Trilogy™ Solventborne Electrostatic HVLP and Air Spray Automatic Gun

Customer Product Manual

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– English –
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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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– Original document –

Table of Contents

Change Record

Revision	Date	Change
03	12/24	Updating Manufacturer Address

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 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 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 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 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.
- Make sure the spray area is adequately ventilated. 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.

High-Pressure Fluids

High-pressure fluids, unless they are safely contained, are extremely hazardous. Always relieve fluid pressure before adjusting or servicing high pressure equipment. A jet of high-pressure fluid can cut like a knife and cause serious bodily injury, amputation, or death. Fluids penetrating the skin can also cause toxic poisoning.

If you suffer a fluid injection injury, seek medical care immediately. If possible, provide a copy of the SDS for the injected fluid to the health care provider.

The National Spray Equipment Manufacturers Association has created a wallet card that you should carry when you are operating high-pressure spray equipment. These cards are supplied with your equipment. The following is the text of this card:

WARNING: Any injury caused by high pressure liquid can be serious. If you are injured or even suspect an injury:

- Go to an emergency room immediately.
- Tell the doctor that you suspect an injection injury.
- Show them this card
- Tell them what kind of material you were spraying

MEDICAL ALERT — AIRLESS SPRAY WOUNDS: NOTE TO PHYSICIAN

Injection in the skin is a serious traumatic injury. It is important to treat the injury surgically as soon as possible. Do not delay treatment to research toxicity. Toxicity is a concern with some exotic coatings injected directly into the bloodstream.

Consultation with a plastic surgeon or a reconstructive hand surgeon may be advisable.

The seriousness of the wound depends on where the injury is on the body, whether the substance hit something on its way in and deflected causing more damage, and many other variables including skin microflora residing in the paint or gun which are blasted into the wound. If the injected paint contains acrylic latex and titanium dioxide that damage the tissue's resistance to infection, bacterial growth will flourish. The treatment that doctors recommend for an injection injury to the hand includes immediate decompression of the closed vascular compartments of the hand to release the underlying tissue distended by the injected paint, judicious wound debridement, and immediate antibiotic treatment.

Fire Safety

To avoid a fire or explosion, follow these instructions.

- Ground all conductive equipment. Use only grounded air and fluid hoses. 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. Do not heat materials to temperatures above those recommended by the manufacturer. Make sure heat monitoring and limiting devices are working properly.
- Provide adequate ventilation to prevent dangerous concentrations of volatile particles or vapors. Refer to local codes or your material SDS for guidance.
- Do not disconnect live electrical circuits when 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.

Halogenated Hydrocarbon Solvent Hazards

Do not use halogenated hydrocarbon solvents in a pressurized system that contains aluminum components. Under pressure, these solvents can react with aluminum and explode, causing injury, death, or property damage. Halogenated hydrocarbon solvents contain one or more of the following elements:

Element	Symbol	Prefix
Fluorine	F	“Fluoro-”
Chlorine	Cl	“Chloro-”
Bromine	Br	“Bromo-”
Iodine	I	“Iodo-”

Check your material SDS or contact your material supplier for more information. If you must use halogenated hydrocarbon solvents, contact your Nordson representative for information about compatible Nordson components.

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 system electrical power. Close hydraulic and pneumatic shutoff valves and relieve pressures.
- Identify the reason for the malfunction and correct it before restarting the system.

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. See Figure 2-1 for the location of the safety label.

Table 1-1 Safety Label

Symbol	Description
	**WARNING:** Allow only qualified personnel to use this equipment. Observe and follow all safety instructions for this equipment.
	**WARNING:** Risk of explosion or fire. Fire, open flames, and smoking prohibited.
	**WARNING:** Do not point the spray gun at any part of your body or at anyone else. Do not operate the fluid delivery system if any component is leaking. Failure to observe this warning could result in an injection injury.
	**WARNING:** Risk of electrical shock. Disconnect and lockout input power to equipment before servicing. Failure to observe this warning may result in personal injury or death

Section 2
Description

Introduction

See Figure 2-1.

The Trilogy automatic electrostatic air spray/HVLP solventborne spray gun is designed for use with solventborne coating materials. It has an internal user-replaceable voltage multiplier that generates the high voltage used to electrostatically charge the coating materials as they are sprayed from the gun. Electrostatic output voltage and air pressure are controlled by an IPS-20 automatic control unit.

The spray gun is non-circulating. It can be used with heated and unheated spray systems. If the coating material is heated then it must be circulated.

HVLP and air spray systems use low-pressure fluid sources, such as pressure pots, diaphragm pumps, or low-ratio piston pumps. They are commonly used to apply low to medium viscosity fluids to products requiring a high-quality finish.

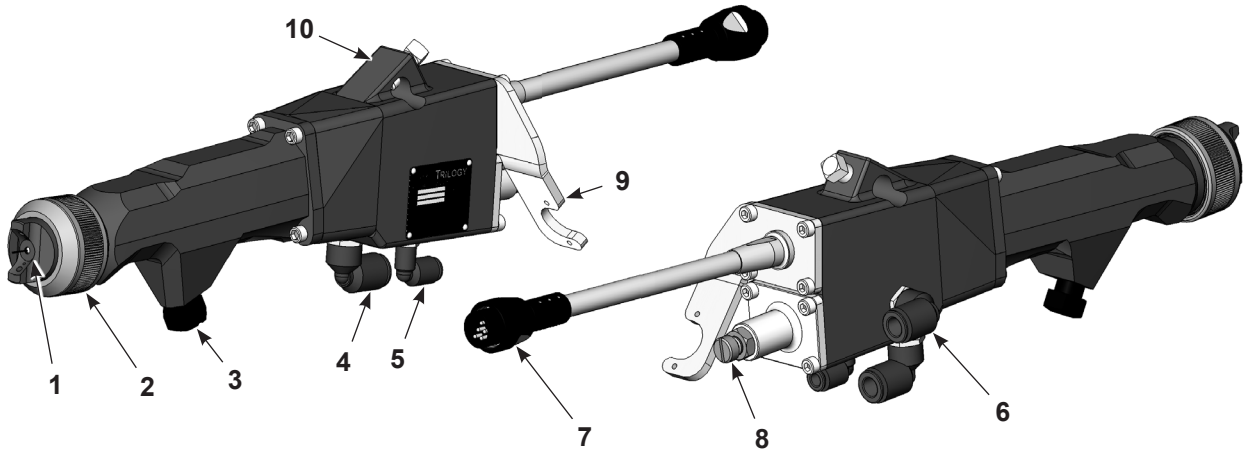


Figure 2-1 Trilogy Air Spray/HVLP Automatic Electrostatic Spray Gun

1. Air cap
2. Retaining ring
3. Fluid inlet
4. Horn air inlet
5. Trigger air inlet
6. Atomizing air inlet
7. Gun cable
8. Flow adjust knob
9. Fluid hose bracket
10. Bar mount point

Spray Gun Features

The Trilogy spray gun features:

- adjustable fluid flow rate
- large air passages for higher air energy
- user-replaceable voltage multiplier
- bellows-type packing cartridge

Spray Technology

The fluid tip and air cap you choose to use determines the spray gun technology: HVLP or air spray.

HVLP technology creates a soft spray with high transfer efficiency, reducing emissions of volatile organic compounds (VOCs). HVLP spray guns use high volumes of very low pressure pattern control (horn) and atomizing air (less than 0.69 bar (10 psi)). The high volume of pattern control air provides sufficient energy to shape the pattern of sprayed fluids. The low atomizing air pressure reduces fluid bounceback and overspray, which improves transfer efficiency.

HVLP atomization is typically coarser than air spray when used with high-viscosity fluids and high flow rates.

Air spray technology atomizes material at higher air pressures and lower air flows than HVLP spray guns. Air spray guns produce a very fine, atomized mist. This makes them useful for extremely fine finishing work.

Options

Options include a variety of fluid tips and air caps; air and fluid hoses; air pressure regulators; gauges; fittings; fluid hose; and quick exhaust valve. HVLP compliance kits are available for each HVLP air cap.

Coating Materials

The spray gun is compatible with a wide variety of solventborne coating materials including

- general solvent-based
- metallics
- high-solids
- multi-component
- ultra-violet coating

NOTE: The seals installed in the spray gun are compatible with most coatings. If the coating material you use damages the seals, contact your Nordson Corporation representative for compatible replacements.

Theory of Operation

See Figure 2-2.

Electrostatic Charge

The IPS-20 gun control unit delivers low-voltage dc power through the gun cable to the voltage multiplier (3). The voltage multiplier generates high voltage which creates a corona discharge around the electrode (8) and an electrostatic field from the electrode to the grounded parts.

Resistors within the multiplier and the needle (6) limit the output current to safe levels. The high voltage electrostatically charges the coating material as it is sprayed. The charged coating material is attracted to the grounded parts.

Fluid Flow

Fluid enters the spray gun through a fluid supply hose attached to the extension (5) and flows past the packing cartridge (9) to the fluid tip (7). When the spray gun is triggered air pushes the piston (13) back, pulling the needle (6) off its seat in the fluid tip (7), and allowing fluid to flow out of the gun. The fluid flow adjuster (14) controls piston travel and the distance the needle is pulled off the seat, which determines fluid flow through the fluid tip. The packing cartridge prevents fluid from flowing past it into the extension (5), spacer (4), and body (2). The fluid flow is dead-ended at the spray gun when the gun is not triggered.

NOTE: If you are using an external fluid pressure regulator to adjust fluid flow then the fluid adjuster should be set to allow full flow when the gun is triggered.

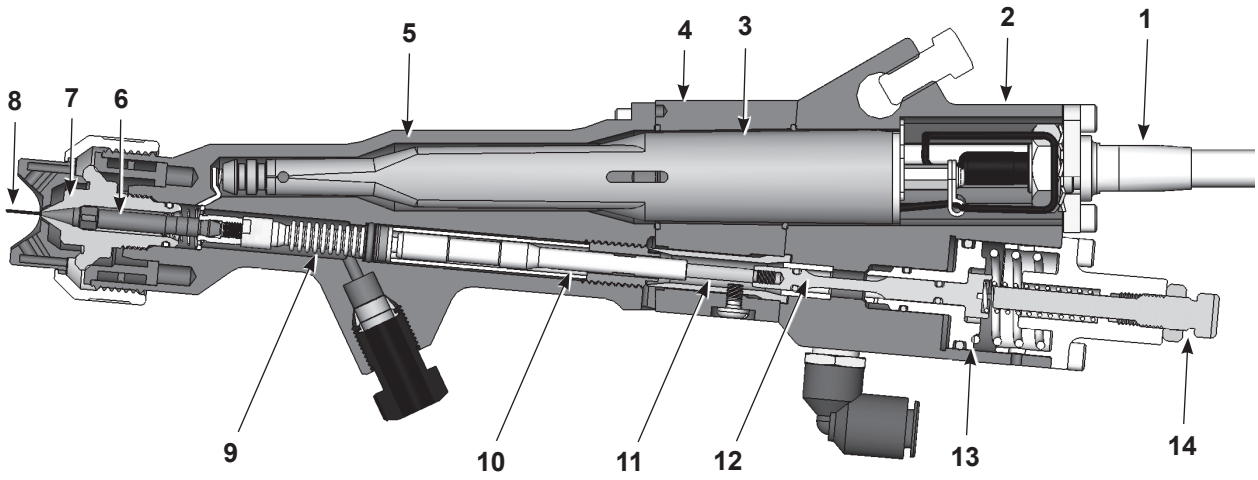


Figure 2-2 Spray Gun Components and Operation

1. Cordset
2. Gun body
3. Multiplier
4. Spacer
5. Extension
6. Needle
7. Fluid Tip
8. Electrode
9. Packing cartridge
10. Pull shaft
11. Adapter link
12. Connecting rod
13. Air piston
14. Fluid adjuster

Air Flow

See Figure 2-1 and Figure 2-2. Air enters the spray gun body at three fittings:

Trigger air (5) pushes the air piston (13) back, which allows atomization air to flow to the air cap. The air piston pulls on the connecting rod (12), coupling (11), pull shaft (10), packing cartridge rod (9), and needle (6), allowing fluid to flow out of the fluid tip. Atomization air starts flowing before the fluid, which eliminates fluid spitting and poor atomization of the initial fluid flow.

Horn air (4) flows directly to the air cap and shapes the spray pattern. The horn air flow is constant unless it is controlled by a separate external solenoid valve.

Atomization air (6) flows when the spray gun is activated or triggered. A small amount of atomization air continually flows through the spray gun body to cool the voltage multiplier.

Specifications

Dimensions

Dimensions	Metric (cm)	English (in.)
Height	12.29	4.84
Length	35.4	13.92
Width	7.92	3.12
NOTE: The spray gun dimensions include the fluid and air fittings		

Weight

Weight	Metric (g)	English (oz)
Air Spray/HVLP	1469	51.8
NOTE: The spray gun weight includes the fluid and air fittings.		

Operating Pressure

Operating Pressures	Metric	English
Maximum air input pressure	6.9 bar	100 psi
Maximum fluid input pressure	6.9 bar	100 psi
Maximum fluid temperature	82°C	180°F
NOTE: Supply air must be particulate free (5 microns maximum) and oil free. Use coalescing-type air filters.		

Air Tubing Requirements

Air Hose	Metric	English
Length (optimum for HVLP)	7.62 m	25 ft
Minimum ID required for HVLP (horn and atomizing)	8 mm	5/16 in.

Standard Fitting Sizes

Spray Gun Standard Fitting Sizes	
Atomization air	3/8-in. tubing
Horn air	3/8-in. tubing
Activation (trigger) air	1/4-in. tubing
Fluid fitting	Hose nut: 5/8−20 UN 2A threads, 3/8 in. tubing, Ferrule set: 3/8-in. tubing

Electrostatics

Maximum voltage: 93 kV

Maximum output rating current: 122 microamps

NOTE: Current draw greater than 50 µA may affect spray pattern, transfer efficiency and finish. If the conductivity of your material causes excessive current draw, changing to a longer tubing may be necessary.

Fluid Conductivity Range

Spray Gun Standard Fitting Sizes	
Greater than 25 megohms/cm	Refer to Fluid Tubing Selection.
Less than 25 megohms/cm	

Approvals

This spray gun has met the requirements for FM approval.

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.

Preparation

CAUTION: Do not overtighten parts. Failure to observe this caution will result in equipment damage.

NOTE: Fluid tips, air caps, and hoses are not shipped with the spray gun. You must order them separately, based on your application. If you order an HVLP air cap, you may also want to order the appropriate compliance kit. You will need one compliance kit for each air cap size you use.

NOTE: Compliance caps are used to verify compliance of non-electrostatic HVLP systems. Electrostatic guns are by themselves compliant spray technologies, so it is not necessary to verify air cap compliance. Instead, you may want to use a compliance kit to make sure the air cap pressure is at optimum level.

Before installation,

- remove the spray gun, brushes, and tool kit from the box.
- make sure you have the appropriate fluid tip and air cap for your application.
- make sure you have air and fluid hoses of the correct length, ID, and materials.

WARNING: Risk of fire and/or electrical shock if the spray gun and system components are not properly grounded.

- make sure the system is properly grounded.

NOTE: Inadequately grounded parts will adversely affect transfer efficiency and coating quality.

Typical Air Spray and HVLP System

Figure 3-1 shows the components of a typical system.

Some components shown are optional. Make sure your system contains self-relieving shutoff valves for both air and fluid supply.

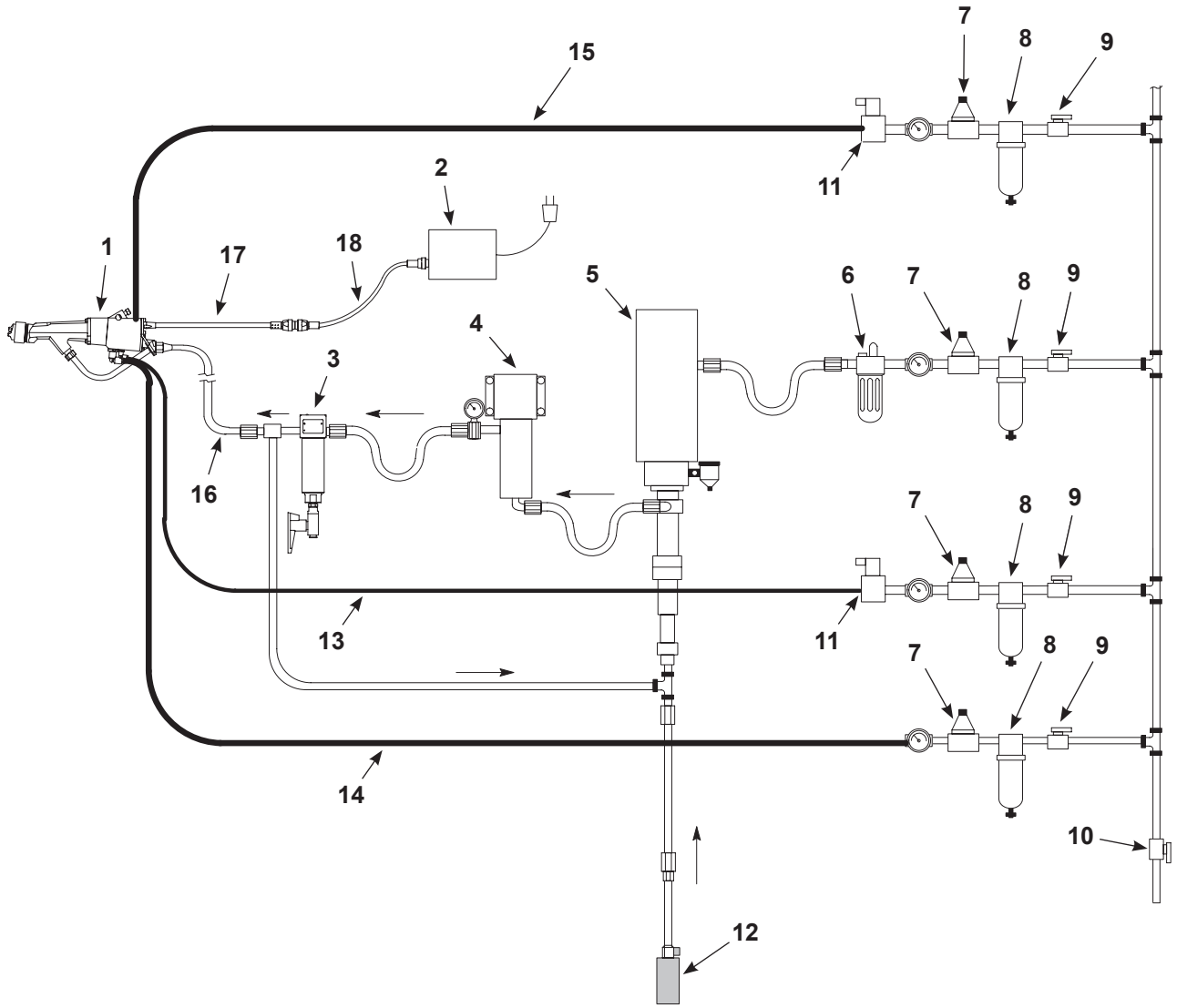


Figure 3-1 Typical Air Spray and HVLP Systems

1. Spray gun
2. Gun control unit
3. Fluid filter
4. Heater (if required)
5. Pump
6. Air lubricator (if required)
7. Air regulator
8. Air filter
9. Self-relieving shutoff valve
10. Drain valve
11. Solenoid valves
12. Siphon screen
13. Trigger air
14. Horn air
15. Atomizing air
16. Fluid hose
17. Cordset
18. Extension cable

Mounting

See Figure 3-2. Secure the spray gun to a 1/2 in. mounting bar with the square head set screw (14).

