Trilogy® Manual
Electrostatic Air Spray/HVLP Waterborne Spray Gun

Customer Product Manual
Document Number 1093558-05
– English –
Issued 10/24

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

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http://www.nordson.com.

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– Original document –

Table of Contents

Change Record

Revision	Date	Change
01	06/09	Initial Release
02	08/19	Recertify waterborne equipment for XPS60
03	04/23	Manual refesh and incorporation of UKCA
04	11/23	Labels replaced with updated ones due to syntax error
05	10/24	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 Labels

Safety labels are provided to help you operate and maintain your equipment safely.

Label Descriptions

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® manual electrostatic air spray/HVLP waterborne spray gun is designed to apply waterborne coating materials. It is used with the Nordson Iso-Flo® system, which electrostatically charges waterborne coatings and delivers them to the spray gun while electrically isolating the charged coating from the coating supply. The electrostatic voltage is provided by a separate EPS-6 electrostatic power supply.

The spray gun is non-circulating and can be used with heated and unheated non-circulating spray systems. For systems that require circulation, a circulation fitting can be coupled to the inlet fluid fitting. Refer to the *Parts* section for ordering information.

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.

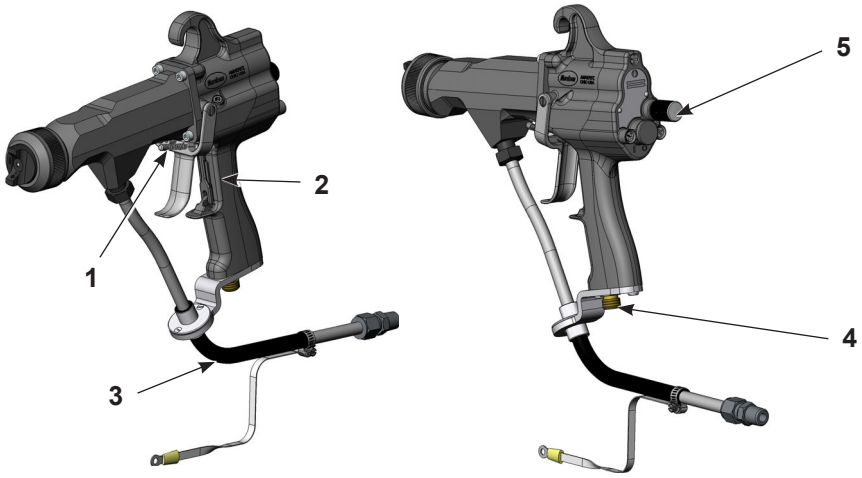


Figure 2-1 Trilogy Air Spray/HVLP Manual Electrostatic Waterborne Spray Gun

1. Fluid flow adjust knob
2. Trigger lock
3. Fluid hose
4. Air fitting 1/4 in. NPS
5. Horn air adjust knob.

Spray Gun Features

The Trilogy spray gun features:

- adjustable horn air pressure and fluid flow rate
- large air passages for higher air energy
- bellows-type packing cartridge
- 25 ft, 1/4-in. ID fluid hose

Spray Technology

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

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 hoses, and a 50-ft cable extension. HVLP compliance kits are available for each HVLP air cap. Refer to *Options* in the *Parts* section.

Coating Materials

The spray guns are compatible with a wide variety of waterborne coating materials.

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.

Trigger Lock

The gun includes a trigger lock (10) to prevent accidental triggering of the spray gun and possible injection injuries.

Electrostatic Charge

A manual Iso-Flo voltage block system delivers electrostatically charged and pressurized coating material to the spray gun on demand and electrically isolates the spray gun and fluid path from the grounded coating material supply. The electrostatic voltage is generated by an EPS-6 60 kV electrostatic power supply.

The charged coating material flows through a special fluid supply hose (7) to the spray gun. As the charged coating material is sprayed it is attracted to the grounded workpiece.

Fluid Flow

Fluid enters the spray gun extension (4) and flows past the packing cartridge (6) to the fluid tip (2). When the trigger (9) is pulled it pulls the needle (5) off its seat in the fluid tip, allowing fluid to flow out of the gun. The fluid flow control knob (8) controls how far the needle is pulled off the seat, which determines fluid flow through the fluid tip.

The packing cartridge (6) prevents fluid from flowing past it into the handle (15). The fluid flow is dead-ended at the spray gun when the trigger is released.

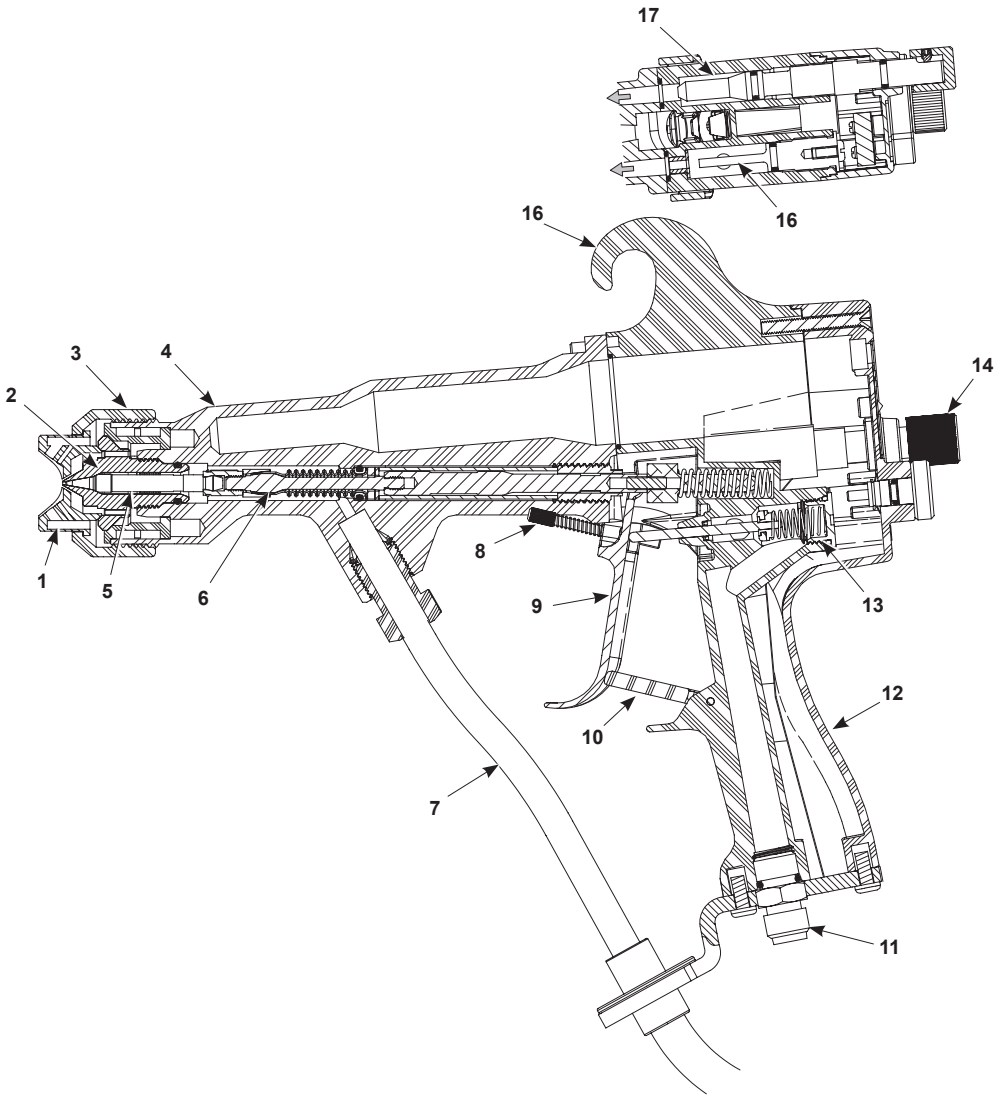


Figure 2-2 Spray Gun Components and Operation

1. Air cap
2. Fluid tip
3. Restraining ring
4. Extension
5. Needle
6. Packing cartridge
7. Fluid hose
8. Fluid flow control knob
9. Trigger
10. Trigger lock
11. Air inlet fitting
12. Handle cover
13. Air valve
14. Horn air adjust knob
15. Handle
16. Application air passage
17. Horn air adjust valve

Air Flow

Compressed air enters the spray gun through an inlet fitting (11) in the spray gun handle (15).

Pulling the trigger opens the air valve (13), allowing air to flow through the atomization (16) and horn air passages to the air cap. The air flow triggers a pressure switch in the Iso-Flo system, which turns on the electrostatic power supply and charges the coating material.

Atomization air flows through the handle and extension to the air cap when the spray gun is triggered. The atomization air atomizes the coating material as it exits the nozzle. To control atomization, adjust the air pressure regulator that supplies the spray gun.

Horn air flows past the horn air valve (17) to the air cap (1) and shapes the spray pattern. The horn air flow is controlled by adjusting the valve opening with the knob (14).

Specifications

Dimensions

Dimensions	Metric (cm)	English (in.)
Height	22.28	8.77
Length	30.48	12.00
Width	5.58	2.20
NOTE: The spray gun dimensions include the fluid and air fittings.		

Weight

Weight	Metric (g)	English (oz)
Airspray/HVLP spray gun	711	25.1
NOTE: The spray gun weight includes the fluid and air fittings.		

Operating Pressures

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.		

Electrostatics

Voltage/Current/Energy	Metric (cm)
Maximum voltage	60 kV
Maximum output rating current	100 microamps
Maximum energy supplied by XPS 60	141 mJ

Spray Gun Fitting Sizes

Spray Gun Standard Fitting Sizes	
Air fitting	1/4 in. NPS, male
Fluid fitting	3/4 in. NPS, male

Fluid Hose

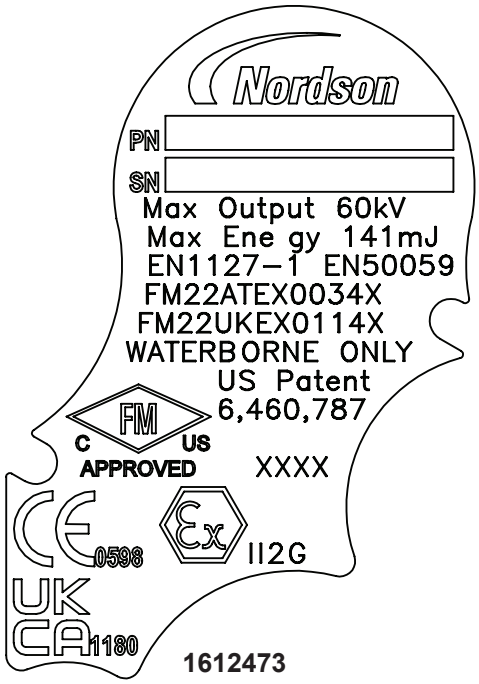
Length	ID	Fittings
7.62 m (25 ft)	6.35 mm (1/4 in.)	1/4 in. NPS, female

Optional Air Hoses

Length	ID	Fittings
9.14, 15.24, 30.48 m (30, 50, 100 ft.)	9.25 mm (3/8 in.)	1/4 in. NPS, female

Special Conditions for Safe Use

The installation, operation, maintenance, and repair of the system equipment shall be in accordance with the Safety Instructions and the User's Manual supplied by the Manufacturer. The power supply/control unit type XPS 60 and the Iso-Flo unit shall be installed only in a safe area.The Trilogy Manual (hand-held) Spray Gun is certified for use with the Manual HD Iso-Flo or Manual Iso-Flo VC used with the XPS 60 PowerSupply Controller. These systems are to be used only with waterborne paint and coatings.



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.

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 a HVLP air cap, order the appropriate compliance kit also. You will need one compliance kit for each air cap size you use.

