

INSTALLATION & OPERATIONS
MANUAL FOR Z0-500

**OZONE SYSTEM FOR
ABOVE-GROUND POOLS
UP TO 18,000 GALLONS**

MANUFACTURED BY

***DEL* INDUSTRIES**

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IMPORTANT SAFETY INSTRUCTIONS

When installing and using DELZONE Model ZO-500™, basic safety precautions should always be followed. Be sure all the electrical power is shut OFF at the main circuit breaker before installing the ZO-500.

1. **READ AND FOLLOW ALL INSTRUCTIONS.**
2. All permanent electrical connections should be made by a qualified electrician.
3. For cord and plug-connected units, connect to a grounded, grounding type receptacle only. If the ZO-500 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 ZO-500 is connected to an independent electrical supply, then a G.F.C.I. must be installed between the ZO-500 and the electrical supply.
4. Do not bury cord.
5. **WARNING:** To reduce the risk of electric shock, replace damaged cord immediately.
6. A pressure wire connector 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 pipe, or conduit within five (5) feet (1.5m) of the unit as needed to comply with local requirements. Install at least 5 feet (1.5m) from the inside wall of the pool and one foot above the maximum water level to prevent water from contacting electrical equipment using non-metallic tubing.
7. The ZO-500 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 3. Install to provide water drainage of generator to protect electrical components.
8. The ZO-500 lamp emits ultraviolet light which is harmful to your eyes and skin if exposed. Always have the electrical power OFF when removing the cover from the ZO-500 and exposing the lamp.
9. Mount the ZO-500 so that it is inaccessible to anyone in the pool. Never attempt any servicing while unit is wet.
10. Follow all applicable electrical codes.
11. Plastic ozone supply tubing is supplied with the ZO-500. Never replace this tubing with metal tubing.
12. **SAVE THESE INSTRUCTIONS.**

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DESCRIPTION of DELZONE ZO-500

The ZO-500 is a vacuum-injected ozone generator which produces ozone using one high output ultraviolet lamp. The generator enclosure is a weatherproof, powder coated, aluminum housing. This unit is designed for installation on above-ground pools up to 18,000 gallons. **Read these instructions completely before you begin the installation.**

Unpack the DELZONE unit (Figure 1) and become familiar with it.

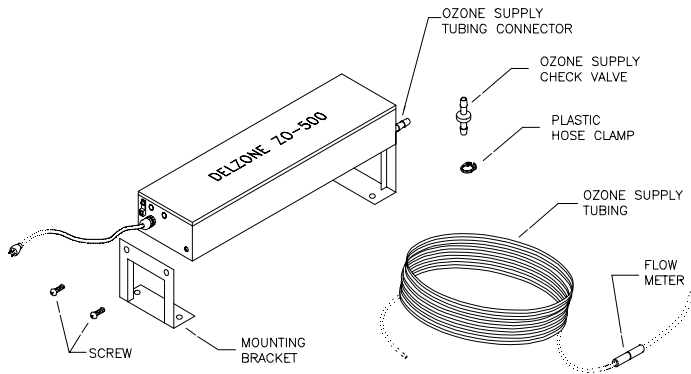


Figure 1: Ozone Generator and Parts

Attach mounting brackets (2) to the short sides of the ozone generator with 2 screws per bracket. Generally, the mounting brackets should be oriented as shown in Figure 1. In this position they will provide the best support to the generator. If convenient, the brackets may be turned with feet pointing outward. Locate the ozone supply tubing connector and power cord. Locate the ozone supply tubing, the plastic ozone supply check valve, the four plastic hose clamps, and the flowmeter (attached to the ozone supply tubing toward one end). The type of injector you require depends on your pump circulation system. Information on the various injectors is further explained in this manual. Once you have located the pertinent parts of the generator, you are ready to begin installation.

GENERAL INSTALLATION

TOOLS AND MATERIALS REQUIRED FOR INSTALLATION

Screwdriver	PVC Pipe Cutters/Saw
Scissors	Teflon Tape
Adjustable Wrench	PVC Glue
Pliers	Mounting Screws

MOUNTING

Attach mounting brackets to the ZO-500 with provided screws as shown on Figure 1.

Find a suitable location to mount the DELZONE ZO-500. It cannot be accessible to anyone inside the pool and must be mounted in an upright position as shown in Figure 3.