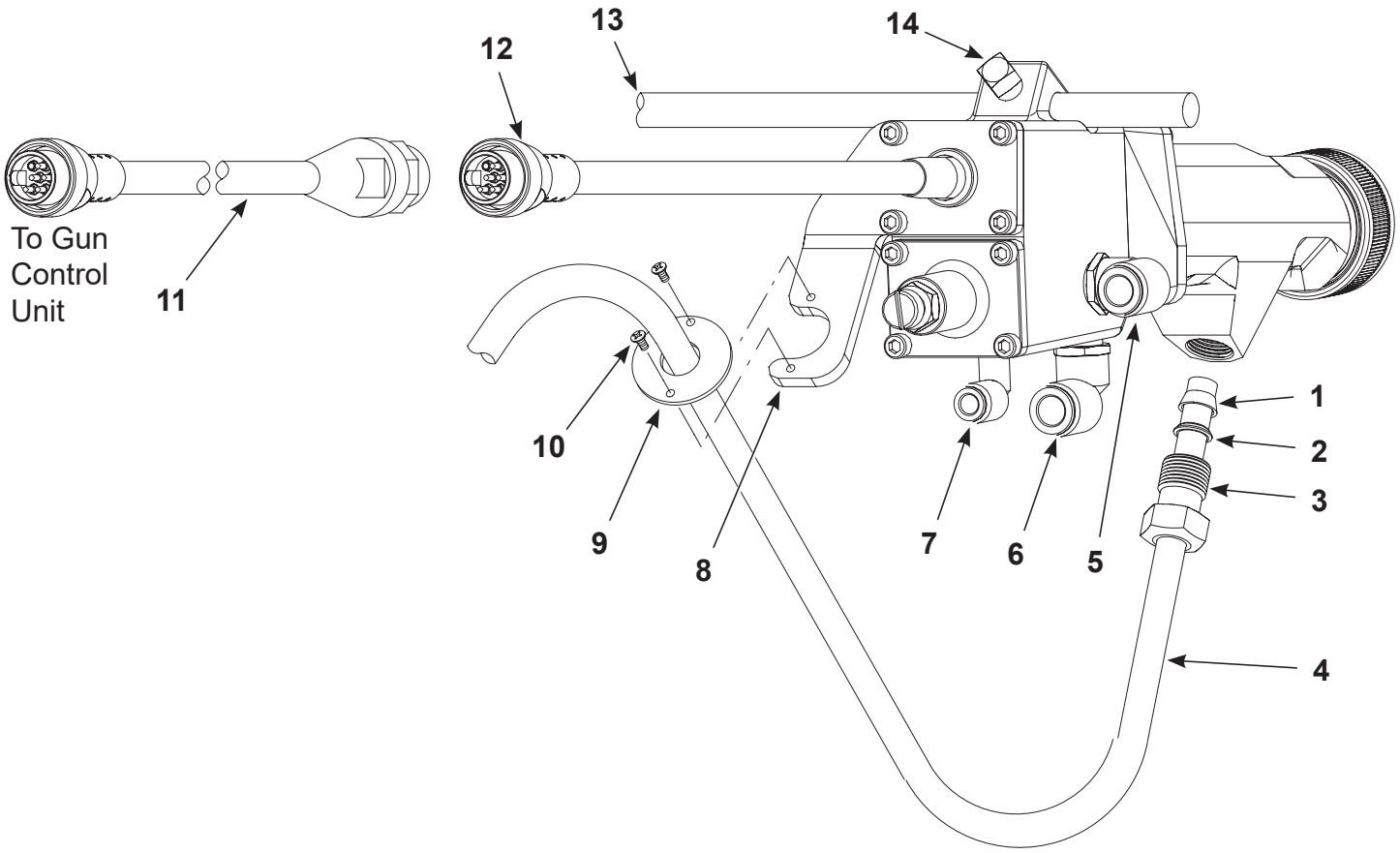


Figure 3-2 Typical Spray gun Installation

1. Large ferrule
2. Small ferrule
3. Hose nut
4. PTFE fluid tubing
5. Atomizing air − 3/8 in.
6. Horn air − 3/8 in.
7. Trigger air − 1/4 in.
8. Hose bracket
9. Collar
10. Screws (2)
11. Cable extension (50 ft)
12. Cordset
13. Mounting bar
14. Square head set screw

Air Connections

The air tubing supplying air to the spray gun should be no longer than 7.62 m (25 ft). Limit the number of restrictions in the air tubing to provide maximum air flow.

See Figure 3-2. Connect atomizing, horn, and trigger air tubing to the spray gun as follows:

- 3/8-in. tubing to horn (6) and atomizing (5) air fittings.
- 1/4-in. tubing to trigger (7) air fitting.

Fluid Tubing Installation

WARNING: The spray gun body and all conductive parts must be grounded. Without a ground, a static charge could build up in the spray gun, resulting in shocks to the operator or sparking that could cause a fire. Resistance checks, from hose fitting to hose fitting, should be a part of your regular maintenance procedures.

Fluid Tubing Selection

Consider the following when selecting the fluid tubing:

- The longer the tubing, the lower the current draw. Lowering the current draw provides better electrostatic charging of the coating material.
- The smaller the tubing ID, the lower the current draw.
- The pressure drop through the tubing increases with length and as the inside diameter gets smaller.
- Both the length and inside diameter of the tubing will affect the fluid flow rate.

Current draw levels through the fluid tubing of 20 µA or less should provide adequate charging of the coating material. Higher current draws may be acceptable if transfer efficiency levels are acceptable.

Figure 3-3 shows the face of a paint resistivity meter and identifies the optimum coating resistivities for air spray electrostatics as 0.5−3.0 MΩ.

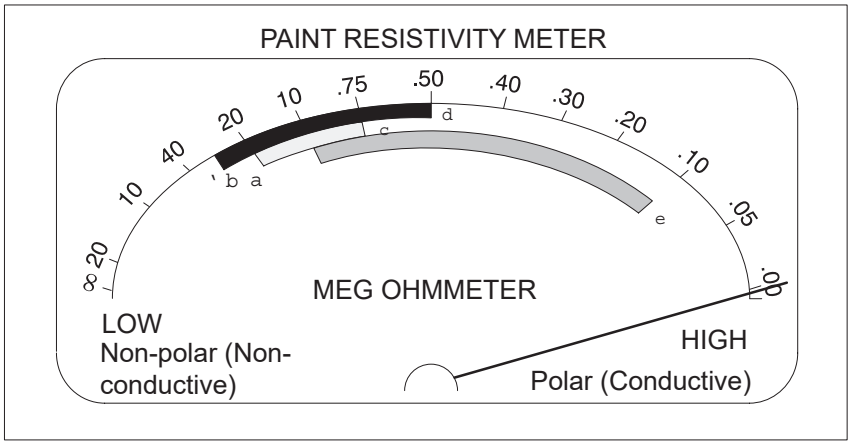
Figure 3-4 plots the tubing length required to keep current draw below 20 µA for 0.25-, 0.170-, and 0.093-in. ID tubing for various coating resistivities. Refer to Table 3-1.

Figure 3-5 plots the tubing length required to keep current draw below 10 µA for 0.25-, 0.170-, and 0.093-in. ID tubing for various coating resistivities.

NOTE: The effectiveness of the electrostatics may diminish when coating resistivities fall below 0.25 megohms.

Table 3-1 Tubing Lengths for a 20 µA Current Draw

Problem	Tubing		
	0.25-in. ID	0.170-in. ID	Corrective Action
0.025 MΩ	21.0 ft	8.75 ft	3.5 ft
0.05 MΩ	16.5 ft	5.5 ft	2.5 ft
0.10 MΩ	3.5 ft	1.8 ft	1.0 ft
0.25 MΩ	1.5 ft	1.0 ft	1.0 ft



Legend:

- Best range for airspray electrostatic 0.5-3.0 range — A to E scale.
- Best range for airless and air-assisted airless electrostatic 0.75-2.0 range — B to D scale.
- Best range for rotary 0.10-1.0 range — C to F scale.

Figure 3-3 Resistivity Range for Coatings

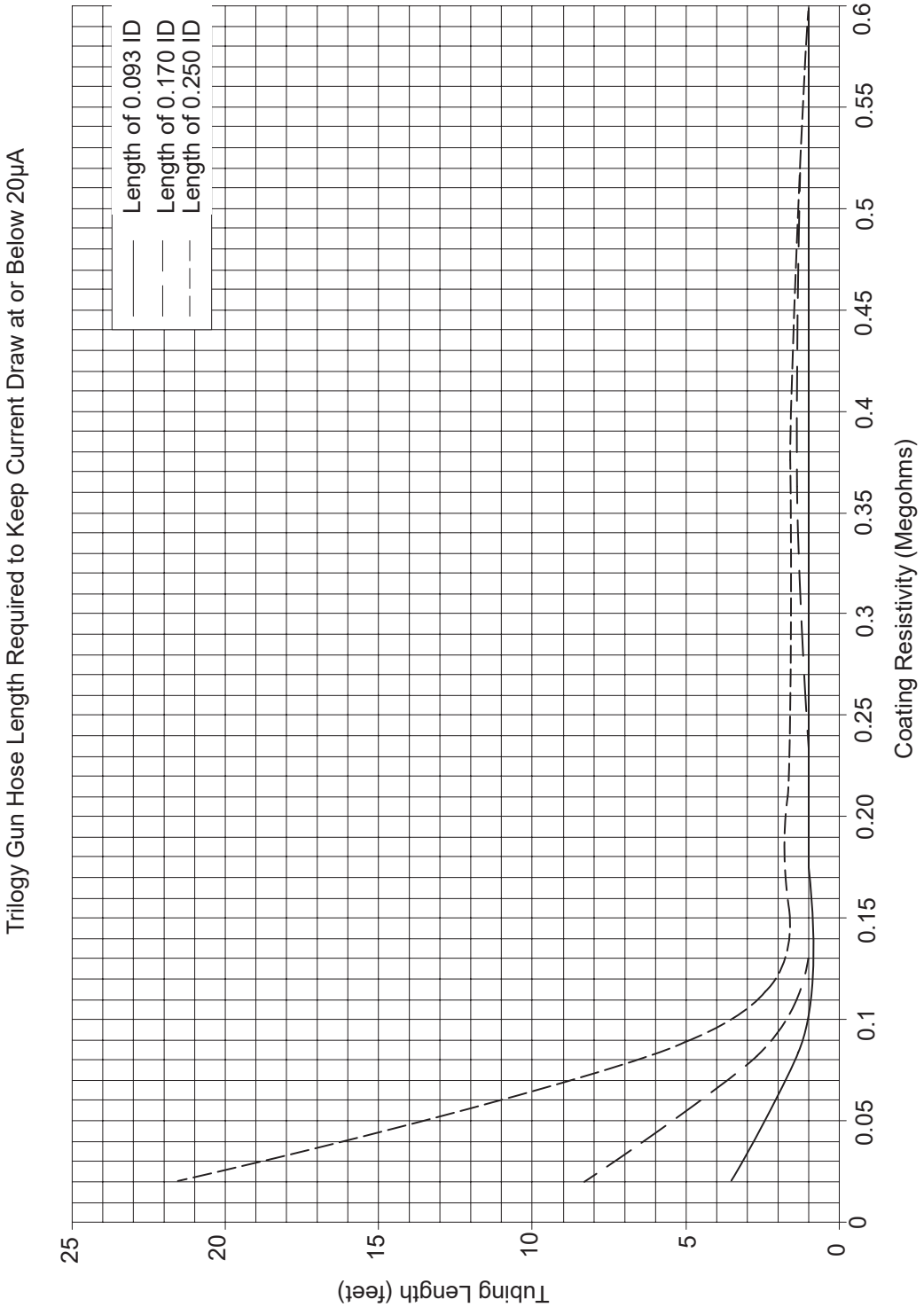


Figure 3-4 Tubing Length Required to Keep Current Draw at or Below 20 µA

See Figure 3-5 for the plot of a 10 µA current draw if you feel that the transfer efficiency or wrap are compromised.

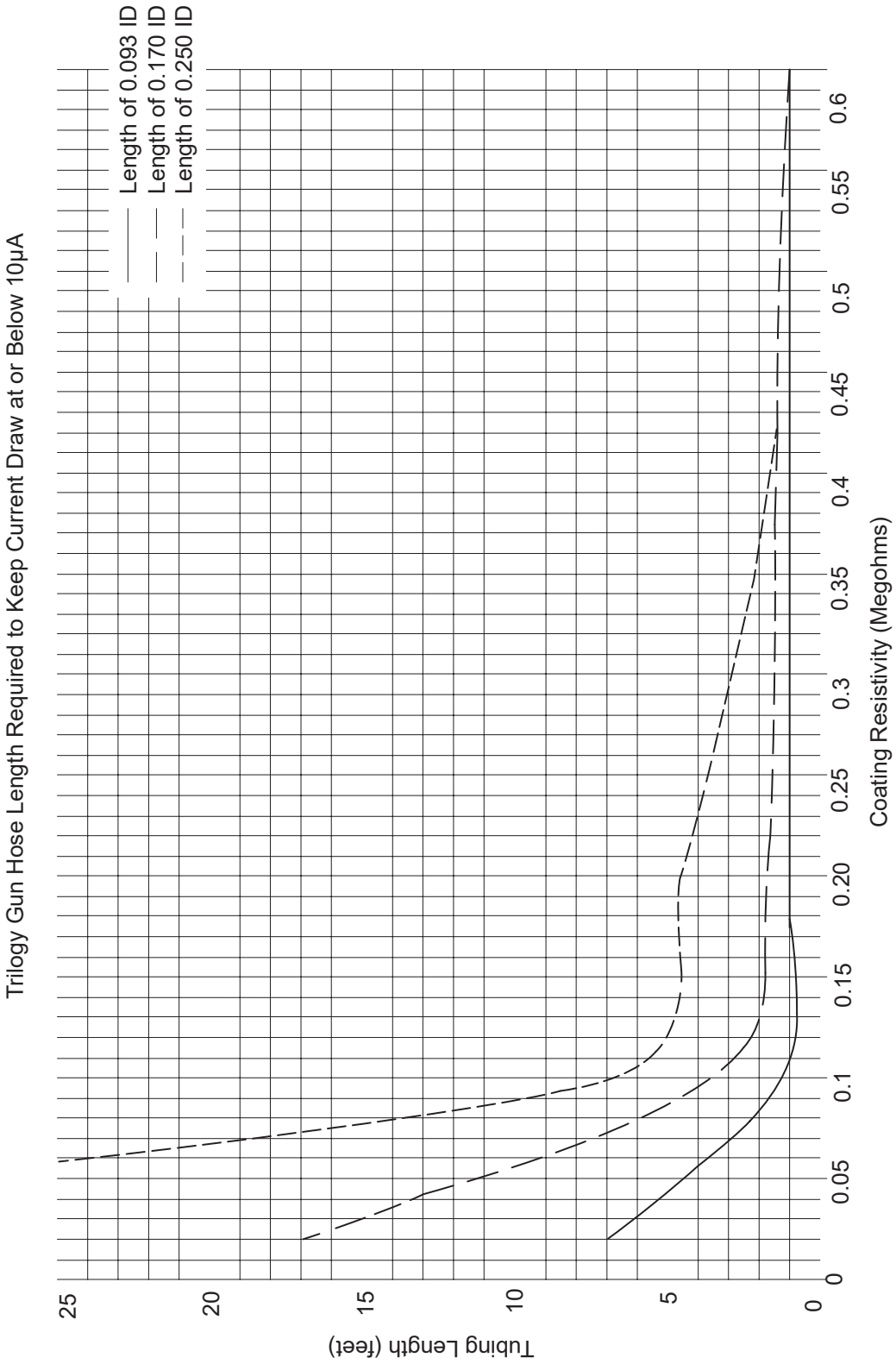


Figure 3-5 Tubing Length Required to Keep Current Draw at or Below 10 µA

Fluid Tubing Connection

See Figure 3-2 and Figure 3-3.

1. Slide the hose nut (3) over the the fluid tubing (4).
2. Slide the small and large ferrules (1, 2) over the fluid tubing, with theconical ends facing toward the tubing end.
3. Insert the fluid tubing into the extension (5) until it bottoms out.
4. Thread the hose nut into the extension until it is hand-tight, then tighten1-1/4 turns past hand-tight.

NOTE: The above procedure swages the new ferrules permanently onto the fluid tubing. Once the ferrules are swaged on the tubing, you only need to tighten the hose nut 1/4 turn past hand-tight when re-installing the nut.

