



MODEL 55 ES



OPERATOR'S MANUAL

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GUARDIAN ULV EQUIPMENT
PRODUCT OF ADAPCO, INC., SANFORD, FL

CAUTION

FAILURE TO FOLLOW SAFE OPERATING PRACTICES MAY RESULT IN INJURY

- Keep all shrouds and guards in place especially the drive belt shroud.
- Before performing any maintenance or service, stop the machine
- Keep hands, feet and clothing away from power-driven parts.
- Read this manual completely as well as other manuals that come with this equipment.
- Use ear protection when in close vicinity of equipment when powered up.
- Do Not direct air blast from nozzle directly at any part of your body.

**REMEMBER – YOUR ULV COLD FOG GENERATOR IS ONLY AS SAFE AS
THE OPERATOR!**

Hazard control and accident prevention are dependent upon the awareness, concern, prudence, and proper training of the personnel involved in the operation, transport, maintenance, and storage of the equipment.

**This manual covers the operating instructions, illustrations,
and parts lists for:**

Guardian 55 ES

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MODEL 55 ES

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SPECIFICATIONS

Guardian 55 ES

Engine

Make:	Honda
Model	GX160
Horse Power:	5.5
Engine type:	Air cooled, 4-stroke, OHV, Single cylinder
Bore & Stroke:	68 x 45 mm (2.7 x 1.8 in.)
Displacement:	163 cm ³ (9.9 cu. In)
Ignition system:	Transistorized magneto
Direction of rotation:	Counterclockwise facing the PTO shaft
Starting system:	Recoil
Dry Weight:	15.0kg (33.1 lbs)
Fuel:	Unleaded gasoline

Compressor

Make:	Chinook
Model:	K12
Dia. Outlet/inlet:	.50"
Max performance:	1200 RPM 150 PSIG 6.97 ACFM @ 100 PSI 3.0 BHP
Housing:	Aluminum case and cylinder
Flywheel:	11" diameter
Belt type:	1-A
Weight	17.9 lbs.
Oil Capacity:	15 oz.

Drive Couple

Method	V-Belt
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Nozzle

Model:	BEET XA series Siphon Round air cap
Port Size:	1/8" FNPT
Material:	Brass Nickel plate
Nozzle rotation:	360° horizontally, 180° vertically



Capacity

Fuel: 0.95 U.S. gallons (3.6 liter)
Formulation: 2.5 Gallon (9.46 liter) Natural/opaque

Flow Control

No pump
Siphon Orifice disk
Orifice sizes .020ø through .061ø (9 sizes)
Formulation filter: Inline

Gauges

Pressure: 0-150 PSI

Throttle & Choke Control

Throttle: manual
Choke: manual

Finish:

Type: Epoxy Powder Coat chassis
Chassis material: Aluminum

Dimensions:

Length 34.2"
Width 15.65"
Height 17"
Weight: 90 lbs (dry)



GENERAL INFORMATION

INTRODUCTION

Your ULV cold fog generator, known from this point on in this manual as “ULV Sprayer”, was built to the highest standards in the industry. However, the prolonged life and maximum efficiency of your sprayer equipment depends on you following the operating, maintenance and adjustment instructions in this manual.

If additional information or service is needed, contact ADAPCO or if applicable, your authorized ADAPCO service representative.

We encourage you to contact ADAPCO for repairs. As the designer and manufacturer of this equipment, ADAPCO professionals are informed and trained on the latest methods to service this equipment and provide prompt and efficient service in the field or at the service shop and carry a full line of Guradian ULV service parts and accessories.

THE REPLACEMENT OF ANY PORTION OF THIS PRODUCT BY OTHER THAN THE MANUFACTURER’S AUTHORIZED REPLACEMENT PART MAY ADVERSELY AFFECT THE PERFORMANCE, DURABILITY OR SAFETY OF THIS PRODUCT. USE OF OTHER THAN ADAPCO/GUARDIAN ULV REPLACEMENT PARTS WILL VOID THE WARRANTY.

For some pictorial clarity, some illustrations and figures in this manual may show guards, or shrouds removed. Under no circumstances should your ULV sprayer be operated without these devices in place.

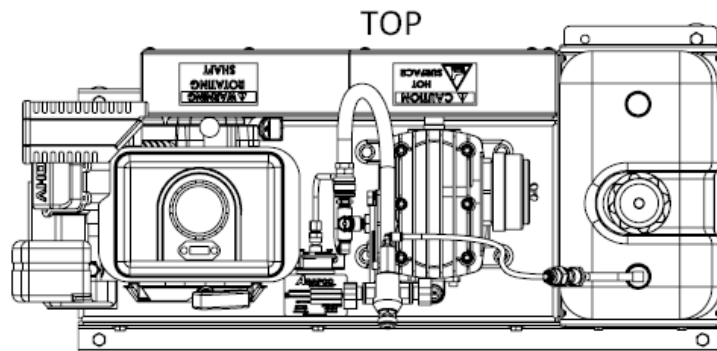
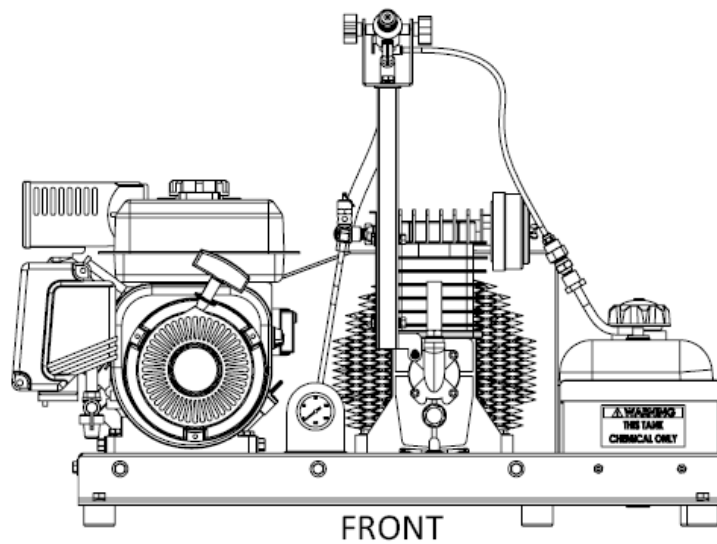
All information is based upon product information available at the time of approval for printing. ADAPCO, Inc. reserves the right to make changes at any time without notice and without incurring any obligation.