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 60 kV Waterborne System

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

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

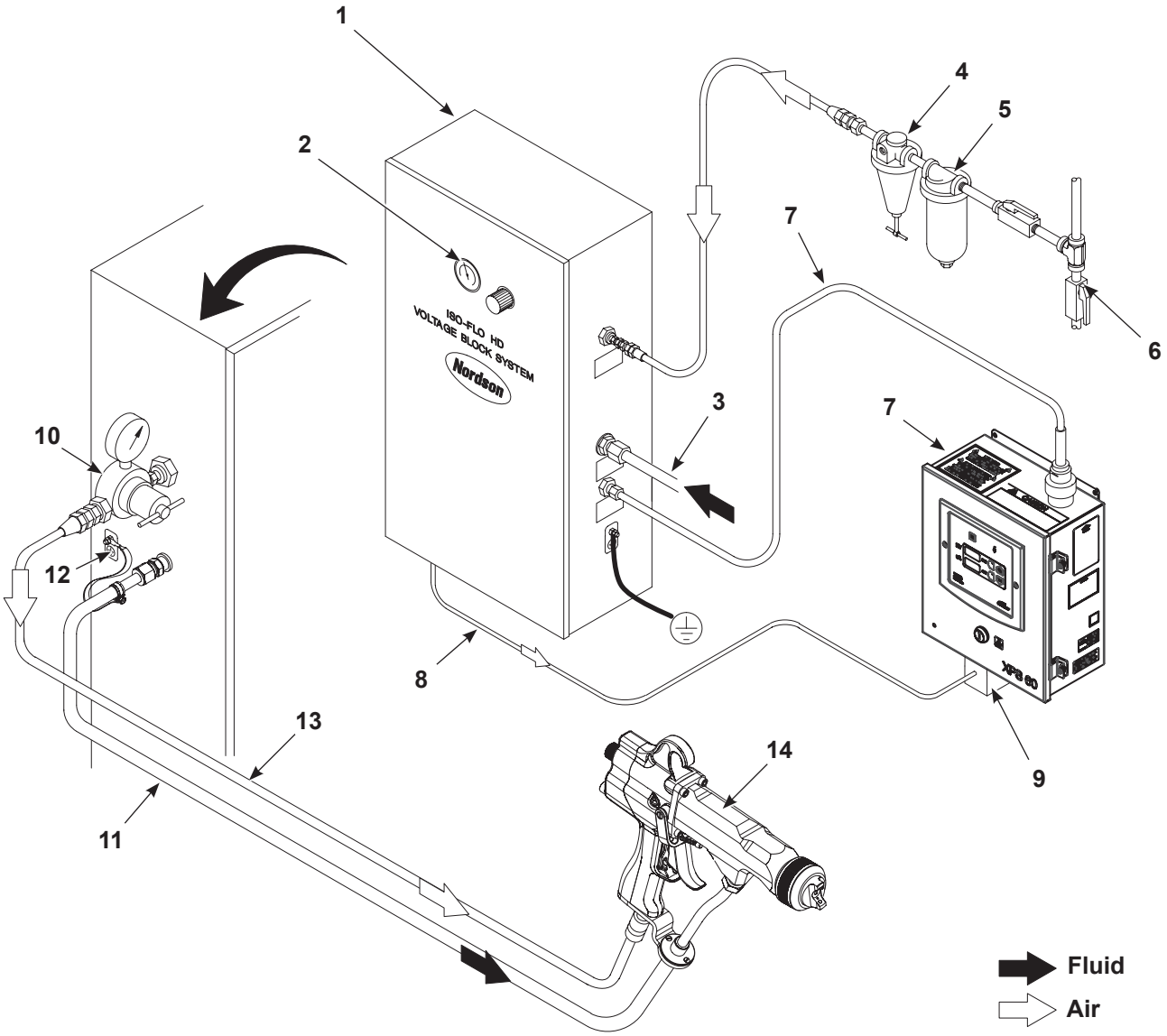


Figure 3-1 Typical Manual 60 kV Air Spray/HVLP System

1. Iso-Flo HD voltage block system
2. Fluid pressure regulator/gauge
3. Fluid supply line
4. System air regulator
5. System air filter
6. Air drop drain valve
7. XPS 60 electrostatic power supply
8. Air line from air flow sensor
9. Pressure switch
10. Atomizing air pressure regulator
11. Fluid hose
12. Fluid ground hose
13. Air hose
14. Spray gun
15. Electrostatic cable

Air and Fluid Hose Connections

Air Hose Connection

The air hose supplying air to the spray gun should be a grounding type hose. Limit the number of restrictions in the air supply lines and hose to provide maximum air flow.

For optimum HVLP performance, 3/8-in. ID hose is recommended, no longer than 9.14 m (30 ft).

1. Clean the air hose fittings with a clean, dry cloth.
2. Connect the air hose to the air OUT fitting on the gun control unit to the 1/4-in. NPSM fitting in the spray gun handle.

Fluid Hose Connection

The spray gun is shipped with a 7.62-meter (25-ft) fluid hose installed on the gun. The hose is equipped with a 3/8-in. NPT stainless steel fitting for connection to a fluid delivery system, and a ground wire with a ring-tong terminal.

Connect the stainless steel hose fitting to the PAINT OUT fitting on the Iso-Flo cabinet or to the fluid outlet of an alternate fluid delivery system.

Connect the ring-tong terminal on the hose ground wire to the ground stud on the side of the Iso-Flo cabinet or a true earth ground.

Securing the Air and Fluid Hoses

Bundle together the fluid and air hose where practical. Do the following to prevent wear and damage:

- Bundle the hoses together with hook and loop tape, spiral-cut tubing, or similar devices. If you secure the hoses to a stationary object at any point between the fluid delivery system and the gun, make sure the hoses can flex without strain.
- Do not tie the hoses to machine members in areas where they must move or stretch.
- Do not kink the hoses.
- Do not allow the hoses to become abraded by sharp corners such as booth edges.
- Do not walk on the hoses or run over them with heavy objects.
- If desired, cover the spray gun body, hoses, and other equipment in the spray area with a grounded, conductive wrapping to keep them clean.

Fluid Tip and Air Cap Installation

See Figure 3-2. Use this procedure to install a fluid tip and air cap on a new spray gun. To remove and replace the fluid tip and air cap, refer to Section 7 *Repair*.

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

1. Unscrew the retaining ring (6).
2. Lubricate the fluid tip (3) O-ring (2) with O-ring grease.
3. Pull the trigger to retract the needle (1).
4. Thread the fluid tip into the extension and tighten it snugly with the combination tool. Do not overtighten.

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 (4) into the retaining ring and thread the retaining ring 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 caps, which use the standard retaining ring shipped with the spray gun.

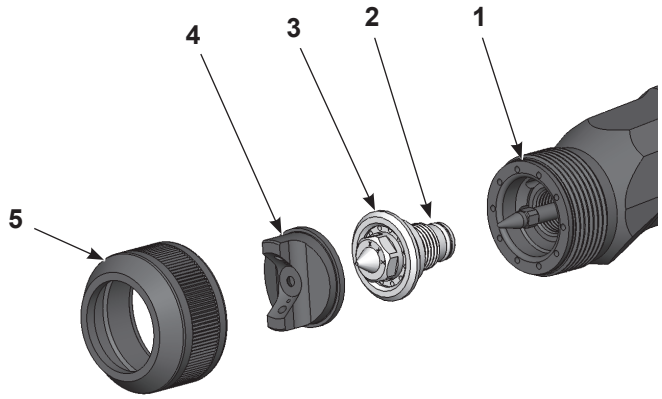


Figure 3-2 Fluid Tip and Air Cap Installation

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

Section 4

Operation

WARNING:

- Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.
- Do not exceed the maximum fluid pressure rating of 6.9 bar (100 psi). Failure to follow this warning may result in personal injury or death.
- Engage the trigger lock whenever you are not spraying to prevent accidental triggering of the spray gun and possible injection injuries. Failure to observe this warning may result in injury.
- The Trilogy spray gun, XPS 60 power supply, Nordson high-voltage cable, Nordson waterborne hose, and the Iso-Flo unit are considered a system. The stored energy of the system could be dangerously increased by any changes. Nordson Corporation should be contacted before any changes are made.
- Do not add any joints or fittings to a waterborne fluid hose intended for use with spraying charged fluid. If the hose becomes damaged replace the entire hose assembly with the appropriate Nordson hose of identical length.

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 or use grounding straps to maintain a connection to ground when working with or around electrostatic equipment.

NOTE: Read this entire section before performing any procedures.

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 to the Iso-Flo cabinet.
- all 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

WARNING: Never operate the spray gun with a worn or damaged trigger lock. Failure to observe this warning may result in injury.

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 the spray gun with solvent.

1. Turn on the spray booth exhaust fans.
2. Supply compressed air to the Iso-Flo system.
3. Start the fluid delivery system pump and pressurize the system with fluid. Do not exceed 6.9 bar (100 psi).
4. Turn on the fluid heater(s), if used. Do not exceed 82 °C (180 °F).
5. Check the fluid-delivery system and Iso-Flo system for leaks. Do not operate the system if any leaks are present.
6. Adjust the fluid and atomizing air pressure to achieve the optimum atomization and desired pattern width. Refer to *Spray Pattern and Atomization Adjustments* on page 4-3. Do not exceed 6.9 bar (100 psi).
7. Turn on the electrostatic power supply.
8. Unlock the trigger, point the spray gun into the booth, and trigger the spray gun. Make sure the red kV indicator on the front panel of the electrostatic power unit lights to indicate that kV is on. If kV is off, make sure the electrostatic power unit is turned on. If the kV voltage indicator is flickering or is off, the air pressure supplied to the pressure switch may be inadequate to keep the pressure switch activated. Increase the air pressure to the switch.
9. Adjust the fluid pressure to obtain the desired atomization and spray pattern. Refer to *Spray Pattern and Atomization Adjustments* on page 4-3.

Spray Adjustments

Fluid Pressure and Flow Rate Adjustments

- Shut off the air supply to the spray gun or control unit and check the fluid flow rate
- For optimum atomization, an appropriate fluid supply 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 desired flow rate does not provide an acceptable fluid stream, install a larger fluid tip and adjust the fluid pressure until a break of 25.4−35.6 cm (10−14 in.) is achieved at the required flow rate.
- If the flow rate is too high, turn the fluid flow adjust knob clockwise in small increments. This decreases needle travel and fluid flow. For more significant flow rate changes, adjust the fluid supply pressure or use the next smallest or largest fluid tip.

For best results, leave the fluid flow adjust knob 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.

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 supply air pressure to the spray gun. If using an HVLP air cap and fluid tip, the air pressure should be set to 0.69 bar (10 psi) or less.

The air pressure controls both the atomization of the sprayed fluid and the spray pattern. Use the lowest possible air pressure to obtain proper atomization of the coating material. Increasing the air pressure provides finer atomization. Decreasing the air pressure provides coarser atomization. If using an HVLP air cap and fluid tip, refer to *HVLP Performance Testing* on page 4-6 for suggested starting air pressures.

2. Point the spray gun into the booth and trigger the spray gun.
3. Adjust the horn air pressure to achieve the desired spray pattern.

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

Spray Pattern and Atomization Adjustments (contd)

4. Adjust the supply air pressure and horn air pressure until you achieve the desired atomization and spray pattern.

NOTE: Increasing the horn air pressure decreases atomization air pressure, decreasing the horn air pressure increases the atomization air pressure. If necessary, adjust the fluid pressure at the fluid delivery systems. Use the lowest atomization air pressure possible along with the appropriate fluid flow rates to ensure maximum transfer rates and highest quality finishes.

5. I**f 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 4-6.

Fluid Tips and Air Caps

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.

Refer to *Installation*, or *Repair*, for air cap and fluid tip installation instructions.

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

NOTE: A range of airspray and HVLP fluid tips and air caps are available. Refer to *Options* in the *Parts* section for part numbers. Refer to *HVLP Performance Testing* on page 4-6 for information on optimum HVLP performance.

Shutdown

WARNING: Shut off the electrostatic unit and ground the spray gun. 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 removing any spray gun components. Failure to observe this warning could result in personal injury.

Short-Term Shutdown

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

Long-Term Shutdown

1. Shut off the electrostatic power unit.
2. Flush the fluid-delivery system, fluid hose(s), and spray gun with a compatible solvent.

NOTE: Refer to the *System Flushing* on page 5-3 for recommended flushing and cleaning procedures.

3. Relieve system fluid pressure.
4. Trigger the spray gun into a waste container to relieve fluid pressure.
5. Shut off the air supply to the Iso-Flo system and spray gun.
6. Remove the air cap and fluid tip and clean them as described in *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.

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

Needle Travel Adjustment

The needle travel is set at the factory. If for some reason the needle travel needs to be adjusted, refer to *Packing Cartridge Replacement* in the *Repair* section. You must remove the trigger and extension to check and adjust the needle travel. Slide calipers are required to check the adjustment.