5. Connect the fluid tubing to the fluid-delivery system outlet.

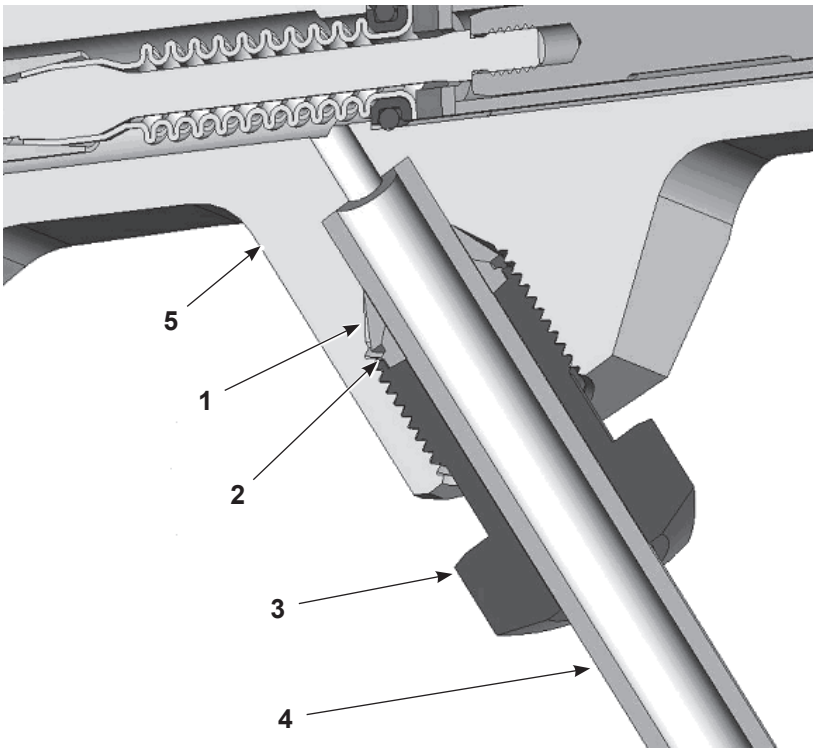


Figure 3-6 Connecting Fluid Tubing to Spray Gun

1. Large ferrule
2. Small ferrule
3. Hose nut
4. Fluid tubing
5. Extension

Cordset and Cable Connection

WARNING: Ground all electrically conductive equipment. Ungrounded conductive equipment can store a static charge, which could ignite a fire or cause an explosion if a hot spark is discharged. Wear shoes with conductive soles such as leather, or use grounding straps to maintain a connection to ground when working with or around electrostatic equipment.

NOTE: Refer to the gun control unit manual for more information.

Refer to Figure 3-2. Connect the 50 ft extension cable (11) to the gun cordset. Connect the opposite end of the extension cable to the receptacle labeled GUN OUTPUT on the rear panel of the gun control unit.

Securing the Tubing and Extension Cable

Bundle together the fluid tubing, air tubing and gun cable where practical. Do the following to prevent wear and damage:

- Bundle the cable and the air and fluid tubing together with hook and loop tape, spiral-cut tubing, or similar devices. If you secure the tubing to a stationary object at any point between the fluid-delivery system, make sure the hoses can flex without strain.
- Keep the cable plugs and sockets clean and protected from contamination.
- Do not tie the cable or tubing to the machine members in areas where the cable must move or stretch.
- Do not bend the cable around a radius of less than 15.24 cm (6 in.) at stationary points and 20.3 cm (8 in.) at flexing points.
- Do not allow the cable or tubing to become abraded by sharp corners such as booth edges.
- Do not walk on the cable and tubing or run over them with heavy objects.
- If desired, cover the spray gun body, tubing, and other equipment in the spray area with a grounded, conductive wrapping to keep them clean.

Fluid Tip and Air Cap Installation

WARNING: Before removing and installing the fluid tip and air cap, shut off the fluid delivery system and relieve the system pressure. Trigger the gun to ensure all pressure is relieved. Shut off the gun control unit and ground the spray gun electrode. Failure to observe this warning could result in personal injury.

See Figure 3-7.

1. Unscrew the retaining ring (6).
2. Lubricate the fluid tip O-ring (4) with MagnaLube-G or an equivalent lubricant.

CAUTION: To prevent damage to the needle or fluid tip seat, trigger the gun (without turning on the electrostatics) to retract the needle while removing or installing the fluid tip.

3. Trigger the spray gun to retract the needle (1).
4. Install the fluid tip over the needle and screw it into the extension withthe combination tool. Tighten snugly but do not overtighten. Do not bend the electrode (2).

CAUTION: Tightening the fluid tip beyond snug does not prevent or eliminate fluid leaks. If coating material leaks around the fluid tip replace the O-ring.

5. Install the air cap (5) into the retaining ring and thread the retaining ringonto the extension. Make sure the air cap is centered on the fluid tip. Hold the air cap in the desired position and tighten the retaining ring until it is snug. Do not overtighten the retaining ring.

NOTE: 991 and 992 air spray air caps are shipped permanently installed into retaining rings. These retaining rings cannot be used with the 985−988 air caps, which use the standard retaining ring shipped with the spray gun.

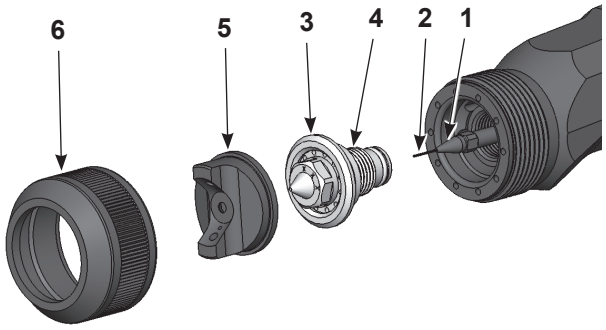


Figure 3-7 Fluid Tip and Air Cap Installation

1. Needle
2. Electrode
3. Fluid tip
4. Fluid tip O-ring
5. Air cap
6. Retaining ring

Optional Quick-Exhause Valve Kit

See Figure 3-8.

A quick-exhaust valve kit is available for applications requiring a faster air piston response. The kit includes the valve, a muffler, and a 1/8 in. NPT nipple.

1. Remove the elbow fitting (2) from the trigger port.
2. Apply PTFE tape to both ends of the nipple (1).
3. Install the nipple in the valve (3).
4. Apply PTFE tape to the muffler (4) and install it in the valve.
5. Apply pipe sealant adhesive to the threads of the elbow and install it inthe valve.
6. Install the valve in the trigger port.

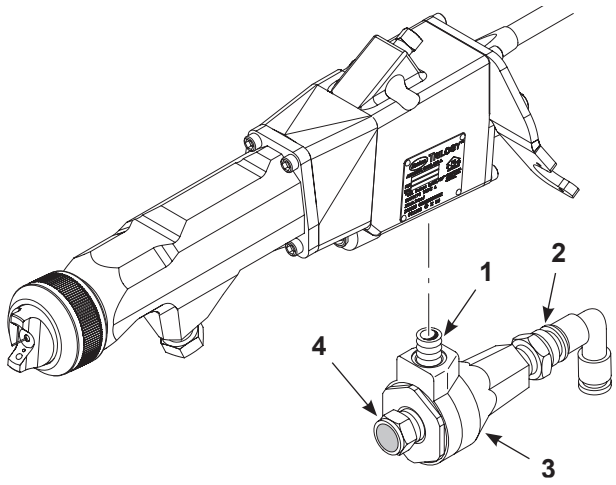


Figure 3-8 Optional Quick-Exhaust Valve Kit Installation

1. 1/8-in. NPT x 1-8-in. NPT nipple
2. 1/8-in. NPT x 1/4-in. T elbow fitting
3. Quick exhaust valve
4. Muffler

Section 4
Operation

Introduction

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: Do not exceed the maximum fluid pressure rating of 6.9 bar (100 psi). Failure to follow this warning may result in death or personal injury.

NOTE: Read this entire section before operating the spray gun.

Before operating the spray gun, make sure that

- the fluid tip is securely tightened and the air cap is correctly installed and secured with the retaining ring.
- all fluid and air connections are secure and leak-free. The fluid hose is grounded.
- air supply and fluid-delivery components are correctly installed. All conductive system components and flammable material containers are securely connected to a true earth ground.
- the operator station and spray area are clean and free of debris.

System Startup

NOTE: When starting a new spray system for the first time, flush the fluid-delivery system, hose, and spray gun with a solvent compatible with the coating material, to remove contaminants from the system. Remove the air cap from the spray gun before flushing solvent through the spray gun.

1. Turn on the spray booth exhaust fans.
2. Supply compressed air to the system. Adjust the air pressures asrequired for your application. Do not exceed 6.9 bar (100 psi).
3. Start the fluid delivery system and pressurize the system. Do notexceed 6.9 bar (100 psi).

System Startup (con’t)

4. Turn on the fluid heater, if used. Do not exceed 82 C (180 F).
5. Check the fluid-delivery system for leaks. Do not operate the system ifany leaks are present.
6. Make sure the gun is pointing into the spray booth and the boothexhaust fans are running. Trigger the spray gun and adjust the atomization air pressure, horn air pressure, and fluid pressure to obtain the desired fluid atomization and spray pattern. Refer to Spray Pattern and Atomization Adjustments.
7. Turn on the gun control unit.
8. Trigger the gun and use a Nordson non-loading kV meter to read themaximum kV output of the spray gun voltage multiplier. Use this information and the values from Electrostatic Troubleshooting as a baseline when troubleshooting.
9. If you are using HVLP air caps and fluid tips: Refer to HVLP Performance Testing.

Spray Adjustments

Fluid Pressure and Flow Rate Adjustments

Shut off the atomization and horn air and check the fluid flow rate.

For optimum atomization, an appropriate fluid pressure should provide an unatomized fluid stream that breaks at a distance of 25.4−35.6 cm (10−14 in.) from the fluid tip. If the fluid stream does not break properly at the desired flow rate, install a larger fluid tip and adjust the fluid pressure until the stream breaks 25.4−35.6 cm (10−14 in.) from the fluid tip.

NOTE: You should use an external fluid pressure regulator to control fluid flow and pressure. If one is installed, set the fluid adjuster on the gun to allow full flow when the gun is triggered.

For **large flow rate changes**, adjust the fluid pressure or use the next smallest or largest fluid tip.

For best results, leave the fluid flow adjusted to allow full fluid flow. If you have to limit the stroke to less than half the needle travel, you are using too large a fluid tip.

Always tighten the jam nut after making adjustments to the fluid flow. If you do not tighten the jam nut, the trigger action will cause the fluid adjuster to rotate in the housing, changing the needle travel and flow rate.

Spray Pattern and Atomization Adjustments

Obtaining the correct spray pattern, coating material atomization, and transfer efficiency for your application requires a combination of operator experience and experimentation. To obtain the best results, perform the following steps:

WARNING: Shut off the gun control unit and ground the spray gun electrode to remove any residual charge. Failure to observe this warning could result in personal injury.

1. Set the desired atomization and horn air pressure. If using HVLP aircaps and fluid tips, the air pressure should be set to 0.69 bar (10 psi) or less.

Use the lowest possible atomization air pressure to obtain proper atomization of the coating material. Increasing the air pressure provides finer atomization. Decreasing the air pressure provides coarser atomization.

2. Trigger the spray gun.
3. Adjust the horn air pressure to achieve the desired spray pattern.

A higher pressure generates a wider and flatter fan pattern. Lowering the pressure decreases the pattern width and creates a rounder pattern.

4. Adjust the atomizing air pressure until you achieve the desiredatomization and spray pattern.

If necessary, adjust the fluid pressure at the fluid delivery systems. Use the lowest atomization air pressure possible along with the appropriate fluid pressure and flow rate to ensure maximum transfer rates and highest quality finishes.

5. **If you are using a HVLP air cap and fluid tip:** Test for optimum HVLP performance. Both atomizing and horn air pressures should be 0.69 bar (10 psi) or less for optimum transfer efficiency. Refer to HVLP Performance Testing on page 4-5.

Fluid Tips and Air Caps

CAUTION: To prevent damage to the needle or fluid tip seat, pull and hold the trigger while removing or installing the fluid tip.

Different combinations of fluid tips and air caps can improve atomization and spray patterns with various coating materials and viscosities. If the fluid flow and air adjustments described previously do not produce the desired results, try a different combination of fluid tip and air cap.

A full range of airspray and HVLP fluid tips and air caps are available. Refer to the air cap and fluid tip selection guides included with this manual for part numbers.

Refer to Installation for air cap and fluid tip installation instructions.

Shutdown

WARNING: Turn off the gun control unit and ground the spray gun electrode to remove any residual charge. Failure to observe this warning could result in personal injury.

WARNING: Shut off the fluid-delivery system and relieve the fluid pressure in the system before disconnecting any fluid connections or perfoming any maintenance and repair procedures. Failure to observe this warning could result in personal injury.

Short-Term Shutdown

For short-term breaks in production, no shutdown procedures are necessary. Deactivate the trigger air and wipe the air cap and fluid tip with a clean cloth dampened with a compatible solvent.

Long Term Shutdown

1. Shut off the gun control unit.
2. Shut off the atomizing and horn air.
3. Flush the fluid-delivery system, fluid hose, and spray gun with acompatible solvent.

NOTE: Refer to the System Flushing in Section 5 Maintenancexx for recommended flushing and cleaning procedures.

4. Relieve system fluid pressure.
5. Trigger the spray gun to relieve any residual pressure.
6. Remove the air cap and fluid tip and clean them as described inSection 5 Maintenance.

Multi-Component Coatings

CAUTION: Leaving the coating material in the spray gun longer than the indicated pot-life may clog the spray gun and require disassembly and replacement of major spray gun components.

Refer to the coating material pot-life information to determine the proper shutdown procedures.

HVLP Performance Testing

To maintain optimum HVLP performance, both atomizing and horn pressures should be 0.69 bar (10 psi) or less. Each HVLP air cap has a corresponding HVLP compliance kit that consists of a modified air cap, air tubing, and pressure gauges. Kits must be ordered separately for each type of air cap. Refer to Parts for kit part numbers.

NOTE: The 0.69 bar (10 psi) limit is for reference only. Many coating materials can be atomized using less pressure. Lower pressures will result in a softer pattern which, as long as the coating material is adequately atomized, provides better transfer efficiency.

After making an air pressure setting, perform an HVLP compliance test.

HVLP Compliance Test

WARNING: Shut off the fluid-delivery system and relieve system fluid pressure before performing a compliance test. Failure to observe this warning could result in personal injury.

NOTE: Use this procedure to adjust air cap performance in order to achieve optimum transfer efficiencies. It is acceptable to exceed pressure limits. The lower the air pressure, the softer the spray.

See Figure 4-1.

1. Turn off the control unit and ground the spray gun electrode.
2. Shut off the fluid-delivery system and relieve the fluid pressure.
3. Remove the production air cap and retaining ring and replace them withthe compliance kit air cap (4) and retaining ring (1).
4. Trigger the spray gun to fully open the air valve.
5. Check the air pressure gauges (2, 3). Both atomization and hornpressures should be 0.69 bar (10 psi) or less.
6. If the atomization pressure exceeds 0.69 bar (10 psi), reduce theregulated air supply pressure and check the atomization quality.

HVLP Compliance Test (con't)

7. If the horn air pressure exceeds 0.69 bar (10 psi), reduce the airpressure and check the pattern size.
8. Install the production air cap and check the fluid atomization.

NOTE: You can check the atomization quality with the compliance cap installed. Make sure the gauge tubing is not crimped or interfering with the spray pattern.

9. If atomization quality is unacceptable, install the next size larger air capor increase the air pressure above the optimum level.

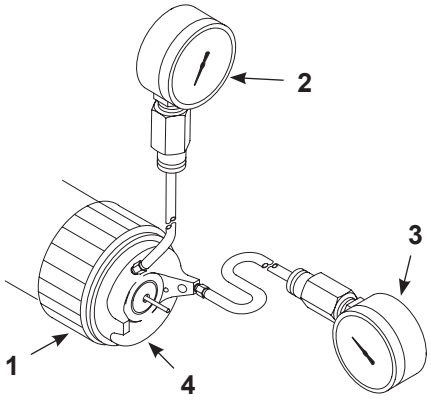


Figure 4-1 Using the HVLP Compliance Kit

1. Retaining ring
2. Atomizing air gague
3. Horn air gague
4. Compliance air cap

Section 5

Maintenance

Introduction

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

The spray gun requires very little routine maintenance beyond cleaning. For best results, keep the spray gun as clean as practical.

Daily

Perform the following procedure at the end of each work shift:

WARNING: Shut off the gun control unit and ground the spray gun electrode to remove any residual charge. Failure to observe this warning could result in personal injury.

WARNING: Shut down the system and relieve all fluid and air pressures before performing these procedures. Failure to observe this warning could result in injury.

1. Turn off the gun control unit and ground the spray gun electrode toremove any residual charge.
2. Shut off the atomization and horn air supply.
3. Flush the fluid-delivery system, fluid hose, and spray gun with acompatible solvent.
4. Relieve system fluid pressure.
5. Trigger the gun to relieve any residual pressure.

CAUTION: Trigger the spray gun to pull the needle out of the seat before removing the fluid tip. This will prevent damage to the needle and the seat.

Remove the air cap and fluid tip.

Daily (cont'd)

CAUTION: Use a non-conductive solvent compatible with your coating material. Cleaning with conductive solvents can result in loss of kV, carbon tracking, and permanent damage to spray gun components.

CAUTION: Use only a Nordson cleaning brush to clean the fluid tip and air cap. Using metal tools will damage the fluid tip and air cap, causing faulty spray patterns.

CAUTION: Avoid cleaning the spray gun with pressurized solvents. Pressurized solvents can pentrate into spray gun cavities, potentially damaging spray gun components.

6. Remove the O-ring from the fluid tip. Soak the fluid tip and air cap in asuitable non-conductive solvent to dissolve any accumulated coatings, then use the brush included with the spray gun to clean them.
7. Clean the spray gun extension with a clean cloth dampened withnon-conductive solvent. Do not soak the spray gun in solvent.
8. Blow the fluid tip, air cap, and spray gun dry with an OSHA-approvedblowgun.
9. Replace the O-ring on the fluid tip. Lubricate the O-ring with O-ringgrease.