The ZO-500 should be mounted **above** the water line if possible. If this is not possible, the ozone supply tubing **must** be routed above the water line with a Hartford Loop (water trap) (Figure 3) between the generator and the pool. In either case, the ozone supply check valve provided must be installed in the ozone supply tubing between the generator and the injector.

Because the ZO-500 generates heat during operation, it is a good idea to mount the unit in a shaded area. If the mounting area is subject to blowing dust or dirt, shelter should be provided for the ZO-500.

INJECTOR INSTRUCTIONS

If you received the 9-0513 Injector then your pump should be single speed and less than 1HP (*Most above-ground pools fit this category*). If so, then proceed with the instructions in section **A**. If you received the IU-206 Adjustable Injector Manifold for single speed pump over 1 HP, then skip to section **B**. If you received the IU-201 Rigid Injector Manifold designed for 2 speed pumps, skip to section **C**.

A. PLUMBING THE 9-0513 INJECTOR ASSEMBLY

1. Wrap Teflon tape on all male pipe threads.
2. Disconnect the pool's return hose from the pool at the point where the tubing returns into the pool. Keep the hose elevated to prevent pool from draining through pump and filter.
3. Screw **1-1/2" nipple** loosely into **1-1/2" elbow**, then screw this assembly into the pool's **1-1/2" eye ball fitting** stopping when tight and elbow is pointed down (Figure 2).
4. Screw the **Venturi Injector** into the elbow.
NOTE: Make sure the injector is installed with the flow arrow pointed in the direction of water flow and with the open port accessible.
5. Screw the **plastic hose barb** into the open port on the injector until tight with the barbed end facing downward.
6. Connect the pool's return hose to the bottom (inlet) of the injector using 1-1/2" flex hose barb and the stainless steel hose clamp.

The injector assembly installation is now complete. Skip to "Installing the Ozone Supply Tubing".

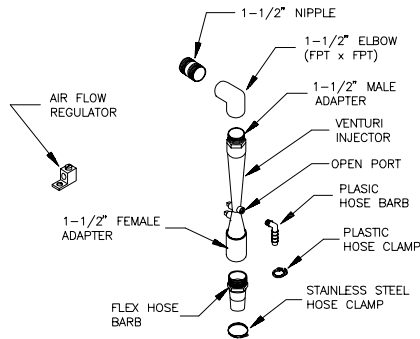


Figure 2: 9-0513 Injector Assembly

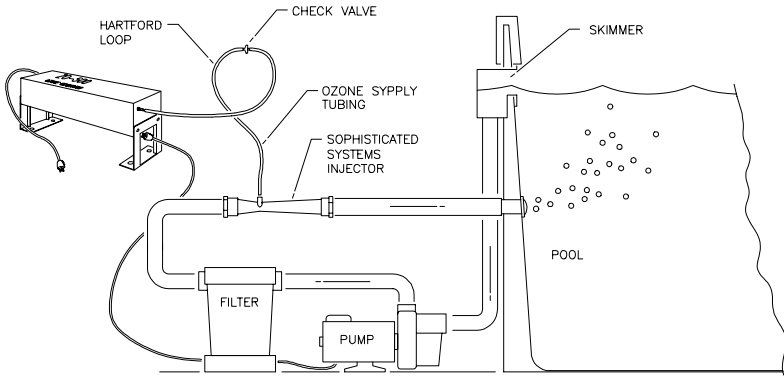


Figure 3: Installation Schematic for 9-0513 Injector Assembly

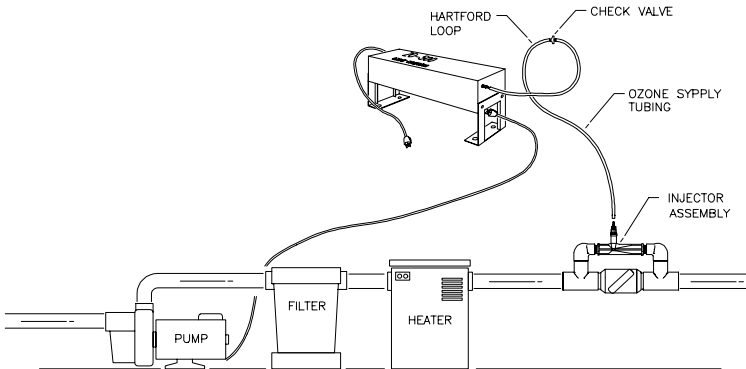


Figure 4: Installation Schematic with IU-201 or IU-206 Injector

B. PLUMBING THE IU-206 ADJUSTABLE INJECTOR MANIFOLD

If you have a single speed pump greater than 1 HP you should be using the **DEL Adjustable Injector Manifold IU-206**. The Adjustable Injector Manifold must be installed in the pool's main return line after all other pool equipment (pump, filter and heater). It should be installed as close to the equipment and as far from the pool as possible.

