

# **Versa-Spray® II Automatic Powder Spray Gun**

Customer Product Manual

Part 107016-02

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**For parts and technical support, call the Industrial Coating  
Systems Customer Support Center at (800) 433-9319 or  
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# Table of Contents

<b>Safety</b> .....	<b>1-1</b>	<b>Repair</b> .....	<b>6-1</b>
Introduction .....	1-1	Powder Path Repair .....	6-1
Qualified Personnel .....	1-1	Multiplier Replacement .....	6-2
Intended Use .....	1-1	Resistor Replacement .....	6-4
Regulations and Approvals .....	1-1	Contact Tip Replacement .....	6-5
Personal Safety .....	1-2	Nozzle Extension Resistor Replacement .....	6-6
Fire Safety .....	1-2		
Grounding .....	1-3	<b>Parts</b> .....	<b>7-1</b>
Action in the Event of a Malfunction .....	1-3	Introduction .....	7-1
Disposal .....	1-3	Using the Illustrated Parts List .....	7-1
Safety Label .....	1-4	Automatic Gun Assemblies .....	7-2
		Automatic Guns with Shur-Lok Mount .....	7-2
<b>Description</b> .....	<b>2-1</b>	Automatic Gun with In-Line Ball Mount .....	7-4
Introduction .....	2-1	Service Kits .....	7-6
Theory of Operation .....	2-2	Spray Gun Body Service Kit .....	7-6
Options .....	2-2	Service Kit Reference Chart –	
Nozzles and Deflectors .....	2-2	Versa-Spray II Automatic Spray Guns .....	7-6
Lance Extensions .....	2-2	Resistor Holder Service Kit .....	7-7
Gun Air Upgrade Kits .....	2-3		
Purge Adapter .....	2-3	<b>Options</b> .....	<b>8-1</b>
In-Line Ball Mount Kits .....	2-3	Options Reference Chart .....	8-1
Ion Collector Kits .....	2-3	Miscellaneous Options .....	8-2
Specifications .....	2-4	Shorting Plug .....	8-2
Air Quality .....	2-4	Gun Mounting Bar .....	8-2
		Powder Feed Hose and Air Tubing .....	8-2
<b>Installation</b> .....	<b>3-1</b>	Purge Adapter .....	8-3
Gun Mounting .....	3-1	Gun Air Upgrade Kits .....	8-4
Gun Connections .....	3-2	Reference Chart .....	8-4
		Kits for Guns Used with	
<b>Operation</b> .....	<b>4-1</b>	Versa-Spray II Control Units .....	8-4
Startup .....	4-1	Diffuser and Extension Kit .....	8-4
Shutdown .....	4-2	Diffuser Kit .....	8-5
Maintenance .....	4-2	Kits For Guns Used with	
Daily .....	4-3	Versa-Spray Control Units .....	8-6
Weekly .....	4-4	Diffuser Kit .....	8-6
		Gun Air Manifold .....	8-7
<b>Troubleshooting</b> .....	<b>5-1</b>	Nozzle Extension Kit for Guns Used with	
Continuity and Resistance Checks .....	5-3	Versa-Spray or Versa-Spray II Control Units	8-8
Multiplier/Resistor Assembly Continuity and		Nozzle Extension Parts and Service Kits	8-9
Resistance Check .....	5-3	In-Line Ball Mount Kit .....	8-10
Resistor Resistance Check .....	5-5	In-Line Ball Mount and Ion Collector Kit .....	8-11
Nozzle Extension Resistor Resistance Check	5-6	Ion Collector Retrofit Kits .....	8-12
Gun Cable Continuity Check .....	5-7	Shur-Lok Mount Ion Collector Kit .....	8-12
		In-Line Ball Mount Ion Collector Kit .....	8-13

## Contact Us

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# *Section 1*

## **Safety**

### **Introduction**

Read and follow these safety instructions. Task- and equipment-specific warnings, cautions, and instructions are included in equipment documentation where appropriate.

Make sure all equipment documentation, including these instructions, is accessible to all persons operating or servicing equipment.

### **Qualified Personnel**

Equipment owners are responsible for making sure that Nordson equipment is installed, operated, and serviced by qualified personnel. Qualified personnel are those employees or contractors who are trained to safely perform their assigned tasks. They are familiar with all relevant safety rules and regulations and are physically capable of performing their assigned tasks.

### **Intended Use**

Use of Nordson equipment in ways other than those described in the documentation supplied with the equipment may result in injury to persons or damage to property.

Some examples of unintended use of equipment include

- using incompatible materials
- making unauthorized modifications
- removing or bypassing safety guards or interlocks
- using incompatible or damaged parts
- using unapproved auxiliary equipment
- operating equipment in excess of maximum ratings

### **Regulations and Approvals**

Make sure all equipment is rated and approved for the environment in which it is used. Any approvals obtained for Nordson equipment will be voided if instructions for installation, operation, and service are not followed.

All phases of equipment installation must comply with all federal, state, and local codes.

## Personal Safety

To prevent injury follow these instructions.

- Do not operate or service equipment unless you are qualified.
- Do not operate equipment unless safety guards, doors, or covers are intact and automatic interlocks are operating properly. Do not bypass or disarm any safety devices.
- Keep clear of moving equipment. Before adjusting or servicing any moving equipment, shut off the power supply and wait until the equipment comes to a complete stop. Lock out power and secure the equipment to prevent unexpected movement.
- Relieve (bleed off) hydraulic and pneumatic pressure before adjusting or servicing pressurized systems or components. Disconnect, lock out, and tag switches before servicing electrical equipment.
- Obtain and read Safety Data Sheets (SDS) for all materials used. Follow the manufacturer's instructions for safe handling and use of materials, and use recommended personal protection devices.
- To prevent injury, be aware of less-obvious dangers in the workplace that often cannot be completely eliminated, such as hot surfaces, sharp edges, energized electrical circuits, and moving parts that cannot be enclosed or otherwise guarded for practical reasons.

## Fire Safety

To avoid a fire or explosion, follow these instructions.

- Do not smoke, weld, grind, or use open flames where flammable materials are being used or stored.
- Provide adequate ventilation to prevent dangerous concentrations of volatile materials or vapors. Refer to local codes or your material SDS for guidance.
- Do not disconnect live electrical circuits while working with flammable materials. Shut off power at a disconnect switch first to prevent sparking.
- Know where emergency stop buttons, shutoff valves, and fire extinguishers are located. If a fire starts in a spray booth, immediately shut off the spray system and exhaust fans.
- Clean, maintain, test, and repair equipment according to the instructions in your equipment documentation.
- Use only replacement parts that are designed for use with original equipment. Contact your Nordson representative for parts information and advice.

## Grounding



**WARNING:** Operating faulty electrostatic equipment is hazardous and can cause electrocution, fire, or explosion. Make resistance checks part of your periodic maintenance program. If you receive even a slight electrical shock or notice static sparking or arcing, shut down all electrical or electrostatic equipment immediately. Do not restart the equipment until the problem has been identified and corrected.

Grounding inside and around the booth openings must comply with NFPA requirements for Class 2, Division 1 or 2 Hazardous Locations. Refer to NFPA 33, NFPA 70 (NEC articles 500, 502, and 516), and NFPA 77, latest conditions.

- All electrically conductive objects in the spray areas shall be electrically connected to ground with a resistance of not more than 1 megohm as measured with an instrument that applies at least 500 volts to the circuit being evaluated.
- Equipment to be grounded includes, but is not limited to, the floor of the spray area, operator platforms, hoppers, photoeye supports, and blow-off nozzles. Personnel working in the spray area must be grounded.
- There is a possible ignition potential from the charged human body. Personnel standing on a painted surface, such as an operator platform, or wearing non-conductive shoes, are not grounded. Personnel must wear shoes with conductive soles or use a ground strap to maintain a connection to ground when working with or around electrostatic equipment.
- Operators must maintain skin-to-handle contact between their hand and the gun handle to prevent shocks while operating manual electrostatic spray guns. If gloves must be worn, cut away the palm or fingers, wear electrically conductive gloves, or wear a grounding strap connected to the gun handle or other true earth ground.
- Shut off electrostatic power supplies and ground gun electrodes before making adjustments or cleaning powder spray guns.
- Connect all disconnected equipment, ground cables, and wires after servicing equipment.

## Action in the Event of a Malfunction

If a system or any equipment in a system malfunctions, shut off the system immediately and perform the following steps:

- Disconnect and lock out electrical power. Close pneumatic shutoff valves and relieve pressures.
- Identify the reason for the malfunction and correct it before restarting the equipment.





## Disposal

Dispose of equipment and materials used in operation and servicing according to local codes.

## Safety Label

Table 1-1 contains the text of the safety label on this equipment. The safety label is provided to help you operate and maintain your equipment safely.

Table 1-1 Safety Label

Item	Part	Description
1.	244664	<p> <b>WARNING:</b> The following procedures <u>MUST</u> be followed when working with this electrostatic spray equipment. Failure to follow these instructions may result in a fire and/or serious personal injury. Display this warning on the spray booth.</p> <p> 1. NO SMOKING. Keep open flames, hot surfaces, and sparks from torches or grinding away from booth.</p> <p>2. Turn the electrostatic power unit <u>off</u> when the spray gun is not in use.</p> <p>3. Shut down immediately in event of fire.</p> <p>4. Maintain ground circuit on all conductive objects below 1 meg ohm to prevent sparking. (ANSI/NFPA 33, Chapter 9, or local codes)</p> <p>5. Shut down operation and correct grounds if sparking occurs.</p> <p>6. Install fixed fire suppression system in accordance with ANSI/NFPA 33, Chapter 7 (or local codes), before operating with combustible powder.</p> <p>7. Install automatic flame detectors in accordance with ANSI/NFPA 33, Chapter 7 (or local codes), before operating automatic guns.</p> <p>8. Examine all equipment at the beginning of each work period and repair or replace any damaged, loose, or missing parts.</p> <p>9. Before cleaning or performing any maintenance on the electrostatic spray gun, turn off the power unit and ground the nozzle. Maintain electrostatic spray equipment in accordance with instruction manual. Do not deviate. Do not substitute parts from other manufacturers.</p> <p> 10. Operator must be grounded to prevent shocks from static electricity. Floor surface must be conductive. Footwear and gloves must be static dissipative in accordance with ANSI Z41-1991 (or local codes).</p> <p>11. Air velocity through all booth openings must meet local requirements and contain powder within the booth. If powder escapes from the booth, shut down operation and correct the malfunction.</p> <p> 12. Powder may be toxic or be a nuisance dust hazard. Refer to supplier's SDS. If exposed to dust during operation, maintenance, or clean up, operators must use appropriate personal protective equipment.</p> <p>13. Do not use compressed air or organic solvents for removal of powder from skin or clothing. Do use soap and water. Wash hands before eating or smoking.</p> <p>14. Guns, feeders, booths, etc., may be cleaned with clean dry air at 1.7 bar (25 psig).</p> <p>If you have any questions concerning this electrostatic spray equipment, call (440) 988-9411, and ask to speak with the Powder Systems Group Technical Service Department.</p>



## Section 2

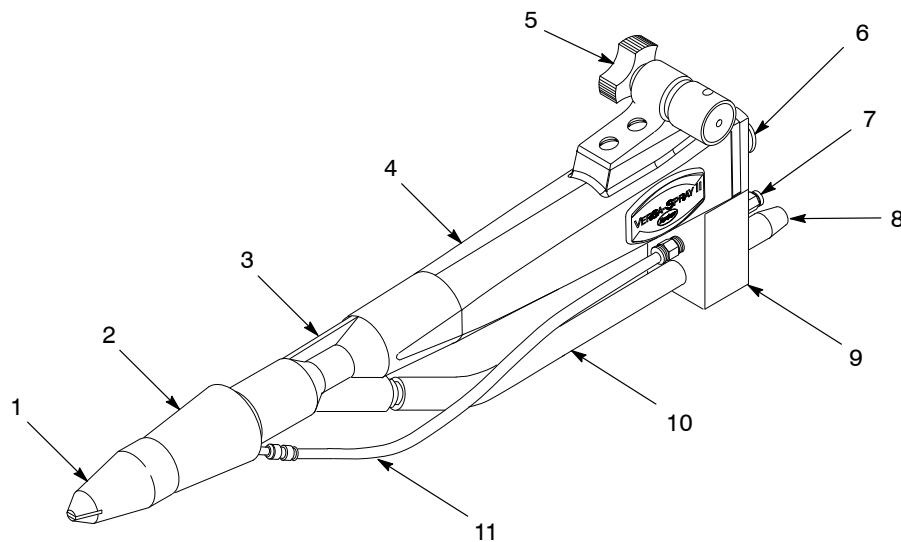
# Description

### Introduction

See Figure 2-1. The Versa-Spray II Integral Power Supply (IPS) automatic electrostatic powder spray gun electrostatically charges and sprays organic powder coatings. The integral power supply (multiplier) (4) is available in either positive or negative polarity and is user-replaceable. The spray gun can be used with several different control units and powder pumps.

Optional gun air upgrade kits are available that include a diffuser (9) and/or nozzle extension (2). The diffuser injects gun air into the powder-air mixture to evenly blend it before it reaches the nozzle (1).

From the diffuser, the gun air is routed to the nozzle extension. Gun air flows through the nozzle extension and out around the electrode to prevent some powder coatings such as metallics from collecting on the electrode.



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Figure 2-1 Versa-Spray II Automatic Powder Spray Gun with Optional Gun Air Kit

- |                      |                            |                      |
|----------------------|----------------------------|----------------------|
| 1. Flat-spray nozzle | 5. Gun mount               | 9. Diffuser          |
| 2. Nozzle extension  | 6. Cable receptacle        | 10. Powder feed hose |
| 3. Powder inlet body | 7. Gun air inlet connector | 11. Gun air tubing   |
| 4. Multiplier        | 8. Feed hose connector     |                      |

*Note:* Items 2, 7, 8, 9, 10, and 11 are only used on spray guns with gun air kits.

## Theory of Operation

The Versa-Spray II control unit supplies low-voltage dc power to the voltage multiplier. The multiplier generates the high voltage needed for powder coating. The voltage generates a high-strength electrostatic field between the spray gun and the grounded part in front of the spray gun. The electrostatic field produces a corona discharge around the electrode. A resistor between the spray gun's multiplier and the electrode limits the current output to safe levels.

Compressed air pumps the powder from the feed hopper, conveys it through the feed hose to the spray gun, and propels it toward the workpieces. As the powder particles are sprayed through the corona, they pick up an electrostatic charge and are attracted to the workpieces.

The spray pattern is controlled by the shape of the nozzle used, the speed of the powder-conveying air as it exits the nozzle, and the electrostatic field generated between the electrode and the grounded workpiece. There are no controls on the spray gun. The voltage controls and the powder pump flow rate and atomizing air pressure regulators are housed in the IPS control unit. A non-adjustable restrictor on the control unit rear panel controls the gun air pressure. The pump and gun air start flowing when the spray gun is triggered.

## Options

Refer to the *Options* section for part numbers and illustrations of the following optional equipment. Contact your Nordson representative for more information about these options.

### ***Nozzles and Deflectors***

Standard spray guns are shipped with a Tivar flat-spray nozzle with 4-mm wide slot. The following optional nozzles may be ordered separately:

- Versa-Spray II conical nozzle, with 19-mm deflector
- 32- and 45-mm conical nozzles
- 14-, 16-, 19-, and 26-mm deflectors for conical nozzles
- 2.5-, 3-, 4-, and 6-mm Tivar and GFT (glass-filled PTFE) flat-spray nozzles for organic powders
- 60° and 90° Cross-Cut nozzles
- castle nozzle (six radial slots)

### ***Lance Extensions***

Lance extensions extend the length of the powder path to help spray powder into recesses and interior corners. The extensions are equipped with 26-mm conical nozzles and are available in 150-, 300-, and 450-mm (6-, 12- and 18-in.) lengths.

## ***Gun Air Upgrade Kits***

Five kits are available to add a diffuser and nozzle extension to a Versa-Spray II automatic powder spray gun. For spray guns used with a Versa-Spray II control unit, the following kits are available.

- Diffuser kit
- Nozzle extension kit
- Diffuser and nozzle extension kit

For spray guns used with a Versa-Spray I control unit, the following kits are available.

- Manifold kit
- Diffuser kit
- Nozzle extension kit

## ***Purge Adapter***

The purge adapter is used to clean accumulated powder from the powder inlet body and nozzle. It is installed in the powder inlet body in place of the hose adapter. The powder feed hose connects directly to the purge adapter.

## ***In-Line Ball Mount Kits***

The spray guns are shipped with the Nordson Shur-Lok gun mount shown in Figure 2-1. This mount can be replaced with an optional in-line ball mount, or a combination in-line ball mount and ion collector.

## ***Ion Collector Kits***

The ion collector can improve the smoothness and appearance of cured powder coatings. It collects ions emitted from the spray gun's charging electrode instead of allowing them to deposit on the part. This can reduce the rate of charge buildup in the powder deposited on the part, which may reduce defects in the cured coating such as pinholing and orange peel.

Three kits are available: two retrofit kits for spray guns with Shur-Lok mounts or in-line ball mounts, and a combination in-line ball mount and ion collector kit. Installation and adjustment instructions are included with each kit.