Periodically

Periodically flush the system and clean the spray gun components. The frequency of these procedures will vary depending on the application and coating material being used.

WARNING: Shut off the gun control unit and ground the spray gun electrode to remove any residual charge. Failure to observe this warning could result in personal injury.

WARNING: Shut down the system and relieve all fluid and air pressures before performing these procedures. Failure to observe this warning could result in injury.

CAUTION: Use a non-conductive solvent compatible with your coating material. Cleaning with conductive solvents can result in carbon tracking and loss of kV.

CAUTION: Avoid cleaning the spray gun with pressurized solvents. Pressurized solvents can penetrate into spray gun cavities, potentially damaging spray gun components.

System Flushing

Relieve system air and fluid pressure and make sure the spray guncannot be activated.

1. Turn off the gun control unit and ground the spray gun electrode toremove any residual charge.
2. Point the spray gun into a grounded waste container. Trigger the spraygun to drain the spray gun and fluid tubing.
3. Remove the retaining ring and air cap.
4. Turn on the solvent supply and adjust it to the lowest possible pressure.
5. Trigger the spray gun and allow solvent to flow until it runs clear.
6. Turn off the solvent supply and relieve the pressure.

Spray Gun Cleaning

CAUTION: Do not clean the multiplier, cordset, or extension cable with solvent. Failure to observe this caution could result in equipment damage.

CAUTION: Use a non-conductive solvent compatible with your coating material. Cleaning with conductive solvents can result in carbon tracking and loss of kV.

CAUTION: Use only a Nordson cleaning brush to clean the fluid tip and air cap. Using metal tools will damage the fluid tip and air cap, causing faulty spray patterns.

Routine Cleaning

NOTE: Trigger the spray gun to pull the needle off of the seat before removing the fluid tip. This will prevent damage to the needle and or the seat.

1. Remove the air cap and fluid tip.
2. Disconnect the fluid tubing and air tubing.
3. Point the spray gun down and clean the front of the spray gun with asoft-bristled brush dampened with a compatible cleaning solvent.

NOTE: Pointing the spray gun down at a slight angle will prevent solvents from entering the air passages and possibly damaging the air seals. Most air seals are not universally compatible with all solvents and can be damaged.

4. Dampen a soft cloth with a compatible cleaning solvent. Point the spraygun downward and clean the exterior.

NOTE: Take special care when cleaning the spray gun with solvents. Using excessive amounts of solvent can allow solvent to leak into the spray gun and damage the multiplier. If the gun requires extensive cleaning, remove the multiplier. Refer to Multiplier Replacement in Repair to remove the multiplier.

5. Clean the fluid tip, air cap, and retaining ring with a soft-bristled brushand a compatible solvent. Remove the O-ring and soak the fluid tip in solvent if necessary.
6. Trigger the gun to retract the needle, then install the fluid tip on the gun.Install the air cap and retaining ring.
7. Connect the air and fluid tubing.

Extensive Cleaning

CAUTION: Never soak or vigorously clean the spray gun with the multiplier installed.

For more extensive cleaning, disassemble the spray gun and clean each part. Once disassembled, the extension and body can be soaked in solvent and scrubbed. Remove O-rings before soaking any parts in solvent.

NOTE: Allow parts that have been soaked or heavily washed in solvent to dry thoroughly (overnight) before assembling and reusing the spray gun.

Electrostatic System Checks

Use a Nordson non-loading kV meter to check the voltage multiplier output and a megohmmeter to check the spray gun resistances. The checks ensure that the operator, spray gun, and all conductive material within the spray area are connected to a true earth ground. Proper grounding is essential for efficient operation and prevention of a buildup of an electrostatic charge that could discharge and ignite combustible material within the spray area.

Make sure the spray gun has and maintains the proper resistance values. Proper resistance values are important to keeping the system within the designed current outputs. The resistance values may vary over a period of time due to conditions such as a buildup of residue in the spray area or the degradation of components that have been exposed to high voltages.

Section 6

Troubleshooting

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

Introduction

WARNING: Shut off the gun control unit and ground the spray gun electrode to remove any residual chargebefore performing any troubleshooting procedures. Failure to observe this warning could result in personal injury.

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.

This section contains troubleshooting procedures for

- common spray gun problems,
- spray pattern and film-build faults, and
- electrostatics.

When multiple causes exist for a problem, they are listed in order of importance.

Common Problems

Problem	Possible Cause	Corrective Action
1. Spray gun splitting	Clogged or damaged needle or fluid tip	Clean or replace the needle and/or fluid tip.
	Partially plugged or dirty air cap	Clean the air cap.
	Air bubbles in fluid stream	Bleed air from the fluid delivery system; check for leaks in the fluid delivery system or excessive agitation in the fluid reservoir.
	Fluid pressure too low	Increase the fluid pressure.
2. Air leaks	Foreign matter on the air piston seal or seat.	Remove and clean the air valve stem and seat.
	Worn or damaged air piston O-rings or other air seals	Replace the air piston O-rings or other seals, using the correct seals or the air seal kit.
3. Fluid leak from front of spray gun	Worn or damaged fluid tip O-ring	Replace the fluid tip O-ring.
	Worn or damaged needle or seat	Replace the fluid tip if the needle seat is damaged. Replace the needle if it is damaged.
4. Fluid leaking from rear of extension	Worn or damaged packing cartridge O-ring	Replace the O-ring.
	Worn or damaged packing cartridge	Replace the packing cartridge (packing cartridge cannot be repaired).
5. Spray pattern not affected by air adjustments	No air to spray gun	Make sure air is being supplied to the gun. Check for blockage in the air tubing. Adjust the supply air regulators.
	Plugged holes in air cap	Clean the air cap.
6. Low or erratic fluid flow	Fluid delivery system malfunction	Check the fluid delivery system.
	Blockage within the spray gun, fluid tubing, or fluid-delivery system	Flush the system. If necessary, repair or replace clogged or damaged components.
	Low fluid pressure	**WARNING:** Do not exceed the maximum fluid pressure rating of 6.9 bar (100 psi). Slowly increase the fluid pressure until the the desired fluid flow is obtained.
	Fluid too viscous	Lower the viscosity by adding solvent or increasing the fluid temperature.

Continued...

7. Coarse spray	Air pressure too low for fluid flow rate	Decrease the fluid flow rate or increase the atomizing air pressure. Change the air cap and fluid tip.
	Fluid viscosity too high for atomizing air pressure	Increase the atomizing air pressure, use a larger air cap, or decrease fluid viscosity by either adding solvent or increasing fluid temperature.
	Obstructed atomizing air orifice	Clean the air cap and exterior surface of the fluid tip.
	Damaged fluid tip or air cap	Inspect the fluid tip and air cap; replace them if they are damaged.
	Solvent evaporates too quickly	Use slower evaporating solvent. Contact your material supplier.
8. Excessive overspray	Atomization air pressure too high	Decrease the atomization air pressure.
	Fluid pressure is too high	Use a larger fluid tip and decrease the fluid pressure.
9. Excessive bounce back	Atomizing air and fluid pressures too high	Decrease the pressures.
	Horn air pressure too high	Decrease the horn air pressure.
10. Dry spell	Spray gun too far away from substrate	Move the spray gun closer to the substrate.
	Horn air pressure too high or fluid pressure too low	Decrease the horn air pressure or increase fluid pressure. Change the air cap or fluid tip.
	Solvent evaporates too quickly	Use slower evaporating solvent. Contact your material supplier.
11. Coating material is wrapping back	Spray gun needs to be cleaned	Clean the spray gun. Refer to Spray Gun Cleaning. Use a gun cover.

Spray Pattern/Film Build Troubleshooting

Figure 6-1 illustrates common spray pattern and film-build faults

Problem	Possible Cause	Corrective Action
1. Blow pattern (1)	Horn air pressure too high	Decrease the horn air pressure.
	Fluid pressure too low	Increase the fluid pressure.
2. Heavy top (3), bottom (2), left (4) or right (5) pattern	Partially clogged air cap or fluid tip	Rotate the air cap and activate the spray gun. If the problem persists, clean the air cap. If the problem still persists, clean the fluid tip or inspect the air cap and fluid tip for damage. Replace if necessary.
	Fluid viscosity incorrect	Change the fluid viscosity.
3. Heavy center (6)	Atomization or horn pressure too low	Increase the atomization and horn air pressure.
	Fluid pressure too high	Decrease the fluid pressure.
	Fluid viscosity too low	Increase the fluid viscosity.
4. Spitting (7)	Air in fluid line	Purge the air from the fluid delivery system.
	Atomization or horn pressure too low	Increase the atomization air and fluid pressure and/or increase the horn air pressure.
	Fluid too viscous	Decease the fluid viscosity.
5. Runs and sags	Air in fluid line	Purge air from the fluid delivery system.
	Atomization air pressure too low	Increase the atomization air pressure and decrease fluid pressure.
	Fluid pressure too high	Increase the atomization air pressure and decrease fluid pressure.
	Spray gun too close to the substrate	Move the spray gun farther from the substrate.
	Horn air pressure is too low	Increase the horn air pressure.
	Fluid too viscous	Decrease the fluid viscosity.

Continued...

6. Dry spray	Atomization air pressure too high	Decrease the atomization air pressure.
	Spray gun too far from the substrate	Move the spray gun closer to the substrate.
	Horn air pressure too high	Decrease the horn air pressure.
	Fluid viscosity incorrect	Change the fluid viscosity.
7. Poor coverage in recesses	Atomization air pressure too high	Decrease the atomization air pressure.
	Fluid pressure too low	Increase the fluid pressure.
	Spray gun too far from the substrate	Move the spray gun closer to the substrate.

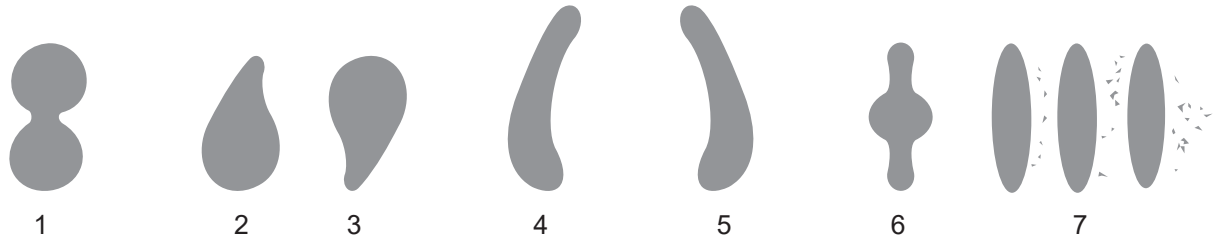


Figure 6-1 Common Spray Pattern Faults

1. Blown pattern
2. Heavy bottom
3. Heavy top
4. Heavy left side
5. Heavy right side
6. Heavy center
7. Splitting

Electrostatic Troubleshooting

Problem	Possible Cause	Corrective Action
1. Loss of wrap, poor transfer efficiency	Low electrostatic voltage	Increase the voltage.
	Resistor or power supply failure	Check the multiplier and needle with a megohmmeter at 500 volts. The multiplier should measure 277−340 megohms. The needle should measure 18.8−22.8 megohms. If either is out of range replace the failed component. Refer to Multiplier and Needle Continuity and Resistance Check.
	Poorly grounded parts	Check conveyor chain, rollers, and part hangers for paint buildup. The resistance between the parts and the ground must be 1 megohm or less. 500 ohms or less is recommended for best results.
	Leaking packing cartridge	Check packing cartridge for leaks. Clean packing cartridge bore and install new packing cartridge.
2. No kV output from spray gun	Damaged gun cable	Check the continuity of the cable from pin to pin. Replace the cable if any opens or shorts are found. Refer to Gun Cordset Continuity Check and Extension Cable Continuity Check.
	Malfunctioning multiplier	Check the continuity and resistance of the multiplier/resistor assembly with a megohmmeter for 277−340 megohms at 500 volts. No burn throughs or arc tracks should be visible on any gun parts. Refer to Multiplier and Needle Continuity and Resistance Check.
	Failed needle resistor	Check the resistor with a megohmmeter for 18.8−22.8 megohms at 500 volts.
	Malfunctioning gun control unit	Check gun control unit. Check control system
	Leaking packing cartridge	Check packing cartridge for leaks. Clean packing cartridge bore and install new packing cartridge and dielectric grease.

Multiplier and Needle Continuity and Resistance Check

See Multiplier and Needle Continuity and Resistance Check.

The multiplier should measure 277−340 megohms at 500 volts. The needle should measure 18.8−22.8 megohms at 500 volts.

NOTE: Multiplier diodes require proper polarity for reading resistance.

1. To check the multiplier connect the earth ground probe (common) of themegohmmeter to the contact spring.
2. Connect the other probe on the megohmmeter to one of the three pins (1) on the end of the multiplier.

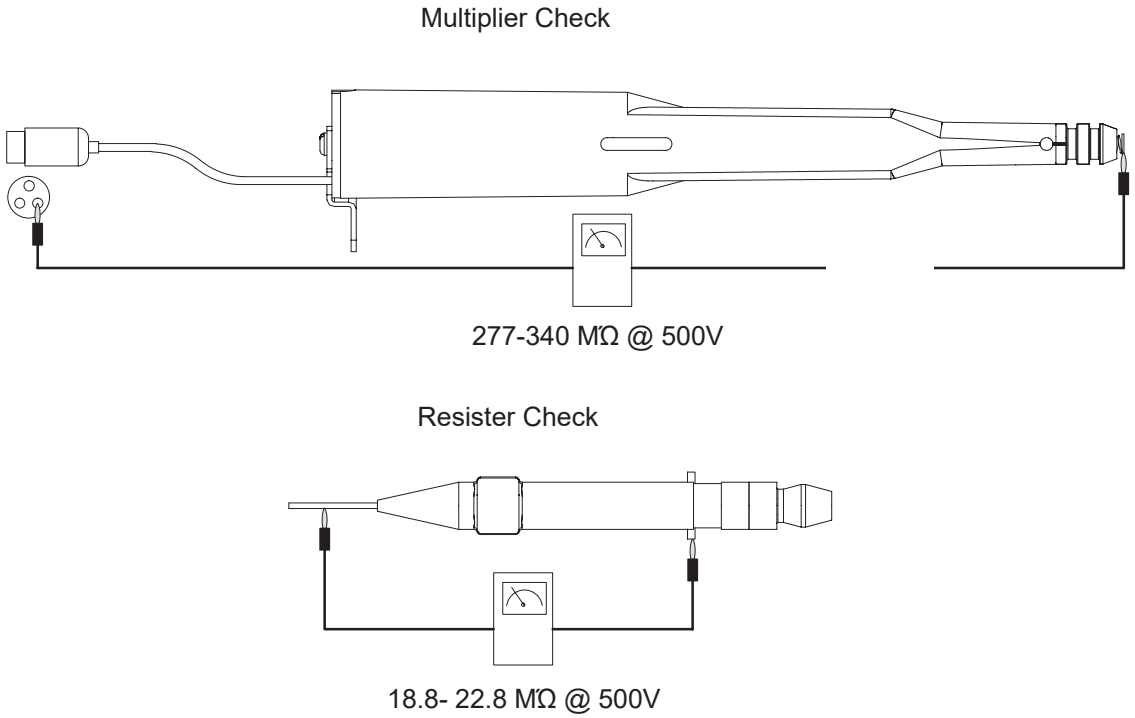
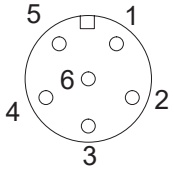


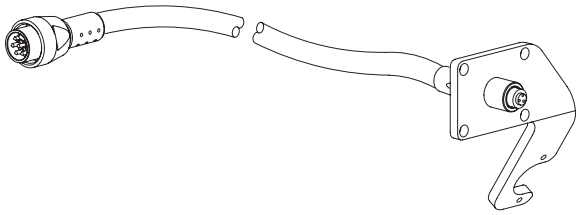
Figure 6-2 Multiplier and Needle Continuity and Resistance Check

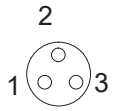
Gun Cordset Continuity Check

Use a standard ohmmeter to check the continuity of the gun cordset.



Extension Cable Connector



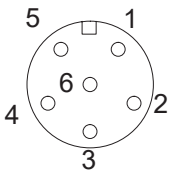


Spray Gun Connector

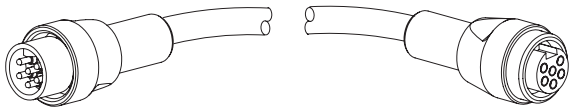
Extension Cable Connector	Spray Gun Connector	Position
1	—	Open
2	3	Closed
3	1	Closed
4	2	Closed
5	Bracket	Closed
6	Bracket	Closed

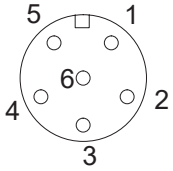
Extension Cable Continuity Check

Use a standard ohmmeter to check the continuity of the extension cable.



Power Supply End Connector





Spray Gun Cable End

Power Supply End Connector	Spray Gun Connector	Position
1	1	Closed
2	2	Closed
3	3	Closed
4	4	Closed
5	5	Closed
6	6	Closed

Section 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: Shut off the gun control unit. Ground the spray gun electrode to remove any residual charge. Failure to observe this warning could result in personal injury.

WARNING: Shut off the fluid-delivery system. Relieve the fluid pressure in the system. Failure to observe this warning could result in an injection injury.

WARNING: Use only Nordson replacement parts to repair the spray gun. Deviating from the repair instructions, using unauthorized parts, or making unathorized modifications can result in personal injury or death and/or the loss of approvals by agencies such as Factory Mutual Research Corporation (FM).

CAUTION: Do not overtighten threaded parts. Failure to observe this caution will result in equipment damage.

NOTE: Tighten all fittings until snug or to the specified torques. Because the spray gun uses O-ring seals, further tightening provides no benefit and could damage plastic threads.

