

Owner's Manual

ESS BP 2.5

ESS BP 4.0



ELECTROSTATIC SPRAYING SYSTEMS, INC.

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Electrostatic Spraying Systems, Inc.
62 Morrison St. · Watkinsville, GA 30677-2749

CE certification applied for

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CONGRATULATIONS!

You have just purchased one of the most advanced spraying systems on the market today. Electrostatic Spraying Systems, Inc.¹ (ESS) is committed to providing you with powerful spraying systems that are easy to operate and maintain.

The products of ESS are the result of the efforts and creativity of many people. In addition to input from engineering, marketing and manufacturing personnel, suggestions from our customers have been implemented into the design of our equipment. We would like to hear your ideas also! If you have any suggestions or comments regarding the products or service of ESS write or call us at:

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62 Morrison St.
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Phone: 706-769-0025
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support@maxcharge.com

Please take time to read this manual before operating your new ESS BP™ sprayer. The manual contains important instructions for the safe operation of this equipment. It also includes helpful suggestions to maximize productive use of the BP sprayer. Essential cleaning instructions should be followed to maintain your sprayer at peak efficiency. Please carefully read and follow all instructions for your own safety and the safety of others around you.

Thank you!

We appreciate your business and are proud that you have selected an ESS sprayer for your operation.

Your new sprayer has been thoroughly tested and calibrated at the factory. If you have any problems with it, please get in touch with us immediately. We will be glad to answer any questions you have concerning our equipment or service. ESS intends to support its customers with efficient, helpful and friendly service. We appreciate your business and sincerely hope that Electrostatic Spraying Systems, Inc. can meet your present and future spraying equipment needs.

For your personal records

Please record the model and serial numbers of your new sprayer here.

BP 2.5 / BP 4.0

Model #

Serial #

Spray gun serial number

Date of purchase.

¹ ESS BP 2.5 Sprayer™, ESS BP 4.0 Sprayer™, BP 2.5™, BP 4.0™, MaxCharge™, and the ESS logo are copyrights or registered trademarks of Electrostatic Spraying Systems, Inc.

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Overview of the ESS BP 2.5/4.0 Air-assisted Electrostatic Sprayer

Air-assisted electrostatic sprayers produce electrically charged spray drops that are carried to the plant canopy in a low pressure, gentle, air stream. The heart of the BP 2.5/4.0 Sprayer is the patented MaxCharge™ nozzle.

Air and liquid enter separately at the rear of the nozzle. Just before leaving the nozzle, the air hits the liquid stream to make many thousands of tiny spray droplets that pass through the charging ring. An electrical charge is applied to the spray droplets by the charging ring. Then the charged spray droplets are blown out of the nozzle and move into the plant canopy where they are attracted to plant material by electrostatic forces. The electrostatic charge induced by the MaxCharge™ nozzle is strong enough to allow the droplets to move in any direction to cover all plant surfaces, even defying gravity to coat the underside of leaves and the back side of fruits and vegetables. The result is uniform spray coverage on hidden areas deep inside of the plant canopy where other sprayers miss.

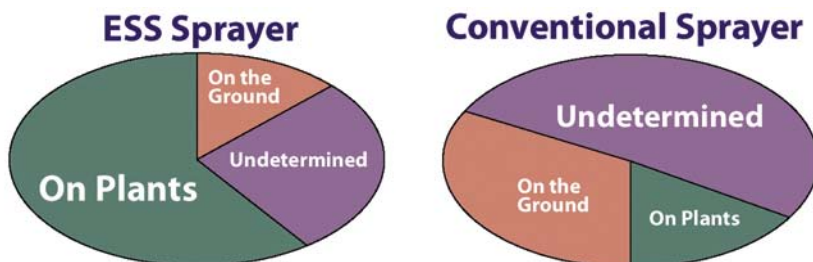
The MaxCharge™ nozzle is easy to clean and corrosion-proof. The interior ceramic outlet resists wear three times better than stainless steel outlets. These features combine to give the best spray coverage on the market. This quality product is virtually maintenance-free, and assures you of savings in the application of chemical.

The comparison of air-assisted electrostatic spraying versus conventional spraying is dramatic.



Electrostatically charged droplets are attracted to plant surfaces.

Where Does the Spray Go?



The University of California completed a series of tests to investigate what happens to spray liquid after it leaves the nozzle.

Conclusion: ESS technology places over 4 times the amount of spray onto the plant surface using ½ the amount of chemicals. Furthermore, they also reported that ESS sprayers send ⅔ less chemicals to the ground and into the air. Less chemical used overall, less waste and less drift than conventional equipment.

Imagine the environmental benefit!

Safe operation of the BP Sprayer

OPERATOR'S RESPONSIBILITY

Read the Owner's Manual.

It is the responsibility of the user to read the Owner's Manual, to understand the safe and correct operating procedures which pertain to the operation of the product, and to maintain the product according to the Owner's Manual. It is the owner's responsibility to ensure that all who are using this equipment read this manual.

The user is responsible for inspecting the equipment and for repairing and replacing damaged or worn parts to prevent damage or excessive wear to other parts. It is the user's responsibility to deliver the machine for service or replacement of defective parts which are covered by the standard warranty.

SAFETY PRECAUTIONS

Lack of attention to safety can result in reduced efficiency, accident, personal injury, or death. Watch for safety hazards and correct deficiencies promptly. Use the following safety precautions as a guide when using this machine.

- ◆ Read the Owner's Manual. Failure to read the manual is considered a misuse of the equipment.
- ◆ Use the BP sprayer ONLY for its intended use as described in this manual.
- ◆ Before operating equipment, become familiar with all caution and warning decals affixed to the sprayer.
- ◆ Do not allow a child to operate the BP sprayer. Do not allow adults to operate the sprayer without proper instruction.
- ◆ Keep the area of operation clear of all persons and animals.
- ◆ Do not apply chemicals when weather conditions favor drift from treated areas.
- ◆ Turn off the sprayer when leaving it unattended.
- ◆ Store sprayer in a dry place. Do not expose to freezing temperatures.

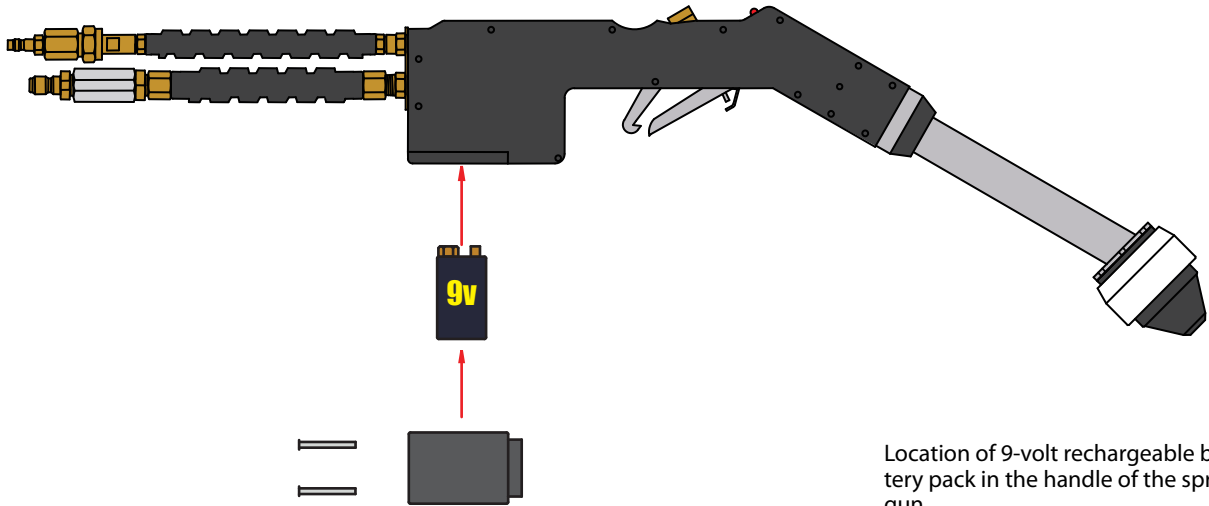
CHEMICAL SAFETY PRECAUTIONS

Read and follow all instructions on the chemical or pesticide manufacturer's label.

- ◆ Use protective clothing, eye protection and gloves when mixing chemicals and while spraying with the BP sprayer.
- ◆ Always use a cartridge respirator, protective clothing and eye protection when spraying with the BP.
- ◆ Follow the chemical manufacturer's recommendations in handling, mixing, applying, storing and disposing of chemicals.
- ◆ Be aware of decontamination methods in case a person, clothing, or equipment is accidentally sprayed.
- ◆ Be aware of poisoning symptoms and know the appropriate first aid.
- ◆ Know the length of time needed to pass before allowing people and pets to go back into the sprayed area.

