

# Owner's Manual ESS SC-1 Suitcase Sprayer



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**OWNER'S MANUAL**  
**ESS SC-1**  
**SUITCASE SPRAYER**

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

CE certification applied for

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This manual last updated May 4, 2009



## CONGRATULATIONS!

You have just purchased one of the most advanced spraying systems on the market today. Electrostatic Spraying Systems, Inc.<sup>1</sup> (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:

**Electrostatic Spraying Systems, Inc.**  
**62 Morrison St.**  
**Watkinsville, Georgia 30677-2749**  
**Phone: 706-769-0025**  
**1-800-213-0518**  
**Fax: (760) 769-8072**  
**support@maxcharge.com**

Please take time to read this manual before operating your new ESS SC-1 Suitcase Sprayer™. The manual contains important instructions for the safe operation of this equipment. It also includes helpful suggestions to maximize productive use of the SC-1. 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 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.

**SC-1**

Model #

Serial #

Spray gun serial number

Date of purchase.

<sup>1</sup> ESS SC-1 Sprayer™, SC-1™, MaxCharge™, and the ESS logo are copyrights or registered trademarks of Electrostatic Spraying Systems, Inc.

## Notes

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*Your SC-1 sprayer may appear slightly different than the photographs and drawings in this manual. We at ESS are constantly listening to customer input and we make frequent improvements to our sprayer designs.*

## Notes

## Overview of the ESS Model SC-1 Air-Assisted Electrostatic Sprayer

Air-assisted electrostatic sprayers produce electrically charged spray droplets that are carried to the target in a low pressure, gentle, air stream. The heart of the SC-1 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 onto the target where they are attracted to surfaces 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 surfaces, even defying gravity to coat the underside of leaves and the back side of the target objects. The result is uniform spray coverage on hidden surfaces that other sprayers miss. Air-assisted electrostatic sprayers give more than twice the deposition efficiency of hydraulic sprayers and non-electrostatic types of air-assisted sprayers. The grower benefits in terms of significant reductions in application costs and optimized insect and disease control, sanitization of beef or other coverage.

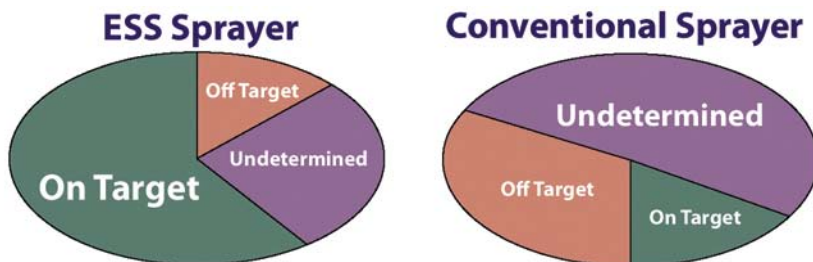
The MaxCharge™ nozzle is easy to clean and corrosion-proof. The interior ceramic outlet resists wear three times better than stainless steel outlets. These features combine to give the best spray coverage on the market. This quality product is virtually maintenance-free, and assures you of savings in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



**A picture worth a thousand words...**  
In this test, fluorescent dye has been sprayed on two round knobs. The left knob was sprayed with the electrostatic system ON; the right knob was sprayed with the same sprayer, but with the electrostatic system OFF. Note how even the coverage is on the electrostatic knob.

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 target surfaces 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 SC-1 Sprayer

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### **OPERATOR'S RESPONSIBILITY**

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#### ***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.**

**Lack of attention to safety can result in reduction of 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 SC-1 sprayer ONLY for its intended use as described in this manual.
- ◆ Do not allow a child to operate the SC-1 sprayer. Do not allow adults to operate the sprayer without proper instruction.
- ◆ Use extra care when spraying on stairs. Do not place sprayer on stairs.
- ◆ Do not use without tank in place.
- ◆ Always empty tank after use and before transporting the sprayer.
- ◆ Store sprayer in a dry place. Do not expose to freezing temperatures.

### **CAUTION: SHOCK HAZARD**

**The SC-1 sprayer has been engineered to be very safe during normal operation. However, as with all line-powered electrical equipment and tools, certain safety procedures need to be followed.**

- ◆ Use a GFCI (Ground Fault Circuit Interrupter) power outlet whenever possible.
- ◆ If an extension cord is necessary, use a three-wire extension cord with a 3-prong grounding type plug.
- ◆ Turn off sprayer before unplugging.
- ◆ Unplug sprayer when not in use.
- ◆ Always unplug by grasping the plug. Do not unplug by pulling on the cord.
- ◆ Never pull plug with wet hands.
- ◆ Do not pull or carry the sprayer by its power cord. Do not crimp the cord or cause it to be damaged by straining it around sharp edges. Keep power cord away from heat sources.
- ◆ Do not use the SC-1 sprayer with a damaged power cord. Call ESS for a replacement.

## CAUTION: HOT SURFACE

**Be aware that the compressor inside the SC-1 becomes hot enough to burn you.**

- ♦ The compressor becomes hot to the touch during normal use. Do not touch the SC-1 compressor after it has been running.
- ♦ Stay clear of the hot compressor when making adjustments inside the SC-1 case or replacing the tank.
- ♦ The sprayer's compressor is equipped with a thermal overload switch. If it overheats, the compressor will stop running. Unplug the sprayer and let it stand for one hour with the door open. The unit should then be able to restart.

