Versa-Spray® IPS Automatic Electrostatic Porcelain Enamel Powder Spray Gun

Customer Product Manual
Part 106584-03
Issued 05/16

For parts and technical support, call the Industrial Coating Systems Customer Support Center at (800) 433-9319 or contact your local Nordson representative.

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Contact Us

Nordson Corporation welcomes requests for information, comments, and inquiries about its products. General information about Nordson can be found on the Internet using the following address: http://www.nordson.com.

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Amherst, OH 44001

Change Record

Revision	Date	Change
03	05/16	Remove approval labels. Add kit information in parts list.

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.

All work conducted inside the spray booth or within 1 m (3 ft) of booth openings is considered within a Class 2, Division 1 or 2 Hazardous location and must comply with 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	 **WARNING:** The following procedures MUST 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.  1. NO SMOKING. Keep open flames, hot surfaces, and sparks from torches or grinding away from booth. 2. Turn the electrostatic power unit off when the spray gun is not in use. 3. Shut down immediately in event of fire. 4. Maintain ground circuit on all conductive objects below 1 meg ohm to prevent sparking. (ANSI/NFPA 33, Chapter 9, or local codes) 5. Shut down operation and correct grounds if sparking occurs. 6. Install fixed fire suppression system in accordance with ANSI/NFPA 33, Chapter 7 (or local codes), before operating with combustible powder. 7. Install automatic flame detectors in accordance with ANSI/NFPA 33, Chapter 7 (or local codes), before operating automatic guns. 8. Examine all equipment at the beginning of each work period and repair or replace any damaged, loose, or missing parts. 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.  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). 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.  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. 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. 14. Guns, feeders, booths, etc., may be cleaned with clean dry air at 1.7 bar (25 psig). 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.

Section 2
Description

Introduction

The Nordson Versa-Spray Integral Power Supply (IPS) automatic electrostatic PE (porcelain enamel, or frit) powder spray gun electrostatically charges and sprays porcelain enamel coatings.

The gun is used with a Nordson Versa-Spray IPS control unit, which supplies low-voltage dc power to the voltage multiplier in the gun. The multiplier generates the high electrostatic voltage needed for powder coating. The electrostatic voltage is adjusted at the control unit by the operator. This voltage generates an electrical field (corona) around the gun electrode. As the powder particles are sprayed through this field they pick up an electrical charge and are attracted to the grounded parts in front of the gun. The current at the electrode is limited to safe levels by a resistor installed between the multiplier and the electrode.

The spray pattern is controlled by the electrostatic field, the shape of the nozzle used, and air velocity. Powder is supplied to the gun by a powder pump. The pump uses compressed air to draw the powder from a feed hopper, atomize it, and force it through the feed hose to the gun.

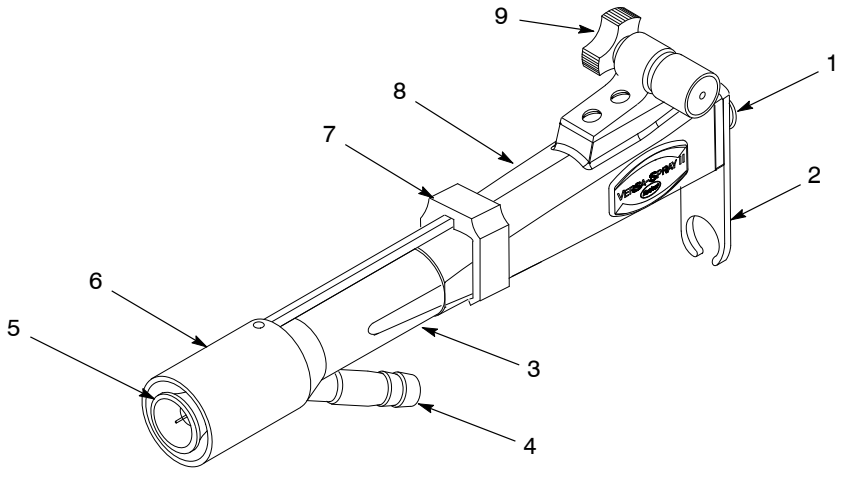

Figure 2-1 Versa-Spray IPS Automatic Porcelain Enamel Powder Spray Gun

1. Gun cable connection
2. Feed hose bracket
3. Powder inlet body
4. Feed hose adapter
5. Deflector
6. Pattern sleeve
7. Pattern sleeve adjuster
8. Multiplier
9. Gun mount

Options

Options include

- gun cables in 8-, 12-, or 16-m (25-, 38- or 50-ft) lengths
- flat-spray nozzle
- gun mounting bar
- feed hose
- barrel deflector for the conical nozzle
- shorting plug for testing multiplier/resistor assembly

Refer to the *Parts* section for part numbers and illustrations. Contact your local Nordson Corporation representative if you need additional information about these options.

Specifications

Maximum rated output voltage at the electrode:	100,000 volts ±10%
Maximum rated output current at the electrode:	0.150 mA ±10%

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

Porcelain enamel powders normally are not flammable. Refer to the powder's Material Safety Data Sheet.

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

Use the optional gun mounting bar listed in the *Parts* section to mount the gun on a fixed gun stand or oscillating or reciprocating gun mover arm.

1. See Figure 3-1. Install the mounting bar clamp (1) on a 25.4-mm (1-in.) diameter bar (2). Tighten handle B to clamp the mounting bar securely in place.

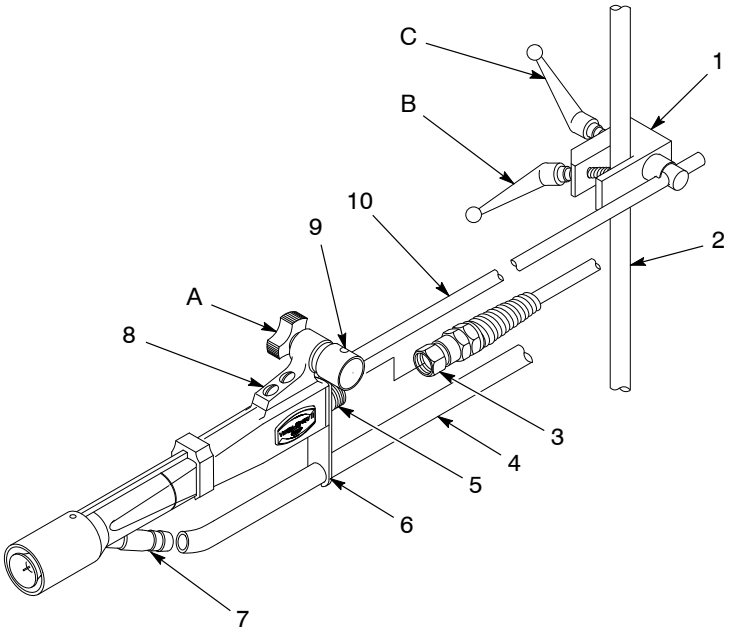

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Figure 3-1 Gun Installation

1. Mounting bar clamp
2. 25.4-mm (1-in.) bar
3. Gun cable
4. 12.7-mm ($^1/_2$-in. ID) feed hose
5. Multiplier receptacle
6. Feed hose bracket
7. Hose adapter
8. Gun mount
9. Set screws
10. Mounting bar

Gun Mounting *(contd)*

2. Loosen the set screws (9) in the gun mount (8) with a hex key and insert the end of the bar (10) in the mount. Tighten the set screws securely.
3. Use knob A to adjust the angle of the gun. Use handle B to adjust the position of the mounting bar clamp (1) vertically (or horizontally). Use handle C to adjust the angle and length of the mounting bar (10).