## **Specifications**

Maximum rated output voltage at the electrode 100,000 volts  $\pm 10\%$

Maximum rated output current at the electrode 0.150 mA  $\pm 10\%$

This equipment is rated for use in an explosive environment (Class II, Division I) and Zone 21 or Zone 22.

### ***Air Quality***

Powder spray systems require clean, dry, oil-free operating air. Moist or oil-contaminated air can cause the powder to clog in the pump venturi throat, feed hose, or powder path.

Use 3-micron filter/separators with automatic drains and a refrigerated or regenerative desiccant-type air dryer that can produce a 3.4 °C (38 °F) or lower dewpoint at 7 bar (100 psi).

## Section 3

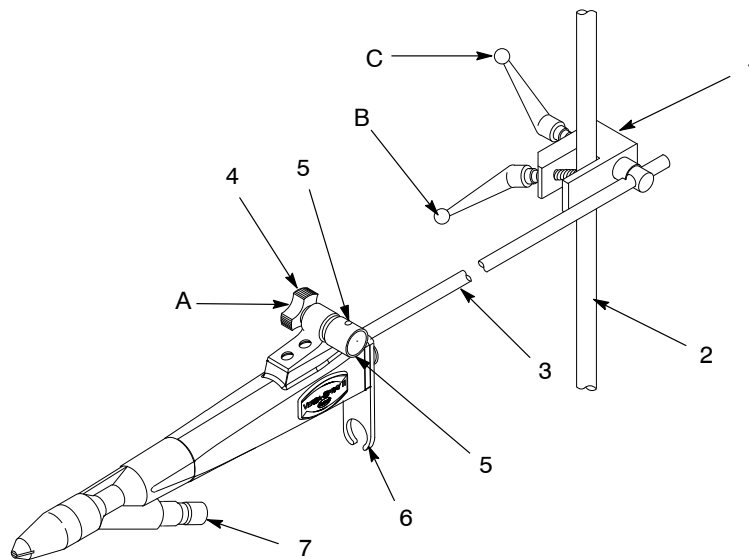
# Installation



**WARNING:** Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

### Gun Mounting

1. See Figure 3-1. Install the mounting bar clamp (1) on a 25.4-mm (1-in.) diameter bar (2). Tighten handle B.
2. Loosen the set screws (5) in the gun mount (4) and insert the end of the mounting bar (3) in the mount. Tighten the set screws securely.
3. Use knob A to adjust the angle of the spray gun. Use handle B to position the clamp (1) vertically or horizontally. Use handle C to adjust the angle and length of the mounting bar.



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Figure 3-1 Gun Mounting—Shur-Lok Gun Mount

- |                        |                       |                 |
|------------------------|-----------------------|-----------------|
| 1. Mounting bar clamp  | 4. Shur-Lok gun mount | 6. Hose bracket |
| 2. 25.4-mm (1-in.) bar | 5. Set screws         | 7. Hose adapter |
| 3. Mounting bar        |                       |                 |

*Note:* Refer to *Gun Mounting Bar* in the *Options* section for ordering information about the mounting bar (3).

## Gun Connections

Perform the following steps to install the gun cable, feed hose, and optional gun air tubing.

See Figure 3-2.

1. Plug the three-socket end of the gun cable (4) into the multiplier receptacle (1). Plug the six-pin end of the gun cable into the GUN OUTPUT receptacle on the rear panel of the IPS control unit. Tighten the cable retaining nuts at each end.
2. Install the feed hose. Secure the hose at both ends with snap clamps. Install spiral-cut tubing around the hose wherever necessary to prevent the hose from kinking and cutting off the flow of powder.
  - **Standard Guns**—Pinch the feed hose and slide it into the hose bracket (See Figure 3-1, (6)) at the rear of the spray gun. Connect the feed hose to the hose adapter (See Figure 3-1, (7)).
  - **Guns with Optional Gun Air Kit**—Connect the feed hose (6) to the connector (3) at the diffuser.

**NOTE:** To increase powder flow and keep the distribution of powder in the air even, keep the feed hose as short as possible. The hose should not be more than 8-m (25-ft) long.

3. **Guns with Optional Gun Air Kit used with Versa-Spray II Control Units**—Install the gun air tubing. For instructions on connecting guns with air to Versa-Spray control units, refer to the instructions shipped with the upgrade kits.
  - a. Remove the plug from the GUN port on the control unit. Wrap the restrictor (10) threads with PTFE tape. Install the restrictor into the GUN port. Install the 6-mm tube connector (9) into the restrictor.
  - b. Install the gun air tubing between the connector and the tubing connector (2).
4. Install 6-mm atomizing air tubing (7) and flow rate air tubing (8) between the control unit and the pump (11).
5. Anchor the feed hose, gun cable, and air tubing to the gun mounting bar and stand or to the reciprocator arm with spiral-cut tubing. Make sure that the hose and cable cannot be abraded, cut, or run over by moving equipment.



**WARNING:** All electrically conductive equipment in the spray area must be grounded. Ungrounded or poorly grounded equipment can store an electrostatic charge which can give personnel a severe shock or arc and cause a fire or explosion.

6. Connect all conductive equipment to a true earth ground.

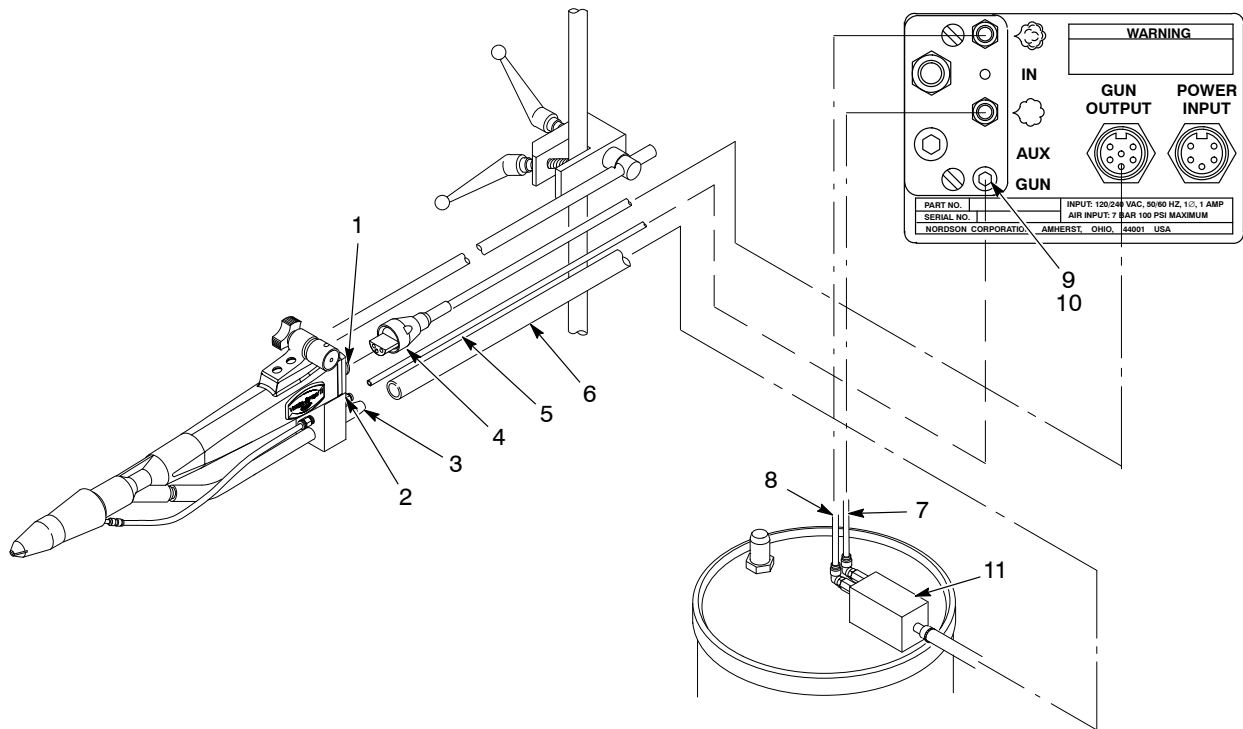


Figure 3-2 Gun Connections (Gun Shown with Optional Gun Air Kit)

- |                             |                              |                        |
|-----------------------------|------------------------------|------------------------|
| 1. Multiplier receptacle    | 5. 6-mm Gun air tubing       | 9. 6-mm tube connector |
| 2. Gun air tubing connector | 6. Feed hose                 | 10. Restrictor         |
| 3. Feed hose connector      | 7. 6-mm Atomizing air tubing | 11. Powder pump        |
| 4. Gun cable                | 8. 6-mm Flow rate air tubing |                        |





## Section 4

# Operation



**WARNING:** Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.



**WARNING:** This equipment can be dangerous unless it is used in accordance with the rules laid down in this manual.

## Startup



**WARNING:** Do not operate the spray gun if the resistor and multiplier resistances are not within the ranges specified in this manual. Failure to observe this warning may result in personal injury, fire, and property damage.

Before turning on the IPS control unit, make sure that

- the booth exhaust fan is on,
- the powder recovery system is operating, and
- the powder supply in the feed hopper is adequately fluidized.

Refer to the appropriate equipment manuals for startup procedures.

1. Make sure the cable, feed hose, and air tubing are correctly connected to the spray gun, powder pump, and IPS control unit.
2. If the IPS control unit is controlled by a master control unit, turn on the master control unit. Make sure that the IPS control unit is on.
3. Adjust the control unit air pressure regulators:

<b>Flow rate</b>	1.4 bar (20 psi)	Controls the volume of the powder delivered to the spray gun
<b>Atomizing</b>	2.1 bar (30 psi)	Controls the velocity and density (powder-to-air ratio) of the powder
<b>Gun</b>	Not adjustable	Keeps powder from building up on the electrode
<b>NOTE:</b> The pressures given are average starting points. Pressures will vary according to required film build, line speed, and part configuration. Adjust the pressures to obtain the desired results.		

## Startup *(contd)*

4. With the spray gun aimed into the booth, trigger the control unit and test the spray pattern. Adjust the flow rate and atomizing air pressures until you obtain the desired pattern.

**NOTE:** The following steps describe electrostatic voltage settings made on a Versa-Spray II control unit that includes AFC controls. A Versa-Spray II spray gun can be used with older Versa-Spray control units without AFC controls, but only the kV mode will be available unless the optional current limit kit is installed.

5. Turn the control unit kV/AFC switch to the on position. Push the kV/AFC switch in to put the unit in kV mode or pull it out to put the unit in AFC mode.
  - If the switch is set for the kV mode, rotate it fully clockwise for maximum voltage.
  - If the switch is set for the AFC mode, rotate it to position 4. This position represents approximately 40 microamps.

**NOTE:** When a new spray gun is put into service, or a multiplier is replaced, set the kV/AFC switch to the kV mode. Turn the switch to the maximum setting, and record the  $\mu\text{A}$  output with no parts in front of the spray gun. Monitor the  $\mu\text{A}$  output daily, under the same conditions. A significant increase in  $\mu\text{A}$  output indicates a probable short in the gun resistor. A significant decrease indicates a failing resistor or voltage multiplier.

6. Coat a part and adjust the kV output or AFC settings and air pressures to achieve the desired results.

## Shutdown



**WARNING:** Turn off the electrostatic voltage and ground the gun electrode before making adjustments to the spray gun or nozzle.

1. Turn off power to the master control unit or the IPS control unit. Ground the gun electrode to discharge any residual voltage.

**NOTE:** Voltage and air to the pump and spray gun will be turned on and off when the master control unit is turned on and off. The IPS control unit power switch, kV potentiometer, and air pressure regulators can be left on after the initial air pressure and kV settings are made.

2. Perform the daily maintenance procedure.

For information on the operation of other system components, refer to their respective manuals.

## Maintenance

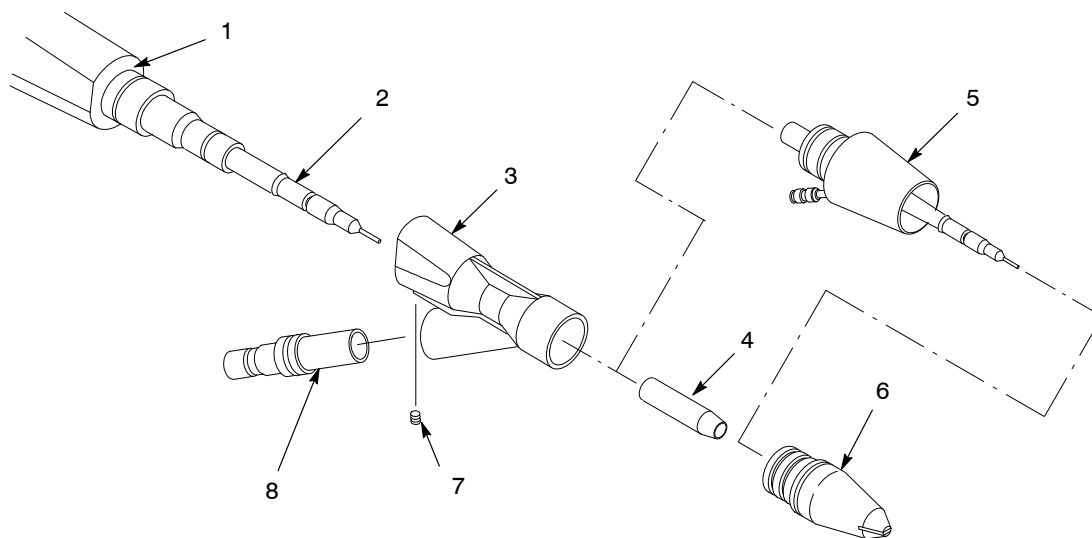


**WARNING:** Turn off the electrostatic voltage and ground the gun electrode before performing the following tasks. Failure to observe this warning could result in a severe shock.

**Daily**

See Figure 4-1.

1. Disconnect the powder feed hose from the pump. Blow the powder out of the hose and spray gun with an OSHA-approved low-pressure air gun. Never blow air through the powder feed hose from the spray gun into the pump.
2. Remove the nozzle parts (4–6), set screw (7), and powder inlet body (3) from the spray gun. Clean them with a low-pressure air gun. Wipe the parts with a clean, dry cloth.
3. Blow powder off the resistor probe (2) and multiplier (1). Wipe them with a clean, dry cloth.
4. Carefully remove fused powder from the parts with a wooden or plastic dowel or similar tool. Do not use tools that will scratch the plastic. Powder will build up and impact-fuse on scratches.



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Figure 4-1 Disassembling the Gun for Cleaning (Gun with Air Shown)

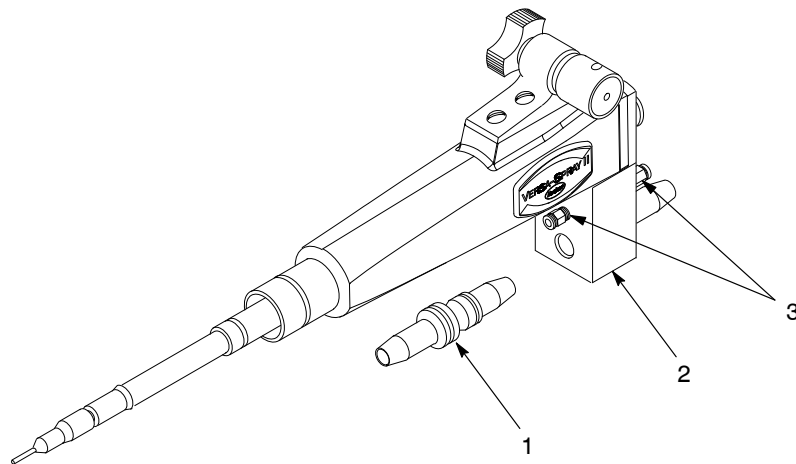
- |                      |                            |                 |
|----------------------|----------------------------|-----------------|
| 1. Multiplier        | 4. Wear sleeve             | 7. Set screw    |
| 2. Resistor probe    | 5. Optional nozzle adapter | 8. Hose adapter |
| 3. Powder inlet body | 6. Flat-spray nozzle       |                 |

*Note:* Item 4 is not used on guns that have an optional nozzle adapter.

## Daily *(contd)*

5. See Figure 4-2. If your spray gun has a diffuser, remove the diffuser hose connector (1) from the bracket (2). Disconnect the air tubing from the tubing connectors (3). Clean the bracket and the connector with low-pressure compressed air and a clean soft cloth.

**NOTE:** If necessary, use a cloth dampened with isopropyl or ethyl alcohol to clean the powder path parts. Remove the O-rings first. Do not immerse the spray gun in alcohol. Do not use any other solvents.



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Figure 4-2 Removing the Diffuser Hose Connector for Cleaning

- |                   |                     |                      |
|-------------------|---------------------|----------------------|
| 1. Hose connector | 2. Diffuser bracket | 3. Tubing connectors |
|-------------------|---------------------|----------------------|

6. Inspect the powder path parts for wear. Replace worn parts.
7. Assemble the spray gun. See Figure 4-1. Rotate items 4, 6, and 8 at least 30° from their previous position to prevent uneven wear and lopsided patterns.

