

Tribomatic[®] 500 Manual Powder Spray Gun

Customer Product Manual
Part 237467D02

Issued 11/07

**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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Tribomatic® 500 Manual Powder Spray Gun

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.

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 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.

- 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.
- 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 II 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.

Description

See Figure 1. The Tribomatic 500 manual powder spray gun uses compressed air to propel powder coatings through charging sleeves inside the barrel of the gun. Friction electrostatically charges the powder particles as they flow through the sleeves.

The 6 meter spray gun is used with a Nordson 3-gauge Tribomatic II control unit and modular Tribomatic powder pump, which are sold separately.

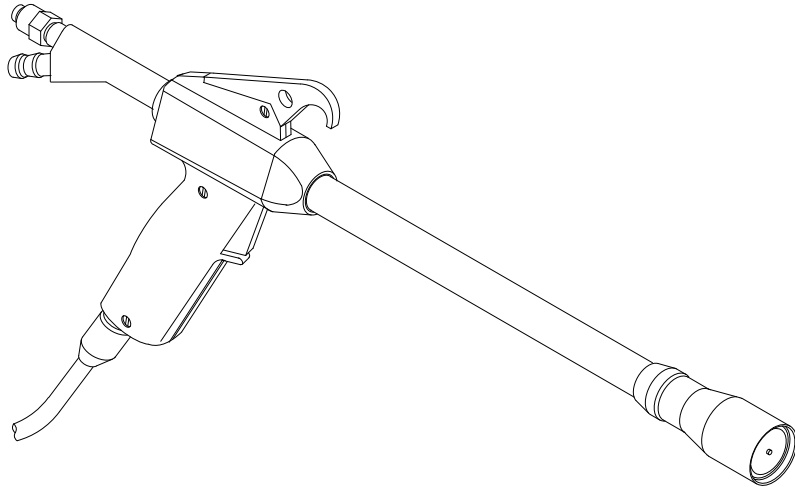


Figure 1 Tribomatic 500 Manual Powder Spray Gun

Gun Components and Operation

See Figure 2. The diffuser (3) mixes compressed air (1) with the powder (2) before it enters the charging sleeves. As the powder and air mixture flows between the inner (4) and outer (5) charging sleeves, the powder particles collide with the charge sleeve walls and receive an electrostatic charge. The sleeves receive an opposite charge that is grounded through the cable (9) and control unit. The control unit displays the grounded charge in microamperes of current. The gun's current output indicates the charge received by the powder.

NOTE: The strength of the charge the powder receives will vary depending on many factors, including the powder type and velocity.

The deflector (7) and the pattern adjust sleeve (8) control the spray pattern shape. Sliding the pattern adjust sleeve forward narrows the pattern; sliding it back widens the pattern.