Feed Hose, Air Tubing, and Cable Connections

1. See Figure 3-2. Plug the 3-socket end of the gun cable (8) into the gun's multiplier receptacle. Plug the 6-pin end of the gun cable into the GUN OUTPUT receptacle on the rear panel of the IPS control unit (9). Tighten the cable retaining nuts at each end of the cable.

NOTE: Keep the powder feed hose as short as possible. The hose should not be more than 12-m (39-ft) long if using $^{1}/_{2}$-in. ID hose, or 8-m (26-ft) long if using $^{5}/_{8}$-in. ID hose. Longer lengths may cause uneven powder flow.

2. Connect the feed hose (1) from the powder pump (2) outlet to the hose adapter on the underside of the powder inlet body. Pinch the hose and snap it into the hose bracket at the back of the gun. Secure the hose at both ends with snap clamps.
3. Wrap spiral-cut tubing around the feed hose at the pump outlet and where necessary to prevent the hose from kinking and blocking the flow of powder.
4. Establish a path for the feed hose and gun cable. Make sure the hose and cable cannot be abraded, cut, or run over by heavy equipment.
5. Connect supply air tubing (5) from the air supply to the control unit; flow rate air tubing (6) and atomizing air tubing (7) from the control unit to the powder pump; and fluidizing air tubing (3) from the control unit to the feed hopper. Refer to the control unit, powder pump, and hopper manuals for more detailed instructions.

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 ground.

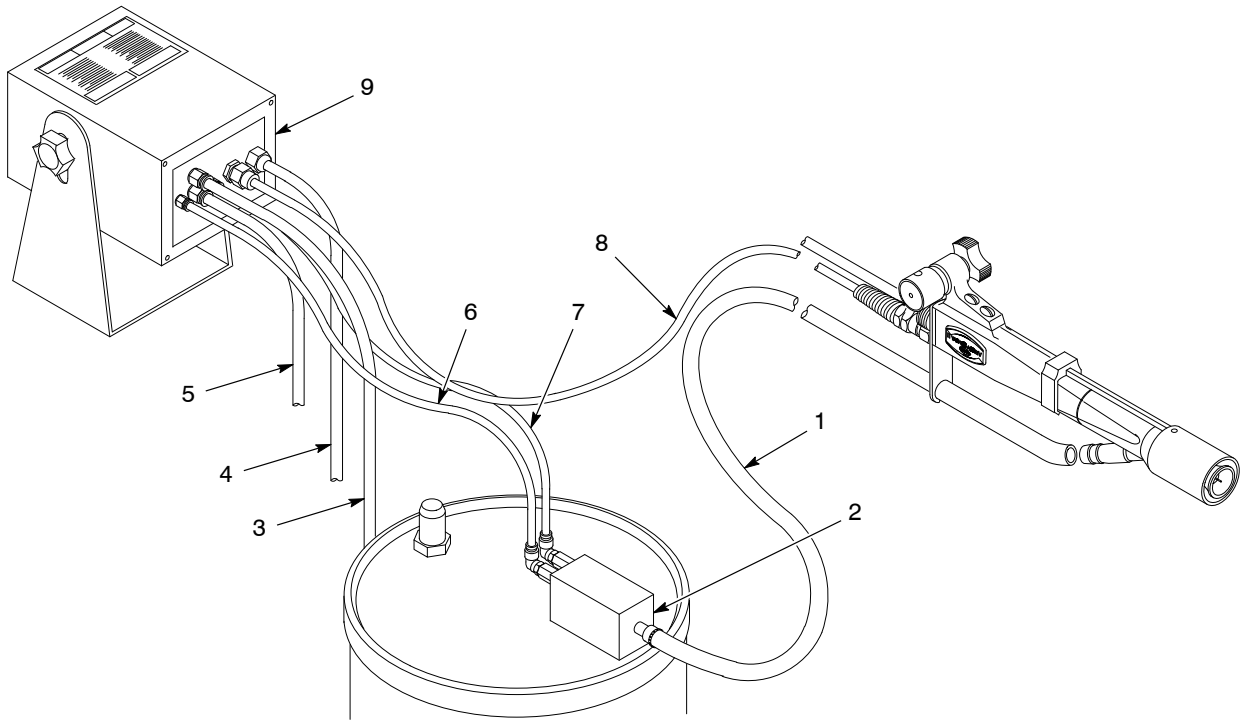

Figure 3-2 Feed Hose, Air Tubing, and Cable Connections

1. Feed hose
2. Powder pump
3. Fluidizing air tubing
4. Control unit power
5. Supply air tubing
6. Flow rate air tubing
7. Atomizing air tubing
8. Gun cable
9. IPS control unit

Air Quality

Powder spray systems require clean, dry operating air. Contaminated air can cause the powder to clog in the pump venturi throat, feed hose, or gun passages. Moist air can also cause grounding or arcing.

Use 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 4
Operation

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

Startup

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

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.

Air pressure and the kV level adjustments (steps 4 and 5) are normally required only the first time you use a new gun and control unit or when you change powders or parts.

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. If the IPS control unit is controlled by a master control unit, turn on the master control unit power switch. Turn on the IPS control unit power switch.
2. Adjust powder pump air pressures with the regulators and gauges on the IPS control unit front panel.

Flow Rate	1.4 bar (20 psi)	Controls the volume of the powder-and-air mixture delivered to the gun
Atomizing	2.1 bar (30 psi)	Controls the velocity and density (powder-to-air ratio) of the mixture
NOTE: The pressures given are average starting points. The air pressures needed to obtain the desired results will vary according to the required film build, line speed, and part configuration.		

Startup *(contd)*

3. Spray powder and observe the spray pattern. Adjust the flow rate and atomizing air pressures to obtain the desired pattern.
4. Turn on the high-voltage switch on the control unit and adjust the kV output to the maximum setting.

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

5. Coat a few parts and adjust the air pressures and kV output to obtain the desired film build and coverage.

NOTE: If the IPS control unit is controlled by a master control unit, 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. Electrostatic voltage, flow rate air, and atomizing air will be turned on and off when the master control unit is turned on and off.