## Weekly

Check the resistance of the multiplier/resistor probe assembly with a megohmmeter, as described in the troubleshooting procedures. Replace the multiplier, resistor, or both, if the resistance readings do not fall within the specified ranges.

Refer to *Continuity and Resistance Checks* in the *Troubleshooting* section for more information.

# Section 5

## Troubleshooting



**WARNING:** Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

This section contains troubleshooting procedures. These procedures cover only the most common problems that you may encounter. If you cannot solve the problem with the information given here, contact your local Nordson representative for help.

No.	Problem	Page
1.	Uneven pattern, unsteady or inadequate powder flow	5-1
2.	Voids in powder pattern	5-2
3.	Loss of wrap, poor transfer efficiency	5-2
4.	No kV output from spray gun	5-2

Problem	Possible Cause	Corrective Action
1. Uneven pattern, unsteady or inadequate powder flow	Blockage in spray gun, feed hose, or pump	Remove the feed hose from the pump outlet. Blow out the hose and spray gun with compressed air. If necessary, disassemble and clean the spray gun and pump.
	Deflector or nozzle worn, or impact-fusion affecting pattern	Remove the deflector and/or nozzle. Clean and inspect them. Replace worn parts. If parts are wearing excessively or impact-fusion is a problem, reduce the flow rate or atomizing air pressure.
	Damp powder	Check the powder in feed hopper, air filters, and dryer. Correct the problem and replace the powder supply if it is contaminated.
	Low atomizing or flow rate air pressure	Increase the atomizing and/or flow rate air pressure.
	Improper fluidization of powder in feed hopper	Increase the fluidizing air pressure. Remove the powder from the hopper and clean or replace the fluidizing plate, if necessary.
Continued...		

Problem	Possible Cause	Corrective Action
<b>2. Voids in powder pattern</b>	Worn nozzle or deflector  Plugged powder path	Remove the nozzle and deflector. Inspect and replace them if necessary.  Disassemble the powder path and clean all parts.
<b>3. Loss of wrap, poor transfer efficiency</b>	Electrostatic voltage insufficient  Dirty or broken electrode  Resistor, multiplier, or IPS control unit failure  Poorly grounded parts, hangers, or conveyor  Failed resistor in optional nozzle extension	Increase the electrostatic voltage.  Clean or replace the electrode (contact tip).  Check the multiplier/resistor probe assembly with a megohmmeter for 208–312 megohms at 500 volts. If the reading is out-of-range, check the resistor probe separately.  Check the conveyor chain, rollers and part hangers for powder buildup. Clean them and check for one megohm or less resistance between parts and ground. For best results, resistance should be no more than 500 ohms.  Check resistor with a megohmmeter for 18–22 megohms at 500 volts.
<b>4. No kV output from spray gun</b>	Damaged gun cable  Malfunctioning voltage multiplier  Failed gun resistor  Malfunctioning IPS control unit Failed resistor in optional nozzle extension	Check the continuity of the cable wires, from pin to pin. Replace the cable if any opens or shorts found.  Use the optional shorting plug and a megohmmeter to check the continuity and resistance of the multiplier/resistor assembly for 208–312 megohms at 500 volts. No burn-throughs or arc tracks should be visible on any gun parts.  Check the resistor with a megohmmeter for 153-187 megohms at 500 volts. No burn-throughs or arc tracks should be visible on any parts.  Repair or replace the control unit.  Check resistor with a megohmmeter for 18–22 megohms at 500 volts.

# Continuity and Resistance Checks

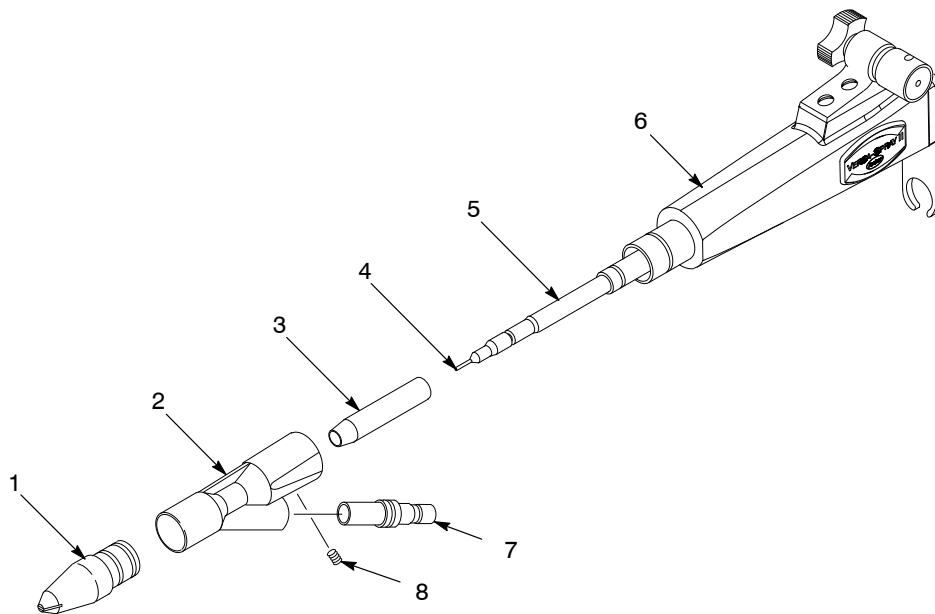


**WARNING:** Do not operate the spray gun if the resistor and multiplier resistances are not within the ranges specified in this manual. Failure to observe this warning may result in personal injury, fire, and property damage.

## Multiplier/Resistor Assembly Continuity and Resistance Check

See Figure 5-1.

1. Disconnect the powder feed hose and gun cable from the spray gun. Remove the feed hose adapter (7) from the powder inlet body (2).
2. Loosen the set screw (8) in the underside of the powder inlet body with a flat-bladed screwdriver. Remove the powder inlet body and nozzle (1). Slide the wear sleeve (3) off the resistor probe (5).
3. Wipe powder off the electrode (4), resistor probe (5), and multiplier (6). Inspect the exterior and interior surfaces. Replace any parts that have burn holes or arc tracks.



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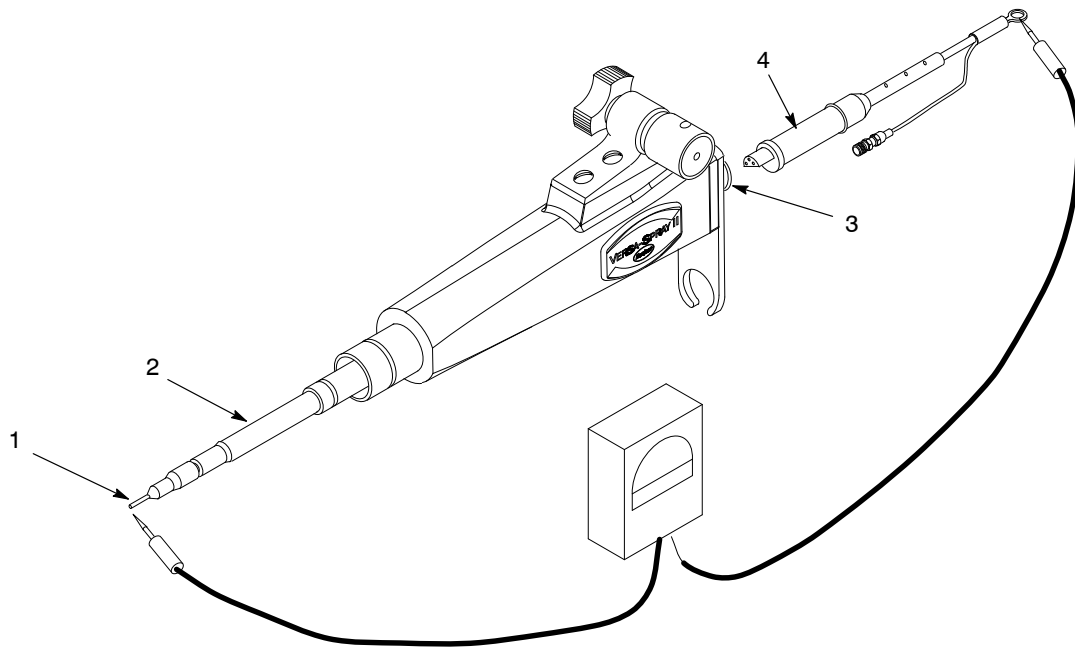
Figure 5-1 Preparing for Continuity and Resistance Checks

- |                      |                   |                      |
|----------------------|-------------------|----------------------|
| 1. Flat-spray nozzle | 4. Electrode      | 7. Feed hose adapter |
| 2. Powder inlet body | 5. Resistor probe | 8. Set screw         |
| 3. Wear sleeve       | 6. Multiplier     |                      |

## Multiplier/Resistor Assembly Continuity and Resistance Check *(contd)*

4. See Figure 5-2. Connect the shorting plug (4) to the multiplier receptacle (3). Connect the megohmmeter probes to the shorting plug ring-tong terminal and electrode. If the reading is infinite, reverse the probes.

**NOTE:** This test can be made without a shorting plug. Connect all three multiplier pins together before taking a reading with a megohmmeter. Failure to do so could damage the multiplier. Contact your Nordson representative for more information.



1400415B

Figure 5-2 Multiplier/Resistor Assembly Continuity and Resistance Check

- |                   |                          |                  |
|-------------------|--------------------------|------------------|
| 1. Electrode      | 3. Multiplier receptacle | 4. Shorting plug |
| 2. Resistor probe |                          |                  |

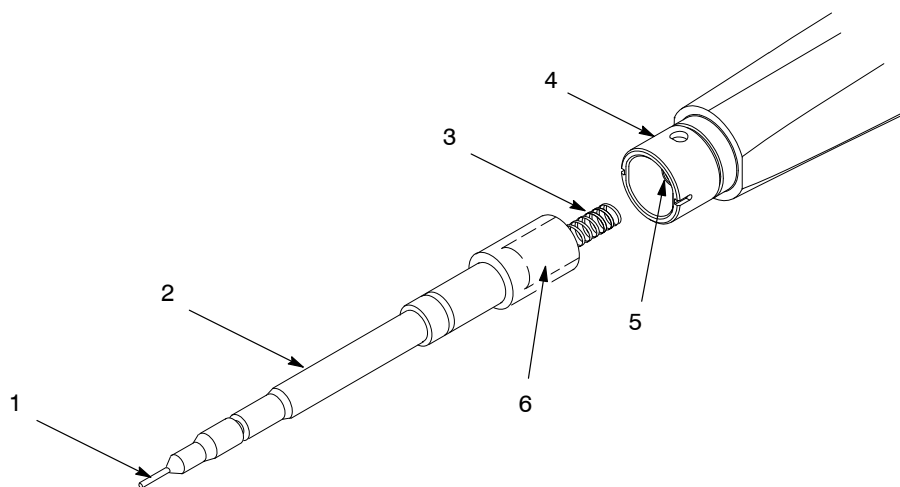
5. The megohmmeter should read between 208 and 312 megohms at 500 volts. If the reading is out of this range, unscrew the resistor probe from the multiplier and check the resistor separately (refer to *Resistor Resistance Check*). If the resistor reading is within the range specified, replace the multiplier.
6. See Figure 5-5. Check for continuity between the bottom pin (5 Vdc feedback) in the multiplier receptacle and the heatsink.



## Resistor Resistance Check

See Figure 5-3.

1. Perform steps 1 through 3 under *Multiplier/Resistor Assembly Continuity and Resistance Check*.
2. Unscrew the resistor probe (2) from the multiplier (4).
3. Connect the megohmmeter probes to the electrode (1) and resistor spring (3). The megohmmeter should read between 153 and 187 megohms at 500 volts. If the reading is out of this range, replace the resistor probe.



1400420B

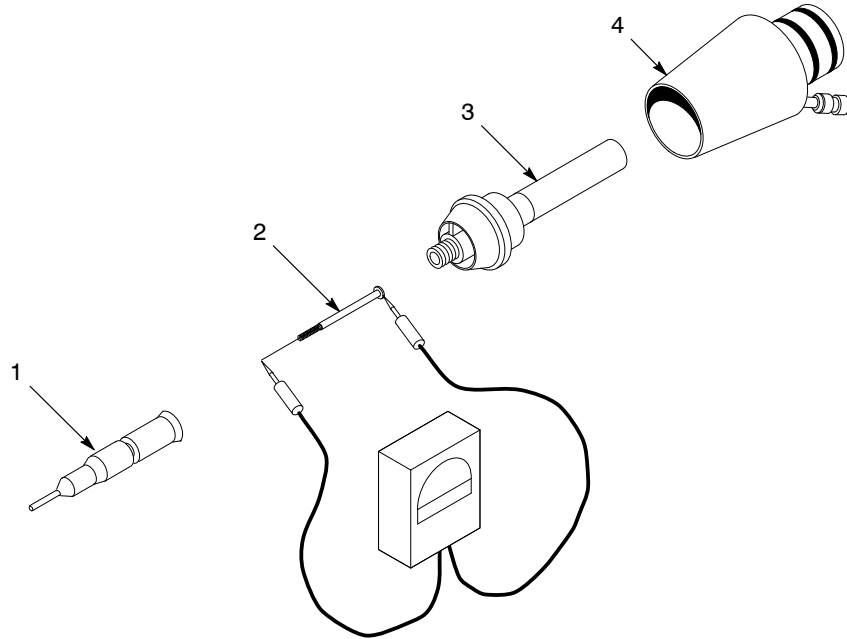
Figure 5-3 Resistor Resistance Check

- |                   |                    |                          |
|-------------------|--------------------|--------------------------|
| 1. Electrode      | 3. Resistor spring | 5. Multiplier well       |
| 2. Resistor probe | 4. Multiplier      | 6. Resistor probe cavity |

## Nozzle Extension Resistor Resistance Check

See Figure 5-4.

1. Remove the wear sleeve/spider/resistor holder assembly (1, 2, 3) from the nozzle adapter (4). Remove the resistor (2) from the resistor/spider/wear sleeve holder (1, 3) assembly.
2. Check the resistor with a megohmmeter. The megohmmeter should read between 18 and 22 megohms at 500 volts. If the reading is out of this range, replace the resistor.



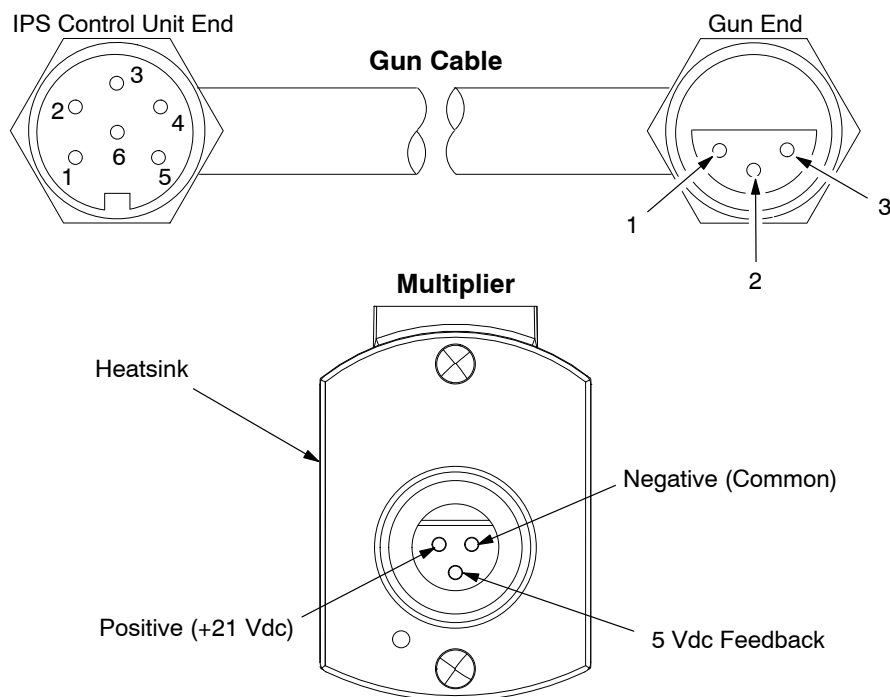
1400196B

Figure 5-4 Nozzle Extension Resistor Resistance Check

- |                    |                       |                   |
|--------------------|-----------------------|-------------------|
| 1. Resistor holder | 3. Spider/wear sleeve | 4. Nozzle adapter |
| 2. Resistor        |                       |                   |

## Gun Cable Continuity Check

Gun cable and multiplier pins, and their functions, are shown in Figure 5-5. Check the continuity of the cable leads from the pins in one end to the pins in the other with a standard ohmmeter. Check for continuity between the bottom pin (5 Vdc feedback) in the multiplier receptacle and the multiplier heatsink.