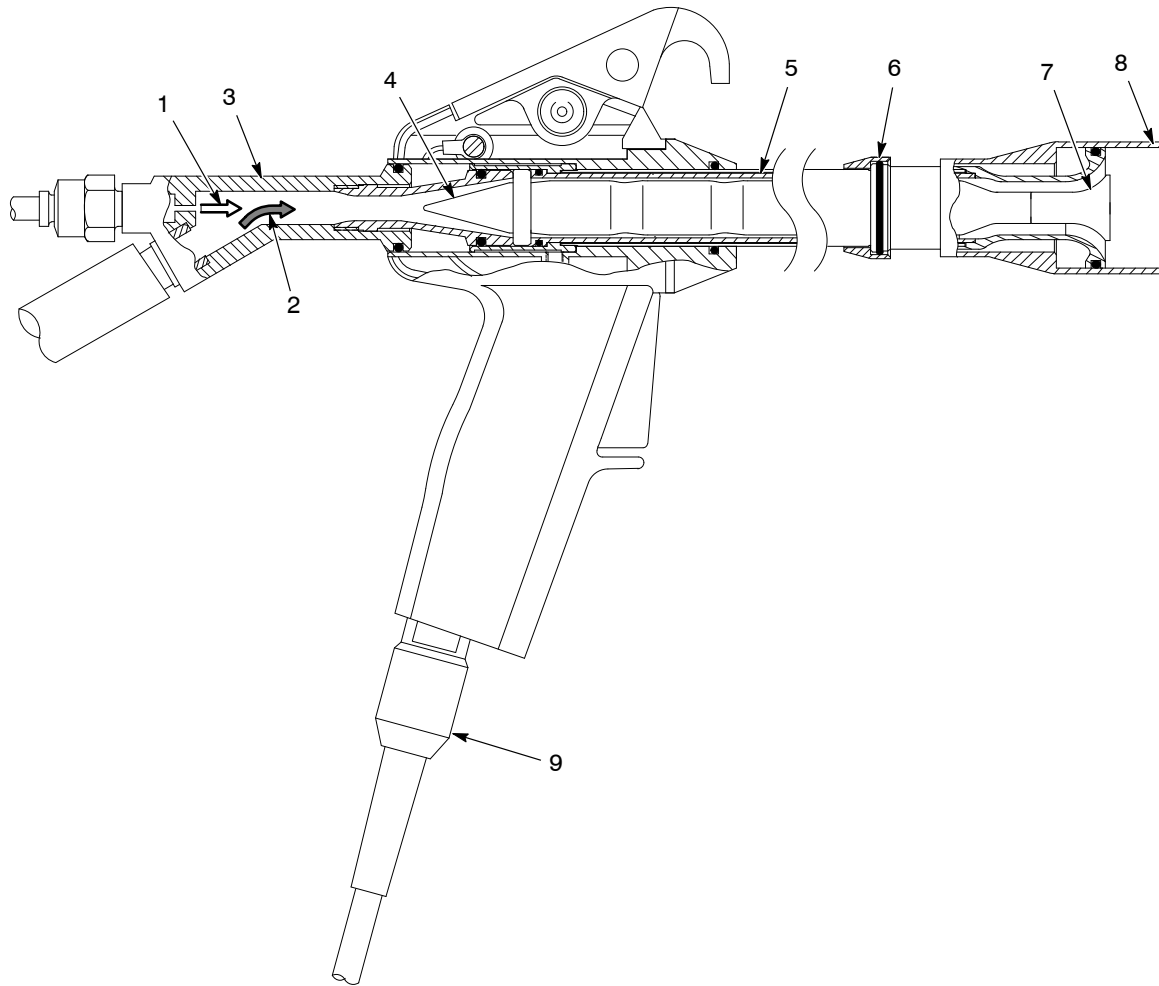


Figure 2 Cutaway View – Gun Components and Operation

- | | | |
|-------------|------------------------------|--------------------------|
| 1. Air | 4. Inner charge sleeve | 7. Deflector |
| 2. Powder | 5. Outer charge sleeve | 8. Pattern adjust sleeve |
| 3. Diffuser | 6. Pattern adjuster retainer | 9. Cable |

Specifications

Length:	521 mm (20.5 in.) maximum
Weight:	0.5 kg (1.1 lbs) (without cable)
Capacity:	4.5–8 kg (10–18 lbs) per hour

Installation



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



WARNING: Ground all electrically conductive equipment in the spray area. Ungrounded or poorly grounded equipment can store an electrostatic charge that can give personnel a severe shock or arc and cause a fire or explosion.

1. See Figure 3. The gun is shipped with the cable (8) installed. Connect the cable end to the GUN OUTPUT receptacle (3) on the back of the Tribomatic II control unit.
2. Install black 6-mm air tubing (11) between the flow-rate air fitting (2) on the control unit and the fitting on the powder pump (10).
3. Install blue 6-mm air tubing (4) between the diffuser air fitting (1) on the control unit and the diffuser (5).
4. Install 9-mm ($\frac{3}{8}$ -in.) ID powder feed hose (9) between the powder pump and the diffuser. Install a few inches of spiral-cut tubing (6) on the feed hose at the diffuser and pump connection points. Secure the spiral-cut tubing with a clamp (7). The tubing will prevent the hose from kinking and blocking the flow of powder.
5. Bundle the powder feed hose, diffuser air tubing, and trigger cable together with spiral-cut plastic tubing. To prevent damage to the hose, tubing, and cable, keep them away from moving equipment and off the floor.

