

INSTALLATION & OPERATIONS
MANUAL FOR Z0-940/942™

OZONE SYSTEM FOR IN-GROUND POOLS

MANUFACTURED BY

DEL **INDUSTRIES**

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IMPORTANT SAFETY INSTRUCTIONS

When installing and using DELZONE Models ZO-940™ or ZO-942™, basic safety precautions should always be followed:

1. **READ AND FOLLOW ALL INSTRUCTIONS.**
2. All electrical connections should be made by a qualified electrician.
3. For cord connected units: connect to a grounded, grounding type receptacle only.
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 mm) 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.
7. Be sure all the electrical power is shut OFF at the main circuit breaker before installing the ZO-940/942.
8. A G.F.C.I. must be installed between the ZO-940/942 and the electrical supply.
9. The ZO-940/942 may be installed either indoors or outdoors, and must be installed so that the orientation is exactly as shown in **Figure 2**. Install to provide drainage of compartment for electrical components.
10. The ZO-940/942 lamp emits ultraviolet light which is harmful to your eyes and skin if exposed. Always have the electrical power OFF when removing the lamp from the aluminum cartridge.
11. Never attempt any servicing while wet.
12. Follow all applicable electrical codes.
13. Plastic ozone supply tubing is supplied with the ZO-940/942. Never replace this tubing with metal tubing.
14. The ZO-940/942 incorporates a low pressure safety switch and must be connected to the diffusion stone to create enough back pressure for the unit to produce ozone.
15. **SAVE THESE INSTRUCTIONS.**

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PRELIMINARIES

DESCRIPTION OF DELZONE ZO-940/942

The ZO-940/942 (*Figure 1*) is a compressor-driven ozone generator. Ozone is produced using one or two high output ultraviolet lamps, mounted inside ozone resistant 6063-T6 aluminum cartridges. The entire assembly is enclosed in a weatherproof, powder coated, aluminum housing. It is designed to be used with several optional dispersion systems available separately from DEL Industries. The ZO-940 is designed for pools up to 30,000 gallons; the ZO-942 is designed for pools up to 60,000 gallons. The optional dispersion systems will allow the flexibility of 24-hour ozonation of the pool water without the expense of running the pool pump continuously. Included with the ZO-940/942 are: one ozone supply check valve, three plastic hose clamps, and twelve feet of ozone supply tubing.

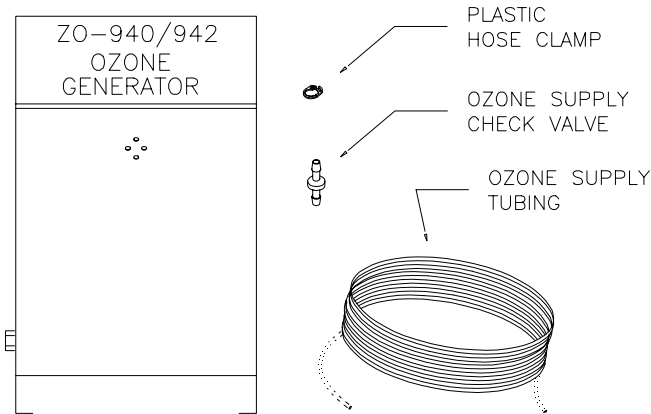


Figure 1: Ozone Generator and Parts

The ZO-940/942 may be used in any number of other installations ranging from well water treatment for iron, manganese, taste, and odor control to removing pesticides from agricultural spray rinse water.

INSTALLATION

TOOLS AND MATERIALS REQUIRED FOR INSTALLATION

- Screwdriver
- Regular household scissors
- Adjustable wrench
- Pliers

MOUNTING

Find a suitable location to mount the DELZONE ZO-940/942. It cannot be accessible to anyone inside the pool and must be installed in an upright position as shown in Figure 2. The ZO-940/942 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) between the generator and the pool. In either case, the supplied in-line check valve must be installed in the ozone supply tubing between the generator and the pool.