HVLP Performance Testing

To maintain optimum HVLP performance, both atomizing and horn air 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 *Options* in the *Parts* section for part numbers. After making an air pressure setting, perform a *HVLP Compliance Test* as described on page 4-6.

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

HVLP Compliance Test

See Figure 4-1.

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.

1. Turn off the electrostatic power unit and ground the spray gun.
2. Shut off the fluid-delivery system and relieve the fluid pressure.
3. Remove the production air cap and replace it with the compliance kit air cap (4). Tighten the retaining ring (1) snugly.
4. Trigger the spray gun to fully open the air valve.
5. Check the air pressure gauges (2, 3). Both atomization and horn pressures should be 0.69 bar (10 psi) or less.
6. If the atomization pressure exceeds 0.69 bar (10 psi), reduce the regulated air supply pressure and check the atomization quality.
7. If the horn air pressure exceeds 0.69 bar (10 psi), do one of these:

- turn the horn air valve clockwise to reduce the pressure. This will automatically increase the atomization air pressure.
- reduce the supply air pressure. This will automatically lower both the atomization and horn air pressures.

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 cap or increase the air pressure above the optimum level.

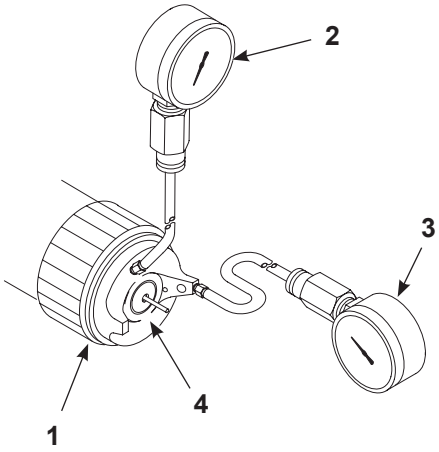


Figure 4-1 Using the HVLP Compliance Kit

1. Retaining ring
2. Atomization air gauge
3. Horn air gauge
4. Compliance air cap

Section 5
Maintenance

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

Introduction

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 XPS 60 power unit and ground the spray gun to remove any residual charge. Failure to observe this warning could result in personal injury.

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

1. Shut off the electrostatic power unit and ground the spray gun to remove any residual charge.
2. Flush the fluid delivery system, fluid hose, and spray gun with a compatible cleaning solution.
3. Shut down the fluid delivery system and relieve all fluid and air pressures.
4. Trigger the gun into the booth or a grounded waste container to relieve any residual pressure.
5. Shut off the air supply to the Iso-Flo system and spray gun.

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.

6. Remove the air cap and fluid tip.

Daily (contd)

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.
- Avoid cleaning the spray gun with a pressurized cleaning solution. Pressurized solutions can be forced it into spray gun cavities, potentially damaging components.

7. Remove the O-ring from the fluid tip. Soak the air cap and fluid tip in a suitable cleaning solution to dissolve any accumulated coatings, then use the brush included with the spray gun to clean them.
8. Clean the spray gun with a clean cloth dampened with cleaning solution. Do not soak the spray gun in solution.
9. Dry the fluid tip, air cap and spray gun with low-pressure air from an OSHA-approved blowgun.
10. Replace the O-ring on the fluid tip. Lubricate the O-ring with O-ring grease.

Periodically

Periodically perform the following maintenance procedures on the spray gun. The frequency of these procedures will vary depending on the application and coating material being used.

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

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

CAUTION: Avoid cleaning the spray gun with a pressurized cleaning solution. Pressurized solutions can be forced it into spray gun cavities, potentially damaging components.

System Flushing

1. Relieve the fluid pressure and make sure the spray gun cannot be activated.
2. Turn off the electrostatic power unit and ground the spray gun to remove any residual charge.
3. Point the spray gun down into a grounded waste container. Trigger the spray gun to drain the spray gun and hose(s). Lock the trigger.
4. Remove the retaining ring and air cap.
5. Turn on the cleaning solution supply and adjust it to the lowest possible pressure.
6. Unlock the trigger and trigger the gun into a suitably grounded container. Allow solution to flow until there is no sign of the coating material.
7. Turn off the cleaning solution supply and relieve the pressure. Disconnect the fluid hose(s).

Spray Gun Cleaning

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 out of the seat before removing the fluid tip. This will prevent damage to the needle and the seat.

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

NOTE: Pointing the spray gun down at a slight angle will prevent cleaning solution from entering the air passages and possibly damaging the air seals.

Spray Gun Cleaning (contd)

4. Dampen a soft cloth with a compatible cleaning solution. Point the spray gun downward and clean the exterior.
5. Clean the fluid tip, air cap, and retaining ring with a soft-bristled brush and a compatible cleaning solution. Remove the O-ring and soak the fluid tip in solution if necessary.
6. Install the fluid tip, air cap, and retaining ring. Trigger the gun to retract the needle before installing the fluid tip.

Connect the air and fluid hoses.

Extensive Cleaning

For more extensive cleaning, disassemble the spray gun and clean each part. Once disassembled, the extension and handle can be soaked in solution and scrubbed. Remove all seals before soaking any parts in cleaning solution.

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

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 electrostatic power unit and ground the spray gun to remove any residual charge. 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.

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

Common Problems

Problem	Possible Cause	Corrective Action
1. Spray gun spitting	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 air valve or worn air valve	Remove and clean the air valve and its seals. Replace the air valve if it is worn or damaged.
	Worn or damaged air seal O-rings or other air seals	Replace the air seal O-rings or other seals.
3. Fluid leaking 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 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 horn air adjustments	No air to spray gun	Supply air to the spray gun. Check for blockage in the air spray line. Adjust the supply air regulator.
	Atomization air pressure too high	Decrease the atomization air pressure.
	Plugged holes in air cap	Clean the air cap.
6. No fluid flow, or low or erratic fluid flow	Fluid delivery system malfunction	Check the fluid delivery system (air and fluid).
	Blockage within spray gun, fluid hose, or fluid 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 raise the fluid pressure until the desired fluid flow is obtained.
	Fluid too viscous	Lower the viscosity by adding solvent or increasing the fluid temperature.
	Damaged fluid tip or air cap	Inspect the fluid tip and air cap; replace them if they are damaged.

Continued...

Problem	Possible Cause	Corrective Action
6. Low or erratic fluid flow (*contd*)	Needle has popped out of the packing cartridge	Remove the fluid tip and push the needle into the packing cartridge. If the problem persists, make sure the operators are pulling the trigger before removing the fluid tip. If the needle keeps popping out of the packing cartridge, replace the packing cartridge.
7. Coarse spray	Air pressure too low for fluid flow rate	Decrease the fluid flow rate or increase 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 reduce the fluid viscosity.
	Damaged fluid tip or air cap	Inspect the fluid tip and air cap; replace them if they are damaged.
	Obstructed atomizing air orifice	Clean the air cap and exterior surface of fluid tip.
8. Excessive overspray	Atomization air pressure too high	Decrease the atomization air pressure.
	Fluid pressure too high	Use a larger fluid tip and reduce the fluid pressure.
9. Excessive bounce back	Air and fluid pressures too high	Decrease the pressures.
	Horn air pressure too high	Decrease the horn air pressure.
10. Dry spray	Spray gun held 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 onto gun	Spray gun needs to be cleaned	Clean the spray gun. Refer to *Spray Gun Cleaning* on page 5-3. Use a gun cover.

Spray Pattern/Film Build Troubleshooting

See Figure 6-1.

NOTE: Common Spray Pattern Faults illustrates common spray pattern and film-build faults.

Problem	Possible Cause	Corrective Action
1. Blown 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 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 air pressure too low	Increase the atomization and horn air pressure.
	Fluid pressure too high	Decrease the fluid pressure.
	Fluid too viscous	Decrease 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 the 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 substrate	Move the spray gun farther from the substrate.
	Horn air pressure too low	Increase the horn air pressure.
	Fluid too viscous	Decrease the fluid viscosity.
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 low	Increase the horn air pressure.
	Fluid viscosity incorrect	Change the fluid viscosity.

Continued...

Problem	Possible Cause	Corrective Action
7. Poor coverage in recesses	Atomization air pressure too high	Decrease the atomization air pressure.
	Fluid pressure too high	Decrease the fluid pressure.
	Spray gun too far from the substrate	Move the spray gun closer to the substrate.

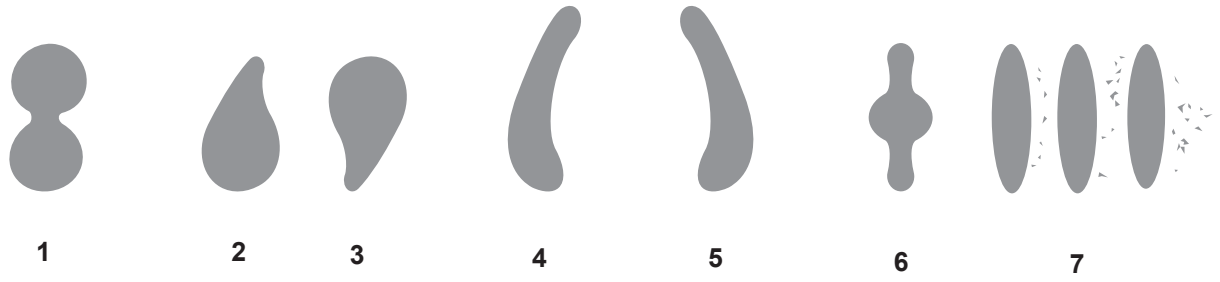


Figure 6-1 Common Spray Pattern Faults

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

Electrostatic Troubleshooting

Problem	Possible Cause	Corrective Action
1. No electrostatic voltage, or the electrostatic voltage is low or erratic	Coating material is grounding out	Inspect the hose and repair or replace it as necessary.
	Defective electrostatic power supply, electrostatic cable, cable connection, or control circuit	Check the electrostatic equipment and repair or replace as necessary. Refer to the appropriate equipment manuals.
	Leaking packing cartridge	Check the packing cartridge for leaks. Clean the packing cartridge bore and install a new packing cartridge and dielectric grease.
2. Supply system malfunction	Supply system grounding out	Check the supply system.

Section 7
Repair

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

WARNING:

- Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.
- Shut down the system and relieve all fluid and air pressures before performing these procedures. Failure to observe this warning could result in injection injury.
- 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 could 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.
- The numeric callouts in this section match the item numbers in the spray gun parts list. Refer to the Section 8 Parts for complete part descriptions 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 spray gun)
- small channel-lock and needle-nosed pliers
- Needle nose pliers (provided with spray gun)
- 5/32 in. hex wrench
- 5/16in. deep socket wrench
- Small flat-blade screwdriver
- Small Phillips head screwdriver
- Service kits and replacement parts
- Removeable threadlocking adhesive (Loctite 242 or equivalent)
- Dielectric grease
- PTFE-based O-ring grease (MαgnaLube-G or equivalent)
- Pipe/thread/hydraulic sealant/adhesive

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

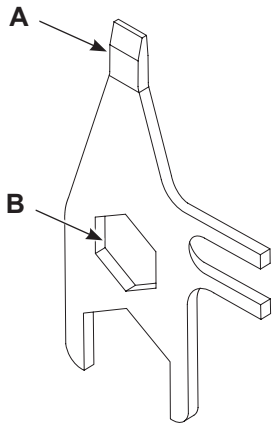


Figure 7-1 Combination Tool

A. Screwdriver

B. Fluid tip tool

Air Cap, Fluid Tip, and Needle Replacement

1. Turn off the electrostatic power unit.
2. Turn off the fluid delivery system and relieve the fluid pressure. Point the spray gun into the booth or a grounded waste container and trigger the gun to relieve any residual pressure.
3. See Figure 7-2. Unscrew the retaining ring (1) and air cap (A) from the extension (4).

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

4. Pull the trigger and unscrew the fluid tip (B) from the extension.
5. Grasp the needle (2) with your fingers and pull it out of the packing cartridge (5). 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. Install a new needle into the end of the packing cartridge. It will snap into place.
7. Make sure the O-ring (C) is installed in the groove in the fluid tip. Lubricate the O-ring with MagnaLube-G or equivalent grease.

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

8. Pull and hold the trigger 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 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 rings, which use the standard retaining ring shipped with the spray gun.