SERVICING THE ENGINE

The detailed servicing and repair of the engine is not covered in this manual; only routine maintenance and general service instructions are provided. For service of the engine during the limited warranty period, it is important to contact ADAPCO and if applicable, an authorized ADAPCO service representative or an authorized servicing agent of the particular engine manufacturer. **Any unauthorized work done on the engine during the warranty period may void your warranty.**

DIRECTION REFERENCE

The “Right” and “Left”, “Front” and “Rear” of the machine are referenced from the operator’s right and left when standing behind the vehicle and facing in the normal forward direction of the vehicle. Additionally, the ULV sprayer is designed to be placed in the back of a vehicle with the engine and compressor facing the rear.



SAFETY INFORMATION

GENERAL SAFETY INFORMATION

Your ULV sprayer is only as safe as the operator. Carelessness or operator error may result in serious bodily injury or death. Hazard control and accident prevention are dependent upon the awareness, concern, prudence, and proper training of the personnel involved in the operation, transport, maintenance, and storage of the equipment. Make sure every operator is properly trained and thoroughly familiar with all of the controls before operating this spray equipment. The owner/user can prevent and is responsible for accidents or injuries occurring to themselves, other people or property.

**READ THIS OPERATOR'S MANUAL
BEFORE ATTEMPTING TO START
OR USE THIS SPRAYER.**

A replacement copy of this manual is available from ADAPCO, Inc. or if applicable, an authorized dealer or reseller of this equipment at:

ADAPCO, Inc.
Attn: Customer Service Dept.
550 Aero Lane
Sanford, FL 32771
Or call 1-800-367-0659

Additionally, a copy of this manual can be downloaded from the ADAPCO web site at www.MyADAPCO by using the model number.

SIGNAL WORDS



This general symbol, the exclamation point inside a triangle means "Attention! Become Alert! Your Safety is involved!" The symbol is used with the following signal words to attract your attention to safety messages found on the decals on the machine and throughout this manual.

The message that follows the symbol contains important information about safety. To avoid injury and possible death, carefully read the message! Be sure to understand the causes of possible injury or death.

Signal Word:

The Signal word is a distinctive word found on the safety decals on the machine and throughout this manual that alerts the viewer to the existence and relative degree of the hazard.



The signal word "DANGER" denotes that an extremely hazardous situation exists on or near the machine that could result in high probability of death or irreparable injury if proper precautions are not taken.



The signal word "WARNING" denotes that a hazard exists on or near the machine that can result in injury or death if proper precautions are not taken.



The signal word "CAUTION" is a reminder of safety practices on or near the machine that could result in personal injury if proper precautions are not taken.

Your safety and the safety of others depend significantly upon your knowledge and understanding of all correct operating practices and procedures of this machine.

BEFORE OPERATION CONSIDERATIONS

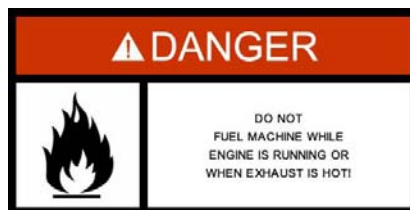
1. Become familiar with the safe operation of the ULV sprayer and the operator controls.
2. **Never** allow children to play with the machine. **Never** allow children to ride in a vehicle sitting next to or on top of this machine.
3. Always wear appropriate clothing while operating, maintaining, servicing or calibrating this machine. The wearing of such items as safety glasses, aprons, gloves, and safety

shoes is advisable and may be required by some local ordinances or insurance regulations.

4. Always wear hearing protection. Operating this machine for prolonged periods of time without hearing protection can cause permanent loss of hearing.



5. Keep the Spray machine and attachments in good operating condition. Keep all guards, or shrouds in place. If a shield, safety device or decal is defective or damaged, repair or replace it before operating the machine.
6. Fill the fuel tank with clean, fresh, unleaded gasoline with a minimum octane rating of 87. To avoid personal injury or property damage, use extreme care in handling gasoline. Gasoline is extremely flammable and the vapors are explosive.
 - a. Keep flammable objects (cigarettes, matches, etc.), open flames and sparks away from the fuel tank and fuel container.
 - b. Use only an approved gasoline container.
 - c. **DO NOT** add fuel to a running or hot engine. Allow the engine to cool for several minutes before adding fuel.



- d. Never fuel the machine indoors or in a small enclosed area without ventilation.
- e. Never store the sprayer or fuel container where there is an open flame, spark or pilot light such as on a water heater or other appliance.
- f. Never fill containers inside a vehicle or on a truck or trailer bed with a plastic bed liner. Always place the container on the ground away from your vehicle before filling.
- g. Keep the nozzle in contact with the rim of fuel tank or container opening at all times until fueling is complete. Recommend not using a nozzle lock-open device.





6. **NEVER** walk directly into the air/chemical blast from the nozzle when insecticide or any other formulation is being atomized.
7. **DO NOT** direct the air/chemical discharge toward bystanders or allow anyone near the machine while in operation.
8. **DO NOT** run the engine inside a building or a confined area without proper ventilation. Exhaust fumes are hazardous and contain carbon monoxide which can cause brain injury and death.