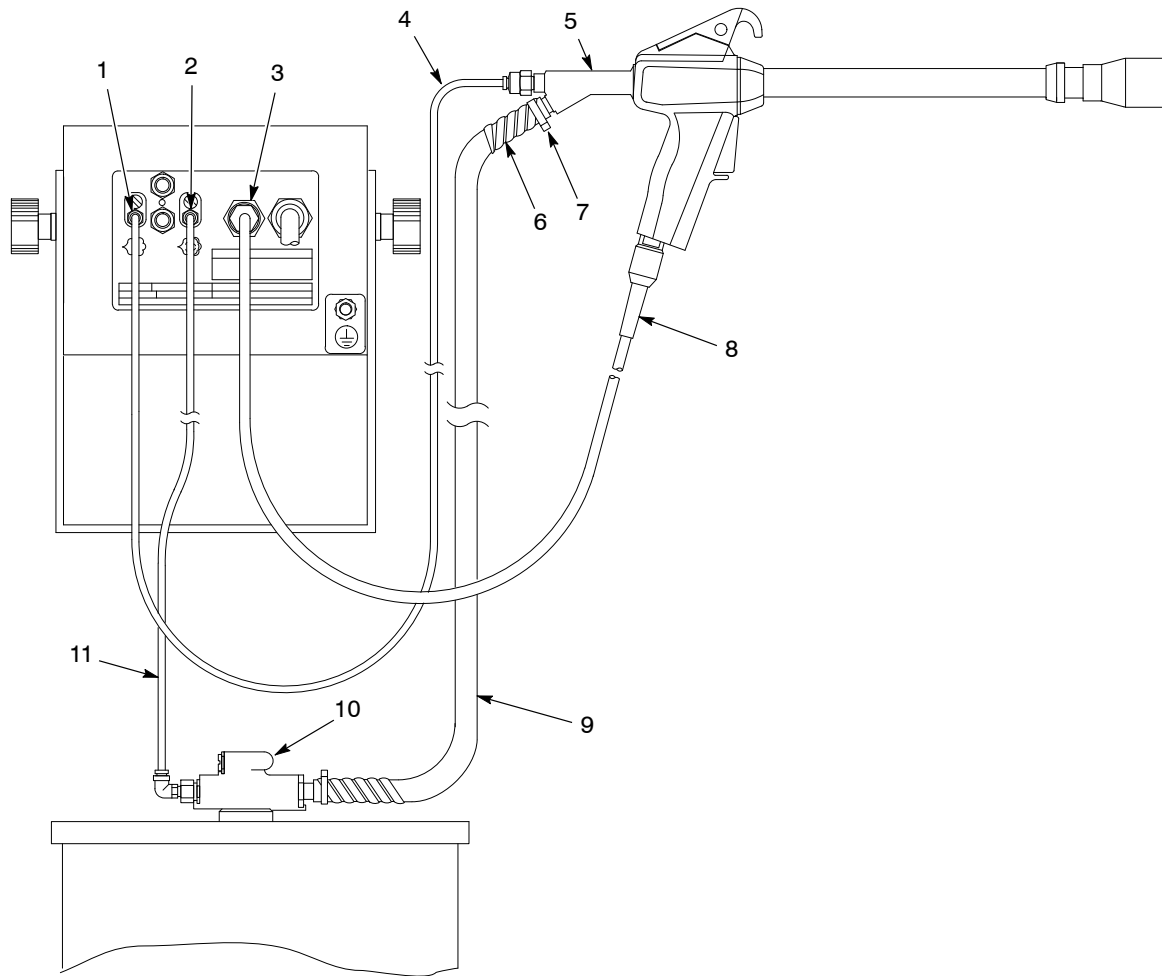


Figure 3 Gun Connections

- | | | |
|--------------------------|----------------------|---------------------------|
| 1. Diffuser air fitting | 5. Diffuser | 9. Powder feed hose |
| 2. Flow-rate air fitting | 6. Spiral-cut tubing | 10. Powder pump |
| 3. GUN OUTPUT receptacle | 7. Clamps | 11. Black 6-mm air tubing |
| 4. Blue 6-mm air tubing | 8. Cable | |

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.



WARNING: The operator must maintain skin contact with the gun handle during operation. If wearing gloves, either cut away the palm or wear conductive gloves. Failure to observe this warning may result in a severe shock.

Break-In Period

Break in new guns before using them for production. The break-in process allows the electrostatic charge generated in the sleeves time to establish a path to ground. Powder charging will improve as the ground path becomes firmly established.

Spray powder for 10 minutes, using the air pressure settings given in this section, then hang up the gun for $1/2$ to 1 hour. You may hear a slight popping sound from the gun.

When you disassemble the gun for cleaning or repairs, you may see small black marks (carbon tracking or tiny pinholes) on the outer charge sleeve, where the sleeve contacts the metal support. This is normal, and will not affect gun operation.

Settings

Set flow-rate and diffuser air pressures at the control unit. Refer to your control unit manual for the location of the regulators.

Air pressure controls powder velocity, flow rate, atomization, and charging. To start, set the regulators as follows:

Flow-rate air	2 bar (30 psi)
Diffuser air	1 bar (15 psi)

Adjust these pressures to obtain the desired results as follows:

- Increase flow-rate air pressure to increase film build; decrease pressure to decrease film build.
- Increase diffuser air pressure to increase electrostatic charging. Decrease diffuser pressure to decrease charging.

Pattern Control

Move the pattern control sleeve back for a wide pattern, forward for a narrow pattern.

MicroAmpere Display

The control unit display should show 1.4 to 4 microamperes during operation. Gun current output varies depending on powder velocity, type of powder, and compressed air moisture content. The higher the output, the better the powder is charging.

Maintenance



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

Perform the following steps daily:

1. Remove the powder feed hose from the pump and the air tubing from the diffuser. Make sure the booth exhaust fan is on. Point the gun into the booth and insert a compressed-air blow gun into the end of the feed hose. Blow out the feed hose, diffuser, and gun.



CAUTION: When cleaning, always disconnect the air tubing from the diffuser and pump. Powder could travel through the air tubing and contaminate the solenoid valves, regulators, and gauges in the control unit. Always blow powder into the booth.

2. Disconnect the powder feed hose from the diffuser. Remove the diffuser from the gun. Blow out the diffuser with low-pressure compressed air.
3. Remove the inner and outer charge sleeves from the gun. Clean the sleeves and nozzle with low-pressure compressed air and a clean, soft cloth. Refer to *Repair* for disassembly instructions.



CAUTION: Never use a knife or other sharp object that will scratch plastic to clean the gun or pump parts. Powder particles will build up on scratches, fuse together on impact, and clog the gun or pump.

4. Disassemble the powder pump and clean the parts with low-pressure compressed air and a clean, soft cloth. Refer to the pump manual for disassembly instructions.
5. Check all equipment ground connections. Make sure all equipment in the spray area is connected to a true earth ground.

Troubleshooting



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

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.

Problem	Possible Cause	Corrective Action
1. Powder does not flow when gun is triggered	No supply air or supply pressure set too low	Make sure the control unit is getting compressed air at correct pressure.
	Flow-rate air pressure set too low	Increase the flow-rate air pressure.
	Blockage in system	Check the flow-rate air tubing for kinks. Make sure the powder feed hose, pump, and pickup tube are not clogged. Make sure the powder and compressed air supplies are clean and dry. Check the fluidizing air pressure.
	Control unit malfunction: solenoid valve not opening	Refer to the control unit manual.
2. Powder puffing from gun	Blockage in system	Clean the pickup tube, pump, feed hose, diffuser, and gun. Make sure the powder is not damp. Check the air dryer.
	Pump venturi throat worn	Replace the venturi throat.
	Diffuser air pressure too high, or incorrect ratio of diffuser to flow-rate air pressure	Decrease the diffuser air pressure or increase the flow-rate air pressure.
	Powder feed hose ID too large or hose too short	Change to a smaller ID hose or change the hose length. Best results are obtained when the hose is 4–6 meters (13–20 feet) long.