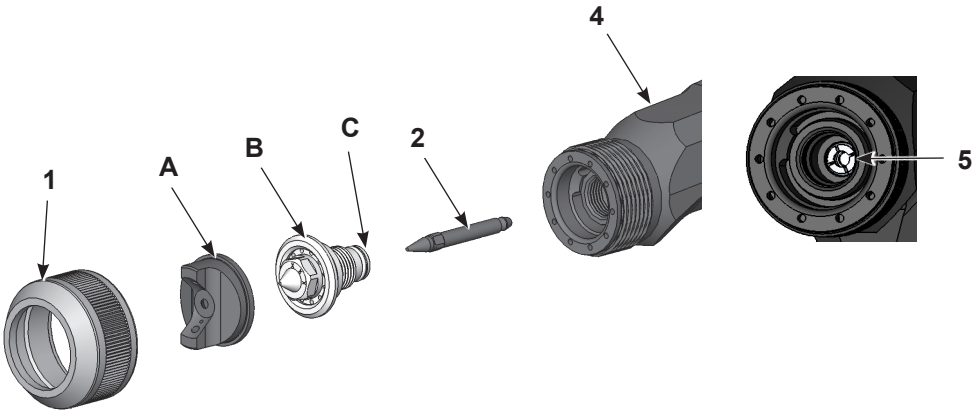


Figure 7-2 Air Gap, Fluid Tip, and Needle Replacement

1. Retaining ring
2. Needle
4. Extension
5. Packing cartridge
A. Air cap
B. Fluid tip
C. Fluid tip O-ring

Trigger Lock Replacement

WARNING: Never operate the spray gun with a worn or damaged trigger lock. Failure to observe this warning could result in injury.

NOTE: Use the trigger lock kit to replace the trigger lock.

1. See Figure 7-3. Drive the pin (35) out of the trigger lock (34) and handle with a small dowel pin.
2. Hold the new trigger lock in place and drive the new pin through the trigger lock and handle hole so that the pin is approximately flush with the outside edges of the trigger lock.

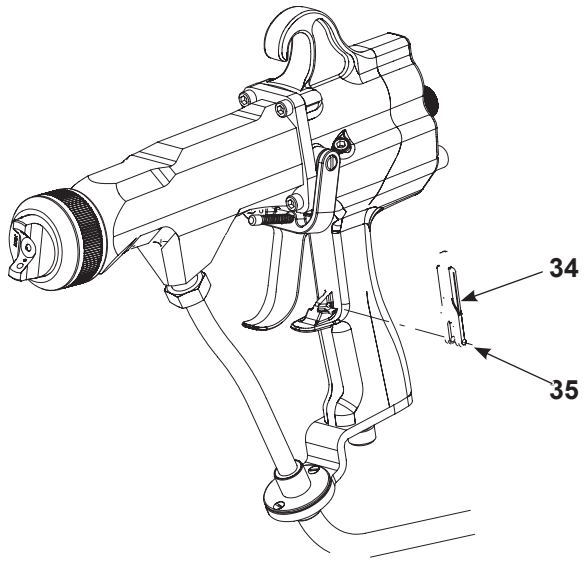


Figure 7-3 Trigger Lock Replacement

34. Trigger lock
35. Pin

Repair Preparation

NOTE: Use these procedures before performing any repair procedures that require disconnecting hoses and cables and taking the spray gun apart.

1. Turn off the electrostatic power unit and ground the spray gun.
2. Flush the fluid delivery system, fluid hoses, and spray gun with a compatible solvent
3. Turn off the fluid delivery system. Relieve system fluid pressures. Point the spray gun into the booth or grounded waste container and trigger it to relieve any residual pressure.
4. Disconnect the fluid and air hoses from the spray gun. Move the spray gun to a clean, dry, flat surface.

Packing Cartridge Replacement

CAUTION:

- If the packing cartridge leaks, thoroughly clean the extension with a compatible cleaning solution. Failure to do so may result in loss of kV and affect atomizing and horn air flow.
- Do not overtighten threaded parts. Failure to observe this caution may result in equipment damage.

Removing the Extension

1. Prepare the spray gun as described in *Repair Preparation* on page 7-4.
2. Remove the air cap, fluid tip, and needle as described in *Air Cap, Fluid Tip, and Needle Replacement* on page 7-3.
3. See Figure 7-4. Remove the two screws (41) and the hose (40) from the hose bracket (30).
4. Remove the two pivot screws (37) and the trigger (36).
5. Use a 5/32-in. hex wrench to remove the four socket-head screws (3). Pull the extension (4) straight away from the handle (13). Do not lose the O-rings (11, 12) installed in the handle.
6. Remove the trigger spring (10) from the trigger puller (9) if it came out of the handle.

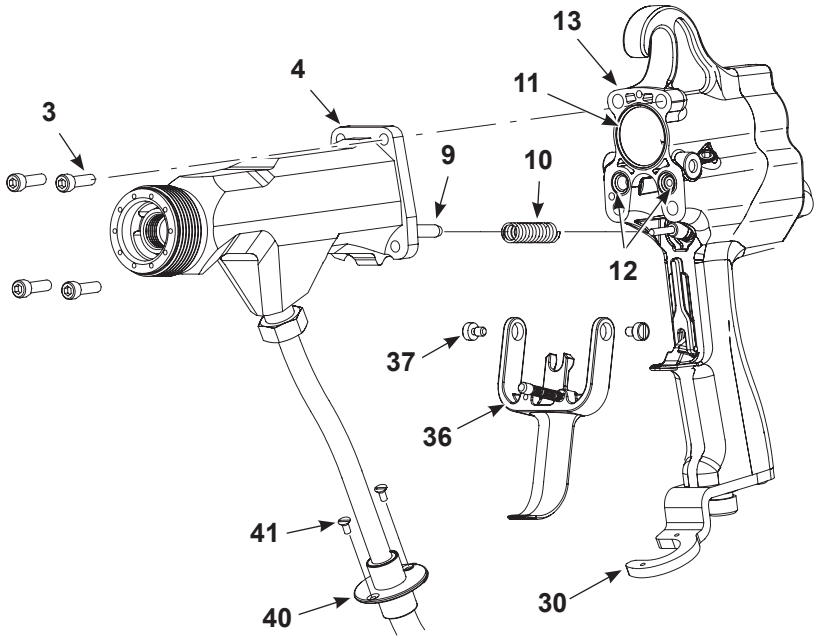


Figure 7-4 Packing Cartridge Replacement - Removing the Extension

3. Screws (4)
4. Extension
9. Trigger puller
10. Trigger spring
11. Large O-ring
12. Small O-rings (2)
13. Handle
30. Hose bracket
36. Trigger
37. Pivot screws (2)
40. Fluid hose
41. Screws (2)

Removing the Packing Cartridge

1. See Figure 7-5. Hold the pull shaft (7) with pliers while unscrewing the trigger puller (9).

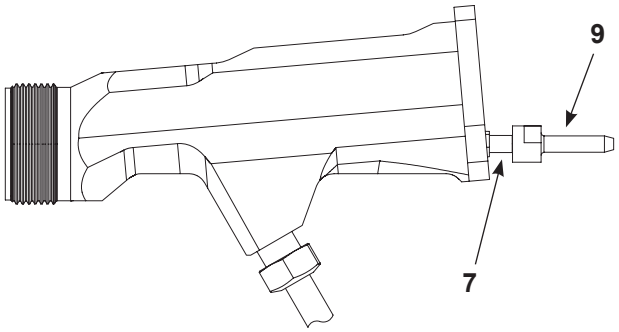


Figure 7-5 Packing Cartridge Replacement - Removing Trigger Puller

7. Pull shaft
9. Trigger puller

2. See Figure 7-6. Unscrew the packing cartridge retainer (8) from the extension.
3. Pull the packing cartridge/pull shaft/sleeve assembly (5, 6, 7) out of the extension. Pull the sleeve off the pull shaft.
4. Unscrew the pull shaft from the packing cartridge.
5. Clean the extension fluid bore with a round, soft-bristled brush and a compatible non-conductive solvent. For thorough cleaning, remove the fluid tube from the extension.

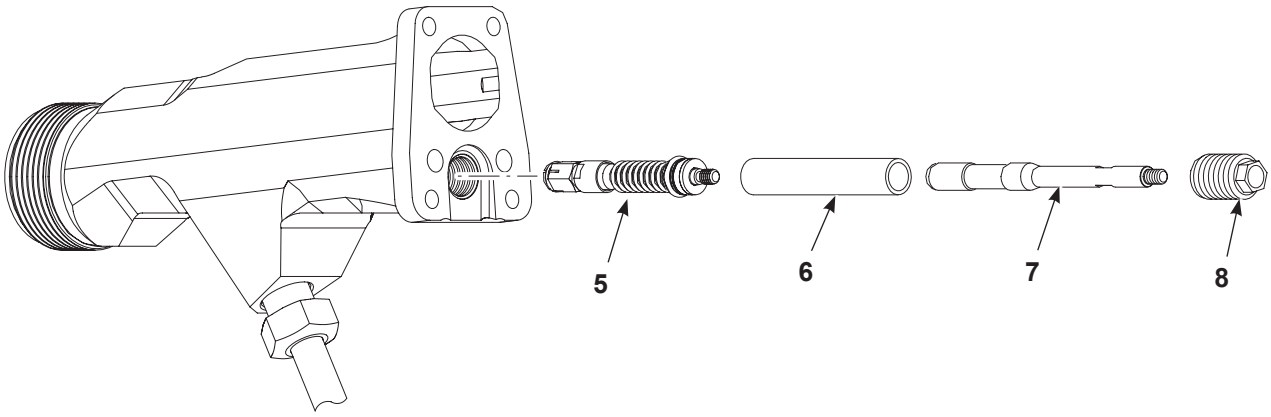


Figure 7-6 Packing Cartridge Replacement - Removing Cartridge From Extension and Pull Shaft

5. Packing cartriidge
6. Pull shaft
7. Pull shaft
8. Packing cartridge retainer

Packing Cartridge Installation

NOTE: Make sure all residual coating material has been removed from all of the parts before installing.

1. Apply a removeable threadlocking adhesive (Loctite 242 or equivalent) to the threads of the new packing cartridge.
2. See Figure 7-6. Screw the pull shaft (7) onto the packing cartridge (5).

CAUTION: Apply dielectric grease as instructed in steps 4 and 5. If it is not applied as instructed, damage to the spray gun is likely and spray gun performance and safety may be compromised.

3. Lubricate the packing cartridge (including O-ring) with MagnaLube-G or equivalent grease.
4. Coat the pull shaft, except for the threaded end, with a liberal amount of dielectric grease, then install the sleeve (6) over the pull shaft and up against the packing cartridge.
5. Apply a thin coating of dielectric grease to the outside of the sleeve, then insert the packing cartridge/pull shaft/sleeve assembly into the extension.
6. Coat the inside diameter of the packing cartridge retainer (8) and the end of the pull shaft (7) with MagnaLube-G or equivalent grease.
7. Slide the packing cartridge retainer over the pull shaft and then screw the retainer into the extension. Tighten the packing cartridge retainer hand-tight (0.56 N•m (5-in-lb) maximum). **Do not overtighten.**
8. Wipe any dielectric grease off the threads of the pull shaft.
9. See Figure 7-5. Apply a removeable threadlocking adhesive (Loctite 242 or equivalent) to the threads of the pull shaft and screw the trigger puller (9) onto the pull shaft.

Needle Travel Adjustment

Before re-installing the extension on the handle, use this procedure to adjust the needle travel and reduce operator fatigue.

1. Complete all steps in Packing Cartridge Installation first.
2. Install the needle, contact spring, and fluid tip as described in *Air Cap, Fluid Tip, and Needle Replacement* on page 7-3.
3. See Figure 7-7. Push on the trigger puller (14) to make sure the needle is fully seated in the fluid tip.
4. With inside calipers, measure the distance from the recessed counterbore in the extension to the face of the trigger puller. If the distance is less than 13.665 mm (0.538 in.), unscrew the trigger puller from the pull shaft until you obtain a distance of 13.665 +/- 0.127 mm (0.538 +/- 0.005 in.).

NOTE: If the distance is greater than 13.792 mm (0.543 in.) and all threaded connections from the packing cartridge to the trigger puller are tight, the needle is installed correctly into the packing cartridge, and the needle is tight against the fluid tip seat, then no further adjustment is possible.