1400417B

Figure 5-5 Gun Cable and Multiplier Pins

Table 5-1 Cable Pin Functions—Control Unit End

Control Unit End Pins	Function
1	Open
2	Negative (Common)
3	Positive (+21 Vdc)
4	5 Vdc Feedback
5, 6	Jumpered

Table 5-2 Cable Pin Functions—Gun End

Gun End Pins	Function
1	Negative (Common)
2	5 Vdc Feedback
3	Positive (+21 Vdc)



## Section 6

# Repair



**WARNING:** Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

### Powder Path Repair



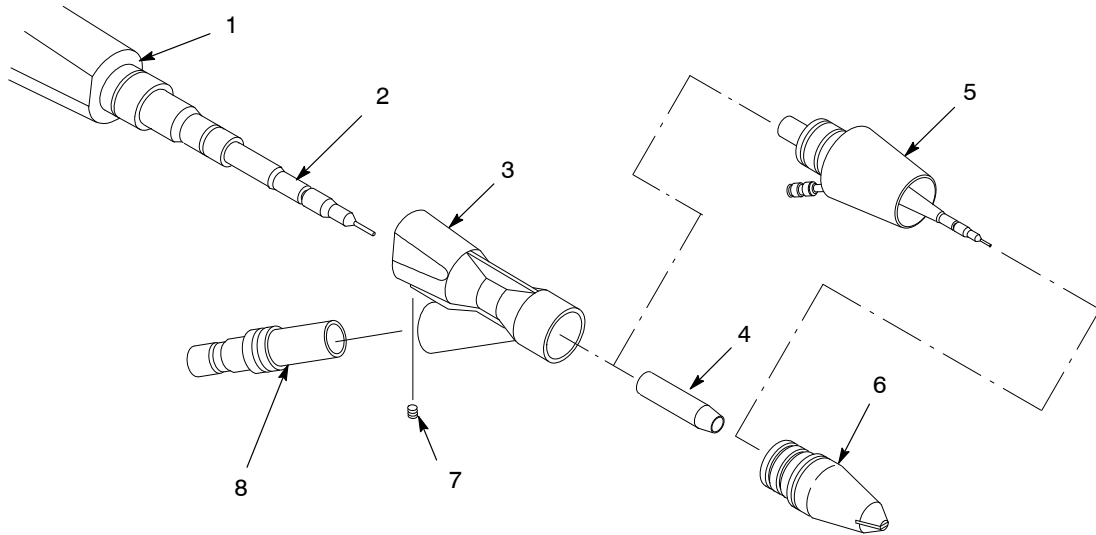
**WARNING:** Turn off the electrostatic voltage and ground the gun electrode before performing the following tasks. Failure to observe this warning could result in a severe shock.

See Figure 6-1.

1. Disconnect the powder feed hose from the hose adapter (8). Disconnect the air tubing from the optional nozzle extension (5), if it is used.
2. Remove the nozzle (6). Remove the optional nozzle extension (5), if it is used.
3. Remove the wear sleeve (4), if it is used, from the resistor probe (2). You may have to remove the powder inlet body (3) first.
4. Loosen the set screw (7) and pull the powder inlet body (3) from the multiplier (1).
5. Clean the powder path parts with an OSHA-approved low-pressure air gun and a clean cloth. Carefully remove fused powder from the parts with a wooden or plastic dowel or similar tool. Do not use tools that will scratch the plastic. Powder will build up and impact-fuse on scratches.
6. If necessary, wipe the parts with a cloth dampened with isopropyl or ethyl alcohol. Do not use any other solvent. Do not immerse the assembled spray gun or parts in alcohol.

## Powder Path Repair *(contd)*

7. Inspect all O-rings and replace them if damaged.
8. Inspect the powder path parts. Replace worn parts as necessary.
9. Reverse the disassembly procedure to assemble the powder path.



1400418B

Figure 6-1 Powder Path Repair

- |                      |                            |                 |
|----------------------|----------------------------|-----------------|
| 1. Multiplier        | 4. Wear sleeve             | 7. Set screw    |
| 2. Resistor probe    | 5. Optional nozzle adapter | 8. Hose adapter |
| 3. Powder inlet body | 6. Nozzle                  |                 |

*Note:* Item 4 is not used on guns that have an optional nozzle adapter.

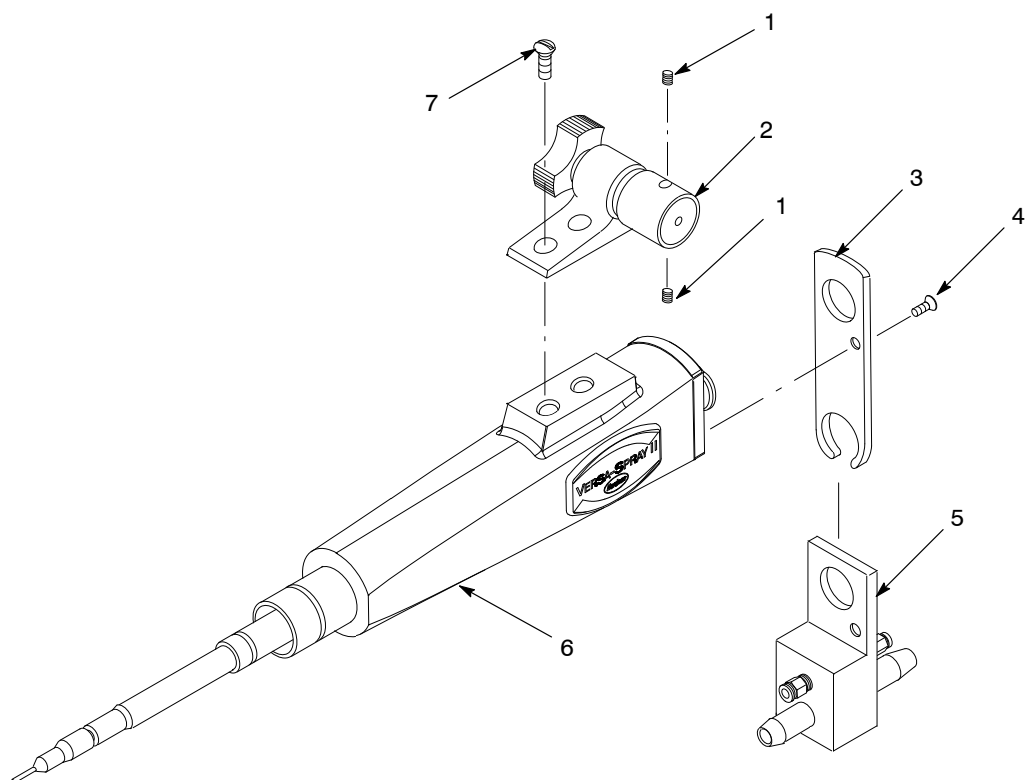
## Multiplier Replacement

The multiplier replacement kit consists of a new multiplier and a resistor probe with contact tip, filled with dielectric grease and assembled.

See Figure 6-2.

1. Disconnect the gun cable, feed hose, and air tubing (if it is used) from the spray gun.
2. Loosen the set screws (1) in the gun mount (2). Remove the spray gun from the mounting bar.
3. Perform steps 1 through 4 of the *Powder Path Repair* procedure.

4. Remove the gun mount and the hose bracket (3) or diffuser (5) from the old multiplier/resistor assembly (6). Save the screws (4, 7) for reuse.
5. Install the gun mount and the hose bracket or diffuser on the new multiplier with the screws removed from the old multiplier.
6. Install the powder path parts.
7. Install the spray gun on the mounting bar. Tighten the gun mount set screws (1) securely.
8. Connect the gun cable, feed hose, and air tubing (if it is used) to the spray gun.



1400419B

**Figure 6-2 Multiplier Replacement**

- |                 |             |                                 |
|-----------------|-------------|---------------------------------|
| 1. Set screws   | 4. Screw    | 6. Multiplier/resistor assembly |
| 2. Gun mount    | 5. Diffuser | 7. Screws                       |
| 3. Hose bracket |             |                                 |

## Resistor Replacement

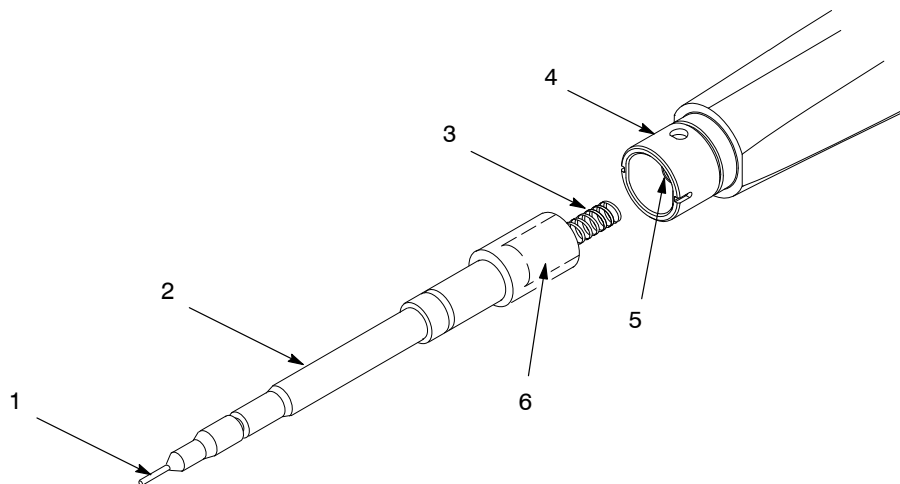
See Figure 6-3.

1. Perform steps 1 through 4 of the *Powder Path Repair* procedure.
2. Unscrew the old resistor probe (2) from the multiplier (4). Clean the exposed threads in the end of the multiplier and wipe the multiplier well (5) with a clean cloth.



**WARNING:** All air must be replaced by dielectric grease in the multiplier well, resistor holder, and contact tip. High voltage can arc through air pockets, burn through the multiplier or resistor probe, and create a fire or explosion hazard.

3. Inject dielectric grease into the multiplier well (5) until it is completely full. Use the applicator shipped with the resistor kit.
4. Fill the new resistor spring (3) and resistor probe cavity (6) completely with dielectric grease.
5. Unscrew the new contact tip (1) from the resistor probe.
6. Screw the new resistor probe onto the multiplier and tighten it securely.
7. Apply dielectric grease to the threads of the new contact tip and into the end of the probe.
8. Screw the contact tip into the resistor probe end and tighten it securely. Do not overtighten. Wipe the excess dielectric grease off the contact tip, resistor probe, and multiplier.
9. Install the wear sleeve over the resistor probe. Install the powder inlet body, nozzle, and hose adapter.



1400420B

Figure 6-3 Resistor and Contact Tip Replacement

- |                   |                    |                          |
|-------------------|--------------------|--------------------------|
| 1. Contact tip    | 3. Resistor spring | 5. Multiplier well       |
| 2. Resistor probe | 4. Multiplier      | 6. Resistor probe cavity |

*Note:* Clean and grease items 1, 3, 5, and 6.



## Contact Tip Replacement

See Figure 6-3.

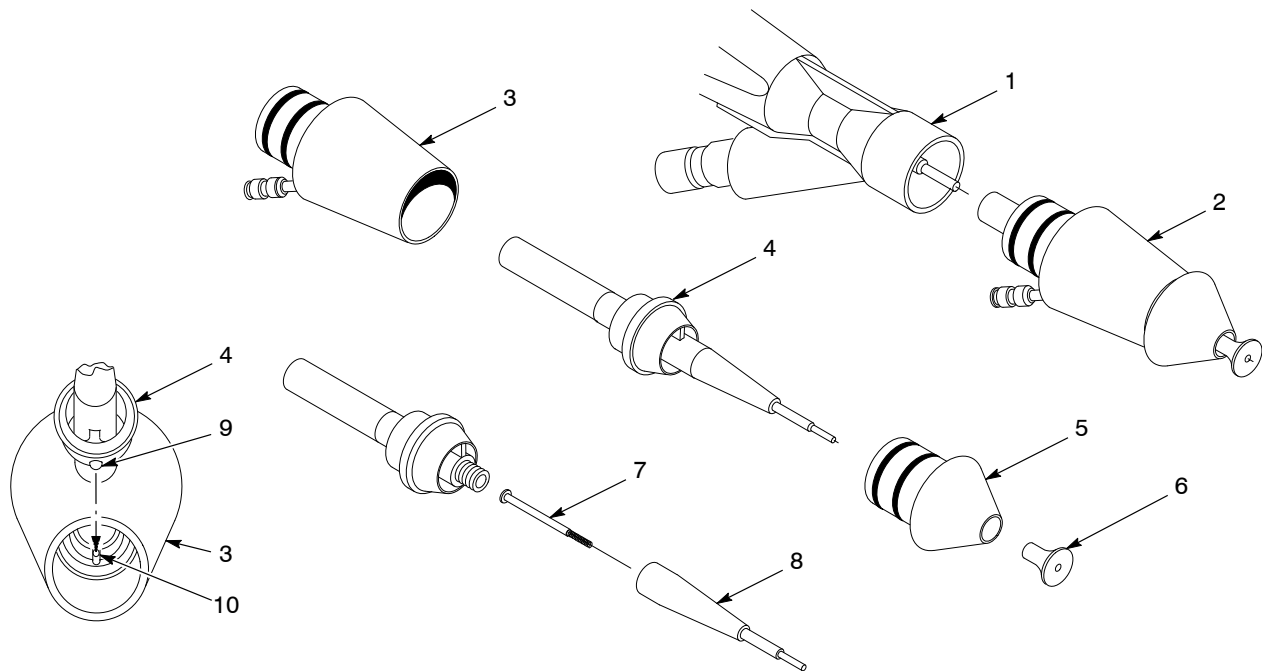
1. Perform steps 1 through 4 of the *Powder Path Repair* procedure.
2. Unscrew the old contact tip (1) from the resistor probe (2).
3. Apply dielectric grease to the threads of the new contact tip and in the end of the probe.
4. Screw the new contact tip into the resistor probe and tighten it securely. Wipe the excess dielectric grease off the contact tip and probe.
5. Install the wear sleeve over the resistor probe. Install the powder inlet body, nozzle, and hose adapter.

## Nozzle Extension Resistor Replacement

This procedure describes the replacement of the resistor and electrode housed in the nozzle extension. They are only used on spray guns with electrode cleaning air.

See Figure 6-4.

1. Remove the nozzle extension (2) from the powder inlet body (1).
2. Remove the deflector (6) and conical nozzle (5).
3. Push the wear sleeve/spider/resistor holder (4) assembly out of the nozzle adapter (3).
4. Unscrew the resistor holder (8) from the spider and remove the resistor (7).
5. Install the new resistor in the holder and screw the resistor holder onto the spider finger-tight.
6. Align the pin (9) on the spider with the slot (10) in the nozzle adapter. Press the wear sleeve/spider/resistor holder assembly into the nozzle adapter.
7. Finish reassembling the nozzle extension and install it onto the powder inlet body.



1400177B

Figure 6-4 Nozzle Extension Resistor Replacement

- |                                       |                   |                    |
|---------------------------------------|-------------------|--------------------|
| 1. Powder inlet body                  | 5. Conical nozzle | 8. Resistor holder |
| 2. Nozzle extension                   | 6. Deflector      | 9. Pin             |
| 3. Nozzle adapter                     | 7. Resistor       | 10. Slot           |
| 4. Wear sleeve/spider/resistor holder |                   |                    |

## Section 7

# Parts

## Introduction

To order parts, call the Nordson Customer Service Center or your local Nordson representative. Use this five-column parts list, and the accompanying illustration, to describe and locate parts correctly.

### *Using the Illustrated Parts List*

Numbers in the Item column correspond to numbers that identify parts in illustrations following each parts list. The code NS (not shown) indicates that a listed part is not illustrated. A dash (—) is used when the part number applies to all parts in the illustration.

The number in the Part column is the Nordson Corporation part number. A series of dashes in this column (- - - - -) means the part cannot be ordered separately.

The Description column gives the part name, as well as its dimensions and other characteristics when appropriate. Indentions show the relationships between assemblies, subassemblies, and parts.

- If you order the assembly, items 1 and 2 will be included.
- If you order item 1, item 2 will be included.
- If you order item 2, you will receive item 2 only.

The number in the Quantity column is the quantity required per unit, assembly, or subassembly. The code AR (As Required) is used if the part number is a bulk item ordered in quantities or if the quantity per assembly depends on the product version or model.

Letters in the Note column refer to notes at the end of each parts list. Notes contain important information about usage and ordering. Special attention should be given to notes.