Problem	Possible Cause	Corrective Action
3. Poor powder charging—little or no electrostatic wrap or adhesion	Flow-rate air pressure too high or diffuser air pressure too low	Decrease the flow-rate air pressure or increase the diffuser air pressure.
	Parts not properly grounded	Check the conveyor and hanger grounds with an ohm meter. The resistance between the parts and ground should not exceed 1 megohm. For best results the resistance should not exceed 500 ohms. Clean the hangers and conveyor.
	Gun not properly broken in	Break in the gun according to instructions in the <i>Operation</i> section.
	Too much moisture in compressed air supply	Check the air dryer for proper operation. Use a refrigerated or regenerative desiccant air dryer that can produce a 3.4 °C (38 °F) or lower dew point at 7 bar (100 psi). Drain the air filter and check the filter element.
	Inner and outer charge sleeves worn	Disassemble the gun and replace the sleeves. Refer to the <i>Repair</i> section.
	Too many fine particles in powder supply	Add virgin powder to the feed hopper, or replace the powder in the hopper with virgin powder.
	Powder not suitable for tribo-charging	Consult with your powder manufacturer.
4. Inadequate powder flow	Flow-rate air pressure too low	Increase the flow-rate air pressure.
	Blockage in system	Clean the pickup tube, pump, feed hose, diffuser, and gun. Make sure the powder is not damp. Check the air dryer.

Repair



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

Inner and Outer Charge Sleeve Replacement

To replace the charge sleeves, you will need the

- inner charge sleeve kit
- outer charge sleeve

Disassembly

1. Clean the gun as described in *Maintenance*.
2. See Figure 4. Pull the diffuser (1) out of the gun body with a slight twisting motion.
3. Pull the outer charge sleeve support (3) out of the gun body with a slight twisting motion. The deflector (4) will pop out. Be careful not to lose it.
4. Slide the pattern adjuster retainer (2) away from the outer charge sleeve O-ring (8). The retainer can remain on the outer charge sleeve support, unless replacement is necessary.
5. Push, then pull the inner charge sleeve assembly (7) out of the outer charge sleeve. The inlet distributor (5), guide (6), and outlet distributor (10) are the only parts of the inner charge sleeve assembly that can be replaced separately. To replace these parts unscrew the distributor from the rest of the assembly.

NOTE: The inlet distributor and guide can only be installed on the tapered end of the inner sleeve.

6. Push, then pull the outer charge sleeve (9) out of the gun body.
7. Remove the O-ring (8) from the outer charge sleeve. If it is undamaged, it can be used on the new charge sleeve.

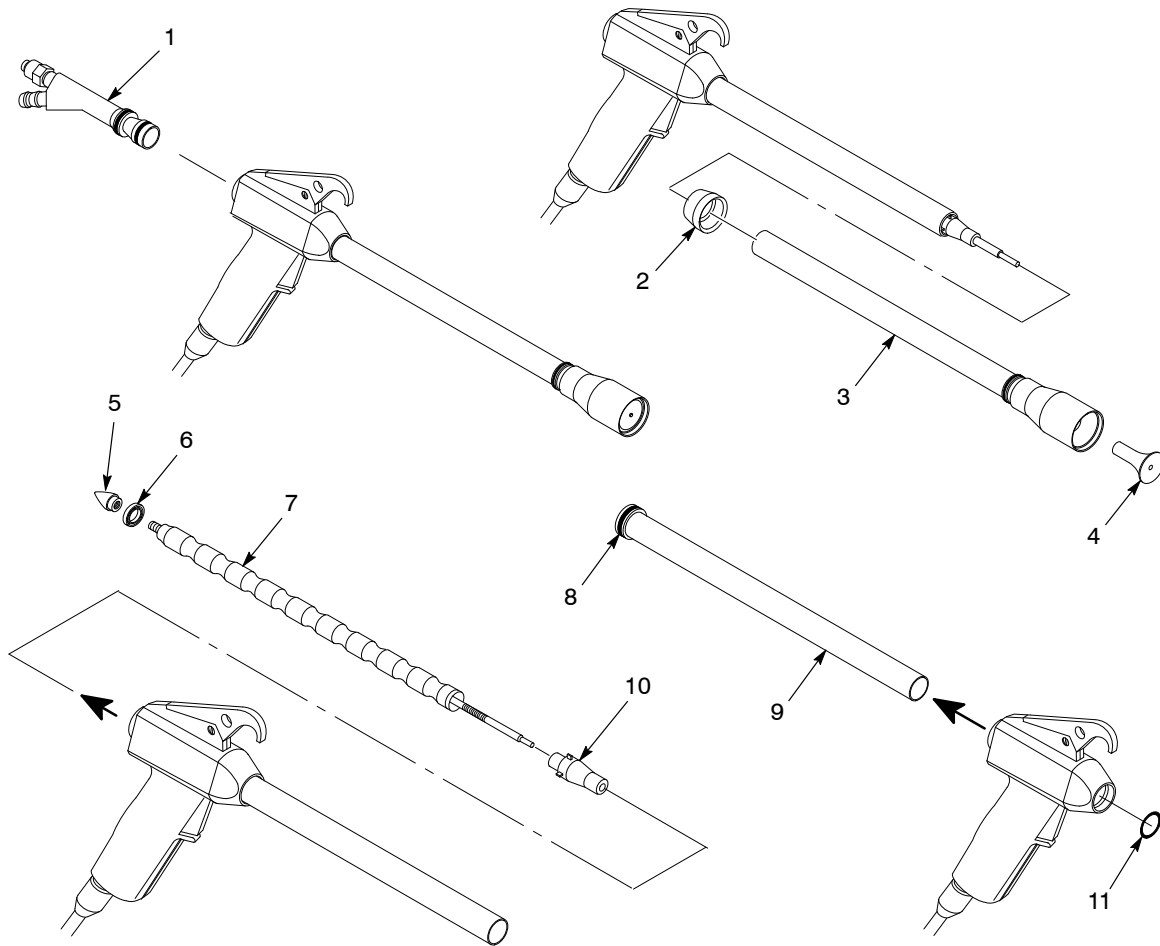


Figure 4 Inner and Outer Charge Sleeve Replacement

- | | | |
|--------------------------------|---------------------------------|------------------------|
| 1. Diffuser | 5. Inlet distributor | 9. Outer charge sleeve |
| 2. Pattern adjuster retainer | 6. Guide | 10. Outlet distributor |
| 3. Outer charge sleeve support | 7. Inner charge sleeve assembly | 11. O-ring (body) |
| 4. Deflector | 8. O-ring (sleeve) | |