The adjustable injector manifold can be installed in either a vertical or horizontal position in the return line, but should **not** be installed with outlet facing down (Figure 5).

Locate an appropriate section of the return line, hold the Adjustable Injector Manifold against the pipe and mark the length. Subtract 2 -2/3" from the overall length. Mark this point, and cut out the section (about 13 -1/3"). Install the adjustable injector manifold with PVC cement. Be very careful to observe and follow the correct water flow direction (Figure 4).

NOTE: If the pool equipment is located above the water level of the pool, you must install the clear 1/3# check valve as shown in Figure 4.

Locate the **plastic hose connector**. Wrap 3 layers of Teflon tape on the threads (do not use thread sealant), and install it hand tight into the 1/2" female pipe thread fitting of the Adjustable Injector Manifold. Tighten the plastic hose connector 1/2 turn with a wrench.

The injector manifold installation is now complete. Skip to "Installing the Ozone Supply Tubing".

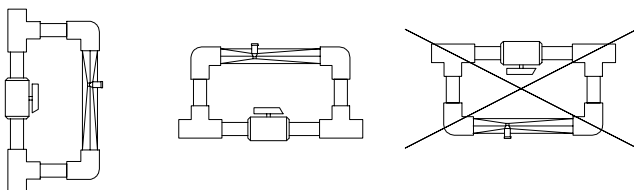


Figure 5: Injector Mounting Diagram

C. PLUMBING IU-201 RIGID INJECTOR MANIFOLD

If you have a 2 speed pump you should be using the **IU-201 Rigid Injector Manifold**. Follow the same instructions as provided for the plumbing of the IU-206 injector.

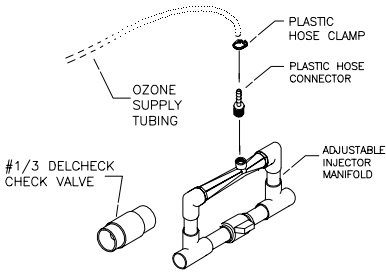


Figure 6: IU-206 Adjustable Injector Manifold

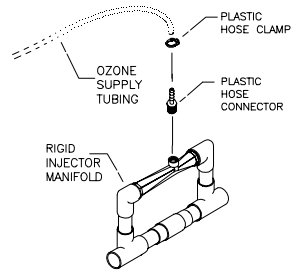


Figure 7: IU-201 Rigid Injector Manifold

INSTALLING THE OZONE SUPPLY TUBING

The **ozone supply tubing** is assembled with a short tubing section, a flowmeter and a long tubing section. Secure the end of the short section to the plastic hose connector on the injector with a supplied plastic hose clamp. (Figure 3, 6 or 7).

If the generator is mounted above the water line attach the other end of **ozone supply tubing** to the fitting on the ZO-500 and secure with the supplied hose clamps.

If the generator is mounted below the water line, the ozone supply tubing *must* be run from the generator to a point above the water line. A Hartford Loop *must* be used at this point. To make a Hartford Loop, simply coil the tubing into a complete circle about 6" diameter (Figure 3 or 4), and fasten it above the water line. The Hartford Loop will act as a water trap to prevent water from running back to the generator.

Locate the small plastic **ozone supply check valve** and install it into the long section of the ozone supply tubing by cutting the tubing and securing both ends of the check valve with plastic hose clamps as shown in Figure 8. The check valve should be installed between the generator and the Hartford loop (Figure 3 or 4). **Be sure that the beveled side of the check valve points in the direction of the injector.**

Note: For the 9-0513 Injector, slip the **air flow regulator** onto the tubing before connecting it to the ZO-500 (Figure 3). Connect the end of the tubing to the ZO-500 and secure it with another plastic hose clamp.