NOTE: The numeric callouts in this section match the item numbers in the spray gun parts list. Refer to Parts section for replacement parts and kits and ordering information. Items in the repair section that are not called out in the spray gun parts list are identified with alphabetic callouts.

Tools/Supplies Required

Before beginning any of the repair tasks described in this section, make sure you have the following tools and supplies:

- See Figure 7-1: Combination tool provided with your spray gun
- Needle nose pliers (provided with your spray gun)
- 5/32-in. hex wrench
- Flat-blade screwdriver
- Service kits and replacement parts
- Removeable threadlocking adhesive
- Dielectric grease

NOTE: Refer to the Parts section for service kits and individual part numbers.

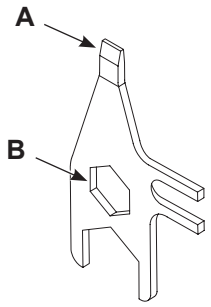


Figure 7-1 Combination Tool

1. Screwdriver
2. Fluid tip tool

Preparation for Repair

1. Turn off the gun control unit and ground the spray gun electrode to remove any residual charge.
2. Flush the fluid-delivery system, fluid tubing, and spray gun.
3. Turn off the fluid delivery system. Relieve system fluid pressure. Trigger the gun to relieve any residual pressure.
4. Shut off the atomizing, horn, and trigger air supply.
5. Disconnect the cordset from the extension cable.
6. Disconnect the fluid and air tubing from the spray gun and move the spray gun to a clean, dry, flat surface.
7. Remove the air cap and fluid tip so they will not be damaged whiler epairing the gun.

Air Cap, Fluid Tip, and Needle Replacement

1. Turn off the gun control unit and ground the spray gun electrode.
2. Turn off the fluid delivery system and relieve the fluid pressure. Trigger the gun to relieve any residual pressure.
3. See Figure 7-2. Unscrew the retaining ring (3) and remove it and the aircap (A) from the extension (6).

CAUTION: To prevent damage to the needle or fluid tip seat, trigger the gun while removing or installing the fluid tip.

4. Trigger the gun and keep it triggered while unscrewing the fluid tip (B) from the extension.
5. Grasp the needle (4) with your fingers and pull it and the contact spring (5) out of the packing cartridge (7). If necessary, hook the bent needle-nose plier jaws under the corners of the needle flats to remove it. Do not scratch the needle.
6. The needle kit includes a new contact spring. Install the contact spring on the needle, then push the new needle into the end of the packing cartridge until it snaps into place. Do not bend the electrode.
7. Make sure the O-ring (C) is installed in the groove in the fluid tip (B). Apply O-ring grease to the O-ring.

CAUTION: Tightening the fluid tip beyond snug does not prevent or eliminate fluid leaks. If coating material leaks around the fluid tip replace the O-ring.

8. Trigger the gun and keep it triggered while screwing the new fluid tip in the extension. Tighten the fluid tip snugly without overtightening it.
9. Install the air cap (A) into the retaining ring and thread the retaining ring (3) onto the extension. Make sure the air cap is centered on the fluid tip. Hold the air cap in the desired position and tighten the retaining ring until it is snug. Do not overtighten the retaining ring.

NOTE: 991 and 992 air spray air caps are shipped permanently installed into retaining rings. These retaining rings cannot be used with the 985−988 air spray air caps, which use the standard retaining ring shipped with the spray gun.

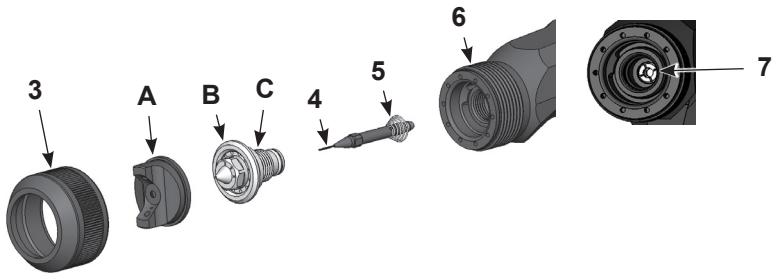


Figure 7-2 Air Cap, Fluid Tip, and Needle Replacement

3. Retaining ring
4. Needle
5. Contact spring
6. Extension
7. Packing cartridge
8. Air cap
9. Fluid tip
10. O-ring

Air Seal Replacement

Disassembly

1. Prepare the spray gun for repair as described onpage 7-2.

2. See Figure 7-3. Remove the four socket screws (27) with a 5/32-in. hex wrench.

NOTE: The springs (38, 39) will push the fluid adjuster housing (40) away from the gun body as you loosen the socket screws (27). Hold onto the housing while removing the screws.

3. Remove the adjuster housing (40) from the gun body.

4. Remove and inspect the springs (38, 39) and replace them if worn ordamaged.

NOTE: Normally there will be no reason to remove the fluid adjuster (42) from the housing (40). If the fluid adjuster must be replaced, lubricate the fluid adjuster shaft with O-ring grease before reinstalling it in the housing. Screw the fluid adjuster into the housing 1-1/2 turns, then tighten the jam nut (41). This is a starting point only for flow adjustment.

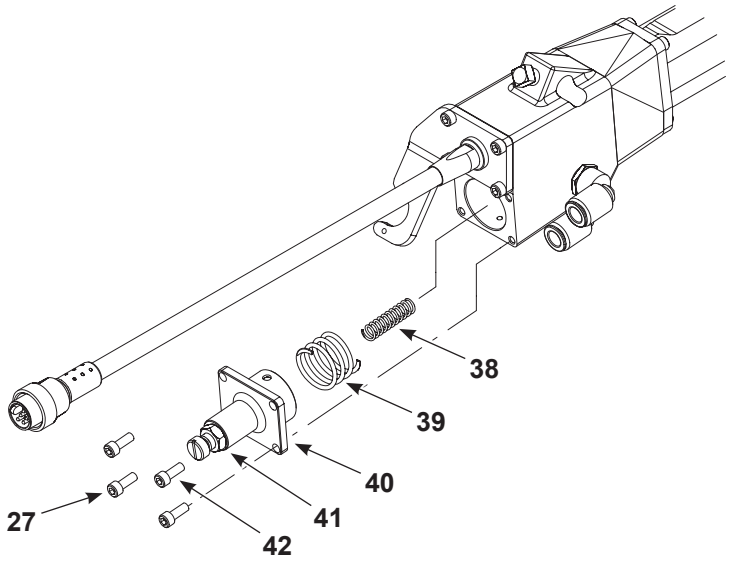


Figure 7-3 Removing the Fluid Adjuster and Springs

27. Screws (4)
38. Fluid return spring
39. Piston return spring
40. Adjuster housing
41. Jam nut
42. Fluid adjuster

5. See Figure 7-4 and Figure 7-5. Remove the pivot screw (16) from the spacer(13).

6. Insert a flat-blade screwdriver into the gun body (30) and turn the connecting rod (37) counterclockwise until it rotates freely. This will disconnect the connecting rod and adapter link (17) from the pull shaft (9, Figure 7-5xx).

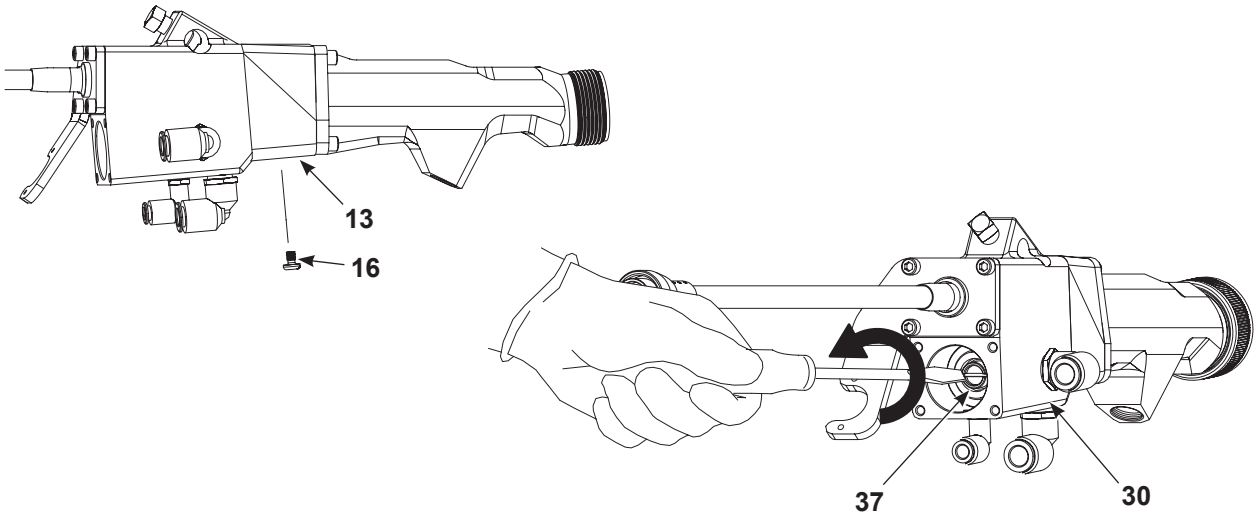


Figure 7-4 Disconnecting the Connecting Rod from the Pull Shaft

13. Spacer
16. Anti-pivot screw
30. Gun body
37. Connecting rod

7. See Figure 7-5. Remove the four screws (1, 2). Pull the extension (6) off the multiplier (18).
8. Pull the spacer (13) off the adapter link (17) and multipler. There are three face-seal O-rings (14, 15) on either side of the spacer.
9. Hold the adapter link with a wrench while using a screwdriver as shown in Figure 7-4 to unscrew the connecting rod (37) from the link

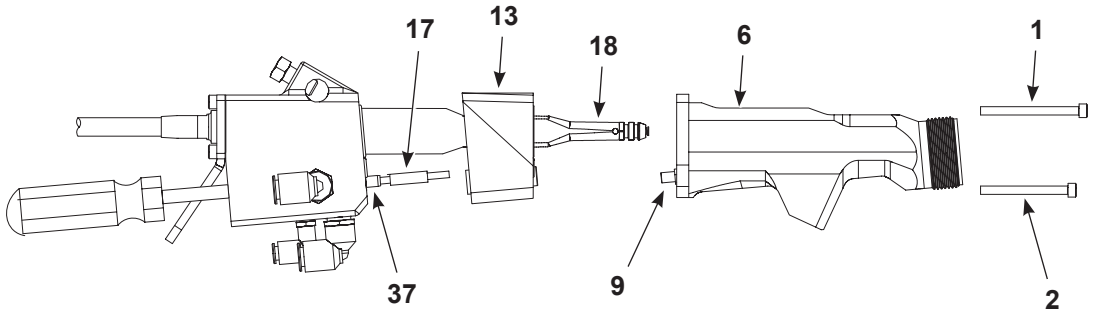


Figure 7-5 Removing the Spacer and Piston from the Gun Body

1. Screws (2.25 in.)
2. Screws (2 in.)
6. Extension
9. Pull shaft
13. Spacer
17. Adater link
18. Multiplier
37. Connecting rod

10. See Figure 7-6 Push the connecting rod and piston (34) out of the gunbody (30).
11. Replace all the O-rings (14, 15) shown with the O-rings included in theair seal O-ring kit. Apply O-ring grease to the O-rings.

NOTE: To replace the packing cartridge, refer to page 7-8.

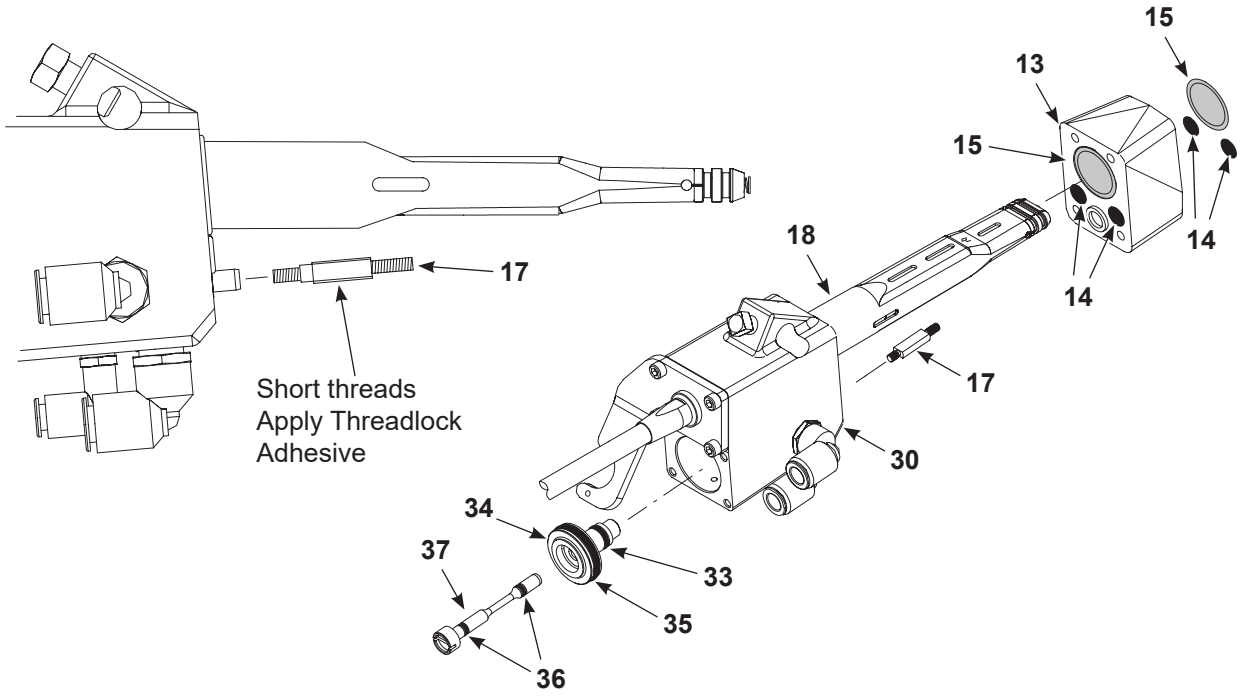


Figure 7-6 Removing the Spacer and Piston from the Gun Body

13. Spacer
14. O-rings (4 small)
15. O-rings (2 large)
17. Adapter link
18. Multiplier
30. Body
33. Piston O-ring (small)
34. Piston
35. Piston O-ring (large)
36. Connecting rod O-rings (2)
37. Connecting rod

Re-Assembly

See Figure 7-3 through Figure 7-7.

1. Install the piston (34) into the body (30), then insert the connecting rod (37) through the piston.
2. Apply Loctite 242 removeable threadlocking adhesive to the shortthreads of the adapter link (17), then screw the short threads into the connecting rod (37). Wipe off any excess adhesive.
3. Install the spacer (13) over the multiplier (18) and adapter link.
4. Install a needle (4) and contact spring (5) into the packing cartridge (7) and install a fluid tip (B) on the extension.
5. Apply dielectric grease to the multiplier contact spring (18A) and thefront 1/3 of the multiplier (18).
6. Install the extension (6) over the multiplier and push it up against thespacer.
7. Secure the extension and spacer to the body with the four screws (1, 2). The 2-in. long screws go in the bottom holes, the 2.25-in screws in the top. Tighten the screws to 2.27−2.83 N•m (20−25 in.-lb).
8. Turn the connecting rod (37) clockwise with a screwdriver so that theadapter link screws into the pull shaft (9), until it bottoms out with a small amount of resistance.\

9. Push the gauge plug (A, included with the spray gun) into the pistonbore and hold it firmly.
10. Insert the screwdriver through the gauge plug hole and turn theconnecting rod (37) counterclockwise to back it out until it contacts the inner surface of the gauge plug.
11. Look through the threaded hole in the bottom of the spacer to see if oneof the flats of the adapter link is lined up with the hole. If not, turn the connecting rod clockwise up to 1/2 turn to align a flat with the screw hole.
12. Thread the anti-pivot screw (16) into the spacer until the screw headbottoms out. The screw should not contact the adapter link (17).

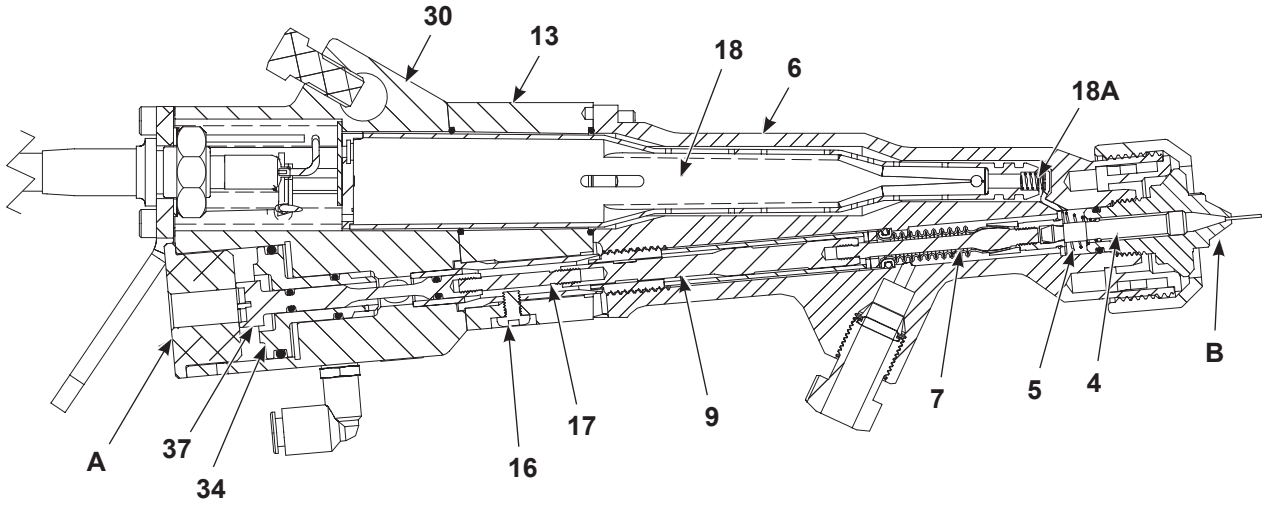


Figure 7-7 Re-Assembly

A. Gague plug	7. Packing cartridge	18. Multiplier
B. Fluid tip	9. Pull shaft	18A. Multiplier contact spring
4. Needle	13. Spacer	30. Body
5. Contact spring	16. Anti-pivot screw	34. Piston
6. Extension	17. Adapter link	27. Connecting rod

13. Remove the gauge plug
14. Refer to Figure 7-3. Coat the springs (27 and 28), adjuster shaft (31), and inside of adjuster housing (29) with O-ring lubricant.
15. Install the large spring inside the adjuster housing, and the small springover the adjuster shaft.
16. Install the adjuster housing on the gun body and secure it with the fourscrews (21). Tighten the screws to 2.27−2.83 N•m (20−25 in.-lb).

