Dyna-Fog[®] Cyclone[™] Ultra-Flex "Cold Fog" ULV/Mister

FOR PROFESSIONAL USE



Model 3000 (115V) and 3004 (220V) with solenoid valve Model 3000-1 (115V) and 3004-1 (220V) with manual valve

Instruction Manual For Operation, Service and Maintenance

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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 an area or work bench that is dry and not electrically conductive. Dry natural wood and plastics are generally nonconductive 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" flash point, the phenomena of the grain mill explosion is 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 are 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.

Do not Use a machine that is broken or damaged in any way.

Do not Alter the machine by adding or removing parts.

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

Do not Tamper with the output nozzle.

Do not 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.

SPECIFICATIONS

The Cyclone[™] Ultra-Flex machine is an electric "Cold Fog" ULV/Mister that utilizes a rugged anodized aluminum nozzle and a high performance blower. A Flexible hose is located between the nozzle and the blower housing to help direct and dispense the spray into normally inaccessible or hard to reach areas.

This device is intended for applications of both Oil Based (following necessary precautions) and Water Based chemical treatments including wettable powders and wet flowables. Note: The Solenoid Valve version (models 3000 and 3004) is not recommended for use with wettable powders.

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.

CycloneTM Ultra-Flex model 3000, 110-130 VAC, with internal solenoid valve CycloneTM Ultra-Flex model 3004, 210-250 VAC, with internal solenoid valve CycloneTM Ultra-Flex model 3000-1, 110-130 VAC, with external manual valve CycloneTM Ultra-Flex model 3004-1, 210-250 VAC, with external manual valve

MOTORIZED BLOWER:

3000 and 3000-1 Continuous Duty 110-130 VOLTS AC 6.85 AMPS 50/60 HZ 20,000 RPM 107 CFM (6.42 m³/min) Max. 3004 and 3004-1 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 with Flexible Hose, built to precision standards. With reasonable care and maintenance, this efficient equipment will provide many hours of service. For best result, this ULV/Mist generator must be operated and maintained in compliance with these instructions.

PRINCIPLES OF OPERATION

The machine consists of a motor/blower assembly, blower housing, flexible hose, 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 minimize 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.

IMPORTANT: For the machines with model 3000-1 and 3004-1, to avoid liquid spill due to the siphon effect and the temporary positive pressure remaining inside the tank, close the manual shutoff valve before to turn off the machine. For the machines with model 3000 and 3004 that process is automatic, because the internal solenoid valve cut off the liquid flow when the machine is turn off.

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.



SYSTEMS DIAGRAM



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GENERAL DIMENSIONS



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 flow 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 when using water.



DOSING VALVE	CYCLONE [™] ULTRA-FLEX FLOW RATE					
	MANUAL VALVE			SOLENOID VALVE		
SETTING	ML/MIN	L/H	GPH	ML/MIN	L/H	GPH
LOW (*)	145	8.7	2.3	100	6.0	1.6
MED (*)	330	19.8	5.2	265	15.9	4.2
MAX (*)	440	26.4	6.9	300	18.0	4.8

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

IMPORTANT: This device is designed to dispense formulations 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 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".



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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 air flow 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 222 (purple) is recommended prior to reinstalling the nut onto the shaft thread.



SPARE PARTS FOR THE MOTOR

	VOLTAGE	DESCRIPTION	<u>P/N</u>	<u>QTY</u>	ITEM
	110-130 VAC)	Rotary Fan, 4.93" O.D.	39651-5	1	1
LOWER (120 VAC)	110-130 VAC	Rotary Fan, 4.93" O.D.	39651-5	1	2
	ANY	Flat Washer	39651-13	1	3
P/N 63534	ANY	Nut	39651-11	1	4
	110-130 VAC	Brush Mechanism	62309-2	2	5
	210-250 VAC	Rotary Fan, 4.18" O.D.	39592	1	1
SERVICE KIT	210-250 VAC	Rotary Fan, 4.72" O.D.	39591	1	2
P/N 63535	ANY	Flat Washer	39651-13	1	3
	ANY	Nut	39655-11	1	4
	210-250 VAC J	Brush Mechanism	62340-2	2	5