Needle Travel Adjustment (contd)

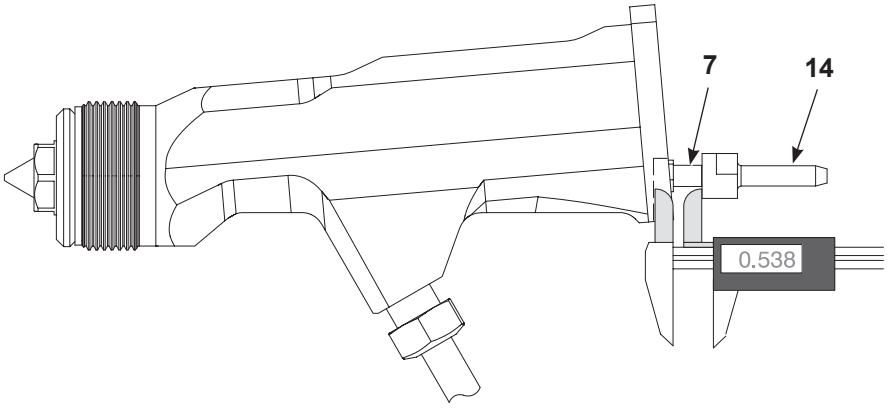


Figure 7-7 Packing Cartridge Replacement - Removing Trigger Puller

5. Install the extension as described in the following procedure.

Extension Installation

See Figure 7-4.

1. Lubricate the trigger puller shaft (9), trigger spring (10), and the spring bore in the handle with MagnaLube-G or equivalent grease.
2. Insert the trigger spring into the spring bore, then insert the trigger puller shaft into the spring while mating together the handle (13) and the extension (4).
3. Secure the extension to the handle with the four socket-head screws (3). Tighten the screws to 2.27-2.83 N•m (20-25 in.-lb).
4. Install the trigger (36) on the handle, making sure the trigger fork engages the trigger puller. Install the pivot screws (37) and tighten them to 0.90−1.13 N•m (8−10 in.-lb).

NOTE: Pull the trigger and make sure it presses the air valve stem into the handle and pulls the packing cartridge into the spray gun.

5. Install the fluid hose (40) into the hose bracket (30) and secure it with the two screws (41).
6. Install the needle, fluid tip, and air cap as described in *Air Cap, Fluid Tip, and Needle Replacement* on page 7-3.
7. Connect the air hose to the gun.
8. Turn on the fluid delivery system and make sure the spray gun is working correctly. Adjust fluid flow rate and atomization as desired. Refer to *Fluid Pressure and Flow Rate Adjustments* on page 4-3 and *Spray Pattern and Atomization Adjustments* on page 4-3.

Air Valve Repair

CAUTION: A worn or damaged air valve could result in an air leak which triggers on the electrostatics unintentionally. Replace a worn or damaged air valve immediately.

See Figure 7-8.

Cover Removal

1. Loosen the set screw (17) in the horn air adjust knob (18) with a 1/16-in. hex wrench, then remove the knob.
2. Remove the three screws (16) from the cover (21).
3. Remove the rear screw (31) from the hose bracket (30), then remove the cover from the handle (13).

Air Valve Repair

1. Unscrew the air valve plug (25). Inspect the O-ring (26) and replace it if it is damaged.
2. Remove the air valve spring (27) from the handle. Do not lose the spring.
3. The air valve stem (28) may come out with the spring. If it does not, push it out from the trigger side of the handle. Do not use any tools to force the stem; you may damage the U-cup seal (29) or stem bore.
4. Inspect the air valve stem. Replace the valve stem if the elastomeric seat is damaged or the stem is worn or damaged.

NOTE: If there is no damage to the air valve stem, and air does not leak from the stem bore when the trigger is pulled, you should not have to replace the U-cup seal.

Air Valve Repair (contd)

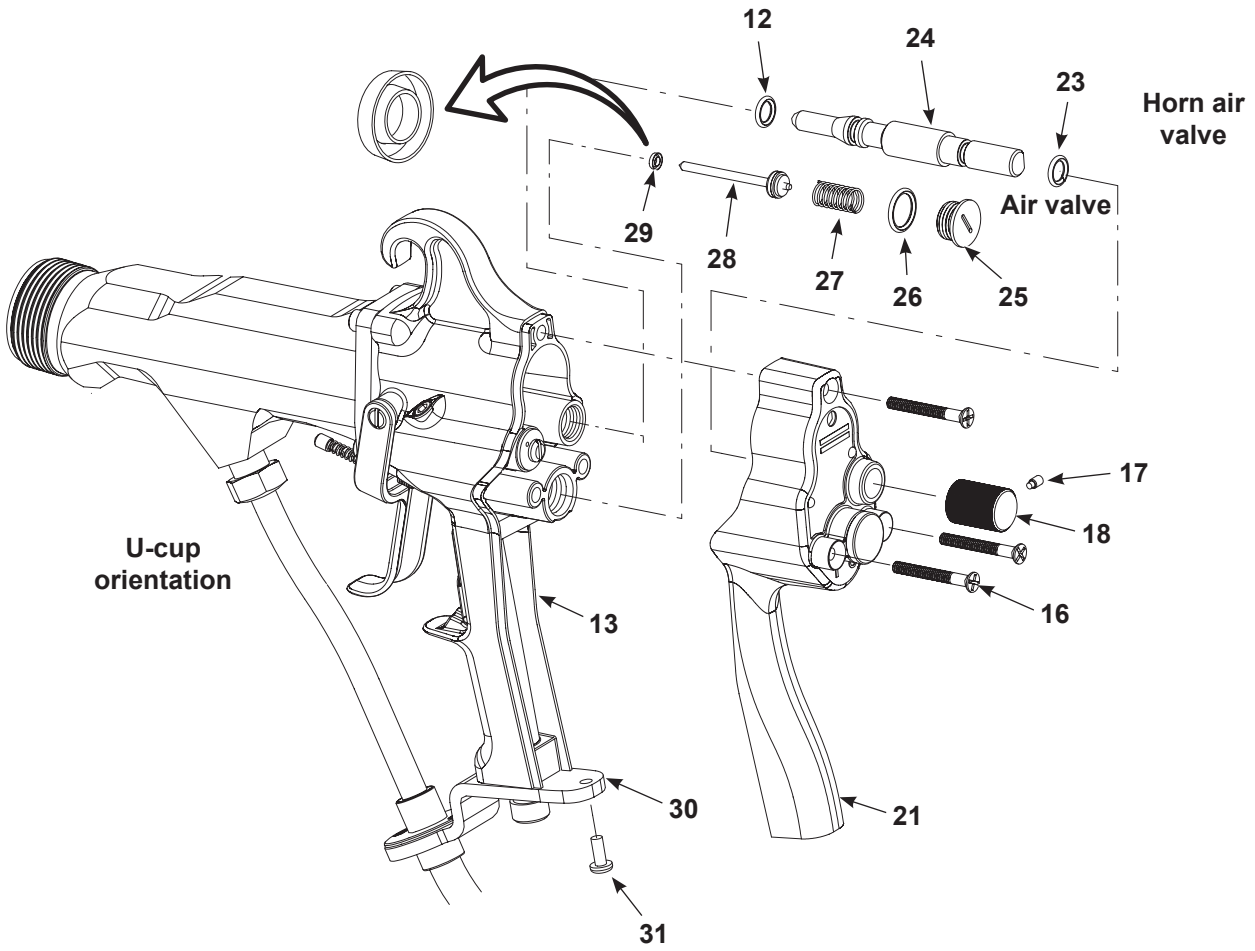


Figure 7-8 Air Valve Repair

12. O-ring
13. Handle
16. Screws (3)
17. Set screw
18. Horn air adjust knob
21. Cover
23. O-ring
24. Horn air valve
25. Plug
26. O-ring
27. Spring
28. Air valve stem
29. U-cup seal
30. Hose bracket
31. Screw

5. If necessary, remove and replace the U-cup seal:
   a. Use the air valve stem or a small dowel to push the U-cup seal out of the handle.
   b. Install a new U-cup seal on the air valve stem with the U facing toward the stem seat. Carefully insert the stem into the stem bore in the handle and seat the U-cup into the recess at the bottom of the bore.
   c. Remove the air valve stem. Use the blunt end of a dowel with a larger diameter than the inside diameter of the U-cup seal to press the seal into the recess. Make sure the end of the dowel does not have sharp edges.

6. If the air valve spring (27) came off the air valve stem (28), snap it back on. The air valve spring must be attached to the air valve stem or the gun will not work properly.
7. Lubricate the U-cup seal (29) with MagnaLube-G or equivalent grease. Insert the air valve stem through the U-cup seal and the stem bore.
8. Push the valve stem back and forth through the U-cup seal several times with your fingers. Pull the spring and air valve stem back out of the bore. If the U-cup seal comes out with the valve stem, reinstall it and reseat it.
9. Lubricate the plug O-ring (26) with MagnaLube-G or equivalent grease and screw the air valve plug (25) into the handle until it is snug.

Cover Installation

1. Install the cover (21) on the handle (13).
2. Secure the cover with the three screws (16), and the screw (31).
3. Install the knob (18) on the horn air valve shaft (24), align the set screw (17) with the flat on the valve shaft, then tighten the set screw snugly.

Horn Air Valve Repair

See Figure 7-8.

1. Remove the cover as described on page 7-9.
2. Install the horn air adjust knob (18) on the horn air valve shaft (24) and tighten the set screw (17). Unscrew the valve from the handle.
3. Inspect the horn air adjust valve and its O-rings (12, 23). Replace any damaged parts. Lubricate the O-rings with MagnaLube-G or equivalent grease before re-installing the horn air valve.
4. Screw the horn air valve into the handle, then remove the knob.
5. Install the cover as described on page 7-9.

Fluid Hose Replacement

See Figure 7-9.

NOTE: New fluid hoses are shipped with the hose nut and ferrule set installed on the gun end of the hose.

1. Turn off the electrostatic power unit and ground the spray gun.
2. Turn off the fluid-delivery system and relieve the fluid pressure.
3. Remove the two screws (41) and remove the fluid hose (40) from the hose bracket (30).
4. Unscrew the hose nut (42) from the extension (4) and pull the hose out of the extension.
5. Disconnect the fluid hose ground terminal from the ground stud on the side of the Iso-Flo cabinet.
6. Open the Iso-Flo cabinet and disconnect the fluid hose from the pump outlet. Pull the hose out of the PAINT OUTLET port in the side of the cabinet.
7. Connect the ground terminal of the new fluid hose to the Iso-Flo cabinet ground stud. Push the end of the hose through the PAINT OUTLET port and connect it to the pump outlet.
8. Remove the protective cap from the gun end of the new fluid hose.
9. Push the fluid hose end tubing into the extension until it bottoms out, then thread the hose nut into the extension hand-tight, then tighten the nut 1-1/4 turn more. This permanently swages the ferrule set to the hose.

NOTE: If re-connecting a hose that has already had the ferrule set swaged to the hose, you only need to tighten the hose nut 1/4 turn past hand-tight.

10. Secure the fluid hose (40) to the hose bracket (30) with the two screws (41).
11. Turn on the fluid-delivery system at a low pressure and slowly increase the fluid pressure to 6.89 bar (100 psi). If the hose fittings leak, retighten the fittings. Do not operate the system with leaking fittings.

