Versa-Spray® Cable-Fed Manual Powder Spray Gun

Customer Product Manual
Part 108 131E

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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Notice

Trademarks

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Versa-Spray Cable-Fed Manual Powder Spray Gun

1. Safety

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.

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.
- While operating manual electrostatic spray guns, make sure you are grounded. Wear electrically conductive gloves or a grounding strap connected to the gun handle or other true earth ground. Do not wear or carry metallic objects such as jewelry or tools.
- If you receive even a slight electrical shock, shut down all electrical or electrostatic equipment immediately. Do not restart the equipment until the problem has been identified and corrected.
- Obtain and read Material Safety Data Sheets (MSDS) 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.

- Ground all conductive equipment in the spray area. Check equipment and workpiece grounding devices regularly. Resistance to ground must not exceed one megohm.
- Shut down all equipment immediately if you notice static sparking or arcing. Do not restart the equipment until the cause has been identified and corrected.

- 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 MSDS 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.
- Shut off electrostatic power and ground the charging system before adjusting, cleaning, or repairing electrostatic equipment.
- 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.

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.

2. Description

See Figure 1. The Versa-Spray cable-fed manual powder spray gun is a corona-type electrostatic powder spray gun. The gun consists of a handle assembly (1), extension (7), powder inlet body (2), nozzle, powder feed tubing adapter (6), and high voltage cable and resistor assembly. This gun is used with a Nordson model NPE-CC8, 100 PLUS, or EXP-100 electrostatic power supply.

When the gun is triggered, a high voltage electrostatic charge is generated by the power supply. The high voltage cable (9) conducts the charge through the gun resistor to the electrode (4), where a corona is generated. As the powder is pumped through the gun and passes through the corona, it becomes electrostatically charged. The powder spray fan pattern is controlled by the nozzle shape. The charged powder is electrically attracted to the grounded workpiece and deposited on it. The resistance of the cable and gun resistor limit the current at the gun to a safe level.The powder path is removable for quick color changes. Most powder path components (nozzles, powder inlet body, hose adapter, and wear sleeve) are common to all Versa-Spray guns. The gun is supplied with a standard 32-mm conical nozzle for use with organic powders.

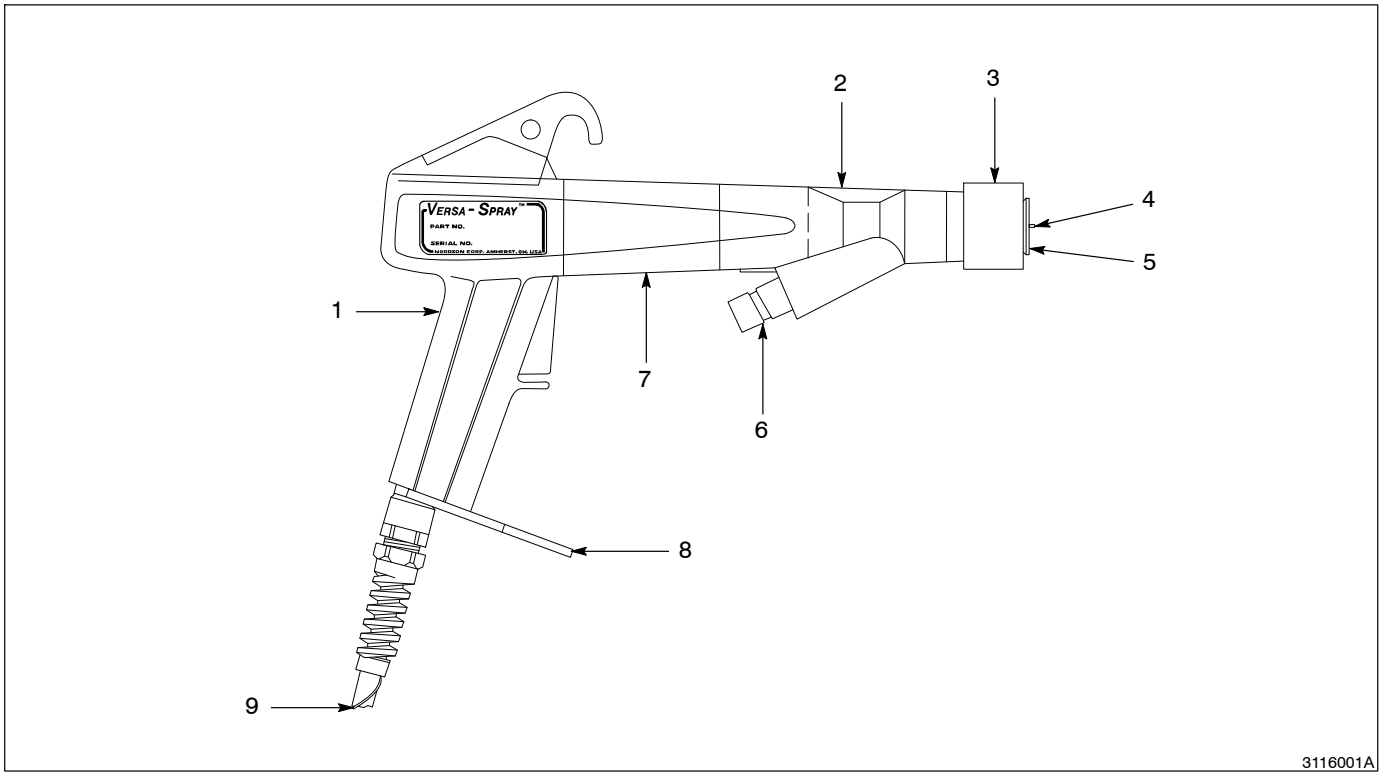

Fig. 1 Cable-Fed Manual Powder Spray Gun (Shown with Conical Nozzle)

1. Handle assembly
2. Powder inlet body (powder path)
3. Pattern adjuster
4. Electrode
5. Deflector
6. Hose adapter
7. Extension
8. Cable/hose bracket
9. Electrostatic cable

Versions

Refer to Table 1 for the available versions of the cable-fed manual gun.

Table 1 Cable-Fed Manual Gun Versions

Cable Length	Power Unit
4 meter	100 PLUS or EXP-100
8 meter	100 PLUS or EXP-100
12 meter	100 PLUS or EXP-100
4 meter	NPE-CC8
8 meter	NPE-CC8

The following options are available for the cable-fed manual gun. These options must be ordered separately and installed by the customer.

- 2.5-, 3-, 4-, and 6-mm flat spray nozzles
- 60° and 90° Cross-Cut nozzles
- Castle nozzles
- 32- and 45-mm conical nozzles
- 150- and 300-mm lance extensions
- Purge adapter kits

Refer to the *Parts* section for information on optional purge adapters.

Various sizes of deflectors for conical nozzles and a low-flow feed tubing ($^3/_8$-in. ID) adapter kit are also available. Refer to the *Parts* section for information.

3. Installation

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

WARNING: All equipment in the spray area must be connected to a true earth ground. Ungrounded or poorly grounded equipment will store an electrostatic charge which, when discharged, could generate a spark hot enough to cause a fire or explosion or give the operator a severe shock.

WARNING: This gun can be used only with the electrostatic cables listed in this manual and only with the Nordson NPE-CC8, 100 PLUS, or EXP-100 electrostatic power supplies. Using other cables or power supplies may cause personal injury, property damage, and void agency approvals.

3. Installation (contd)

Use the following procedures to install the cable-fed manual gun.

Cable and Powder Feed Tubing

Connect the cable and powder feed tubing using the following steps.

NOTE: Make sure that the cable end is clean and dry before inserting it into the multiplier well. Contaminants can cause arcing, carbon tracking, and burn through. If necessary, use a CFC-free electronic contact cleaner to clean the cable end.

1. New guns are shipped with the cable installed in the gun. Connect the cable to the electrostatic power supply as directed in the power supply manual.

2. Connect a length of powder feed tubing to the powder pump outlet. Connect the opposite end to the tubing adapter on the underside of the powder inlet body. Pinch the tubing to fit it into the retainer bracket at the base of the handle.

   NOTE: To increase powder flow and keep the distribution as even as possible, keep the feed tubing short. Feed tubing length should not exceed 8 m (26 ft).

3. Wrap spiral-cut tubing around the feed tubing where necessary to prevent it from kinking and blocking the flow of powder. The cable can be secured to the feed tubing with cable ties.

NOTE: Protect the cable from damage. Because it conducts high voltage, the cable is subject to electrical breakdown if it is not properly cared for. Do not whip the cable, stretch it or bend it around a radius of less than 15.25 cm (6 in.), step on it, or allow material handling equipment to drive over it.

Air Supply

Powder spray systems require clean, dry operating air. Moist or otherwise contaminated air can cause powder to clog in pump venturi throats, feed tubing, and gun passages, and can also cause grounding or arcing of the high-voltage electrostatic charge.

Use filter/separators with automatic drains and a refrigerated or regenerative desiccant-type air dryer, capable of producing a 3.4 °C (38 °F) or lower dewpoint at 7 bar (100 psi).

Optional Flat Spray Nozzles

Use the following procedure to install optional flat spray nozzles.

1. Remove the deflector, pattern adjuster, nozzle, and wear sleeve.
2. Install the flat spray wear sleeve over the end of the gun resistor. Be careful not to bend the tip of the electrode. Do not use the flat spray nozzle without the wear sleeve.
3. Push the flat spray nozzle into the front end of the gun until the nozzle bottoms out.

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: Breathing finishing powders may be hazardous to your health. Obtain and read the Material Safety Data Sheets for the powders you are using. Wear appropriate respiratory protection when handling or spraying powder.

Use the following procedures to operate the cable-fed manual gun.

Startup

Use the following procedure to start up the gun.

1. Turn on the system electrical power and air supply.

2. Turn on the booth exhaust fans.

3. Fill the hopper $^2/_3$ full with clean, dry powder. Start the fluidizing air and adjust it to the pressure recommended for your hopper.

   NOTE: The suggested fluidizing air pressure is typically 0.7–1.0 bar (10–15 psi). Refer to the documentation included with your hopper for specific air pressure adjustments.

4. Turn on power to the electrostatic power supply. Do not turn on the high voltage until the air pressures are set.

   NOTE: Flow rate air pressure controls the volume and velocity of the powder and air mixture delivered to the gun. Atomizing air pressure controls the density (powder-to-air ratio) of the mixture. The pressures given are average starting points. Pressures will vary according to required film build, line speed, and part configuration. Adjust the air pressures to obtain the desired results.

5. Adjust the pump air pressures to the following specifications:

   - Atomizing air: 2.0 bar (30 psi)
   - Flow rate air: 1.5 bar (20 psi)

WARNING: Before turning on the high voltage, make sure that the power supply and all conductive objects in the spray area are properly grounded. Ungrounded or poorly grounded objects will store an electrical charge which, when discharged, could generate a spark hot enough to cause a fire or explosion, or give the operator a severe shock.

6. Test the spray pattern and adjust the air pressures and conical nozzle pattern sleeve, if used, as necessary.

7. Turn on the high voltage at the electrostatic power supply. Adjust the high voltage as directed in the power supply manual.

WARNING: Make sure that all workpieces are properly grounded. Ungrounded or poorly grounded objects will store an electrical charge which, when discharged, could generate a spark hot enough to cause a fire or explosion, or give the operator a severe shock.

8. Test spray some workpieces. Adjust the air pressures and kV output to obtain the desired results.

Shutdown

Use the following procedure to shut down the gun.

1. Turn off the electrostatic power supply high voltage and main power switches.

2. Disassemble and clean the gun powder paths and pumps. With the booth exhaust fans running, blow out the feed tubing from the pump into the booth. Replace worn parts as necessary.

3. Perform daily maintenance procedures as described in your component and system manuals.

5. Maintenance

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

Follow these procedures as directed to maintain the cable-fed manual powder spray gun.

Daily

Perform this procedure daily.

NOTE: If necessary, use a cloth dampened with isopropyl or ethyl alcohol to clean parts. Remove O-rings before cleaning. Do not immerse the gun in alcohol. Do not use other solvents.

1. Disconnect the powder feed tubing from the gun. Remove the nozzle assembly and powder path parts from the gun and blow them clean with low pressure compressed air. Wipe all parts with a clean cloth.

2. Check the powder contact parts for wear and replace worn parts. Remove any impact fusion carefully. Never use sharp objects to clean parts. Scratches in the surface will allow powder to build up, causing impact fusion and affecting gun operation.

3. Clean the powder spray booth with a rubber squeegee or another non-conductive, non-sparking device. Operator must wear respiratory protection, and booth exhaust fans must be on while cleaning. Check filter cartridges and final filters.

***Daily** (contd)*

4. Disconnect the feed tubing from the pump. Blow out the tubing with low pressure compressed air. Replace tubing if clogged with impact-fused powder.

   NOTE: Never blow air through the tubing toward the pump. When blowing out tubing, make sure that the gun end of the tubing is directed at the booth collectors, and the exhaust fans are on.

5. Disassemble the pump and clean and inspect all parts. Replace worn parts as necessary.

6. Check all equipment ground connections in the spray area.

7. Check the operation of the air dryer and filter system. Drain the filters as necessary.

Periodically

WARNING: Before performing the following procedure, shut off all electrical power at a disconnect switch or breaker ahead of the power supply. Ground the gun electrode. Wait three minutes after shutting off the power supply before removing the cable from the multiplier well.

Perform this procedure periodically.

