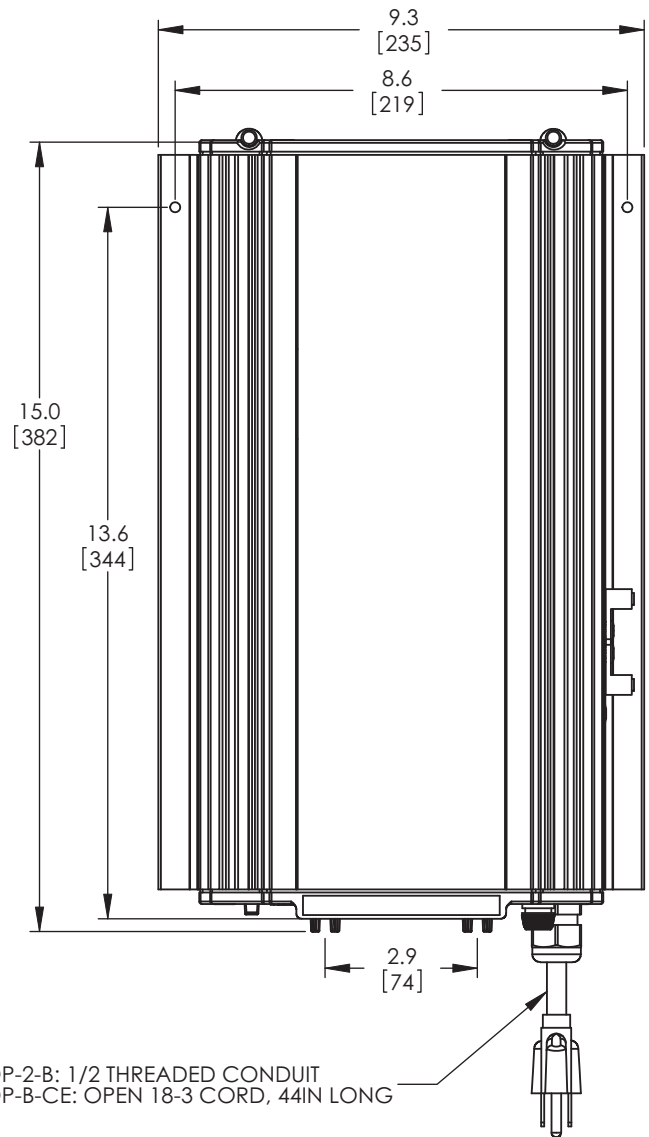
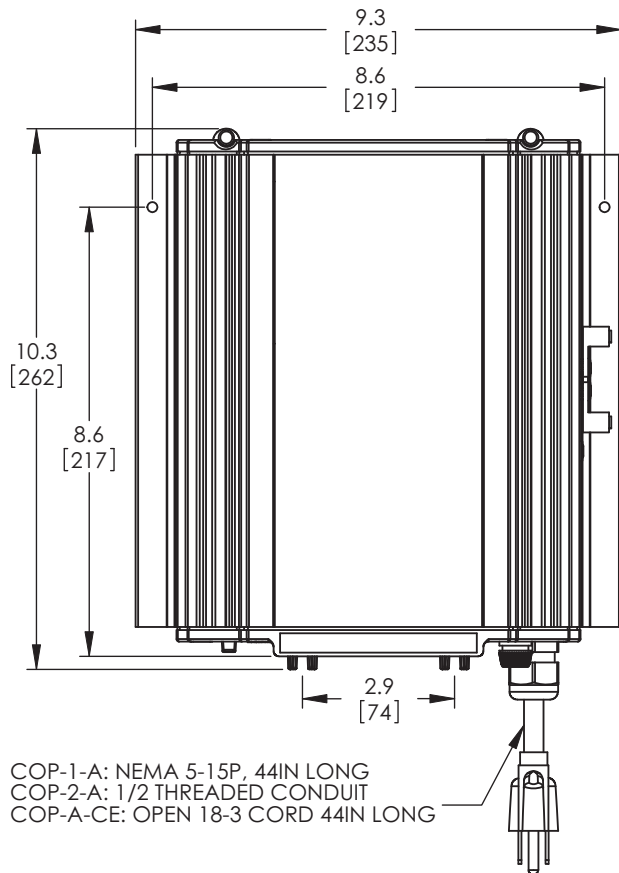
- Read this manual completely before attempting installation. Failure to install in accordance with the installation instructions could void warranty and result in injury or death.
- All permanent electrical connections should be made by a qualified electrician.
- For cord and plug-connected units, connect to a grounded, grounding type receptacle only. If 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.
- Do not bury cord.
- Warning - To reduce the risk of electrical shock, replace damaged cord immediately.
- A pressure wire connector bonding lug is provided on the outside of the unit to permit connection to a minimum No. 8 AWG (8.4 mm²) solid bonding conductor between this point and any metal equipment, metal enclosures of electrical equipment, metal water pipes, or conduit within five (5) feet (1.5m) of the unit 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.
- Electric shock hazard. Be sure to turn power OFF and disconnect from power source before any service work 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 - Do NOT touch the ends of the Ozone Check Valve and Tube Assembly or check valve when replacing. Trace amounts of nitric acid may be present on the check valve and could prove harmful if touched or ingested.