9. **DO NOT** operate the machine under the influence of alcohol or drugs.
10. Use care when loading or unloading the machine onto a truck, trailer, or utility vehicle
11. Do not change the engine governor settings or over-speed the engine. See the engine operator's manual for information on engine settings.
12. **NEVER** leave the machine running unattended.

MAINTENANCE AND STORAGE

1. Allow only trained personnel to service the ULV spray machine.
2. Park the vehicle or place the machine on level ground for fluid level verification.
3. Never make adjustments to the machine with the engine running unless specifically instructed to do so. If the engine is running, keep hands feet and clothing away from moving parts.
4. Stop engine or disconnect spark plug wire(s) to prevent accidental starting of the engine when servicing or adjusting the machine. Wait for all movement to stop before adjusting, cleaning or repairing.

5. Keep all nut, bolts and screws tight, to ensure the machine is in safe working condition.
6. The engine must be shut off before checking the oil or adding oil to the crankcase.
7. Let the engine cool before storing.
8. DO NOT store the machine near an open flame.
9. Shut off fuel while storing or transporting. 
10. To shut off engine for prolonged periods of time or seasonal storage, shut off the fuel valve and let the engine run out of fuel before turning the ignition switch off. 

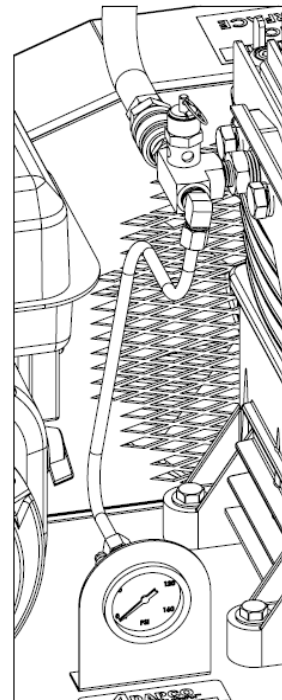
FAMILIARIZATION

OPERATOR CONTROLS

The standard configuration of the Guardian 55 ES incorporates manual controls of the engine and the spray on/off. Optional electrical remote spray on/off is available by using a 12-volt electric solenoid valve in place of the manual spray ball valve to control the flow of chemical to the nozzle. This remote control device plugs into a “cigarette” lighter or accessory port of a vehicle to provide 12 volts and a simple toggle switch opens the solenoid valve so the operator can gain more distance between him/her and the machine.

AIR PRESSURE GAUGE

The air pressure gauge has a pressure range from 0-150 psig. When the engine is running and manual throttle adjusted to the desired engine RPM, air pressure is most often the overriding factor in assuring correct atomization of a given flow rate. Air pressure is measured through the copper tubing from the air compressor discharge port.



SPRAY VALVE (Ball Valve)

The Guardian 55 ES unlike its larger stable mates in the Guardian line, does not utilize an insecticide pump to meter a chemical formulation to the atomization nozzle but rather pulls or draws a siphon from this specially designed nozzle. The nickel plated brass ball valve is equipped with Viton® elastomeric seals and a stainless steel ball for trouble free operation. The manual ball valve is a 2-position (open/close) valve that when closed blocks the flow path from the formulation tank to the atomization nozzle. When opened, the strong vacuum effect from the siphoning nozzle pulls liquid into the nozzle for atomization.

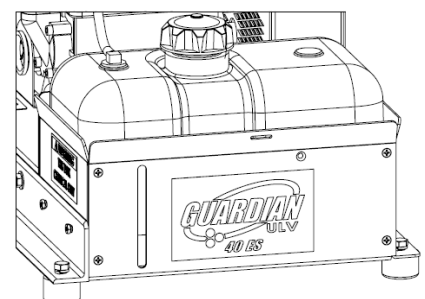
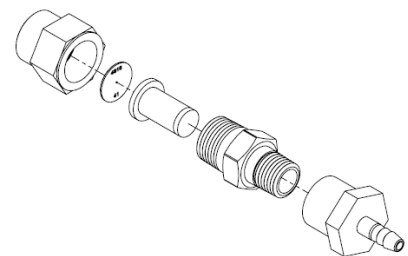
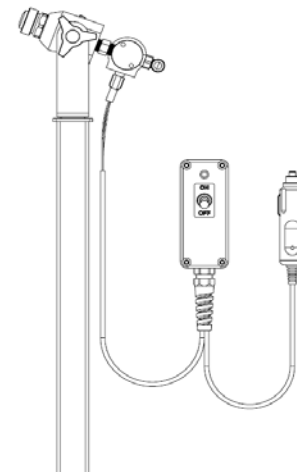
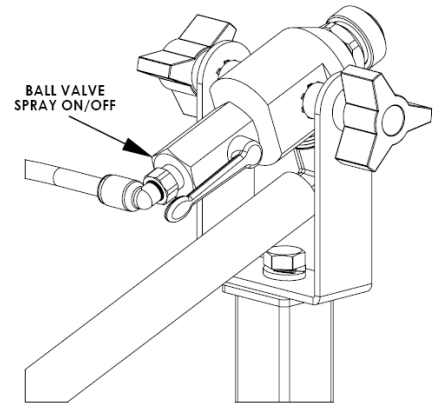
A remote spray on/off option is available for the Guardian 55 ES in the form of a 12-volt electric solenoid valve which is installed in place of the manual valve. Power to support this remote spray on/off option is drawn from a 12-volt source such as an accessory port or “cigarette lighter” port found on many utility vehicles. A length of cable is supplied to the valve allowing a driver to activate spray without having to physically be at the machine and place the ball valve in the closed position. If this option is of interest to you, contact your dealer, distributor or sales associate to find out more.

FORMULATION FILTER AND ORIFICE

The chemical or formulation is drawn through this fitting to the nozzle. Inside this fitting resides both an inline screen filter as well as an orifice disk. The purpose of the orifice disk to limit the amount of flow to the nozzle based on the product label and desired droplet size. Refer to the table provided in this manual to select the appropriate orifice disk for desired product and atomization performance.