1. Measure the resistance of the high voltage cable and gun resistor with a megohm meter. If your readings are not in the proper range, replace the faulty component. The resistance of the cable and the gun resistor limit the current at the gun electrode to safe levels. Failure of the cable or gun resistor will cause a loss of powder wrap and poor coating efficiency.

2. Refer to Table 2. Disconnect cable assembly from electrostatic power supply and measure the resistance, from cable end to gun electrode.

Table 2 Cable Resistance

Cable Assembly Length	Resistance at 500 Volts
4 meter	243–321 Megohms
8 meter	332–456 Megohms
12 meter	422–590 Megohms

3. If the cable assembly resistance does not meet specifications, remove the resistor kit from the cable and measure the resistance from the electrode to the end of the resistor.

   Resistance of gun resistor should be:
   153 to 187 MΩ, at 500 Volts.

4. Replace the gun resistor with a new resistor kit if the reading is not within the specified range. Otherwise, replace the entire cable assembly with a new cable kit, which includes a resistor kit installed on the cable and ready to install in the gun. Refer to the *Repair* section in this manual for instructions.

6. Troubleshooting

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

WARNING: Before performing any of the following procedures, shut off all electrical power at a disconnect switch or breaker ahead of the power supply or master control module, and ground the electrode.

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.

6. Troubleshooting (contd)

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 and blow out 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 and clean and inspect it. Replace any worn parts. If parts are wearing excessively or impact fusion is a problem, reduce the air pressure.
	Damp powder	Check the powder supply, air filters and dryer. Replace the powder supply if it is contaminated.
	Low atomizing or flow rate air pressure	Increase the atomizing or flow rate air pressure.
	Improper fluidization of powder in hopper	Increase the fluidizing air pressure, remove the powder from the hopper and clean the fluidizing plate, if necessary.
2. Voids in powder pattern	Worn nozzle or deflector	Disassemble the gun and inspect parts. Replace parts if necessary.
	Plugged gun orifices	Disassemble and clean the gun.

Problem	Possible Cause	Corrective Action
3. Loss of wrap, poor transfer efficiency	Output voltage insufficient	Increase the output voltage. Refer to the power supply manual.
	Cable assembly or electrostatic power supply failure	Check the cable assembly with a megohmmeter. Values are given in the *Maintenance* section of this manual. Refer to the power supply manual for multiplier test procedures.
	Poorly grounded workpieces	Stop the conveyor and check the chain, rollers and hangers for powder buildup. Clean and check for 1 MΩ or less resistance between the workpiece and ground.
4. No kV output from gun	Damaged high voltage cable	Check the cable assembly with a megohm meter.
	Damaged gun resistor	Check the resistor with a megohmmeter for 153–187MΩ at 500 V.
	Malfunctioning voltage multiplier	Refer to the power supply manual for multiplier test and replacement procedures.
	Malfunctioning power supply circuit board	Refer to the power supply manual for test and replacement procedures.
5. Gun stays on when operator stops squeezing trigger, or gun will not turn on	Damaged trigger switch or circuit	Replace the cable.

7. Repair

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

WARNING: Before attempting any of the following procedures, shut off all power at a disconnect switch or breaker ahead of the electrostatic power module or master control module and ground the gun electrode.

Use the following procedures to disassemble and repair the cable-fed manual powder spray gun.

Powder Path Disassembly

Use the following procedure to disassemble the powder path.

1. See Figure 2. If you are using a conical nozzle, remove the deflector (1), pattern adjuster (2), and nozzle. If you are using a flat spray nozzle, remove the nozzle only.
2. Remove the wear sleeve (14) from the resistor.
3. Remove the tubing adapter (11) from the powder inlet body (13). Pinch the powder feed tubing to remove it from the retainer bracket (7).
4. Back out, but do not remove completely, the set screw (12) from the powder inlet body. Pull the powder inlet body forward off the front of the gun. Do not twist the powder inlet body when pulling it from the gun.
5. Clean parts with compressed air and a clean cloth. Do not use a knife or other sharp object to scrape off impact fusion. Scratches in the surface will allow powder to build up, causing impact fusion and affecting gun operation.

   NOTE: If necessary, wipe parts with a cloth dampened with isopropyl or ethyl alcohol. Do not use any other solvent. Do not immerse the assembled gun in alcohol.
6. Inspect all O-rings and replace if damaged. Inspect all gun parts. Replace worn parts as necessary.

Reverse the disassembly procedure to reassemble the powder path.

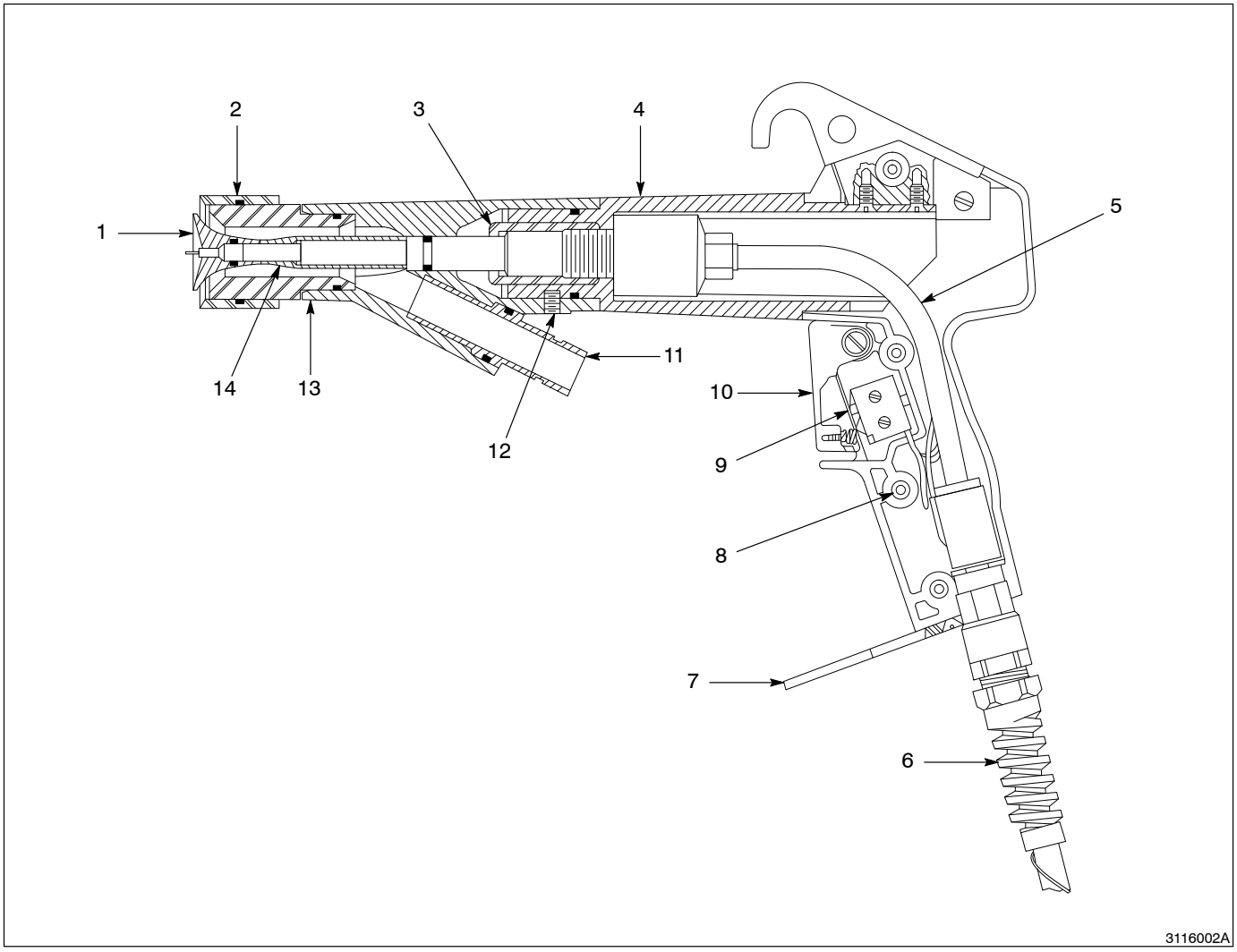

Fig. 2 Powder Path Disassembly

1. Deflector
2. Pattern adjuster
3. Cable retaining nut
4. Extension
5. Electrostatic cable
6. Cable strain relief
7. Cable/feed hose bracket
8. Captive screw
9. Switch and actuator
10. Trigger
11. Powder tubing adapter
12. Set screw
13. Powder inlet body
14. Wear sleeve

High-Voltage Cable Replacement

See Figure 2. Use the following procedure to replace the high-voltage cable.

1. Remove the powder path as described in *Powder Path Disassembly*.
2. Unscrew the three handle cover screws (8). The screws are captive and will not fall out of the handle. Remove the cover half of the handle.
3. Loosen and remove the cable retainer nut (3). Use a wrench if necessary.
4. Rotate the cable bracket (7) slightly and release the cable strain relief (6).
5. Unscrew the two screws from the switch and actuator (9). Remove the switch and actuator from the gun handle.
6. Grasp the cable (5) near the cutout at the back of the gun. Pull the cable firmly but gently from the extension (4).
7. Unscrew the retainer nut and pull the cable from the power supply multiplier well. If the cable is undamaged and will be reinstalled, put a plastic bag around the cable end to keep it clean and dry.
8. Reverse steps 1–7 to install the cable. Refer to your power supply manual for cable installation procedures.

NOTE: When installing the cable in the gun, be careful not to overtighten the cable retainer nut. Too much force may break the extension. Ensure that the trigger wires will not be crimped when you reassemble the handle.

Resistor Replacement

WARNING: When replacing the resistor, follow the greasing instructions exactly. The greasing procedures are designed to allow the dielectric grease to displace air inside the resistor holder. Air pockets will allow the high voltage to arc, causing carbon tracking and burn-through.

Use the following procedure to replace the gun resistor.

1. Remove the cable from the gun as described in *High-Voltage Cable Replacement*.
2. Unscrew the old resistor probe from the end of the cable.
3. See Figure 3. Inject 0.5–0.75 cc of dielectric grease into the end of the cable fitting (1), using the 3-cc applicator supplied with the resistor kit.
4. Remove the shipping container and protective caps from the resistor kit.
5. Unscrew the contact tip (3) from the resistor probe (4) one or two turns. Do not remove it completely.
6. Fill the new resistor spring and the resistor holder cavity (2) with 0.5–0.75 cc of dielectric grease.
7. Screw the new resistor probe onto the cable fitting until snug.
8. Tighten the contact tip until snug. Do not overtighten.
9. Wipe any excess grease off the contact tip and cable fitting.
10. Reinstall the probe and cable into the extension, install the trigger switch and actuator, and reassemble the handle as described in *High-Voltage Cable Replacement*.

Resistor Replacement *(contd)*

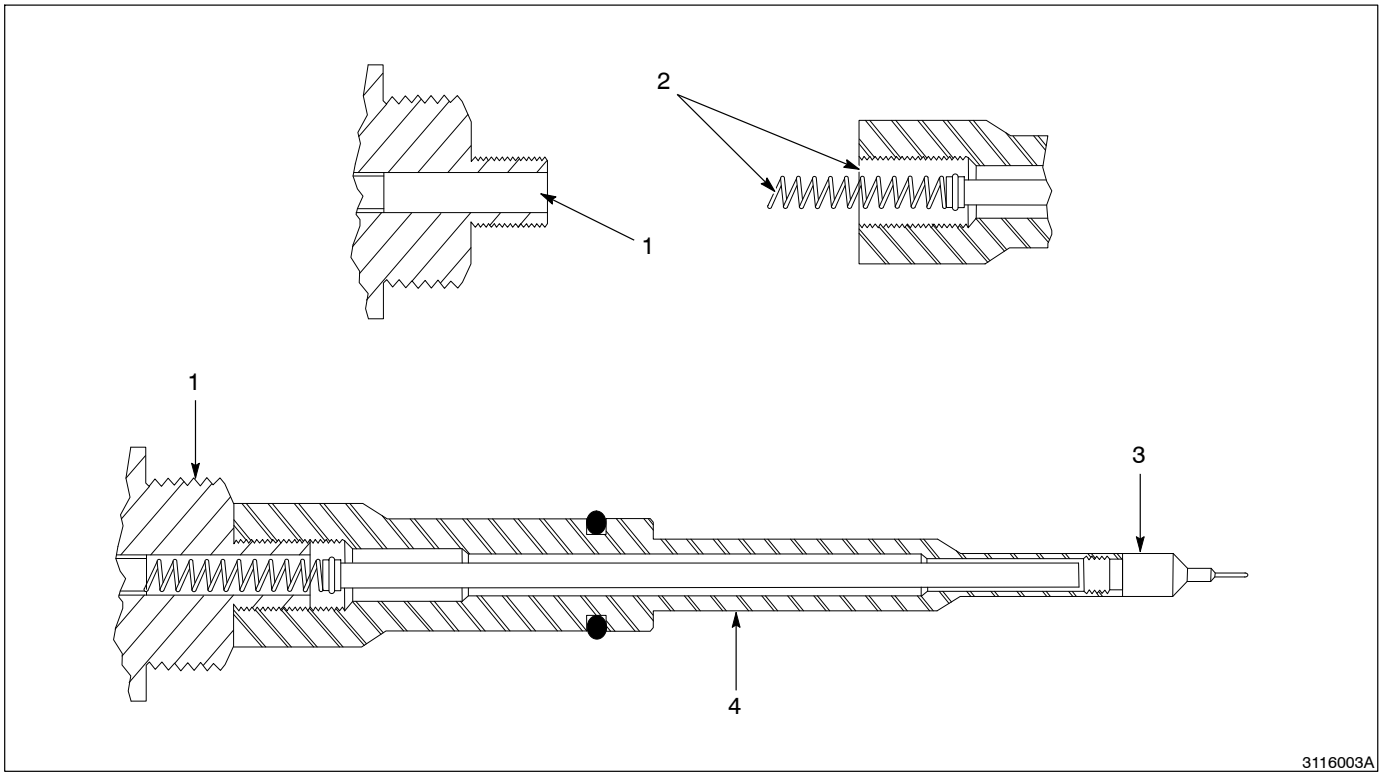

Fig. 3 Resistor Replacement

1. Cable fitting
2. Spring and resistor holder cavity
3. Contact tip
4. Resistor probe

8. Parts

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 six-digit 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.

