



MODEL 2734 & 2736 OPERATION AND MAINTENANCE MANUAL

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SAFETY PRECAUTIONS

WARNING

READ AND UNDERSTAND THESE SAFETY PRECAUTIONS BEFORE OPERATING MACHINE. FAILURE TO PROPERLY FOLLOW THESE PRECAUTIONS MAY LEAD TO A FIRE, EXPOSION OR ELECTRIC SHOCK HAZARD.

1. ELECTRIC POWER. This machine uses electrical power at common commercially available voltages. When directly contacted, such voltages are hazardous to human life. All precautions commonly applicable to the use of the electric power general are applicable to the use of this machine. This machine is designed to operate from three wire power systems where one of the wires is a safety ground. Do not disconnect the safety ground or use extension cords or "cheater" plugs to connect this machine to a two-wire system. This defeats the purpose of the safety ground and may result in a hazardous electrical shock condition.

When making repairs on the machine, use a work area or bench that is dry and not electrically conductive. Dry natural wood and plastics are generally non-conductive at the working voltages of this machine. Metals are usually conductive. Do not probe inside the machine.

Extension cords must be properly sized and rated for the voltage, current and length of an individual cord. Consult the nameplate current and voltage rating of your machine and the marked rating of the extension cord. A single extension cord only should be used. When two or more extension cord are placed in series, the rated current carrying capacities of the cords may no longer be valid If an extension cord gets warm to the touch, discontinue its use and obtain a cord with a higher current rate. Improper extension cords are not only hazardous, but may result in poor machine performance due to excessive voltage drop. Finally, since the machine uses oil-based formulation, the extension cord should be rated as oil resistant.

2. FORMULATIONS. Many formulations are combustible; that is, they all can be caused to burn. This is true of even high flash point or "no" flash point formulation (fine particle dust in a grain mill has "no" flash point). A combustible liquid vapor can more easily be ignited because it more readily form a uniform mixture with the air, which contains the Oxygen needed for combustion. However, fine particles of combustible liquids or solid suspended in the air very closely spaced are capable of propagating flame from one to another once an ignition starts. A good analogy is the grain mill explosion. Although the fine particle dust in a grain mill has "no" flashpoint, the phenomena of the grain mill explosion are an all too common occurrence.

Where a high flash point or "no" flash point liquid formulation will ignite far less readily than a low flash point liquid and for this reason is strongly advocated. The

higher or "no" flash point formulation can ignite if the proper conditions exist. These conditions are basically two: 1. A sufficiently volume of liquid in the form of fine particles suspended in the air; and 2. A sufficiently high-energy source of ignition.

- 3. AEROSOL CONCENTRATION. It has been fully established that an acceptable level of liquid in the atmosphere is one gallon per 50,000 cubic feet (2.7 Liter per 1,000 cubic meters). There is a safety margin of at least 5 to 1 in this figure. To avoid danger of fire or explosion in a closed space, the enclosed volume, spray time and required formulation volume must be carefully calculated.
- 4. AEROSOL IGNITION. If a combustible atmosphere is established or a combustible deposit is laid down, a source of ignition may cause a fire. Sources of ignition can be gas or oil pilot lights or sparks from electrical controls. Therefore, it is strongly recommended that all such sources be eliminated by extinguishing all pilot lights and turning off all unnecessary electric power. To avoid danger of fire or explosion in an enclosed space, the enclosed volume fogging time and required formulation volume should be carefully calculated.

PROPER AND IMPROPER USE.

The following rules apply to the operation of this machine:

DO

Read the entire manual before operating the machine and pay particular attention to all CAUTIONS and WARNINGS.

Store formulation in its original labeled container.

Use an extension cord which is properly rated for voltage, current and length and which is free from nicks, cracks and other signs of prior abuse. For lengths up to 100 feet (30.5 meters) cord No. 12AWG wire are usually adequate.

Replace damaged or worn electric cord immediately.

Turn the flow valve CLOCKWISE to the OFF position after each spray application while the motor is still operating to allow clearing of the lines. This will also prevent a siphon effect if the unit is ever accidentally knocked over with the valve remaining open.

Always comply with any requirements for protective clothing, goggles, gloves, facial masks or respirator required by the formulation label.

Ensure that formulation is applied only in strict compliance with the formulation label as well as local State and Federal regulations.

DO NOT

<u>Do not</u> Spray flammable liquids near open flame or other source of ignition.

<u>Do not</u> Use a machine that is broken or damaged in any way.

<u>Do not</u> Alter the machine by adding or removing parts.