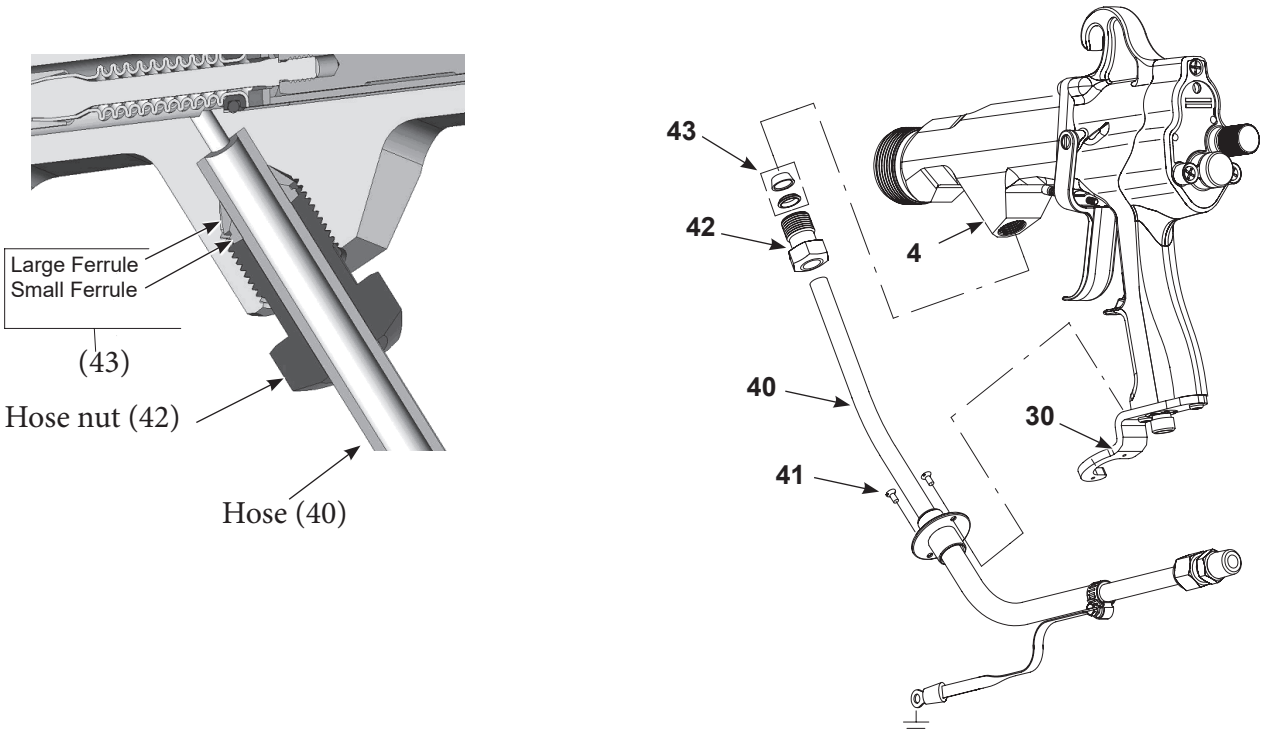


Figure 7-9 Multiplier Replacement

4. Extension
30. Cable bracket
40. Fluid hose
41. Screws (2)
42. Hose nut
43. Ferrule set 4

Service Notes

Refer to Table 7-1.

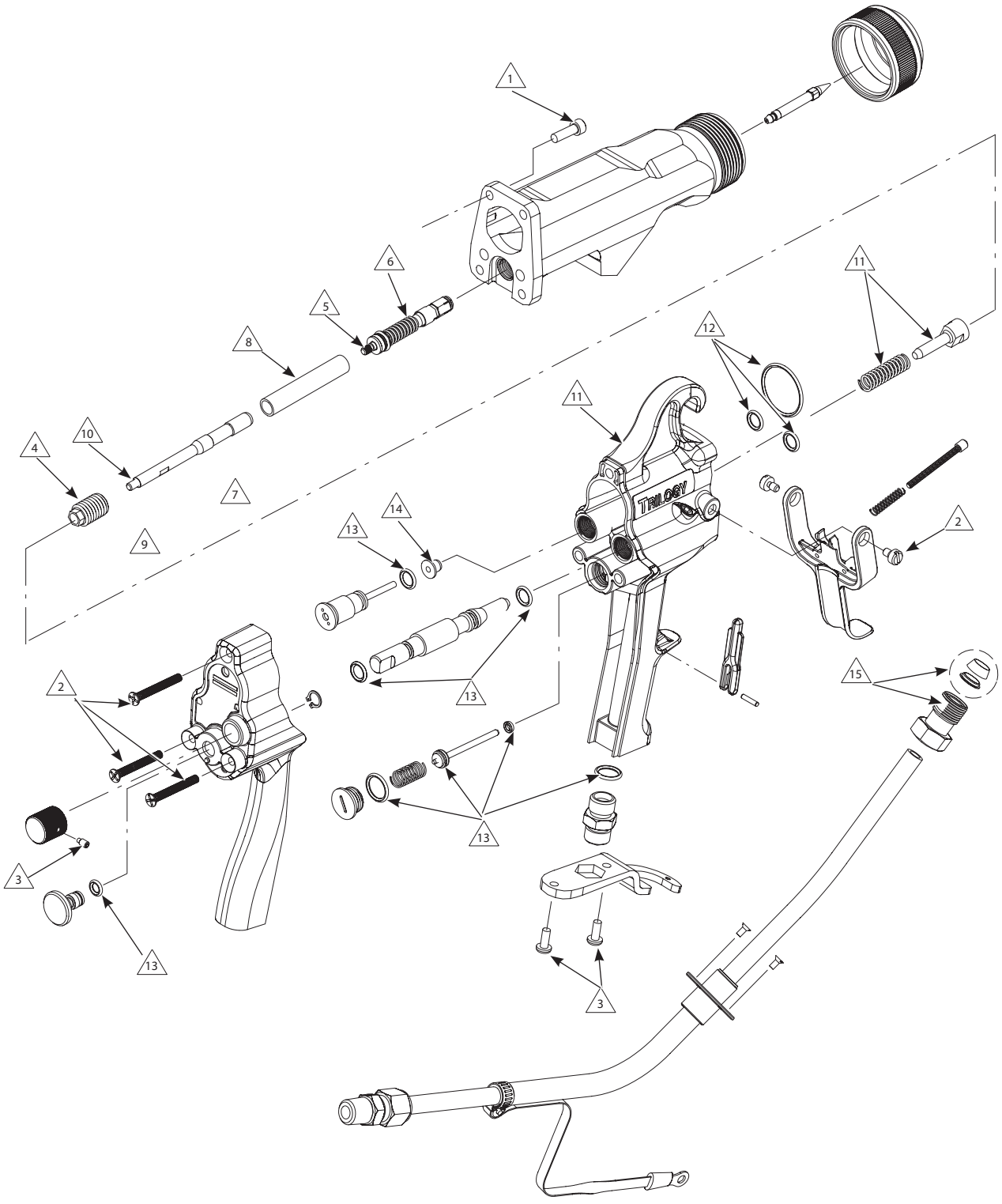


Figure 7-10 Spray Gun Service Notes

Table 7-1 Spray Gun Service Notes

Note △	Description
1	Tighten to 2.27-2.83 N•m (20-25 in.-lb)
2	Tighten to 0.9-1.13 N•m (8-10 in.-lb)
3	Tighten to 1.36-1.69 N•m (12-15 in.-lb)
4	Tighten hand-tight (0.56 N•m (5 in.-lb) maximum)
5	Apply Loctite 242 removeable threadlocking adhesive to the packing cartridge threads before screwing it onto the pull shaft.
6	Apply MagnaLube-G O-ring lubricant to the packing cartridge before installing it into the extension.
7	Apply a liberal coat of dielectric grease to these areas of the pull shaft before installing it into the extension.
8	Apply a thin coat of dielectric grease to the outside diameter of the sleeve before installing it over the pull shaft and into the extension.
9	Apply MagnaLube-G O-ring lubricant to the end of pull shaft (not to the threads) and the inside diameter of the packing cartridge retainer before installing the retainer over the pull shaft.
10	Apply removeable threadlocking adhesive (Loctite 242) to the threads of the pull shaft before screwing it into the trigger puller.
11	Generously apply MagnaLube-G O-ring lubricant to: • spring • small diameter of trigger puller • handle spring bore before installing extension on handle
12	Apply dielectric grease to these O-rings.
13	Apply MagnaLube-G O-ring lubricant to these O-rings.
14	Apply Loctite Prism 406 instant adhesive to outside small diameter of plug before installing.
15	When installing a new ferrule set, tighten the hose nut 1-1/4 turns past hand-tight. If ferrule set has already been swaged, tighten the hose nut 1/4 turn past hand-tight.

Section 8
Parts

Introduction

To order parts, call the Nordson Finishing Customer Support Center at (800) 433-9319 or contact your local Nordson representative. Use the illustrations and parts lists to locate and describe parts correctly.

Spray Gun Parts

Before ordering parts for your spray gun, review the procedures in the *Repair* section to make sure you have the correct parts and service items to complete the procedure.

See Figure 8-1.

Item	Part	Description	Quantity	Note
—	1091981	GUN, Trilogy, manual, low pressure, waterborne	1	
1	1089398	• RING, retaining, air cap, Trilogy	1	
2	1089361	• NEEDLE, Trilogy, bellows, solid	1	
3	325752	• SCREW, socket, #10−24 x 0.625 in., SS	4	
4	1094724	• KIT, extension, Trilogy, Watermark	1	
5	1094777	• KIT, cartridge, Trilogy	1	
5A	940118	• • O RING, hot paint, 0.313 x 0.438 x 0.063 in.	1	
6	1095878	• RETAINER, sleeve, bellows cartridge	1	
7	1093963	• SHAFT, puller, w/stud, Trilogy	1	
8	325749	• RETAINER, packing cartridge, electrostatic	1	
17	982763	• SCREW, pan, #8−32 x 0.375 in., steel, zinc	1	
9	325751	• PULLER, shaft, trigger, electrostatic	1	
10	325534	• SPRING, fluid return, low pressure	1	
11	336499	• O-RING, PTFE, 1.051 x 0.07 in.	1	A
12	940110	• O-RING, hotpaint, 0.313 x 0.438 x 0.063 in.	4	A
13	1092040	• HANDLE, machined, Trilogy	1	
14	336427	• PLUG, air adjust, HVLP, electrostatic	1	
15	336376	• HEAT SINK, electrostatic	1	
16	325760	• SCREW, flat, #8−32 x 1.375 in., 18-8 SS	3	
17	981030	• SCREW, socket, #6−32 x 0.187 in., dog, zinc	1	
18	1095740	• KNOB, valve, adjustment	1	
19	325738	• PLUG, switch hole	1	
20	940090	• O-RING, Viton, 0.208 ID x 0.07 wide, brown	1	A

Continued...

Item	Part	Description	Quantity	Note
21	336411	• COVER, electrostatic, molded	1	
22	986030	• RETAINING, ring, external, 31, basic	1	
23	336512	• O-RING, PTFE, 0.313 x 0. 438 x 0.06 in.	1	A
24	336334	• VALVE, air adjust, electrostatic	1	
25	1090742	• PLUG, valve, air trigger, 0.688 in. dia. head	1	
26	940140	• O-RING, hotpaint, 0.50 x 0.625 x 0.063 in.	1	A
27	325499	• SPRING, air valve	1	B
28	325523	• STEM, air valve, trigger assembly	1	B
29	955076	• SEAL,1/8 x 1/4 x 1/16 in., PTFE	1	B
30	325736	• BRACKET, cable, electrostatic, 60 kV	1	
31	325754	• SCREW, pan, #8−32 x 0.406 in., SS	2	
32	973505	• COUPLING,1/4 x 1/4 in., brass	1	
33	940130	• O-RING, hotpaint, 0.438 x 0.563 x 0.063 in.	1	A
34	336631	• KIT, trigger lock, Kinetix	1	
35	985438	• • PIN, dowel, 0.094 x 0.438 in., alloy steel, hardened and ground	1	
36	336365	• TRIGGER, Kinetix	1	
37	246526	• SCREW, pivot, trigger/handle	2	
38	336353	• SPRING, compression, fluid adjustment	1	
39	1093570	• SCREW, adjustment, #6−32, Trilogy	1	
40	1094727	• KIT, hose, Trilogy, low pressure, manual, 25 ft	1	
41	346725	• • MACH SCREW, flat, #4−40, 0.25 in. SS	2	
42	1089413	• • NUT, hose, 3/8-in.	1	C
43	1090625	• • FERRULE, set, 0.375 ID	1	C
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	1	

NOTE: A. Parts are included in 336634 Kit, Air Seal, Hotpaint, Electrostatic.