Item	Part	Description	Quantity	Note
—	000 000	Assembly	1	
1	000 000	• Subassembly	2	A
2	000 000	• • Part	1	

- 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.

Gun Assembly

See Figure 4.

Item	Part	Description	Quantity	Note
—	132 739	Handgun, conical, 4 m cable, Versa-Spray	1	
—	132 741	Handgun, conical, 8 m cable, Versa-Spray	1	
—	163 405	Handgun, conical, 12 m cable, Versa-Spray	1	
—	135 143	Handgun, Versa-Spray, 4 m, retrofit	1	A
—	135 144	Handgun, Versa-Spray, 8 m, retrofit	1	A
1	- - - - - -	• Service kit, cable	1	B
2	982 327	• Screw, chez head, slotted M4 x 12	1	
3	125 616	• Hanger, handgun, modular	1	
4	132 334	• Pivot, trigger	1	
5	982 370	• Screw, pan head, slotted, M2 x 5	1	
6	133 783	• Spring, trigger, return	1	
7	125 617	• Trigger, handgun, modular	1	
8	132 345	• Bracket, cable/tube, retaining	1	
9	982 098	• Screw, flat head, slotted, M4 x 6	3	
10	982 098	• Screw, fillet head, M4 x 6	3	
11	125 613	• Extension	1	
12	940 243	• O-ring, silicone, 1.125 x 1.250 x 0.062 in.	1	
13	984 165	• Nut, cable retainer	1	
14	125 612	• Body, inlet, powder	1	
15	982 455	• Screw, set, M6 x 1.0 x 8, nylon, black	2	
16	134 386	• Adapter, hose, with O-ring, universal	1	
17	940 163	• • O-ring, silicone, 0.625 x 0.750 x 0.063 in.	1	
18	- - - - - -	• Service kit, 32 mm conical nozzle	1	C
19	940 060	• O-ring, Viton, 0.125 x 0.250 x 0.063 in.	3	
20	981 626	• Screw, captive, slotted, M4 x 12, black	3	

NOTE A: For use with model NPE-CC8 electrostatic power supply only.
B: Order the appropriate cable service kit from the *Cable Service Kit* list.
C: Order a nozzle kit from the nozzle lists in this section.

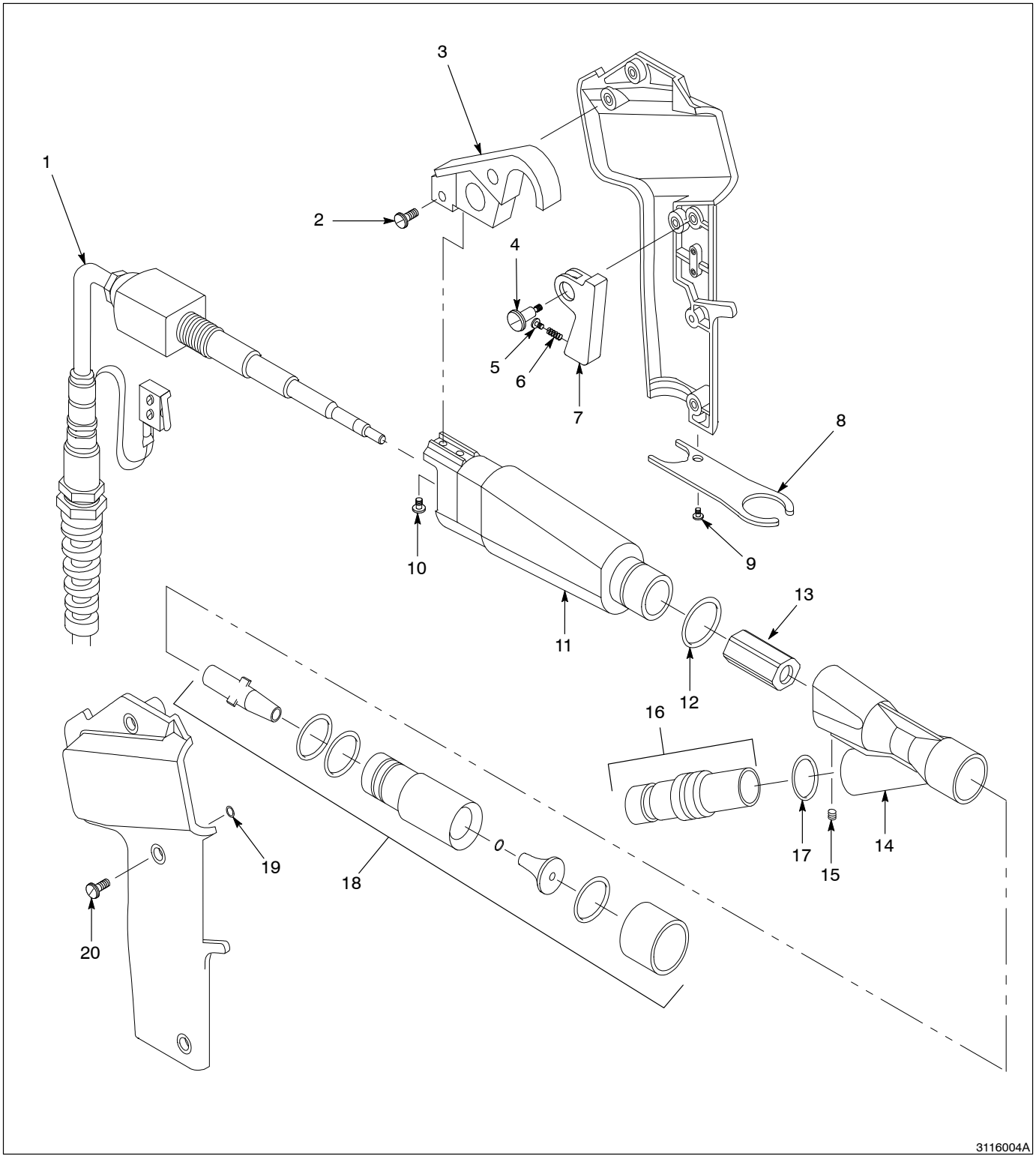

Fig. 4 Gun Assembly

Cable Service Kits

See Figure 5.

Item	Part	Description	Quantity	Note
—	133 841	Service kit, cable, 4 m	1	A
—	133 842	Service kit, cable, 8 m	1	A
—	163 404	Service kit, cable, 12 m	1	A
—	135 149	Service kit, cable, 4 m, retrofit	1	B
—	135 148	Service kit, cable, 8 m, retrofit	1	B
1	- - - - - -	• Cable	1	
2	- - - - - -	• • Switch	1	
3	134 376	• Service kit, holder resistor	1	
4	132 336	• Actuator, switch	1	
5	981 915	• Screw, pan, #2-56 x 0.373	2	
6	983 510	• Washer, flat, e, 0.094 x 0.188 x 0.025 in.	2	
7	983 113	• Washer, lock, e, split	2	
NS	247 512	• Oil, 7.5 mL, HV insulating, pipette	1	

NOTE A: For use with 100 Plus or EXP-100 power supplies only.
B: For use with NPE-CC8 power supply only.
NS: Not Shown

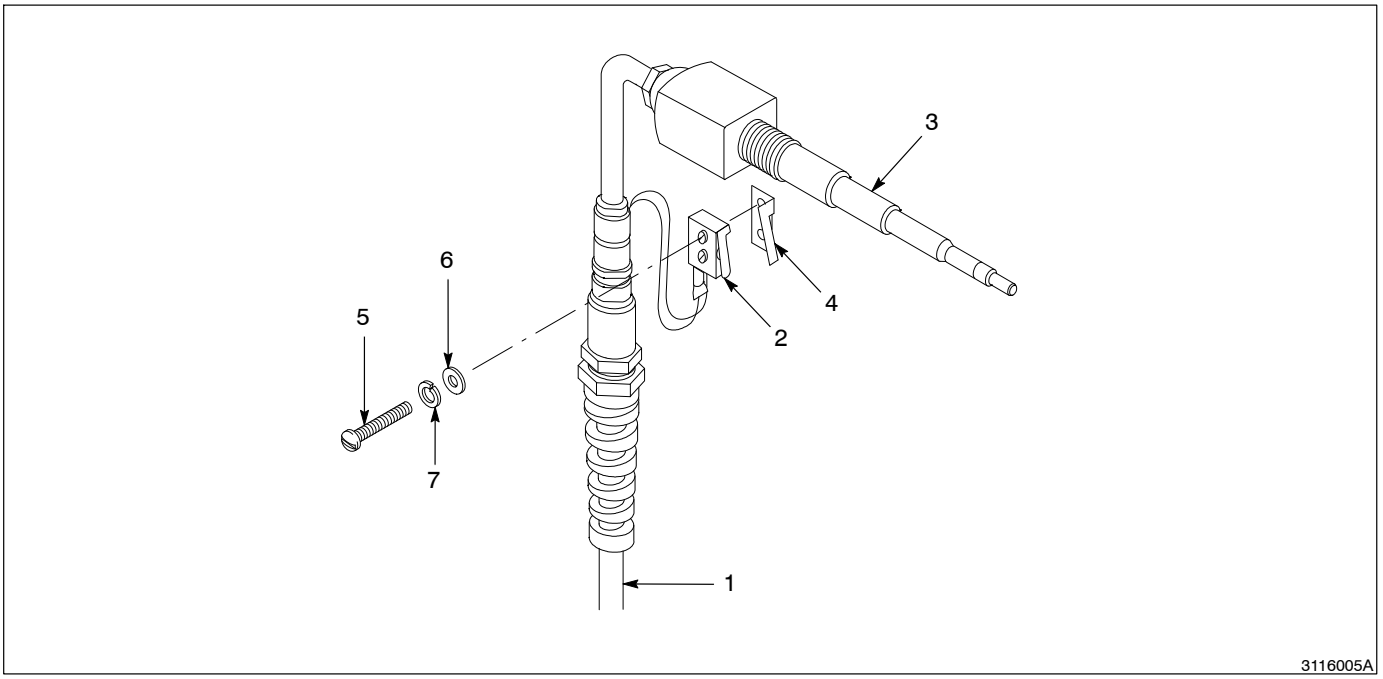

Fig. 5 Cable Service Kits

Resistor Service Kit

See Figure 6.

Item	Part	Description	Quantity	Note
—	134 376	Service kit, holder, resistor	1	
1	132 748	• Contact, cable	1	
2	940 117	• O-ring, silicone, 0.312 x 0.438 x 0.063 in.	1	
NS	245 733	• Grease, dielectric, 3 cc applicator	1	
NS: Not Shown				

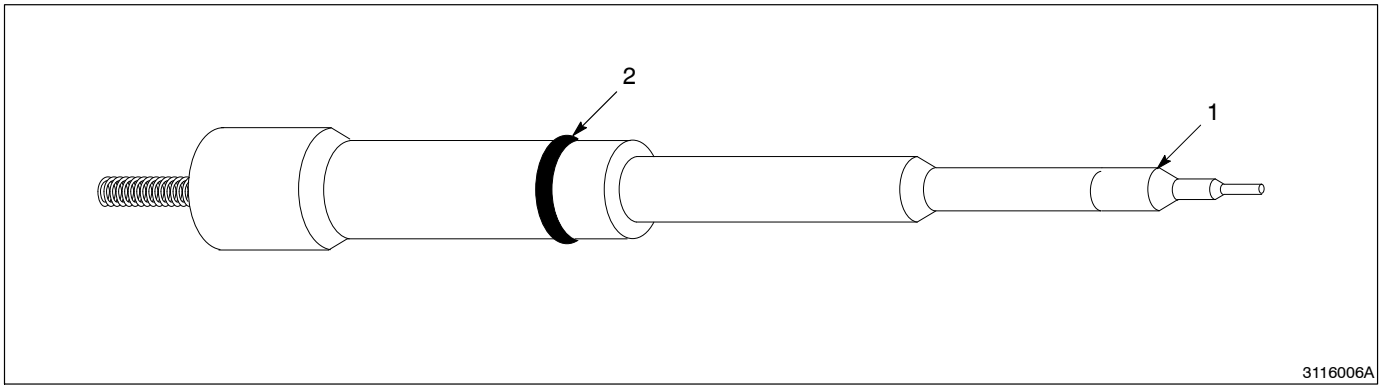

Fig. 6 Resistor Service Kit

Handle Service Kit

See Figure 7.