Shutdown

1. If the IPS control unit is controlled by a master control unit, turn off the master control unit power switch. If it is not, turn off the IPS control unit power switch.
2. Perform the daily maintenance procedure.

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

Maintenance

The following maintenance procedures are for the gun only. Add these procedures to your routine maintenance schedule. Maintenance procedures for other components of your system are in their manuals.

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 Cleaning

See Figure 4-1. Clean and inspect the powder path, which consists of the pattern sleeve, deflector, nozzle, powder inlet body, wear sleeve, and hose adapter.

1. Disconnect the powder feed hose from the powder pump outlet. Blow out the feed hose with compressed air.
2. Slide the pattern sleeve (1) towards the back of the gun. Unclip the pattern adjuster (4) from the multiplier and remove the end from the pattern sleeve.

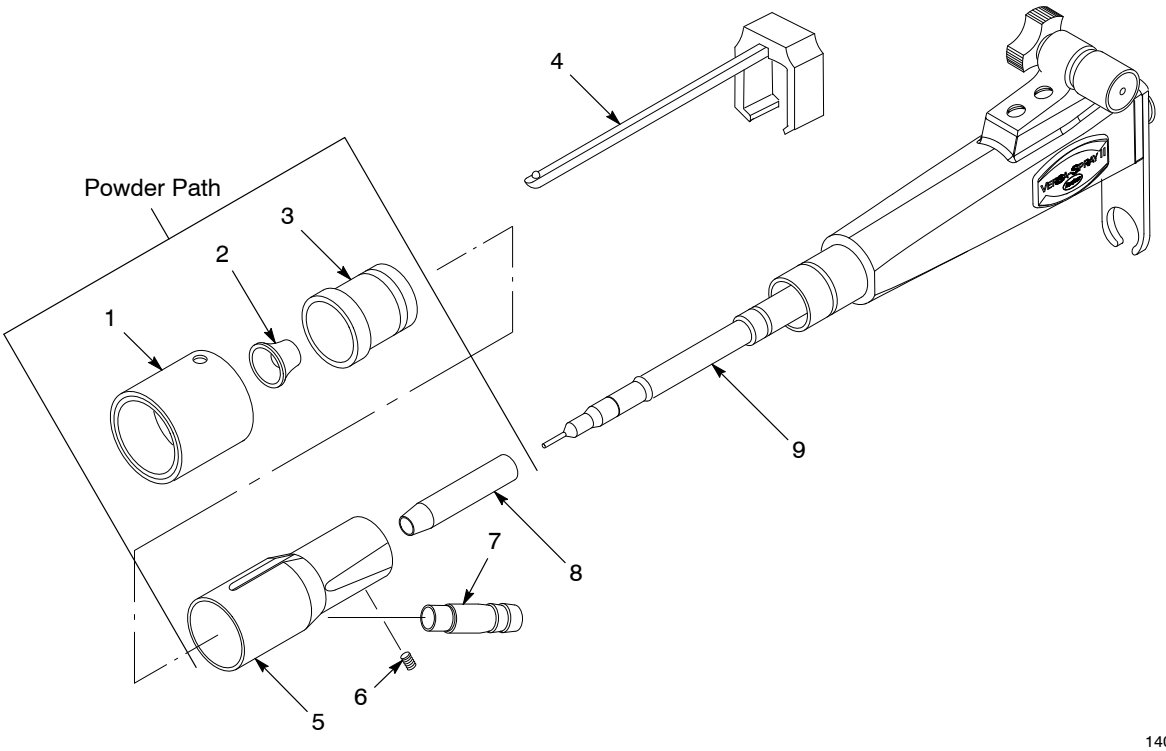

Figure 4-1 Disassembling the Powder Path

1. Pattern sleeve
2. Deflector
3. Nozzle
4. Pattern adjuster
5. Powder inlet body
6. Set screw
7. Hose adapter
8. Wear sleeve
9. Resistor probe

3. Slide the pattern sleeve off the powder inlet body (5).
4. Pull the deflector (2) off the resistor probe (9) and pull the nozzle (3) out of the powder inlet body.
5. Disconnect the feed hose from the gun. Remove the hose adapter (7) from the powder inlet body.
6. Loosen the set screw (6) in the underside of the powder inlet body. Pull the powder inlet body off the gun.
7. Slide the wear sleeve (8) off the resistor probe.
8. Blow powder off the powder path parts, the resistor probe, and the multiplier with an OSHA-approved, low-pressure blow gun. Wipe the parts with a clean cloth.
9. Carefully remove any 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.

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 gun in alcohol. Do not use any other solvents.

10. Inspect the powder path parts for wear. Replace worn parts.

Weekly

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

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.

Perform continuity and resistance checks if you are having problems with the electrostatic components of the gun. Use the procedures at the end of this section to perform these checks.

- multiplier/resistor assembly continuity and resistance
- resistor continuity and resistance
- gun cable continuity

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.

Problem	Possible Cause	Corrective Action
1. Uneven pattern, unsteady or inadequate powder flow	Blockage in gun, feed hose, or pump	Remove the feed hose from the pump outlet. Blow out the hose and gun with compressed air. If necessary, disassemble and clean the gun and pump.
	Deflector or nozzle worn, or impact-fusion affecting pattern	Remove the deflector and/or nozzle. Clean and inspect them. Replace the worn parts. If the parts are wearing excessively or if impact-fusion is a problem, reduce the air pressures.
	Damp powder	Check the air filters and dryer, and then check the powder in the feed hopper. 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.
2. Voids in powder pattern	Worn nozzle or deflector	Remove the nozzle and deflector. Inspect and replace them if necessary.
	Plugged powder path	Disassemble the powder path and clean all of the parts.
3. Loss of wrap, poor transfer efficiency	Electrostatic voltage insufficient	Increase the electrostatic voltage.
	Dirty or broken electrode	Clean or replace the electrode (contact tip).
	Resistor, multiplier, or IPS control unit failure	Check the multiplier/resistor probe assembly with a shorting plug. If the reading obtained is out of the correct range, check the resistor separately.
	Poorly grounded parts, hangers, or conveyor	Check the conveyor chain, rollers, and part hangers for powder buildup. Clean them and check for 1 MΩ or less resistance between the parts and ground. For best results, resistance should be no more than 500 Ω.
4. No kV output from gun	Damaged gun cable	Check the continuity of the gun cable wires from pin to pin.
	Malfunctioning voltage multiplier	Check the resistance of the multiplier.
	Failed gun resistor	Check the resistance of the resistor.
	Malfunctioning IPS control unit	Repair or replace the control unit.

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 Resistance Check

1. Disassemble and clean the powder path as described in the *Daily Maintenance* procedure in this manual.
2. 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 Corporation representative for more information.