About the low-voltage system of the MaxCharge spray gun

For operator safety, the MaxCharge spray gun is powered by a low-voltage power supply. The rechargeable 9-volt batteries are in the handle of the BP spray gun. The electrostatic charge imparted to the spray is not strong enough to harm people. Some people report feeling a “tingle” or a slight stinging sensation when the spray from the nozzle falls on their bare skin.



Safety decals

Appropriate safety decals are placed on ESS equipment in order to alert the operator to possible dangers. The decal below is located on the tank. This decal describes important information regarding the safe use of agricultural chemicals. If it is missing, please contact ESS immediately for a replacement decal.

 WARNING!	 ¡PRECAUCIÓN!
<p>AGRICULTURAL CHEMICALS CAN BE DANGEROUS. IMPROPER SELECTION OR USE CAN SERIOUSLY INJURE PERSONS, ANIMALS, PLANTS, SOIL OR OTHER PROPERTY.</p> <p>BE SAFE:</p> <ul style="list-style-type: none">• SELECT THE RIGHT CHEMICAL FOR THE JOB.• HANDLE IT WITH CARE.• FOLLOW THE INSTRUCTIONS ON THE CHEMICAL MANUFACTURER'S LABEL.	<p>LOS PRODUCTOS QUÍMICOS AGRÍCOLAS PUEDEN SER PELIGROSOS. LA SELECCIÓN O EL USO INAPROPIADOS PUEDEN LESIONAR SERIAMENTE A LAS PERSONAS, LOS ANIMALES, LAS PLANTAS, LA TIERRA U OTRA PROPIEDAD.</p> <p>TENGA CUIDADO:</p> <ul style="list-style-type: none">• SELECCIONE EL PRODUCTO QUÍMICO CORRECTO PARA EL TRABAJO.• MANÉJELO CON CUIDADO.• SIGA LAS INSTRUCCIONES DE LA ETIQUETA DEL FABRICANTE DEL PRODUCTO QUÍMICO.

READ AND FOLLOW THE CHEMICAL MANUFACTURER'S INSTRUCTIONS CAREFULLY.

It is extremely important for the owner/operator's safety as well as the safety of other people in the vicinity that all chemical safety precautions are followed.

Features of the BP 2.5 / 4.0 Sprayer

This backpack style sprayer is perfect for small growers, interiorscapes, and retail areas



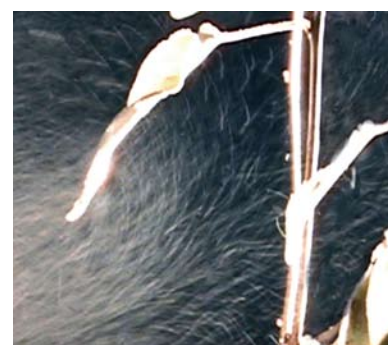
Compatible with all conventional chemicals and fungicides

Available in two sizes:
2.5 gallon and 4 gallon
(9.5 liter and 15.1 liter)

Optional two- or three-
nozzle spray gun
(3-nozzle spray gun not
shown)

About the sprayer

The BP 2.5 /4.0 allows workers to work faster than before. By giving workers the ability to move up to 300 feet from the compressed air supply with a backpack style tank, The larger BP 4.0, even when full, only weighs 42 pounds – an advantage of having the air compressor at a fixed location instead of having to be carried with the rest of the backpack.



Helpful hint

Let the MaxCharge™ Spray Gun do the work! There's no need to push the nozzle into the plant canopy. Best coverage results from standing back a few feet and letting the electrostatic charge guide the spray to the plants. The charged mist will even fly up against gravity or reverse direction to get to the back side of the leaves, stems flowers, and fruit..

Specifications

Nozzles	1
External air supply required	Yes
CFM required	8 CFM/nozzle
Electricity required	No
Standard air hose length	100 ft. (30.5 m.)
Maximum air hose length	300 ft. (91.4 m.)
Weight empty	7 lbs. (3.2 kg.)
Weight full	42 lbs. (19.1 kg.)
Main tank capacity	2.5 or 4 gal. (9.5 ltr. or 15.1 ltr.)
Air line pressure	60 to 70 PSI (4.2 to 4.9 kg./cm ²)
Flow rate	4 gal./hr. (15.1 ltr./hr.)
Drop size	40 microns
Spray range	15 to 20 ft. (4.6 to 6.1 m.)
Available options	2 or 3-headed spray gun

Operating Instructions

All operators must read this Owner's Manual completely and thoroughly before operating the BP 2.5 / BP 4.0 Sprayer. They must be familiar with all operating instructions and safety precautions.

Unpacking and assembling the sprayer

In the shipping box there should be
one spray gun in a box,
one backpack tank assembly,
one 30.5-meter (100-foot) air hose, and
one BP Parts Kit.

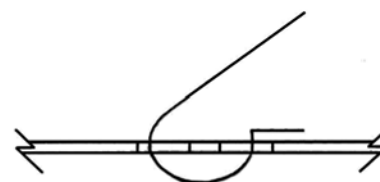
Carefully open the spray gun box, remove the spray gun, and unwrap the bubble wrap from the spray gun. Store the box and bubble wrap for future shipping. The air hose is wrapped with a strap for shipping; cut this strap.

Lay the backpack tank face down. Both shoulder straps are permanently attached at the top. To attach the bottom of the left shoulder strap, please follow these steps:

1. There is a hook on the bottom of the strap. Turn the strap so that the end of the hook is pointing down
2. On the bottom right side of the back of the tank there are two square holes in the metal rim. Insert the hook into the bottom square hole from the top.
3. Turn the hook 180°.
4. Pull on the hook so that the end comes up through the top square hole.
5. Pull the hook towards the top of the tank so that it will not slip out.
6. The second strap simply hooks under the stainless steel ring at the bottom of the tank.

The Parts Kit contains a collection of small parts commonly needed to maintain and repair your BP sprayer. Please store it in a safe place for future use. Among the items in the Parts Kit you will find one extra flow disk and one extra strainer. We call your attention to these parts because they are indeed very small and easy to overlook; however they are essential for your sprayer to run correctly. (See the section about the air filter for detailed instructions on cleaning and replacing the air filter. See the section on the liquid filter to clean or replace the flow disk and the strainer.)

A warranty registration card is bound into the manual after the Warranty page. After unpacking the sprayer, please take time to fill this card out and send it in to ESS. This will insure your warranty protection in the event anything happens to your sprayer or handgun.



The right strap hook after being inserted in the square holes.

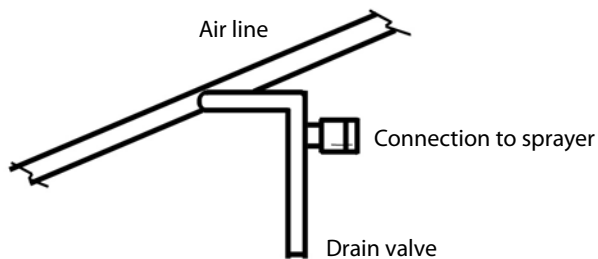


BP Parts Kit

BEFORE USE

The BP-4TM/BP-2.5 requires an external air supply of at least 8 CFM at 60 psi. Set the regulator of the air source at 60-70 psi to allow for any pressure drop in the air lines.