Item	Part	Description	Quantity	Note
—	160 103	Service kit, handle, Versa-Spray	1	A
1	- - - - - -	• Handle, gun	1	
2	- - - - - -	• Handle, cover	1	
3	940 060	• O-ring, Viton, 0.125 x 0.250 x 0.063 in.	3	
4	981 626	• Screw, captive, slotted, M4 x 12	3	
NOTE A: Customer must provide gun part number and serial number when ordering.				

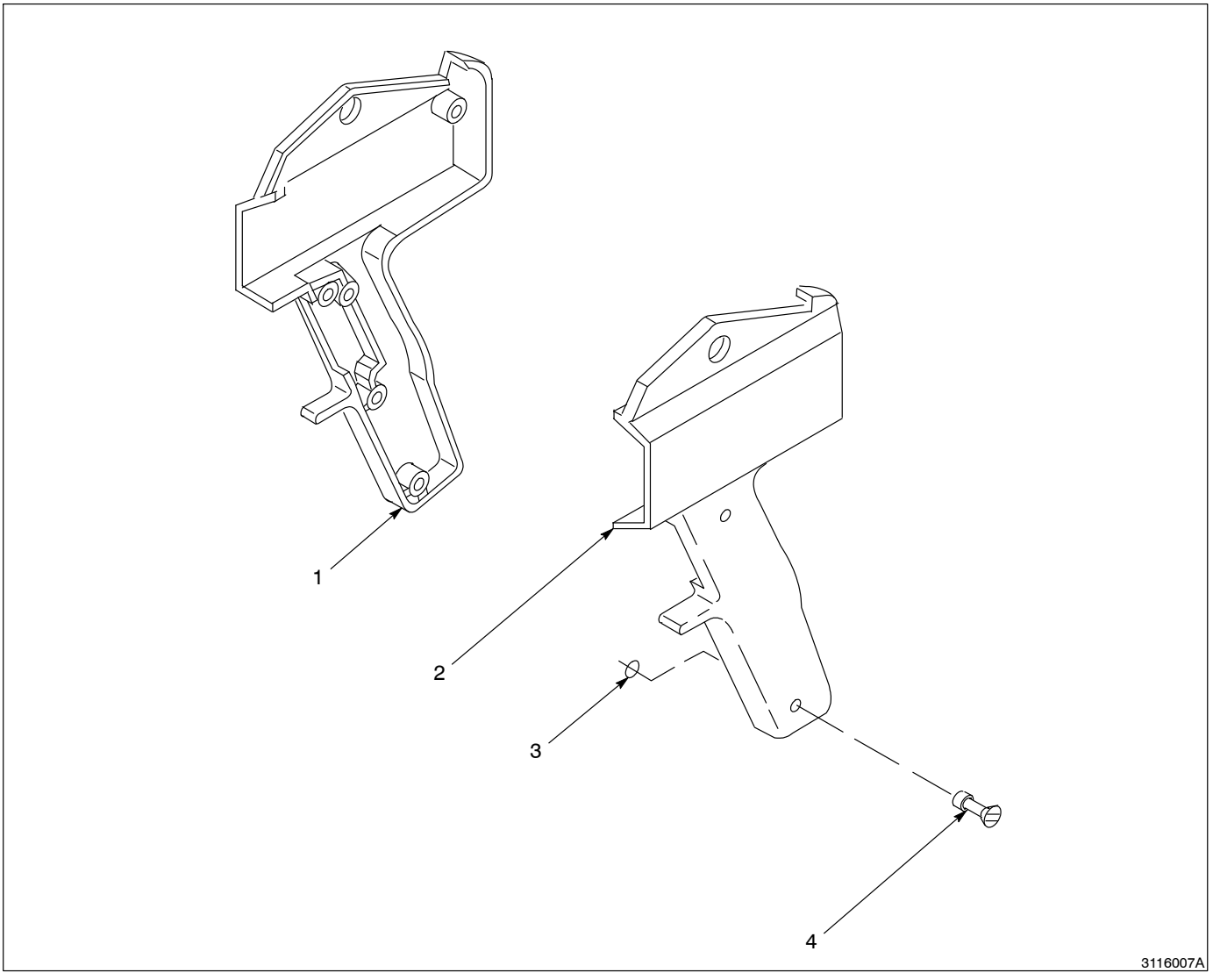

Fig. 7 Handle Service Kit

Trigger Service Kit

See Figure 8.

Item	Part	Description	Quantity	Note
—	160 104	Service kit, trigger, Versa-Spray	1	
1	132 334	• Pivot, trigger	1	
2	125 617	• Trigger, handgun, modular	1	
3	133 783	• Spring, trigger, return	1	
4	982 370	• Screw, pan head, slotted, M2 x 5	1	

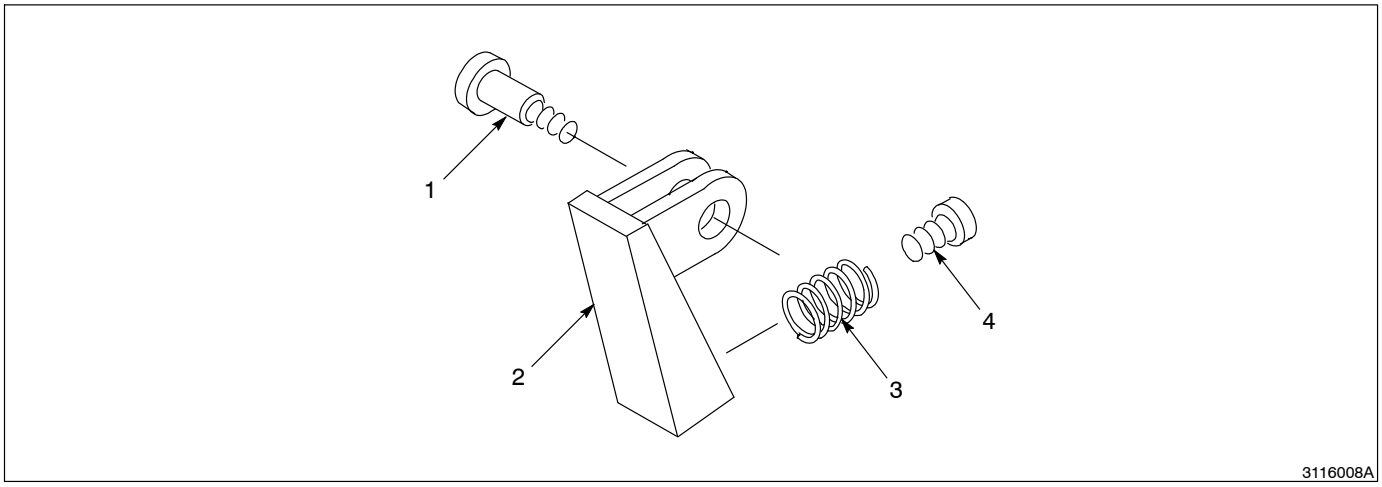

Fig. 8 Trigger Service Kit

32-mm Conical Nozzle Service Kit

Use the following lists to order 32-mm conical nozzle service kits and related parts.

Old Style

See Figure 9. The old style conical nozzle has an O-ring on the inside diameter of the pattern adjuster.

Item	Part	Description	Quantity	Note
—	- - - - - -	Service kit, nozzle, 32 mm, auto	1	A
1	132 348	• Sleeve, wear, conical, Tivar	1	
2	- - - - - -	• Nozzle, 32 mm dia, with O-rings, Tivar	1	B
3	940 212	• • O-ring, silicone, 0.938 x 1.063 x 0.063 in.	2	B
4	- - - - - -	• Sleeve, pattern, Versa-Spray	1	B
5	940 262	• • O-ring, silicone, 1.250 x 1.375 x 0.063 in.	1	
6	133 734	• Deflector, 26 mm dia, Tivar, with O-ring	1	
7	940 084	• • O-ring, silicone, 0.188 x 0.312 x 0.063 in	1	

NOTE A: Obsolete, replaced by conical nozzle service kit, part 145 559. Refer to *New Style* and see Figure 10.

B: Obsolete, replaced by nozzle, part 145 558 and pattern adjuster, part 144 759. Refer to *New Style* and see Figure 10.

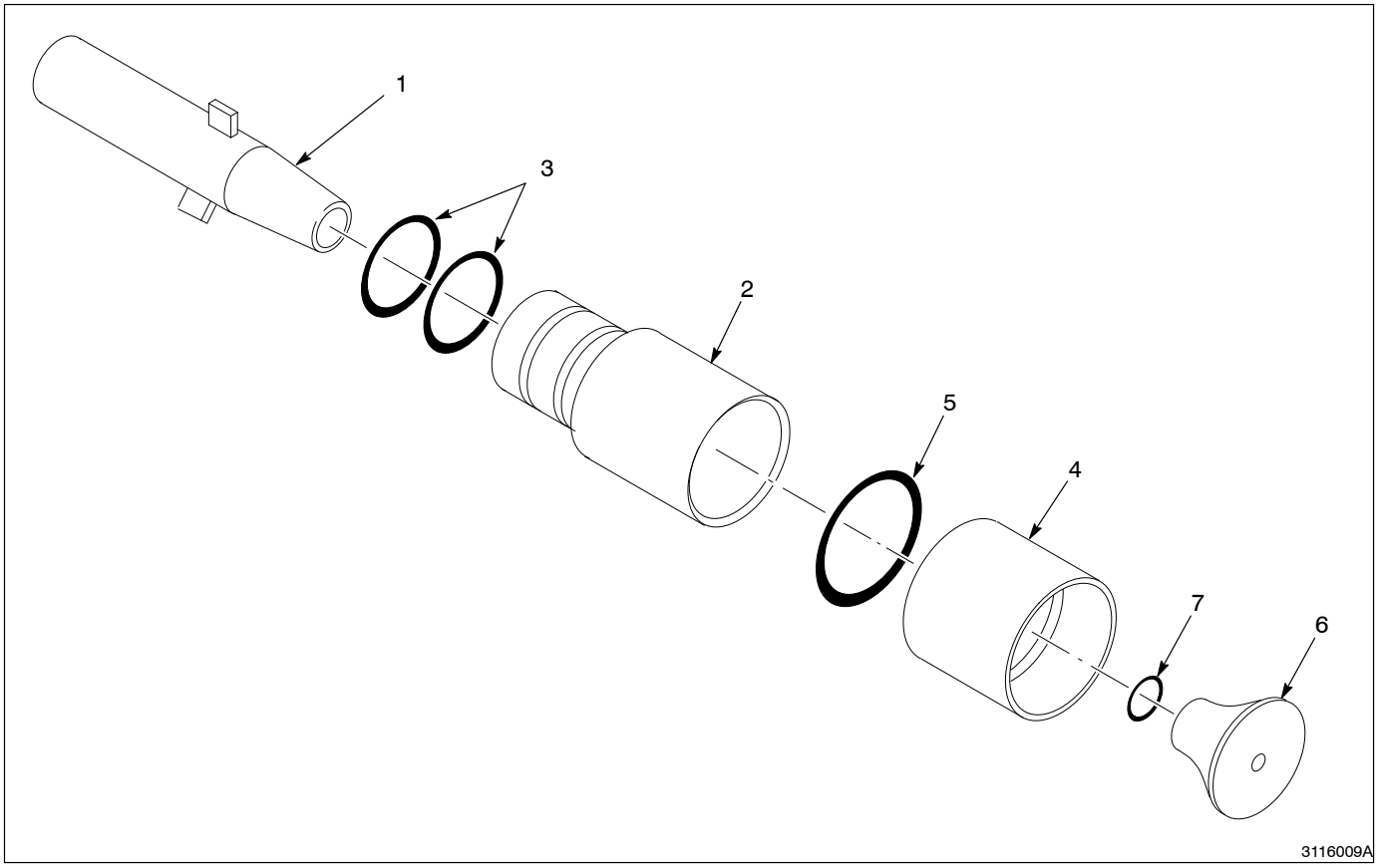

Fig. 9 Old Style 32-mm Conical Nozzle Service Kit

New Style

See Figure 10. The new style conical nozzle has an O-ring on the outside diameter of the nozzle.

