

HG-1500 Ozone Generator

Manual



**Ozone Solutions Thanks You
For Purchasing Our Products**

Ozone Solutions, Inc.

HG-1500 Ozone Generator

With proper care and maintenance, this device should give you years of trouble-free service.

Please take the time to read this manual so that you may safely operate your ozone generator and utilise the unique properties of ozone.

Specifications

Voltage: DC12V

Power Adaptor: AC 100V- 240V / 50-60Hz

Cooling: Air Cooled

Power Consumption: 25 Watts

Dimensions: 200 mm x 210 mm x 110 mm

(7.87-in. x 8.26-in. x 4.33-in.)

Ozone output: Adjustable between 0-100% of rated output

Inlet and outlet port diameter: 6 millimetres (1/4-in)

Net Weight: 2.5 kilograms (5.51 lbs.)

Max. Ozone Output:

1. Oxygen input (25 °C.) (77° F):

Oxygen flow (L/min)	Ozone output (mg/Hr)
0.5	990
1	1100
1.5	1250
4	1500

2. Dry air input (25 °C.) (77° F) (with air dryer):

SAFETY INFORMATION

It is the responsibility of the user to thoroughly understand the contents of this manual.

The HG-1500 ozone generator can deliver up to 1.5 gram of ozone per hour from pure oxygen. In a confined space, ozone concentrations generated by the HG-1500 may greatly exceed the 15-minute exposure limit of 0.3 parts per million, set by the US Occupational Safety and Health Administration (OSHA). Above the OSHA exposure limit there is risk of inflammation to the respiratory system. **Where ozone is used as a fumigant, remove all people, pets and plants**

from the area and keep people away until all the residual ozone has disassociated or dispersed.

Ozone has been shown to induce asthma attacks. **Asthma sufferers should not enter a newly ozonised airspace until all the residual ozone has fully dispersed and well ventilated with fresh air.**

Ozone has a distinctive sharp odour and is normally detectable by smell at concentrations well below the OSHA 15-minute exposure limit. Most people can detect the smell of ozone at concentrations around 1/10th of the 15-minute exposure limit. A strong smell of ozone normally indicates an ozone concentration that exceeds the 15-minute exposure limit. **Those people that lack a sense of smell should not operate this equipment. Don't attempt to confirm ozone production by directly smelling the ozone outlet.**

CAUTIONS:

1. The unit is not waterproof, for indoor uses only. DO NOT allow water to enter. Water damage is not covered by warranty.
2. DO NOT open, temper or try to repair the unit. The unit utilizes very high voltages that can result in injury. Do not touch an opened or tempered unit, while it is working.
3. DO NOT operate the unit in humid conditions (Humidity > 95%).
4. The suggested minimum room space is 30 m³ to avoid very strong smell of ozone when purifying water.
5. Keep the unit at a place where the unit is not reachable by children
6. Unplug when you no longer need it.
7. Inhalation of high-concentration or unmixed ozone gases can cause serious harmful physiological effects. Do not directly inhale ozone gas produced by this device.
8. DO NOT use unit within an environment with flammable gases or explosive materials.
9. DO NOT touch the machine with wet or damp hands.
10. Ensure that the cooling system is working properly for extended long period of usage. It is not recommended for prolonged use.
11. Avoid using the unit repeatedly in the warehouse of metals and lactoprene materials.
12. Use only ozone compatible hoses between the ozone generator and the injection point. Failure to use the correct materials could result in an undesirable leakage of ozone into the surrounding airspace.
13. DO NOT lubricate fittings or hoses with mineral oil or grease.

IMPORTANT WARNING

Ozone Solutions. Inc. accepts no liability for any damage or injury caused by this product or damages that may arise through its use by the purchaser or by others. The purchaser is responsible for ensuring that the unit is correctly installed, operated and properly maintained.

