

Select Coat[®] Slim Swirl Applicator

Customer Product Manual
Part 303 776D



NORDSON CORPORATION • AMHERST, OHIO • USA

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Section 1

Safety

Section 1

Safety

1. 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.

2. 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.

3. 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

4. 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.

5. 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 Material Safety Data Sheets (MSDS) for all materials used. Follow the manufacturer's instructions for safe handling and use of materials, and use recommended personal protection devices.
- 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 MSDS 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 him this card.
- Tell him 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.

6. Fire Safety

To avoid a fire or explosion, follow these instructions.

- Ground all conductive equipment in the spray area. 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 MSDS for guidance.
- Do not disconnect live electrical circuits while working with flammable materials. Shut off power at a disconnect switch first to prevent sparking.
- Know where emergency stop buttons, shutoff valves, and fire extinguishers are located. If a fire starts in a spray booth, immediately shut off the spray system and exhaust fans.
- Shut off electrostatic power and ground the charging system before adjusting, cleaning, or repairing electrostatic equipment.
- Clean, maintain, test, and repair equipment according to the instructions in your equipment documentation.
- Use only replacement parts that are designed for use with original equipment. Contact your Nordson representative for parts information and advice.

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:

<u>Element</u>	<u>Symbol</u>	<u>Prefix</u>
Fluorine	F	"Fluoro-"
Chlorine	Cl	"Chloro-"
Bromine	Br	"Bromo-"
Iodine	I	"Iodo-"

Check your material MSDS 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.

7. 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.

8. Disposal

Dispose of equipment and materials used in operation and servicing according to local codes.

Section 2

Description

Section 2

Description

1. Introduction

The Select Coat slim swirl applicator uses Nordson slim swirl 12-hole nozzles to apply materials that do not require heating (and are not circulated). It is air-actuated and the piston and ball travel is micro-adjustable for precise pattern and film-thickness control.