Because the ZO-940/942 generates heat during operation, it is a good idea to mount the unit in a shaded area for cooling. If the mounting area is subject to blowing dust or dirt, shelter should be provided for the ZO-940/942.

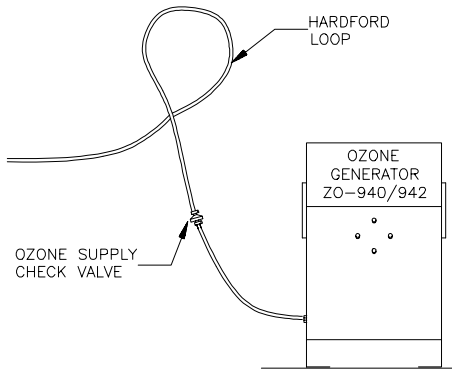


Figure 2: Installation Diagram

ELECTRICAL CONNECTION

The ZO-940/942 must be connected to a Ground Fault Circuit Interrupter (G.F.C.I.) protected 120 VAC, 60 Hz power supply. If your pool pump operates on 120 VAC, 60Hz, the ZO-940/942 can be wired directly to the pool pump timer allowing simultaneous operation with the pool pump. For 24-hour operation (recommended), the ZO-940/942 should be plugged directly into a G.F.C.I. protected outlet. The ZO-940/942 can be wired through a timer if desired for timed operation or it can be hardwired into a dedicated circuit breaker. **NOTE:** All electrical connections should be performed by a qualified electrician.

OPTIONAL DISPERSION SYSTEMS

The ZO-940/942 is designed to be used with the DEL BIG-EZ™ available separately from DEL Industries. This system allows the flexibility of 24-hour pool ozonation, completely separate from the pool filtration system. It is designed for installation during new in-ground pool construction. For further information on the DEL BIG-EZ™, see Optional Dispersion System Section of the manual.

OZONE SUPPLY TUBING CONNECTION

Connection to the ZO-940/942 is made at the brass bulkhead fitting on the side of the enclosure. The fitting includes a compression nut and a tubing insert. Square off the end of the ozone supply tubing, and slip the tubing insert inside the end of the tubing. Push the end of the tubing into the fitting until it seats. Slide the nut against the fitting, and snug it up hand tight. Tighten the nut one and a half turns with a wrench.

SYSTEM SHUT DOWN

If, for any reason, you need to turn off your ZO-940/942 for an extended amount of time, it is recommended that you disconnect the ozone supply tubing at the ZO-94/942 check valve fitting. In doing so, be sure that the check valve is left on the tubing that runs to the disperser.

MAINTENANCE

CAUTION: Never operate the ZO-940/942 with the lamp removed from the aluminum cartridge, as exposure to the Ozone lamp while it is operating can cause severe eye and skin damage!

The ZO-940/942 is very reliable and requires very little maintenance. As long as the green power indicating light on the ZO-940/942 is on, the red lamp service light(s) is (are) out, the low pressure indicator light is out, and bubbles (ozone) are entering the pool water, you can assume that the system requires no maintenance. If your lamps are over two years old, then you should think about replacing them.

THE ZO-940/942 LAMP

The ZO-940/942 lamp has a life expectancy of about two years. This means that if your ZO-940/942 runs for 24-hours a day, every day, you can project about two years of lamp life. (Fluctuations in local line voltage may reduce lamp life.)