3. The megohmmeter should read between 208 and 312 MΩ at 500 volts. If the reading is out of this range, check the resistor separately (refer to *Resistor Resistance Check*). If the resistor reading is within the range specified, replace the multiplier.
4. See Figure 5-4. Check for continuity between the bottom pin (5 Vdc feedback) in the multiplier receptacle and the heatsink.

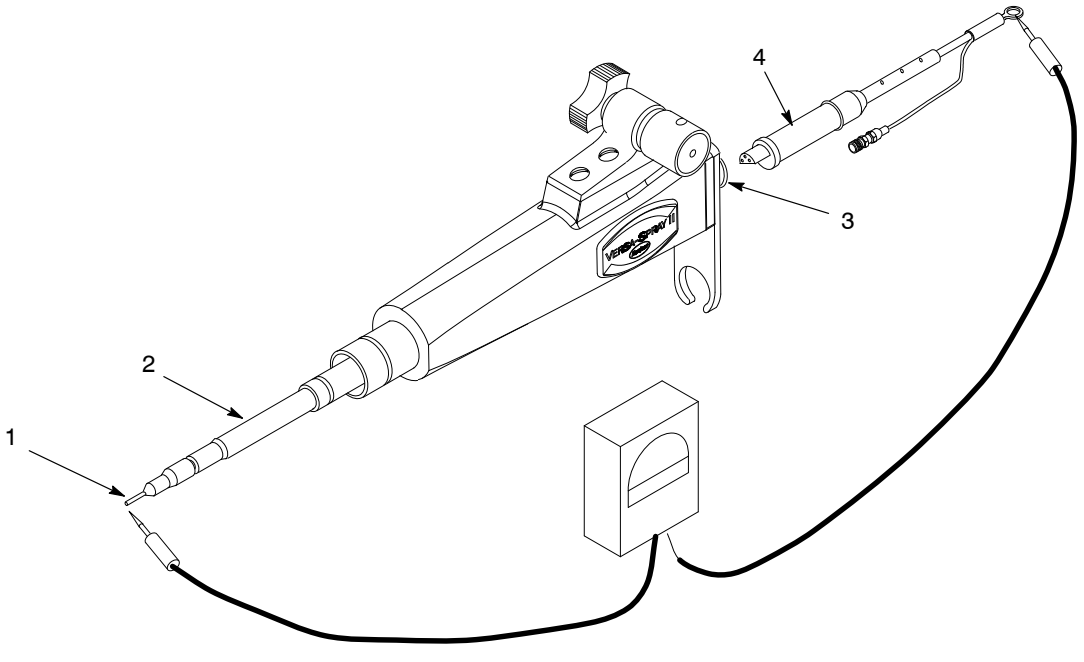

Figure 5-2 Multiplier/Resistor Assembly Resistance Check

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

Resistor Resistance Check

1. Perform the *Multiplier/Resistor Assembly Resistance Check.*
2. See Figure 5-3. Unscrew the resistor probe (2) from the multiplier (4).
3. Check the resistor with a megohmmeter. The megohmmeter should read between 153 and 187 MΩ at 500 volts. If the reading is out of this range, replace the resistor probe.

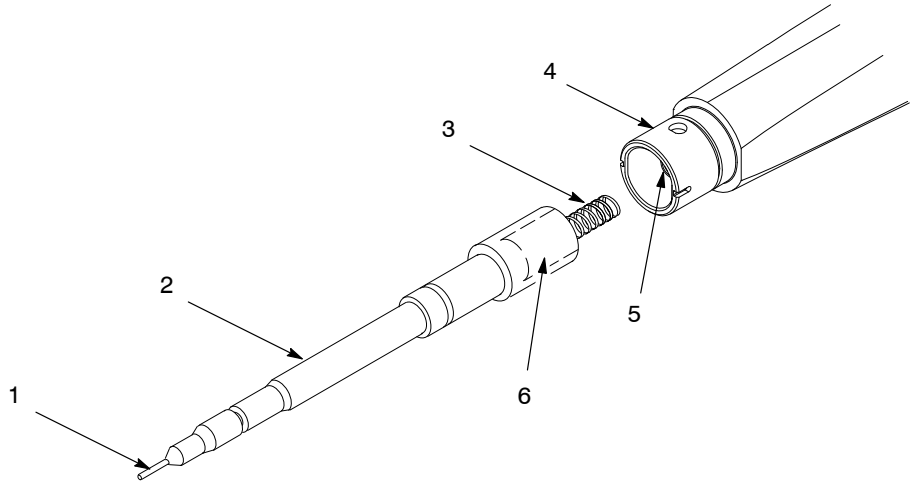

Figure 5-3 Resistor Resistance Check

1. Electrode
2. Resistor probe
3. Resistor spring
4. Multiplier
5. Multiplier well

Gun Cable Continuity Check

Gun cable and multiplier pins, and their functions, are shown in Figure 5-4 . 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.

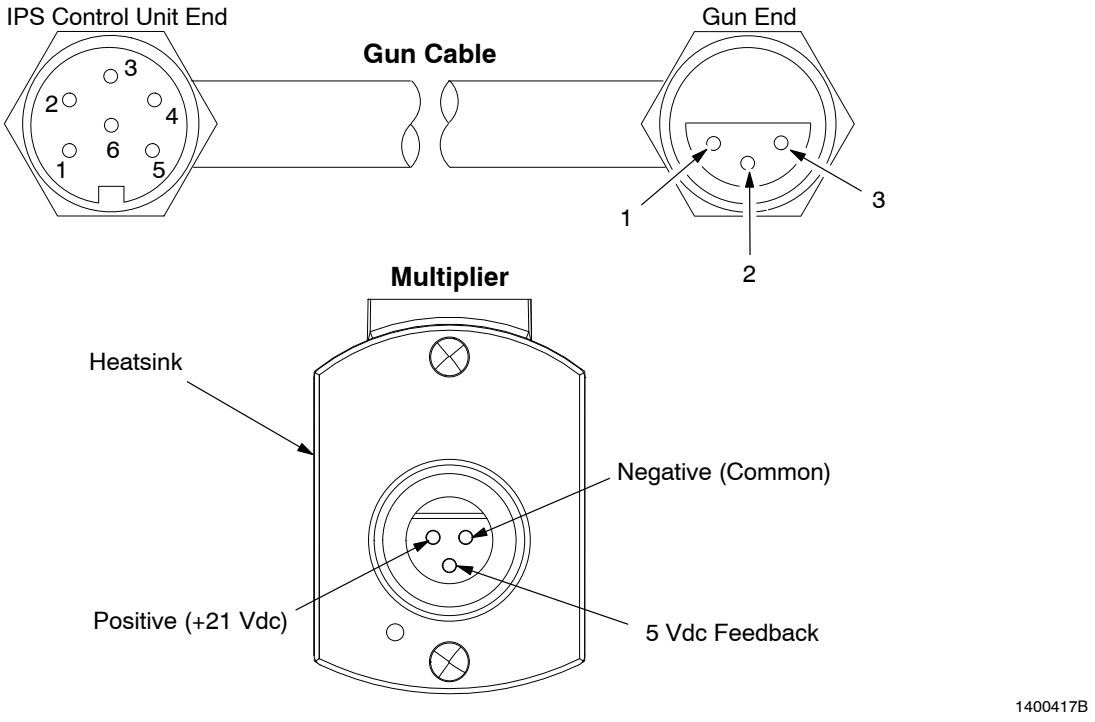

Figure 5-4 Gun Cable and Multiplier Pins

Table 5-1 Gun 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 Gun 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.