SAVE THESE INSTRUCTIONS!

SECTION 1 General Information

1A Dimensions.

(All dimensions are in inches [millimeters])



Models: COP-1-A, COP-2-A, & COP-A-CE

Models: COP-2-B & COP-B-CE

SECTION 1 General Information

1B Description

The CoPilot Corona Discharge (CD) series ozone generators described in this manual are designed to add the benefits of ozonated water to your AutoPilot system 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 CD ozone generators, unpleasant effects of traditional chemical use are virtually eliminated. The CoPilot CD ozone generators are safe and harmless to your equipment when installed properly.

1C Specifications

Power Requirements:

COP-1-A	.....	120V, 60 Hz, 1Ø, 0.06 Amp
COP-2-A	.....	220V, 60 Hz, 1Ø, 0.03 Amp
COP-A-CE	.....	230V, 50 Hz, 1Ø, 0.03 Amp
COP-2-B	.....	220V, 60 Hz, 1Ø, 0.06 Amp
COP-B-CE	.....	230V, 50 Hz, 1Ø, 0.06 Amp

Shipping Weight:

COP-A:	Approx. 3.5 pounds / 1.6 kg
COP-B:	Approx. 5.5 pounds / 2.5 kg

Location Requirements:

Mounting: Wall mount in a clean, protected area.
 Ambient Temp: 30°F - 120°F (0°C - 50°C)

1D 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 and Operation Manual	.....	1 ea
Hose Clamps	.....	3 ea
Leak Test Cap	.....	1 ea
Tube Adapter	.....	1 ea
Flowmeter	.....	1 ea
Flow Control Assembly	.....	1 ea
Check Valve and Tubing Assembly	.....	1 ea

SECTION 2 Installation

2A Location

The CoPilot units are designed for wall mounting. **See Figure 1.** 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 and all tubing and electrical wires. The ozone generator should be installed at least (not less than) one foot above the maximum water level.

2B Wall Mounting

1. Refer to Figure 1 to mark the locations for the four mounting screws.
2. Install screws (or other hardware appropriate for the mounting surface) through the two mounting slots built in to the bottom end cap on the CoPilot. Install two more screws in the flanges towards the top.

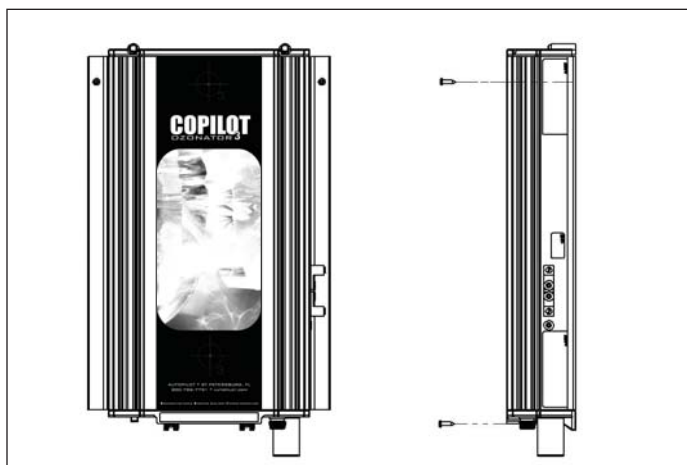


Figure 1 Wall Mount

2C Electrical

2C-1. Main Power: The CoPilot must operate simultaneously with the pool pump. It may be wired directly to the pool timing circuit or wired into the Pool Pilot Controller.