OZONE COMPATIBLE MATERIALS

Glass
PTFE (Teflon®)
Stainless Steel
EPDM
Silicone
High-density polyethylene

DESCRIPTION

The HG-1500 ozone generator is designed to continuously generate ozone by corona discharge. The conversion of oxygen to ozone occurs in a reaction cell excited by a high-voltage potential. A control circuit allows the user to manually adjust the ozone output between 40-100% of its rated output.



An internal fan cools the circuitry. Ozone production rapidly declines as the temperature of the reaction cell increases, therefore keep the area around the generator free from obstructions to maximise air movement.

The ozone generator has a calibrated dial that to regulate the ozone output on the front panel. A power switch to turn the unit on and IEC chassis plug are located on the rear panel. Ensure that the power lead fully engages the chassis plug before turning on the generator.

OPERATION

CAUTION: Use only the rated voltage indicated on the product information label. The product information label is affixed on the case.

Place the ozone generator close to the point of use, in a clean and dry location free from dew, condensation or high humidity. If applicable, locate your ozone generator well above the waterline to prevent water entering the generator (see figure 1).

The HG-1500 ozone generator can produce 1 gram of ozone per hour from oxygen.

The air/oxygen inlet and ozone outlet ports are located on the rear panel of the generator. The ports are bi-directional so either can be used as the inlet.

Connect one port to a suitable air or oxygen supply and the other to the ozone delivery system with ozone compatible tubing. If a check-valve is required on the outlet side of the generator, ensure that it is made from ozone compatible materials. Check valves that are not ozone compatible must be placed on the air inlet side of the generator.

A typical system for ozonising with air requires:

- A suitable diaphragm pump or oil-less compressor to deliver air at a flow rate between 1 and 15 litres per minute, at a maximum pressure of 3 psi, which is equivalent to a 2.0-meter (6.56 ft.) head of water. Suitable pumps are available from aquarium suppliers.
- Ozone compatible 6mm tubing and fittings.
- An in-line fine-particulate filter to remove dust, fitted before the air inlet port of the ozone generator.
- An adsorption-type air dryer may also be used to remove excess water vapour from the air to limit the generation of nitrogen oxides.
- For ozonising water, a typical system would also include a check valve and diffuser, or for pools or spas, a venturi injection point (see figures 1 & 2).

If you use a diffuser, set its depth at no more than 2.0 meters (6.56ft.) below the level of the water.

Many spas include a venturi to aerate the water to the nozzles. It is normally located between the circulation pump outlet and the first nozzle. It may be possible to inject ozone into the spa water at this point. Nevertheless, check with the manufacturer before making any modifications as it may void your spa warranty.

Figure 2 shows a suitable position for a venturi for ozonising a swimming pool or spa. A venturi normally creates a partial vacuum that may be sufficient to operate the ozone generator without using an air pump. However, make sure you fit a check-valve as a precaution.

If the water outlet of a venturi is blocked for any reason, water will run back up the ozone delivery tubing under pressure from the pool pump.

When regular ozonating is required, such as for maintenance dosing a water tank or swimming pool, a programmable time switch may be used to automate the system.

Generators that use oxygen should be connected to a pressure-regulated supply adjusted to deliver no more than 3 psi and include an adjustable flow meter to control the oxygen flow rate before it enters the ozone generator. The optimum flow rate should be between 1.0–4.0 liter's per minute. Your oxygen provider can normally supply suitable regulators and flow meters. For automatic operation, a solenoid valve may be fitted to switch on the oxygen flow.

The diagrams on the next page show how the HG-1500 generator may be set-up to ozonise a water tank and a swimming pool or spa. These diagrams are not to scale.

Figure 1 shows a typical configuration for ozonising a water tank. A wall-mounted diaphragm pump supplies air to a self-regenerative drying column to remove moisture from the air. The dry air is then filtered to remove fine particulates before entering the HG-1500. The ozonised air is discharged through a check-valve and diffuser submerged to a maximum depth of 2.0 meters (6.56ft). Check all connections for leaks and make sure that there is sufficient airflow passing through the diffuser before switching on your ozone generator.