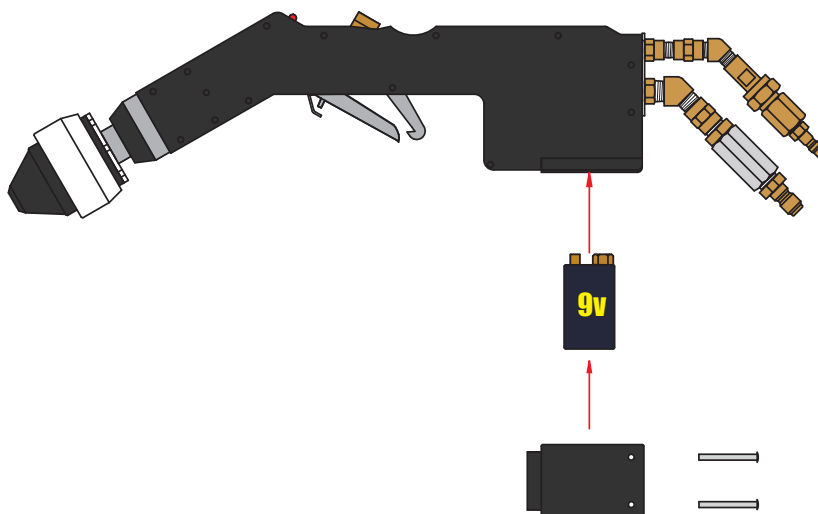
## CHEMICAL SAFETY PRECAUTIONS

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

- ♦ Use protective clothing, eye protection and gloves when mixing chemicals to be sprayed with the SC-1 sprayer.
- ♦ Always use a respirator and eye protection when spraying with the SC-1.
- ♦ 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 power supply for the MaxCharge spray gun is entirely separate from the power supply for the sprayer's compressor. The spray gun is powered by 9-volt batteries in the handle of the SC-1 sprayer. This low-voltage charge is not enough to harm people. Some people report feeling a "tingle" or a slight stinging sensation when the spray from the spray gun falls on their bare skin.



## Safety decals

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Appropriate safety decals are placed on ESS equipment in order to alert the operator to possible dangers. If any decal is missing or damaged, please contact ESS immediately for a replacement decal.



### **PROTECT YOUR LUNGS PROTECT YOUR EYES**

*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.*

*This label is placed on top of the SC-1 Sprayer, near the quick connect sockets.*

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*The SC-1 compressor becomes hot during normal operation.*

*DO NOT TOUCH.*

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*This label is wrapped around the hose to remind you to clean the filters regularly. The number one cause of poor sprayer performance is a clogged or dirty filter.*

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# Troubleshooting

## SC-1 will not turn on:

- Is the SC-1 plugged in securely to the socket and the case?
- Is the electrical outlet faulty? Try a different outlet.
- Is the GFCI (Ground Fault Circuit Interrupter) set properly? Reset if necessary.
- Has the compressor overheated? Be careful, it may be hot. Let the SC-1 cool with the case open. Try again in about one hour.
- Did the fuse burn out? If so, replace it. A spare fuse is attached to the compressor frame.

## Spray quality problems:

- Is the liquid filter clogged? Remove and rinse clean.
  - The sprayer and filter should be cleaned and rinsed with water each day after use.
- Check that all hose “quick connections” are connected.
  - 2 from hose to handgun
  - 2 from hose to case
  - 1 on bottom of tank
- Does the air filter need to be changed? Check “in-line” air filter. A spare air filter comes with the parts kit.
- Is the nozzle cover dirty? Unscrew the nozzle cover.
  - Wash inside nozzle cover with water.
  - Check to see if liquid port is clogged. Clean out with paper clip or small wire.
- Is the trigger mechanism dirty? Read manual and clean.
- Is the liquid or ambient temperature too cold? The nozzle can freeze up when the ambient temperature or the solution is less than 50°.
- Check to make sure you have a “flow disk” in the liquid line. This is a small disk that is in the liquid line next to the filter. A spare flow disk comes with the parts kit.

## Charging Light will not come on:

- If the red LED on the handle of the spray gun does not come on, it indicates that the spray is not receiving an electrostatic charge.
- Make sure the batteries are charged. Fully charged batteries will last for about 5 continuous hours of use.
- Replace the rechargeable batteries with new ones when necessary.

## More help is available

- Also see the “Troubleshooting Guide” in the Owner’s Manual.
- If you are still experiencing problems after exhausting the troubleshooting guides, please call ESS at 1-800-213-0518 and ask for Customer Service.