Packing Cartridge Replacement

CAUTION: If the packing cartridge leaks, it is important to thoroughly clean the packing cartridge bore in the extension with a compatible non-conductive solvent to remove any residual coating material. Failure to do so may result in loss of kV.

CAUTION: Do not overtighten threaded parts. Failure to observe this caution will result in equipment damage.

The only serviceable part of the packing cartridge is the external O-ring. If replacing the O-ring does not stop the packing cartridge from leaking, you must replace the packing cartridge.

Removal

1. Prepare the gun as described in Preparation for Repair.
2. Remove the air cap, fluid tip, and needle as described in Air Cap, Fluid Tip, and Needle Replacement.
3. Refer to Air Seal Replacement. Perform Steps 2−7 of the Disassembly procedure.
4. See Figure 7-8. Unscrew the packing cartridge retainer (10) from theextension (6).
5. Pull the pull shaft/sleeve/packing cartridge assembly (7, 8, 9) out of theextension.
6. Remove the sleeve, then unscrew the packing cartridge from the pullshaft.

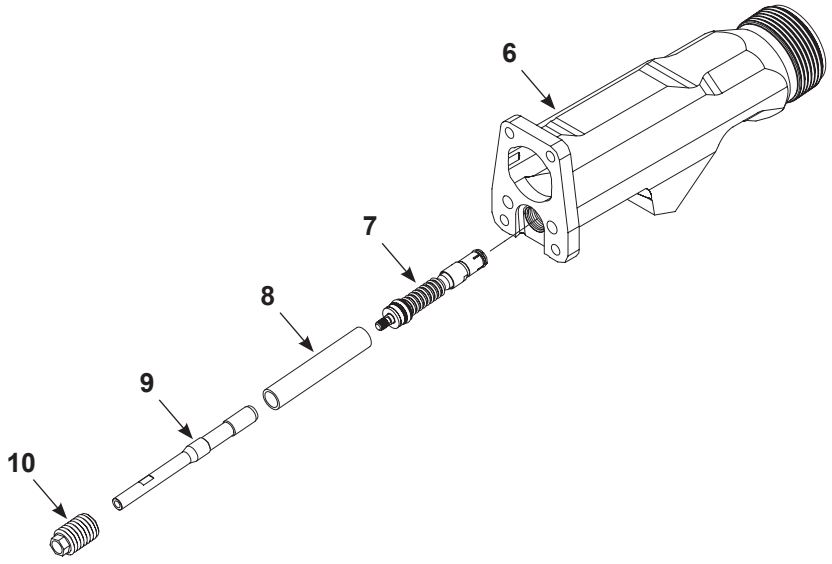


Figure 7-8 Re-Assembly

6. Extension
7. Packing cartridge
8. Sleeve
9. Pull shaft
10. Packing cartridge retainer

Installation

WARNING: Apply dielectric grease as instructed in this procedure. Failure to follow instructions could result in damage to the spray gun and could compromise the safety and performance of the gun.

1. Before re-assembling the spray gun, clean the extension thoroughly to remove any residual coating material.
2. See Figure 7-8. Apply a removeable threadlocking adhesive (Loctite 242 or equivalent) to the threads of the new packing cartridge (7).
3. Screw the pull shaft (9) onto the packing cartridge.
4. Lubricate the exterior of the packing cartridge with O-ring lubricant.
5. Apply a liberal coating of dielectric grease to the pull shaft.
6. Slide the sleeve (8) over the pull shaft and up against the packing cartridge.
7. Apply a thin coat of dielectric grease to the outside of the sleeve.
8. Insert the sleeve/pull shaft/packing cartridge assembly into the extension.
9. Apply O-ring lubricant to the inside diameter of the packing cartridge retainer and to the end of the pull shaft.
10. Install the packing cartridge retainer over the pull shaft and screw it into the extension. Tighten the retainer hand-tight (0.56 Nm (5 in-lb) maximum). Do not overtighten the retainer.
11. Apply a liberal coating of dielectric grease to the multiplier contact spring (18A) and front 1/3 of the multiplier (18).
12. Install the extension (6) over the multiplier and push it up against the spacer.
13. Refer to page 7-6. Perform Steps 6 through 11 to re-assemble the spray gun.

Multiplier Replacement

Multiplier Removal

1. Prepare the gun as described in Preparation for Repair.
2. See Figure 7-9. Remove the four socket screws (27) securing the cordset bracket (28A) to the gun body (30).
3. Unplug the multiplier pigtail (18B) from the cordset.
4. Remove the two upper screws (26), lock washers (25), and spacers (24), from the multiplier.

CAUTION: Do not use the pigtail to pull out the multiplier.

5. Install one of the upper screws (27) into the right-hand standoff (21) anduse it to pull the multiplier out of the spray gun.
6. Remove the following items from the old multiplier and install them onthe new multiplier:
   - screw (23), flat washer (22), and clamp (20)
   - standoffs (21)
   - heat sink plate (19)
7. Inspect the gasket (32) and replace it if it is damaged.

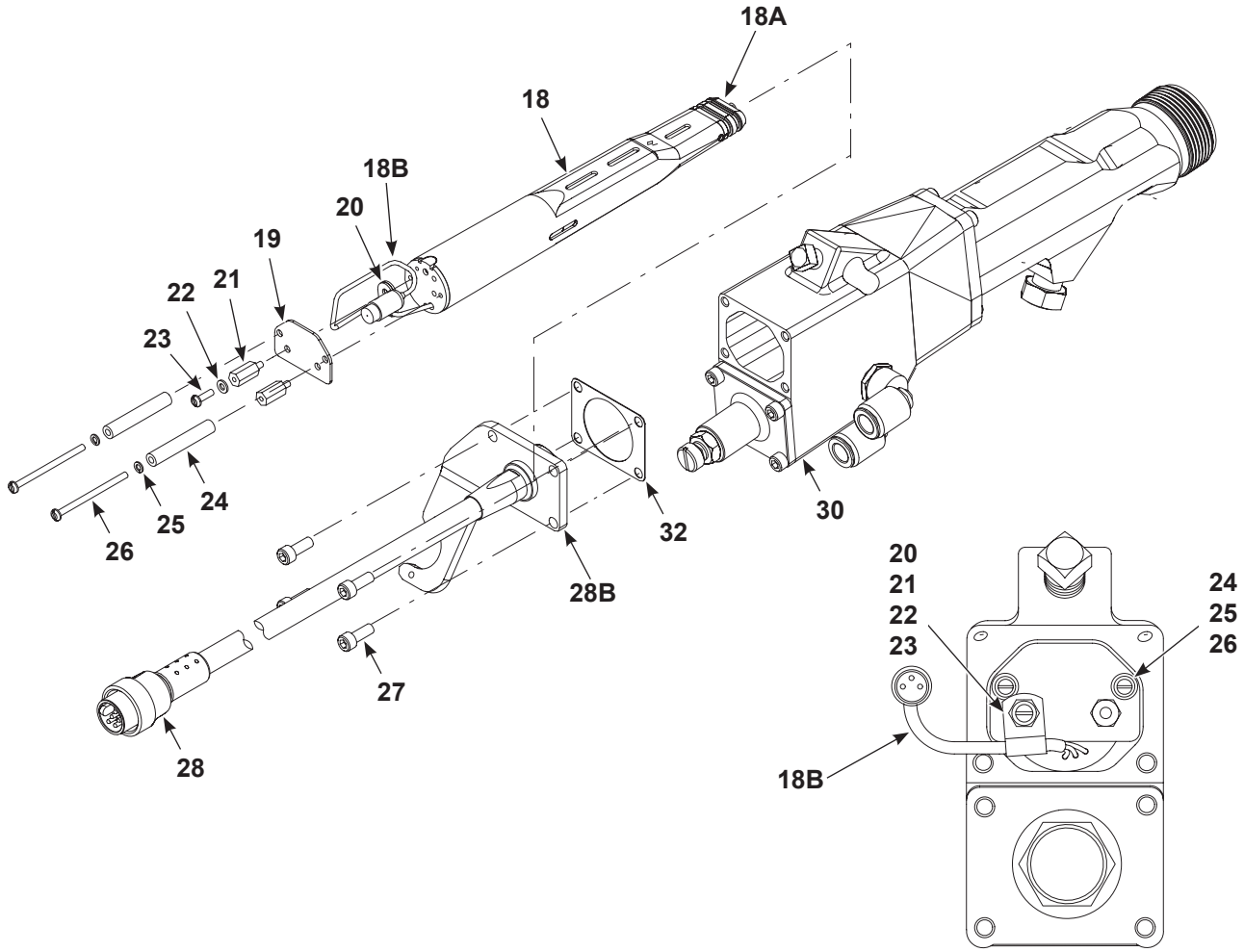


Figure 7-9 Multiplier Replacement

18.	Multiplier	22.	Flat washer	27.	Screws (4)
18A.	Multiplier contact spring	23.	Screw (1)	28.	Cordset
19.	Heat sink	24.	Spacers (2)	28A.	Cordset bracket
20.	Clamp	25.	Lockwashers (2)	30.	Body
21.	Standoff (2)	26.	Screws (2)	32.	Gasket

Multiplier Installation

CAUTION: Apply dielectric grease as instructed. If it is not applied as instructed, damage to the spray gun is likely and spray gun performance and safety may be compromised.

1. See Figure 7-9. Make sure that the contact spring (18A) is in place inthe front end of the multiplier (18). Apply a liberal coating of dielectric grease to the contact spring and front 1/3 of the multiplier.
2. Push the new multiplier into the gun.

NOTE: If it is difficult to seat the heat sink plate (19) up against the flange inside the gun body, loosen the four screws that secure the extension to the body (Figure 7-5, items 1 and 2) approximately one turn. This should relieve any residual air pockets and allow the heat sink plate to seat against the flange. Tighten the screws to 2.27−2.83 N•m (20−25 in.-lb).

3. Install the two upper screws (26), lock washers (25), and spacers (24) tosecure the heat sink to the gun body.
4. If necessary, install the gasket (32) on the gun body.
5. Connect the multiplier pigtail (18B) to the cordset (28).
6. Install the cordset bracket (28A) on the gun body and secure it with thefour socket head screws (27). Tighten the socket head screws to 2.27−2.83 N•m (20−25 in.-lb).

Cordset Replacement

See Figure 7-10.

The cordset assembly includes the bracket. It can be replaced as an assembly, or you can purchase just the cable portion and install it on the your existing bracket.

1. Turn off the gun control unit and ground the spray gun electrode toremove any residual charge.
2. Disconnect the fluid tubing from the bracket if necessary.
3. Disconnect the cordset (28) from the extension cable.
4. Remove the screws (27) from the bracket (28A), and the bracket fromthe gun.
5. Disconnect the multiplier pigtail (18B) from the cordset.
6. Remove the nut (28B) and lock washer (28C), then remove the cable(28D) from the bracket.
7. Inspect the gasket (32) and replace it if it is damaged.
8. Reverse these steps to install the new gun cable.

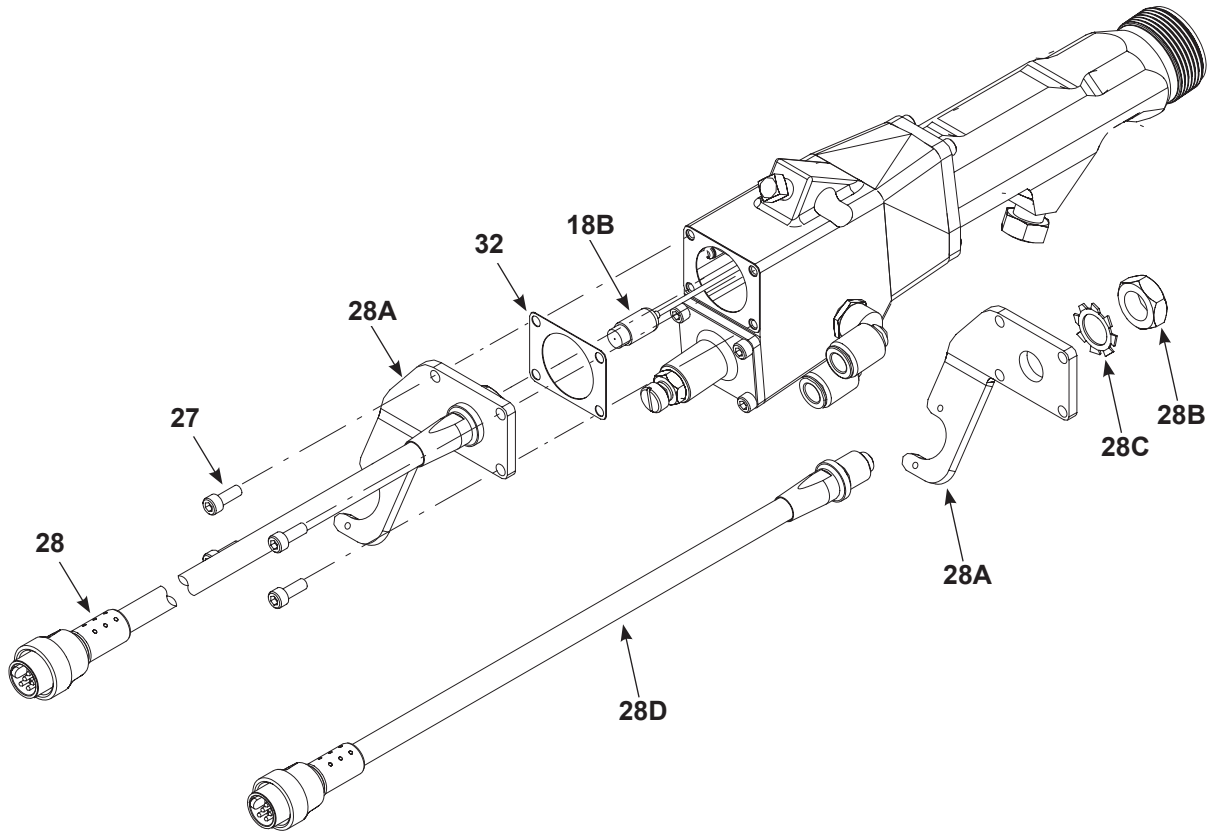


Figure 7-10 Cordset Replacement

Fluid Tubing Replacement

Refer to Installation, for guidelines on choosing the correct fluid tube for your application and tubing installation instructions.

Service Illustration and Notes

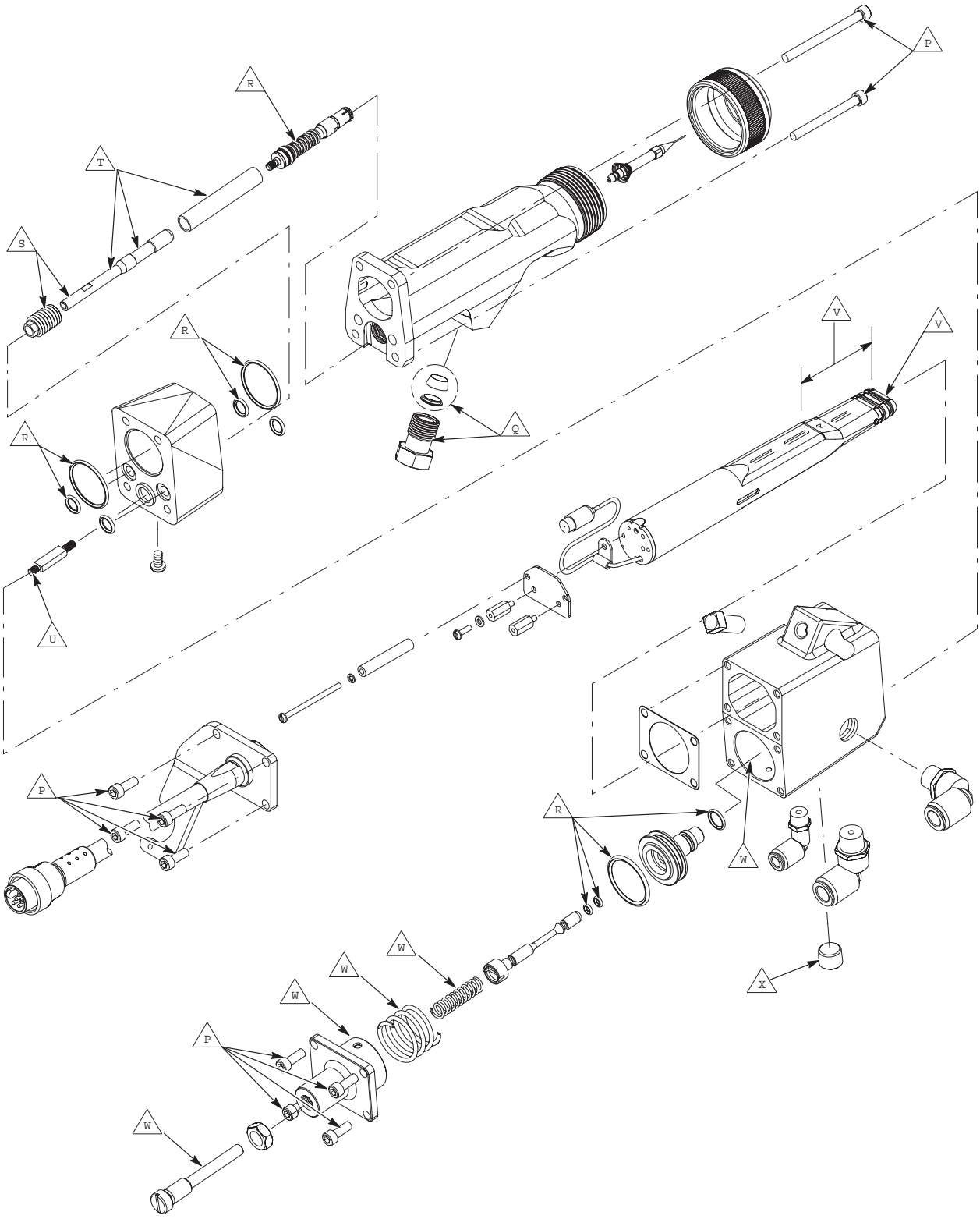


Figure 7-11 Spray Gun Service Notes

Note	Item	Description
1	Screws	Tighten the screws to 2.27−2.83 N•m (20−25 in.-lb).
2	Ferrule and hose nut	On first installation, tighten 1-1/4 turns past hand tight. On re-installation, tighten 1/4 turns past hand tight.
3	O-rings and packing cartridge	Apply MagnaLube-G O-ring lubricant to all O-rings, and the bellows and seal portion of the packing cartridge.
4	Pull shaft, packing cartridge retainer	Apply MagnaLube G O-ring lubricant to ID and the threads of the packing cartridge retainer and to the end of the pull shaft before installing the retainer over the pull shaft. Tighten the retainer hand tight (0.56 Nm (5 in-lb) maximum).
5	Pull shaft, sleeve	Apply a liberal coating of dielectric grease to the indicated areas of the pull shaft. Apply a thin coating of dielectric grease to the OD of the sleeve.
6	Adapter link	Apply Loctite 242 removeable threadlocking adhesive to the short threads of the adapter link before screwing the connecting rod onto the link.
7	Multiplier	Apply a liberal coating of dielectric grease to the contact spring and the front 1/3 of the multiplier.
8	Adjuster shaft, housing, springs, body	Apply MagnaLube G O-ring lubricant to the adjuster shaft, the ID of the adjuster housing, the springs, and the piston bore of the body.
9	Plug	Apply pipe thread adhesive to the plug if removed and reinstalled.