A suitable tank vent must be fitted to release pressure and allow a free exchange of air between the tank contents and the atmosphere. Vents also allow the tank water to continually adsorb oxygen from the air, which is essential for the maintenance of good water quality.

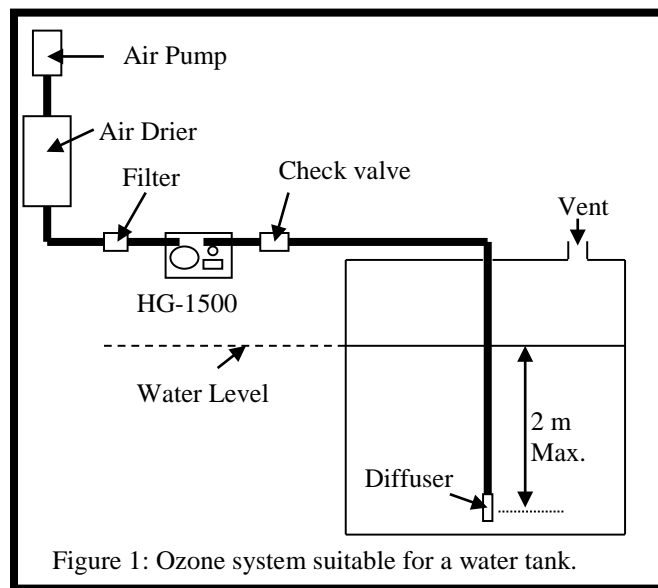


Figure 1: Ozone system suitable for a water tank.

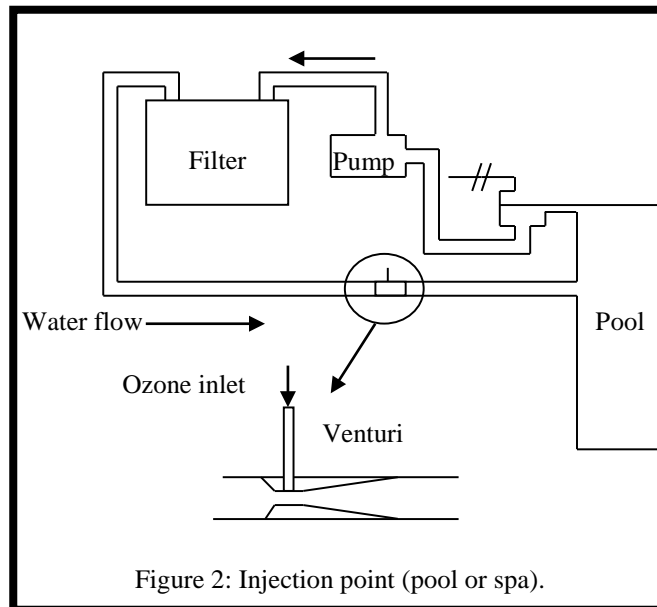


Figure 2 shows a suitable ozone injection point for pools or spas using a venturi. It is normally fitted before the water outlet(s). A venturi inlet is often used to aerate spa water and may be obtained from pool and spa suppliers in a range of sizes to accommodate different flow rates and pipe diameters. When correctly installed, the flow of water through the venturi creates a partial vacuum causing air to be drawn into the water flow. This vacuum may provide enough suction to pull sufficient air through the ozone generator and eliminate the need for a separate air pump. Ensure that a suitable check valve is fitted between the ozone generator and the injection point.

GUIDANCE FOR APPLYING OZONE TREATMENT

The concentration of ozone required for an antimicrobial treatment is dependent on the total quantity of oxidisable material present and must be allowed for. Oxidisable materials, such as organic matter or mineral salts consume ozone; therefore, more ozone is required for effective antimicrobial treatment. When fumigating spaces, the more oxidisable material present as dirt or dust, the greater the concentration of ozone required for effective treatment. Concentrations suitable for fumigation typically vary between 0.01 and 0.5 parts per million according to application. Heavily contaminated areas associated with food storage may require higher concentrations.