FORMULATION TANK

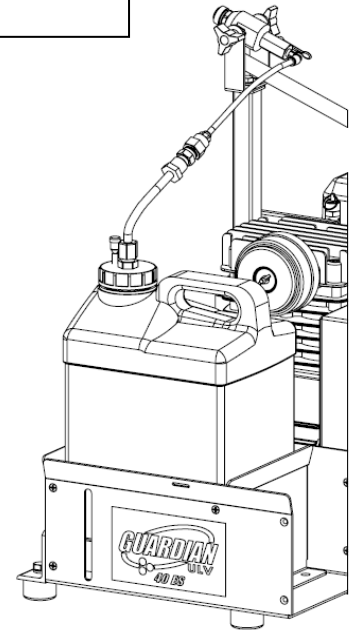
2.5 U.S. gallons (9.46 liters) is the capacity of the formulation tank installed on this ULV sprayer. The opaque high density polyethylene (HDPE) tank is suitable for all known products used in Vector control. Additionally, the formulation tank is supplied



standard with a 2 inch threaded cap. A slot in the chassis aluminum end panel allows for visual reference to volume remaining.

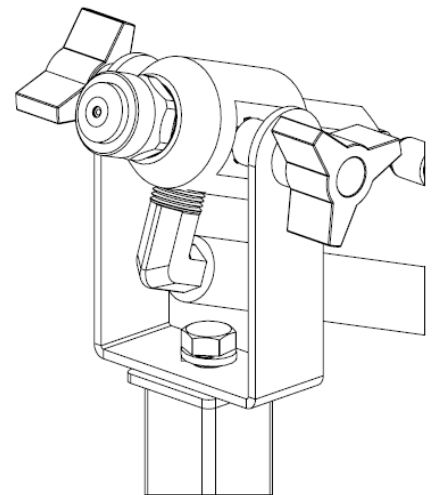
Note: Use only products specifically intended for ULV use as outlined on the product label.

A “Ready-To-Use” 2.5 gallon jug may be used in place of the supplied tank. Included with this machine is a customized 63mm cap for use with 2.5 gallon jugs. This cap is fitted with a draw tube and compression style coupling and vent. Simply replace the existing cap of your “RTU” jug with the new Guardian cap and place the jug in the same location as standard tank and strap securely in place. Auxiliary holes have been added to allow the end panel of the “tank basket” to be moved inward to stabilize the position of an RTU jug. Finally, connect the line from the orifice assembly to the bulkhead connector of the Guardian RTU cap.



ATOMIZATION NOZZLE

The atomization nozzle is designed to efficiently and effectively atomize various oil and water based formulations to micron diameter droplet sizes as outlined on the specific formulation label. Keep the nozzle clean and free from dings and dents to maintain perfect concentric alignment of the air and fluid ports. Formulation is fed through the rear of the nozzle body by way of the ball valve. Compressed air is introduced into the nozzle from the bottom of the aluminum nozzle body. The nozzle swivels 360° horizontally and approximately 300° vertically to position the nozzle at the desired attitude. The most common nozzle position is pointed directly toward the back with respect to the travel direction of a vehicle with an upward 45° degree attitude.





INSTALLATION

COLD FOG GENERATOR (ULV SPRAYER) CONTENTS

FACTORY FLUID LEVELS

When you receive your Guardian ULV sprayer, the fluid levels will be as follows:

Engine oil	full
Compressor	full
Fuel tank	empty
Formulation tank	empty

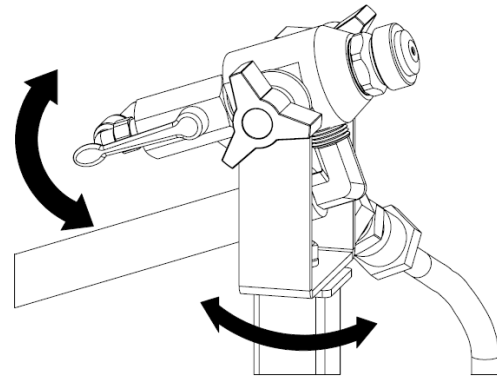
Each machine is fully tested functionally and appropriate fluid levels are services beforehand.

VEHICLE INSTALLATION

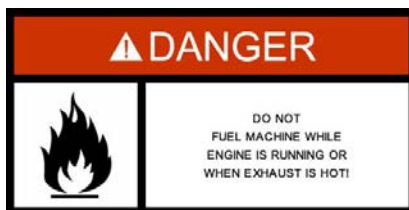
1. The ULV sprayer is packaged in a double-walled corrugated box that protects the machine from damage in shipping and storage. Open the box and remove the sprayer from the top. You may elect to retain the shipping container for storage purposes.
2. The Guardian 55ES arrives standard with rubber vibration dampening feet on each bottom corner to provide a stable platform during spray operations. This lightweight machine is designed to be portable either by hand lifting (suggest two persons) into a support vehicle such as a side-by-side UTV, golf cart, or maintenance vehicle or by mounting in a more rigid and semi-permanent fashion to a 2 or 4-wheel drive ATV. In this latter use, remove the rubber vibration dampening feet and mount the ULV sprayer to the desired machine. The end user must provide mounting hardware when mounting in a more permanent way.
3. Place the sprayer onto the vehicle or trailer with the engine and blower facing the rear of the vehicle for ease of reaching the recoil starter pull. Make sure the engine exhaust has ample area in which to discharge and heat from the exhaust can dissipate without causing damage to surrounding surfaces, use straps to secure if desired.

Note: ADAPCO is not responsible for mounting and securing the Guardian ULV sprayers onto a vehicle; it is the responsibility of the owner or end user to do so. ADAPCO will only make recommendations on how to accomplish the placement and securing of this unit.