<u>Do not</u> Restrict the motor blower inlet area.

<u>Do not</u> Tamper with the output nozzle.

<u>Do not</u> Allow the machine to operate unattended.

<u>Do not</u> Apply more than one gallon of formulation per 50,000 cubic feet (2.7 Liters per 1,000 cubic meters) enclosed space. Exceeding this concentration is both hazardous and wasteful.

WARNING

The US Occupational Safety and Health Administration (OSHA) recommends that hearing protection be used when noise levels exceed 85 decibals (dba). See noise level chart on page 19 of this manual.

SPECIFICATIONS

The Cyclone[™] Ultra machine is an electric "Cold Fog" ULV that utilizes a rugged anodized aluminum nozzle and a high performance blower.

This device is intended for applications of both Oil Based (following necessary precautions) and Water Based chemical treatments.

The body and tank are made of high-density chemical resistant polyethylene. The applicator is useful for dispensing most chemicals which are labeled for aerosol or mist applications such a disinfectants, deodorizers, germicides, insecticides, etc., in locations such hospitals, schools, nursing homes, greenhouses, stables, warehouses, homes, and farm buildings. The particle sizes generated range from 7 to 30 microns VMD, obtained using water. Machine output and particle size are dependent upon the viscosity of the liquid being dispensed.

Cyclone[™] Ultra model 2734, 110-130 VAC Cyclone[™] Ultra model 2736, 210-250 VAC

MOTORIZED BLOWER: MODEL 2734 Continuous Duty 110-130 VOLTS AC 6.85 AMPS 50/60 HZ 20,000 RPM 107 CFM (6.42 m³/min) Max

MODEL 2736 Continuous Duty 210-250 VOLTS AC 3.4 AMPS 50/60 HZ 22,000 RPM 109 CFM (6.54 m³/min) Max

This machine is one of the world's finest hand held ULV/Mist generator built to precision standards. With reasonable care and maintenance, this efficient equipment will provide many hours of service. For best result, this ULV generator must be operated and maintained in compliance with these instructions.

PRINCIPLES OF OPERATION

The machine consists of a motor/blower assembly, blower housing, a nozzle, formulation tank, tank neck filter, metering valve, check valve and shutoff valve (solenoid or manual, depending of the model). The various components are identified in the fluid systems diagram and major components diagram.

The blower is a two-stage centrifugal compressor driven by a universal motor operating at a speed of 20,000 rpm. The blower moves a large amount of air through the nozzle system. The flexible hose is located between the nozzle and the blower housing to allow easy orientation of the nozzle to direct the spray into hard to reach areas. The nozzle has six (6) stationary fins, which direct the air to create a swirling effect of the air mass as it leaves the nozzle. In the center of this exiting swirling air, a liquid supply spout tube injects formulation. The formulation is sheared into tiny aerosol droplets and dispersed into the atmosphere.

The liquid is delivered to the liquid spout by a combination of positive and negative pressures. A negative pressure is generated in the nozzle by the exiting air mass and a positive pressure is generated inside the blower housing and sampled to pressurize the formulation tank. The positive pressure minimizes the effect of the variation of the flow rate due to the difference in the static head of the liquid when the nozzle is at higher or lower position.

The rate of flow is controlled by a metering valve located at the left side of the tank. Generally, the sizes of the output droplets increase with increasing flow rates and with increasing viscosity of the liquid being dispensed.

The check valve allows the airflow from the blower housing to the tank, and avoid any return of pressurized air/vapor or liquid to the blower housing.

The vented tank cap in combination with the air coming from the blower housing, allow a medium positive pressure inside the formulation tank when the machine is in operation, and equalize the tank pressure to the atmospheric pressure in relatively short period of time, when the machine is turn off.

FLUID SYSTEM DIAGRAM Cyclone™ Ultra





MAJOR COMPONENTS DIAGRAM Cyclone™ Ultra

GENERAL DIMENSIONS



Machine Orientation

The machine allows adjusting the angle from the horizontal position to 30° above horizontal and 20° below horizontal. Use the locking handle and the plastic nut of the telescopic support to adjust the angle.



FLOW RATE

Turning the knob of the Metering Valve regulates the Flow Rate. If the knob is rotated clockwise, the flow rate will be reduced. If the Knob is rotated counterclockwise, the floe rate will be increased.