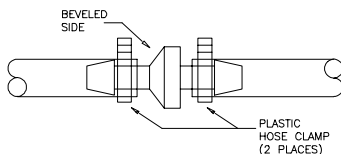


Figure 8: Check Valve

FLOWMETER TEST

A. 9-0513 Injector Assembly

With water in the pool, turn on the pool pump. Hold the flowmeter vertically. The ball should now be “pegged” at the top (the top side of the flowmeter is attached to the short side of ozone supply tubing). Slowly close the air flow regulator until the ball bounces just above the center line on the flow meter. If the ball rises to the line or above, this indicates proper suction (Figure 9). Remove the Flowmeter from the assembly and attach the tubing directly to the injector.

B. IU-206 Adjustable Injector Manifold

Turn the handle counter-clockwise all the way until the ball valve is wide open. With water in the pool, turn on the pool pump and slowly turn the ball valve in a clockwise direction (toward closed) until the middle of the ball in the flowmeter floats just at the indicator line. Hold the flow-meter vertically with top side up (the top side of the flowmeter is attached to the short piece of ozone supply tubing). If the ball bounces up and down, use the average of the movement as the set point. If the ball rises to the line or above, this indicates proper suction (Figure 9). Remove the Flowmeter from the assembly and attach the tubing directly to the injector.

C. IU-201 Rigid Injector Manifold

Skip the Flowmeter Test. Remove the Flowmeter from the assembly and attach the tubing directly to the injector.

NOTE:

If the ball does not reach the indicating line, check your installation for a leak in the ozone supply tubing, a restriction in the water system, or a dirty pool filter. Make sure the ozone supply check valve is installed pointing in the correct direction, the ozone supply tubing is not kinked or pinched and that all the connections are secure.

If the ball is still too low and/or not bouncing, remove the eyeball fitting from the pool's return line. If this serves to increase the air flow through the injector, then replace the eyeball fitting with the new one with a larger orifice opening.

If you still cannot establish the proper suction, Contact DEL's Customer Service Department.

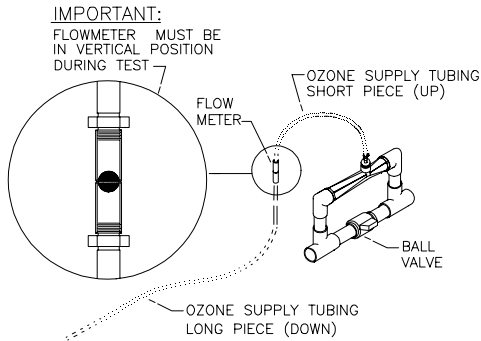


Figure 9: Flowmeter Test

ELECTRICAL CONNECTION

The ZO-500 is manufactured for **110 VAC** only unless specifically ordered for **220 VAC** (**200 VAC version is not equipped with internal receptacle**). The electrical connection should be made by a licensed electrician and all applicable codes should be followed.

The ZO-500 must operate *only while the pool pump is on*. The ZO-500 must be connected to a Ground Fault Circuit Interrupter (G.F.C.I.) protected power source. The ZO-500 should be wired directly to the pool pump timer allowing simultaneous operation with the pool pump. If the pool pump operates continuously (24 hours), the 110 VAC model ZO-500 can be plugged directly into a G.F.C.I. protected outlet.

NOTE: If there is no extra receptacle to plug the ZO-500 in, you can unplug the pump from the poolpack and use the internal ZO-500 receptacle for the pump's connection. Internal receptacle is accessible from the bottom of the unit. Simply turn the unit upside down, plug the pump cord into the receptacle inserted into the cavity of the unit. Then plug the ZO-500 into the poolpack.

MAINTENANCE

The ZO-500 is very reliable and requires little maintenance. As long as the lamp service (red indicator) light on the ZO-500 is **not** on, and there is sufficient air flow through the generator, you can be assured the system is working.

NOTE: The ZO-500 is equipped with a switch that shuts off the unit when the lid is removed, however, you should always **turn off the power and unplug the ZO-500 before performing any service.** Never bypass the switch and operate the unit with the cover removed and the lamp exposed. **CAUTION: Exposure to the Ozone lamp while it is operating can cause severe eye and skin damage!**

THE ZO-500 LAMP

The ZO-500 lamp has a life expectancy of approximately two years. (Fluctuations in local line voltage may reduce lamp life). When the red indicator light stays on, it is time to change the lamp.

CHANGING THE ZO-500 LAMP

Turn off electrical power and unplug the ZO-500. Remove the six screws holding the cover of the ozone generator. Lift the cover off and set it aside. Disconnect the 4-pin electrical connector attached to the lamp. Push the lamp into the ozone chamber past the center divider. Lift the other end of the lamp out of the lamp clip.