Contact Tip Replacement

See Figure 6-1.

1. Disassemble and clean the powder path by performing the *Daily Cleaning* procedure in the *Operation* section.
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 resistor probe.
4. Screw the new contact tip into the resistor probe and tighten it securely. Wipe 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.

Resistor Replacement

See Figure 6-1.

1. Disassemble and clean the powder path by performing the *Daily Cleaning* procedure in the *Operation* section.
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, lint-free cloth.
3. Use the applicator shipped with the resistor kit to inject $^1/_2$- to $^3/_4$-cc dielectric grease into the multiplier well.
4. Fill the new resistor spring (3) and resistor probe cavity (6) with $^1/_2$- to $^3/_4$-cc dielectric grease.

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, affect electrostatic performance, possibly burn through the gun, and create a fire or explosion hazard.

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. Screw the contact tip into the resistor probe end and tighten it securely. Do not overtighten the tip or the threads will be stripped.
8. Wipe 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.

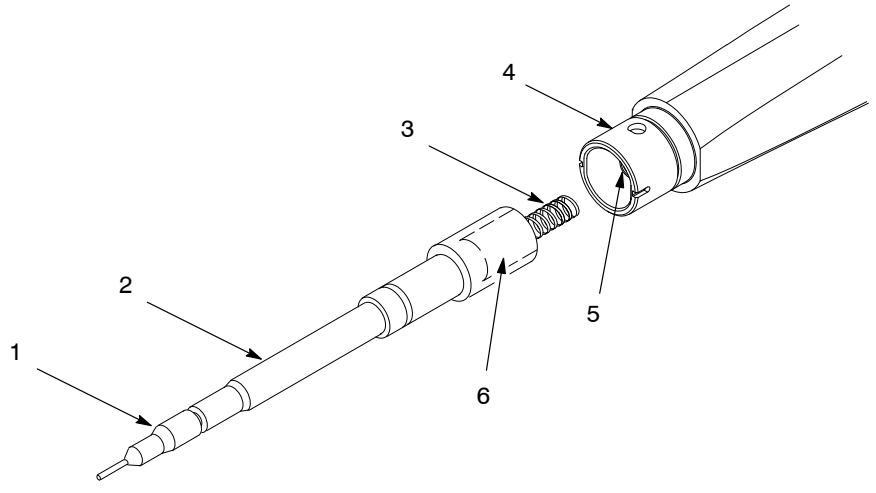

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Figure 6-1 Resistor Replacement

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

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

Multiplier Replacement

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

1. Disassemble and clean the powder path by performing the *Daily Cleaning* procedure in the *Operation* section. Disconnect the gun cable from the gun.
2. See Figure 6-2. Loosen the set screws (13) in the gun mount (15) with a hex key and remove the gun from the mounting bar.
3. Remove the gun mount (15) and the hose bracket (12) from the old multiplier (10). Save the screws (11, 14) for reuse.

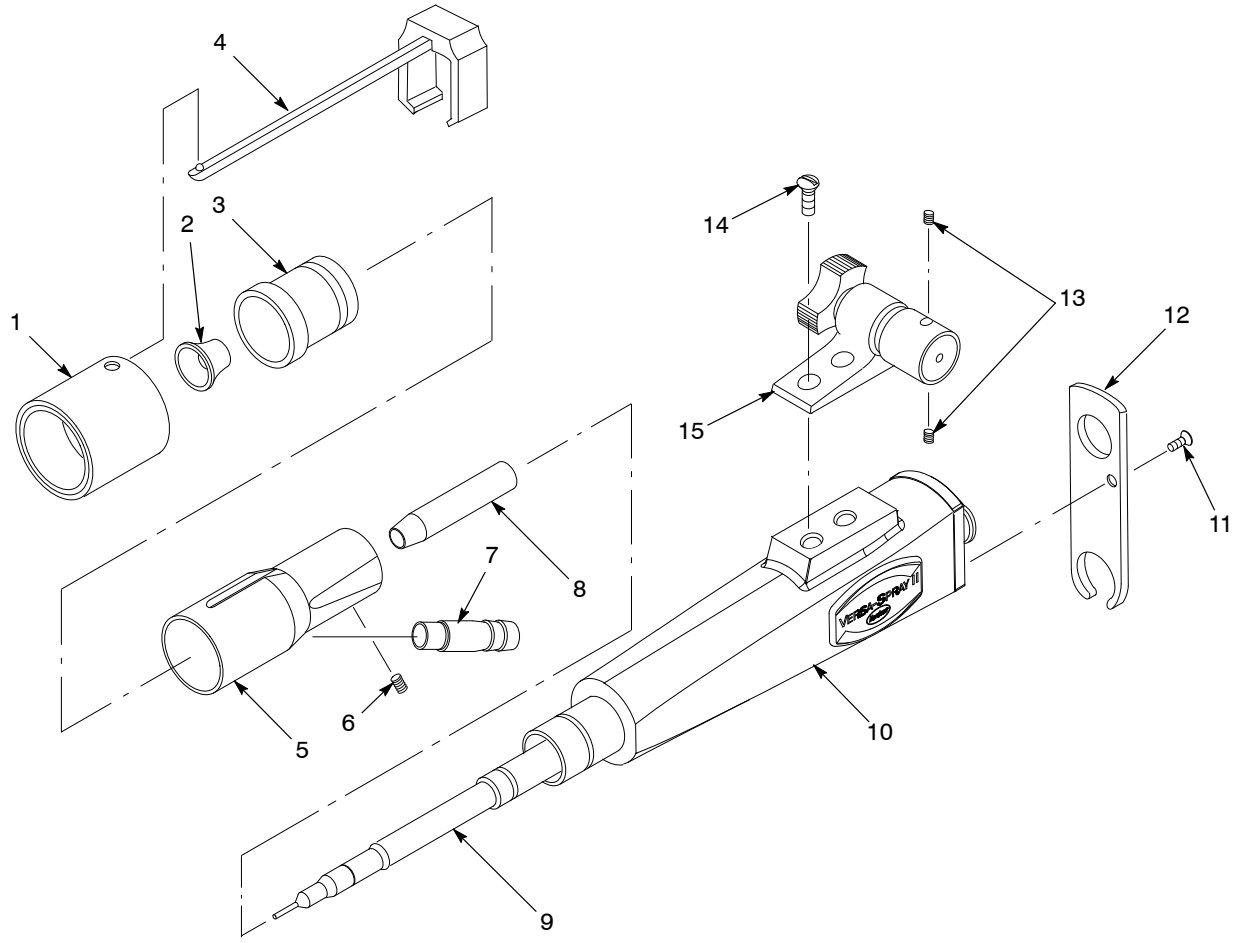

Figure 6-2 Multiplier Replacement

1. Pattern sleeve
2. Deflector
3. Nozzle
4. Pattern adjuster
5. Powder inlet body
6. Set screw
7. Hose adapter
8. Wear sleeve
9. Resistor probe
10. Multiplier
11. Screws
12. Hose bracket
13. Set screws
14. Screws
15. Gun mount