As reference, the average flow rate is shown in the bottom table at three different positions of the Metering Valve knob.



| CYCLONE™ FLOW RATE AND DROPLET SIZE (VOLUME MEDIAN DIAMETER) | | | | | | |
|--|------------|--------------|-------------|---------|------------|--------------|
| Valve | 32 Seconds | Droplet Size | 40 Seconds | Droplet | 50 Seconds | Droplet Size |
| Positionin | Formulatio | Microns | Formulation | Size | Formulatio | Microns |
| g | n | | | Microns | n | |
| LOW (*) | 40 ML/MIN | 8 VMD | 37 ML/MIN | 15 VMD | 12 ML/MIN | 20 VMD |
| | 1.4 OZ/MIN | | | | 0.4 OZ/MIN | |
| MED (*) | 83 ML/MIN | 10 VMD | 80 ML/MIN | 18 VMD | 48 ML/MIN | 22 VMD |
| | 2.8 OZ/MIN | | 2.7 OZ/MIN | | 1.6 OZ/MIN | |
| MAX (*) | 93 ML/MIN | 11 VMD | 92 ML/MIN | 20 VMD | 60 ML/MIN | 24 VMD |
| | 3.1 OZ/MIN | | 3 OZ/MIN | | 2 OZ/MIN | |

CAUTION: Read and follow the instructions on the formulation manufacturer's label and in the operation manual.

IMPORTANT: This device is designed to dispense formulation in a SPRAY (Cold Fog) or MIST. Many of the formulations which may be dispensed with this machine require registration with or approval by various government agencies.

(*)Note: All flow rate information in the table in the table above is based on spraying water. Thicker viscosity liquids will flow at lower rates than what is shown. Calibrate flow rate before attempting to spray

MAINTENANCE

- 1. Periodically clean the formulation tank using a hot water/detergent solution. Fully open the machine valve and operate the machine for 3 to 5 minutes, flushing the solution through the valve, lines and nozzle.
- 2. Examine the electrical cord for evidence of damage and replace any damaged cord immediately.
- 3. After 400-500 hours of operation, carefully remove the blower assembly and examine the brushes and the commutator bars of the blower motor. If brushes are worn out, replace them. If commutator bars are damaged, replace Blower Assembly.
- 4. If it becomes necessary to disassemble the Machine Flow Valve for cleaning, be careful not to enlarge the metering orifice or damage the taper of the valve steam, as this will affect the calibration of the machine.
- 5. Clean the Air Intake Filter after every application. If the filter gets saturated (wet and dripping) while the machine is working, stop the machine and clean the filter.

Note: If it becomes necessary to operate the machine in areas where the air become saturated with spray droplets and these droplets accumulate at the blower intake filter, the machine can be outfitted with an optional "Fresh Air Intake Hose" P/N 62060.

To repair the blower/motor components and request spare parts, please see section ""Rotary Fan Replacement".

ELECTRICAL SCHEMATICS



ROTARY FAN REPLACEMENT

CAUTION:

The Blower of your machine rotates at a high speed (approximately 20,000 RPM). The replacement of the Rotary Fan, if required, should be performed by a certified Dyna-Fog representative.

If the machine has been working in a closed room, the intake air filter gets saturated, and liquid (chemical) is introduced to the blower. The first contact point is the center section of the rotary fan, which could be attacked for the chemical. Then the debilitated wall of the fan fails. As result of the broken fan, the motor increases the speed, the airflow and the mist stops. The machine has to be shut off immediately.

The deterioration process of the fan material is accelerated if the machine is operated without air intake filter, or if disinfectant is applied in a closed room. The Fresh Air Intake hose P/N 62060 is recommended for those kinds of applications.



When the machine is disconnected from the power supply, remove the rear cover and pull the motor out the plastic housing. Some cables will keep the motor close to the housing.

TO DISASSEMBLE THE BLOWER:

1) To remove the metal end shell, add some pieces of industrial strength tape and use a screwdriver and hammer to lightly tap as indicated in above diagram. Gently tap the edges gradually working around the entire diameter.

2) After removing the end shell, use a 1/8" Allen Wrench and a $\frac{1}{2}$ " open end wrench to loosen and remove the nut. Remove the circular section of the remaining material from the broken fan.

3) Remove tape and proceed to remove the stationary fan by using the screwdriver and hammer. Remove the long spacer and the rotary fan of the second stage (item 1).

4) Add the new fans positioning them as shown in below diagram, place the big washer with the smooth outside edge against the fan material, tighten out the nut to a torque of 20 to 25 Lb-Inch, and reinstall the end shell. A thread lock product like **Loctite ref. 222** (purple) is recommended prior to reinstalling the nut onto the shaft thread.