Item	Part	Description	Quantity	Note
—	0000000	Assembly	1	
1	000000	• Subassembly	2	A
2	000000	• • Part	1	

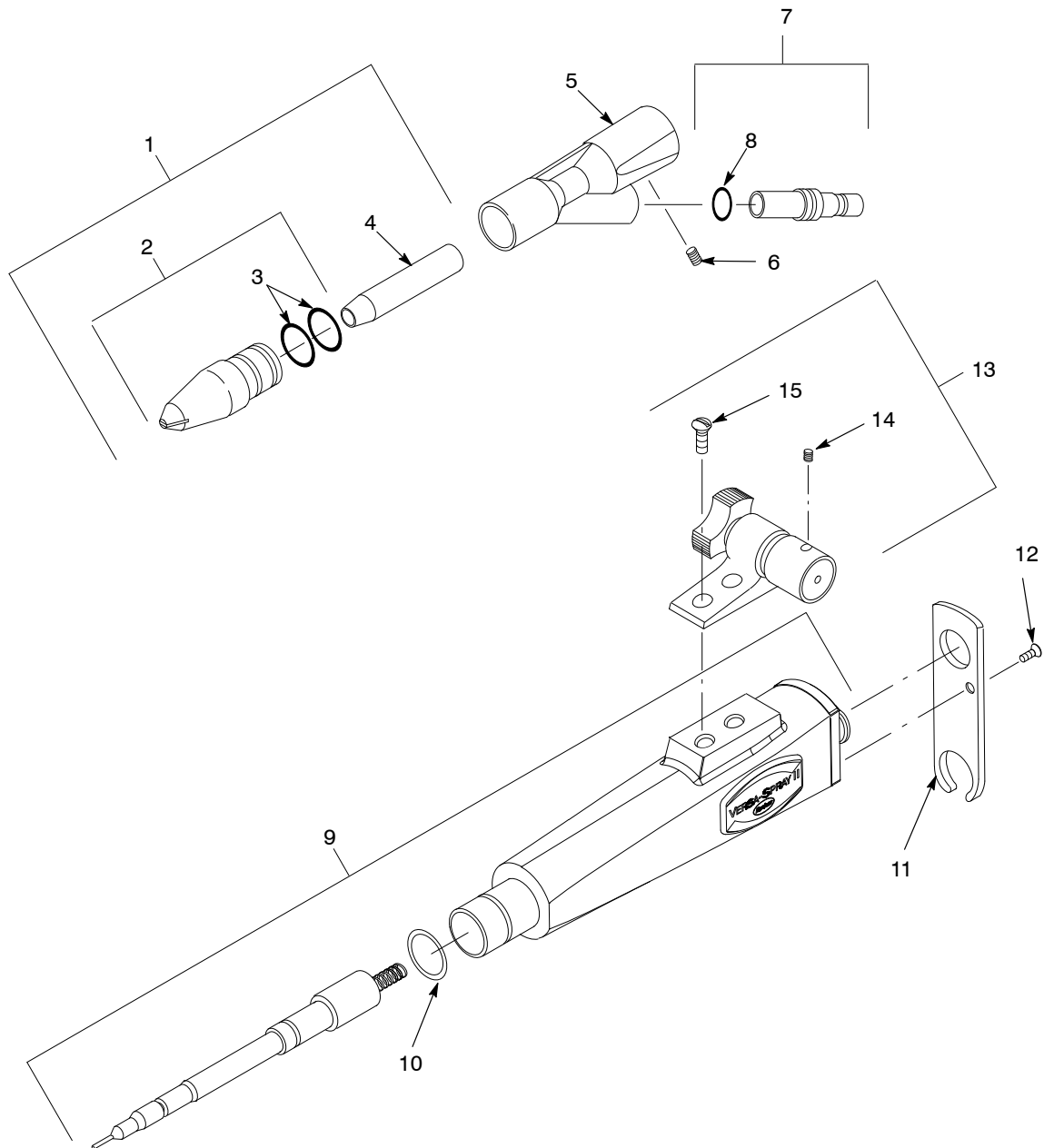
## Automatic Gun Assemblies

**NOTE:** Four Versa-Spray II automatic guns are currently available. If you need to order a gun air wash extension or diffuser kit, use the *Gun Air Upgrade Kits* lists on page 8-4.

### Automatic Guns with Shur-Lok Mount

See Figure 7-1.

Item	Part	Description	Quantity	Note
—	173155	GUN, automatic, Versa-Spray II, negative, with Shur-Lok mount and 4-mm flat-spray nozzle	1	
—	228657	GUN, automatic, Versa-Spray II, negative, with Shur-Lok mount and 2.5-mm flat-spray nozzle	1	
—	173156	GUN, automatic, Versa-Spray II, positive, with Shur-Lok mount and 4-mm flat-spray nozzle	1	
1	141044	• SERVICE KIT, 4-mm nozzle, flat spray	1	A, C
2	141045	• • 4-mm NOZZLE, flat spray, with O-rings, Tivar	1	
3	941181	• • • O-RING, silicone, 0.875 x 1.063 x 0.094 in.	2	
4	134385	• • SLEEVE, wear, flat spray, with O-ring	1	C
1	134380	• SERVICE KIT, 2.5-mm nozzle, flat spray	1	C
2	134384	• • 2.5-mm NOZZLE, flat spray, with O-rings, Tivar	1	
3	941181	• • • O-RING, silicone, 0.875 x 1.063 x 0.094 in.	2	
4	134385	• • SLEEVE, wear, flat spray, with O-ring	1	
5	125612	• BODY, inlet	1	
6	982455	• SCREW, set, M6 x 1.0 x 8 mm, nylon, black	1	
7	134386	• ADAPTER, hose, with O-ring	1	C
8	940163	• • O-RING, silicone, 0.625 x 0.75 x 0.063 in.	1	
9	146009	• SERVICE KIT, multiplier with resistor probe, negative	1	B
9	146008	• SERVICE KIT, multiplier with resistor probe, positive	1	B
10	940243	• • O-RING, silicone, 1.125 x 1.25 x 0.062 in.	1	
11	140562	• BRACKET, tube	1	
12	1068118	• SCREW, flat head, M3 x 6	1	
13	133409	• MOUNT, gun, with pivot	1	
14	982067	• • SCREW, set, cup, M5 x 5, black	2	
15	981708	• • SCREW, M8 x 1.25 x 20 mm, black	2	
<p><b>NOTE</b> A: Refer to the <i>Options</i> section for other nozzle service kits that are available.</p> <p>B: To make sure you order the correct multiplier, locate the gun part number on the gun's label and match it to one of the gun part numbers at the top of this chart.</p> <p>C: Part is not included in gun body kits 1609566 and 1609567.</p>				



1400421B

Figure 7-1 Versa-Spray II IPS Automatic Powder Spray Gun with Shur-Lok Mount Parts

## Automatic Gun with In-Line Ball Mount

See Figure 7-2.

Item	Part	Description	Quantity	Note
—	224875	GUN, automatic, Versa-Spray II, negative, with in-line ball mount and 4-mm flat-spray nozzle	1	
1	141044	• SERVICE KIT, 4-mm nozzle, flat spray	1	A, D
2	141045	• • 4-mm NOZZLE, flat spray, with O-rings, Tivar	1	
3	941181	• • • O-RING, silicone, 0.875 x 1.063 x 0.094 in.	2	
4	134385	• • SLEEVE, wear, flat spray, with O-ring	1	
5	125612	• BODY, inlet	1	
6	982455	• SCREW, set, M6 x 1.0 x 8 mm, nylon, black	1	
7	134386	• ADAPTER, hose, with O-ring	1	D
8	940163	• • O-RING, silicone, 0.625 x 0.750 x 0.063 in.	1	
9	146009	• SERVICE KIT, multiplier with resistor probe, negative	1	B
10	940243	• • O-RING, silicone, 1.125 x 1.250 x 0.062 in.	1	
11	140562	• BRACKET, tube	1	
12	1068118	• SCREW, flat head, M3 x 6	1	
13	183539	• KIT, Versa-Spray II in-line ball mount		
—	-----	• • MOUNT, Versa-Spray II, in-line ball	1	
14	183548	• • • PLATE, adapting, ball mount	1	
15	982595	• • • SCREW, set, cone, M6 x 8, stainless steel	1	
16	183549	• • • CAP, ball mount	1	
17	183818	• • • BALL, pivot, Versa-Spray II gun mount	1	
18	941176	• • • O-RING, silicone, 0.813 x 1.00 x 0.094 in.	1	
19	982067	• • • SCREW, set, cup, M5 x 5, black	2	
20	183546	• • • FLANGE, bar, ball mount	1	
21	183547	• • • ADJUSTER, hand, ball mount	1	
22	941143	• • • O-RING, silicone, 0.625 x 0.813 x 0.094 in.	1	
23	1068119	• • SCREW, flat head, M8 x 25	2	
NS	129592	KNOB, clamping, M6 x 12	1	C

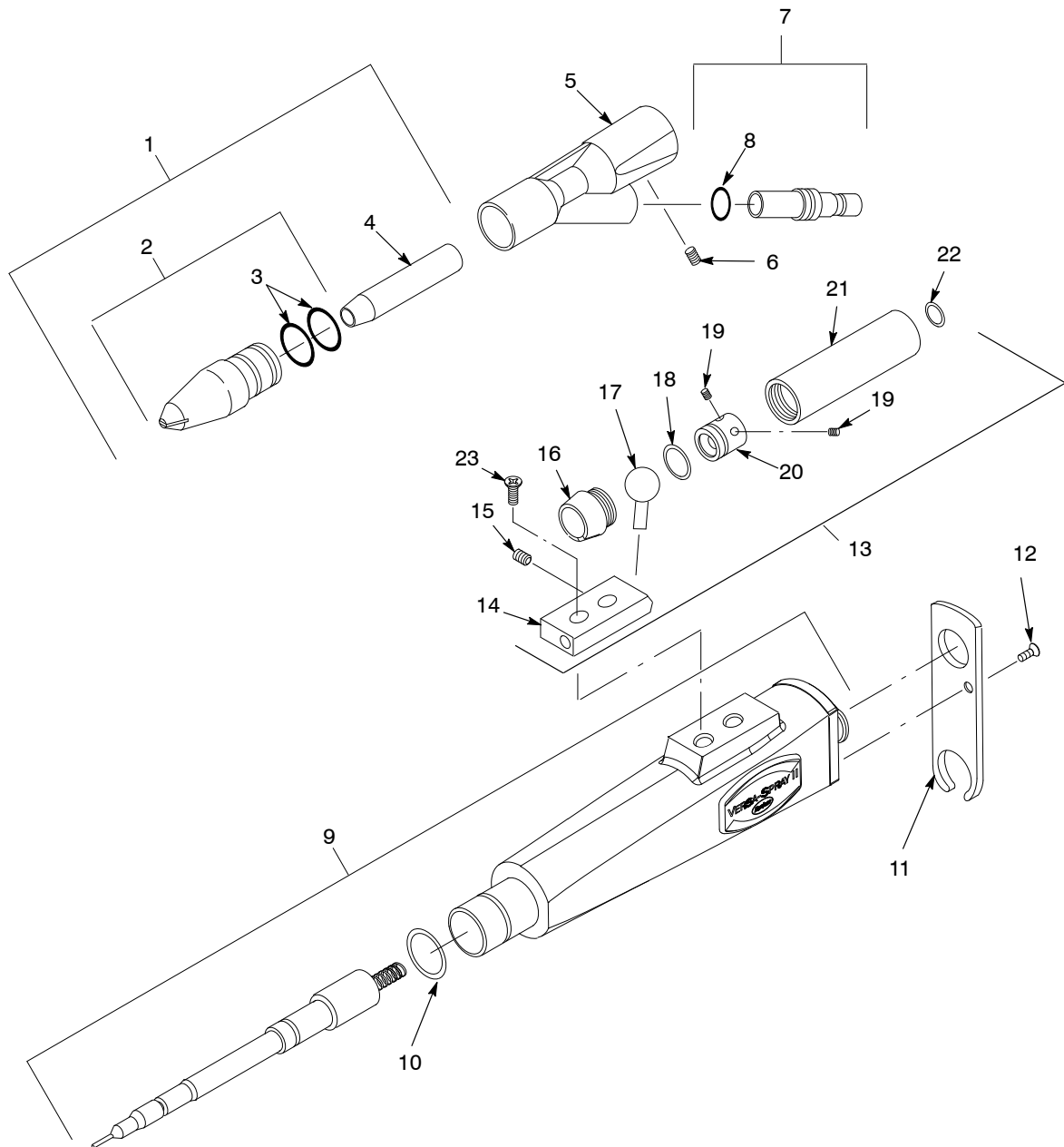
NOTE A: Refer to the *Options* section for other nozzle service kits that are available.

B: The standard multiplier polarity is negative. If you need a positive-polarity multiplier, order part number 146008.

C: Optional. Replaces item 15.

D: Part is not included in gun body kit 1609568.

NS: Not Shown



1401298A

Figure 7-2 Versa-Spray II IPS Automatic Powder Spray Gun with In-Line Ball Mount Parts

## Service Kits

### *Spray Gun Body Service Kit*

Part	Description	Note
1609566	KIT, repair, gun body, NEG, IPS, Shur-lok	A
1609567	KIT, repair, gun body, POS, IPS, Shur-lok	A
1609568	KIT, repair, gun body, NEG, IPS, ball mount	B
NOTE A: See <i>Automatic Guns with Shur-lok Mount</i> on page 7-2 for parts in kit. B: See <i>Automatic Guns with In-line Ball Mount</i> on page 7-4 for parts in kit.		

### *Service Kit Reference Chart – Versa-Spray II Automatic Spray Guns*

These service kits are used to replace parts on Versa-Spray II automatic spray guns. Refer to the *Options* section for service kits for optional components.

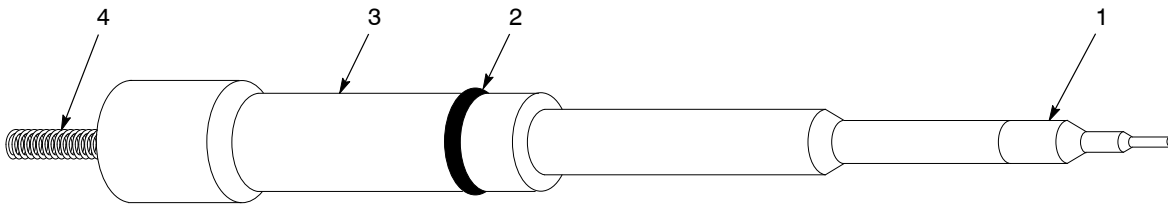
Part	Description	Note
142108	8-m (25-ft) CABLE, Versa-Spray, 100 kV	A
168448	12-m (38-ft) CABLE, Versa-Spray, 100 kV	A
142109	16-m (50-ft) CABLE, Versa-Spray, 100 kV	A
334783	ADAPTER, cable, Versa-Spray gun to Sure Coat or iControl console	
146008	SERVICE KIT, multiplier, with resistor probe, positive	B
146009	SERVICE KIT, multiplier, with resistor probe, negative	B
134376	SERVICE KIT, holder, resistor	
NOTE A: Cables are not included with the gun. Order according to length of cable desired. B: Check multiplier polarity before ordering. Gun polarity can be switched by changing multiplier. Multiplier kits include the multiplier, resistor holder, and resistor. If replacing just the resistor, order an entire resistor holder service kit, part 134376.		



## Resistor Holder Service Kit

See Figure 7-3.

Item	Part	Description	Quantity	Note
—	134376	SERVICE KIT, holder, resistor	1	
1	132748	• CONTACT, cable	1	
2	940117	• O-RING, silicone, 0.312 x 0.438 x 0.063 in.	1	
3	-----	• HOLDER, resistor	1	
4	-----	• RESISTOR	1	
NS	245733	• GREASE, dielectric, 3-cc applicator	1	
NS: Not Shown				



1400139A

Figure 7-3 Resistor Service Kit



# Section 8

## Options

### Options Reference Chart

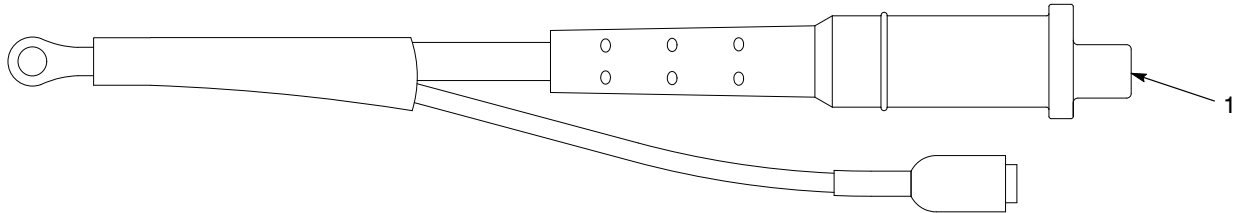
Part	Description	Refer to:
<b>Tivar Nozzles</b>		
134380	2.5-mm FLAT-SPRAY NOZZLE service kit, with O-rings, Tivar	NOTE A
139935	3-mm FLAT-SPRAY NOZZLE service kit, with O-rings, Tivar	NOTE A
141044	4-mm FLAT-SPRAY NOZZLE service kit, with O-rings, Tivar	NOTE A
139937	6-mm FLAT-SPRAY NOZZLE service kit, with O-rings, Tivar	NOTE A
<b>Glass-Filled PTFE Nozzles</b>		
174223	2.5-mm FLAT-SPRAY NOZZLE, with O-rings, glass-filled PTFE	NOTE A
174225	3-mm FLAT-SPRAY NOZZLE service kit, with O-rings, glass-filled PTFE	NOTE A
174227	4-mm FLAT-SPRAY NOZZLE service kit, with O-rings, glass-filled PTFE	NOTE A
174229	6-mm FLAT-SPRAY NOZZLE service kit, with O-rings, glass-filled PTFE	NOTE A
<b>Cross-Cut and Castle Nozzles</b>		
141013	60° CROSS-CUT NOZZLE service kit, Tivar	NOTE A
141014	90° CROSS-CUT NOZZLE service kit, Tivar	NOTE A
147495	CASTLE NOZZLE service kit, 0.375 in.	NOTE A
<b>Conical Nozzles</b>		
173139	SHORT NOZZLE, Versa-Spray II, with O-rings	NOTE A
145559	32-mm CONICAL NOZZLE service kit, with O-rings, Tivar	NOTE A
144760	45-mm CONICAL NOZZLE service kit, with O-rings, Tivar	NOTE A
-----	DEFLECTORS, Tivar, in different diameters, with O-rings	NOTE A
<b>Lance Extensions</b>		
233469	LANCE EXTENSION, 150 mm	NOTE B
233468	LANCE EXTENSION, 300 mm	NOTE B
233455	LANCE EXTENSION, 450 mm	NOTE B
<b>Miscellaneous Options</b>		
161411	PLUG, shorting, IPS	Page 8-2
133403	BAR, gun mounting	Page 8-2
-----	FEED HOSE	Page 8-2
-----	AIR TUBING	Page 8-2
157094	ADAPTER, purge, Versa-Spray	Page 8-3
-----	GUN AIR UPGRADE KITS—to add diffusers and nozzle extensions to guns	Page 8-4
<b>Mounting and Ion Collector Kits</b>		
183539	IN-LINE BALL MOUNT KIT, Versa-Spray II	Page 8-10
189495	IN-LINE BALL MOUNT AND ION COLLECTOR KIT, Versa-Spray II	Page 8-11
189491	ION COLLECTOR KIT, Shur-Lok	Page 8-12
189490	ION COLLECTOR KIT, ball mount	Page 8-13
NOTE A: Refer to the <i>Optional Nozzles for Versa-Spray and Versa-Spray II Guns</i> instruction sheet for application, installation, and parts information about the nozzles and deflectors available.		
B: Refer to the <i>150-, 300-, and 450-mm Lance Extensions</i> instruction sheet for installation and parts information for the optional lance extensions.		