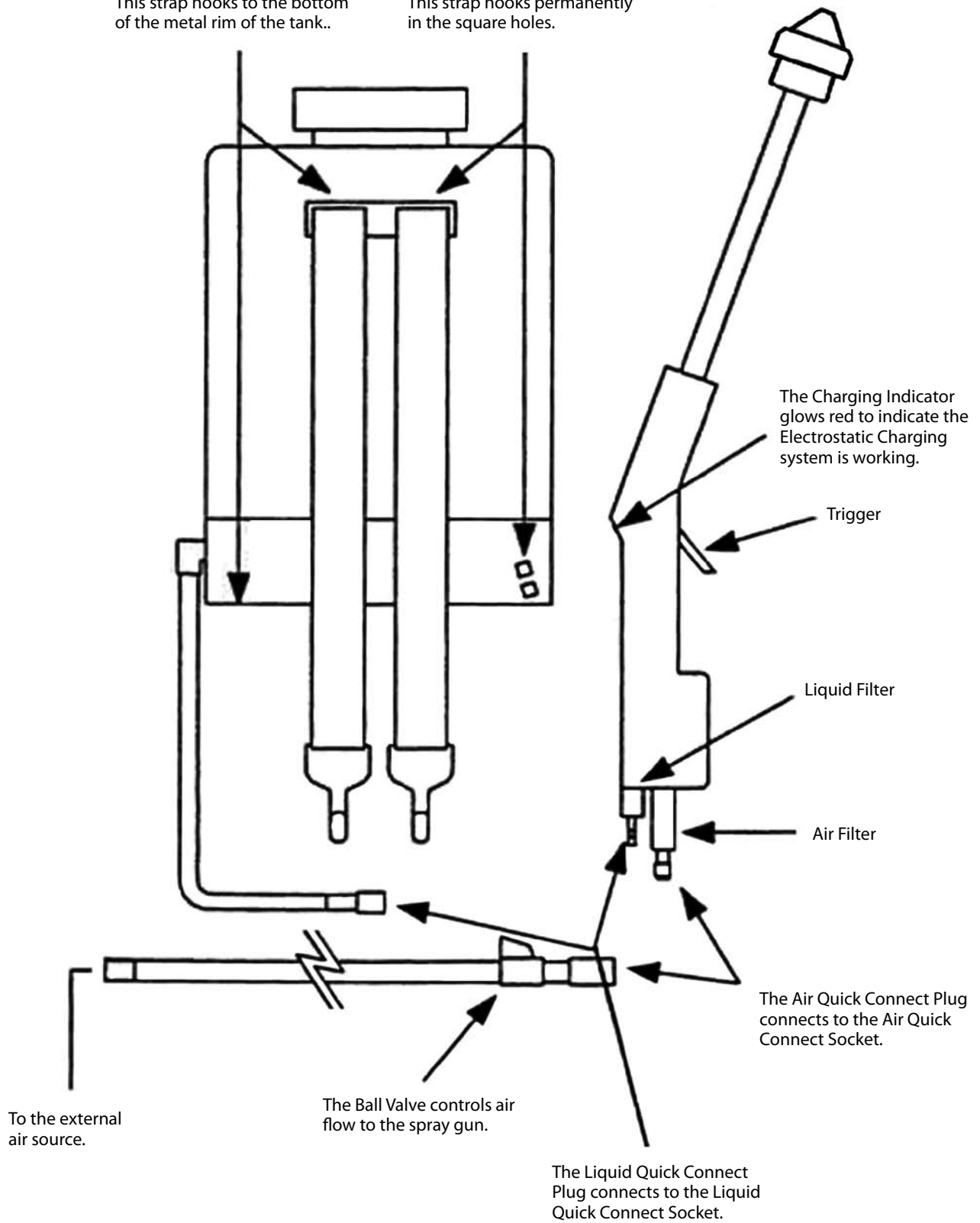
ESS recommends that growers install dryers in their air lines to minimize the amount of water condensation that is sprayed through the air line of the BP-4TM/BP-2.5. Air compressors produce warm, moist air which condensates in air delivery lines during pumping. If allowed to travel into a sprayer, this moisture can corrode or freeze its air lines or regulators. A simple air dryer installed in the hose air lines can prolong the life of spraying equipment. Typically, an air dryer is a separator or drain with a plug or valve that is offset from the line to trap water build-up before it leaves the air line through connectors. Air lines should be drained monthly if they are used frequently.



A diagram of an air line dryer.

This strap hooks to the bottom of the metal rim of the tank..

This strap hooks permanently in the square holes.



Steps for operation

1. Prepare the tank mix. Open tank. Pour mix in. Close tank
2. Make sure the ball valve is closed.
3. Connect the air line hose to the air connection from the external air source to air leader on the spray gun.
4. Connect the liquid line hose from the backpack tank to the liquid leader on the spray gun.
5. Set external air source to 60 to 70 psi.
6. Put on backpack tank.
7. Open ball valve.
8. Aim spray gun at spray target and engage the trigger; lock trigger if desired. Spray with even, sweeping strokes.
NOTE: It may take about 15 seconds for air to clear the lines before liquid sprays regularly without air bubbles.
9. Apply Spray

After spraying:

1. Disengage trigger.
2. Close ball valve.
3. Take off backpack tank
4. Open backpack tank; clean its interior and exterior; fill tank with 5 liters (1.25) gallons of clean water; close tank
5. Disconnect air and liquid spray gun quick connects.
6. Disassemble liquid filter assembly; set aside.
7. Put liquid quick connect plug (which is still threaded in 1/8 inch NPT body) into liquid quick connect socket; water will begin to run out of quick connect plug; allow 4 liters (1 gallon) to run through to clean lines.
8. Unplug liquid quick connect plug from liquid quick connect socket to stop flow of liquid.
9. Clean liquid filter assembly.
10. Reassemble liquid filter assembly.
11. Reconnect quick connects.
12. Engage trigger and allow remaining liter (approximately 1 quart) of water to run through to clean handgun; allow air to flow for 30 seconds more to reduce possibility of corrosion.
13. Disconnect handgun quick connects.
14. Disconnect the air hose from the external air source.
15. Apply silicone spray or similar lubricating oil to all quick connects.
16. Clean the nozzle assembly.
17. Record application in Spray Log.



Sil-Glyde is an excellent silicone-based protective lubricant. You may purchase it directly from ESS. S/N # 3174

BP Maintenance Schedule

Please observe the recommended maintenance schedule for your BP sprayer in order to preserve spray quality and the working life of the unit. If you use heavy wettable powders to spray or if you operate the BP in a dusty environment, you may need to clean liquid and air filters more often than these recommendations. Visually inspect the nozzle and trigger assembly often and clean as necessary.

Clean the liquid filter assembly	After every spray application
Clean the nozzle	When spray pattern is different than when the BP 2.5™/BP 4.0™ was new
Recharge batteries in spray gun	When charging indicator does not light during operation (about every 8 operational hours)**
Replace batteries in spray gun	When batteries no longer hold a sufficient charge to complete a ten-hour work session or show other signs of battery deterioration

** Whichever comes first

REFERENCE SECTION

Backpack tank

The BP-4.0 is equipped with a 15 liter (about 4 gallons) tank which is worn on the operator's back. The BP 2.5 tank's capacity is 9.5 liters (2.5 gallons). For both models, the tank is opened by turning the tank lid counter-clockwise until it can be lifted off and closed by turning the tank lid clockwise on the tank opening until it fits tightly.

It is extremely important that you do *not* overfill the tank. If the liquid level is too high inside the tank, chemicals may spray out the air bleed hole.

To put the tank on your back:

1. Put your left arm through the left strap.
2. Pull the other strap over your right shoulder.
3. Hook the end of the strap hook on the base of the metal rim
4. Tighten or loosen the strap to make it fit.

To take the tank off your back:

1. Unhook the end of the strap hook from the base of the metal rim.
2. Pull your left arm out of the left strap.

The tank should be thoroughly cleaned immediately after each use by triple-rinsing the tank. A commercially available tank cleaner (like Nutra-sol) may be used and is recommended when the BP-2.5/BP-4.0 sprayer is used to spray wettable powders on a regular basis.

Note: Do not operate the sprayer when the tank lid is not securely closed. Chemicals may splash out onto the operator if the tank is open during operation.

◀ NOTE



ESS recommends the use of NUTRA-SOL cleaner which can be purchased from ESS.
Order S/N#1566.

Quick connects

There are four sets of quick connects (plug and socket) on the sprayer:

Air hose (air) outlet
Tank (liquid) outlet,
spray gun air inlet
spray gun liquid inlet

To disconnect the quick connects:

1. Slide the sleeve on the quick connect socket up.
2. While holding the sleeve up, pull the socket off the quick connect plug.

To connect the quick connects:

1. Slide the sleeve of the quick connect socket up.
2. While holding the sleeve up, push the socket onto the quick connect plug.
3. Release the sleeve.
4. Pull on the socket body to ensure that it is properly seated and cannot be pulled off the plug when the sleeve is down.

The air connection

The air hose quick connect plug connects to the air leader of the spray gun. The air leader of the spray gun is below the liquid leader and is easily recognizable because its connector is larger than the liquid connector – it is not possible to connect the air hose to the liquid leader. The air line hose is red.

The liquid connection

The quick connect for the liquid line is on the bottom of the backpack tank and connects the liquid leader of the spray gun. The liquid line is gray and only long enough to allow the user to move freely with the spray gun.