4. Attach the nozzle post assembly to the vertical bracket with hardware supplied and secure post in place. Attach the air hose from the nozzle assembly to the discharge port of the air compressor.
5. Loosen the 2 knobs on the Nozzle swivel and adjust the nozzle vertically to the desired attitude. Loosen the single bolt below the nozzle swivel and adjust the nozzle horizontally to the desired position then retighten.



6. Fill the fuel tank with unleaded gasoline of not less than 87 octane. **ALWAYS** take precautions when filling the machine with fuel. **NEVER** fuel the machine while running and **ALWAYS** wait for a hot machine to cool before fueling.



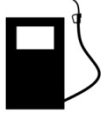





7. Check the engine oil level by loosening and removing the engine oil dip stick. Ensure oil level is between the H and L.
8. Visually check the oil level on the air compressor by ensuring the oil level is visible and 2/3 full in the sight gauge on the side of the compressor.

ENGINE STARTING & STOPPING

The Guardian 55ES has either a 4 hp Kawasaki or 4 hp Honda engine that has an on/off ignition switch connected electrically to the engine. When the engine is cold, the manual choke will be

required to start the engine. After the engine is warm, the choke should not be required in most cases. Refer to the engine symbols below for definitions


Engine Symbols

 <p>Fuel On</p>	 <p>Fuel Off</p>	 <p>Choke off</p>	 <p>Choke On</p>		
<p>Fuel selected allowing gravity feed of gasoline to the carburetor</p>	<p>Fuel valve to this position turns the fuel to the carburetor off</p>	<p>In this position, the choke is in the normal "RUN" mode</p>	<p>To aid in cold starting the engine. Return to choke OFF position when started</p>	<p>Run fast mode increasing the engine RPM the farther toward this position</p>	<p>Idle or slow mode decreasing engine RPM the farther toward this position</p>

The oil level sensor will stop the engine and flash the LED beside this symbol when the oil level gets too low. The engine won't restart without adding oil. If the engine is tilted too much during operation, it may suddenly stop even though the oil level is not too low.



Recoil Start (Pull Start)

1. First turn the fuel valve to the ON position by aligning the fuel valve knob with this symbol. 
2. Next, turn the engine ignition switch to the ON position. This position breaks the ignition electrical path to Ground and allows spark at the spark plug when the engine is turning over.
3. Firmly grasp the recoil starter rope handle and with strength pull to full extent. Repeat as required and also apply the manual choke as required to start engine.
4. To stop the engine, turn the ignition switch back to the off position.

MAINTENANCE

CHECKING ENGINE CRANKCASE OIL LEVEL

1. The engine oil level should be checked after every 8 hours of operation or daily as instructed in the Engine Operator's Manual furnished with this machine.
2. Level the machine and engine to ensure accurate inspection and to prevent overfilling
3. Unscrew the oil gauge, wipe its dipstick dry, and insert it into the filler hole but **DO NOT SCREW IT IN.**
4. The oil level should be between the "H" and "L" marks on the dipstick.
5. Add engine oil as required to maintain a level between the H and L marks, refer to the Engine Owner's Manual for viscosities according to geographic temperature ranges.

CHANGING ENGINE CRANKCASE OIL

1. After the first 8 hours of operation, change the engine crankcase oil. Thereafter, change the engine crankcase oil every 50 hours of operation or annually whichever occurs first.
2. With engine off and preferably warm but not hot enough to cause a burn, slide a shallow oil catch pan directly under the oil drain plug. Loosen and remove the oil gauge dipstick and set aside. Loosen the oil drain plug and remove allowing the crankcase oil to drain into the pan below until the flow of oil has stopped. Warm oil will drain more freely and completely.
3. Replace the engine oil drain plug securely but do not over tighten.
4. Fill the engine crankcase with fresh engine oil; refer to the Engine Owner's Manual for proper viscosities according to geographic temperature ranges.
5. Check and verify the engine oil level to be between the "H" and "L" marks on the dipstick as described in the Engine Owner's manual and the preceding section.

ENGINE AIR CLEANER

For any air cleaner, the operating environment dictates how often the air cleaner should be serviced. Refer to the Engine Owner's Manual for Instructions

CAUTION- to prevent excessive engine wear, do not run the engine with the air filter removed

WARNING- DO NOT use gasoline or low flash point solvents to clean the air filter

COMPRESSOR LUBRICATION

A clear sight gauge or window is located on the air compressor indicating lubrication oil level. Ensure the oil level is maintained to 2/3 full as visible on the sight gage. Use 30 weight, non-detergent oil for temperatures above 56°F, or 20 weight non-detergent oil for temperatures from 32-55°F. Temperatures below 32°F are not recommended for atomization.

CLEANING THE MACHINE



- Keeping this ULV machine clean is paramount in maintaining a well running and efficient ULV sprayer.
- Washing this machine after each use is highly recommended.
- Use warm water and general duty cleaners.
Pressure washing is not recommended!
- DO NOT spray electrical components directly.

BELT TENSION

Correct belt tension and alignment is essential for proper operation and longevity of this ULV sprayer. When adjusting the belt tension, ensure the alignment is maintained when the fasteners are loosened and retightened after adjustment. Use a straight edge across the face of the Compressor flywheel and align the engine's pulley face with it before securing the engine mounting bolts.

An over-tightened drive belt can cause excessive pulley wear, shorten the belt's life and place too much strain on bearing surfaces of the devices being driven. Conversely, a belt too loose allows slippage and under performance of the machine. The best method for setting the proper tension is the "Deflection" method. A good rule of thumb is 1/64" of deflection for every inch between the pulley centers.

In the final analysis, the correct belt tension is just enough tension to keep the belt from slipping under normal load conditions.