ISOMETRIC, UPPER COMPONENTS

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Dyna-Fog[®] Cyclone[™] Ultra-Flex, Upper Components

ITEM	QTY	<u>P/N</u>	DESCRIPTION
1	1	62031-2	Cord Assembly, 120 VAC L
	1	62051-1	Power Cord, 240 VAC
2	1	20180-3	Strain Relieve, 120 VAC
3	1	62301-3	Housing, Ultra-Flex
4	1	85916	Elbow, 1/8P Barb
5	1	74288	Nut, Lock, 1/8 NPSL
6	3	11719	Clamp, carry strap
7	1	62325	Indicator Plate
8	1	N.A.	Nut, included with Item 7
9	1	62316	Christmas Tree Clip
10	1	62310	Support, Handle
11	1	59962	Grip, Foam
12	1	62366	Gasket, Foam, Die Cut
13	1	9425178	Screw 10-24X3/8 HXSL, Tap (Qty=2 if Item 39)
14	5	62161	Screw 10X3/4, High-Low Thread, SS
15	1	54078-1	Cover, Vinyl
16	1	10000-13	"O" Ring
17	1	62369	Switch ON/OFF
18	1	62309	Blower 120 VAC
	1	62340	Blower 240 VAC
19	1	62002-1	Closure, Housing, 120 VAC
	1	62002-2	Closure, Housing, 240 VAC
20	1	62160	Screw, 10-16X1.25 HXSL
21	1	63507-1	Sleeve, Housing
22	1	63503-19	Adaptor Housing/Hose
23	1	43065	Rivet, SS
24	1	63523-1	Cable Assembly, Restrain
25	1	159254	Screw, 6-32X3/8
26	1	131094	Washer, Lock, # 6, Split
27	1	131014	Washer, Flat, # 6
28	1	114524	Nut, 6-32, Hex
29	1	62163	Screw, 8-32X3/8, Tap, SS
30	1	20054-2	Clamp, Worm Drive, 1.5 Dia
31	1	62299-2	Hose Flex, 1.5 ID
32	1	39088	Grip, Foam
33	1	39086	Hook
34	1	80296-11	Clamp
35	1	62495	Gasket
36	1	62313-1	Nozzle Assembly
37	1	63503-29	Adaptor, Nozzle/Hose
38	1	85574-1	Strap, Carry
39	1	62027	Cover, Motor (Optional)
N.S.	1	62060	Hose, 4", Fresh Air Intake (Optional)
		-	
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CYCLONE[™] ULTRA-FLEX PARTS LIST

ITEM	QTY	P/N	DESCRIPTION
1	1	62130-11	TANK, 1 GAL (MODIFIED)
2	1	85655	CONNECTOR, 1/8 PIPEBARB
3	1	10100-211	"O" RING
4	1	58596	FILTER, TANK NECK
5	1	62057	LABEL, WARNING
6	1	62135-2	CAP ASSEMBLY
7	2	21158	CLAMP, PLASTIC
8	1	10000-343	"O" RING
9	1	62164	LABEL, FLOW RATE
10	1	62151-5	LABEL, ID, MODEL 3000
	1	62151-6	LABEL, ID, MODEL 3004
	1	62151-7	LABEL, ID, MODEL 30001
	1	62151-8	LABEL, ID, MODEL 30041
11	1	62131-22	CLEVIS, BLACK (MODIFIED)
12	1	62498-1	CHECK VALVE/TUBE ASSEMBLY (PAGE 19)
13 (*)	1	62367	NUT, 3/616, SQUARE
14	1	62083	WASHER, FRICTION
15	1	62128	WASHER
16	1	62010	LOCKING HANDLE
17	1	65240	NUT, #10, NYLOCK, SS
18	1	65221	SCREW 1024 X 1, SS
19	2	39080	CLEVIS, SS
20	6	65232	WASHER, FLAT, #10, SS
21	1	62163	SCREW, 832 X 3/8, TAP. SS
22	1	39082-1	TUBE, INNER
23	1	159254	SCREW 632 X 3/8
24	1	62582-3	NUT, .375, PLASTIC GRIP
25	1	39085	TUBE ASSEMBLY, OUTER
26	1	138526	LOCK WASHER #6
27	1	65244	NUT, 632, HEX, SS
28	1	65351	LABEL, LOGO
29	4	80296	CLAMP, HOSE, DOUBLE WIRE
30	1	64956-2	KNOB AY, FORMULATION VLV.
31	1	39090	RETAINER, SQUARE WASHER
32	1	62134-1	
33	1	62195	VALVE AY., BRASS (WITH FILTER)