B. Parts are included in 325657 Kit, Air Valve Service.

C. Parts included in 1094775 Kit, Ferrule,3/8-in., Low Pressure.

NS: Not Shown

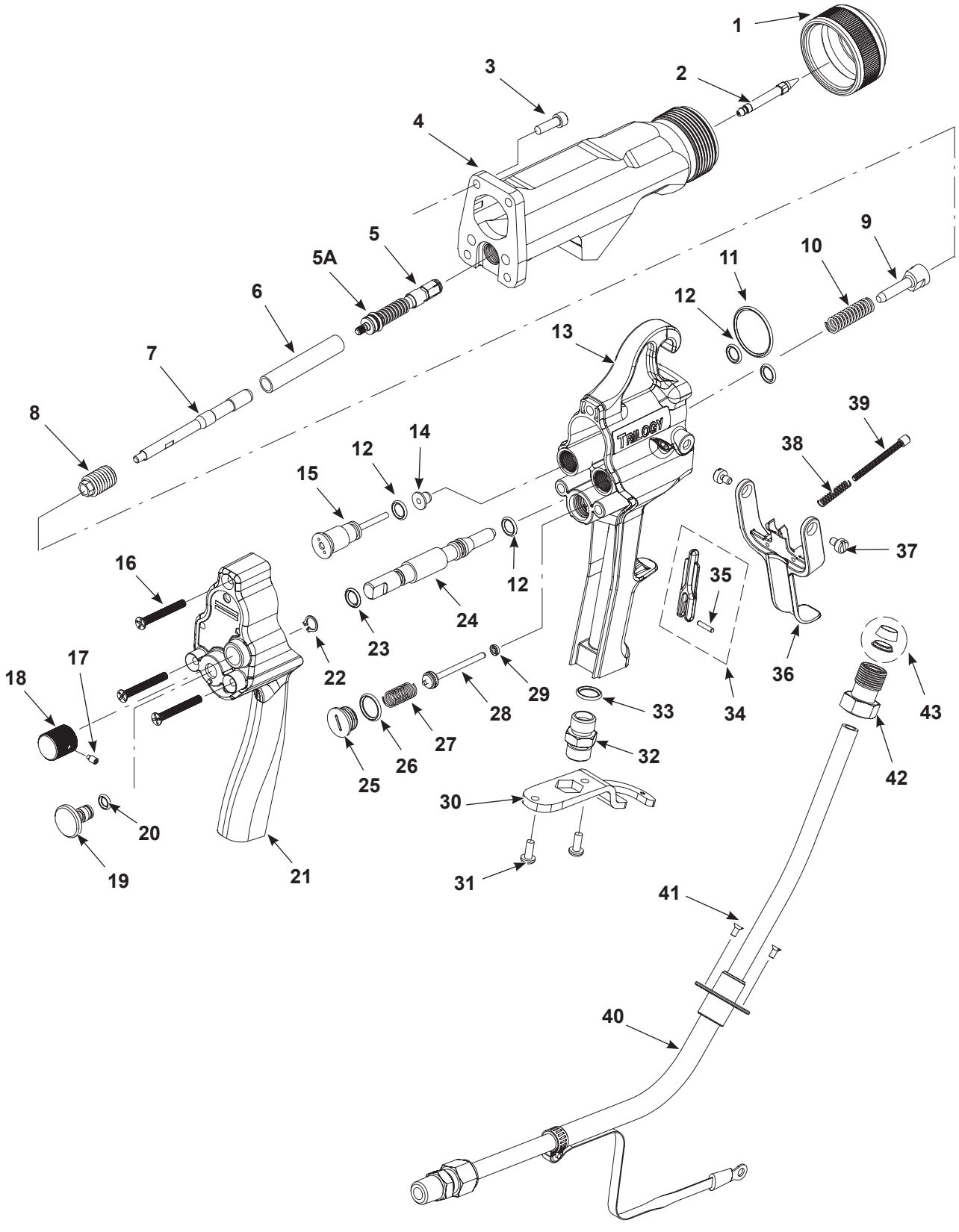


Figure 8-1 Spray Gun Parts

Repair Kits

See Figure 8-1.

Air Seal Kit

Item	Part	Description	Quantity	Note
—	336634	KIT, air seal, hotpaint, electrostatic	1	
11	336499	• O-RING, PTFE, 1.051 x 0.07 in.	1	A
12	940110	• O-RING, hotpaint, 0.313 x 0.438 x 0.063 in.	4	A
20	940090	• O-RING, Viton, 0.208 ID x 0.07 wide, brown	1	A
23	336512	• O-RING, PTFE, 0.313 x 0. 438 x 0.06 in.	1	A
26	940140	• O-RING, hotpaint, 0.50 x 0.625 x 0.063 in.	1	A
33	940130	• O-RING, hotpaint, 0.438 x 0.563 x 0.063 in.	1	A

Air Valve Kit

Item	Part	Description	Quantity	Note
—	325657	KIT, air valve	1	
27	325499	• SPRING, air valve	1	B
28	325523	• STEM, air valve, trigger assembly	1	B
29	955076	• SEAL, 1/8 x 1/4 x 1/16 in., PTFE	1	B

Trigger Lock Kit

Item	Part	Description	Quantity	Note
34	336631	KIT, trigger lock, electrostatic	1	
–	–––––	• LOCK, trigger, Kinetix	1	
35	985438	• PIN, dowel, 0.094 x 0.438 in., alloy steel	1	

Ferrule Kit

Item	Part	Description	Quantity	Note
–	1094775	KIT, ferrule, 3/8 in., low pressure	1	
42	1089413	• • NUT, hose, 3/8 in.	1	D
43	1090625	• • FERRULE, set, 0.375 ID	1	D

Recommended 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
336634	KIT, air seal, hotpaint, electrostatic	1	
325657	KIT, air valve	1	
1094777	KIT, cartridge, Trilogy	1	
336631	KIT, trigger lock, electrostatic	1	
336462	CABLE, 50 ft, Kinetix, manual, 5 conductor	1	
1094727	KIT, hose, Trilogy, low pressure, manual, 25 ft	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
1094025	POSTER, Parts, manual, solventborne, Trilogy	1	

NOTE A: Refer to the *Trilogy HVLP and Airspray Fluid Tip and Air Cap Selection Charts* included with this manual for available part numbers and descriptions.

Options

Air Caps and Fluid Tips

Refer to the air cap and fluid tip guides included with this manual to select and order air caps and fluid tips for your spray gun:

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

TC−09−02 HVLP Fluid Tips and Air Caps

Adhesives, Sealants, and Lubricants

Use these adhesives, sealants, and lubricants when repairing your spray gun. Refer to the Repair or Installation sections for application instructions.

Part	Description	Quantity
900464	ADHESIVE, threadlocking (Loctite Removable 242)	1
900349	LUBRICANT, PTFE grease, O-ring, (MagnaLube) , 0.75-oz tube	1
247658	DIELECTRIC GREASE, applicator, 10 cc, 12 count	1

Cable Extension

Part	Description	Quantity	Note
336531	CABLE, 50 ft, electrostatic, extension	1	

Fluid and Air Hoses and Fittings

Part	Description	Quantity	Note
1074130	HOSE, air, w/1/4 in. NPSF fittings, 30 ft, packaged	1	
1074131	HOSE, air, w/1/4 in. NPSF fittings, 50 ft, packaged	1	
1074132	HOSE, air, w/1/4 in. NPSF fittings, 100 ft, packaged	1	
336470	COUPLING, 3/8 in. NPMSM, brass	1	
972637	COUPLING, 3/8 in. NPMSM, brass, nickel plate	1	
336497	STEM, swivel, 3/8 in. NPS, Hosco	1	
336495	CONNECTOR, quick disconnect, 3/8 in. NPS, Hosco	1	
336496	CONNECTOR, circulation, 3/8 in. NPS, PLH−RY−6, stainless steel	1	A

NOTE A: Use to circulate fluid at the gun handle.

HVLP Compliance Kit

See Figure 8-2.

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	
4	------	• CAP, compliance, HVLP	1	A
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 kit and air cap part numbers.

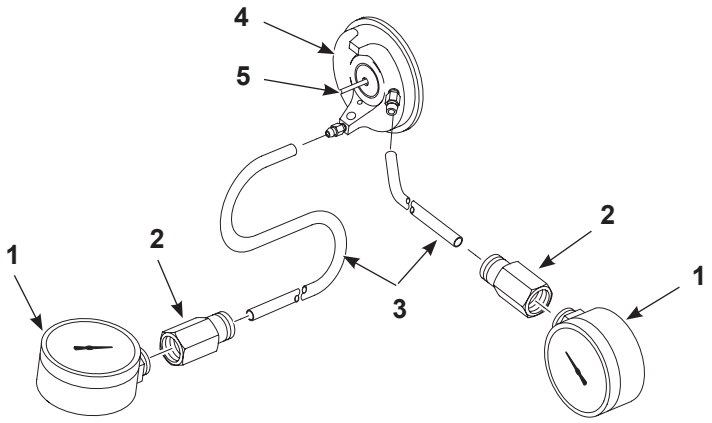


Figure 8-2 HVLP Compliance Kit Parts

Nordson

Instruction Sheet
Document Number TCP0182-02

ATEX/EX Safety Instruction

Description of Equipment

See Figure 1 and Figure 2.

Trilogy® Hand-held Waterborne System and a Trilogy Automatic Waterborne System include an XPS60 (60kV Max) controller/ power supply connected by a resistive core, shielded high voltage cable, to an Iso-Flo® voltage block system.

The high voltage cable delivers the 60kV charge from the power supply to the Iso-Flo.

The waterborne coatings are charged in the Iso-Flo unit reservoir. The Iso-Flo unit reduces the distance to the applicator for the charged system, lowering the system capacitance, thus lowering the energy of the system.

There are different Iso-Flo units for Manual and Automatic.

A fluid hose takes the charged paint from the Iso-Flo unit to the Automatic or Manual Trilogy Waterborne Spray applicators. The Trilogy applicators, both manual (hand-held) and automatic are low pressure spray guns.

Since the paint is already charged when it gets to the applicator, there are no electrical components and no electrode in the spray applicators.

Electrical Characteristics

Application	Specification
Trilogy Waterborne Applicator	
Ambient temperature	0-40 °C (32-104 °F)
Maximum current	100µA
Maximum energy	141mJ
Maximum voltage	60kV
XPS 60 Power Supply	
Maximum current out	100µA
Maximum voltage out	60kV
Rated current	65VA/2A
Rated Frequency	50 / 60 Hz
Rated Voltage	100-240VAC
HD Iso-Flo System / VC Iso-Flo System	
Maximum voltage	60kV

Waterborne Equipment Safety info:

- electrostatic hand-held spraying equipment shall only be used with non-ignitable liquid coating material with a conductivity of less than 2000 µS/cm;
- electrostatic hand-held spraying equipment shall only operate with direct current having a sinusoidal ripple of not more than 10 % of the rms value;
- electrostatic hand-held spraying equipment shall only be operated by competent persons;
- protective clothing to be worn, including gloves, shall comply with EN 1149-5. The measured insulation resistance shall not exceed 100 MΩ;
- electrostatic hand-held spraying equipment shall be used only in spraying areas according to EN 12215, or under equivalent ventilation conditions;
- electrostatic hand-held spraying equipment shall be interlocked with the forced ventilation;
- all conductive components of the system, like for instance floors, walls, ceilings, protective gratings, transport devices, workpieces, reciprocators or constructional parts, etc. within the spraying area, except for parts which are at high voltage for operational reasons, shall be connected to the earthing system. Parts of the booth shall be earthed in accordance with EN 12215.
- electrostatic hand-held spraying equipment shall only be operated in a safe and sound state.

Damaged equipment shall be put out of operation immediately and shall be replaced or repaired;

- spare parts can have safety relevant properties;
- only original spare parts shall be used, which are also subject to a quality assessment (e.g. production control);
- worn parts shall be replaced immediately;
- only electrically conducting containers shall be used for cleaning liquids; the containers shall be earthed;
- non-ignitable cleaning agents shall be preferred;
- appropriate measures shall ensure that the resistance to earth of the jig shall not exceed 1 MΩ, measured at 500 V or 1000 V.
- all references required for a correct operation of the equipment;
- mode of functioning of the safety devices;
- measures in case of disturbances and repairs;
- This electrostatic hand-held spraying equipment could present hazards if it is not operated according to the information given in the instruction manual;
- footwear to be worn by the operator shall comply with EN ISO 20344. The measured insulation resistance shall not exceed 100 MΩ;
- it shall be ensured that excess of coating material (overspray) will be collected reliable.

Test Intervals of Repeated Tests

Table 1 Test Intervals

Subclause	Reference	Test Interval
5.2	Earthing measures	Weekly
6.2.1	Interlocking of forced ventilation and electrostatic hand-held spraying equipment	Yearly
6.2.2	Check of electrostatic hand-held spraying equipment for damage	Weekly
The test intervals shown are recommended per EN50059.		