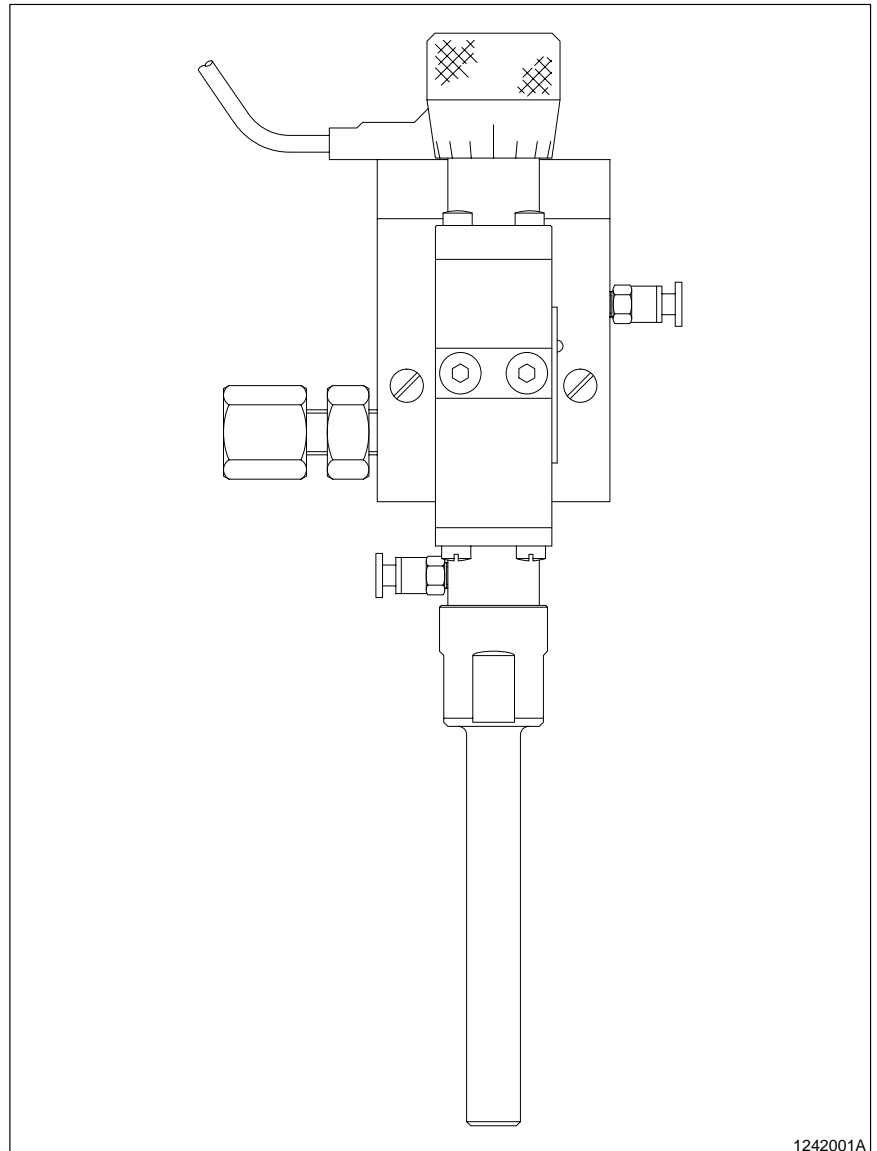


Fig. 2-1 SC-200 Slim Swirl Applicator

1. Introduction (contd)

See Figure 2-2.

The SC-200 slim swirl applicator consists of a manifold assembly (5) and a body module (3). The manifold mounts to the gantry robot and incorporates the air solenoid valve, the air line connection (4), the fluid line connection (2), and the connector (1).

The SC-200 slim swirl applicator body module mounts to the manifold and consists of an air cylinder and piston, and air and fluid seals. It has a micro-adjust mechanism to control piston travel and a nozzle extension.

Movement

A gantry robot moves the basic SC-200 slim swirl applicator horizontally along the X and Y axes, and vertically along the Z axis.

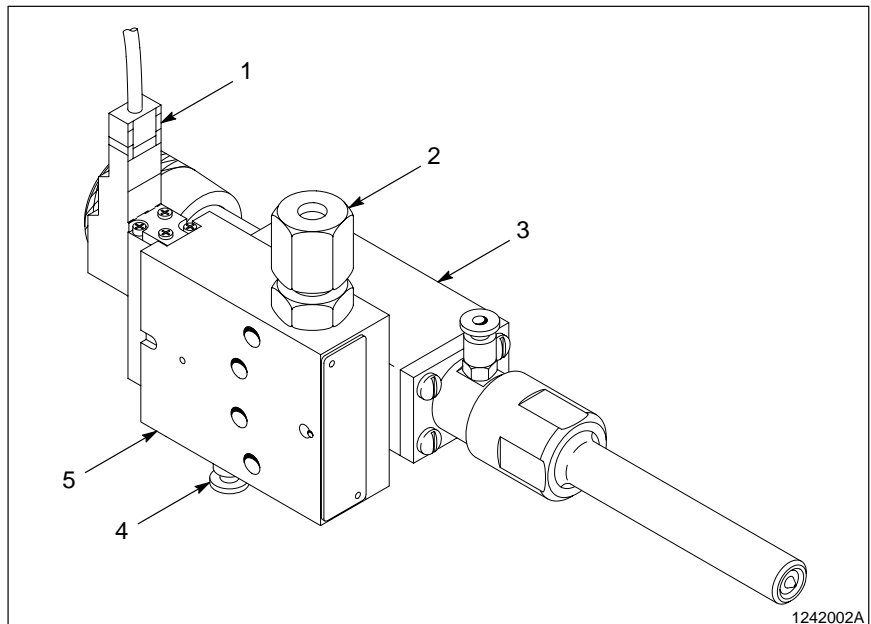


Fig. 2-2 SC-200 Slim Swirl Applicator Components

- | | |
|--------------------------|------------------------|
| 1. Connector | 4. Air line connection |
| 2. Fluid line connection | 5. Manifold |
| 3. Body module | |

2. Theory of Operation

See Figure 2-3.

The following paragraphs describe applicator operation. Use the software supplied with either the Select Coat or Select Coat high-volume system to operate the applicator.

Solenoid Valve

A normally closed air solenoid valve is mounted on the applicator manifold. When 24 Vdc is supplied to the valve, it opens, allowing air in to trigger the gun. Mounting the solenoid valve directly on the manifold provides a quick response time for short-duration dispense operations.

Trigger Air

Trigger air enters the applicator from the solenoid valve on the manifold at port A (6), then travels upward through the bore and presses against the piston (5). The air overcomes the downward pressure exerted by the spring washers (4) to push the piston upward. A seal on the piston and an O-ring on the piston retainer help prevent trigger air from leaking past the piston. Any air that does leak past escapes through the weep hole in the front of the applicator cap.

Piston/Needle

The trigger air forces the piston upward until it comes in contact with the micro-adjust cap screw stop. The needle (8) (attached to the piston) pulls away from the seat (9) and allows coating material to flow through the seat orifice. Air, which may leak past the hat seals, escapes out the weep hole in the body (between the hat seals and the U-cup seal).