CHANGING THE ZO-940/942 LAMP

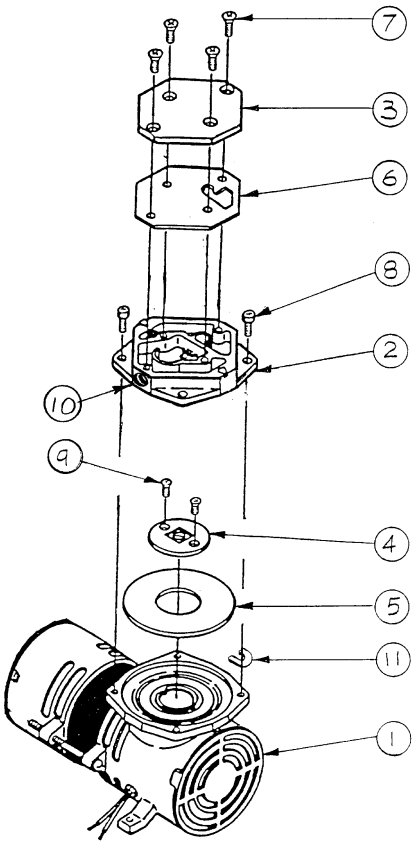
Turn off the electrical power, remove the screws holding the enclosure cover and remove the cover. The lamp(s) is contained inside the aluminum cartridge hanging on the back wall inside the enclosure. Disconnect the lamp electrical socket by rocking gently and pulling upward from the lamp end. Using a pair of pliers, loosen the knurled compression nut and remove the nut and washer from the lamp cartridge. Gently loosen the rubber seal which retains the lamp and pull the lamp up and out of the cartridge. New lamp comes with a new seal. Lower the new lamp into the cylinder, being careful that it seats into the retainer bracket at the bottom of the cylinder. Slip the rubber seal over the lamp end and install the washer and compression nut. Tighten the nut securely with pliers at least one full turn past hand tight. Connect the lamp electrical socket (make sure it is installed correctly), place the top cover on the enclosure and install the screws. **NOTE:** Never touch the glass portion of the ZO-940/942 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 every third month, or as needed. To do so, disconnect the ZO-940/942 from its electrical source 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.

COMPRESSOR

The system's air compressor is designed for years of maintenance-free operation and/or service. If the compressor's output has diminished, DEL offers a rebuild kit specifically for the compressor. The kit consists of the replacement gasket and diaphragm. Refer to Figure 3 for compressor diaphragm and gasket replacement details.



No.	ITEMNAME	DEL PART NUMBER
1	Compressor Assembly	
2	Compressor Head Assembly	
3	Cover Plate	
4	Diaphragm Retainer	
5	Diaphragm	7-0334
6	Gasket	7-0333
7	Cover Screws (4)	2-0176
8	Head Screws (4)	2-0175
9	Retainer Screws (2)	2-0177
10	Brass Tube Fitting	
11	Horseshoe Shaped Shims (4)*	

*Not included in all compressors.

Figure 3: Compressor Diagram

OPTIONAL DISPERSION SYSTEM

DEL BIG-EZ™ DISPERSION SYSTEM

This disperser is also designed for installation during construction of a new in-ground pool. A single, large sized head disperses ozone in the middle of the pool. The DEL BIG-EZ™ Dispersion System can be installed for immediate use with the ZO-940/942 ozone generator, or as an ozone-ready option, ready and waiting for the new owner to add the BIG-EZ™ dispersion head and the ozone generator. One DEL BIG-EZ™ will handle an in-ground pool with a surface area of up to 1,000 sq. ft.

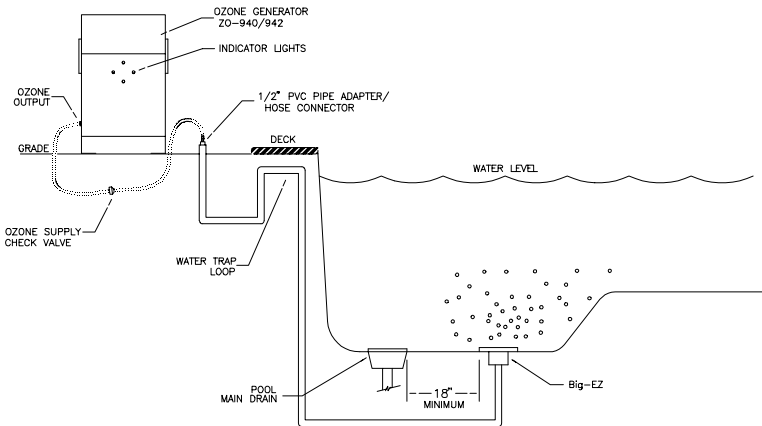


Figure 4: DEL BIG-EZ™ Dispersion System

The DEL BIG-EZ™ Dispersion System body and the PVC piping must be installed and pressure tested prior to the gunite and plastering of the pool.