*This label is placed inside the SC-1 case for handy reference.*

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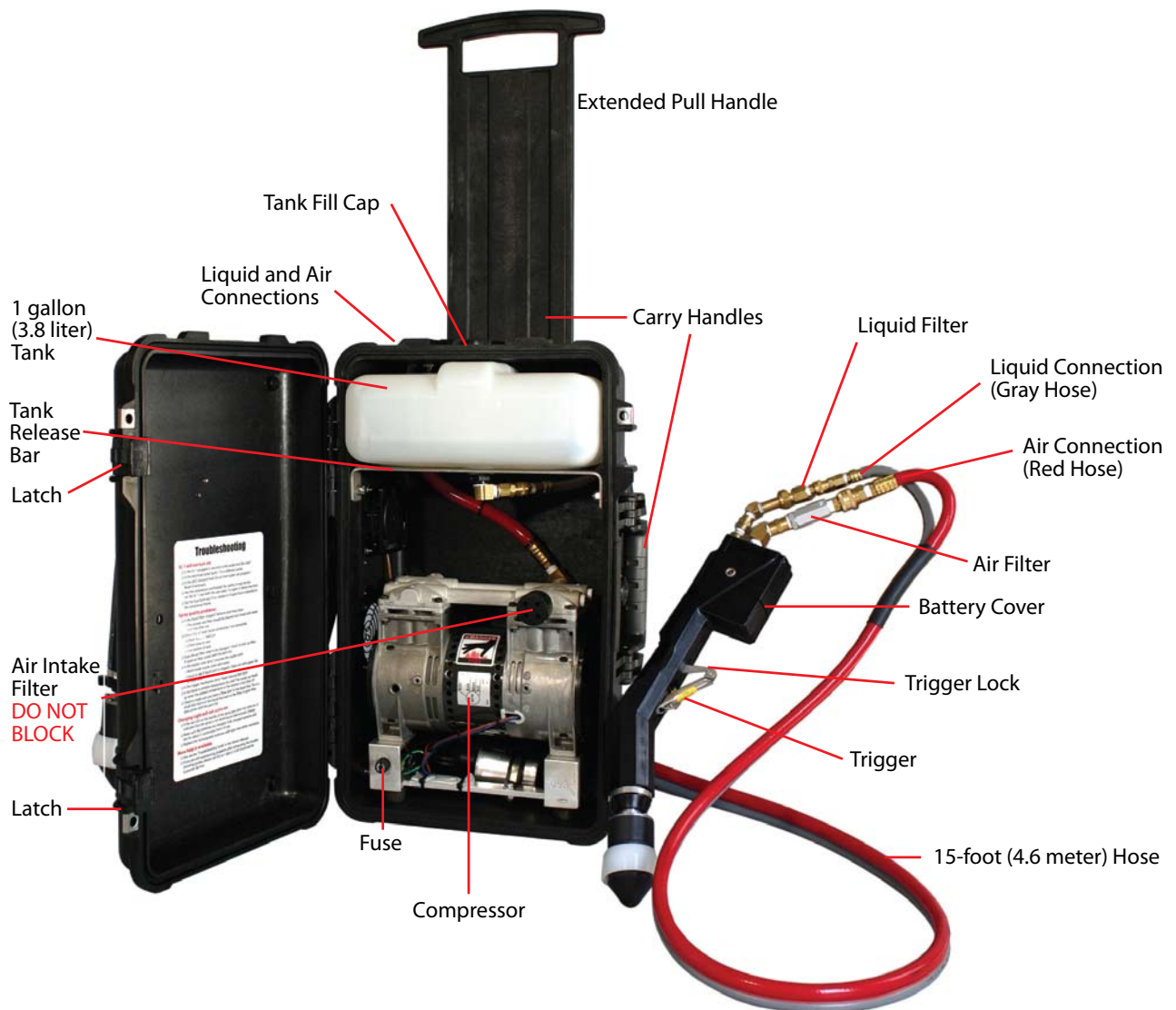
*ESS is currently redesigning all sprayer labels. Your sprayer may not have the same version of these decals. If you desire an updated decal, please contact Customer Service at 1-800-213-0518.*

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# Labeled Diagrams of the SC-1 Sprayer



**Figure 1. Closed and open views of the ESS SC-1™**



## Quick List: Operating Instructions

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### Steps for Operation

1. Prepare the tank mix.
2. Connect the twin line hose to the liquid and air connection.
3. Connect the twin line hose to the liquid and air leaders on the spray gun.
4. Plug the power cord into an appropriate receptacle. Turn on the air compressor.
5. Engage the trigger and spray.

### Helpful hints:

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The latch for the Pull Handle simply pulls out to release the Pull Handle. Extend the Pull Handle fully. To stow the handle, again release the latch, then push the Pull Handle in.

Purchase multiple polyethylene tanks for your SC-1; doing so will let you quickly switch tanks to spray a different chemical mix. It's easy to switch tanks. Remove the tank cap, then open the SC-1 case. You will need to loosen the two nuts at the ends of the metal Tank Release Bar. Then pull the bar down and towards you. Disconnect the liquid connector from the tank bottom. The tank will then slide out easily.



In addition to the standard polyethylene tank, ESS also sells a polyethylene tank with stainless steel tank fittings that are more resistant to certain corrosive chemicals.

DO NOT BLOCK any of the vents or the Air Intake Filter. Doing so will cause the SC-1 compressor to overheat and trip the thermal overload switch.



**Cautions:**  
ESS recommends that you use an outlet with a Ground-Fault Circuit Interrupter (GFCI).

**Do not operate the SC-1 in standing water.**

**Do not immerse the SC-1 compressor.**

**The SC-1 compressor becomes hot enough to burn during normal operation. DO NOT TOUCH.**

**The compressor has a built-in thermal overload switch. If the SC-1 overheats, the compressor will cut off. If this should happen, let the unit cool for one hour with the case open.**



*The SC-1 has tough Velcro™ straps to hold hoses and cords.*

## Quick List: Troubleshooting problems

# Troubleshooting

### SC-1 will not turn on:

- Is the SC-1 plugged in securely to the socket and the case?
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- Is the GFCI (Ground Fault Circuit Interrupter) set properly? Reset if necessary.
- Has the compressor overheated? Be careful, it may be hot. Let the SC-1 cool with the case open. Try again in about one hour.
- Did the fuse burn out? If so, replace it. A spare fuse is attached to the compressor frame.

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  - Wash inside nozzle cover with water.
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- Is the trigger mechanism dirty? Read manual and clean.
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### Charging Light will not come on:

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- Replace the rechargeable batteries with new ones when necessary.

### More help is available

- Also see the “Troubleshooting Guide” in the Owner’s Manual.
- If you are still experiencing problems after exhausting the troubleshooting guides, please call ESS at 1-800-213-0518 and ask for Customer Service.

This helpful reference is inside the lid of the SC-1.

Also see the Troubleshooting Guide at the back of this manual on page 20.

## **Quick List: To clean the SC-1 after operation:**

1. Clean the exterior of the sprayer with a damp cloth.
2. Clean the tank.
3. Disconnect the twin line hose from the spray gun air line and liquid line leaders.
4. Disassemble and clean the liquid filter. Be careful not to lose the flow disk.
5. Unthread the quick connect plug from the spray gun liquid line leader. Use a  $\frac{7}{16}$ " wrench on the plug and an  $\frac{11}{16}$ " wrench on the  $\frac{1}{8}$ " NPT body.
6. Connect the quick connect plug to the grey hose of the twin line hose.
7. Fill the tank with  $\frac{1}{2}$  to  $\frac{3}{4}$  gallon (1 to 2 liters) of clean water.
8. Turn on the air compressor to flush the line with most of the of water. Turn off the air compressor.
9. Disconnect the quick connect plug from the twin line hose, then connect it into the spray gun liquid line leader.
10. Reassemble the liquid filter.
11. Turn on the air compressor and engage the trigger to flush the spray gun lines with the remaining water. Check the nozzle for a good spray pattern while flushing. Allow air to flow for 30 seconds after the water has been sprayed.
12. Apply silicone spray or similar lubricating oil to all quick connect fittings.
13. Record application in the Spray Log.