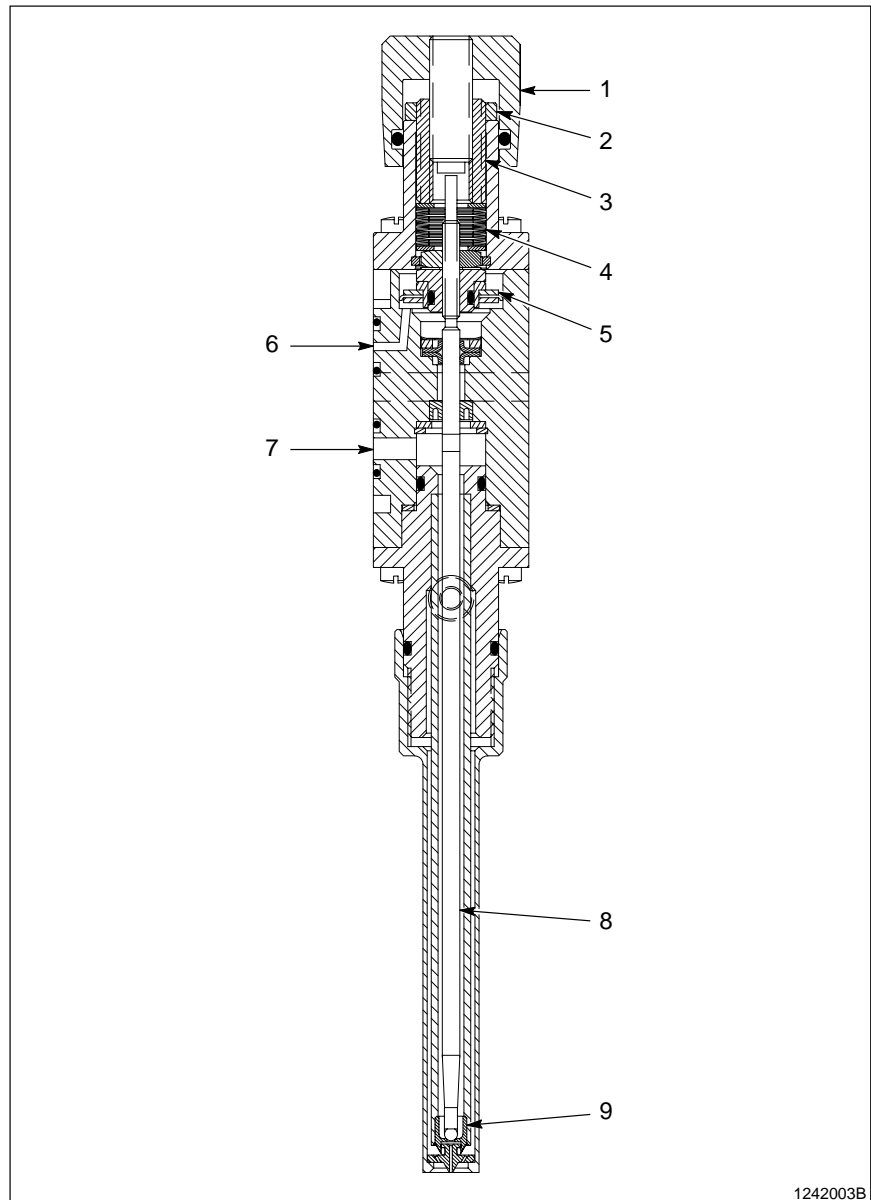
Fluid

Pressurized coating material enters the body at port B (7), flows into the extension, through the seat orifice, and out of the film coater through the nozzle.

Micro-Adjustment

Rotating the micro-adjust cap (1) at the top of the applicator adjusts the piston and needle travel. Rotating the micro-adjust cap clockwise decreases the piston and needle travel, which decreases coating material flow. Rotating the micro-adjust cap counter-clockwise increases the piston and needle travel, which increases coating material flow.

Micro-Adjustment (contd)



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Fig. 2-3 Cross-Section

- | | |
|---------------------|---------------------|
| 1. Micro-adjust cap | 6. Port A: air in |
| 2. Preload lock nut | 7. Port B: fluid in |
| 3. Preload screw | 8. Needle |
| 4. Spring washers | 9. Seat |
| 5. Piston | |

3. Specifications

Refer to the following chart for applicator specifications.

NOTE: Because of constant technological improvement, specifications are subject to change without notice.