LOCATED INSIDE THE BLOWER HOUSING

(*)



Connector, 1/8P, Barb TUBE, PVC., 3/16 ID X 5/16 OD Bracket, Solenoid Washer, Lock, #8, Ext Screw, 8-32x1/4, PNCR

Valves are including Viton Seal

62227-14



* Item 4A included in Item 4. Information given for Service & Repair.





	TYPICAL SOUND	TYPICAL MUSIC	SPL, Db
	Chest wall vibrates, chiking,		150
	giddiness		
	Jet taking off, 25 meters	-	140
	Threshold of pain		
	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
<u>p</u>		Loud classical music	
	Heavy truck		90
Hearing Protection	Inside motor bus	Moderately loud classical	
Recommended	Noisy traffic, corner	-	80
	Noisy office	Soft popular music	
			70 Ultra-Flex
	Business office	Soft classical music	
	Conversational Speech		60
	Private office	Very soft music	50
	Background noise, city home		
			40
	Background noise, suburb		
	Library		
	Background, country night		
	Whisper, leaves rustling		20
	Good recording studio		40
		Ē	10
	Threshhold of hearing		0

NOISE LEVEL COMPARISON

The Cyclone Ultra-Flex hand held electric sprayer is a relatively quiet machine, as shown in above comparison.

Dyna-Fog Offers a Complete Assortment of Sprayers and Foggers



PULSE-JET POWERED THERMAL FOGGERS:

From 0-120 GPH (0-453 LPH) output. Our complete line include different models like the Superhawk, Golden Eagle, Trailblazer, Falcon, Patriot, Blackhawk, Mister III, SilverCloud and Model 1200. Portable or Truck mounted machines. Different models are available for Oil base or Water base formulations.

ELECTRIC ROTARY ATOMIZERS:

DYNA-JET L30: State-of-the-Art, Electric Rotary Atomizer ULV Aerosol Generator. 12 VDC, Light Weight, Truck mounted Machine with FMI pump. Optional Syncroflow Available. **DYNA-JET L15:** Drift Sprayer for migratory pest control like Locust. Flow Rate from 0 to 2 L/ min. Optional Radar Syncroflow.



ELECTRIC HAND-HELD ULV/MIST GENERATORS:

A Full line of electric cold fog applicators with 1-3 gallon tanks, available in 115 and 230 VAC.





COMBUSTION ENGINE DRIVEN ULV AEROSOL GENERATORS:

Truck mounted Units powered by 8, 9, 11, 18 and 20 HP four cycle, OHV Gasoline Engines. Diesel versions also available. One, two, four and eight nozzle configurations. Patented full remote control of boom functions (rotation of turntable and angle of nozzles) available on certain models. Your choice of Gear, Piston or Diaphragm pumping system. Pressurized system versions available for specific international markets. Optional Automatic flow control "Syncroflow" also available with Radar or GPS speed sensing. 25 cc and 40 cc two cycle portable models are also available.

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