Detailed instructions on maintaining each of the SC-1's components follow in the next sections.



*Sil-Glyde is an excellent silicone-based protective lubricant. You may purchase it directly from ESS.*

## Notes

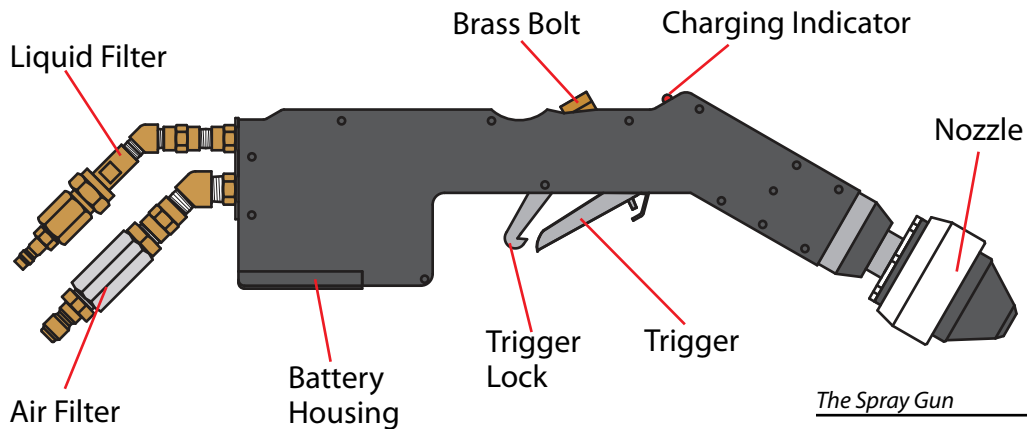
# REFERENCE

## Spray gun

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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**



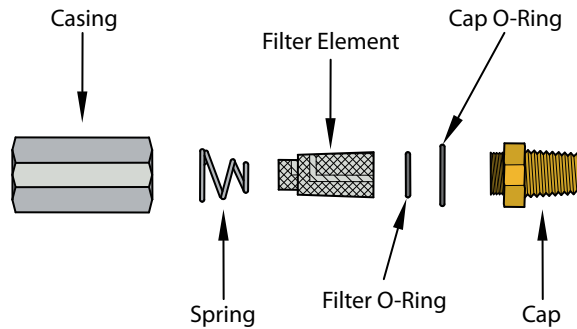
See also: [Changing the batteries](#)  
[Yearly spray gun service](#)  
[Spray technique](#)

## Air filter

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**Note: SC-1 units manufactured after March 2009 do not require an air filter on the spray gun air leader.**

For SC-1 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*

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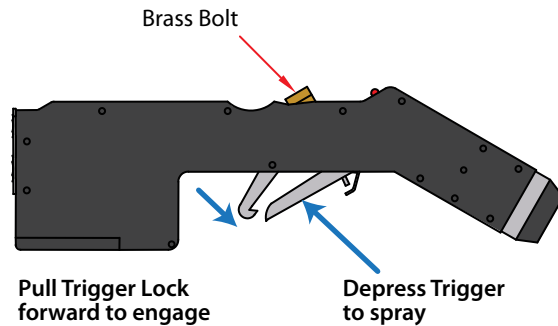
### To clean the air filter:

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

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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.

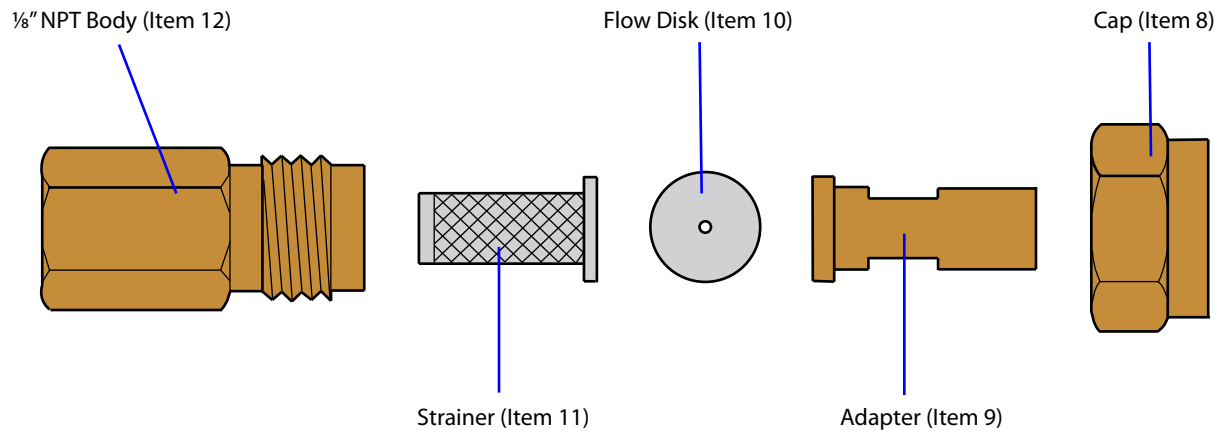
### To clean the trigger:

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  $\frac{1}{8}$ " 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 SC-1 Parts Kit in case the originals are lost or damaged.