CAUTION: Risk of Electric Shock

Refer to the IMPORTANT SAFETY INSTRUCTIONS at the beginning of this manual for important wiring information

2C-2. Bonding Lug: Using an 8AWG conductor, connect the bonding lug on the right side of the CoPilot to an appropriate earth contact.

2D Plumbing

Ozone gas is introduced to the pool circulation line using the venturi injector installed in the AutoPilot Combination Bypass Manifold. Water passing through the injector creates a suction that pulls the ozone gas into the water. Water should never travel back into the CoPilot Ozone Generator.

2D-1 Plumbing the Manifold: The AutoPilot Combination Manifold is typically installed after all other pool equipment. Follow the instructions in your Pool Pilot Controller Manual and AutoPilot Cell/Manifold Assembly – Installation Instructions.

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2D-2 Special considerations for the AutoPilot *Combina-tion* 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).
2. Install the manifold after any Tablet/Erosion Feeders that could collect gas bubbles.

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).

2D-4. Pressure Test:

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

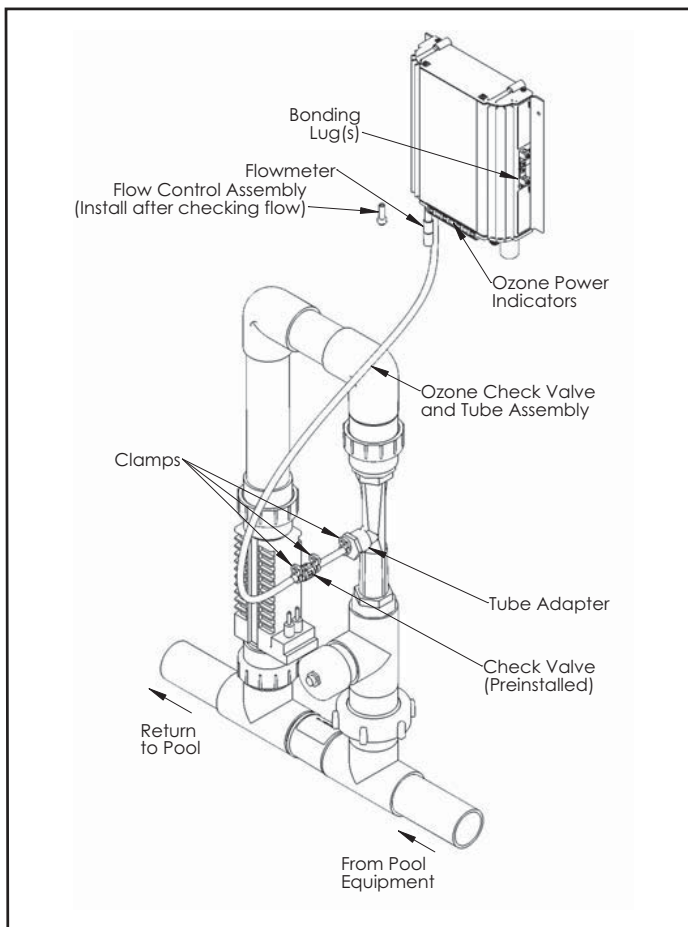


Figure 2 Installation Diagram

2D-5. Ozone Gas Line - refer to Figure 2.

1. Install Tube Adapter on injector. Use thread sealant if needed. (Do not use thread tape.)
2. Connect the shorter end of the Ozone Check Valve and Tube Assembly with the check valve installed onto the Tube Adapter.
3. Cut off the excess tubing from the longer end so that the line from the injector to the CoPilot is as straight and free from dips and loops as possible.
4. Install Clamps on the Tube Adaptor and on both ends of Check Valve.

5. The base of the CoPilot has two tube connections. Connect the longer end of the ozone supply tubing to the port marked "OZONE" (see Bottom View - Figure 3). NOTE: Connecting the Ozone Line to the incorrect port will cause damage to the ozone generator.

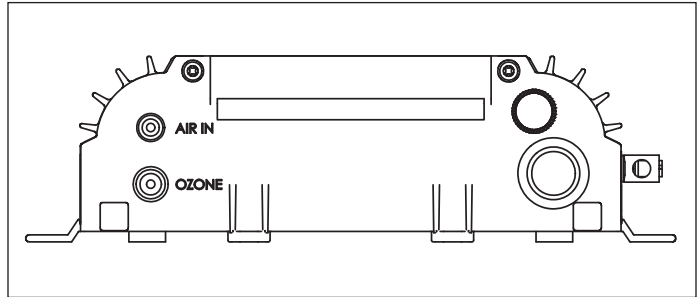


Figure 3 CoPilot Connections

SECTION 3 Operation

3A General

To achieve optimal performance from the CoPilot 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 system connections and cleaning the pool, you are ready to start the CoPilot.