LUBRICATION AND MAINTENANCE

BREAK-IN (AFTER FIRST 8 HOURS)		EVERY 8 HOURS (DAILY)	EVERY 25 HOURS	EVERY 50 HOURS	EVERY 100 HOURS	EVERY 200 HOURS	EVERY 300 HOURS OR ANNUALLY	PROCEDURE	COMMENTS
X								Check all hardware for tightness	
X								Check drive belt for proper alignment	
X								Change engine oil (break-in)	See Engine Owner's Manual
X	X							Check engine oil level	See Engine Owner's Manual
X	X							Check compressor oil level	
X	X							check or clean engine air intake screen	See Engine Owner's Manual
X	X							Wash and clean ULV sprayer	See cleaning machine- this manual
X	X	X						Check all hardware for tightness	
X	X	X						Check and clean atomization nozzle	
X	X	X						Check belt tension	
X	X	X						Clean air filter foam element	See Engine Owner's Manual
X	X	X	X					Clean fuel filter element	See Engine Owner's Manual
X	X	X	X					Change compressor oil	See Compressor Owner's Manual
X	X	X	X					Check and verify formulation calibration	
X	X	X	X					Change engine oil (Kawasaki engine only)	See Engine Owner's Manual
X	X	X	X	X				Clean air cleaner paper element	
X	X	X	X	X				Change engine oil (Honda engine only)	See Engine Owner's Manual
X	X	X	X	X				Clean and regap spark plug	See Engine Owner's Manual
X	X	X	X	X				Clean formulation filter	
X	X	X	X	X				Check and clean compressor intake element	
X	X	X	X	X	X			Change compressor oil	See Compressor Owner's Manual
X	X	X	X	X	X			Clean and rinse formulation tank	
X	X	X	X	X	X			Replace air cleaner paper element	
X	X	X	X	X	X			*Clean combustion chamber	
X	X	X	X	X	X			*Clean and lap valve seating surface	
X	X	X	X	X	X			*Check and adjust valve clearance	

* Have an authorized Honda engine dealer perform these services

CALIBRATION

There are two types of calibrations that are commonly performed to ensure proper parameters are being maintained for both formulation FLOW and atomization DROPLET spectrums. Perform these calibrations in the order outlined in this manual.

FLOW CALIBRATION DESCRIPTION

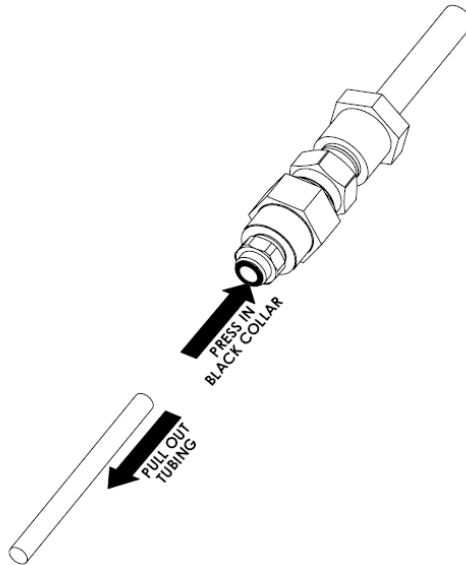
Flow to the atomization nozzle is controlled on the Guardian 55 ES by 2 variables, pressure and orifice size. Generally speaking, the maximum pressure potential of this unit under normal operating conditions is approximately 80 psi which produces the greatest vacuum or siphoning. Nozzle pressure can change if clogging occurs or belt slippage is present so it is a matter of good practice to visually verify pressure periodically to ensure the proper atomization conditions are met. Orifice sizes from .020" to .061" are included with this machine and depending on the amount of atomization required will dictate which orifice to choose. Water and oil based products may or may not use the same orifice disk to accomplish the same flow rates. Refer to the chart below for average flow rates of both water and oil based products. Use these flow rates in the below chart as a reference only, viscosity, temperature and nozzle pressure all can affect flow rate.

Orifice ϕ	Water based formulation Avg. flow rate Oz/minute (mL)	Light Oil based formulation Avg. flow rate Oz/minute (mL)
20	1.3 (38)	1.4 (41)
25	1.9 (56)	2 (59)
30	2.5 (74)	2.6 (77)
35	3.2 (95)	3.2 (95)
40	3.8 (112)	3.8 (112)
45	4.8 (142)	4.2 (124)
51	5.8 (171)	4.6 (136)
55	6.2 (183)	4.9 (145)
61	6.9 (204)	5.4 (160)

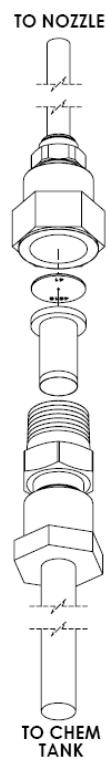
**Flow rates in chart above are based
on 80 psi nozzle pressure**

FLOW CALIBRATION PROCEDURES

1. Disconnect hose on upper side of orifice disk fitting with gloved hands. Pull back on the black collar and pull the tubing straight out until disconnected.



2. Loosen the black orifice fitting to reveal both a filter screen and orifice disk. Place the desired disk chosen from the proceeding table into the fitting and retighten. Ensure the filter element is clean before completing.



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3. With hose still attached to the formulation tank, unscrew the hose and draw tube assembly from the formulation tank and place into a graduated cylinder. Reconnect the tube from the nozzle to the top of the orifice fitting.
 4. Add chemical to the graduated cylinder until well above the bottom of draw tube and note volume in the cylinder.
 5. Turn engine ignition on and pull start engine. Let engine warm for at least 30 seconds to one minute. If engine at idle, increase engine throttle manually until pressure gauge reads approximately 80 PSI.
 6. Ensure the top of the draw tube is close to the same height as it would be if attached to the formulation tank. Note: if the draw tube is higher or lower than it would be normally, this can skew the results and cause inaccurate flow calibration.
 7. Open the spray valve on the rear side of the nozzle either manually or electrically if that option is installed. Let spray for exactly 1 minute using a stop watch then turn spray valve off.
 8. Read remaining volume in graduated cylinder (note: do not remove the draw tube) and subtract that number from that which was noted in step 4. This is your flow per minute based on the orifice size selected.
 9. Increase or decrease orifice size and repeat these steps until reaching the desired flow results.
 10. When Flow calibration is complete, reinstall the draw tube back into the formulation tank and ensure all connections are secure.