**You may have to clean the liquid filter more frequently if the SC-1 is being used to spray high-particle density solutions.**



*Liquid Filter Assembly*

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

1. Using a  $\frac{13}{16}$ " wrench on the cap (Item 8) and an  $\frac{11}{16}$ " wrench on the  $\frac{1}{8}$ " 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  $\frac{1}{8}$ " NPT body.
3. If the  $\frac{1}{8}$ " 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  $\frac{1}{8}$ " NPT body.
7. Rethread the  $\frac{1}{8}$ " NPT body and the cap.

## Nozzle assembly

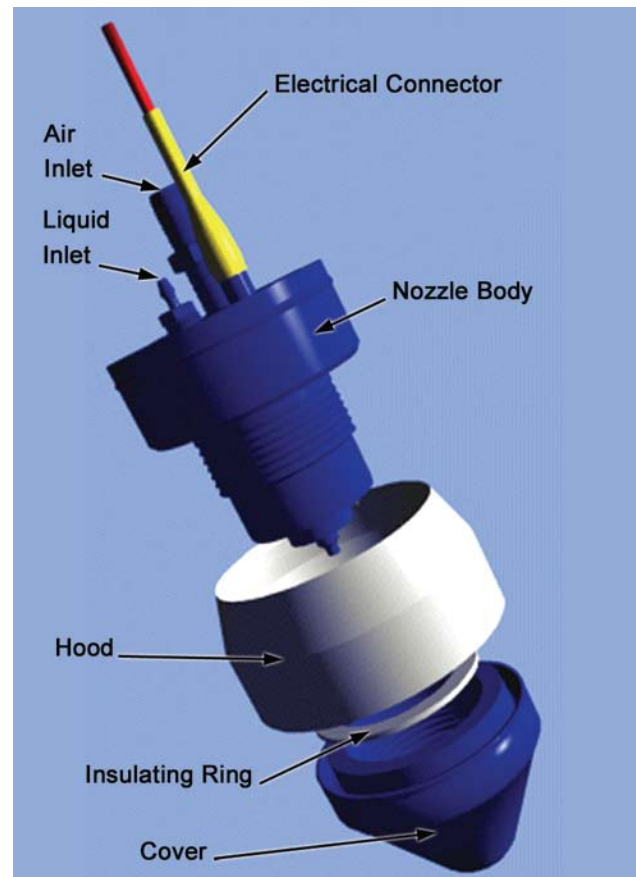
It is very important to follow all the maintenance and cleaning procedures to ensure that the electrostatic sprayer will function properly. Although the MaxCharge™ nozzle will outperform all electrostatic spray technology on the market, regular cleaning will ensure peak operating performance.

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 SC-1 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 powders 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 Nutra-Sol 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**

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### 1. 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.

### 2. 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**

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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.

## **The air & liquid delivery system**

---

### **The air compressor**

The air compressor produces compressed air which atomizes and propels the liquid. It plugs into a 110 volt electrical source. Use the SC-1™ with an three-pronged extension cord of no more than 50 feet and rated for no less than 15 amp service. The On/Off switch is on the side of the case.



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



On/Off Switch



### **Cautions:**

**The SC-1 compressor becomes hot during normal operation. DO NOT TOUCH.**

**The compressor has a built-in thermal overload switch. If the SC-1 overheats, the compressor will cut off. If this should happen, let the unit cool for one hour with the case open.**

## **Quick connects**

---

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

- Compressor (air) outlet
- Tank (liquid) outlet,
- Spray gun air inlet
- Spray gun liquid inlet

In all cases, the plug is on the outlet side of the connection.

### **To disconnect the quick connects at the spray gun leaders:**

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 disconnect the quick connects at the top of the SC-1:**

1. Push the latch at the side of the socket to release the plug.
2. Pull the plug out of the socket.

### **To connect the quick connects at the spray gun leaders:**

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.

### **To connect the quick connects at the top of the SC-1:**

1. Push the liquid and air plugs into their respective sockets until you feel it latch. They are different sizes and cannot be cross-connected.
2. Pull gently to make sure it is properly seated.

## **Air connection**

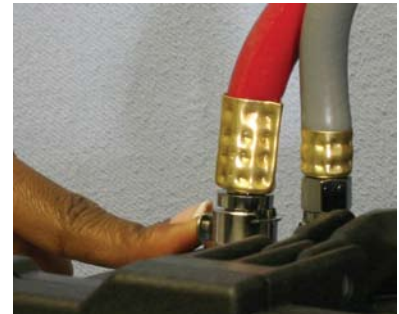
The quick connect for the air connection is on the top of the SC-1 case and is toward the outside of the case. The other end of the twin line hose connects to the air leader of the spray gun. The air leader of the spray gun is below the liquid leader and is easily recognizable because its connector is larger than the liquid connector – it is not possible to connect the air hose to the liquid leader. The air line hose is red.

## **Liquid connection**

The quick connect for the tank connection (liquid line) is also on the top of the SC-1 case. It is smaller and is to the handle side of the air quick connect socket. The other end of the twin line hose connects to the air leader of the spray gun. The liquid line is gray.



*To connect or disconnect the air or liquid connections on the spray gun, pull back the outer sleeve of the socket to release.*



*To disconnect the air or liquid connections at the top of the sprayer, push the small latch to release the connector.*

## Tank

The location of the tank's fill cap is on the top of the SC-1.



***Always check the quick-connect at the bottom of the tank before spraying.***

**Without a proper seal at the bottom of the tank, liquid could enter the SC-1's compressor and cause a shock hazard.**

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 SC-1™ is used to spray wettable powders on a regular basis.

Purchase multiple polyethylene tanks for your SC-1; doing so will let you quickly switch tanks to spray a different chemical mix. It's easy to switch tanks. Remove the tank cap, then open the SC-1 case. You will need to loosen the two nuts at the ends of the metal Tank Release Bar. Then pull the bar down and towards you. Disconnect the liquid connector from the tank bottom. The tank will then slide out easily.