Section 8
Parts

Parts

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

Spray Gun Parts

NOTE: Before ordering parts for your spray gun, review the appropriate procedure in the Repair or Installation section to make sure you are ordering the correct parts, lubricant, and adhesives to complete the procedure.

See Figure 8-1xx.

Item	Part	Description	Quantity	Note
—	1090428	• GUN, Trilogy, automatic, low pressure	1	
1	338909	CAPSCREW, socket head, #10−24 x 2.25 in., stainless steel	2	
2	338910	CAPSCREW, socket head, #10−24 x 2 in., stainless steel	2	
3	1089398	RING, retaining, air cap, Trilogy	1	
4	1094722	KIT, needle, Trilogy	1	
5	1090179	SPRING, compression, contact, Trilogy	1	
6	1094723	KIT, extension, Trilogy, low pressure	1	
7	1094777	KIT, cartridge, Trilogy	1	
7A	940118	O RING, hot paint, 0.313 x 0.438 x 0.063 in.	1	
8	1095878	RETAINER, sleeve, bellows cartridge	1	
9	1093946	SHAFT, pull, Trilogy	1	
10	325749	RETAINER, packing cartridge, electrostatic	1	
11	1090625	FERRULE, set, 0.375 in. ID	1	A
12	1089413	NUT, hose, 0.38 in.	1	A
13	1093812	SPACER, electrostatic, Trilogy, auto, assembly	1	B
14	940110	O-RING, hotpaint, 0.313 x 0.438 x 0.063 in.	4	B, C
15	336499	O-RING, PTFE, 1.05 x 0.07 in.	2	B, C
16	1093599	SCREW, anti-pivot, #10−32, Trilogy	1	
17	1093799	ADAPTER, link-pin, #8−32 UNC-2A Trilogy	1	

Continued...

Item	Part	Description	Quantity	Note
18	336505	• KIT, multiplier, 93 kV, Kinetix	1	
18A	336383	SPRING ASSEMBLY, contact	1	
19	336625	PLATE, heat sink, electrostatic, automatic	1	
20	336732	CLAMP, cable, miniature, electrostatic, auto	1	
21	336705	STANDOFF, hex, male/female, #4−40 x 0.5 in.	2	
22	983531	WASHER, flat, English, 0.125 x 0.25 x 0.032 in., zinc	1	
23	981496	SCREW, pan head, #4−40 x 0.375 in., zinc	1	
24	336706	SPACER, round, clearance, #4	2	
25	983526	LOCK WASHER, English, split, #4, steel, zinc	2	
26	336707	SCREW, pan, #4−40, 1.75 in.	2	
27	981104	SCREW, socket, #10−24 x 0.50 in., zinc	8	
28	1045983	KIT, cordset, automatic gun, Kinetix	1	D
29	336531	CABLE, 50 ft, electrostatic, extension	1	D
30	336620	BODY, piston block, automatic	1	
31	981405	SCREW, square, set, 3/8−16 x 0.75 in., cup, zinc	1	
32	336626	GASKET, cable bracket, Kinetix, automatic	1	
33	940125	O-RING, Viton, 0.375 x 0.50 x 0.063 in.	1	C
34	243975	PISTON, air	1	
35	941210	O-RING, Viton, 1.063 x 1.25 x 0.094 in.	1	C
36	940063	O-RING, Viton, 0.125 x 0.25 x 0.063 in.	2	C
37	325693	ROD, connecting, automatic	1	
38	325537	SPRING, fluid return, high pressure	1	
39	241176	SPRING, compression, 1.24 x 1.093 OD x 0.094 in.	1	
40	336623	HOUSING, adjuster, electrostatic, automatic	1	
41	984156	NUT, hex, jam, 3/8−24, brass	1	
42	325692	ADJUSTER, fluid, low pressure	1	
43	972119	ELBOW, male, 1/4-in. tube x 1/8 in. NPT	1	
44	972183	ELBOW, male 3/8-in. tube x 1/4 in. NPT	2	
45	973410	PLUG, pipe, socket, standard, 1/4 in., zinc	1	
NS	156098	BAG, polyethylene	3	E
NS	1094480	KIT, tools, low pressure, Trilogy	1	
NS	901905	BRUSH (wooden toothbrush type)	1	
NS	247066	BRUSH	1	
NS	336642	WRENCH, Kinetix, combination tool	1	
NS	1028630	PLIERS, needle nose, bent, Kinetix		

NOTE: A. Included in 1094775 Kit, Ferrule, 3/8 in., Low Pressure.

B. Included in 1093816 Spacer, Electrostatic, Trilogy, Automatic, Assembly

C. Included in 336656 Kit, Air Seal Service.

D. Also included in 1046521 Kit, Cordset, Automatic, with 50 ft (Extension) Cable.

E. Order 106403 for a quantity of 10 cover bags.

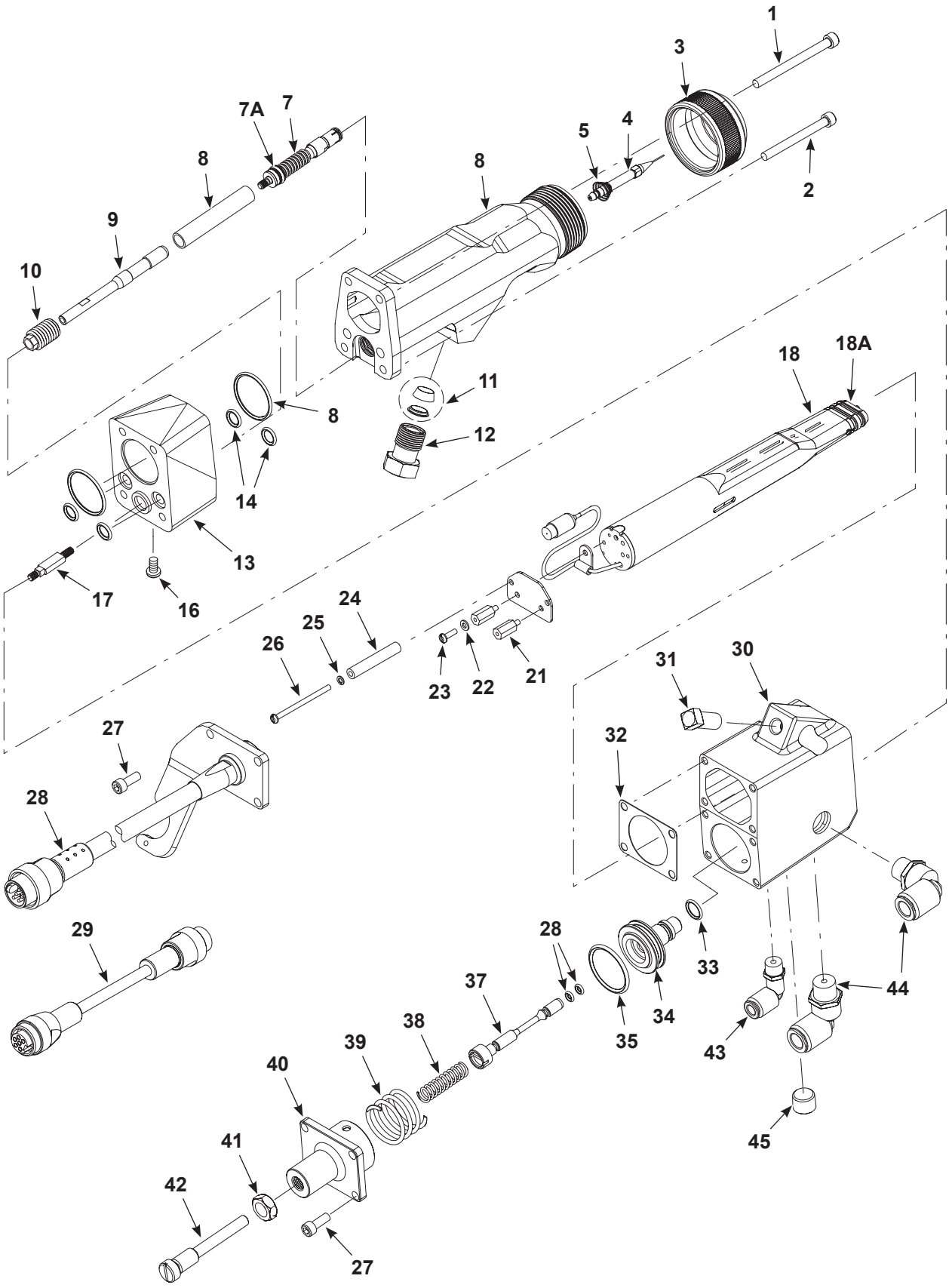


Figure 8-1 Trilogy Air Spray HVLP Automatic Electrostatic Spray Gun

Repair Kits

Air Seal

Item	Part	Description	Quantity	Note
—	336656	AIR SEAL KIT, automatic	1	
14	940110	O-RING, hotpaint, 0.313 x 0.438 x 0.063 in.	4	
15	336499	O-RING, PTFE, 1.05 x 0.07 in.	2	
33	940125	O-RING, Viton, 0.375 x 0.50 x 0.063 in.	1	
35	941210	O-RING, Viton, 1.063 x 1.25 x 0.094 in.	1	
36	940063	O-RING, Viton, 0.125 x 0.25 x 0.063 in.	2	

Packing Cartridge

Item	Part	Description	Quantity	Note
7	1094777	KIT, cartridge, Trilogy	1	
7A	940118	O RING, hot paint, 0.313 x 0.438 x 0.063 in.	1	

Needle Kit

Item	Part	Description	Quantity	Note
4	1094722	KIT, needle, Trilogy	1	
—	- - - - - -	NEEDLE, potted, solvent	1	
5	1090179	SPRING, compression, contact, Trilogy	1	

Cordset Kit

Item	Part	Description	Quantity	Note
—	1045983	CORDSET KIT, automatic, Trilogy	1	
1	1045531	CORDSET ASSEMBLY, Trilogy, automatic	1	
2	1046703	LOCKNUT, bulkhead, 9/16−18, brass	1	
3	983513	LOCK WASHER, E, external, 9/16-in., steel	1	
4	1045076	BRACKET, cable, automatic, long, Trilogy	1	
5	346725	MACHINE SCREW, flathead, recessed, 4−40, 0.25 in., stainless steel	2	

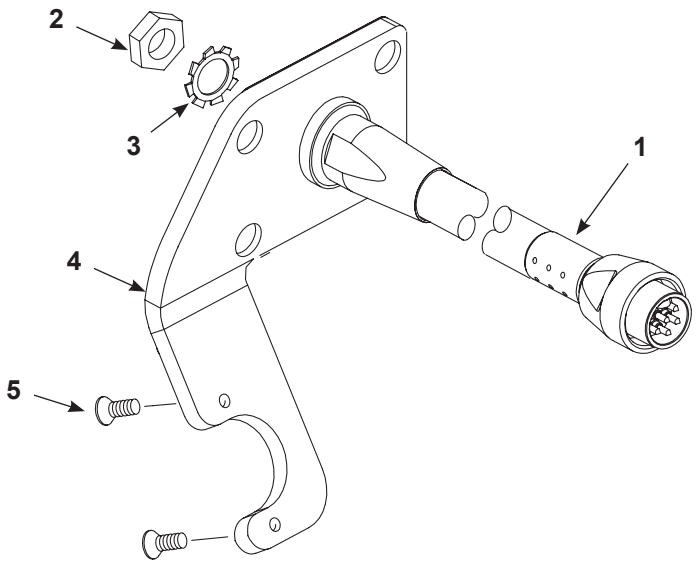


Figure 8-2 Cordset Kit Spare Parts

Cordset with 50ft Extension

See figire 8-2xx.

Item	Part	Description	Quantity	Note
—	1046521	CORDSET KIT, automatic with 50 ft cable	1	
1	1045531	CORDSET ASSEMBLY, Trilogy, automatic	1	
2	1046703	LOCKNUT, bulkhead, 9/16−18, brass	1	
3	983513	LOCK WASHER, E, external, 9/16-in., steel	1	
4	1045076	BRACKET, cable, automatic, long, Trilogy	1	
5	346725	MACHINE SCREW, flathead, recessed, 4−40, 0.25 in., stainless steel,	2	
NS	336531	CABLE, 50 ft, electrostatic, extension	1	

Reccomended Spare Parts

Keep the following parts in inventory to avoid unplanned downtime. Quantities listed support a single spray gun. Adjust order quantities based on the number of spray guns in service.

Part	Description	Quantity	Note
336656	KIT, air seal, automatic	1	
1094777	KIT, cartridge, Trilogy	1	
1094722	KIT, needle, Trilogy	1	
1046521	CORDSET KIT, automatic, gun, with 50-ft cable	1	
336531	CABLE, 50 ft, electrostatic extension	1	
1045983	CORDSET KIT, automatic extension	1	
336505	KIT, multiplier, 93 kV, Kinetix	1	
1094732	KIT, extension, Trilogy, low pressure	1	
1045985	FLUID HOSE COLLAR KIT, Kinetix	1	
336642	WRENCH, Trilogy, combination tool	1	
106403	BAG, polyethylene, (quantity of 10)	1	
900349	LUBRICANT, O-ring, (MagnaLube) , 0.75-oz tube	1	
247658	DIELECTRIC GREASE, applicator, 10 cc, 12 count	1	
- - - - - -	FLUID TIP	1	A
- - - - - -	AIR CAP	1	A
1094775	KIT, ferrule, 3/8 in., low pressure	1	
1094023	POSTER, parts, solventborne, automatic, Trilogy	1	
NOTE: A. Refer to the fluid tip and air cap selection guides included with this manual for part numbers.			

Optional Kits

Adhesives, , Sealants, and Lubricants

Use these adhesives, sealants, and lubricants when repairing your unit. Refer to the Repair or Installation sections in this manual for application instructions

Part	Description	Quantity
900481	ADHESIVE, pipe/thread/hydraulic sealant (Loctite High Temp SS567 for stainless steel threads)	1
900464	THREADLOCKING ADHESIVE (Loctite Removable 242)	1
900349	PTFE-FILLED LUBRICANT, O-ring, (MagnaLube) , 0.75-oz tube	1
247658	DIELECTRIC GREASE, applicator, 10 cc, 12 count	1

Fluid Hose Collar Kit

Part	Description	Quantity	Note
1045985	FLUID HOSE COLLAR KIT, Trilogy	1	
1045986	COLLAR, low-pressure, automatic, Trilogy	1	
346725	MACHINE SCREW, flathead, recess, 4−40, 0.25 in., stainless steel	2	

Optional Quick-Exhaust Valve

Part	Description	Quantity	Note
325529	MUFFLER/EXHAUST VALVE KIT	1	
973000	NIPPLE, steel, schedule 40, 1/8 in., 0.75 in.	1	
901262	VALVE, exhaust	1	
272556	MUFFLER, low profile, 1/4-in. NPT	1	

Tubing and Accessories

Part	Description	Quantity	Note
336467	FLUID TUBING, PTFE, 0..375 in. OD x 0.093-in. ID	AR	
900561	FLUID TUBING, PTFE, 0.375 in. OD x 0.188-in. ID	AR	
146132	FLUID TUBING, PTFE, 0.375 in. OD x 0.25-in. ID	AR	
900509	AIR TUBING, polyethylene, 0.25-in. OD x 0.04-in. wall	AR	
900511	AIR TUBING, polyethylene, 0.375-in. OD x 0.062-in. wall	AR	
900556	AIR TUBING, nylon, 0.25-in. OD x 0.035-in. wall	AR	
900557	AIR TUBING, nylon, 0.375-in. OD x 0.05-in. wall	AR	
NOTE: A. Order in increments of one foot. AR: As Required			

Air Caps and Fluid Tips

Refer to the publications included with this manual to select and order air caps and fluid tips for your spray gun and application:

TC−09−01: Air Spray Air Caps and Fluid Tips

TC−09−02: HVLP Air Caps and Fluid Tips

Tubing and Accessories

Item	Part	Description	Quantity	Note
—	- - - - - -	COMPLIANCE KIT	1	A
1	325643	GAUGE, air, 1.5-in. diameter, 0−30 psi	2	
2	972937	CONNECTOR, female, 1/8-in. tube x 1/8-in. NPT	2	
3	- - - - - -	TUBING, 1/8-in. diameter, gray (18 in.)	3	B
4	- - - - - -	CAP, compliance, HVLP	1	A, C
5	971620	CONNECTOR, barbed, #3-56 x 1/8 in., brass	2	

NOTE: A. Refer to the Trilogy HVLP Fluid Tip and Air Cap Selection Chart included with this manual for the correct part number.