Reverse the procedure to install the new lamp. Firmly attach connector and screw on cover.

NOTE: Never touch the glass portion of the DELZONE lamp with your bare hands. If this is unavoidable, be sure to wipe the lamp with a soft cloth. Fingerprints may result in lamp damage!

CABINET CLEANING

Clean the cabinet in the beginning of each season, or as needed. To do so, turn off the breaker, unplug the ZO-500 and remove the cover. Using compressed air or a vacuum cleaner, clean the interior of the unit of any accumulated dust or debris. Wipe down the outside of the cabinet with a damp cloth. After cleaning, replace the cover and reconnect to the electrical supply.

TROUBLE-SHOOTING

There are four areas to check to determine the location of any problem:

1. The green power indicator light on the left of the unit should remain ON during operation.
2. The red lamp indicator light on the left of the unit, which should remain OFF while the unit is operating.
3. Ozone bubbles in the water.
4. The condition of the water.

SYMPTOM: Green indicator light OFF

PROBABLE CAUSE

1. No power to unit
2. Main circuit breaker tripped
3. G.F.C.I. tripped
4. Defective electrical system

CORRECTIVE ACTION

- 1A. Check power source and cord
- 2A. Reset circuit breaker
- 3A. Reset G.F.C.I.
- 4A. Return to dealer for service/repair

SYMPTOM: Red and green indicator lights ON

PROBABLE CAUSE

5. Lamp connection(s) loose
6. Lamp burnt out
7. Defective Ballast

CORRECTIVE ACTION

- 5A. Check and reconnect if loose.
- 6A. Replace lamp
- 7A. Disconnect wires from the ballast and check the resistance across the ballast as indicated below:
 - white - white - 0
 - black - blue - 9 ohms
 - white - blue - infinityIf the ballast checks good, then the lamp has failed.

SYMPTOM: Red indicator light OFF, but no ozone bubbles

PROBABLE CAUSE

8. Leak in system
9. Tubing is kinked or crimped
10. Defective electrical system

CORRECTIVE ACTION

- 8A. Check all tubing connections.
- 9A. Check all tubing and unkink.
- 10A. Return to dealer for service/repair

SYMPTOM: Everything works correctly, but water is dirty

PROBABLE CAUSE

CORRECTIVE ACTION

11. Excessive bather load

11A. If an extra-high bather load is unusual, water will usually clear within 24 hours; if the extra-high bather load is not unusual, continue 24 hours operation and begin a test program of increasing by a small amount the chlorine or bromine or use a non-chlorine shock treatment.

12. pH not balanced

12A. Adjust pH to between 7.2 and 7.8.

13. Total alkalinity incorrect

13A. Adjust total alkalinity to between 80 and 150 PPM.

14. Dirty, loose, or cracked filter

14A. Service filter.

Parts List

Part	Number
Lamp	5-0232
Ballast	5-0218
Check Valve	7-4012
Ozone Supply Tubing	7-0075
Plastic Clamp	7-0021

STANDARD POOL MAINTENANCE

GUIDELINES:

When Used With Ozone

Measurement	Recommended Level
Total Alkalinity	80-120 ppm
Calcium Hardness	200-300 ppm
Chlorine	.5-1 ppm
Bromine	1-2 ppm
Total Dissolved Solids	Less than 1500 ppm