DEL BIG-EZ™ Layout and Plumbing

The DEL BIG-EZ™ dispersion head should be placed in the deep end, no closer than 18 inches (edge to edge) from the main drain. It should be placed in line with the main drain, toward the shallow end (or center) of the pool. Plumb a 1/2" Schedule 40 PVC pipe line from the location of the dispersion head, under the pool floor, and up along the outside of the pool form. Plumb a water trap loop a minimum of 1-1/2" above that top of the form. **Note:** The loop must be above the water line of the finished pool.

The water trap loop should be graded over and will generally be poured over the deck. The pipe should then run to the equipment area, and be stubbed out of the ground at a point within five feet of where the ZO-940/942 will be mounted. Trim the 1/2" PVC pipe stub in the equipment area to about 12" above ground level. **Note:** After completing the piping, and before gluing the disperser body and the 1/2" pipe adapter/hose connector assembly to the pipe, flush the DEL BIG-EZ™ piping system with water to remove any debris from the pipe. Debris left in the line will clog the dispersion head. Be sure not to miss the critical step.

Ozone-Ready Disperser Cap:

If the pool is being built for ozone-ready convenience, an ozone-ready cap is supplied with the dispersion system which must be installed in the disperser body just before the pool is filled. To do so, remove the protective label from the disperser body and clean the inside of the body so that it is free of any debris. Set one ozone-ready cap into the body and press it into place. Installation is complete. When the pool owner is ready for ozone, the cap is removed and replaced with the BIG-EZ™ dispersion head.

Dispersion Head Cleaning:

As the ozone passes through the dispersion head into the pool water, the dispersion head acts much as a filter. Small particles carried through the ozone system can eventually clog the pores of the dispersion head resulting in reduced ozone flow as well as excess back pressure on the system. In addition, ozone will cause calcium and metals to plate out on the dispersion head with that same result. If not corrected, the ozone generator system may malfunction and/or pool water quality can be affected.

DEL BIG-EZ™ Connection:

After the pool and the DEL BIG-EZ™ Dispersion System have been completed, and pool filled with water, you can connect the ZO-940/942. Connecting the ozone generator consists of the following steps.:

1. Run a length of ozone supply tubing between the fitting on the ZO-940/942 and the hose connector on the 1/2" ozone line.
2. Install the plastic ozone supply check valve in this line, near the hose connector. Make sure that the beveled side of the check valve is pointing in the direction of the hose adapter.
3. Secure the tubing to the check valve and the hose connector with the plastic hose clamps provided.

The DEL BIG-EZ™ Dispersion System has now been installed and is ready for operation. The ZO-940/942 with the BIG-EZ™ Dispersion System is designed for continuous operation.

FINAL POOL CONSTRUCTION

(DEL BIG-EZ™ Dispersion System)

Once the pool shell has been constructed, and the piping has been flushed clean, glue the 1/2" pipe adapter/hose connector to the vertical pipe stub in the equipment area. Glue the dispersion body to the 1/2" PVC pipe in the pool floor. After gluing the body and adapter and before the gunite and plaster, pressure test the plumbing system. Make sure that the disperser body level with the surface of the plaster as if installing a main drain.

CAUTION: Do not plaster over the top of the disperser body. Leave the protective label on the disperser body during plastering. Leave the protective label on the disperser body until you are ready to install the dispersion head or ozone-ready cap.