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

3C Normal Operation

1. Ozone Power Indicator Lights: When the pool's circulation system starts, the green LED indicator(s) on the front of the CoPilot will illuminate. The COP-A and COP-B should show 1 and 2 indicators, respectively.
2. Gas Flow: Connect the Flowmeter provided to the "AIR IN" port on the base of the CoPilot (see Figure 3). Under worst-case system conditions the Flowmeter Ball should indicate at least a small amount of air flow. If not, adjust system valves as required to reduce back pressure and/or increase flow through the manifold. Under nominal conditions, the Ball should float above the middle of the flowmeter. It is ok if the Ball is all the way at the top if it is not stuck. Tap the Flowmeter to verify that the Ball is not stuck.

If you experience complications see TROUBLESHOOTING Section 4D.

3D Flow Control Assembly

Once proper suction is established, remove the Flowmeter and install the Flow Control Assembly on the "AIR IN" port of the CoPilot. The Flow Control Assembly must remain attached to the CoPilot, except when temporarily removed to verify flow with the Flowmeter

3E 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 ozone 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 Gas Line from the ozone generator.

SECTION 4 Maintenance and Service

4A System Electromechanical Overview

Refer to Figure 4.

4A-1 Ozone Module: The CoPilot Ozone Generators are constructed with High Voltage Corona Discharge Ozone Modules. The COP-A has one Module, the COP-B has 2 modules.

4A-2. Indicator Lights: Each indicator light on the base of the CoPilot corresponds to an Ozone Module inside the unit. Model COP-A has one indicator, model COP-B has two. A green light indicates proper operation of its respective Ozone Module. For red indicators or no indicators, see Troubleshooting Section.

4A-3. Fuse: The CoPilot is equipped with an externally accessible AGC-1 fuse, located on the base of the unit.

4B System Maintenance

4B-1. The green "ozone power" indicator light(s) on the front of the CoPilot indicate that the ozone power supply is operating properly. When an indicator light turns red, replace the corresponding ozone module.

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 little or no ozone after this period of time due to contamination within the corona discharge ozone chamber.

4B-3. Regularly reinstall and check the flowmeter for proper flow. **Always remove the flowmeter after confirming proper flow.** Inspect ozone supply tubing for cracks or wear and replace as necessary.

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

of water in the CoPilot may void the warranty.

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

4B-5. While operating, check to see if bubbles are entering the pool. If 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

4C-1. Removing the Cover: The CoPilot ozone generator may be serviced on the wall without disconnecting any of the plumbing or wiring. Simply remove the cover as follows:

1. Shut down the pool system power, then disconnect power to the ozone generator.
2. From the Top End-cap of the CoPilot, remove the 2 rear screws.
3. From the Bottom End-cap, remove the 2 front screws. See Figure 4 - Do not remove the screws securing the unit to the wall.
4. Carefully lift and pull the cover off of the CoPilot.
5. Hold the cover and locate the screw connecting the ground wire to the base. Remove the screw and set the cover aside. Do not hang the cover from the ground wire.
6. The Base will remain firmly mounted to the wall with the Ozone Modules fully accessible for servicing.

4C-2. Ozone Module Replacement

The green indicator lights on the front of the CoPilot correspond from left to right to Ozone Module numbers 1 and 2. The ozone modules are numbered beginning with number 1 at the bottom.