Air hose

The BP-4TM/BP-2.5TM uses pressurized air from an external source to create and propel the spray. It channels this air into the handgun through the red air hose. The air hose has a 1/4" MPT end connection. It requires a 1/4" FPT connector on the external air source. Use a 9/16" wrench on the 1/4" MPT and a 5/8" wrench on the 1/4" FPT to thread and unthread the connection.

Ball valve

The ball valve is located next to the quick connect socket which connects to the handgun air inlet quick connect plug. Use the ball valve as an ON/OFF valve to start and stop air flow to the spray gun. Turn the ball valve handle in line with the hose to allow pressurized air to flow; turn the ball valve handle perpendicular to the hose (as if it crosses the hose) to stop the air flow.

To open the ball valve:

Push the handle on the ball valve so that it is parallel to the body of the valve.

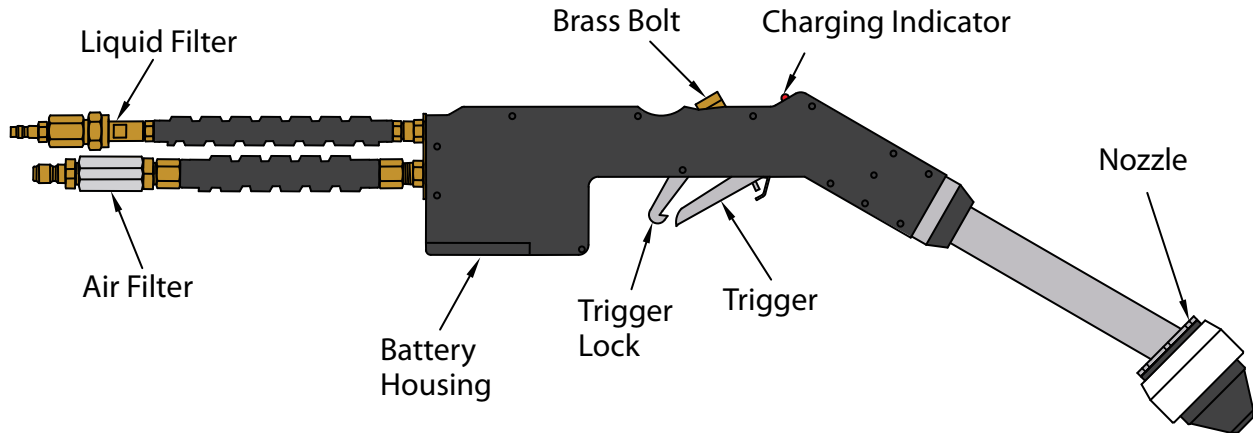
To close the ball valve:

Push the handle on the ball valve so that it is perpendicular to the body of the valve.

Spray gun

The spray gun is held by the operator during spraying. Activation of the trigger causes liquid to spray. The Spray gun has the following user-serviceable parts: the air filter, the liquid filter assembly, the nozzle assembly, and the batteries. Except for the batteries, which are accessed by removing the battery cover, nothing inside the Spray gun shell is user-serviceable. **Do not open the spray gun shell;** doing so will void the warranty on the spray gun.

NOTE

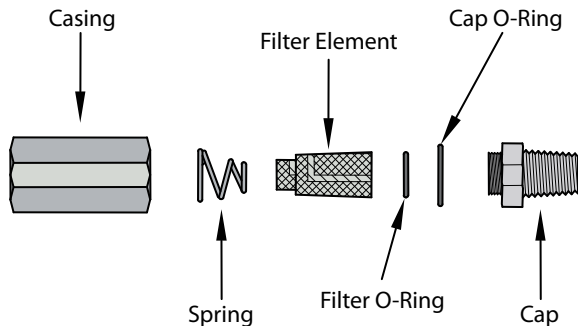


The Spray Gun

Air filter

Note: BP units manufactured after March 2009 do not require an air filter on the spray gun air leader.

For BP units manufactured before March 2009, there is an in-line air filter located outside the base of the spray gun in the air hose. It filters dirt out of the air lines. It's easy to tell the Air Filter from the Liquid Filter Assembly because the Air Filter is in a silver-colored casing. Replacement parts for the air filter assembly are available as a kit. The kit includes a filter, and large and small o-rings. Order using ESS part number 231.



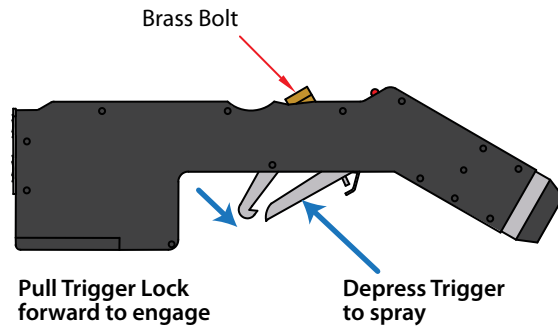
The Air Filter Assembly

To clean the air filter:

1. Unthread the casing from the cap using a $\frac{3}{4}$ " wrench on both parts. Be careful not to lose the spring or the air filter inside of the casing.
2. Check inside each part for debris. Clean any dirt out with compressed air or warm, soapy water.
3. Reassemble the air filter, making sure to put it together as shown above.

Trigger

The trigger turns the spray on and off. It can be continuously held for operation or it can be locked in place.



To engage/disengage the trigger:

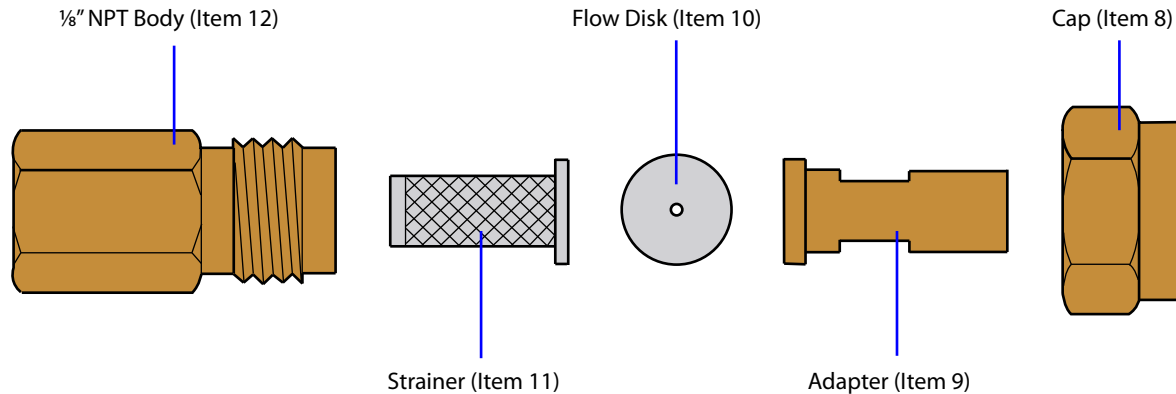
1. Depress the trigger up towards the body of the spray gun to start spraying.
2. To keep spraying, either keep holding the trigger or lock it in place by pulling up the lock and hooking the trigger.
3. To stop spraying when the trigger is not locked, let go of the trigger.

To clean the trigger:

1. Unthread the brass bolt on the top of the spray gun with a $\frac{5}{8}$ " socket wrench. Be careful not to lose the spring, plunger, copper washer, and small brass bushing inside the trigger. Note how they fit inside so they may be replaced properly.
2. Check inside the trigger for blockage. Clean out any debris with compressed air or warm, soapy water.
3. Replace the spring and plunger; rethread the brass bolt into the top of the spray gun until tight.

Liquid filter assembly

The liquid filter assembly is located outside the base of the spray gun. It is composed of these parts: a 1/8" NPT body (Item 12), a strainer (Item 11), a flow disk (Item 10), an adapter (Item 9) and a cap (Item 8). The strainer is the active filtering element in the volume of liquid that flows through the line. There is an extra flow disk and an extra strainer in the BP Parts Kit in case the originals are lost or damaged.



Liquid Filter Assembly

To disassemble, clean and reassemble the liquid filter (see labeled drawing above):

1. Using a 13/16" wrench on the cap (Item 8) and an 11/16" wrench on the 1/8" NPT body (Item 12), unthread them.

Note: When you disassemble the liquid filter assembly, notice how the parts fit together in order to reassemble them properly. Be careful not to lose any parts, particularly the flow disk (Item 10) which is inside the cap. The sprayer will not function correctly without the flow disk.