The maximum ozone output of the HG-1500 is 1g per hour when fed by oxygen, this is equivalent to an output of 16 milligrams of ozone per minute, or 7.8 millilitres of ozone per minute. The output of ozone expressed as a volume is especially useful for estimating fumigation times since 1 millilitre of ozone dispersed in 1 cubic metre of air is equal to 1 part per million of ozone. Knowing the generator output and volume of the space to be fumigated it is possible to estimate the time required to reach the target concentration:

$$\text{Time (mins)} = \frac{\text{Volume (cubic metres)} \times \text{Target concentration (ppm)} \times \text{Correction}}{\text{factor}}$$

The correction factor is applied to allow for ozone consumed or lost during the fumigation process. This factor will depend on the amount of oxidisable material present as airborne and surface dust or dirt and will typically vary between 2 & 10 according to conditions. In small spaces, the output of the HG-1500 may be reduced to increase fumigation time.

In all but the smallest fumigation volumes, some form of air circulation will be necessary to evenly disperse the ozone around the space. This can be achieved with a suitable low-speed oscillating fan.

Typically, sterilising reasonably clean water requires a concentration of between 0.5 – 1.0 milligrams of ozone per litre of water maintained for at least 5 minutes. However, sterilising water heavily contaminated may typically require concentrations of 2.0 - 3.0 milligrams of ozone per litre of water and may also require longer treatment times, such as in the case of bore or well-water contaminated with soluble iron or magnesium salts. Heavily contaminated water can be successfully managed with relatively low ozone concentrations using extended or continuous treatment.

For disinfecting spas and swimming pools, effective ozone concentrations may range between 0.1 – 1.0 milligram of ozone per litre of water, according to the total amount of oxidisable material suspended in the water. Efficient ozone treatment for pools and outdoor spas therefore depends on removing excess organic solids from the water. This is achieved with efficient filtration and regularly removing the in-fall of leaves and other organic matter that enters the water.

Note: Waters with a high pH (alkaline) reduce the effectiveness of ozone and these waters should be adjusted with acid or buffer to a pH less than 7 before treatment.

FAQ's

Q. What is the optimum airflow for maximum ozone production?

A. A low oxygen flow will produce the highest concentration of ozone at the outlet, however a high oxygen flow will produce the highest ozone output.

Please visit www.ozonesolutions.com for information about additional applications and FAQ's.

MAINTENCE

If you only use your ozone generator intermittently, you should store the device in a dry place when not in use and protect it from dust with a plastic bag.

If you choose to use an automated ozone delivery system, carry out regular inspections to ensure that your system is working effectively.

- Examine all tubing and connections for leaks or damage.
- Check air-pump flow rates.
- Examine check-valves for effectiveness.
- Replace dirty particulate filters.
- If you are using a regenerative adsorbent to remove water vapour, check its efficiency.
- Check the diffuser for an efficient bubble-pattern or if using a Venturi inlet, check for the presence of a vacuum.

Note: Continuous exposure to ozone will damage the rubber diaphragms of air pumps.

WARRANTY

Ozone Solutions warrants new instruments free of defects for a period of 12-months from date of shipment. Ozone Solutions will repair or replace defective instruments provided it has been properly installed, operated and maintained in accordance with this manual. The option to repair or replace the product will be the exclusive decision of Ozone Solutions.

**Damage Caused by Improper or Unintended
Use of this Product
Will Automatically Void this Warranty.**

MAKING A CLAIM

If you believe that this product is not operating satisfactorily you must:

1. Contact us by email at support@ozonesolutions.com
2. Provide us with your name, model and serial number, and the date of purchase.
3. Explain your problem clearly

You will be advised by Ozone Solutions if you need to return the unit for servicing. Please note that the purchaser is responsible for all return shipping costs. Ozone Solutions is not responsible for incoming freight costs.

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