Assembly

1. See Figure 4. Install the O-ring (8) on the new outer charge sleeve. Make sure the O-ring (11) in the gun body is undamaged. Replace the O-ring if necessary.
2. Install the new outer charge sleeve into the gun body.
3. Install the new inner charge sleeve assembly into the outer charge sleeve.
4. Slide the pattern adjuster retainer over the outer charge sleeve support. Push the outer charge sleeve support over the outer charge sleeve and into the body until it is seated.
5. Install the deflector on the end of the inner charge sleeve assembly.

Outer Charge Sleeve Support and Pattern Adjust Sleeve Replacement

The outer charge sleeve support kit includes the support tube, a pattern adjuster retainer, and O-rings. The pattern adjust sleeve must be purchased separately. To remove and replace the pattern adjust sleeve, perform the following steps:

1. See Figure 5. Pull the outer charge sleeve support (1) out of the gun body with a slight twisting motion. The deflector (3) will pop out. Be careful not to lose it.
2. Pull the pattern adjust sleeve (4) forward.
3. Slide the pattern adjuster retainer (2) off the outer charge sleeve support.
4. Roll the black O-ring (5) onto the tube as shown.
5. Slide the pattern adjust sleeve down the tube.
6. Check the O-rings (5, 6) and replace them if they are worn or damaged before installing a new pattern adjust sleeve.

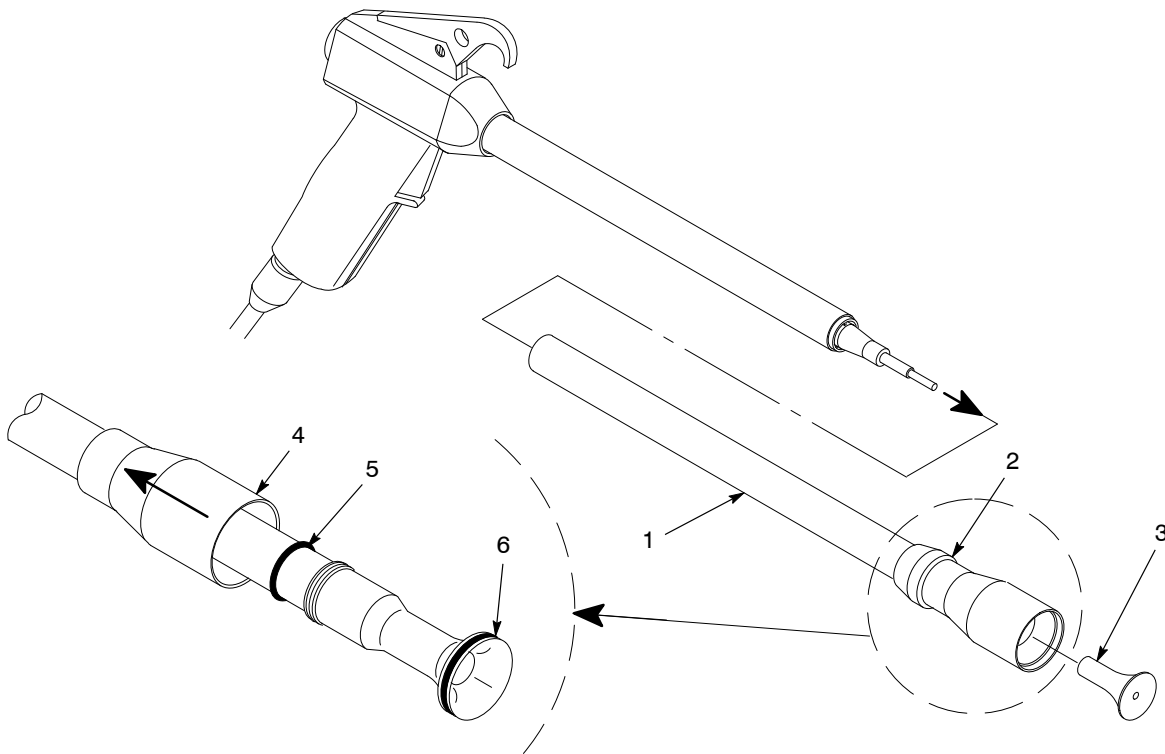


Figure 5 Outer Charge Sleeve Support and Pattern Adjust Sleeve Replacement

- | | | |
|--------------------------------|--------------------------|-------------------|
| 1. Outer charge sleeve support | 3. Deflector | 5. O-ring (black) |
| 2. Pattern adjuster retainer | 4. Pattern adjust sleeve | 6. O-ring (red) |

Handle, Trigger, and Cable Replacement

To replace the handle, trigger, or cable, you must disassemble the handle. Kits are available to replace the handle or trigger. To replace the trigger switch you must replace the cable.

Handle Disassembly

The handle assembly consists of two parts, the handle and the cover. Threaded brass inserts, used to secure the cover, trigger, trigger switch, ground wire, and hanger, are molded into the handle.