2. Remove the strainer (Item 11) from the 1/8" NPT body.
3. If the 1/8" NPT body contains residue, clean it with compressed air or clean water.
4. Clean the strainer with compressed air or clean water. If residue still remains in the 50 mesh screen, disassemble the strainer. Unscrew the top brass part from the bottom brass part. The 50 mesh screen slides off the brass body and can be cleaned with compressed air or clean water. If residue still remains, soak the 50 mesh screen and screw the top brass part back on the lower brass part.
5. If the flow disk is still in the cap, remove it. Check the aperture of the flow disk for blockage. If there is any, clean it with compressed air or water. Replace the flow disk so that the numbers on the disk face the strainer.
6. Replace the strainer in the 1/8" NPT body.
7. Rethread the 1/8" NPT body and the cap.

Nozzle assembly

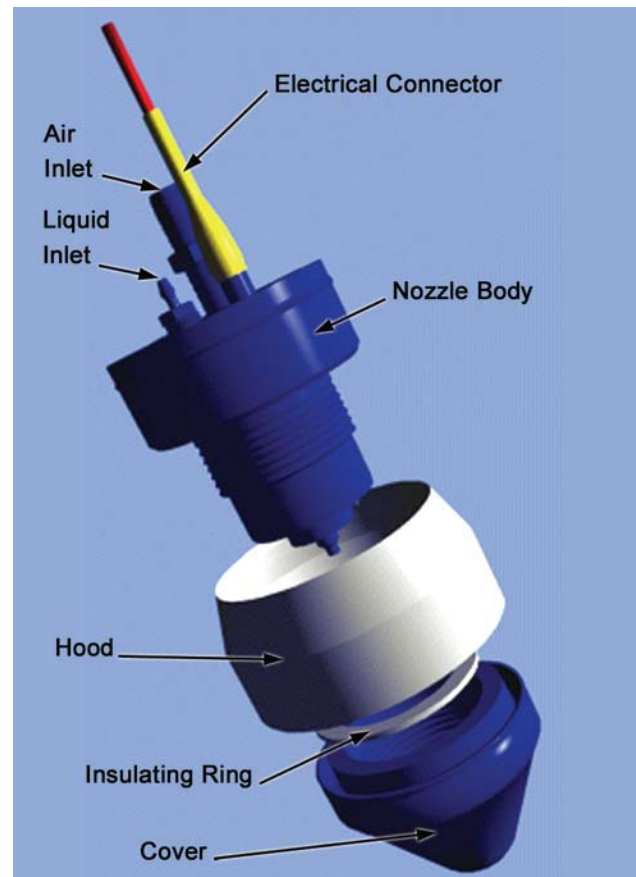
It is very important to follow all the maintenance and cleaning procedures to ensure that the electrostatic sprayer will function properly. Although the MaxCharge™ nozzle will outperform all electrostatic spray technology on the market, regular cleaning will ensure peak operating performance.

The nozzle assembly is located at the end of the spray gun wand. It is composed of a nozzle body, internal o-ring, Teflon ring, cover, external o-ring, and a hood (see labeled drawing at right). To access the nozzle components, just unscrew the nozzle cover by hand.

Cleaning the spray gun

Always rinse the spray gun out with clean soapy water after every day's spraying. That is the most important thing you can do to ensure trouble free operation of your BP sprayer. By cleaning after each and every working day you will avoid the long-term chemical buildup that eventually causes clogs, poor spray patterns and shortens nozzle life.

Establish maintenance intervals to disassemble and clean the nozzle. Your nozzle maintenance schedule will vary depending on the types of chemicals used and adherence to pre- and post-spray checks. In general it is sufficient to thoroughly clean nozzles every 50 hours. If heavy loads of wettable powers are used, the cleaning schedule should be sooner.



To clean the nozzle assembly

1. Slide the hood over the nozzle cover.
2. Unscrew the cover from the nozzle base and remove the Teflon ring. Clean any debris from around the nozzle tip.

Note: There is a small o-ring in the nozzle around the base of the tip, take care that it doesn't fall off. If it does, clean it and press back into place. Also, take care not to damage the nozzle tip when the cover is removed.

3. Soak the ring, cover, and hood in a mild detergent solution. Use a small brush (soft or mild bristle) to clean the inside of the cover and the hole through it. Also, be sure to clean the hood. It is important to clean inside the hood and the two cavities. Rinse thoroughly.
4. Scrub the nozzle base with the detergent solution using a soft bristle brush. Clean the ceramic outlet. Be sure to thoroughly clean the base cavity and take care not to damage the nozzle tip. Rinse and make sure the small o-ring is in place.
5. Reassemble nozzle by placing the Teflon ring on the base and screwing the cover on **hand tight**. Next, slide the hood over the nozzle and seat it securely against the external o-ring. Wipe clean the exterior of all hoses and fittings connected to the nozzle.

The electrode cover should be hand tight. Never use pliers or other tools to tighten it. The insulating ring should be loose.

You may wish to purchase Nutrasol Tank Cleaner from ESS (S/N# 1566), which cuts hard water scale and chemical deposits from the electrode and internal component of the spray gun. The regular use of Nutra-Sol will keep your equipment operating at peak performance. The recommended mixing ratio is 4 ounces in 12.5 gallons of water (113 grams in 47 liters of water).

Pre-spray check

I. Inspect Nozzles

Check nozzle cover to make sure it is on hand tight (do not over tighten or use a wrench). Make sure the hood is seated firmly to the nozzle base and against the external o-ring.

II. Preparing the Tank Mix

If you will be spraying wettable powders it is a good idea to use a compatibility agent with the water and tank mix. Compatibility agents are chemicals mixed with the water that make mixing easier and keep heavy concentrations uniformly in suspension. Some brand name additives are COMPLIMENT™, UNITE®, and BALANCE™. Check with your local chemical supplier for others that are available.

Post-spray check

After each spray it is essential that hoses and spray gun be flushed with clean soapy water. This will help prevent chemical build-up that can clog lines and nozzles. Also, it is recommended that the nozzle exterior (black portion of nozzle) and nozzle hoods be cleaned with soapy water at this time.

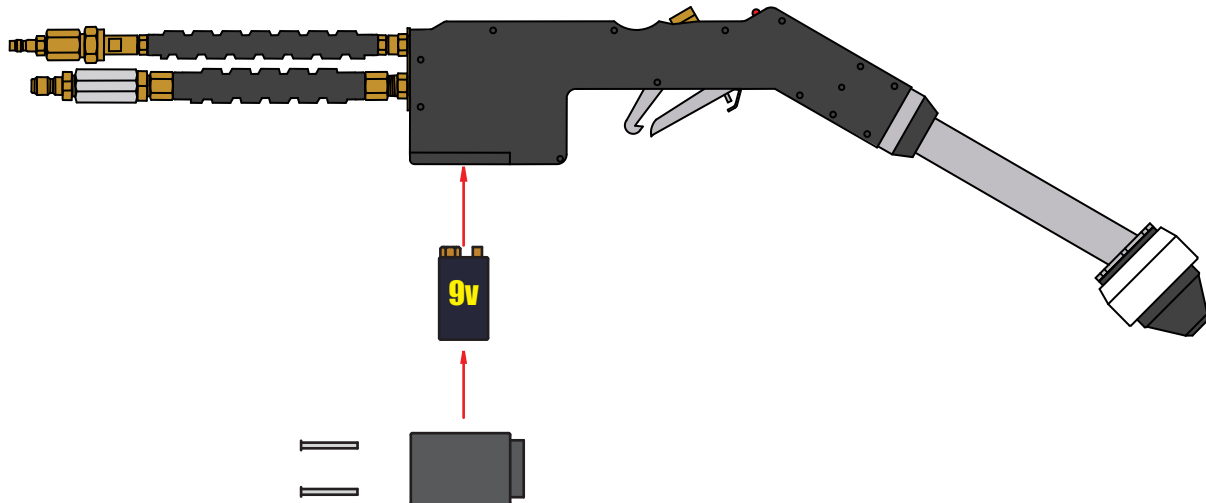


ESS recommends the use of NUTRA-SOL cleaner which can be purchased from ESS.
Order S/N#1566.

Batteries

The nozzle charging operates on two 9-volt rechargeable batteries which are located in the base of the spray gun. In average conditions, the batteries will last 10 to 15 hours of operation on a charge. They should be recharged when the charging indicator on top of the spray gun shell doesn't glow when air is going through the spray gun. After approximately 800 to 1000 hours of service the battery pack will no longer be able to hold an adequate charge and will need to be replaced. Replace with nickel-hydrate rechargeable batteries. Order the BP's replacement battery pack from ESS.

Remember to charge the spray gun batteries after every work session!