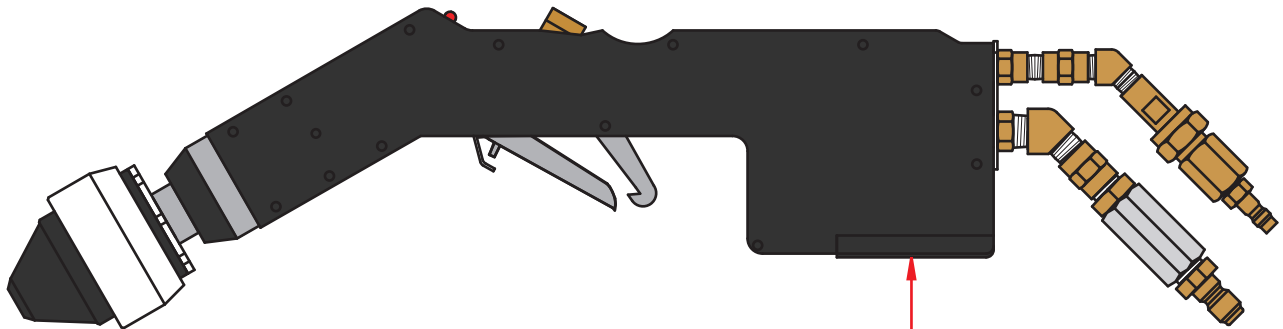
Remember to disconnect the liquid quick connect (red hose) from the tank bottom.

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

In addition to the standard polyethylene tank, ESS also sells a polyethylene tank with stainless steel tank fittings that are more resistant to certain corrosive chemicals. Contact Customer Service to order.

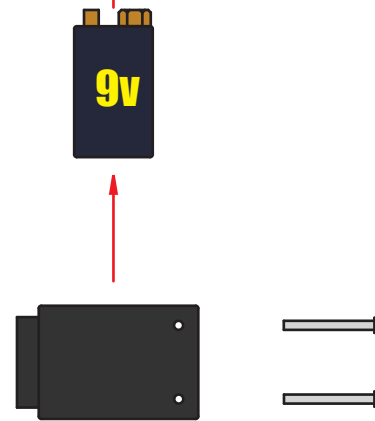
## Batteries

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 SC-1 Replacement Battery Pack from ESS, S/N # 4512.



### 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 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.



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

## Yearly spray gun services

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**

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*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.*

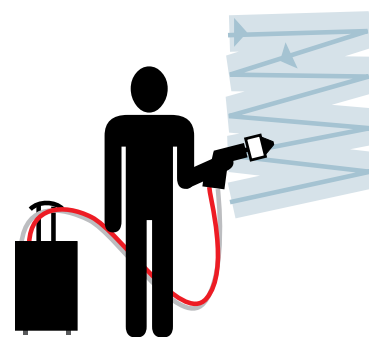
### **Spray Technique**

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 SC-1'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 SC-1 sprayer.

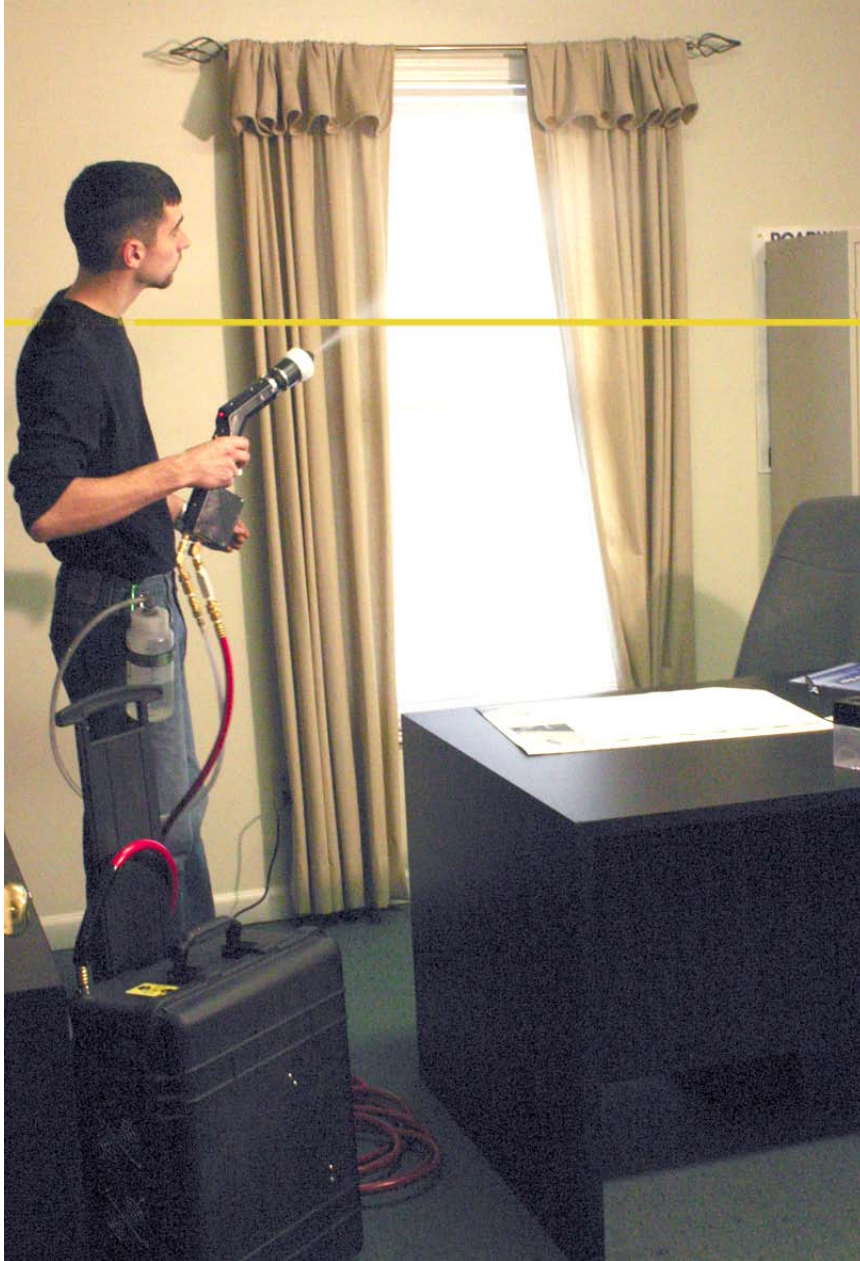
1. Before each job, ensure that your sprayer is in good working order (see the pre-spray checklist on page 15 of this manual).
2. The optimal spraying distance is at least 18 inches away from the target surface, however 36 to 48 inches may provide a more even coating. This gives the fine mist produced 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.