1. See Figure 6. Loosen the three captive screws (10) in the cover (11).
2. Separate the cover from the handle (8).
3. Remove the body (4) from the handle. Remove the nut (6) and ground wire (5) from the set screw (7).
4. Remove the screw (2), ground wire (3), and hanger (1) from the handle.
5. Unscrew the two small screws (13), then remove the trigger switch (12) and actuator (15) from the handle. If replacing the cable (9), remove the screws, washers, and actuator from the trigger switch.
6. Unscrew the pivot (17), then remove it and the trigger (16). Remove the screw (14) to replace the trigger spring.

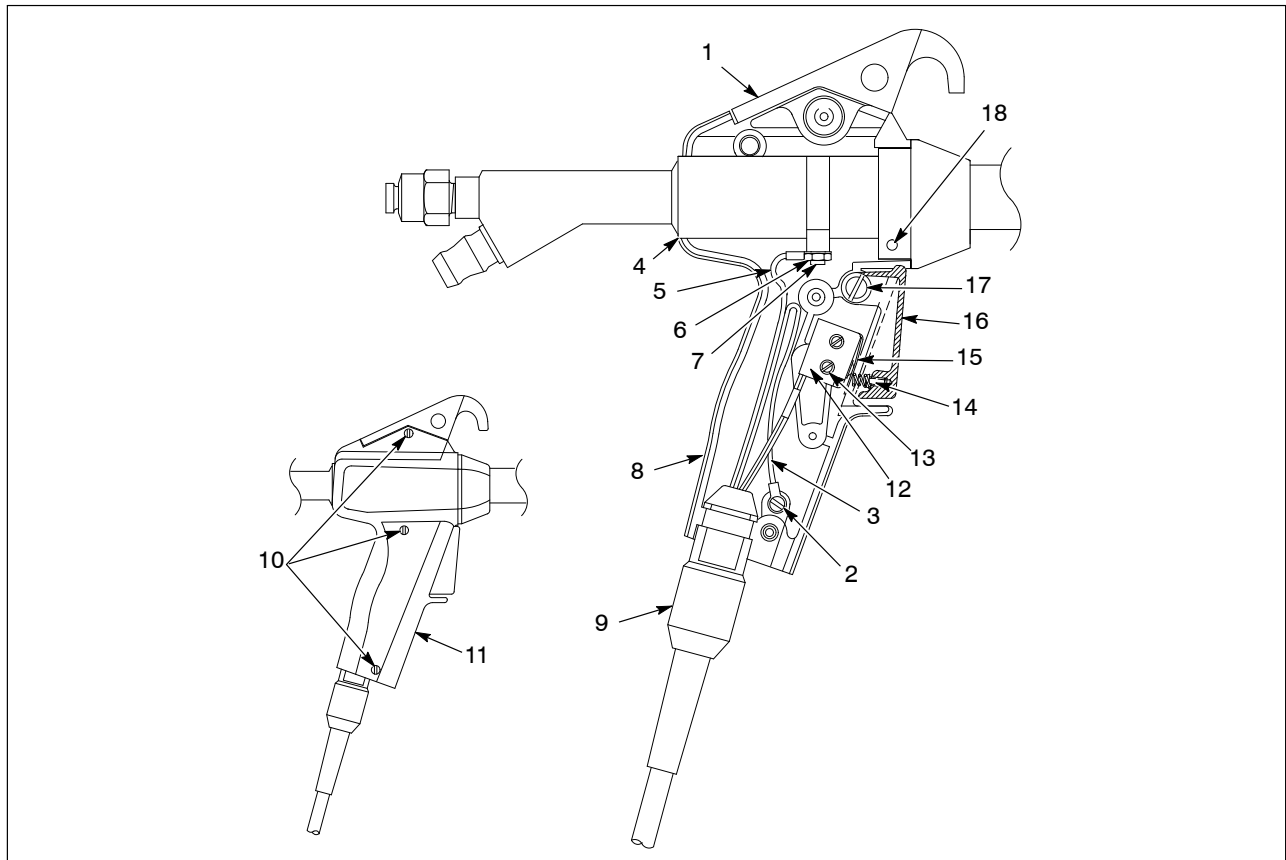


Figure 6 Handle, Trigger, and Cable Replacement

- | | | |
|------------------------|--------------------|------------------------|
| 1. Hanger | 7. Set screw | 13. Screws and washers |
| 2. Screw | 8. Handle | 14. Screw |
| 3. Ground wire (green) | 9. Cable | 15. Actuator |
| 4. Body | 10. Captive screws | 16. Trigger |
| 5. Ground wire (blue) | 11. Cover | 17. Pivot |
| 6. Nut | 12. Trigger switch | 18. Holes |

Assembly

1. Install the green ground wire on the handle with the screw.
2. Install the hanger on the body.
3. Secure the blue ground wire to the set screw with the nut.
4. Secure the actuator and trigger switch to the handle with the two screws and washers (flat and lock).
5. Install the trigger on the handle with the pivot.
6. Install the body into the handle. Make sure the pin in the handle fits into the hole (18) in the body.
7. Arrange the wires so they will not be pinched between the handle halves. Make sure the cable molding fits properly into the bottom of the handle.
8. Install the cover and tighten the captive screws.

Parts

To order parts, call the Nordson Finishing Customer Support Center at (800) 433-9319 or contact your local Nordson representative.

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	

Gun Parts

See Figure 7.