To change the batteries:

1. Unscrew the two 6-32 x 1/2" Phillips head machine screws which hold the battery cover in place.
2. While holding the leads in one hand, gently disconnect the batteries from the leads. Be careful not to tear the leads off the wires or to tear the lead wires out of the power supply.
3. Connect the fresh battery pack to the leads.
4. Replace the battery cover. Screw the two 6-32 x 1/2" Phillips head machine screws back in to secure the battery cover.
5. Charge the spray gun before attempting to use it.

Yearly spray gun service

Electrostatic Spraying Systems, Inc. offers and recommends yearly services on ESS spray guns. For a nominal fee plus the cost of replacement parts, ESS will thoroughly clean the spray gun, replace any worn parts and recalibrate the electronics and nozzle. The Yearly Service also extends the spray gun warranty for another year. Consistent yearly service by ESS will increase spraying performance and prolong the life of the gun.

Contact ESS at (706) 769-0025 to schedule spray gun services. Then package the spray gun securely since it can be damaged in shipment. Ship the spray gun in its original packing material if possible. If the original packing is not available, wrap the spray gun in bubble wrap, place it in a strong cardboard box and surround the gun handle with foam packing. Include a return shipping address and a telephone number.

A form is provided for you at the back of this manual

Ship the spray gun via UPS or Parcel Post to:

Electrostatic Spraying Systems, Inc.
62 Morrison Street
Watkinsville, GA 30677

Yearly service will be conducted within one day of receipt by ESS. If any parts need to be replaced, the owner will be contacted for authorization before replacement. The spray gun will be returned via UPS, COD, or return shipping costs may be invoiced, contingent upon credit approval. ESS also accepts the following charge cards: Visa, MasterCard, and American Express

As an additional benefit, Yearly Spray Gun Service "turns back the clock" – the original 1-Year Warranty on the spray gun is renewed for another year!

Yet another good reason to send your spray gun in to ESS for factory-authorized service!



Spraying with your ESS sprayer

Note: When using unfamiliar equipment or chemicals, always test on a small area before treating the entire crop or surface. Do not use a chemical with the ESS sprayer if the label prohibits use in low-volume sprayers.

Spray Technique

As in spray painting, the goal is to achieve even coverage over the surface. The ESS MaxCharge spray gun is designed to help you do just that -- by propelling the chemical spray with a gentle air flow, you can stay well away from the target surface and let the electrostatic attraction do the rest of the work.

Please note: the spray droplets are very, very fine --- about 40 microns each. If you are used to working with a conventional sprayer, you may make the mistake of thinking the target is not wet enough because you do not see large beads of liquid. In fact, after a pass with the BP's MaxCharge spray gun, the surface of the target should just barely glisten with moisture. The fine droplets will evaporate quickly.

Here are some tips to achieve the best possible coverage with the ESS BP sprayer.

1. Before each job, ensure that your sprayer is in good working order (see the pre-spray checklist on page 18 of this manual).
2. The optimal spraying distance is at least 18 inches away from the target surface, however 36 to 48 inches may provide a more even coating. This gives the fine mist produced by the MaxCharge nozzle room to develop into a chaotic cloud that will be attracted to the target surface.
3. Hold the spray gun at right angles to the target surface. Starting at the highest point and using zig-zag horizontal strokes about 1 meter (3 ft.) wide, spray down to the lowest point. Try to have each stroke overlap the previous stroke by about 50%.
4. You can use vertical strokes if it suits the area better. Just make sure to work in a methodical pattern and let your strokes overlap.
5. When moving to the next section, allow it to overlap the previous section by a few inches. Do not leave a gap.
6. The target surface should just barely glisten with the spray. Do not over-saturate the surface; if you see runs or puddles it means you are wasting chemicals. Do check to make sure the newly-sprayed surface is very slightly damp.
7. Be careful to keep the spray gun barrel as level as possible. If you allow the nozzle to point down too much, it may drip occasionally.
8. Unlike spray painting, you don't have to stop the spray on every return stroke. Just engage the trigger lock and concentrate on the regular pattern of spraying.
9. Periodically check to make sure the red light is illuminated on the spray gun.



Let the MaxCharge™ Spray gun do the work!

There's no need to stick the tip of the spray gun into the plant canopy. The electrostatically charged spray will blow into the plant canopy and the droplets will even change direction to find a dry surface to cling to.

Preparing a tank mix

The tank mix depends on two factors: water requirement and dosage. Water requirement is the amount of water needed to cover the given treatment area. Dosage is the amount of chemical which should be applied in a given treatment area.

First determine the water requirement for your sprayer over a known area. An easy way to determine water requirement is to spray a trial application with water. Put a gallon of clean water in the ESS SC-1 tank and thoroughly spray a known area. After spraying the known area, determine how much water was used from the amount left in the tank. This is the water requirement for the given area. Next measure the known area to determine how many square feet were sprayed. Write down both values for future reference.

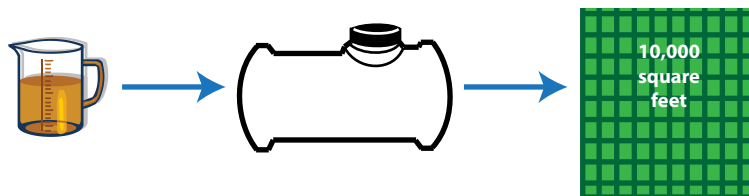
_____ (gallons) Water Requirement
for _____ (size of known area in ft²)

Next determine the dosage. This is the amount of chemical you wish to dispense in a given area. Appropriate dosage depends upon chemical label recommendations, disinfection or sanitization goals, level of pest or disease infestation, past experience with particular chemicals, and other variables.

Because electrostatic spraying is a much more effective spraying method, ESS recommends that you experiment to find the optimum chemical concentration. Start spraying using the same chemical rate used in the past with either hydraulic or air assisted sprayers. For example, if in the past you have used 2 ounces of chemical in a hydraulic sprayer to spray a known area; then mix 2 ounces of chemical to the water required by the BP to spray the same known area. In other words, the same amount of chemical is sprayed out in the area but with much less water

Example:

You have two greenhouses covering 10,000 square feet that are sprayed using a conventional hydraulic sprayer. In the past you mixed 6 ounces of chemical to 25-50 gallons of water in order to spray both house at full rate.



With your new ESS sprayer you need to find out how much water is needed to spray the known area. The amount of water required to spray both houses is the amount of water in which you mix the 6 ounces of chemical in. Depending on the crop sprayed, you will use approximately 1 to 2 gallons of water with the ESS sprayer to cover 10,000 square feet. This applies to all chemicals, even wettable powders.



DO NOT OVERFILL THE TANK

ESS recommends that the tank not be filled past the full level mark, since the force of agitation may cause liquid to escape through the air bleed hole in the tank lid.

After becoming familiar with the sprayer spraying at full rate, you can start reducing the amount of chemical used for each spray. Keeping the amount of water in the tank constant, cut the amount of chemical mixed in by 15 to 25% for each spray until a desirable kill is no longer achieved. If you are planning to cut rates then it is very important to scout your crop to determine spray efficiency.

Chemical compatibility

It's sometimes desirable to spray a mixture of two different chemicals at the same time. It is good practice to conduct a jar test to determine if the chemicals to be mixed are compatible. If they are not, then investigate alternative chemicals or use a compatibility agent to maintain the chemicals in suspension. It is also a good idea to treat the water with a pH agent.

ESS does not recommend the use of wetting agents or spreader-stickers.

A note about operating temperatures

The MaxCharge nozzle should always be operated at temperatures above 10° Celsius (50° Fahrenheit). When the ambient temperature is colder than this, the evaporative cooling caused as the spray is atomized will freeze the nozzle opening.

Nozzle freeze-up can also occur when the liquid to be sprayed is colder than 10° C (50° F).

How to conduct a jar test

Needed:

Solutions of chemicals in approximate dilutions

Jar with lid

Gloves and Safety Glasses

After mixing solutions of the desired chemicals, place them in a large jar, cap it securely, and shake vigorously. Carefully observe the interaction between the chemical compounds. If the water becomes milky or cloudy, the combined solution may plug the nozzles. Let the jar sit for one to two hours. If there is precipitate on the bottom of the jar, then seek another combination of chemicals.

IMPORTANT

Water temperature must be at least 10° C (50° F). When the liquid and air meet in the nozzle, the temperature of the liquid decreases. As a result, water at temperatures below 10° C (50° F) may freeze and clog the nozzle.