## Miscellaneous Options

### Shorting Plug

See Figure 8-1.

Item	Part	Description	Quantity	Note
1	161411	PLUG, shorting, IPS	1	



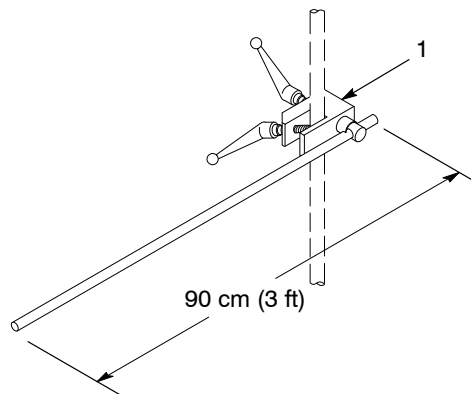
1400149A

Figure 8-1 Shorting Plug

### Gun Mounting Bar

See Figure 8-2.

Item	Part	Description	Quantity	Note
1	133403	BAR, gun, mounting	1	



1400427A

Figure 8-2 Gun Mounting Bar

### Powder Feed Hose and Air Tubing

These are bulk part numbers. Order in one-foot increments.

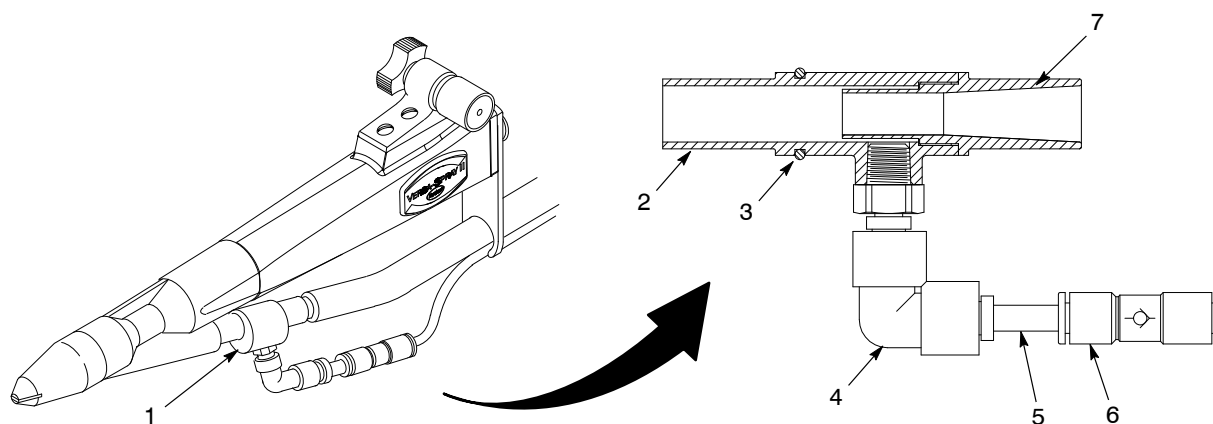
Part	Description	Note
900550	POWDER TUBING, Isoprene, 0.469 x 0.208 in.	
900549	POWDER TUBING, Isoprene, 0.348 x 0.208 in.	
900742	AIR TUBING, polyurethane, 6 mm	

## Purge Adapter

See Figure 8-3. The purge adapter is installed in the powder inlet body in place of the hose adapter. It is used to clean accumulated powder from the powder inlet body and nozzle. Air flow controls and 6-mm air tubing are not included. Refer to the instructions shipped with the purge adapter for installation and operation instructions.

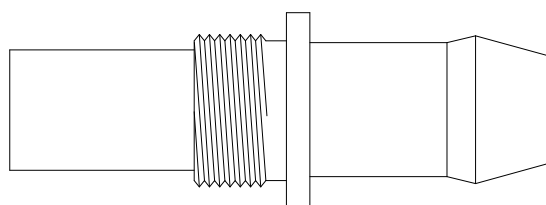
Item	Part	Description	Quantity	Note
1	157094	ADAPTER, purge, Versa-Spray	1	
2	155179	• ADAPTER, purge, outlet	1	
3	940163	• O-RING, silicone, 0.625 x 0.750 x 0.062 in.	1	
4	183456	• FITTING, swivel, elbow, 6-mm tubing x 1/8-in. BPST	1	
5	900586	• TUBING, polyurethane, 6-mm OD x 4-mm ID, blue	AR	
6	1021472	• VALVE, check, 6-mm tube x 6-mm tube	1	
7	155178	• ADAPTER, purge, inlet	1	
—	140907	ADAPTER, purge, inlet, 3/8-in. ID hose	1	A

NOTE A: See Figure 8-4. Optional hose adapter for use with 3/8-in. ID feed hose.  
AR: As Required



1400443B

Figure 8-3 Purge Adapter



1400446A

Figure 8-4 3/8-in. ID Hose Adapter for Purge Adapters

## Gun Air Upgrade Kits

Several upgrade kits are available to upgrade guns without air. Order kits based on the control unit used with the spray guns.

### Reference Chart

Part	Description	Refer to:
<b>Guns Used with Versa-Spray II Control Units</b>		
183536	KIT, Versa-Spray II diffuser and extension	Page 8-4
183538	KIT, Versa-Spray II diffuser with hardware	Page 8-5
183537	KIT, Versa-Spray II extension, automatic gun	Page 8-8
<b>Guns Used with Versa-Spray Control Units</b>		
169659	KIT, Versa-Spray II diffuser, IPS automatic gun	Page 8-6
169658	MANIFOLD, Versa-Spray II gun diffuser	Page 8-7
183537	KIT, Versa-Spray II extension, automatic gun	Page 8-8

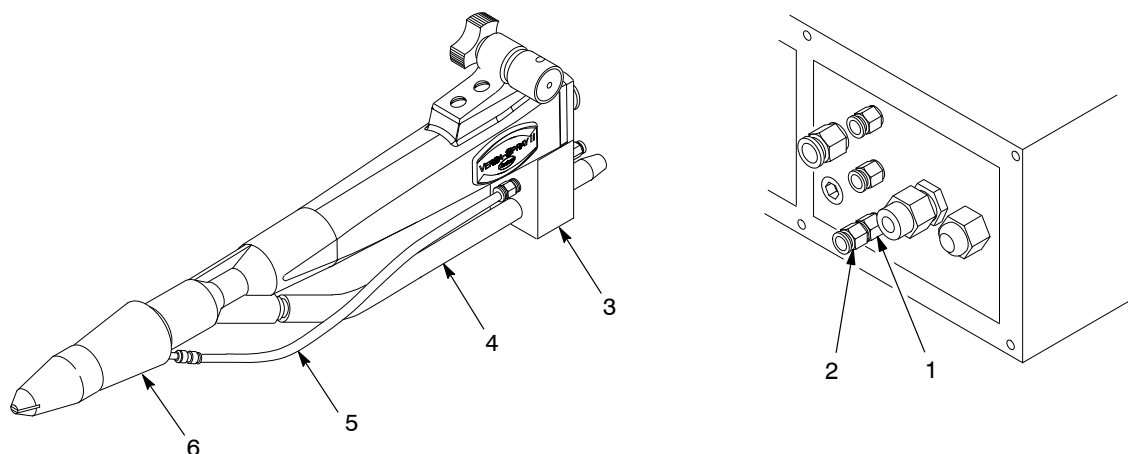
### Kits for Guns Used with Versa-Spray II Control Units

#### Diffuser and Extension Kit

See Figure 8-5. This kit adds both a diffuser and a nozzle extension to a Versa-Spray or Versa-Spray II gun without air used with a Versa-Spray II control unit. To install the components, follow the instructions included with the kit.

**NOTE:** To use this kit, you must order a length of 6-mm air tubing, as long as the gun cable, to deliver air from the control unit to the spray gun.

Item	Part	Description	Quantity	Note
—	183536	KIT, Versa-Spray II diffuser and extension	1	
1	972243	• ORIFICE, 0.026, 1/8-in. NPT x 1/8-in. NPT	1	
2	972141	• CONNECTOR, male, 6-mm tube x 1/8-in BSPT	1	
3	-----	• DIFFUSER, Versa-Spray II, extension	1	
4	900650	• TUBING, powder, 1/2-in. ID, blue	AR	A
5	900742	• TUBING, polyurethane, 6 mm, blue	AR	A
6	183334	• KIT, extension, nozzle, Versa-Spray II	1	B
<p>NOTE A: Bulk part number. Order in one-foot increments.</p> <p>B: Refer to <i>Nozzle Extension Parts and Service Kits</i> on page 8-9 for a breakdown of the parts included in this assembly.</p> <p>AR: As Required</p>				



1400428B

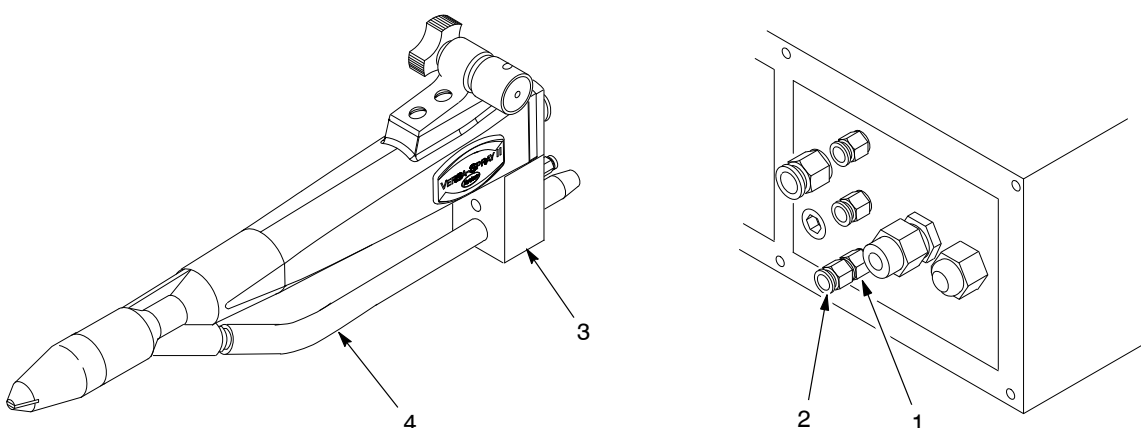
Figure 8-5 Diffuser and Extension Kit

### Diffuser Kit

See Figure 8-6. This kit adds a diffuser to a Versa-Spray or Versa-Spray II gun without air used with a Versa-Spray II control unit. To install the components, follow the instructions included with the kit.

**NOTE:** To use this kit, you must order a length of 6-mm air tubing, as long as the gun cable, to deliver air from the control unit to the spray gun.

Item	Part	Description	Quantity	Note
—	183538	KIT, Versa-Spray II diffuser with hardware	1	
1	972243	• ORIFICE, 0.026, 1/8-in. NPT x 1/8-in. NPT	1	
2	972141	• CONNECTOR, male, 6-mm tube x 1/8-in BSPT	1	
3	-----	• DIFFUSER, Versa-Spray II, plugged	1	
4	900650	• TUBING, powder, 1/2-in. ID	AR	A
NOTE A: Bulk part number. Order in one-foot increments.				
AR: As Required				



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Figure 8-6 Diffuser Kit

## Kits For Guns Used with Versa-Spray Control Units

Order one or all of the following kits to upgrade spray guns used with Versa-Spray control units.

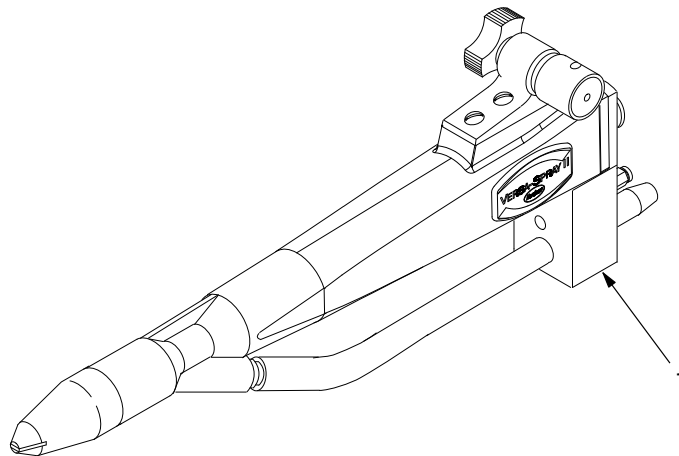
### Diffuser Kit

This kit adds a diffuser to a Versa-Spray or Versa-Spray II gun without air used with a Versa-Spray control unit. Use this kit with the manifold listed in *Gun Air Manifold*. To install the components, follow the instructions included with the kit.

**NOTE:** To use this kit, you must order a length of 6-mm air tubing, as long as the gun cable, to deliver air from the manifold to the spray gun. A piece of 260-mm (10.25-in.) long feed hose must be installed between the diffuser and the adapter in the powder inlet body.

See Figure 8-7.

Item	Part	Description	Quantity	Note
—	169659	KIT, Versa-Spray II diffuser, IPS automatic gun	1	
1	-----	• DIFFUSER, plugged, assembly	1	



1400432B

Figure 8-7 Diffuser Kit

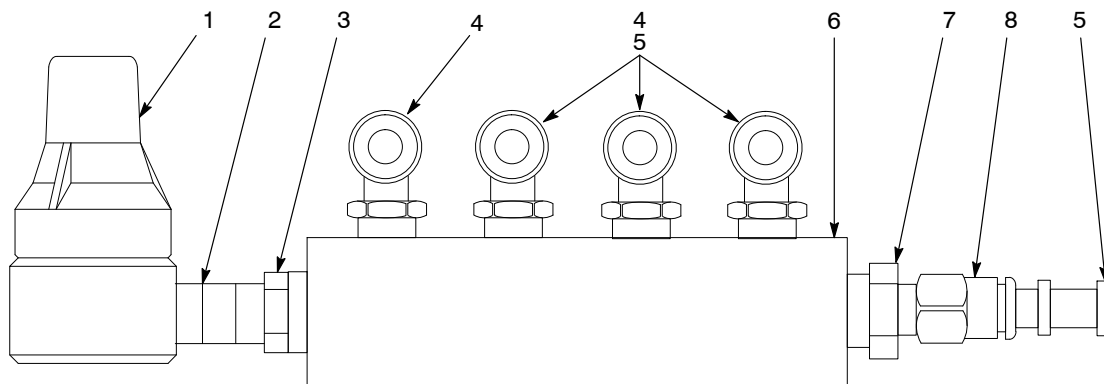


## Gun Air Manifold

To use Versa-Spray II automatic spray guns already equipped with diffusers and extensions with Versa-Spray control units, order the manifold listed below. Up to five automatic spray guns can be supplied with regulated air from the manifold.

See Figure 8-8.