## Siphoning

---

The SC-1 sprayer's design relies on siphoning of the liquid from the backpack tank. If your spraygun is held above your head, the liquid will not spray properly. To get the best performance from your sprayer, hold the spraygun no higher than your shoulder.



## 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 ft<sup>2</sup>)

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 other sprayers. Test to ensure that infective agent levels have been reduced to desired levels. At the next application, 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, testing after each experiment to see if the desired results are being accomplished. If you are planning to cut rates then it is very important to conduct these experiments to determine the optimum chemical concentration.

## **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**

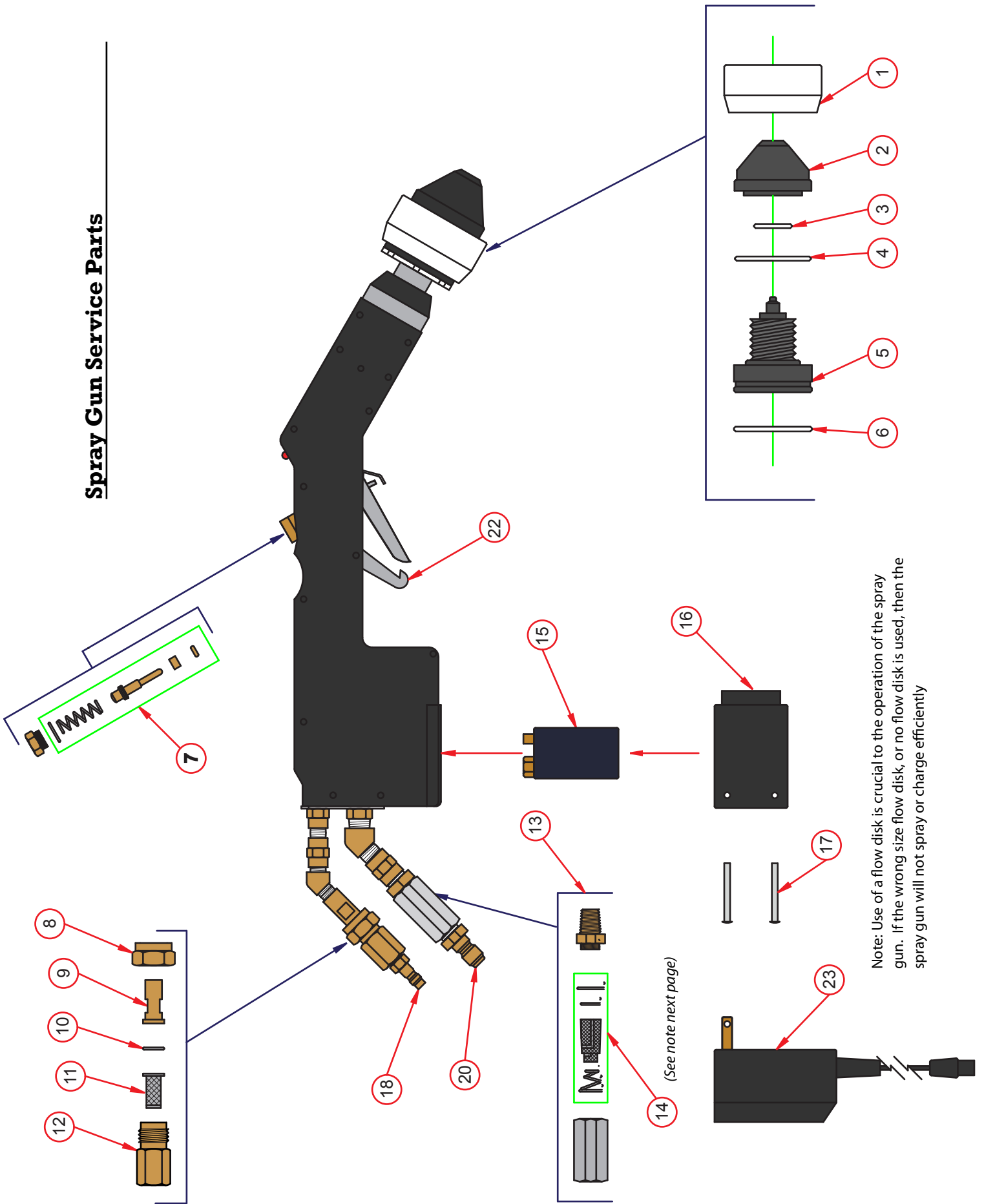
*Water temperature must be at least 10° C (50° F). When the liquid and air meet in the nozzle, the temperature of the liquid decreases. As a result, water at temperatures below 10° C (50° F) may freeze and clog the nozzle.*