Item	Part	Description	Quantity	Note
—	145 559	Service kit, nozzle, 32 mm	1	
1	132 348	• Sleeve, wear, conical, Tivar	1	
2	145 558	• Nozzle, 32 mm dia, with O-rings, Tivar	1	
3	941 181	• • O-ring, silicone, 0.875 x 1.063 x 0.094 in.	2	
4	941 205	• • O-ring, silicone, 1.00 x 1.188 x 0.094 in.	1	
5	144 759	• Adjuster, pattern, 32 mm	1	
6	133 734	• Deflector, 26 mm dia, with O-ring, Tivar	1	
7	940 084	• • O-ring, silicone, 0.188 x 0.312 x 0.063 in.	1	

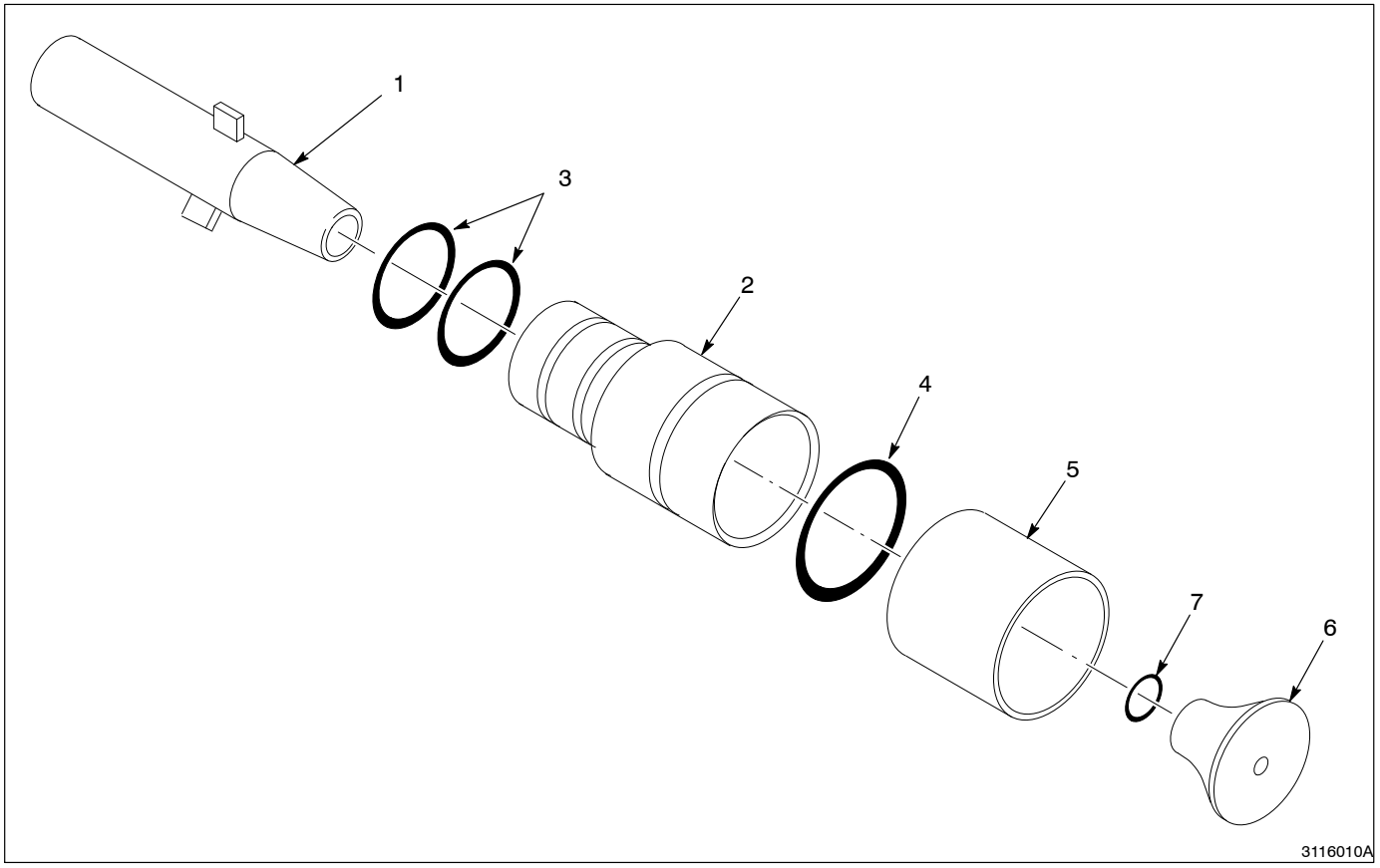

Fig. 10 New Style 32-mm Conical Nozzle Service Kit

Optional 45-mm Conical Nozzle

See Figure 11.

Item	Part	Description	Quantity	Note
—	144 760	Service kit, nozzle, 45 mm	1	
1	132 348	• Sleeve, wear, conical, Tivar	1	
2	144 789	• Nozzle, 45 mm conical, with O-rings	1	
3	941 181	• • O-ring, silicone, 0.875 x 1.063 x 0.094 in.	2	
4	249 233	• Deflector, Tivar, with O-ring	1	A
NOTE A: This deflector is only used with nozzle, part 144 789.				

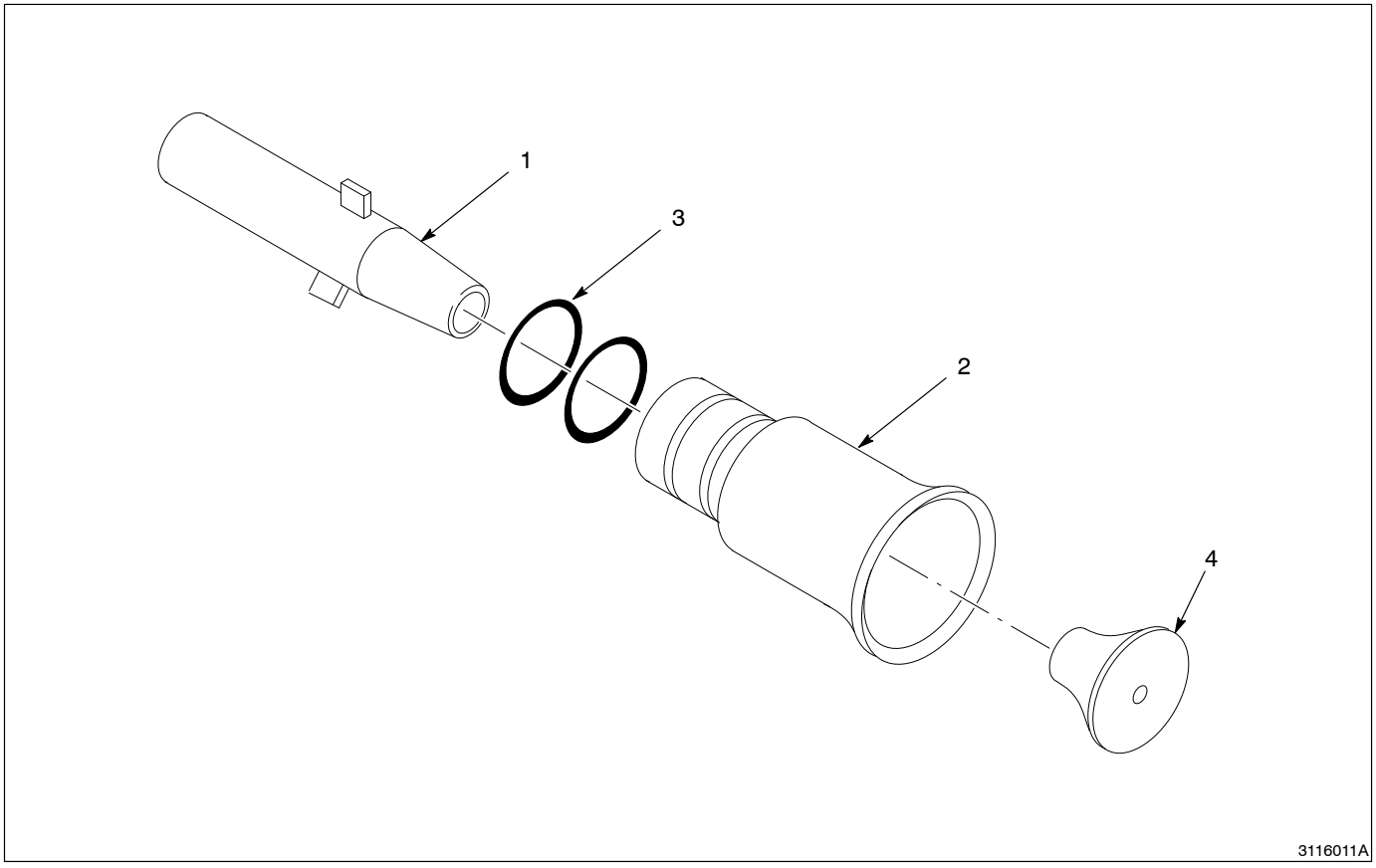

Fig. 11 Optional 45-mm Conical Nozzle

Optional Flat Spray Nozzles

See Figure 12. Use the following lists to order optional flat spray nozzle service kits.

2.5-mm Flat Spray Nozzle

Item	Part	Description	Quantity	Note
—	134 380	Service kit, nozzle, flat spray, 2.5 mm	1	
1	134 384	• Nozzle, flat spray, 2.5 mm, with O-rings, Tivar	1	
2	941 181	• • O-ring, silicone, 0.875 x 1.063 x 0.094 in.	2	A
3	134 385	• Sleeve, wear, flat spray, with O-ring	1	

NOTE A: Nozzles without identification groove use O-ring, part 940 212 , nozzles with groove use O-ring, part 941 181.

3-mm Flat Spray Nozzle

Item	Part	Description	Quantity	Note
—	139 935	Service kit, nozzle, flat spray, 3 mm	1	
1	139 902	• Nozzle, flat spray, 3 mm, with O-rings, Tivar	1	
2	941 181	• • O-ring, silicone, 0.875 x 1.063 x 0.094 in.	2	A
3	134 385	• Sleeve, wear, flat spray, with O-ring	1	

NOTE A: Nozzles without identification groove use O-ring, part 940 212 , nozzles with groove use O-ring, part 941 181.

4-mm Flat Spray Nozzle

Item	Part	Description	Quantity	Note
—	141 044	Service kit, nozzle, flat spray, 4 mm	1	
1	141 045	• Nozzle, flat spray, 4 mm, with O-rings, Tivar	1	
2	941 181	• • O-ring, silicone, 0.875 x 1.063 x 0.094 in.	2	A
3	134 385	• Sleeve, wear, flat spray, with O-ring	1	

NOTE A: Nozzles without identification groove use O-ring, part 940 212 , nozzles with groove use O-ring, part 941 181.

6-mm Flat Spray Nozzle

Item	Part	Description	Quantity	Note
—	139 937	Service kit, nozzle, flat spray, 6 mm	1	
1	139 903	• Nozzle, flat spray, 6 mm, with O-rings, Tivar	1	
2	941 181	• • O-ring, silicone, 0.875 x 1.063 x 0.094 in.	2	A
3	134 385	• Sleeve, wear, flat spray, with O-ring	1	
NOTE A: Nozzles without identification groove use O-ring, part 940 212 , nozzles with groove use O-ring, part 941 181.				

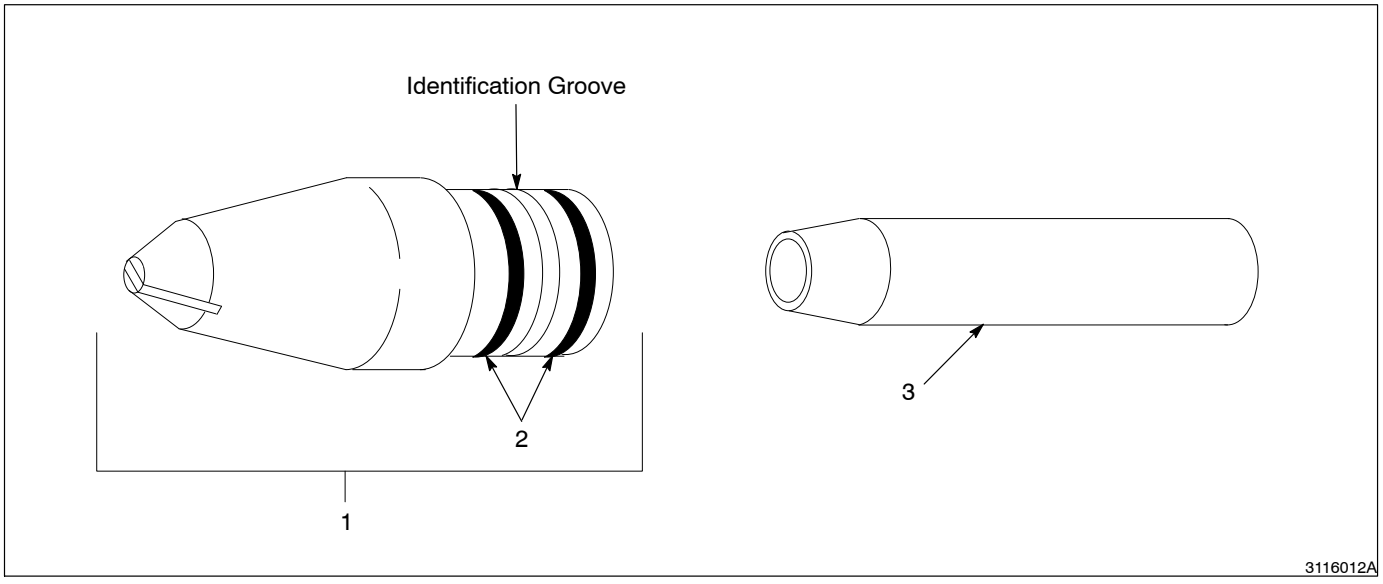

Fig. 12 Optional Flat Spray Nozzle Service Kits

Optional Cross-Cut Nozzles

See Figure 13. Use the following lists to order optional Cross-Cut nozzle service kits.

60° Cross-Cut Nozzle

Item	Part	Description	Quantity	Note
—	141 013	Service kit, nozzle, Cross-Cut, 60°	1	
1	141 017	• Nozzle, Cross-Cut, 60°, with O-rings	1	
2	941 181	• • O-ring, silicone, 0.875 x 1.063 x 0.094 in.	2	A
3	134 385	• Sleeve, wear, flat spray, with O-ring	1	
NOTE A: Nozzles without identification groove use O-ring, part 940 212 , nozzles with groove use O-ring, part 941 181.				