Multiplier Replacement *(contd)*

4. Install the gun mount (15) and the hose bracket (12) on the new multiplier (10) with the screws (11, 14) removed from the old multiplier.
5. Install the wear sleeve (8) over the resistor probe (9). Install the powder inlet body (5) over the resistor probe and end of the multiplier. Tighten the set screw (6) to secure the powder inlet body to the multiplier.
6. Install the hose adapter (7) and nozzle (3) into the powder inlet body.
7. Install the deflector (2) onto the end of the resistor probe. Do not bend the electrode.
8. Install the pattern sleeve (1) onto the powder inlet body with the hole in the sleeve over the slot in the powder inlet body.
9. Install the pattern adjuster (4) on the gun. Slide the end of the pattern adjuster arm into the slot in the powder inlet body and under the pattern sleeve edge. Fit the ball on the end of the arm into the hole in the pattern sleeve. Clip the pattern adjuster onto the multiplier.
10. Install the gun on the mounting bar. Tighten the gun mount set screws (13) securely with a hex key.
11. Connect the gun cable and feed hose to the gun.

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	

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Discontinued Gun Assemblies

Only one configuration of the gun (224877) is currently available. If you need to order replacement nozzles, mounting kits, or ion collectors for discontinued guns, use the following chart to identify your gun's part number and options.

NOTE: The conical nozzle, Shur-Lok mounting assembly, and all other parts for these discontinued guns are listed in the *Standard Gun Parts* list on page 7-4.

Discontinued Gun Part Number	Variables			
	Variable	Description	Part Number	Refer to Page:
228687	NOZZLE:	Flat-Spray	248282	7-7
	MOUNTING ASSEMBLY:	Shur-Lok	133409	7-4
228689	NOZZLE:	Standard Conical	—	7-4
	MOUNTING ASSEMBLY:	Shur-Lok	133409	7-4
	ION COLLECTOR:	Shur-Lok	189491	7-8
228688	NOZZLE:	Flat-Spray	248282	7-7
	MOUNTING ASSEMBLY:	Shur-Lok	133409	7-4
	ION COLLECTOR:	Shur-Lok	189491	7-8
228691	NOZZLE:	Standard Conical	—	7-4
	MOUNTING ASSEMBLY:	Ball Mount	183539	7-9
228690	NOZZLE:	Flat-Spray	248282	7-7
	MOUNTING ASSEMBLY:	Ball Mount	183539	7-9
228693	NOZZLE:	Standard Conical	—	7-4
	MOUNTING ASSEMBLY:	Ball Mount with Ion Collector	189495	7-10
	ION COLLECTOR:	Included with Mounting Assembly		
228692	NOZZLE:	Flat-Spray	248282	7-7
	MOUNTING ASSEMBLY:	Ball Mount with Ion Collector	189495	7-10
	ION COLLECTOR:	Included with Mounting Assembly		

Standard Gun Parts

See Figure 7-1.

Item	Part	Description	Quantity	Note
—	224877	GUN, PE, Versa-Spray, negative, with conical nozzle and Shur-Lok mount	1	
1	245523	• DEFLECTOR, ceramic, 38 mm	1	A
2	945016	• • O-RING, silicone, 0.251 x 0.400 x 0.074 in.	1	
NS	246823	• DEFLECTOR, with O-ring, barrel, ceramic	1	A
NS	945016	• • O-RING, silicone, 0.251 x 0.400 x 0.074 in.	1	
3	113931	• SLEEVE, pattern adjust	1	A
4	246578	• • INSERT, Pyrex	1	
5	940331	• • O-RING, silicone, 2.000 x 2.125 x 0.063 in.	1	
6	112806	• • SLEEVE	1	
NS	942240	• • O-RING, hot paint, 1.750 x 2.000 x 0.125 in.	1	
7	245521	• NOZZLE, powder gun, ceramic	1	A
8	246180	• • NOZZLE	1	
9	942161	• • O-RING, silicone, 1.125 x 1.375 x 0.125 in.	1	
10	153988	• BODY, inlet, PE, Versa-Spray	1	
11	982455	• SCREW, set, M6 x 1 x 8, nylon, black	1	
12	245434	• CONNECTOR, inlet, powder, ceramic	1	A
13	101128	• SLEEVE, ceramic	1	A
14	154863	• ADJUSTER, pattern sleeve, PE	1	A
15	154869	• SERVICE KIT, multiplier, PE, negative	1	
16	940243	• • O-RING, silicone, 1.125 x 1.250 x 0.063 in.	1	
17	154963	• • SERVICE KIT, resistor	1	
18	1053112	• • • CONTACT, cable	1	
19	940117	• • • O-RING, silicone, 0.312 x 0.438 x 0.063 in.	1	
20	140562	• BRACKET, tube	1	
21	982056	• SCREW, flat head, slotted, M3 x 6 mm, zinc	1	
22	133409	• MOUNT, gun, pivot, lock, gun bar	1	
23	981708	• • SCREW, slotted, M8 x 20 mm, black	2	
24	133415	• • KNOB, gun mount	1	
25	983527	• • WASHER, flat head, 0.344 x 1.125 x 0.063 in., zinc	1	
26	982067	• • SCREW, set, cup, M5 x 5 mm, black	2	
NOTE A: Part is not included in gun body kit 1609569.				

Spray Gun Body Service Kit

See *Standard Gun-Parts* for parts in kit.