Item	Part	Description	Quantity	Note
—	169658	MANIFOLD, Versa-Spray II gun diffuser	1	
1	249467	• REGULATOR, in-line air	1	
2	973117	• NIPPLE, steel, sched, 40, 1/4-in. NPT x 1.50 in.	1	
3	973370	• BUSHING, reduction, 3/8 in. x 1/4 in., steel, zinc	1	
4	972142	• ELBOW, male, 6-mm tube x 1/4-in. universal	4	
5	183804	• PLUG, 6-mm tube	4	
6	248105	• MANIFOLD, air	1	
7	973373	• BUSHING, pipe, hydraulic, 3/8 in. x 1/8 in., steel, zinc	1	
8	972141	• CONNECTOR, male, 6-mm tube x 1/8-in. universal	1	



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Figure 8-8 Gun Air Manifold

## Nozzle Extension Kit for Guns Used with Versa-Spray or Versa-Spray II Control Units

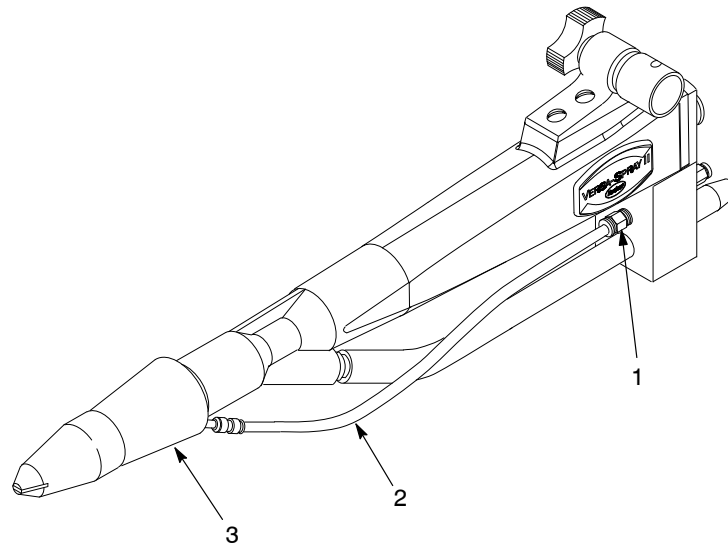
Order the following kit to upgrade a spray gun used with a Versa-Spray or Versa-Spray II control unit.

This kit adds a nozzle extension to a Versa-Spray or Versa-Spray II gun with a diffuser used with a Versa-Spray or Versa-Spray II control unit. To install the components, follow the instructions included with the kit.

See Figure 8-9.

Item	Part	Description	Quantity	Note
—	183537	KIT, Versa-Spray II extension, automatic gun	1	
1	972141	• CONNECTOR, male, 6-mm tube x 1/8-in BSPT	1	
2	900742	• TUBING, polyurethane, 6 mm, blue	AR	A
3	183334	• KIT, extension, nozzle	1	B

NOTE A: Bulk part number. Order in one-foot increments.  
 B: Refer to *Nozzle Extension Parts and Service Kits* on page 8-9 for a breakdown of the parts included in this assembly.  
 AR: As Required



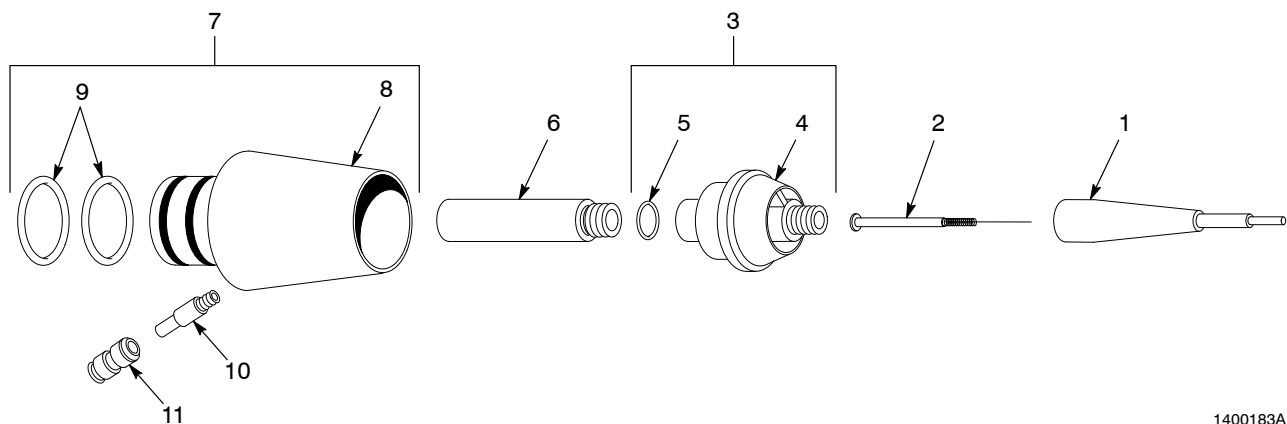
1400430B

Figure 8-9 Nozzle Extension Kit

## Nozzle Extension Parts and Service Kits

See Figure 8-10.

Item	Part	Description	Quantity	Note
—	183334	KIT, extension, nozzle, Versa-Spray II	1	
1	173182	• HOLDER, resistor, Versa-Spray II	1	
2	169656	• RESISTOR, nozzle extension, Versa-Spray II	1	
3	182255	• KIT, spider, with O-ring, Versa-Spray II	1	
4	-----	• • SPIDER, air inlet, Versa-Spray II	1	
5	940093	• • O-RING, silicone, 0.219 x 0.344 x 0.063 in.	1	
6	173179	• SLEEVE, wear, Versa-Spray II	1	
7	182254	• KIT, adapter, nozzle, Versa-Spray II, with O-ring	1	
8	-----	• • ADAPTER, nozzle, Versa-Spray II	1	
9	941181	• • O-RING, silicone, 0.875 x 1.063 x 0.094 in.	2	
10	173177	• FITTING, M6, straight	1	
11	971790	• UNION, straight, 6 mm, plastic	1	
—	183645	SERVICE KIT, resistor, with holder, Versa-Spray II	1	
1	173182	• HOLDER, resistor	1	
2	169656	• RESISTOR, nozzle extension, Versa-Spray II	1	
—	183646	SERVICE KIT, resistor, nozzle extension, Versa-Spray II	1	
2	169656	• RESISTOR, nozzle extension, Versa-Spray II	1	



1400183A

Figure 8-10 Nozzle Extension Parts and Service Kits

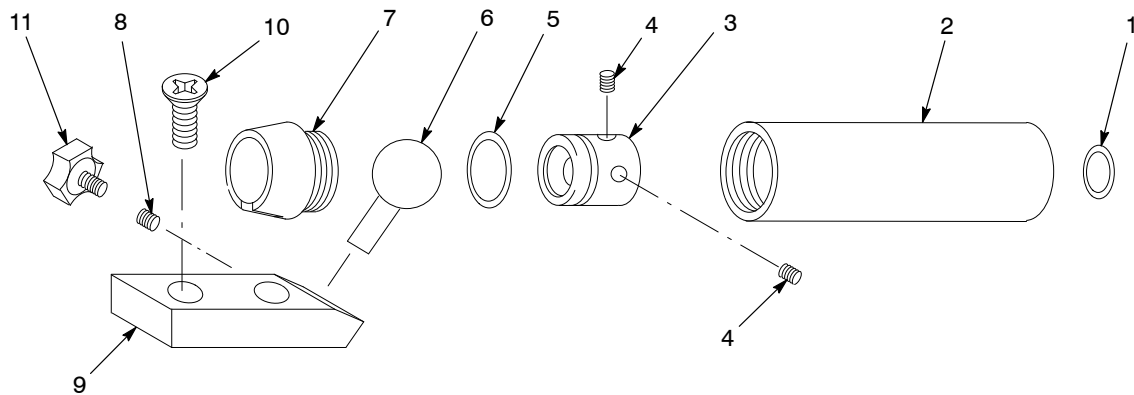
## In-Line Ball Mount Kit

This kit can be used with a Versa-Spray or Versa-Spray II automatic spray gun. Installation instructions are included with each kit.

See Figure 8-11.

Item	Part	Description	Quantity	Note
—	183539	KIT, Versa-Spray II in-line ball mount	1	
—	-----	• MOUNT, Versa-Spray II, in-line ball	1	
1	941143	• • O-RING, silicone, 0.625 x 0.813 x 0.094 in.	1	
2	183547	• • ADJUSTER, hand, ball mount	1	
3	183546	• • FLANGE, bar, ball mount	1	
4	982067	• • SCREW, set, cup, M5 x 5, black	2	
5	941176	• • O-RING, silicone, 0.813 x 1.00 x 0.094 in.	1	
6	183818	• • BALL, pivot, Versa-Spray II gun mount	1	
7	183549	• • CAP, ball mount	1	
8	982595	• • SCREW, set, cone, M6 x 8, stainless steel	1	
9	183548	• • PLATE, adapting, ball mount	1	
10	1068119	• SCREW, flat head, M8 x 25	2	
11	129592	KNOB, clamping, M6 x 12	1	A

NOTE A: Optional, replaces item 8.



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Figure 8-11 In-Line Ball Mount Kit

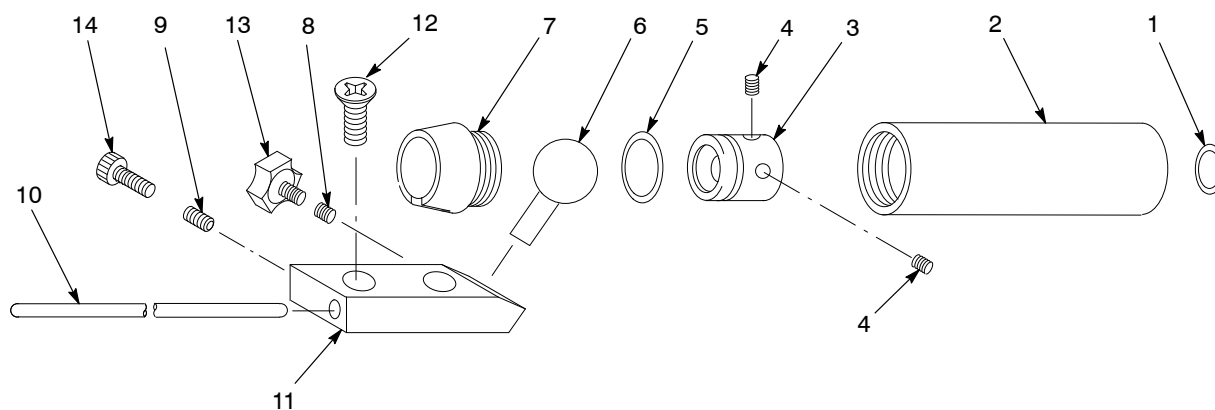
## In-Line Ball Mount and Ion Collector Kit

This kit can be used with a Versa-Spray or Versa-Spray II automatic spray gun. Installation and adjustment instructions are included with each kit.

See Figure 8-12.

Item	Part	Description	Quantity	Note
—	189495	KIT, ball mount and ion collector	1	
—	-----	• MOUNT, Versa-Spray II, in-line ball, ion collector	1	
1	941143	• • O-RING, silicone, 0.625 x 0.813 x 0.094 in.	1	
2	183547	• • ADJUSTER, hand, ball mount	1	
3	183546	• • FLANGE, bar, ball mount	1	
4	982067	• • SCREW, set, cup, M5 x 5, black	2	
5	941176	• • O-RING, silicone, 0.813 x 1.00 x 0.094 in.	1	
6	183818	• • BALL, pivot, Versa-Spray II gun mount	1	
7	183549	• • CAP, ball mount	1	
8	982595	• • SCREW, set, cone, M6 x 8, stainless steel	1	
9	982394	• • SCREW, set, dog, M6 x 16, black	1	
10	189482	• • ROD, ion collector, 11 in.	1	
11	189486	• • PLATE, ball mount, ion collector	1	
12	1068119	• SCREW, flat head, M8 x 25	2	
13	129592	KNOB, clamping, M6 x 12	1	A
14	982030	SCREW, socket, M6 x 20, black	1	B

NOTE A: Optional, replaces item 8.  
B: Optional, replaces item 9.



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Figure 8-12 In-Line Ball Mount and Ion Collector Kit

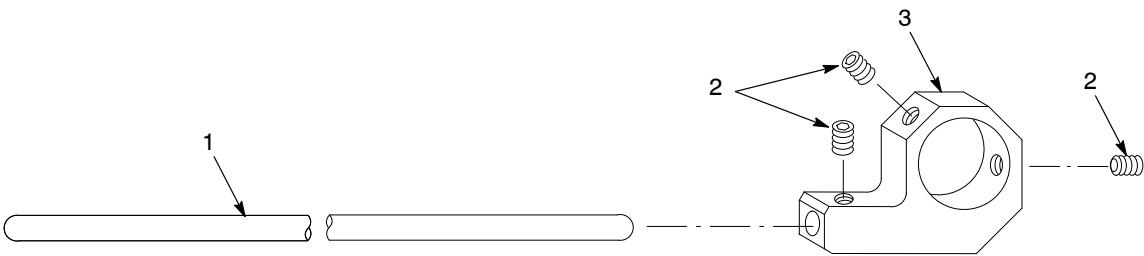
# Ion Collector Retrofit Kits

Installation and adjustment instructions are included with each kit.

## Shur-Lok Mount Ion Collector Kit

See Figure 8-13.

Item	Part	Description	Quantity	Note
—	189491	KIT, Shur-Lok, ion collector	1	
1	189482	• ROD, ion collector, 11 in.	1	
2	982067	• SCREW, set, cup, M5 x 5, black	3	
3	189488	• BRACKET, Shur-Lok, ion collector	1	
NS	982628	SCREW, socket, M5 x 10, stainless steel	3	A
NOTE A: Optional, replaces item 2.				
NS: Not Shown				



1400435A

Figure 8-13 Shur-Lok Mount Ion Collector Kit

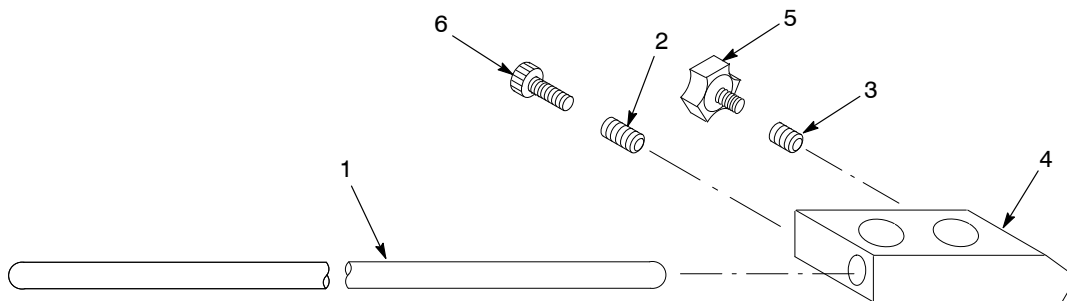
## In-Line Ball Mount Ion Collector Kit

This kit is used on spray guns already equipped with in-line ball mounts. Installation and adjustment instructions are included with each kit.

See Figure 8-14.

Item	Part	Description	Quantity	Note
—	189490	KIT, ball mount, ion collector	1	
1	189482	• ROD, ion collector, 11 in.	1	
2	982394	• SCREW, set, dog, M6 x 16, black	1	
3	982595	• SCREW, set, cone, M6 x 8 mm, stainless steel	1	
4	189486	• PLATE, ball mount, ion collector	1	
5	129592	KNOB, clamping, M6 x 12	1	A
6	982030	SCREW, socket, M6 x 20, black	1	B

NOTE A: Optional, replaces item 3.  
B: Optional, replaces item 2.



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Figure 8-14 In-Line Ball Mount Ion Collector Kit


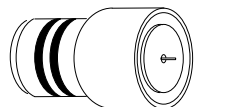




# Optional Nozzles for Versa-Spray<sup>®</sup> and Versa-Spray<sup>®</sup> II Guns

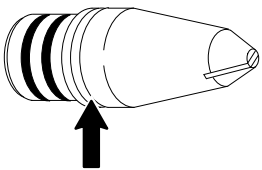
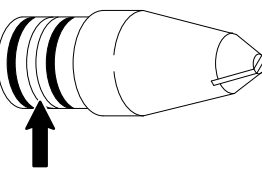
## Description

A wide variety of nozzles are available for Versa-Spray and Versa-Spray II powder spray guns. Manual and automatic guns are shipped with different types of nozzles. All nozzles listed in this instruction sheet can be used on any manual or automatic Versa-Spray or Versa-Spray II gun.