90° Cross-Cut Nozzle

Item	Part	Description	Quantity	Note
—	141 014	Service kit, nozzle, Cross-Cut, 90°	1	
1	141 015	• Nozzle, Cross-Cut, 90°, with O-rings	1	
2	941 181	• • O-ring, silicone, 0.875 x 1.063 x 0.094 in.	2	A
3	134 385	• Sleeve, wear, flat spray, with O-ring	1	
NOTE A: Nozzles without identification groove use O-ring, part 940 212 , nozzles with groove use O-ring, part 941 181.				

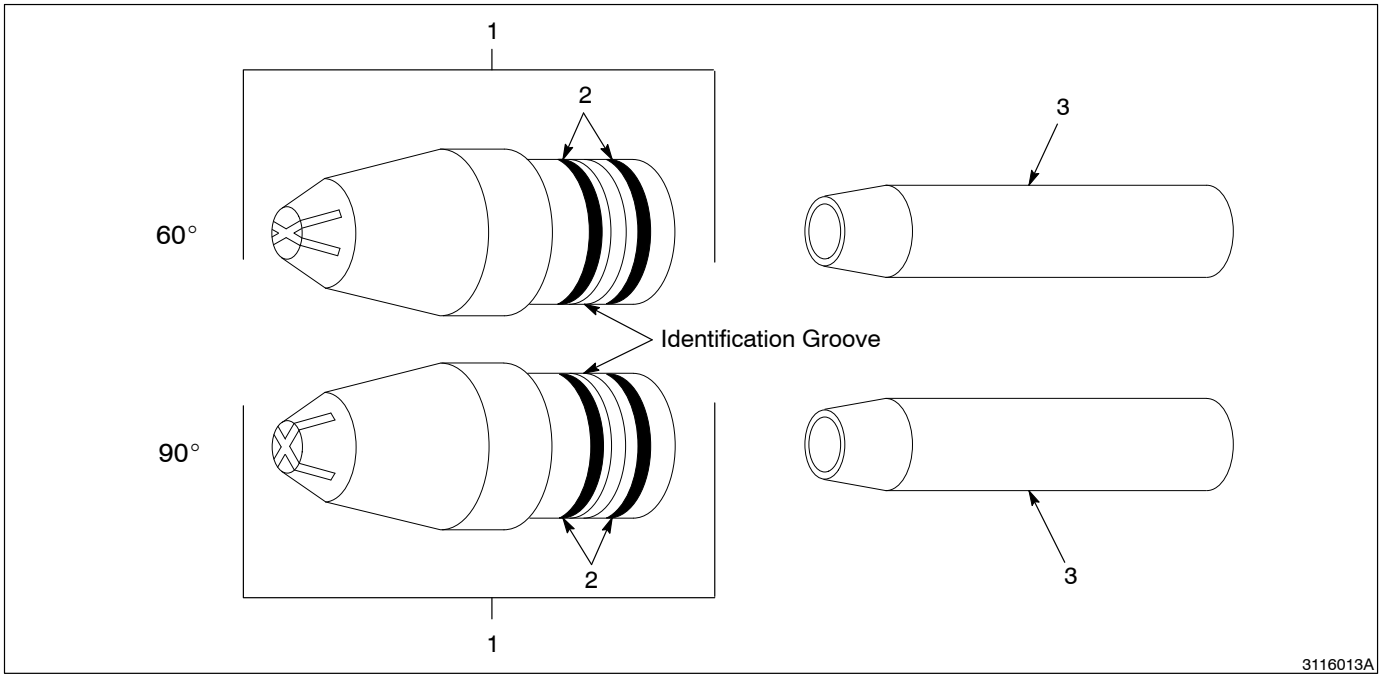

Fig. 13 Optional Cross-Cut Nozzle Service Kits

Optional Castle Nozzle

See Figure 14.

Item	Part	Description	Quantity	Note
—	147 495	Service kit, nozzle, castle, 0.375 in.	1	
1	147 877	• Nozzle, castle, 0.375 in. with O-rings	1	
2	941 181	• • O-ring, silicone, 0.875 x 1.063 x 0.094 in.	2	
3	134 385	• Sleeve, wear, flat spray, with O-ring	1	

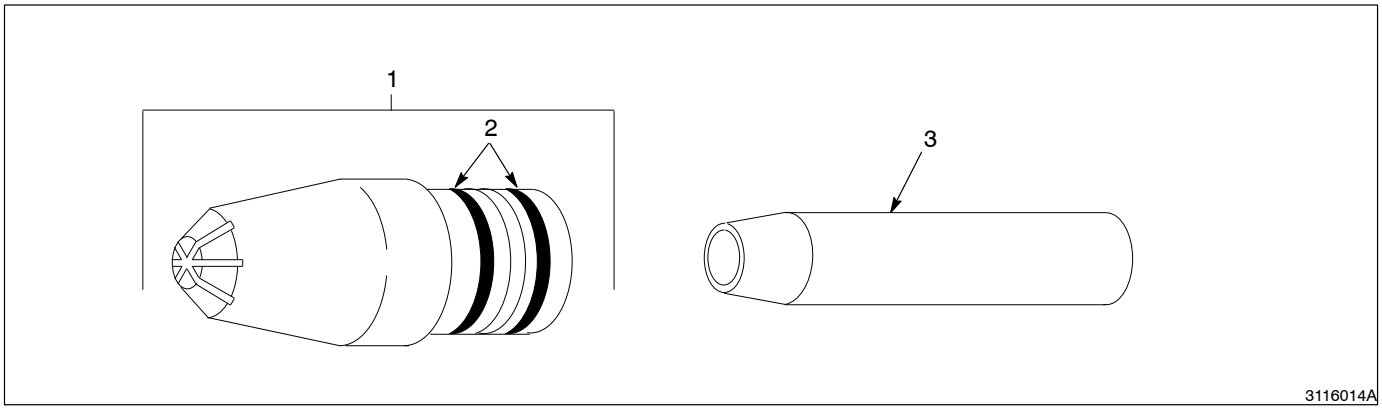

Fig. 14 Optional Castle Nozzle Service Kit

Optional 150- and 300-mm Lance Extensions

See Figure 15.

Item	Part	Description	Quantity	Note
—	133 730	Extension, lance, 150 mm	1	
—	133 731	Extension, lance, 300 mm	1	
1	940 212	• O-ring, silicone, 0.938 x 1.063 x 0.063 in.	1	
2	133 728	• Tube, extension, 150 mm	1	
2	133 729	• Tube, extension, 300 mm	1	
3	940 224	• O-ring, silicone, 1.000 x 1.125 x 0.063 in.	1	
4	160 066	• Electrode, lance, 150 mm	1	A
5	160 020	• • Sleeving, contact	1	
4	160 068	• Electrode, lance, 300 mm	1	B
5	160 020	• • Sleeving, contact	1	
6	160 021	• • Link, adapter, 300 mm	1	
7	133 719	• Support, lance	1	
8	133 721	• Connector, nozzle	1	
9	249 194	• Support, cable well	1	
NS	- - - - - -	• Nozzle, 32 mm, with O-rings	1	C
NS	940 212	• • O-ring, silicone, 0.938 x 1.063 x 0.063 in.	2	
NS	- - - - - -	• Adjuster, pattern, with O-ring	1	D
NS	940 262	• • O-ring, silicone, 1.250 x 1.375 x 0.063 in.	1	
10	145 558	• Nozzle, with O-ring	1	
11	941 181	• • O-ring, silicone, 0.875 x 1.063 x 0.094	2	
12	941 215	• • O-ring, silicone, 1.250 x 0.063 x 0.094	1	
13	144 759	• Adjuster, pattern, 32 mm	1	
14	133 734	• Deflector, 26 mm, with O-ring	1	

NOTE A: Replaces 150-mm electrode, part 133 732. Use contact sleeve, part 130 727 with old style electrode. Refer to Figures 9 and 10 for differences between old and new style electrodes.

B: Replaces 300-mm electrode, part 133 733. Use contact sleeve, part 130 727 with old style electrode. Refer to Figures 9 and 10 for differences between old and new style electrodes.

C: Obsolete, replaced by item 13, nozzle, part 145 558.

D: Obsolete, replaced by item 16, pattern adjuster, part 144 759.

NS: Not Shown

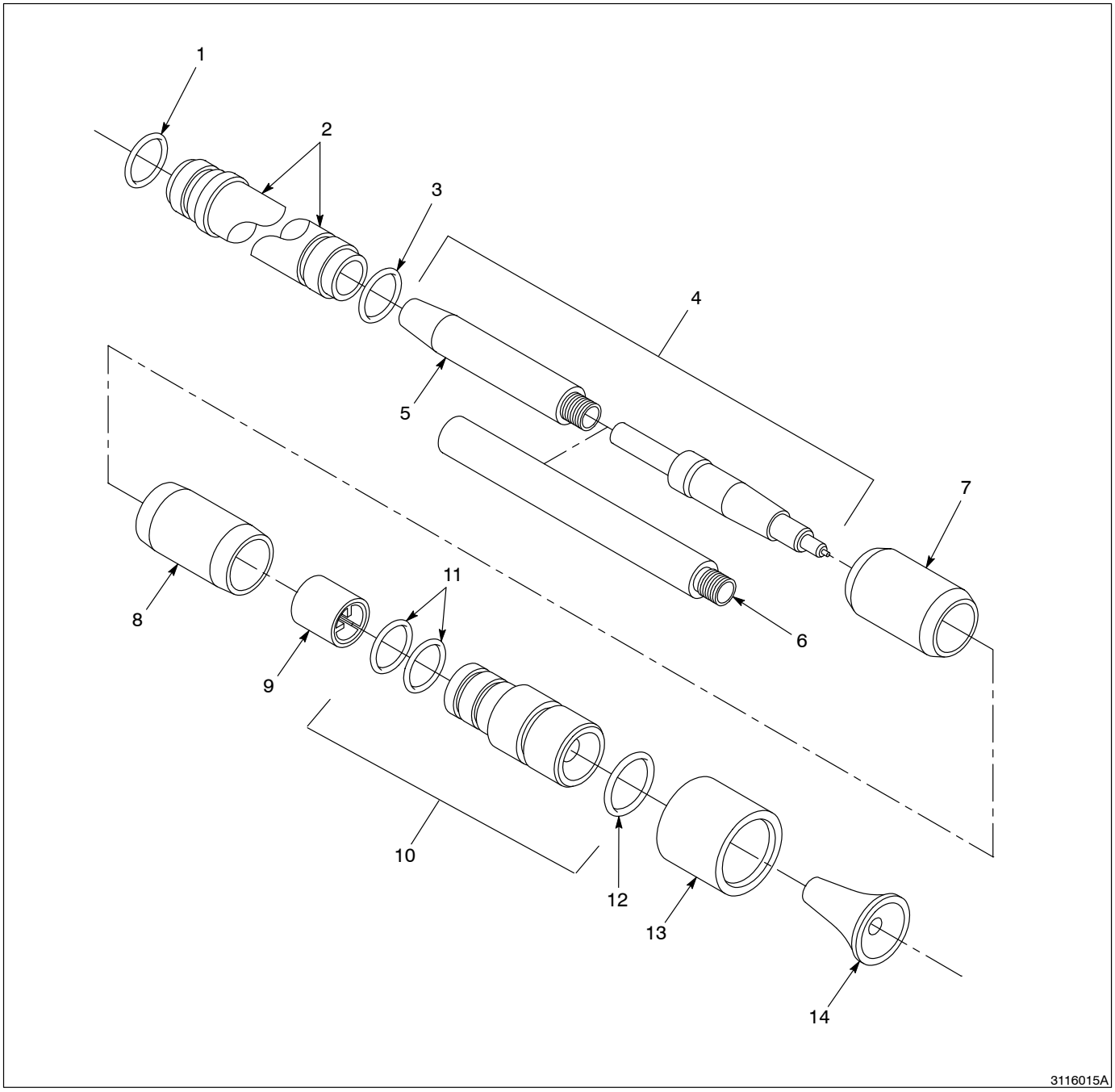

Fig. 15 Optional 150- and 300-mm Lance Extensions

Optional Deflectors and Hose Adapter

See Figure 16.