## 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, 1-800-213-0518, toll-free.

Symptom	Possible Problem(s)	Corrective Action
Air pressure of spray appears low	<ul style="list-style-type: none"> <li>• Clogged Liquid Filter</li> <li>• Liquid fittings are loose</li> <li>• Air fittings are loose or damaged</li> <li>• Clogged Air Filter</li> <li>• Dirty Trigger</li> </ul>	<ul style="list-style-type: none"> <li>• Clean the Liquid Filter Assembly (See the <i>Liquid Filter Assembly</i> section of this manual)</li> <li>• Make sure the Liquid Filter Assembly is installed correctly;</li> <li>• 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</li> <li>• Clean the Air Filter (See The <i>Air Filter Assembly</i> section of this manual)</li> <li>• Clean the Trigger (See the <i>To Clean the Trigger</i> section of this manual)</li> </ul>
No spray from nozzle or the spray from nozzle is erratic or spits	<ul style="list-style-type: none"> <li>• Debris in the nozzle</li> <li>• Spray is freezing due to evaporative cooling</li> <li>• Liquid filters are clogged</li> <li>• Low liquid level in the tank</li> <li>• Loose liquid or air fitting</li> <li>• Dirty Trigger</li> <li>• Overtightened nozzle cover</li> </ul>	<ul style="list-style-type: none"> <li>• Clean nozzle according to instructions</li> <li>• Make sure that water temperature is at least 50° (10°C)</li> <li>• Clean the Liquid Filter Assembly (See the <i>Liquid Filter Assembly</i> section of this manual)</li> <li>• Refill tank</li> <li>• Inspect hose quick connects at case and at spray gun leader. Make sure that all liquid fittings and air fittings are properly seated.</li> <li>• Clean the Trigger (See the <i>To Clean the Trigger</i> section of this manual)</li> <li>• Loosen cover. It should only be finger-tight</li> </ul>
Charging indicator (LED) blinks or goes is out during operation	<ul style="list-style-type: none"> <li>• Batteries are exhausted</li> <li>• Dirty nozzle</li> </ul>	<ul style="list-style-type: none"> <li>Recharge batteries If problem persists, replace battery pack</li> <li>• Clean nozzle according to instructions</li> </ul>
Air compressor cuts off during operation	<ul style="list-style-type: none"> <li>• Compressor has overheated</li> <li>• Blown fuse</li> </ul>	<ul style="list-style-type: none"> <li>• Let unit cool for approximately 1 hour with case open</li> <li>• Replace fuse inside case</li> </ul>
SC-1 will not start	<ul style="list-style-type: none"> <li>• No power</li> <li>• SC-1 is not switched on</li> <li>• Blown fuse</li> </ul>	<ul style="list-style-type: none"> <li>• Make sure the unit is plugged into an appropriate electrical receptacle</li> <li>• Make sure the power switch is on</li> <li>• Replace fuse inside case</li> </ul>

# Spray Gun Service Parts



## SC-1 Spray Gun Service Parts

ITEM NUMBER	ESS PART NUMBER	DESCRIPTION	QUANTITY ORDERED
1	5795	Hood	1
2	5775	Nozzle Cover	1
3	5771	O-ring, Internal	1
4	5694	Teflon Ring	1
5	5777	Nozzle Body, Greenhouse	
		Note: <i>Must Send Spray Gun In For Repair</i>	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, 9V	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	1748	Spray Gun Leader Assy, Liquid	1
20	240	QC Plug, 1/4", 1/4" MPT, Brass (Spray Gun)	1
21	1749	Spray Gun Leader Assembly, Air	1
22	6518	Trigger Pawl	1
23	4430	Battery Charger	1

## SC-1 Service Parts

P/N	Item	P/N	Item
80	ESS Serial Plate	8419	KL nuts #6 SS
90	QC Socket 1/8", Brass	8631	Screw, #10 x 3/4" self tapping
92	QC Socket 1/4", Brass	9192	Screw, #6-32 x 5/8", Counter Sink, SS
107	3/8" Ferrule, Brass	9601	Screw, 4-24 x 1/4", Panhead Sheet Metal, SS
110	1/4" H x 1/8" MPT Brass	9856	Plug Socket Head, 1/4" NPT, Brass
156	Street Ell, 1/4" Brass	9915	12 GA Green/Yellow Wire
216	Hose - 3/8" ID - Conductive - Red	16127	Heat Shrink
224	1/4" Ferrule, Brass	16716	Reducing Bushing, 1/2" x 1/4", Blk PPL
239	QC Plug - 1/8" x 1/8" MPT - BR	16969	Compressor Mount Weldment
252	Twinline hose, 1/4" Gray & 3/8" Red	16980	Pelican 1510 Series Case
411	3/8" H x 1/4" MPT, Brass	16981	1.0 Gallon Tank
411	3/8" H x 1/4" MPT, Brass	16982	Tank Cap
959	Female Spade Connectors	16983	Washdown Rocker Switch
1055	Ring connectors #8	16984	Tool Holder
1067	Adaptor 1/4" - 1/8" Brass	16998	Vibration Dampening Mount
1087	Male Branch Tee, 1/4" Brass	17003	Mini Louver
1096	1/4" H x 1/8" FPT, Brass"	17004	Quick Disconnect Tube Coupling Plug
1649	Hex Nut 1/4 - 20, SS	17005	Quick Disconnect Tube Coupling Plug
1651	Lock Washer 1/4", SS	17006	Quick Disconnect Tube Coupling Panel Mount Socket
1662	Worm Clamps	17007	Quick Disconnect Tube Coupling Panel Mount Socket
3250	15 Amp Fuse	17027	Velcro Strap
3783	Nyloc Hex Nut 1/4 -20, SS	17105	Extension Cord, NEMA 5-15 plug & IEC 320 Connector
4945	Pop-off valve, 1/4" Brass	17106	Schurter IEC 320 AC Power Line Appliance Inlet
5791	Hex Head Cap Screw 1/4 - 20 x 1/2", SS	17120	Wob-L 2660CE44 Thomas Comp. w/ Capacitor
5978	Panel Mount Fuse Holder	17140	Wob-L 2660series Thomas Comp Fan Guard
6434	Hex Head Cap Screw 1/4-20 x 3/4" SS	16988-1	Tank Support
6564	Ring connectors 1/4"		
7497	1/4" Blue hose, conductive		



62 Morrison St. · Watkinsonville, 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.

## Notes

# Spray Gun Return Form

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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.**