DELQUIK BASIC WATER CHEMISTRY CHART

PROBLEM	DESCRIPTION	CAUSE	REMEDY
Green Algae	<ol style="list-style-type: none"> 1. Green water 2. Green spots on surface 3. Slippery surface 	<ol style="list-style-type: none"> 1. Low ozone, bromine or chlorine levels 2. Low algaecide levels 	<ol style="list-style-type: none"> 1. Superchlorinate 2. Brush spa (removing algae) 3. Vacuum spa (removing algae) 4. Increase oxidizer residual 5. Increase algaecide level
Black Algae	<ol style="list-style-type: none"> 1. Black spots on spa surface 	<ol style="list-style-type: none"> 1. Low oxidizer levels 2. Low algaecide levels 	<ol style="list-style-type: none"> 1. Superchlorinate 2. Brush spa (removing algae) 3. Increase ozone, chlorine or bromine residual 4. Increase algaecide level
Unpleasant Odor Burning Eyes	<ol style="list-style-type: none"> 1. Chlorine-like odor 2. Burning sensation in eyes 	<ol style="list-style-type: none"> 1. Combined chlorine; 2. pH out of balance 	<ol style="list-style-type: none"> 1. Balance pH to 7.2-7.6 2. Superchlorinate
Colored Water	<ol style="list-style-type: none"> 1. Water in newly filled spa turns black, blue or brown when first treated with ozone 	<ol style="list-style-type: none"> 1. Copper, iron, or manganese in water being oxidized by chlorine or ozone 	<ol style="list-style-type: none"> 1. Adjust pH to 7.2-7.6 2. Run filter continuously and backwash as required 3. Vacuum settled material 4. Use sequestering agent for prevention
Hard Water	<ol style="list-style-type: none"> 1. Cloudy water 2. Scaling 	<ol style="list-style-type: none"> 1. Excessive hardness of makeup water or building up of dissolved minerals in the water caused by continued use of spa chemicals 	<ol style="list-style-type: none"> 1. Clean filter 2. Filter continuously 3. Adjust pH to 7.2-7.6 4. Use scale inhibitor 5. Dilute with makeup water

DEL Industries • ONE YEAR LIMITED WARRANTY

The limited warranty set forth below applies to products manufactured by DEL INDUSTRIES, 3428 Bullock Lane, San Luis Obispo, California 93401, and sold by DEL INDUSTRIES and its authorized dealers. This limited warranty is given only to the first retail purchaser of such products and is not transferable to any subsequent owners or purchasers of such products. DEL INDUSTRIES warrants that it or its authorized dealers will repair or replace, at its option, any part of such products proven to be defective in materials or workmanship within one (1) year of the date of retail purchase of such products. ANY REPAIR OR REPLACEMENT WILL BE WARRANTED ONLY FOR THE BALANCE OF THE ORIGINAL WARRANTY PERIOD. NOTE: USE ONLY DEL AUTHORIZED REPLACEMENT PARTS. USE OF ANY OTHER PART(S) WILL AUTOMATICALLY VOID THIS WARRANTY. THIS LIMITED WARRANTY DOES NOT INCLUDE ANY OF THE FOLLOWING: (a) any labor charges for trouble-shooting, removal, or installation of such parts; (b) any repair or replacement of such parts necessitated by faulty installation, improper maintenance, improper operation, misuse, abuse, negligence, accident, fire, repair materials, and/or unauthorized accessories; (c) any such products installed without regard to required local codes and accepted trade practices; (d) ANY IMPLIED WARRANTY OF MERCHANTABILITY OR IMPLIED WARRANTY OF FITNESS FOR PARTICULAR PURPOSE, AND SUCH WARRANTIES ARE HEREBY DISCLAIMED; AND (e) DEL INDUSTRIES SHALL NOT BE LIABLE UNDER ANY CIRCUMSTANCES FOR LOSS OF USE OF SUCH PRODUCTS, LOST PROFITS, DIRECT DAMAGES, INDIRECT DAMAGES, CONSEQUENTIAL DAMAGES AND/OR INCIDENTAL DAMAGES. This warranty gives you specific legal rights. You may also have other rights which vary from state to state.

TO OBTAIN WARRANTY SERVICE:

Contact DEL INDUSTRIES, 3428 Bullock Lane, San Luis Obispo, CA 93401 Customer Service Number: (805) 541-1601. When filing a claim, you must provide: 1) your name, mailing address and telephone number; 2) the selling dealer's name; 3) proof of date of purchase; 4) the date of failure; and 5) a description of the failure.

After this information is provided, DEL INDUSTRIES will issue a RETURN GOODS AUTHORIZATION (RGA) NUMBER. After receiving this number, the part in question must be returned to DEL INDUSTRIES, freight prepaid, with the ***RGA number clearly marked on the outside of the package***. All pre-authorized defective parts must be returned to DEL INDUSTRIES within thirty (30) days. ***Under no circumstances may any product be returned to DEL INDUSTRIES without prior authorization.*** You must call or write first or your returned goods shipment will be refused. Upon receipt of pre-authorized returned goods, DEL INDUSTRIES will repair or replace, at DEL's option, the defective product(s) and return them freight collect. To validate your warranty, fill in the enclosed warranty registration card and return it to DEL INDUSTRIES within ten (10) days of your purchase. Buyer's acceptance of the product and use thereof constitutes acceptance of these terms.