Item	Part	Description	Quantity	Note
—	1076394	GUN, manual, Tribomatic 500, 6 meter cable	1	
1	302422	• HANGER, manual gun	1	
2	304390	• KIT, handle	1	A
3	132334	• PIVOT, trigger	1	
4	982370	• SCREW, pan head, M2 x 25	1	
5	133783	• SPRING, trigger, return	1	
6	125617	• TRIGGER, manual gun, modular	1	
7	982487	• SCREW, pan head, M4 x 5	1	
8	984121	• NUT, hex, #10-24	1	
9	1076395	• CABLE, T2, 6 meter	1	
10	132336	• ACTUATOR, switch	1	
11	983510	• WASHER, flat, 0.094 x 0.188 x 0.025, brass	2	
12	983113	• WASHER, lock, #2	2	
13	1070246	• SCREW, pan head, #2-56 x 0.437 in.	2	
14	173138	• DEFLECTOR, 19 mm, flat, VS2, w/O-ring	1	
NS	940084	• • O-RING, silicone, 0.188 x 0.312 x 0.063 in.	1	
15	304389	• KIT, outer charge sleeve support	1	A
16	302402	• SLEEVE, pattern adjuster	1	
17	302407	• SLEEVE, outer charge	1	
18	940175	• O-RING, silicone, 0.688 x 0.813 x 0.062 in.	1	
19	304388	• KIT, inner charge sleeve	1	A
20	302413	• SCREW, set, #10-24 x 0.375 in.	1	
21	941181	• O-RING, silicone, 0.875 x 1.063 x 0.094 in.	1	
22	-----	• BODY, handle interface	1	
23	302410	• KIT, diffuser	1	A
NS	247006	• CLAMP, hose, 0.673–0.795 in.	1	
NS	900517	• TUBING, poly, spiral-cut	2	
NOTE A: Refer to the kit lists for included parts.				
NS: Not Shown				

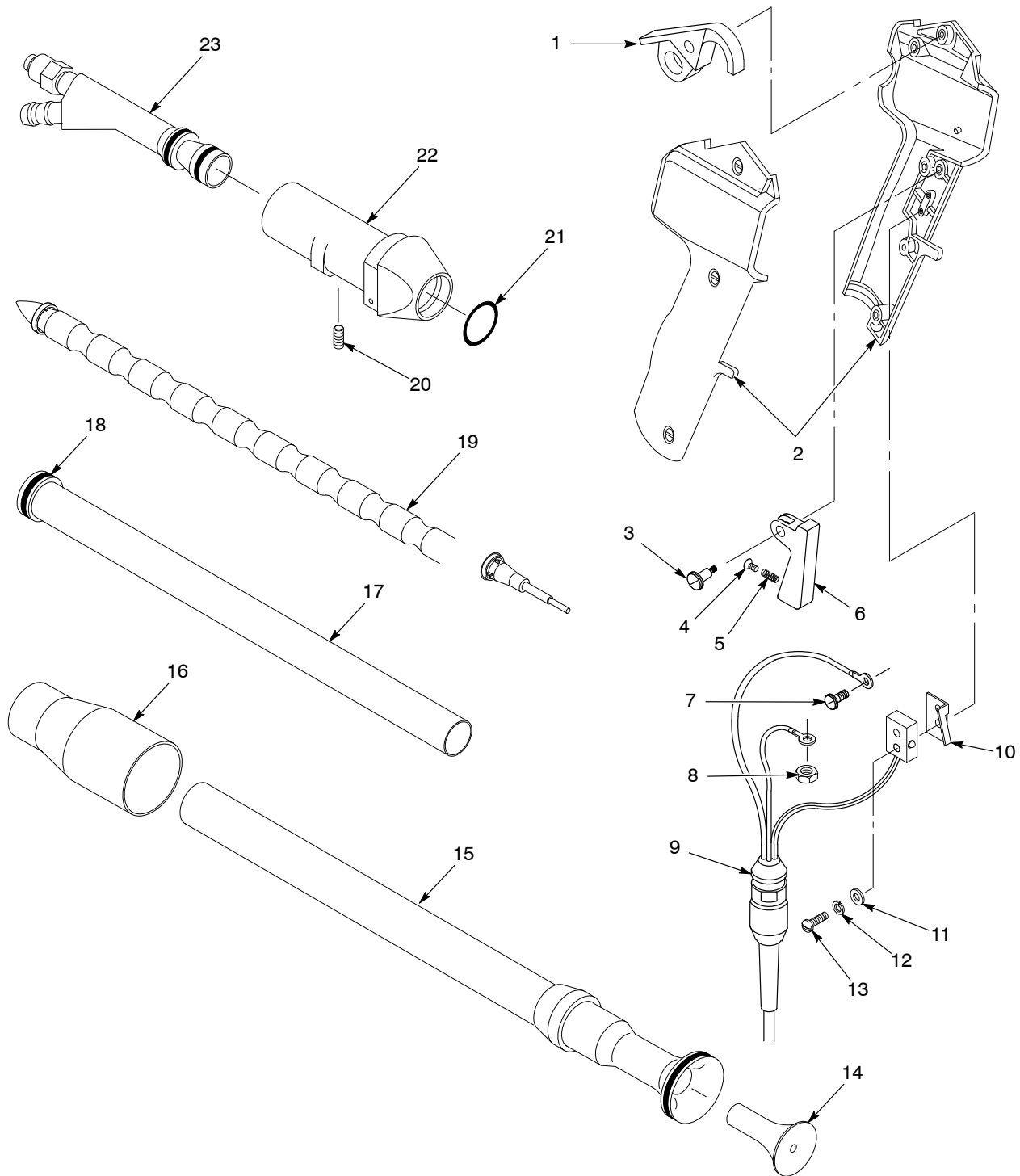


Figure 7 Handle, Trigger, and Cable Replacement

Inner Charge Sleeve Kit

Item	Part	Description	Quantity	Note
—	304388	KIT, inner charge sleeve	1	
1	302411	• DISTRIBUTOR, inlet	1	
2	302412	• GUIDE, inner charge sleeve	1	
3	302404	• DISTRIBUTOR, outlet	1	