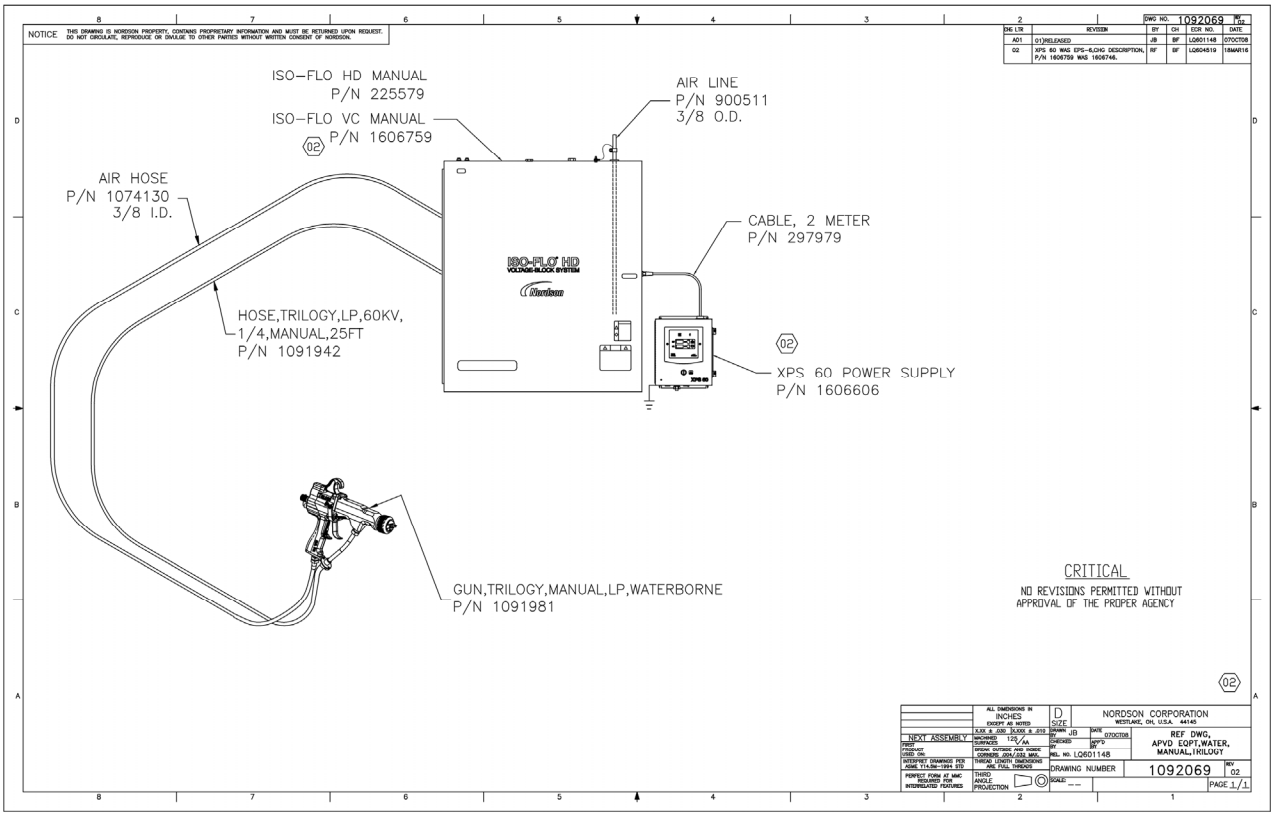


Figure 1 Manual System

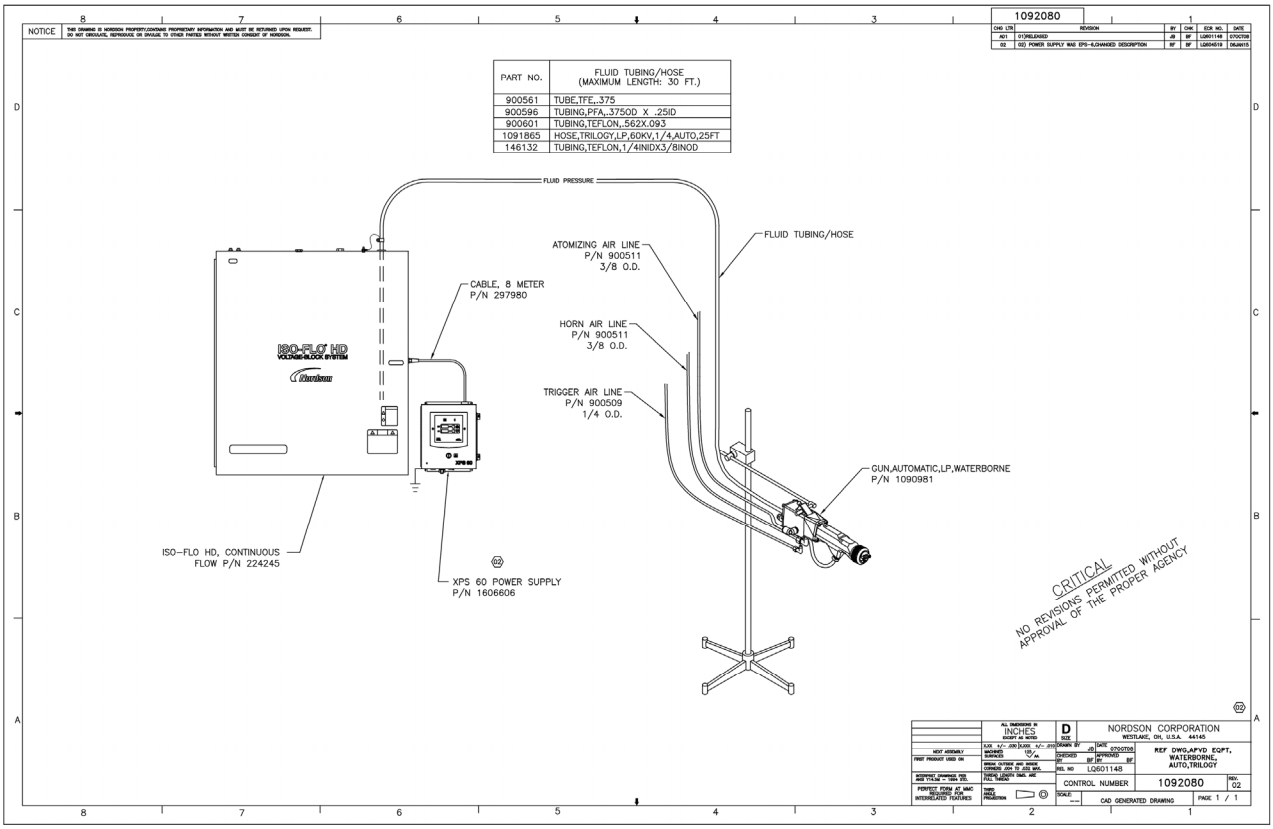


Figure 2 Automatic System

Safety Instructions For Installation In Hazardous Areas

Before the installation READ CAREFULLY the INSTRUCTION MANUAL of the Trilogy liquid applicator and the associated apparatus HD Iso-Flo, VC Iso-Flo and XPS60.

For installation, maintenance and cleaning of the system, refer and read carefully information on paragraph 4 of the manuals concerning hand-held and automatic guns.

Installation and use of this equipment shall be carried out by suitably trained personnel.

TRILOGY WATERBORNE SYSTEM shall be installed and maintained according to the applicable standards regarding safety requirements of electrostatic application equipment for non-ignitable liquid coating material (waterborne).

The user is the solely responsible for the proper use and maintenance.

The user shall not repair the equipment.

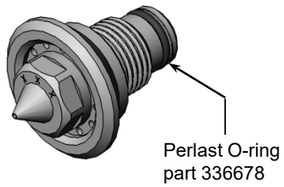
WARNING: Use equipment only for its intended purpose. It is forbidden to use the HAND-HELD AND AUTOMATIC WATERBORNE SYSTEM in a different way not included in the instruction manual. Nordson® Corporation is not responsible for damages caused by an improper and/or dangerous use.

Issued 04/23

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.

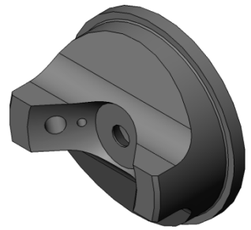


Air Spray Fluid Tip

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

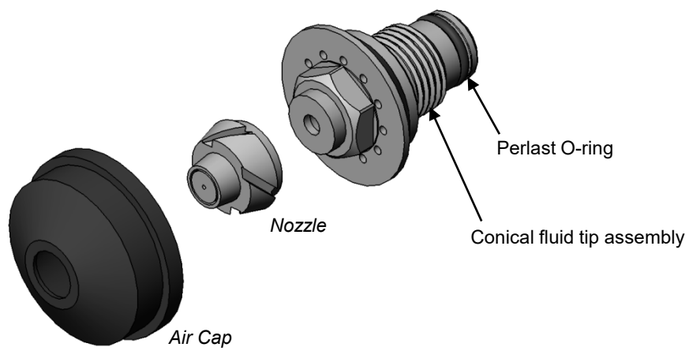


Air Spray Air Cap

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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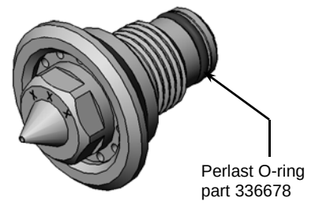
Trilogy™ Air Spray Fluid Tip and Air Cap Selection Chart

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.

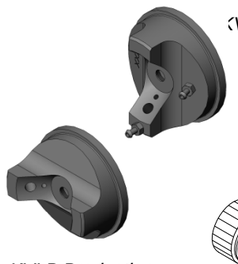


HVLP Fluid Tip

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.									

TC-09-02
Issued 4/09

Trilogy ™ HVLP Fluid Tip and Air Cap Selection Chart

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

EU DECLARATION of CONFORMITY

This Declaration is issued under the sole responsibility of the manufacture.

Product: Trilogy Hand-Held and Automatic WaterBorne Spray Systems

Models: Trilogy Hand-Held and Automatic Spray Applicators, ISO-FLO HD Manual and Auto, ISO-FLO VC Manual, XPS60 high voltage power supply controller.

Description: The Trilogy hand held liquid waterborne applicator used with the manual ISO-FLO HD or ISO-FLO VC and the XPS 60 controller. The Trilogy automatic liquid waterborne applicator used with the automatic ISO-FLO HD and the XPS 60 controller.

Applicable Directives:
2006/42/EC - Machinery Directive
2014/30/EU - EMC Directive
2014/34/EU - ATEX Directive

Standards Used for Compliance:

EN/ISO12100 (2010)	EN50059 (2018)	EN61000-6-3 (2007 AMD 2012)
EN60204-1 (2018)	EN1127-1 (2019)	EN61000-6-2 (2005)
		EN55011 (2016 AMD 2017)

Type of Protection:
- Ambient Temperature: 0ºC to +40ºC
- Ex II 2 G, 141mJ = Trilogy Spray Applicators
- Ex II (2) G = ISO-FLO units and XPS 60 controller

ATEX Product Certificates:
- FM22ATEX0034X (Waterborne System) (Dublin, Ireland)

ATEX Surveillance
- 0598 SGS Fimko Oy (Helsinki, Finland)
- 2809 FM Approvals Europe Ltd (Dublin, Ireland)

Date: 10October2022

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UK DECLARATION of Conformity

This Declaration is issued under the sole responsibility of the manufacture.

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Description: The Trilogy hand held liquid waterborne applicator used with the manual ISO-FLO HD or ISO-FLO VC and the XPS 60 controller. The Trilogy automatic liquid waterborne applicator used with the automatic ISO-FLO HD and the XPS 60 controller.

Applicable UK Regulations:
Supply Machinery Safety 2008
Electromagnetic Compatibility Regulation 2016
Equipment & Protective Systems Intended for use in Potentially Explosive Atmosphere Reg 2016, UKSI 2016 :1107 (as amended)

Standards Used for Compliance:

EN/ISO12100 (2010)	EN50059 (2018)	EN61000-6-3 (2007 AMD 2012)
EN60204-1 (2018)	EN1127-1 (2019)	EN61000-6-2 (2005)
		EN55011 (2016 AMD 2017)

Type of Protection:
- Ambient Temperature: 0ºC to +40ºC
- Ex II 2 G, 141mJ = Trilogy Spray Applicators
- Ex II (2) G = ISO-FLO units and XPS 60 controller

Certificates:
- FM22UKEX0114X = (Waterborne) (Maidenhead, Berkshire, UK)

ATEX Surveillance
- 0598 SGS Fimko Oy (Helsinki, Finland)
- 1725 FM Approvals Ltd (Maidenhead, Berkshire, UK),

Date: 10October2022

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