Part	Description	Note
1609569	KIT, repair, gun body, NEG, PE, Shur–lok	

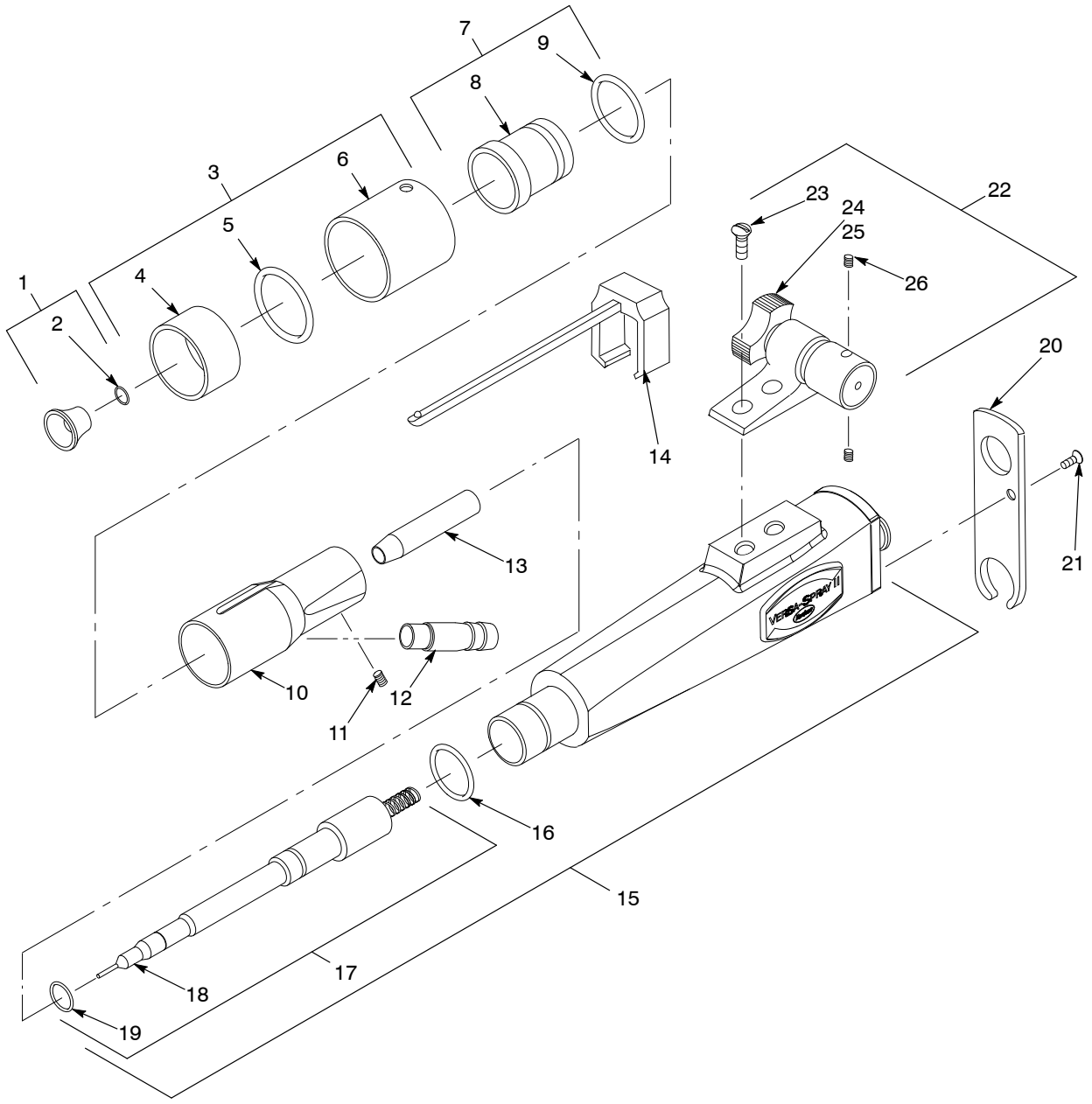


Figure 7-1 Versa-Spray IPS Automatic Porcelain Enamel Powder Spray Gun with Shur-Lok Mount

Options

Cables and Feed Hose

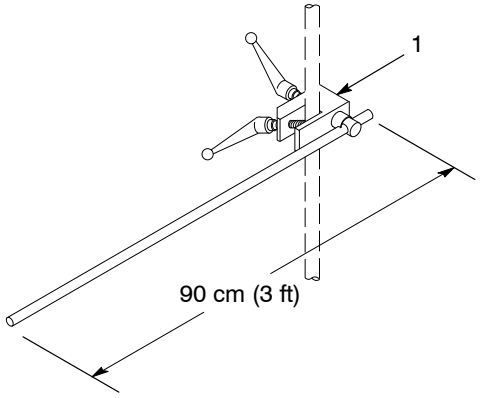
Gun cables and feed hose are not included with automatic guns. Order cables in lengths desired. Order feed hose in increments of one foot.

Part	Description	Note
142108	8-m (25-ft) CABLE, Versa-Spray, 100 kV	
168448	12-m (38-ft) CABLE, Versa-Spray, 100 kV	
142109	16-m (50-ft) CABLE, Versa-Spray, 100 kV	
334783	ADAPTER, cable, Versa-Spray gun to Sure Coat or iControl console	
900723	TUBING, powder, polyurethane, 0.360 in.	

Gun Mounting Bar

See Figure 7-2.

Item	Part	Description	Quantity	Note
1	133403	BAR, gun, Versa-Spray	1	



1400427A

Figure 7-2 Gun Mounting Bar

Shorting Plug

See Figure 7-3.

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

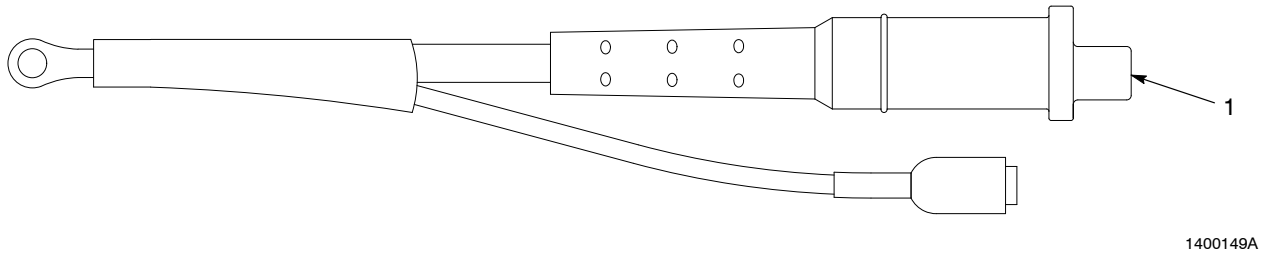


Figure 7-3 Shorting Plug

Flat-Spray Nozzle

See Figure 7-4.

Item	Part	Description	Quantity	Note
1	248282	NOZZLE, flat fan, frit, with O-ring	1	
1	1074636	NOZZLE, 6 mm flat, ceramic, with O-ring	1	
1	1074637	NOZZLE, 4 mm flat, 45 deg., ceramic, with O-ring	1	
2	942161	• O-RING, silicone, 1.125 x 1.375 x 0.125 in.	1	A
NOTE A: This O-ring is included with all three flat spray nozzles				

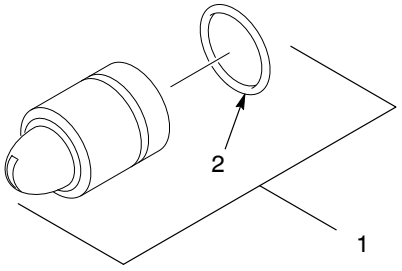


Figure 7-4 Flat-Spray Nozzle

Ion Collector Retrofit Kits

Shur-Lok Ion Collector Kit

See Figure 7-5. Order this kit for guns with the standard Shur-Lok mounting assembly.