To replace an ozone module:

1. Open the CoPilot as described in section 4C-1.
2. Disconnect the tubing at both the inlet and outlet of the ozone electrode.
3. Remove the two nuts that secure the ozone electrode to

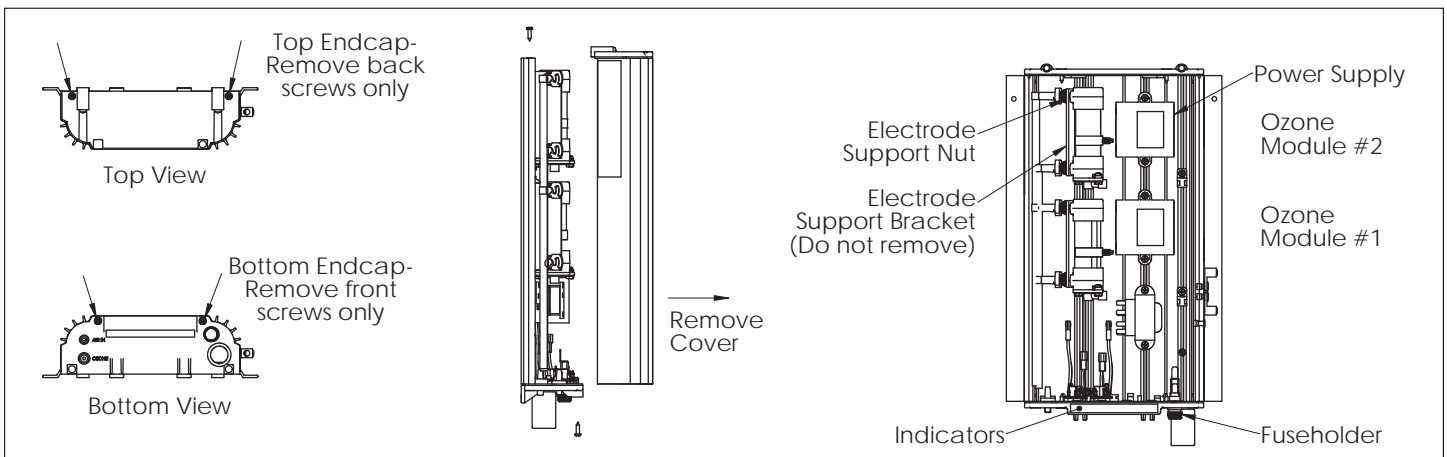


Figure 4 Component Locations (COP-2-B Shown).

CoPilot Corona Discharge Ozone Generators

the support bracket.

4. Disconnect the plastic power connector between the power supply and wire harness.
5. Remove the two screws that secure the power supply to the metal base.
6. Install the new ozone module by reversing the above steps.

4D. Troubleshooting

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

4D-1 Symptom: "LED Indicator" 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. Fuse in the unit has blown and needs to be replaced. Fuse is an AGC-1 (1/4" x 1.25" long glass fuse).

2. G.F.C.I. has tripped.

- a. Check power cord and reset G.F.C.I.

4D-2 Symptom: LED Indicator has turned red.

- a. This means that the power supply of that specific ozone module is no longer drawing power and needs to be replaced. Refer to section 4C for instructions on how to replace the corresponding ozone module.

Note: It is normal for the LED indicators to shine red for several seconds as the system powers up. As long as they turn back to green several seconds after startup.

4D-3 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. A Union fitting is installed to simplify the removal of 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 tubing from the injector. With the pump running, test 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-4 Symptom: Flow Control Assembly is Clogged.

Clean or replace flow control assembly.

4D-5 Symptom: Ozone tubing becomes yellow/brown and brittle.

- a. The high concentration of ozone created by the CoPilot family of corona discharge ozone generators, as

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

4D-6 Symptom: Can't get ball to stay in the center of flowmeter.

- a. 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 flowmeter. 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-7 Symptom: Check Valve is Leaking.

- a. Shut down the 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 AqualCal 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 and Order Information

5A. Standard Replacement Parts List:

Ozone Module, COP-1-A, COP-2-A, & COP-2-B..... 9-0789-01¹

Ozone Module, COP-A-CE & COP-B-CE 9-0789-02¹

Indicator Board, All CoPilot units 9-0789-03

Transformer, Ozone Power Supply, COP-2-A & COP-A-CE 9-0789-04

Transformer, Indicator Board, COP-1-A, COP-2-A & COP-A-CE..... 9-0789-05

Transformer, Ozone Power Supply, COP-2-B & COP-B-CE 9-0789-06

Check Valve and Tube Assembly, All CoPilot Models 9-0789-07²

Fuse, COP-1-A, COP-2-A, & COP-2-B..... 9-0789-08

Fuse, COP-A-CE & COP-B-CE 9-0789-09

Flow Control Assembly, All CoPilot Models..... 9-0789-10



¹Ozone modules should be replaced after 15,000 hours of use.

²Warranty is void if Check Valve and Tube Assembly is not replaced once a year.