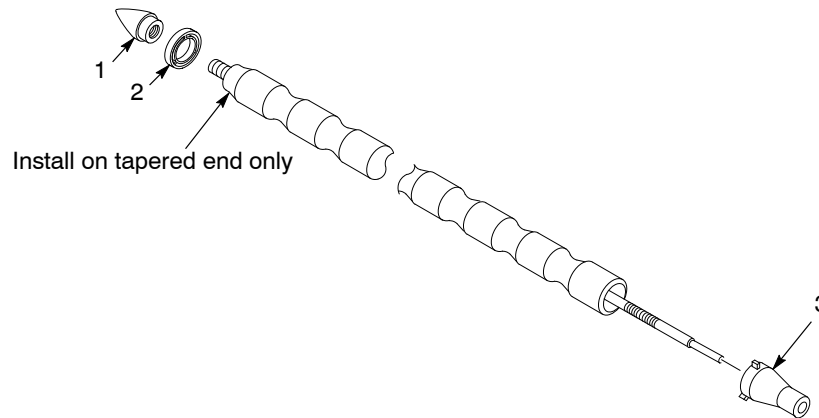


Figure 8 Inner Charge Sleeve Kit

Outer Charge Sleeve Support Kit

Item	Part	Description	Quantity	Note
—	304389	KIT, outer charge sleeve support	1	
1	940184	• O-RING, silicone, conductive, 0.75 x 0.875 in.	1	
2	941231	• O-RING, silicone, 1.188 x 1.375 x 0.094 in.	1	
3	326656	• RETAINER, pattern adjuster	1	

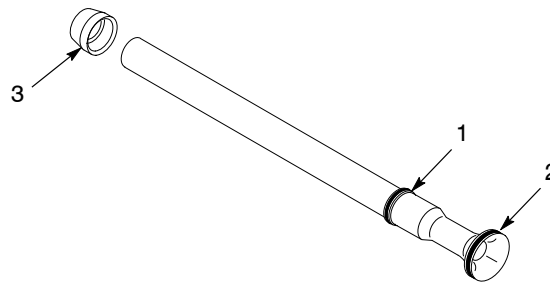


Figure 9 Inner Charge Sleeve Kit

Diffuser Kit

Item	Part	Description	Quantity	Note
—	302410	KIT, diffuser	1	
1	302419	• DIFFUSER	1	
2	941162	• O-RING, silicone, 0.75 x 0.937 x 0.094 in.	1	
3	302417	• SLEEVE, inlet	1	
4	941154	• O-RING, silicone, conductive, 0.688 x 0.75 in.	1	
5	631275	• CONNECTOR, diffuser, PVC tube	1	
6	972080	• CONNECTOR, male, 1/2 in. tube x 1/8 in. NPT	1	
NS	247006	• CLAMP, hose, 0.673–0.795 OD	1	

NS: Not Shown

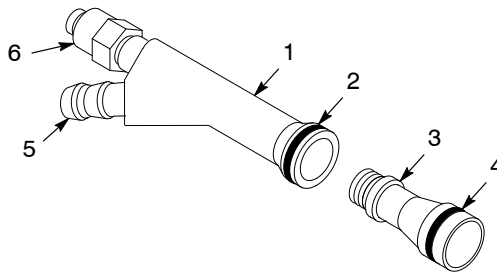


Figure 10 Diffuser Kit

Handle Kit

Item	Part	Description	Quantity	Note
—	304390	KIT, handle	1	
1	981626	• SCREW, captive, M4 x 12	3	
2	940060	• O-RING, Viton, 0.125 x 0.250 x 0.063 in.	3	

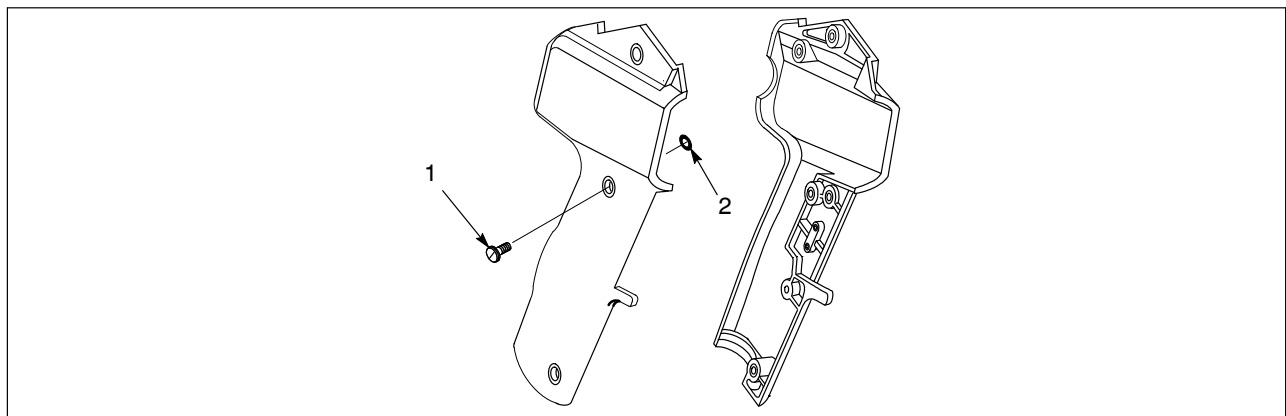


Figure 11 Handle Kit