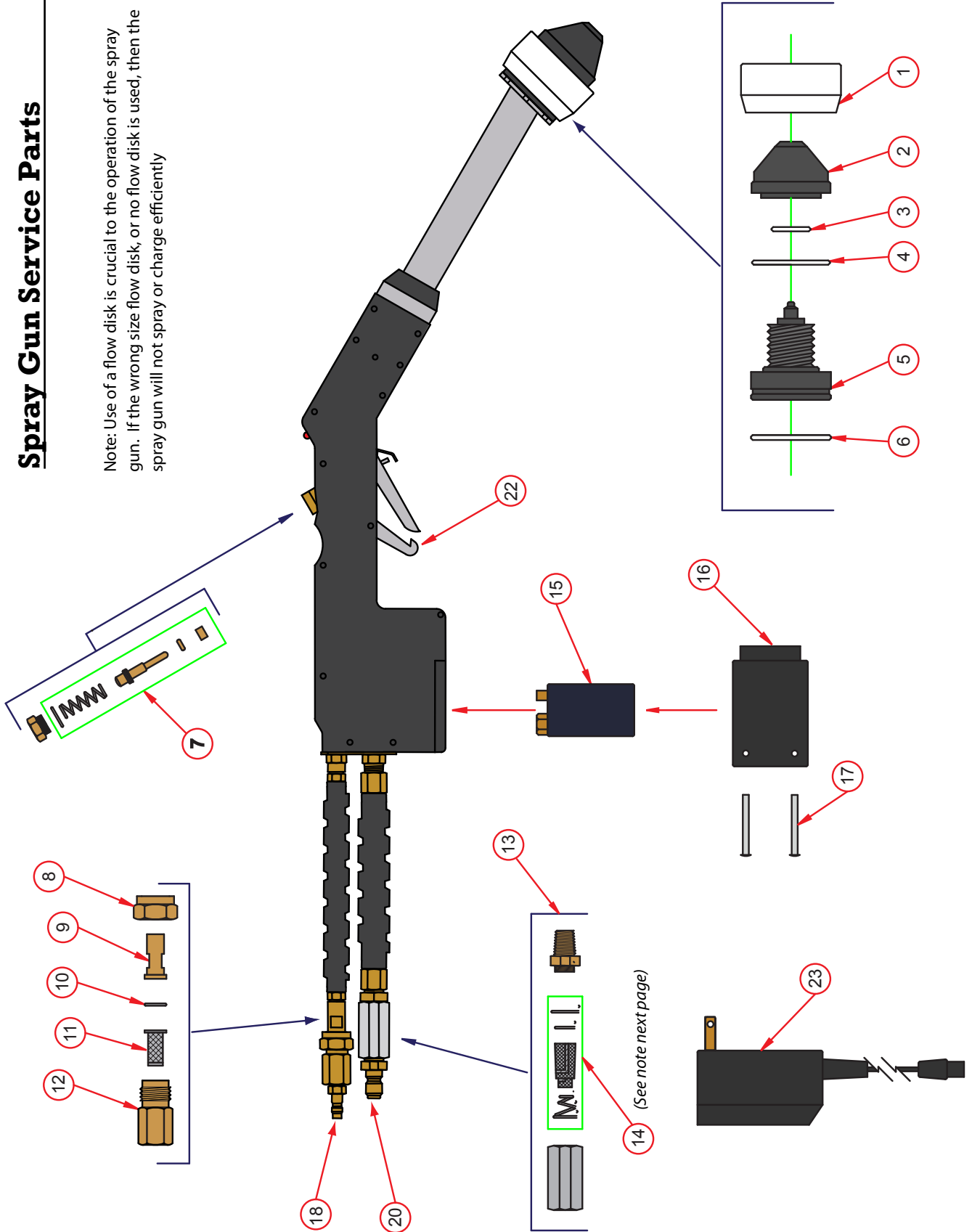
Troubleshooting Guide

When you encounter the problems listed below, use the suggested trouble-shooting methods. If you cannot solve the problem or have a problem with the Spray Gun that is not addressed in this manual, contact ESS at (706) 769-0025.

Symptom	Possible Problem(s)	Corrective Action
Air pressure of spray appears low	<ul style="list-style-type: none"> • Clogged Liquid Filter • Liquid fittings are loose • Air fittings are loose or damaged • Clogged Air Filter • Dirty Trigger 	<ul style="list-style-type: none"> • Clean the Liquid Filter Assembly (See the <i>Liquid Filter Assembly</i> section of this manual) • Make sure the Liquid Filter Assembly is installed correctly; • Make sure that the Air Filter is installed correctly. Inspect for loose hoses or failed air lines – Spray fittings with soapy water – tighten ones that bubble replace if necessary • Clean the Air Filter (See The <i>Air Filter Assembly</i> section of this manual) • Clean the Trigger (See the <i>To Clean the Trigger</i> section of this manual)
No spray from nozzle or the spray from nozzle is erratic or spits	<ul style="list-style-type: none"> • Debris in the nozzle • Spray is freezing due to evaporative cooling • Liquid filters are clogged • Low liquid level in the tank • Loose liquid or air fitting • Dirty Trigger • Overtightened nozzle cover 	<ul style="list-style-type: none"> • Clean nozzle according to instructions • Make sure that water temperature is at least 50° (10°C) • Clean the Liquid Filter Assembly (See the <i>Liquid Filter Assembly</i> section of this manual) • Refill tank • Inspect hose quick connects at case and at spray gun leader. Make sure that all liquid fittings and air fittings are properly seated. • Clean the Trigger (See the <i>To Clean the Trigger</i> section of this manual) • Loosen cover. It should only be finger-tight
Charging indicator (LED) blinks or goes is out during operation	<ul style="list-style-type: none"> • Batteries are exhausted • Dirty nozzle 	<ul style="list-style-type: none"> Recharge batteries If problem persists, replace battery pack • Clean nozzle according to instructions

Spray Gun Service Parts

Note: Use of a flow disk is crucial to the operation of the spray gun. If the wrong size flow disk, or no flow disk is used, then the spray gun will not spray or charge efficiently.