Item	Part	Description	Quantity	Note
1	135 865	Deflector,14 mm dia, Tivar, with O-ring	1	
2	940 084	• O-ring, silicone, 0.188 x 0.312 x 0.063 in.	1	
3	147 880	Deflector, 16 mm dia, Tivar, with O-ring	1	
4	940 084	• O-ring, silicone, 0.188 x 0.312 x 0.063 in.	1	
5	133 714	Deflector, 19 mm dia, Tivar, with O-ring	1	
6	940 084	• O-ring, silicone, 0.188 x 0.312 x 0.063 in.	1	

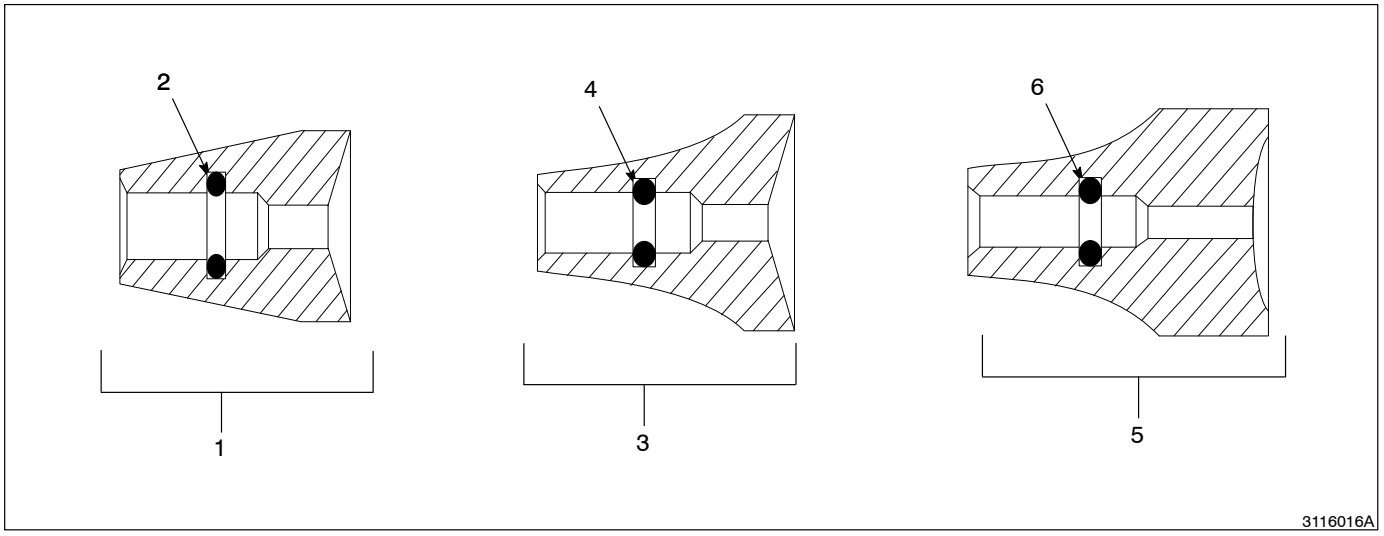

Fig. 16 Optional Deflectors and Hose Adapter

Powder Feed Tubing

The following numbers are bulk part numbers. Order powder tubing in increments of one foot.

Part	Description	Note
900 550	Tubing, isoprene, 0.469 x 0.208 in.	
900 549	Tubing, isoprene, 0.348 x 0.208 in.	
900 650	Tubing, powder, 12.7 mm (0.50 in.), blue	
900 649	Tubing, powder, 9.5 mm (0.37 in.), blue	

Non-Metallic Manual Purge Adapter Kit

See Figure 17.

Item	Part	Description	Quantity	Note
—	157 085	Conversion kit, Versa-Spray, handgun, non-conductive	1	
1	157 094	• Adapter, purge, hose	1	A
2	153 830	• Panel, control, purge	1	B

NOTE A: Refer to *Purge Adapter* in this section for parts.
B: Refer to *Purge Control Panel* in this section for parts.

Non-Metallic Manual Purge Adapter Kit *(contd)*

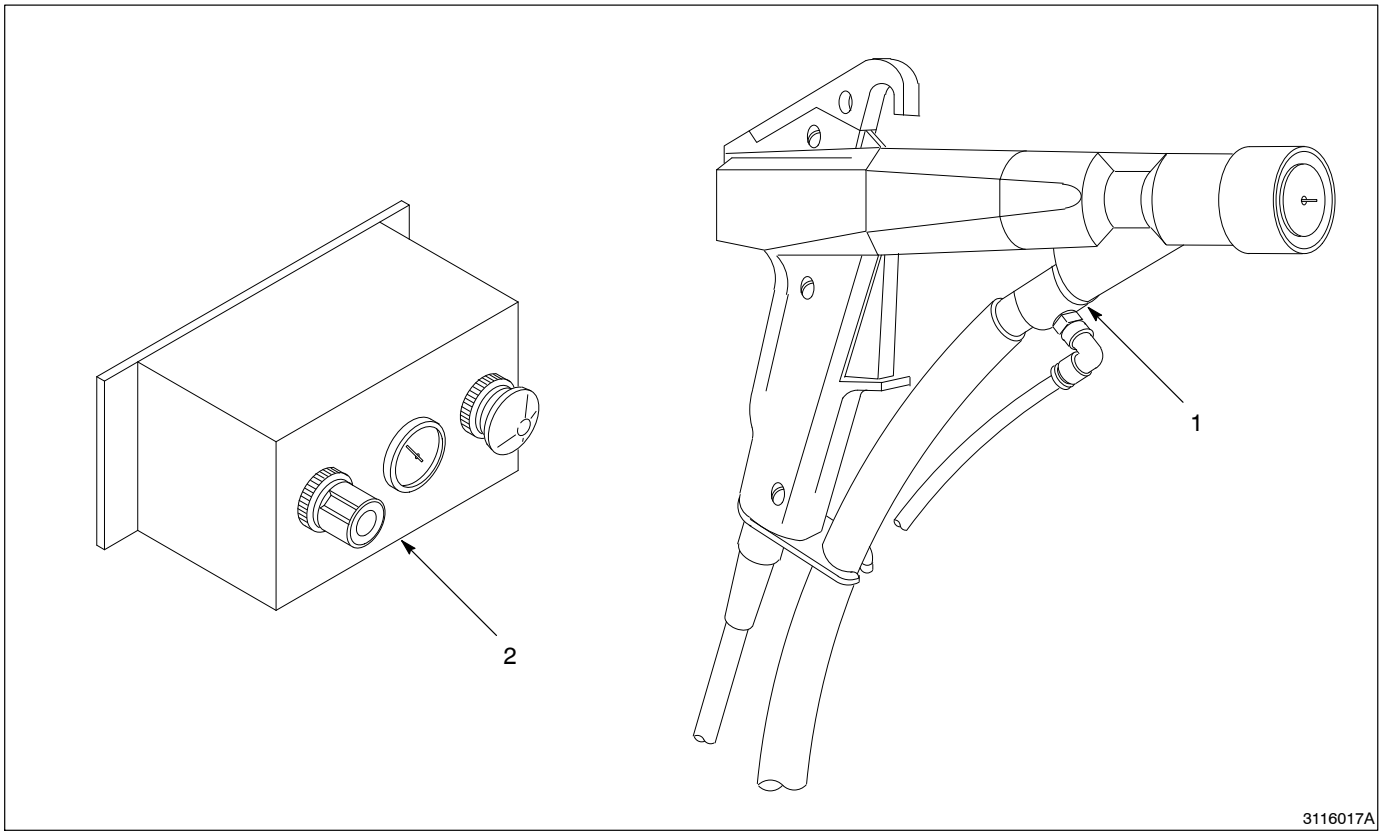

Fig. 17 Non-Metallic Manual Purge Adapter Kit

Metallic Manual Purge Adapter Kit

See Figures 18 and 19.

Item	Part	Description	Quantity	Note
—	153 832	Conversion kit, Versa-Spray, handgun, conductive	1	
1	153 830	• Panel, control, purge	1	A
2	157 094	• Adapter, purge, hose	1	B
3	140 290	• Clamp, tubing, worm drive	1	
4	156 204	• Bracket, hose, purge adapter	1	
5	156 203	• Tube, inlet, conductive, PTFE	1	
6	940 142	• O-ring, silicone, 0.500 x 0.625 x 0.063 in.	2	
7	940 163	• O-ring, silicone, 0.625 x 0.750 x 0.063 in.	1	
8	972 368	• Adapter, conductive, inlet, tube	1	

NOTE A: Refer to *Purge Control Panel* in this section for parts.
B: Refer to *Purge Adapter* in this section for parts.

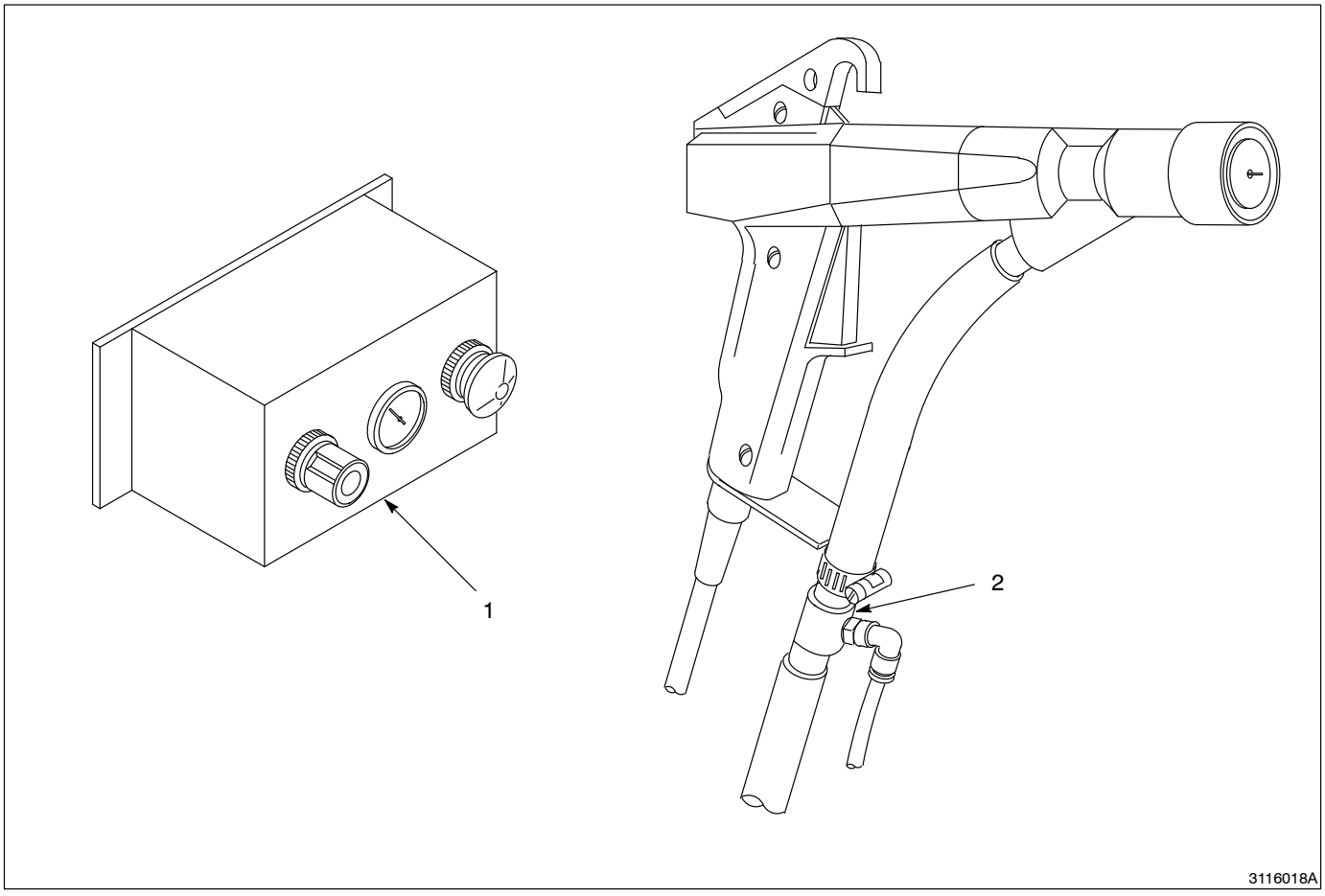

Fig. 18 Metallic Manual Purge Adapter Kit

Metallic Manual Purge Adapter Kit *(contd)*

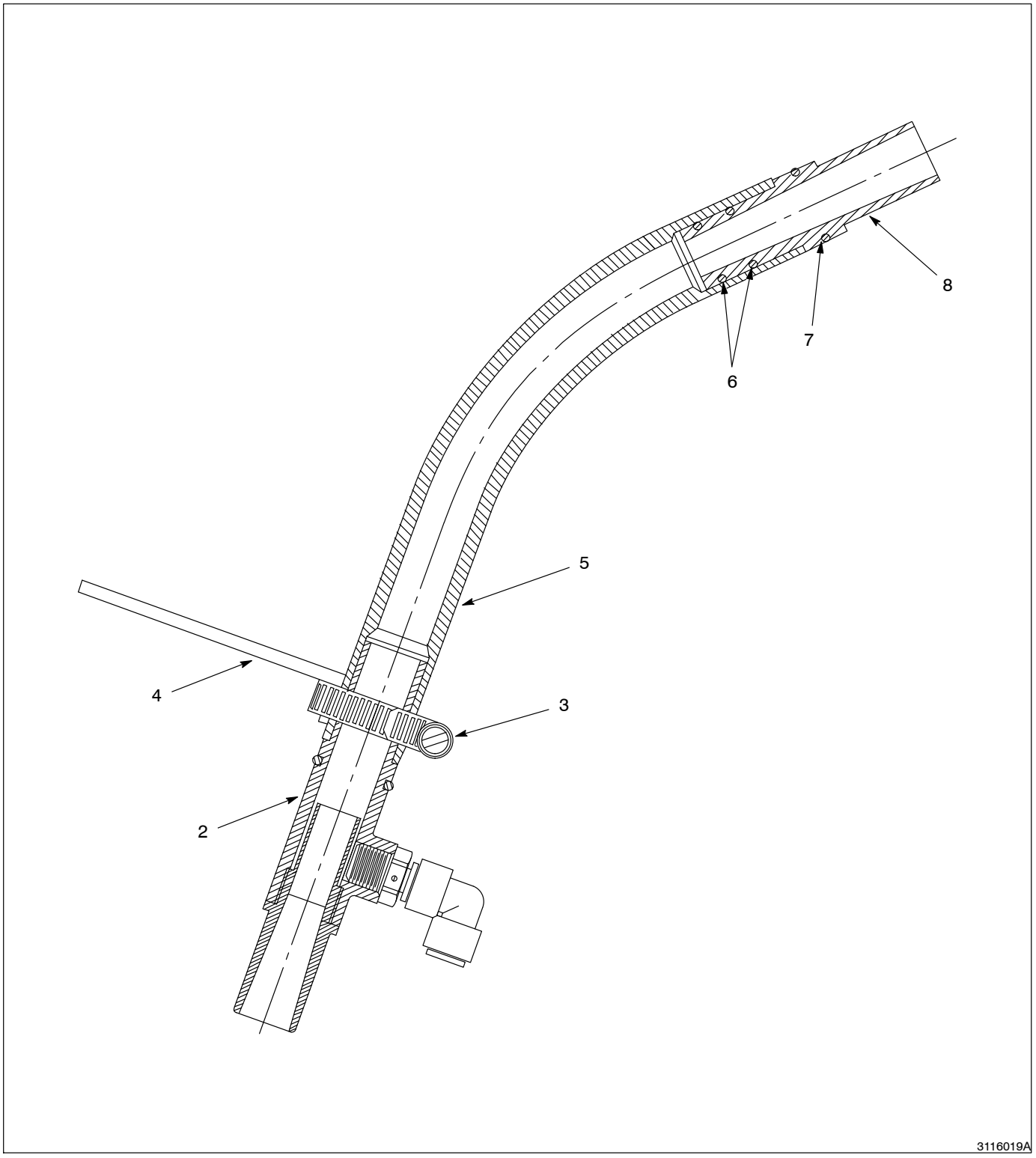

Fig. 19 Additional Metallic Manual Purge Adapter Components

Purge Control Panel

See Figure 20.