TROUBLESHOOTING

Troubleshooting guidelines are outlined for both the engine and air compressor in the corresponding owner's manuals of each. For problem identification, refer to these manuals for further guidance. For all other troubleshooting symptoms, refer to the table below. If the troubleshooting symptom you are experiencing is not listed in the below table or in either of the engine or air compressor troubleshooting sections, contact the manufacturer for service and support.

SYMPTOM	PROBABLE CAUSE	REMEDY
1) Machine will not spray	Formulation tank empty Air/vacuum leak Clogged formulation filter Valve not opening broken, melted, or clogged formulation feed tube Nozzle clogged	Add formulation Tighten all fittings from formulation tank to nozzle check and if necessary clean in-line filter Verify manual/electrical valve open at nozzle and formulation has free path to nozzle Check all tubing from formulation tank to nozzle Remove and clean nozzle tip
2) Air pressure increases @ constant engine RPM's	Nozzle clogged Faulty air pressure gauge	Remove and clean nozzle tip Replace gauge
3) Spray continues when valve closed	Valve not closing completely	Check and/or clean valve for possible contaminants
4) No air flow through nozzle	Belt loose, broken, or slipped off pulley/flywheel supply hose not connected Supply hose broken Pressure relief valve stuck open Engine off	Check and if necessary, replace or repair Connect Check for worn area, holes, or fitting breaks Decrease engine RPM, or check replace relief valve Start engine
5) Too much fluid flow through nozzle	Oriface disk missing Oriface disk too large	Add oriface disk Reduce size of oriface disk diameter
6) Too little fluid flow through nozzle	Oriface disk too small Nozzle clogged Air/vacuum leak Clogged formulation filter	Increase oriface disk diameter Remove and clean nozzle tip Tighten all fittings from formulation tank to nozzle check and if necessary clean in-line filter
7) Atomization droplets too large	low engine rpm/low air pressure Oriface disk too large Nozzle gumming up or varnishing	Increase engine RPM to increase air pressure Reduce size of oriface disk diameter Clean nozzle, soak in industrial cleaners if applicable
8) Atomization droplets too small	Engine RPM and air pressure too high Oriface disk too small	Reduce engine RPM to decrease air pressure Increase size of oriface disk diameter



GUARDIAN 55 ES PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	1865-601	K12 Air Compressor	57	1865-627	Orifice assembly 1/4"FPT x 1/4" barb
2	1865-622	GX200K1(Honda) Recoil start engine.	58	1865-629-X	Orifice disk, X = size (see orifice chart)
3	1865-103	Air Compressor Aluminum Flywheel	59	1865-626	Orifice assembly, unijet reducing hex nipple
4	1865-082	Aluminum angle frame runner short	60	Tubing	Polyurethane tubing, 1/4" ID x 3/8" OD
5	1865-083	Engine/Compressor mount plate	61		10-32 x 1/4" truss head machine screw
6	1865-081	Aluminum angle frame runner long	62	1865-606	Ball valve, 1/8" NPT male x female
7	1865-075	Tank tray rear panel	63	1865-094	Nozzle post bracket
8	1865-630	Replacement compressor air filter	64	1865-189	Nozzle swivel
10	1865-073	Chemical/Formulation tank tray	65		5/16"-18 x 5/8" hex bolt
11	1865-074	Tank tray front panel	66	1865-099	1/4" brass tee w/extra 1/4" threaded port
12	1865-080	Belt tensioner bracket	67	1865-602	1/4" NPT brass male QD air fitting
14		5/16" flat washer	68	1865-620	125 PSI brass pressure relief, 1/4" NPT
15		5/16"-18 x 1.5" hex bolt	70	1865-603	Air hose- 1/4 NPT elbow x fem QD air fitting
16		5/16" hex nut	71	1865-621	1/4 NPT x 1/4 tube, push to lock fitting.
17		5/16" split lock washer	72	LDPE tubing	1/4"OD x 1/8" ID LDPE tubing, 15" OAL
20	1865-087	Belt shroud weldment	73		M8 X 1.25 X 30mm Reverse thread bolt
21	1865-618A	Knurled ring nut for nozzle	74		M8 HD retainer washer
22	1865-618	Nozzle main body section	75		1/4"-20 x 3/8" hex head set screw
23	1865-619	Nozzle gasket, high pressure	76		5/16"-18 x 2 1/4" hex bolt
24	1865-610	Pully, 3.75" OD x .750" bore V-belt	77		M6 X 1.0 X 18MM blk socket head cap screw
25		Keyway 3/16" x 1 3/8" carbon steel	78		M8 x 1.25 x 10MM hex bolt (Kawasaki)
27	1865-622	Alum. Spacer 1/2" OD x 1/4" ID x 7/16" Lg.	78A		5/16"-24 x 1/2" hex bolt (Honda)
28	1865-093	Nozzle post weldment assembly	79		1/4"NPT x 1/4" tube brass elbow comp. ftg.
30		1/4" ID external tooth lock washer	80	1865-104	Pressure gauge mount bracket
31	1865-617	40ES nozzle tip air cap	81	1865-611	0-160 PSI 1.5" pressure gauge w/mount ring
32	1865-096A	40ES nozzle body w rear fluid input	82		1/8"NPT x 1/4" tube brass staight comp. ftg.
33		5/16"-18 x 7/8" Hex bolt	83		1/4"-20 x 1 1/2" hex bolt
34	1865-616	A-45 V-Belt	84		1/4"-20 hex nut
36		M10 x 1.5 x 20mm hex bolt	85		1/4" flat washer
37		M10 Split lock washer	86		1/4" Split lock washer
38	1865-609	1/2" NPT x 1/4" NPT brass hex nipple	87		1/8" OD x 1/8" long pop rivet
39		Model/Serial No. plate	88		10-32 x 1/2" pan head phillips mach. screw
41	1865-623	Rubber vibration mount 3/8-16 Female	89	1865-105	40ES Copper pressure tubing, Tee to gauge
47		10-32 x 3/8" undercut flat head phillips	90	1865-504	1/8 NPT x 1/4 tube push to lock elbow ftg.
48		10-32 x 1/2" flat head phillips	91		Wingnut 1/4-20
49		#10 Split lock washer	92	1865-079	Formulation tank, 2.5 gallon, opaque
50		10-32 hex nut	93	1865-615	Chem/formulation tank cap
51		3/8"-16 x 5/8" hex bolt	95	3/8 tubing	3/8 OD LDPE draw tube
52		3/8" Split lock washer	96	1865-106	63 mm custom cap (2.5 gal jug)
53	57715K49	1/4-20 X 1" Tri-arm knob, phenolic	97	1865-632	3/8" tube bulkhead union
54	1865-078	Belt shroud outside panel	98	Poly Tubing	1/4" OD Polyurethane tubing
55	1865-625	Orifice assembly uni-jet to 1/4 FPT fitting	99	1865-631	chem tank breather vent
56	1865-628	Orifice filter screen-red			