SPARE PARTS FOR THE MOTOR

| ITEM | QTY | P/N | DESCRIPTION | VOLTAGE | |
|------|-----|----------|------------------------|---------------|------------------|
| | | | | | |
| 1 | 1 | 39651-5 | Rotary Fan, 4.93" O.D. | 110/130 VAC | BLOWER (120 VAC) |
| 2 | 1 | 39651-5 | Rotary Fan, 4.93" O.D. | 110/130 VAC | SERVICE KIT |
| 3 | 1 | 39651-13 | Flat Washer | ANY | |
| 4 | 1 | 39651-11 | Nut | ANY | P/N 63534 |
| 5 | 2 | 62309-2 | Brush Mechanism | 110/130 VAC | |
| | 4 | 00500 | | 040/050 \/4.0 | |
| 1 | 1 | 39592 | Rotary Fan, 4.18" O.D. | 210/250 VAC | BLOWER (120 VAC) |
| 2 | 1 | 39591 | Rotary Fan, 4.72" O.D. | 210/250 VAC | SERVICE KIT |
| 3 | 1 | 39651-13 | Flat Washer | ANY | |
| 4 | 1 | 39655-11 | Nut | ANY | P/N 63534 |
| 5 | 2 | 62340-2 | Brush Mechanism | 210/250 VAC | |

CYCLONE[™] ULTRA EXPLODED DIAGRAM



CYCLONE™ ULTRA EXPLODED PARTS LIST

| <u>ITEM</u> | <u>QTY</u> | <u>P/N</u> | DESCRIPTION | | |
|-------------|------------|------------|---------------------------------|--|--|
| 1 | 1 | 62130-10 | TANK, 1 GAL | | |
| 2 | 1 | 62135-2 | CAP AY, TANK BLK | | |
| 3 | 1 | 62131-2 | CLEVIS, BLOWER | | |
| 4 | 1 | 45933-1 | STRAIN CONNECTOR | | |
| 5 | 1 | 62031-2 | POWER CORD AY, 120 AY | | |
| 6 | 1 | 62313 | NOZZLE ASSEMBLY | | |
| 7 | 1 | 80296-11 | CLAMP | | |
| 8 | 2 | 62343-1 | EYELET, BRASS | | |
| 9 | 2 | 62163 | SCREW, 8-32 X 3/8, TAP | | |
| 10 | 1 | 62325 | INDICATOR PLATE | | |
| 11 | 1 | 62316 | XMAS TREE CLIP | | |
| 12 | 1 | 62310 | HANDLE SUPPORT | | |
| 13 | 1 | 59962 | GRIP | | |
| 14 | 1 | 62301-54 | HOUSING AY | | |
| 15 | 1 | 62312 | TOGGLE SWITCH AY | | |
| 16 | 1 | 10000-13 | O'RING | | |
| 17 | 1 | 62309 | BLOWER (115 V) | | |
| | 1 | 62340 | BLOWER (230 V) | | |
| 18 | 1 | 62002-1 | HOUSING CLOSURE | | |
| 19 | 1 | 62160 | SCREW, 10-16 x 1.25 SHWH | | |
| 20 | 5 | 62161 | SCREW, 10-16 x .75 THR | | |
| 21 | 2 | 62309-2 | MOTOR BRUSH (115 V) | | |
| | 2 | 62340-1 | MOTOR BRUSH (230 V) | | |
| 22 | 1 | 62366 | GASKET, FOAM, DIE CUT | | |
| 23 | 1 | 62083 | WASHER, FRICTION | | |
| 24 | 1 | 62118 | LOCK HANDLE, & WASHER | | |
| 25 | 1 | 62124 | AIR FILTER | | |
| 26 | 1 | 64956 | KNOB AY., FORMULATION VLV. | | |
| 27 | 1 | 39090 | RETAINER, SQUARE WASHER | | |
| 28 | 1 | 62134-1 | VALVE INDICATOR, METERING | | |
| 29 | 1 | 62195 | VALVE AY., BRASS (WITH FILTER) | | |
| 30 | 1 | 62329 | INJECTION TUBE AY. | | |
| 31 | 1 | 10247-31-1 | ORIFICE, .031 DIA. | | |
| 32 | 1 | 63409 | LABEL, MADE IN USA | | |
| 33 | 1 | 62029-1 | LABEL, CAUTION | | |
| 34 | 1 | 62253 | LABEL, FLOW | | |
| 35 | 1 | 62151-3 | LABEL, ID, CYCLONE ULTRA, 115V. | | |
| | 1 | 62151-4 | LABEL, ID, CYLCONE ULTRA, 120V. | | |
| 36 | 1 | 62251 | LABEL, CYCLON ULTRA LOGO | | |