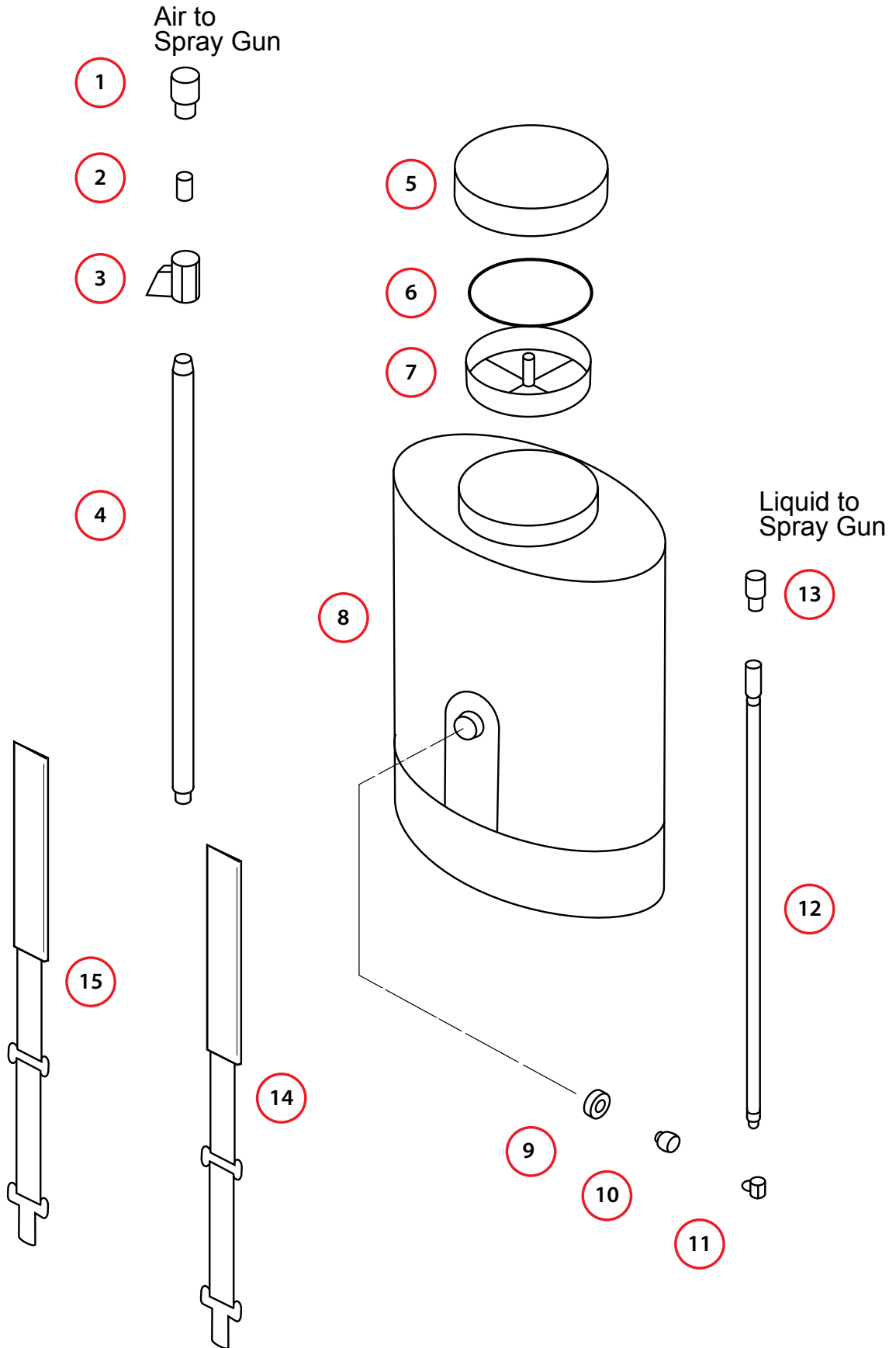
Spray Gun Service Parts

ITEM NUMBER	ESS PART NUMBER	DESCRIPTION	QUANTITY ORDERED
1	AP-5795	Hood	1
2	NC 5764	Nozzle Cover	1
3	5771	O-Ring, Internal	1
4	AP-5694	Teflon Ring	1
5	NB-5983	Nozzle Body, Greenhouse Note: Must Send Spray Gun In For Repair	1
6	5770	O-Ring, External	1
7	3731	Repair Kit, Trigger	1
8	767	Cap, Flow Regulator	1
9	768	Adapter, 1/8"-27 FPT	1
10	1755	Orifice Disk (Flow Disk)	1
11	437	Strainer, #50 Mesh	1
12	770	Body, 1/8"-27 FPT, Greenhouse	1
13	227	Filter, Air, In-Line	1
14	231	Repair Kit, Air Filter (NOTE: for models manufactured pre-March 2009)	1
15	4512	Battery, Alkaline, 9 V	2
16	118	Battery Cover, Spray Gun Shell	1
17	316	Screw, #6-32 x 3/8" Long, Phillips, SS	2
18	239	QC Plug, 1/8", 1/8" MPT, Brass (Spray Gun Liquid)	1
19	AS-1748	Spray Gun Leader Assembly, Liquid	1
20	240	QC Plug, 1/4", 1/4" MPT, Brass (Spray Gun)	1
21	AS-1749	Spray Gun Leader Assembly, Air	1
22	6518	Trigger Pawl	1
23	4430	Battery Charger	1

Flow disk chart

UNIT STYLE	TANK SIZE	ORIFICE NUMBER	ESS PART PART NUMBER
XT	3 GALLON TANK	#20	765
XT	1 QUART BOTTLE	#40	766
GPS	4 GALLON TANK	#30	1755
EPS	4 GALLON TANK	#30	1755
TRG	4 GALLON TANK	#30	1755
J SERIES	15 GALLON TANK	#30	1755
BP-2.5	2.5 GALLON TANK	#59	4350
BP-4	4 GALLON TANK	#59	4350

Backpack exploded view



Service Parts

Backpack

ITEM NUMBER	ESS PART NUMBER	DESCRIPTION	QUANTITY ORDERED
1	92	QC SOCKET, 1/4", 1/4" FPT, BRASS (HANDGUN AIR)	1
2	54	NIPPLE, 1/4", CLOSE, BRASS	1
3	250	BALL VALVE, 1/4" NPT, HEX STOCK, GRIP HANDLE	1
4	AS390	HOSE ASSY, AIR HOSE, BACKPACK	1
5	6313	LID WITH GASKET	1
6	6314	LID GASKET	1
7	6315	10K-15K STRAINER	1
8	454	BP TANK	1
9	6332	NUT, KNURLED, ALUMINUM	1
10	6333	BACKPACK ADAPTER	1
11	67	ELL, 1/8" NPT, STREET, 90 DEG, BRASS	1
12	AS4599	HOSE ASSEMBLY, TANK TO GUN	1
13	90	QC SOCKET, 1/8", 1/8" FPT, BRASS (SPRAY GUN LIQUID)	1
14	17215	SHOULDER STRAP, LEFT	1
15	17214	SHOULDER STRAP, RIGHT	1



62 Morrison St. · Watkinsville, Georgia 30677-2749
706-769-0025 · 1-800-213-0518 · Fax: 706-760-8072
Email: support@maxcharge.com · www.maxcharge.com

ESS Warranty

Electrostatic Spraying Systems, Inc. warrants to the original purchaser of any Electrostatic Spraying Systems equipment that the equipment shall be free from defects in material and workmanship for a period of one year after date of delivery. The electrostatic power supply warranty form must be returned for verification of date of purchase.

Disclaimer of Implied Warranties and Consequential Damages

Electrostatic Spraying Systems' obligation under this warranty, to the extent allowed by law, is in lieu of all warranties, implied or expressed, including implied warranties of merchantability and fitness for a particular purpose and any liability for incidental and consequential damages with respect to the sale or use of the items warranted. Such incidental and consequential damages shall include, but not be limited to: transportation, charges other than normal freight charges, cost of installation other than cost approved by Electrostatic Spraying Systems, Inc., duty, taxes, charges for normal service or adjustments, loss of crops or any other loss of income, expenses due to loss, damage, detention or delay in the delivery of equipment or parts resulting from acts beyond the control of Electrostatic Spraying Systems, Inc.

THIS WARRANTY SHALL NOT APPLY:

1. To vendor items which carry their own warranties such as, but not limited to, engines, air compressors, and liquid pumps. Electrostatic Spraying Systems, Inc. shall supply replacement parts at list price pending the warranty investigation of the vendor item. Vendor item parts such as air compressors, liquid pumps, solenoids, and other such items must be returned before warranty credit.
2. If the unit has been subject to misapplication, abuse, misuse, negligence, fire or other accident.
3. If parts not made or supplied by Electrostatic Spraying Systems, Inc. have been used in connection of the unit, if, in the sole judgment of Electrostatic Spraying Systems, Inc. such parts affect its performance, stability or reliability.
4. If the unit has been altered or repaired in a manner which, in the sole judgment of Electrostatic Spraying Systems, Inc. such alteration or repair affects its performance, stability or reliability. This shall include but not be limited to opening of the spray gun shell by anyone not authorized by Electrostatic Spraying Systems, Inc. to do so.
5. **To normal maintenance, service and replacement items such as, but not limited to, engine lubricant, filters, or to normal deterioration of such things as, but not limited to, belts and exterior finish, due to use and exposure.**

NO EMPLOYEE OR REPRESENTATIVE OF
ELECTROSTATIC SPRAYING SYSTEMS, INC.
IS AUTHORIZED TO CHANGE THIS WARRANTY IN ANY WAY
OR GRANT ANY OTHER WARRANTY
UNLESS SUCH CHANGE IS MADE IN WRITING
AND IS SIGNED BY A CORPORATE OFFICER OF
ELECTROSTATIC SPRAYING SYSTEMS, INC.



Spray gun repair/Yearly service return form

When returning a spray gun for warranty or repair services to ESS, please pack it securely and include the following form with your spray gun.

Spray Gun Serial Number: _____

Returned from:

Company: _____

Contact person: _____

Phone number: _____

Shipping address: _____

Mailing address: _____

(if different) _____

Date last serviced: _____

Problems with the Spray gun (if any):

Method of Payment:

Account (must be an approved account)

COD

Credit Card:

VISA MASTERCARD AMERICAN EXPRESS

Card Number: _____

Expiration Date: _____

Card Holder's Name: _____

PRINT

SIGN

Send to:
Electrostatic Spraying
Systems, Inc.
62 Morrison St.
Watkinsville, GA 30677-2749

ESS recommends sending
your spray gun via a carrier
with tracking.



SPRAY LOG

Date	Applicator	Time IN/OUT	Crop	Pest	Pesticide	Treatment Area Size	Tank Mix	COMMENTS



ELECTROSTATIC SPRAYING SYSTEMS, INC.

Main Office: 62 Morrison St. · Watkinsonville, GA 30677
 Phone: (706) 769-0025 · 1-800-213-0518 · FAX: (706) 769-8072

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