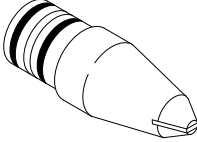
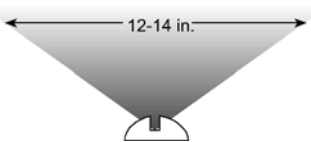
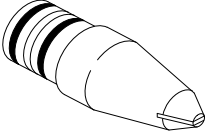
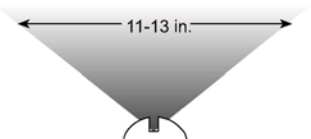
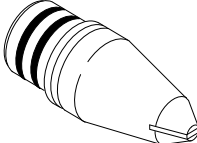
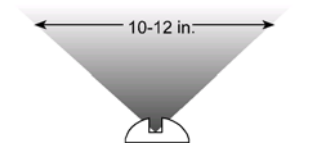
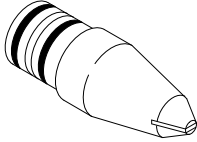
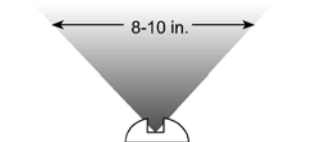
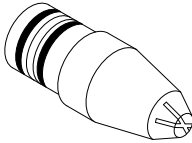
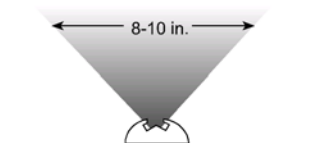
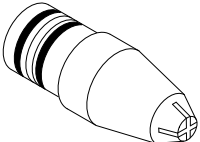
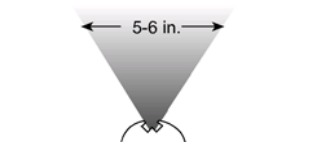
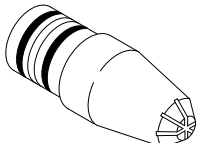
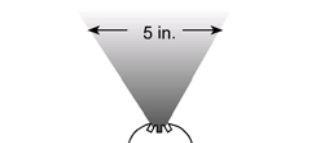
Nozzle Type		Shipped With
Flat-Spray		automatic guns
Conical		manual guns

## Flat-Spray Nozzle Selection


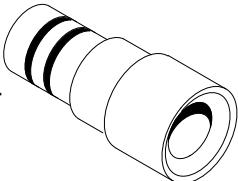
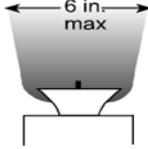

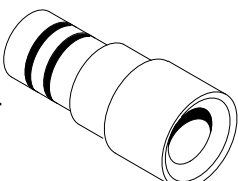
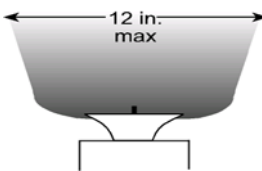

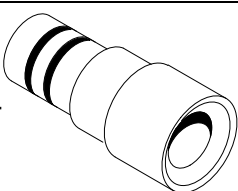
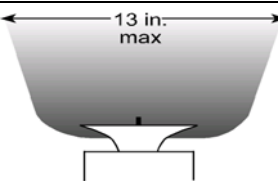

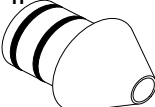
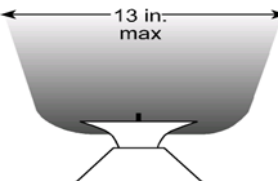

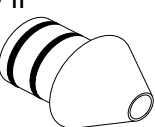
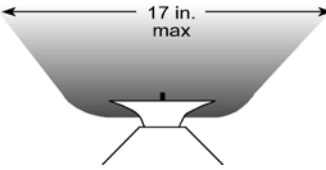

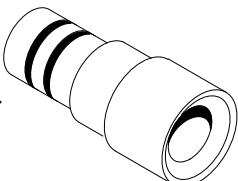
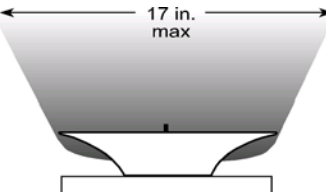
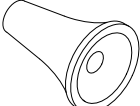
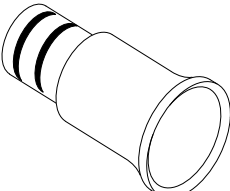
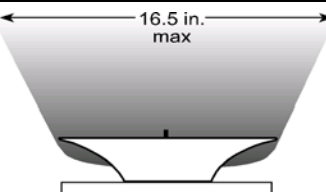
An identification groove appears in one of two locations on all flat-spray nozzles:

Identification Groove Location	Meaning
	New-style, 4-mm nozzle. This nozzle is shipped with automatic guns and provides better pattern dispersion and atomization than most other flat-spray nozzles.
	Old-style, optional nozzles. These optional flat-spray nozzles produce different spray patterns and film builds.

### Flat-Spray Nozzle Selection (contd)

Nozzle	Spray Pattern	Powder Velocity	Application
2.5-mm Flat Spray 		High	Large, flat surfaces
3-mm Flat Spray 		Medium-high	Fine finish on flat surfaces
4-mm Flat Spray 		Medium-low	Touch up
6-mm Flat Spray 		Low	Reinforcement
60° Cross-Cut 		Medium-low	Recess reinforcement
90° Cross-Cut 		Low	Deep recesses
Castle 		Medium-low	Pin point

**Conical Nozzle and Deflector Selection**

Deflector Size	Used with This Nozzle	Spray Pattern	Powder Velocity	Application
14 mm 	32 mm with pattern adjuster 		High	Manual touch-up
16 mm 	32 mm with pattern adjuster 		Medium-high	General finishing
19 mm 	32 mm with pattern adjuster 		Medium	Large surfaces
19 mm 	Short Versa-Spray II 		Medium	Large surfaces
26 mm 	Short Versa-Spray II 		Medium-low	Parts with gaps and recesses
26 mm 	32 mm with pattern adjuster 		Medium-low	Parts with gaps and recesses
38 mm 	45 mm 		Low	Large surfaces

# Nozzle Installation



**WARNING:** Turn off the electrostatic voltage and ground the gun electrode before performing the following tasks. Failure to observe this warning could result in a severe shock.

**NOTE:** Before removing nozzles, disconnect the powder feed hose from the pump. Blow out the feed hose, powder inlet body, nozzle extension (if used), and nozzle with low-pressure compressed air. Use a clean, dry cloth to wipe off the remaining powder after removing the nozzle parts.

**NOTE:** Versa-Spray II guns with air do not use a nozzle wear sleeve. Disregard steps 2 and 3 if you have a Versa-Spray II gun with an electrode-cleaning air extension (10).

1. See Figure 1. Pull the existing nozzle (1) straight off the gun.
2. Pull the wear sleeve (2) straight off the resistor probe (4).
3. Slide the appropriate wear sleeve (6) over the resistor probe. Be careful not to damage the electrode (5).
4. Push the conical nozzle (7) into the end of the powder inlet body (3) or air extension (10).
5. Slide the pattern adjuster (8) (if used) over the nozzle.
6. Push the deflector (9) onto the end of the resistor probe. Be careful not to damage the electrode.

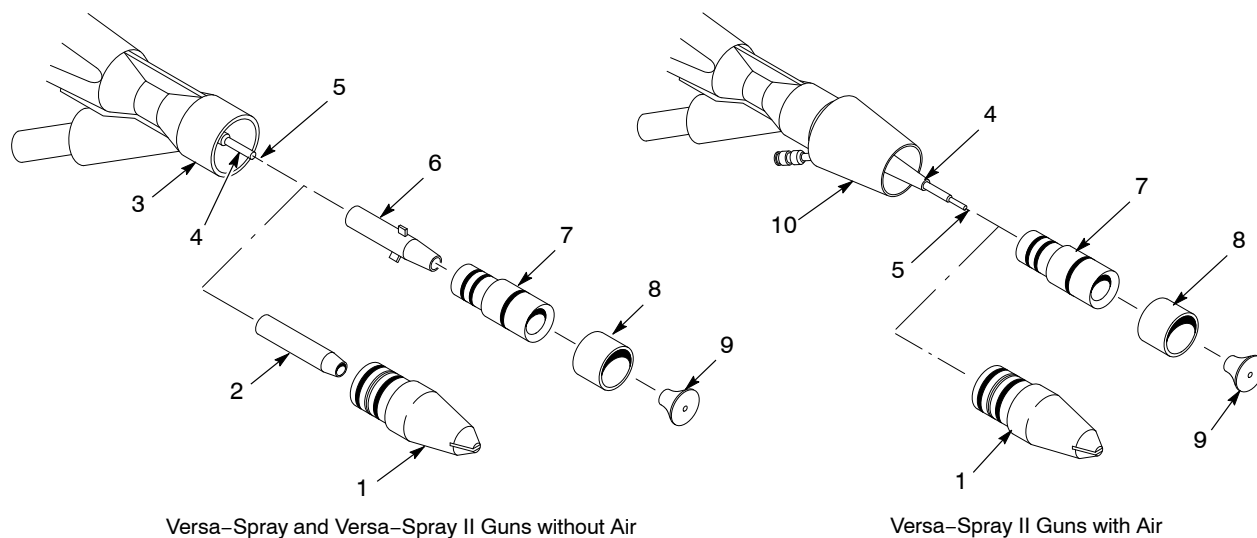


Figure 1 Nozzle Installation

- |                                    |                                 |                     |
|------------------------------------|---------------------------------|---------------------|
| 1. Flat-spray nozzle               | 5. Electrode                    | 8. Pattern adjuster |
| 2. Wear sleeve (flat-spray nozzle) | 6. Wear sleeve (conical nozzle) | 9. Deflector        |
| 3. Powder inlet body               | 7. Conical nozzle               | 10. Air extension   |
| 4. Resistor probe                  |                                 |                     |

# Parts

## Flat-Spray Nozzles

Item	Slot Type	Kit P/N	Nozzle Material		Kit Includes These Items:	
			Tivar	Glass-Filled PTFE (GFT)	Two O-rings (6) 941181	Wear Sleeve (7) 134385 with O-ring (8) 940084
1	4 mm	141044	X		X	X
		141045	X		X	
		174227		X	X	
2	2.5 mm	134380	X		X	X
		134384	X		X	
		174223		X	X	
2	3 mm	139935	X		X	X
		139902	X		X	
		174225		X	X	
2	6 mm	139937	X		X	X
		139903	X		X	
		174229		X	X	
3	60° Cross-Cut	141013	X		X	X
		141017	X		X	
4	90° Cross-Cut	141014	X		X	X
		141015	X		X	
5	Castle	147495	X		X	X
		147877	X		X	

**NOTE:** These nozzle kits can be used on any Versa-Spray or Versa-Spray II manual or automatic gun. If you have a Versa-Spray II gun with an electrode-cleaning air extension, you do not need to order a nozzle kit that includes a wear sleeve (7) with O-ring (8).

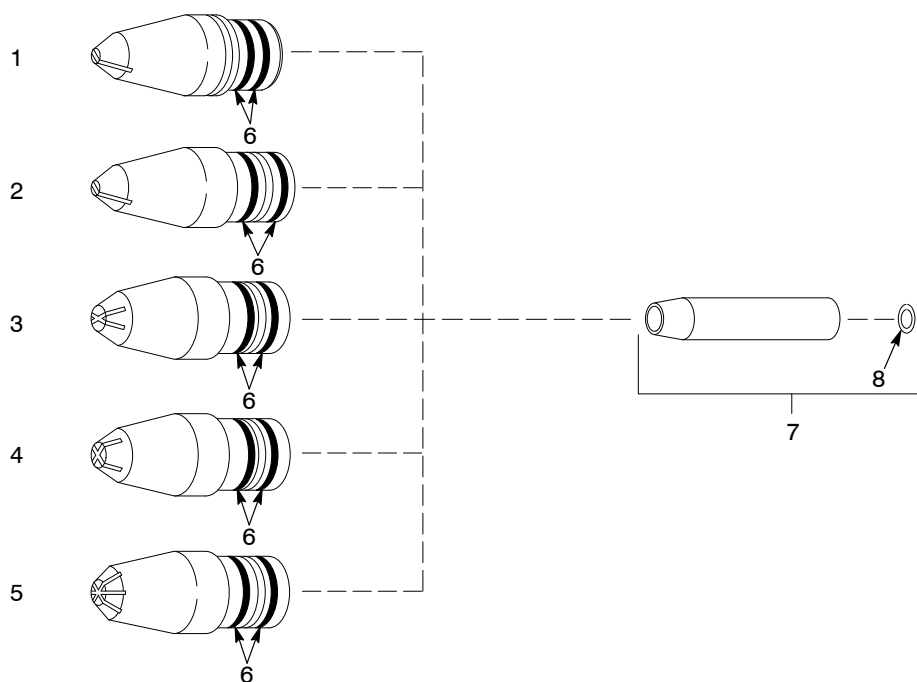


Figure 2 Flat-Spray Nozzle Parts

## Conical Nozzles and Deflectors

### 32-mm Conical Nozzle and Deflectors

See Figure 3.

Item	Part	Description	Quantity	Note
—	145559	SERVICE KIT, nozzle, 32 mm	1	
1	133734	• 26-mm DEFLECTOR, with O-ring, Tivar	1	
2	940084	• • O-RING, silicone, 0.188 x 0.312 x 0.063 in.	1	
3	144759	• ADJUSTER, pattern, 32 mm	1	
4	145558	• NOZZLE, 32-mm dia, with O-rings, Tivar	1	
5	941205	• • O-RING, silicone, 1.000 x 1.188 x 0.094 in.	1	
6	941181	• • O-RING, silicone, 0.875 x 1.063 x 0.094 in.	2	
7	132348	• SLEEVE, wear, conical, Tivar	1	
<b>Optional Deflectors</b>				
1	135865	14-mm DEFLECTOR, Tivar, with O-ring	1	
1	147880	16-mm DEFLECTOR, Tivar, with O-ring	1	
1	133714	19-mm DEFLECTOR, Tivar, with O-ring	1	
2	940084	• O-RING, silicone, 0.188 x 0.312 x 0.063 in.	1	A
NOTE A: This O-ring is included with all deflectors.				

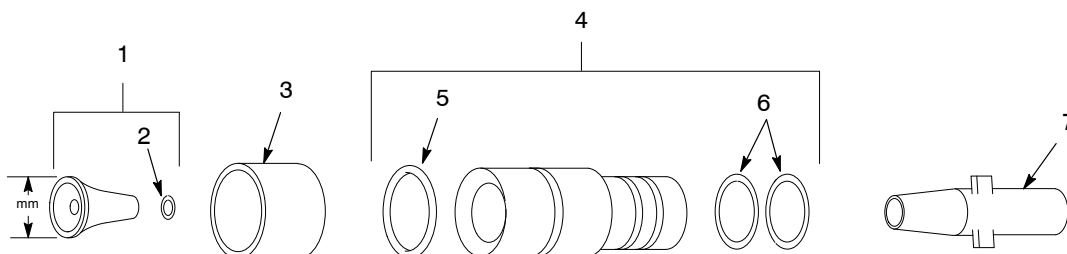


Figure 3 32-mm Conical Nozzle and Deflectors

### 45-mm Conical Nozzle and Deflector

See Figure 4.

Item	Part	Description	Quantity	Note
—	144760	SERVICE KIT, nozzle, 45 mm	1	
1	249233	• 38-mm DEFLECTOR, with O-ring, Tivar	1	
2	940084	• • O-RING, silicone, 0.188 x 0.312 x 0.063 in.	1	
3	144789	• NOZZLE, 45-mm dia, with O-rings	1	
4	941181	• • O-RING, silicone, 0.875 x 1.063 x 0.094 in.	2	
5	132348	• SLEEVE, wear, conical, Tivar	1	

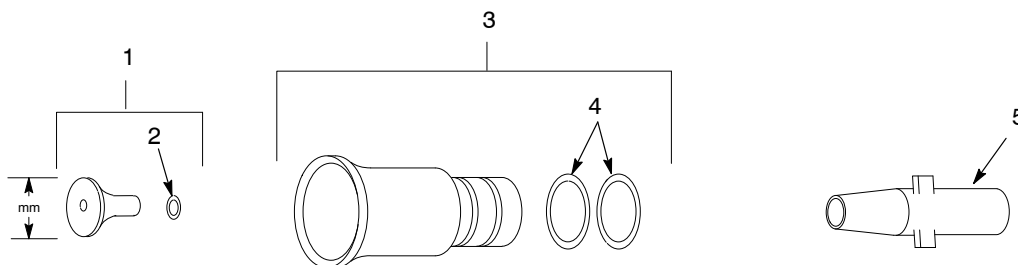


Figure 4 45-mm Conical Nozzle and Deflector

### Short Conical Nozzle and Deflectors

See Figure 5.

Item	Part	Description	Quantity	Note
1	173138	19-mm DEFLECTOR, Versa-Spray II, with O-ring	1	
1	173141	26-mm DEFLECTOR, Versa-Spray II, with O-ring, Tivar	1	
2	940084	• O-RING, silicone, 0.188 x 0.312 x 0.094 in.	1	A
3	173139	NOZZLE, short, Versa-Spray II, with O-rings	1	
4	941181	• O-RING, silicone, 0.875 x 1.063 x 0.094 in.	2	
5	132348	SLEEVE, wear, conical	1	B

NOTE A: This O-ring is included with all deflectors.

B: Use only on guns without air.

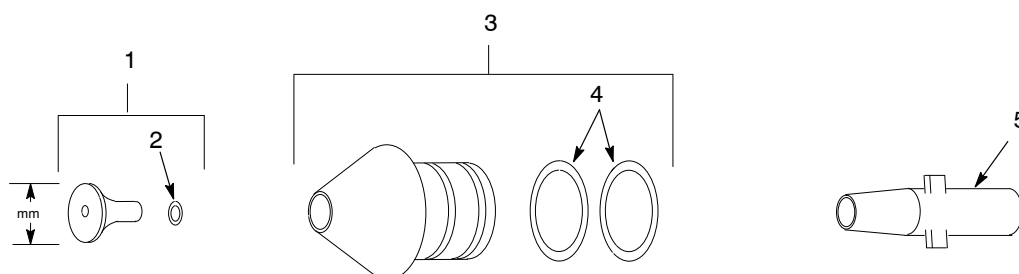


Figure 5 Short Conical Nozzle and Deflectors

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