GUARDIAN 55 ES PARTS LIST

Ref. No.	Part No.	Description
58	1865-629-020	Orifice disk, .020" diameter
	-025	Orifice disk, .025" diameter
	-030	Orifice disk, .030" diameter
	-035	Orifice disk, .035" diameter
	-040	Orifice disk, .040" diameter
	-045	Orifice disk, .045" diameter
	-051	Orifice disk, .051" diameter
	-055	Orifice disk, .055" diameter
	-061	Orifice disk, .061" diameter

NOTES:



GUARDIAN ULV LIMITED WARRANTY

Any part of the commercial Guardian Cold Fog Generator, referred to from this point forward as "ULV sprayer" manufactured by ADAPCO, Inc. and found in the reasonable judgment of ADAPCO, to be defective in materials or workmanship, will be repaired or replaced by ADAPCO or an Authorized Guardian ULV Service Dealer without charge for parts and labor during the periods specified below. This warranty is limited to the original purchaser and is not transferable. Proof of purchase may be required by ADAPCO or by the dealer to substantiate any warranty claims. All warranty work must be performed by ADAPCO or an authorized Guardian ULV Service dealer with the exception of the engine which may be warranty serviced by an authorized Kawasaki or Honda engine dealer (whichever is appropriate) with prior consent of ADAPCO.

This warranty is limited to the following specified periods from the date of the original end user purchase for defects for materials or workmanship:

- Engines are covered by the engine manufactures warranty period subject to following proper operating parameters and maintenance schedules.
- Blower or compressor is covered by the manufactures warranty period subject to following proper operating parameters and maintenance schedules.
- Frame and structural components including chassis, belt shroud, covers, enclosures and nozzle piping are covered for 2 years (parts and labor).
- All other components or aspects of this ULV sprayer are conditionally covered for 1 year (parts and labor)

The Guardian ULV sprayer, including any defective part must be returned to ADAPCO or an authorized Guardian ULV Service Dealer within the warranty period. The expense of delivering the ULV sprayer to the service center for warranty work and the expense of returning it to the owner after repair will be paid for by the owner. ADAPCO's responsibility is limited to making the required repairs and no claim of breach of warranty shall be cause for cancellation or rescission of the contract of sale of any Guardian ULV machine.

The warranty does not cover any ULV sprayer that has been subject to misuse, neglect, negligence, or accident, or that has been operated in any way contrary to the operating instructions as specified in the Operator's Manual. The warranty does not apply to any damage to the ULV sprayer that is the result of improper maintenance or to any ULV sprayer or parts that have not been assembled or installed as specified in the Operator's manual or outlined in the Illustrated Parts Breakdown. The warranty does not cover any ULV sprayer that has been altered or modified, changing performance or durability. In addition, the warranty does not extend to repairs made necessary by normal wear, or by the use of parts or accessories which, in the reasonable judgment of ADAPCO, are either incompatible with the Guardian ULV machine or adversely affect its operation, performance or durability.

ADAPCO reserves the right to change or improve the design of any ULV sprayer without assuming any obligation to modify any machine previously manufactured. All other implied warranties are limited in duration to the one (1) year warranty. ADAPCO's obligation under this warranty is strictly and exclusively limited to the repair or replacement of defective parts and ADAPCO does not assume or authorize anyone to assume for them any other obligation.

ADAPCO assumes no responsibility for incidental, consequential or other damages including, but not limited to expense for gasoline, expense of delivering the ULV sprayer to ADAPCO or an authorized service dealer and expense of returning it to the owner, mechanic's travel time, telephone charges, travel, loss or damage to personal property, loss of revenue, loss of use of the sprayer, loss of time or inconvenience.

Conditionally- refers to the use on this Guardian ULV sprayer of known and widely used insecticide formulations specified on the product label acceptable for ULV applications or specifically design for ULV use with the exception of insecticide



formulation with NALED as the active ingredient. This Guardian ULV machine will not be warranted for any period if the active ingredient NALED is used for any purpose.

Guardian Model: 55 ES _____

Serial Number: _____ Record the serial number of your machine here

Date of Delivery: _____ Record the date the unit was received