Item	Part	Description	Quantity	Note
—	153 830	Panel, control, purge	1	
1	901 444	• Regulator, air, 5–125 psi, $^1/_4$ in. NPT	1	
2	901 260	• Gauge, air, 0–100 psi, 0–7 bar	1	
3	155 180	• Valve, mechanical, 2 way, $^1/_8$ in. NPT, pushbutton	1	
4	156 347	• Housing, purge adapter, painted	1	
5	973 572	• Coupling, pipe, hydraulic, SAE, $^1/_8$ in.	1	
6	972 716	• Connector, $^1/_4$ in. tube x $^1/_8$ NPT	1	
7	972 119	• Elbow, male, $^1/_4$ in. tube x $^1/_8$ in. NPT	3	
8	900 558	• Tubing, synflex, 0.250 x 0.035	AR	
9	971 266	• Elbow, male, $^1/_4$ in. tube x $^1/_4$ in. NPT	1	
10	971 177	• Connector, male, 0.38 tube x $^1/_4$ in. NPT	1	
AR: As Required				

Purge Control Panel *(contd)*

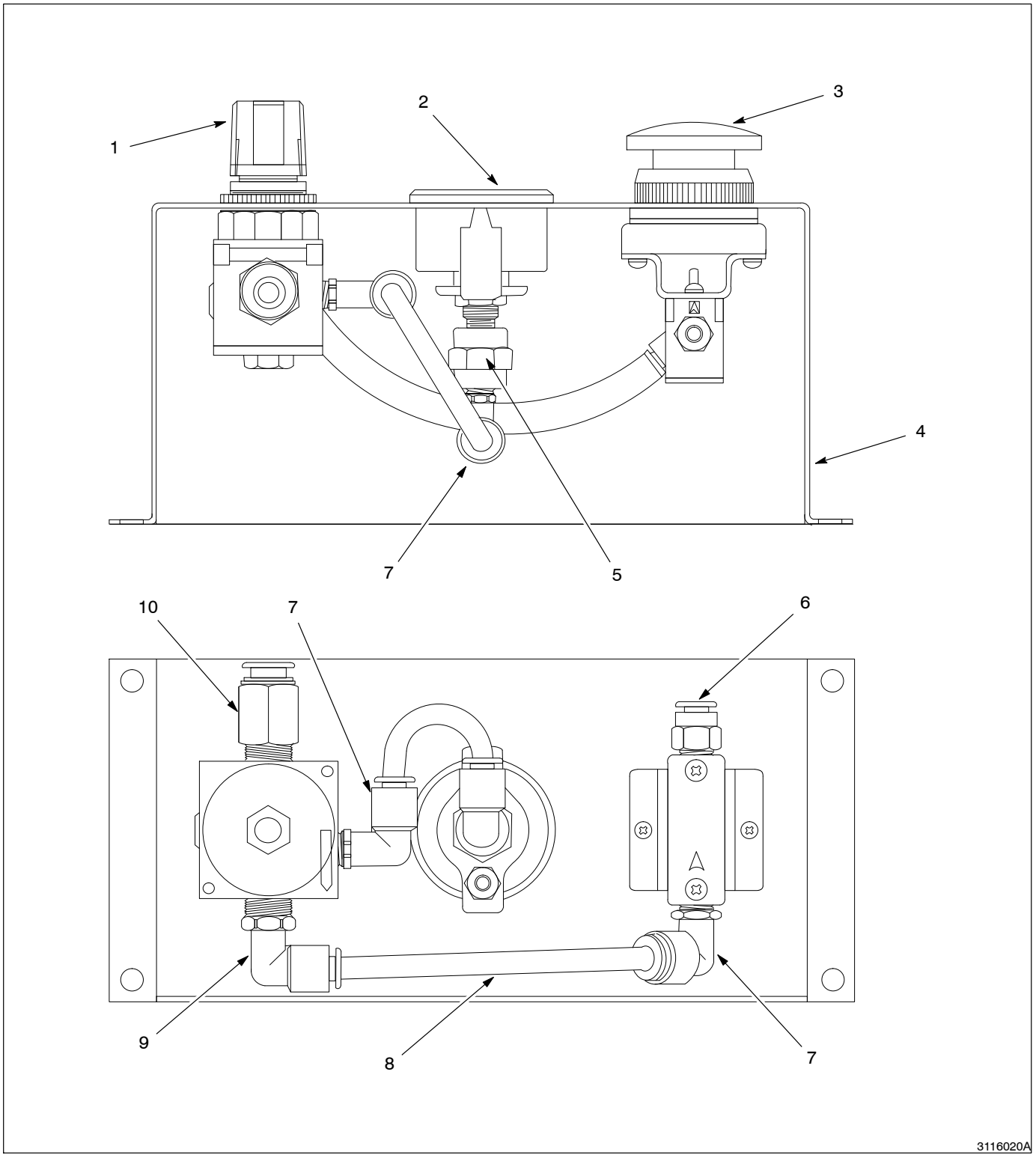

Fig. 20 Purge Control Panel

Purge Adapter

See Figure 21.

Item	Part	Description	Quantity	Note
—	157 094	Adapter, purge, Versa-Spray	1	
1	- - - - - -	• Adapter, purge, outlet	1	
2	940 163	• O-ring, silicone, 0.625 x 0.750 x 0.063 in.	1	
3	- - - - - -	• Adapter, purge, inlet	1	
4	971 675	• Fitting, swivel, elbow, $^1/_4$ tube x $^1/_8$ NPT	1	

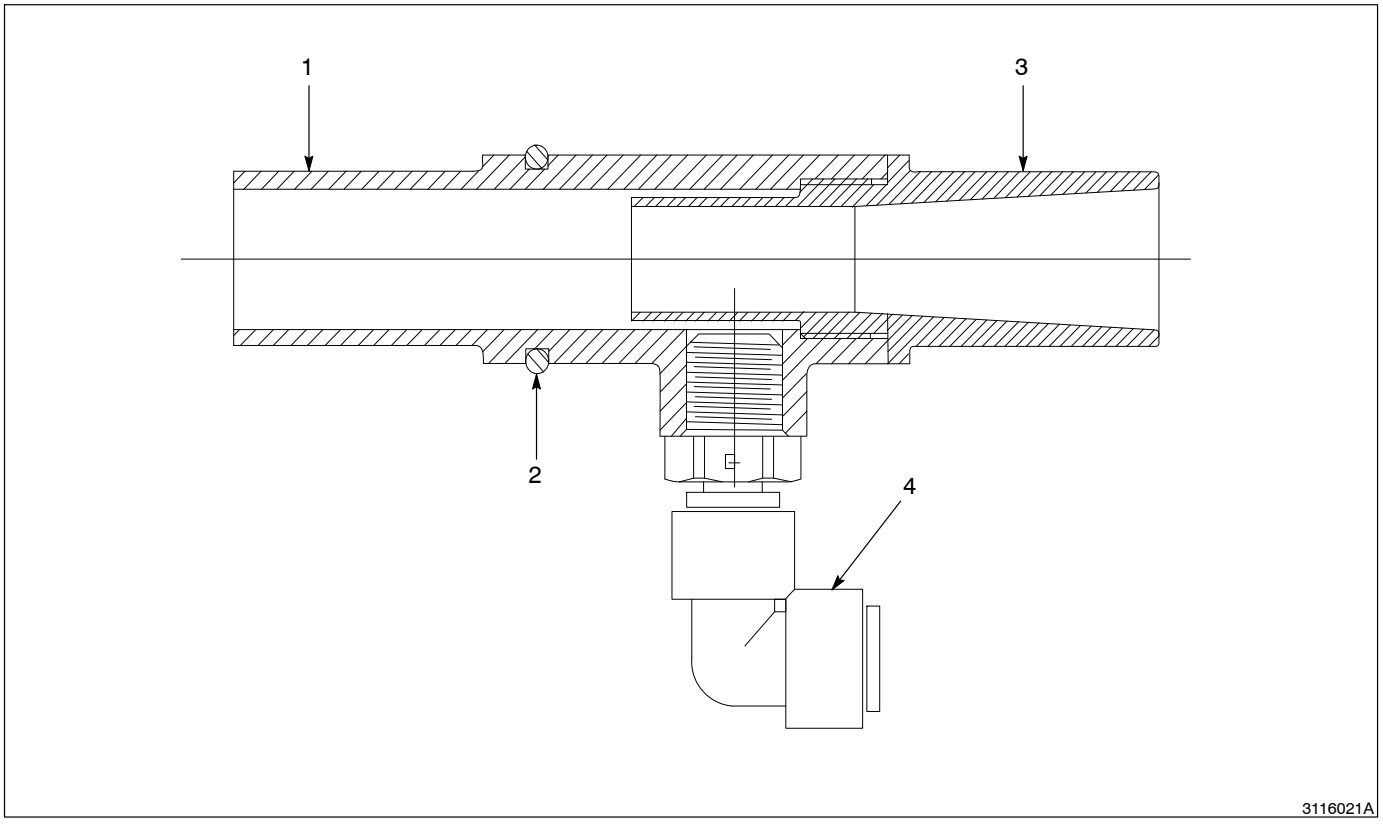

Fig. 21 Purge Adapter

Low-Flow Purge Adapter Inlet (Optional)

See Figure 22.

Part	Description	Note
163 917	Adapter, purge, inlet, low flow	

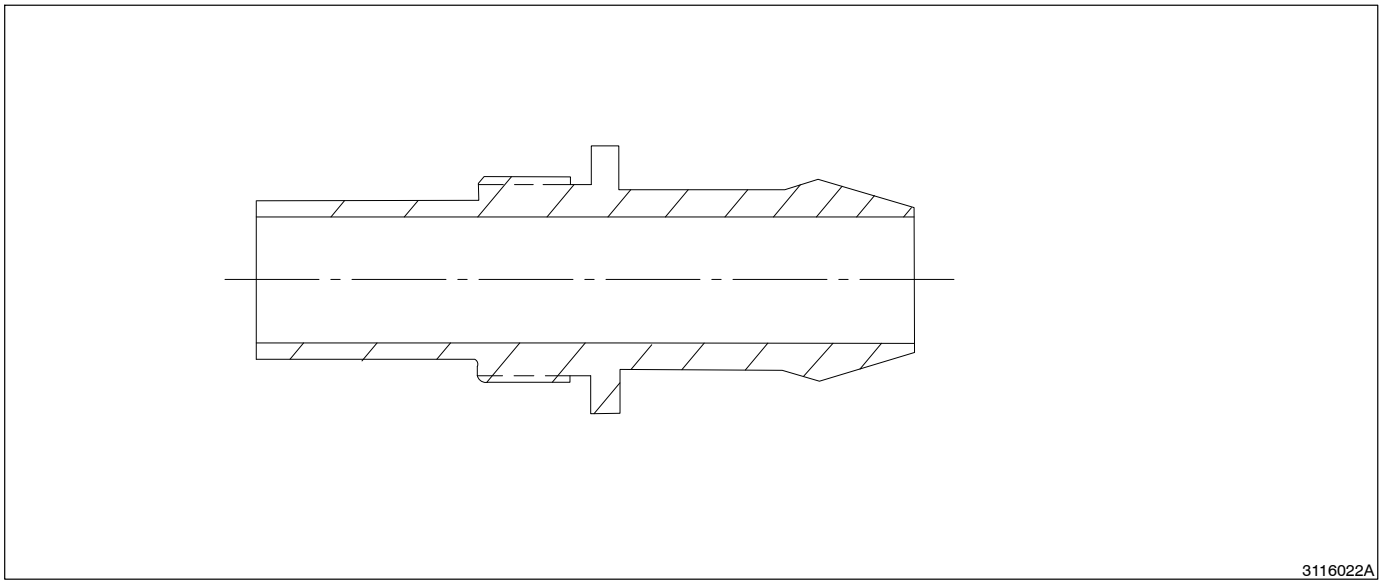

Fig. 22 Low-Flow Purge Adapter Inlet