DISPERSION HEAD INSTALLATION:

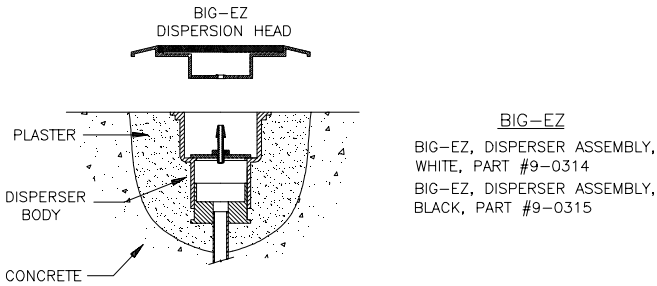


Figure 5: Installation Diagram

The best time to install the dispersion head is just prior to filling the pool. To do so, remove the protective label from the disperser body and clean the inside of it so that it is free of any debris. Set the dispersion head in the disperser body and press it into place. Removing protective label from the disperser head should be the very last step before filling pool. If the pool was built ozone-ready you need to replace the ozone ready cap. Remove the protective label from the disperser head, dive to the pool floor and remove the ozone-ready cap by pulling upward. Place the dispersion head into the disperser body, and press down.

As a part of your regular pool maintenance, the dispersion head should be periodically removed by simply “popping” it loose, and pulling it up and way from the dispersion head body mounted in the pool floor. Soak it in lemon juice, vinegar, or a 10 to 1 diluted muriatic solution overnight, then rinse off and reinstall. Adding a standard metal conditioner to the pool water will help eliminate mineral built-up on the dispersion head. Pool water that has a heavy iron or mineral content may cause the dispersion head to clog fairly often due to plating on the head. If, after repeated cleaning, the head does not clear, it will need to be replaced.

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

BASIC SYSTEM TROUBLE SHOOTING

SYMPTOM: Red Lamp Service light(s) is on, low pressure indicator is on, Green Power Indicator light is on and compressor is on.

PROBABLE CAUSE	CORRECTIVE ACTION
1. Internal pressure switch not activated (no back pressure)	1A. Check for kink in tubing; check for proper connection to the diffusion stone. Fix broken ozone supply tubing. Pressure switch may be out of adjustment (call dealer).
2. Improperly seated lamp	2A. Reseat lamp
3. Loose fitting	3A. Check all fittings for leaks using bubble solution (soap and water)
4. Defective electrical system	4A. Return to dealer for service

SYMPTOM: Power indicator light is on, all other indicators are off, compressor is off.

PROBABLE CAUSE	CORRECTIVE ACTION
5. Dispersion head clogged, high system pressure, compressor will not restart	5A. Clean dispersion head by soaking in diluted muriatic acid
6. Defective compressor	6A. Return to dealer for service
7. Defective electrical system	7A. Return to dealer for service

SYMPTOM: No Power Indicator lights nor is compressor on.

PROBABLE CAUSE	CORRECTIVE ACTION
8. Blown fuse	8A. Replace with a 10 amp fuse.
9. Interrupted electrical system	9A. Check circuit breaker in main panel, check timer and switches in circuit.
10. Defective electrical system	10A. Return to dealer for service

SYMPTOM: Power Indicator light and compressor both on, lamp service indicator and low pressure indicator off, but no bubbles coming from dispersion head.

PROBABLE CAUSE	CORRECTIVE ACTION
11. Dispersion head needs cleaning	11A. Soak overnight in mild solution of muriatic acid and rinse. Scrub with brush.
12. Air leak in system	12A. Check connections and fittings with soapy water to find leak and repair leak.
13. Defective compressor	13A. Return to dealer for service

PARTS

1. Compressor	9-0170
2. Lamp w/seal	9-0200
3. Ozone supply tubing	7-0075
4. Ozone supply check valve	7-4012
5. Plastic hose clamp	7-0021
6. Ballast	5-0218
7. Fan	5-0140
8. Compressor repair kit	9-0073
9. BIG-EZ™ dispersion head (wt.)	9-0379
10. BIG-EZ™ dispersion head (bk.)	9-0378
11. Stub-up assembly	9-0397
12. Hose barb (stub-up)	7-0127

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.