B. Order tubing in one-foot increments. Two 18 in. sections are required.

C. Compliance caps can be ordered separately corresponding to different air caps used.

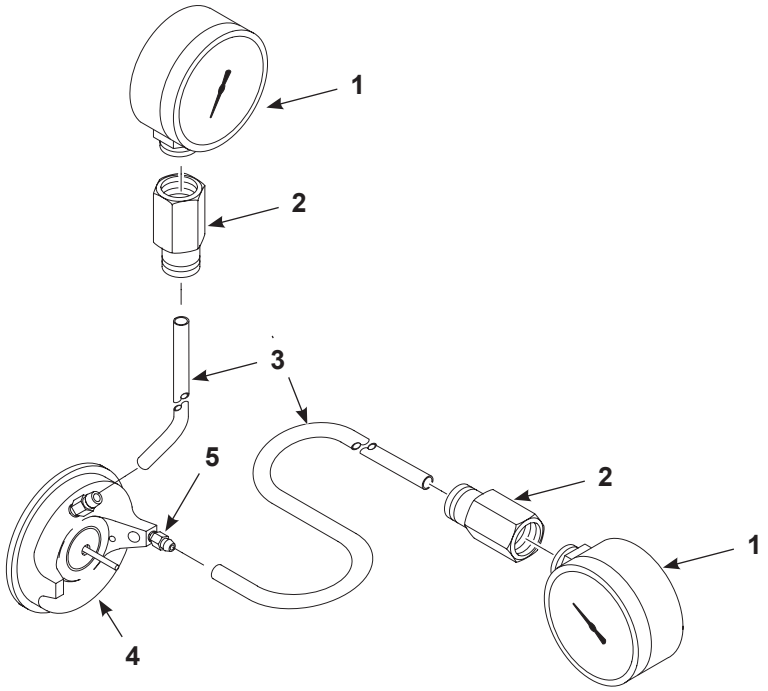
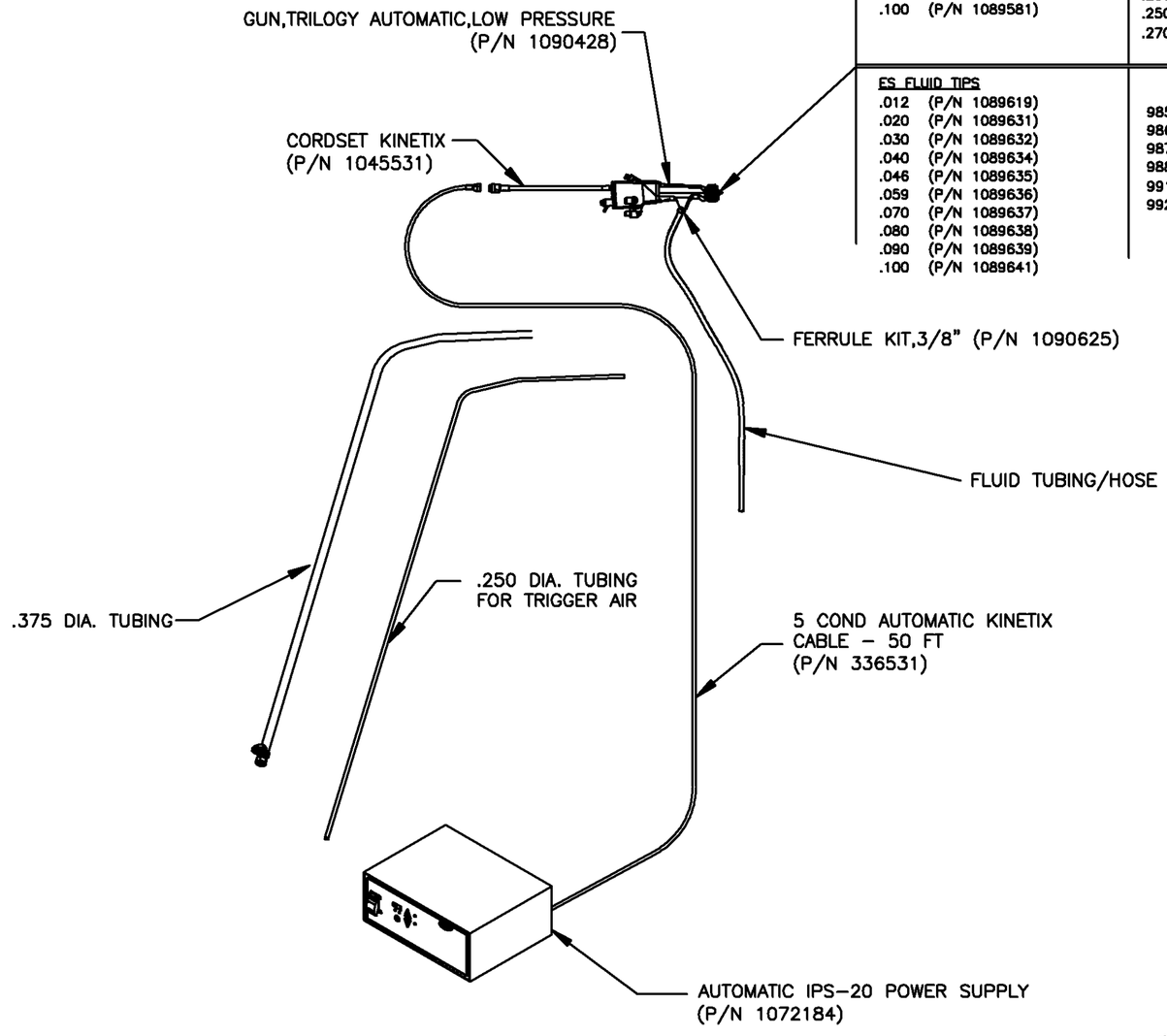


Figure 8-3 Cordset Kit Spare Parts

PART NO.	FLUID TUBING/HOSE (MAXIMUM LENGTH: 30 FT.)
900561	TUBE,TFE,.375
900596	TUBING,PFA,.375OD X .25ID
900601	TUBING,TEFLON,.562X.093
146132	TUBING,TEFLON,1/4INIDX3/8INOD

CHG LTR	REVISION	BY	CH	ECR NO.	DATE
A01	01) RELEASED	JB	BF	LQ601148	06OCT08

LOW PRESSURE



HVLP FLUID TIPS

.030	(P/N 1089574)
.035	(P/N 1089575)
.040	(P/N 1089576)
.050	(P/N 1089577)
.060	(P/N 1089578)
.070	(P/N 1089579)
.080	(P/N 1089580)
.100	(P/N 1089581)

AIR CAPS

.140	(P/N 1092119)
.150	(P/N 1092130)
.160	(P/N 1092131)
.170	(P/N 1092132)
.190	(P/N 1092133)
.210	(P/N 1092134)
.230	(P/N 1092135)
.250	(P/N 1092137)
.270	(P/N 1092138)

ES FLUID TIPS

.012	(P/N 1089619)
.020	(P/N 1089631)
.030	(P/N 1089632)
.040	(P/N 1089634)
.046	(P/N 1089635)
.059	(P/N 1089636)
.070	(P/N 1089637)
.080	(P/N 1089638)
.090	(P/N 1089639)
.100	(P/N 1089641)

AIR CAPS

985	(P/N 245985)
986	(P/N 245986)
987	(P/N 245987)
988	(P/N 245988)
991	(P/N 1092156)
992	(P/N 1092157)

CRITICAL
NO REVISIONS PERMITTED WITHOUT APPROVAL OF THE PROPER AGENCY

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.

ALL DIMENSIONS IN INCHES EXCEPT AS NOTED
X.XX ± .030 X.XXX ± .010
MACHINED SURFACES 125/AA
BREAK OUTSIDE AND INSIDE CORNERS .004/.032 MAX.
THREAD LENGTH DIMENSIONS ARE FULL THREADS
THIRD ANGLE PROJECTION

NEXT ASSEMBLY
FIRST PRODUCT USED ON:
INTERPRET DRAWINGS PER ASME Y14.5M-1994 STD
PERFECT FORM AT MMC REQUIRED FOR INTERRELATED FEATURES

C SIZE

NORDSON CORPORATION
Amherst, Ohio 44001

DRAWN BY JB | DATE 06OCT08
CHECKED BY | APP'D BY
REL. NO. LQ601148

REF DWG, SOLVENTBORNE, AUTO TRILOGY

DRAWING NUMBER 1092047 | REV A01

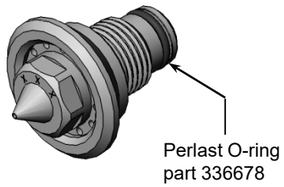
SCALE: NONE | Liquid Systems Group | PAGE 1/1

DWG NO. 1092047 REV A01

Trilogy™ Air Spray Fluid Tip and Air Cap Selection Chart

FLUID TIPS

- Understand the flow rate required for your application. Flow rate is a function of film build, pattern width, line speed, coating material solids, and gun travel speed.
- After making your initial choice, have the next lower and higher size fluid tip on hand as well.
- Flow-rate the nozzle with the coating material.
- Make sure that the un-atomized fluid stream breaks between 10 and 14 inches. Change the fluid tip to obtain the correct flow rate and fluid stream break instead of increasing or decreasing the fluid pressure.
- All fluid tips include a Perlast O-ring 336678. Optional O-rings are: Kalrez 709774, Hotpaint 940120.

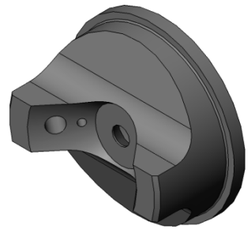


Air Spray Fluid Tip

Part	Orifice Diameter
1089619*	0.012
1089631*	0.020
1089632	0.030
1089634	0.040
1089635	0.046
1089636	0.059
1089637	0.070
1089638	0.080
1089639	0.090
1089641	0.100

* These fluid tips are intended for use with Trilogy waterborne guns only.

AIR CAPS

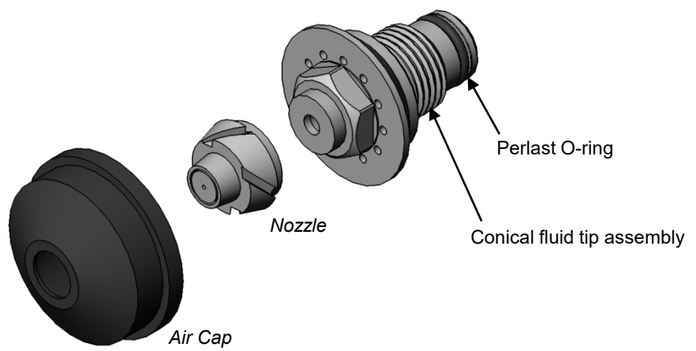


Air Spray Air Cap

AIR CAP	AIR CAP MARKING	ATOMIZATION AIR PRESSURE	SCFM	FLOW RATE	FAN WIDTH PATTERN	USAGE
245985	985	Less than 2.41 bar (35 psi)	8.2 @ 20 psi	0.059–0.295 l/min (2–10 oz/min)	15.24–30.48 cm (6–12 in.)	Universal air cap; low flow rates
245986	986	2.07–4.14 bar (30–60 psi)	12 @ 40 psi	0.236–0.355 l/min (8–12 oz/min)	30.48–45.72 cm (12–18 in.)	Medium flow rates
245987	987	1.38–4.14 bar (20–60 psi)	16 @ 40 psi	0.296–0.592 l/min (10–20 oz/min)	30.48–45.72 cm (12–18 in.)	High flow rates, must use for fluid tips 0.80 in. and larger
245988	988	Less than 2.41 bar (35 psi)	12 @ 40 psi	0.059–0.326 l/min (2–11 oz/min)	30.48–45.72 cm (12–18 in.)	Low flow rates, high solids or metallics
1092156	991	Less than 2.76 bar (40 psi)	8 @ 15 psi	0.059–0.326 l/min (2–11 oz/min)	Less than or equal to 40.64 cm (16 in.)	Low flow rates, high viscosities
1092157	992	Less than 2.76 bar (40 psi)	8 @ 15 psi	0.059–0.326 l/min (2–11 oz/min)	Less than or equal to 40.64 cm (16 in.)	Low flow rates, high solids or metallics

Conical Nozzle Kits

	10-in. Nozzle Kit 1103490	13-in. Nozzle Kit 1610748
Air Cap	1089649	1089692
Nozzle	247777	247778
Fluid Tip	1103511	1103511
Nozzle Insert	247779	247780
O-Ring	336678	336678



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Issued 08/19

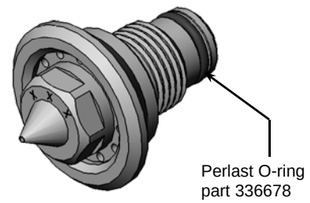
Trilogy™ Air Spray Fluid Tip and Air Cap Selection Chart

Refer to the appropriate Trilogy Spray Gun manual for other parts.

Trilogy™ HVLP Fluid Tip and Air Cap Selection Chart

FLUID TIPS

- Understand the flow rate required for your application. Flow rate is a function of film build, pattern width, line speed, coating material solids, and gun travel speed.
- After making your initial choice, have the next lower and higher size fluid tip on hand as well.
- Flow-rate the nozzle with the coating material.
- Make sure that the un-atomized fluid stream breaks between 10 and 14 inches. Change the fluid tip to obtain the correct flow rate and fluid stream break instead of increasing or decreasing the fluid pressure.
- All fluid tips include a Perlast O-ring 336678. Optional O-rings are: Kalrez 709774, Hotpaint 940120.

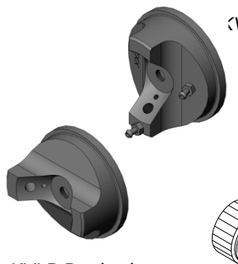


HVLP Fluid Tip

Part	Orifice Diameter
1089574	0.030
1089575	0.035
1089576	0.040
1089577	0.050
1089578	0.060
1089579	0.070
1089580	0.080
1089581	0.100

AIR CAPS

- A larger air cap will provide lower cap pressures and higher air flow, but may yield coarser atomization.
- Lower air cap pressures produce a softer spray and theoretically, improved transfer efficiency.
- Smaller air caps will produce finer atomization.
- Smaller air caps will require higher air cap pressures to atomize.
- Smaller fluid tips will work best with smaller air caps.
- Larger fluid tips will work best with larger air caps.
- As the fluid tip ID increases, the airflow through the atomizing section of the air cap decreases, as a result, there is less air available for atomization.
- Higher viscosity coatings and higher flow rates require more airflow for atomization.
- Atomizing air and horn air are completely independent in automatic spray guns.



KVLP Production Air Cap

KVLP Compliance Air Cap

Compliance Kit

DESCRIPTION	PART
General purpose air caps	1092132
	1092133
	1092134
Very light viscosity, low solids air caps	1092119
	1092130
	1092131
Heavy viscosity, high solids, high flow	1092135
	1092137
	1092138

AIR CAP LOCATER	COATING CHARACTERISTICS	MAXIMUM AIRFLOW (SCFM)	TYPICAL COATINGS
A	Very light viscosity, very low solids, (<25%) Low flow (<5 oz/min)	10–12	Stains, wash primers, bleaches, fine finish
B	Light viscosity, low solids (25–30%) Low flow (<5 oz/min) to medium flow (5–10 oz/min)	13–15	Stains, wash primers, ADPRO, lacquer clear coat, fine finish
C	Light viscosity, low solids (25–30%) Medium flow (5–10 oz/min)	17–20	Primers, ADPRO, lacquer clear coat, metallics, solid colors, enamels, urethanes, waterbornes
	Medium viscosity, medium solids (30–50%) Low flow (<5 oz/min)		
D	Medium viscosity, medium solids (30–50%) Medium flow (5–10 oz/min) to high flow (10–20 oz/min)	22–25	Metallics, solid colors, enamels, urethanes, waterbornes, plural component, corrosion protection
	Heavy viscosity, high solids (>75%) Low flow (<5 oz/min)		
E	Medium viscosity, medium solids (30–50%) High flow (10–20 oz/min) to very high flow (>20 oz/min)	28–34	High solids enamels and urethanes, high solids waterbornes, plural component, corrosion protection
	Heavy viscosity, high solids (>75%) Medium flow (5–10 oz/min) to high flow (10–20 oz/min)		
X	Not recommended		

AIR CAP PART NUMBER (Atomizing Air Hole Diameter in inches)									
Tip Orifice (inches)	**1092119 (0.140)**	**1092130 (0.150)**	**1092131 (0.160)**	**1092132 (0.170)**	**1092133 (0.190)**	**1092134 (0.210)**	**1092135 (0.230)**	**1092137 (0.250)**	**1092138 (0.270)**
0.030	A	A	B	B	C	D	E	X	X
0.035	A	A	B	B	C	D	E	E	X
0.040	A	A	B	B	C	D	E	E	E
0.050	A	A	A	B	C	C	D	E	E
0.060	X	A	A	A	B	C	D	E	E
0.070	X	X	A	A	B	C	D	E	E
0.080	X	X	X	A	B	C	D	E	E
0.100	X	X	X	X	X	B	C	D	E
Compliance Air Cap	1094642	1094643	1094644	1094645	1094646	1094647	1094648	1094649	1094650
NOTE: Compliance air caps are modified caps for testing air pressure ONLY.									
Compliance Kits	1094668	1094669	1094680	1094681	1094682	1094683	1094684	1094685	1094 686
NOTE: Compliance kits include caps, gauges, and air tubing. Compliance kits are modified for testing ONLY.									

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Trilogy ™ HVLP Fluid Tip and Air Cap Selection Chart

Refer to the appropriate Trilogy Spray Gun manual for other parts.