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

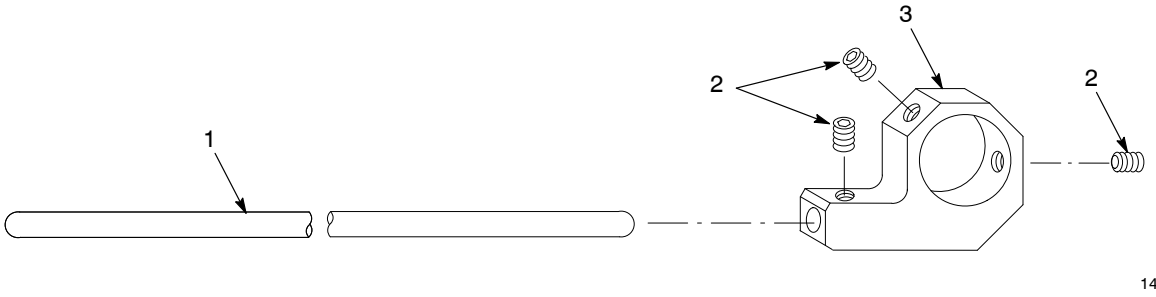


Figure 7-5 Shur-Lok Mount Ion Collector Kit

In-Line Ball Mount Ion Collector Kit

See Figure 7-6. Order this kit for guns with the in-line ball mount assembly.

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.

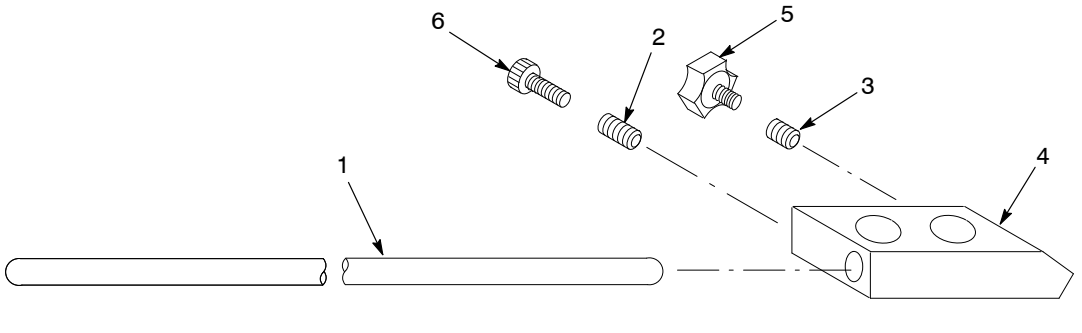


Figure 7-6 In-Line Ball Mount Ion Collector Kit

In-Line Ball Mount Kits

In-Line Ball Mount Kit

See Figure 7-7.

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	982186	• SCREW, flat head, M8 x 20	2	
11	129592	KNOB, clamping, M6 x 12	1	A
NOTE A: Optional, replaces item 8.				

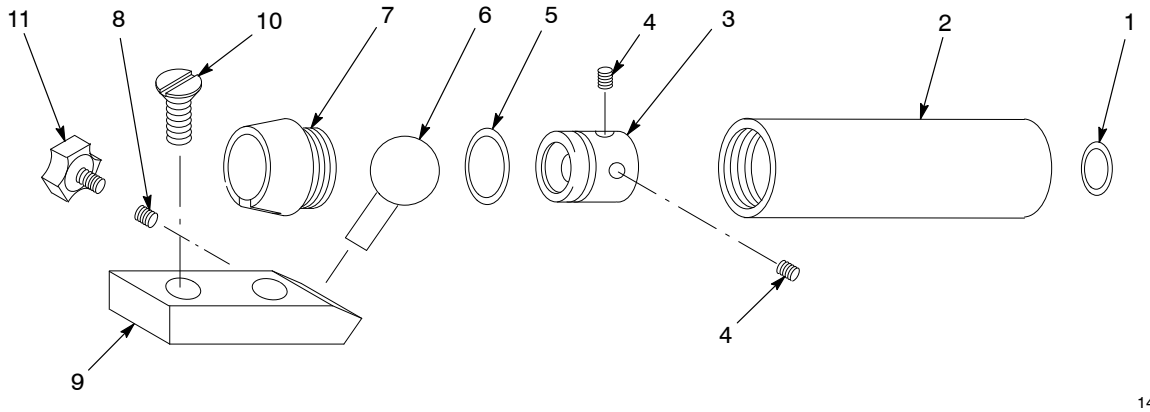


Figure 7-7 In-Line Ball Mount Kit

In-Line Ball Mount with Ion Collector Kit

See Figure 7-8.

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	982186	• SCREW, flat head, M8 x 20	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.

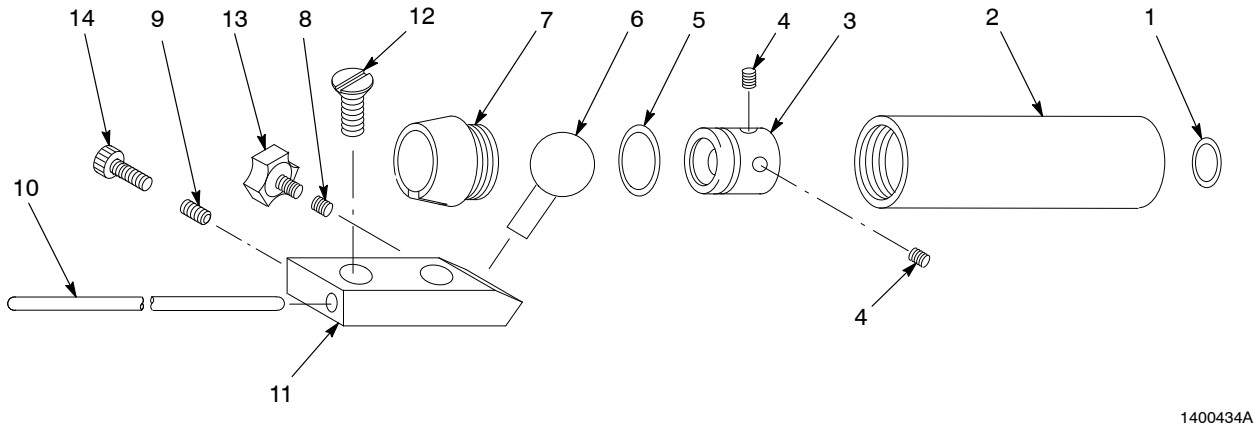


Figure 7-8 In-Line Ball Mount and Ion Collector Kit