NOISE LEVEL COMPARISON CHART

| | TYPICAL SOUND | TYPICAL MUSIC | Τ | SPL, Db | |
|--------------------|-------------------------------|-----------------------------|----------|---------|-------------------------------------|
| | Chest wall vibrates, chiking, | | — | 150 | |
| | giddiness | | | | |
| | Jet taking off, 25 meters | | | 140 | |
| | Threshold of pain | | 1 | | |
| | Artillery, 100 yards | Cannon (peaks) | | 130 | |
| | Pneumatic chipper | | | | |
| | Riveter, nearby | | | 120 | |
| | Loud car horn, nearby | Very loud rock (peaks) | | | |
| | | Very loud classical (peaks) | | 110 | |
| Pain | | | | | |
| Threshold | Inside N.Y. subway | Very loud classical (avg.) | | 100 | |
| | | Loud classical music | | | |
| | Heavy truck | | — | 90 | |
| Hearing Protection | Inside motor bus | Moderately loud classical | | | <cyclone td="" ultra<=""></cyclone> |
| Recommended | Noisy traffic, corner | |] | 80 | |
| | Noisy office | Soft popular music | | | |
| | | | | 70 | |
| | Business office | Soft classical music | | | |
| | Conversational Speech | | | 60 | |
| | | | 4 | 50 | |
| | Private office | Very soft music | | 50 | |
| | Background holse, city nome | | 4 | 10 | , |
| | Paakground poice, suburb | | | 40 | |
| | Librory | | - | 20 | |
| | Reakground country night | | - | | |
| | Mackground, country flight | | _ | 20 | |
| | Cood recording studio | | - | 20 | |
| | | | <u> </u> | 10 | |
| | | | - | | |
| | Threshhold of hearing | | <u> </u> | 0 | |

The Cyclone Ultra hand held electric aerosol applicator is a relatively quite machine, as shown in above comparison.

DYNA-FOG[®] Offers a complete and wide assortment of aerosol generator systems.



ELECTRIC ROTARY ATOMIZERS:

DYNA-JET L30: State of the Art,

Electric Rotary Atomizer ULV Aerosol Generator. 12 VDC, Light Weight, Truck mounted Machine wit FMI pump. Optional Radar Sincroflow. <u>DYNA-JET L15:</u> Drift Sprayer for migratory pest control like Locust. Flow Rate from 0 to 2000 ml/min.

<u>ASC-A20</u>: State of the Art, Electric Rotary Atomizer, for use on Fixed Wing and Rotary Wing aircraft.

PULSE-JET POWERED THERMAL FOGGERS:

From 0-120 GPH (0-453 LPH) output. Our complete line include different models like the Superhawk, Golden Eagle, Trailblazaer, Patriot, Blackhawk, Mister III, Mister Max, SilverCloud and Model 1200.

Portable or Truck mounted machines. Different models are available for Oil base or Water base formulations.





Optional Radar Syncroflow.

WIND DRIVEN ROTARY ATOMIZERS:

The ASC-A10 is a wind driven atomizer designed for Fixed Wing aircraft. The rotational speed of the atomizer controls the droplet size and can be adjusted by changing the angle of the blades. Also available is the ASC-A10H for Rotary Wing application.

No other Rotary atomizer for aircraft can handle the amount of Flow rate as the ASC Atomizer.

Several accessories are available to meet your requirements. Also available in 12 or 24 VDC, see rotary atomizers above model ASC-A20.

ELECTRIC HAND-HELD ULV/MIST GENERATORS: Full line of electric cold fog applicators with 1 Gal (3.8 L) tank, available in 115 and 230 VAC. An Electric Thermal version is available. For bigger Formulation capacity we have some models with 3 Gal (11.4 L) tank.





COMBUSTION ENGINE DRIVEN ULV AEROSOL GENERATORS:

Truck mounted Units powered by 8, 9, 11 or 18 HP four cycle, OHV Gasoline Engine. Diesel version available. One, two or four nozzles. Optional full remote control of boom functions (rotation of turntable and angle of nozzles).

Diversity of pumping systems, Gear, Piston and Diaphragm. Pressurized system available for overseas market.

Optional Radar Syncroflow.

40 cc Two cycle portable machines also available.

CURTIS **DYNA-FOG**[®] Ltd.

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17335 US Highway 31 North Westfield, IN 46074 U.S.A. Phone: (317) 896-2561 Fax: (317) 896-3788 Internet: www.dynafog.com

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