Pressures	
Maximum fluid	4.137 bar (60 psi)
Actuating air	4.48–5.52 bar (65–80 psi)
Thread sizes	
Fluid port	1/8 NPT
Air port	#10-32
Dimensions	See Figure 2-4

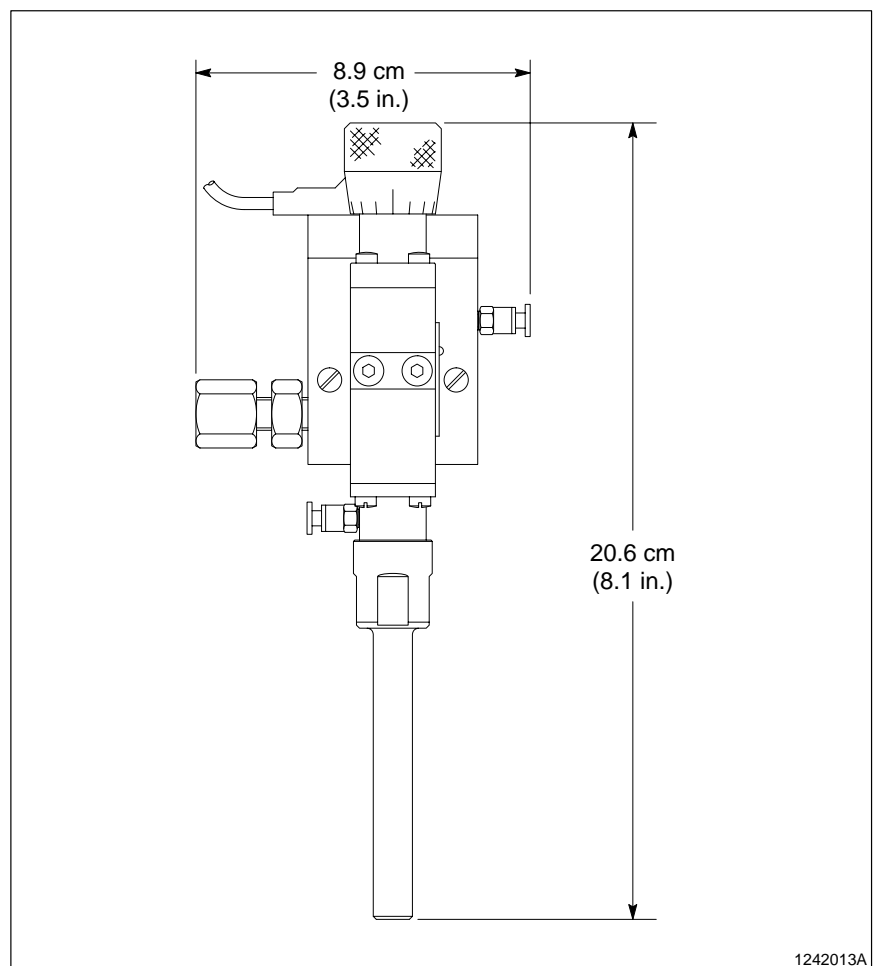


Fig. 2-4 Approximate Applicator Dimensions

NOTE: The applicator extends from robot mounting surface approximately 5.72 cm (2.25 in.).

4. Installation

This section describes the installation of the applicator to the head of the gantry robot.

Mounting

Attach the manifold of the applicator to the head of the gantry robot. Position the applicator by aligning the locating holes provided. Secure with two #8-32 fillister head machine screws.

Section 3

Operation

Section 3 Operation



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

1. Introduction

This section provides applicator operating procedures. For complete system operating procedures, refer to the system manual.



CAUTION: Obtain and read the Material Safety Data Sheets (MSDS) for all materials used.

2. Startup

1. Start up the system using the procedure provided in the *Select Coat System* manual or the *Select Coat High-Volume System* manual, depending on which system you have.

NOTE: Be sure that the slim swirl coat nozzle is properly installed into the carbide seat before screwing the nozzle nut onto the applicator. Nozzle face (with size showing) should face out of the nozzle nut. Simultaneously apply upward force and turn the nozzle one quarter until it seats against the carbide face. When installed, the nozzle should sit flat against the carbide seat.

2. Check that the nozzle nut and nozzle are wrench-tightened (1.1 N•m (10 in.-lb)) onto the applicator extension.

NOTE: A purge program is necessary to properly purge the applicator before and after use. For assistance in performing this procedure, refer to the *Easy Coat Programming Manual*, or contact your Nordson Corporation representative.

3. Place a small waste container under the end of the extension to catch coating material. Start the purge program.
4. After completing the purge program, remove the waste container.
5. Check the production planning log to determine the proper nozzle to be used. Mount the proper nozzle.

3. Shutdown

1. Shut down the system using the procedure provided in the system manual.
2. Fill the fluid system with solvent according to the instructions in the system manual.
3. Reposition the applicator as required for purging the fluid delivery system according to the instructions in the system manual.

NOTE: A purge program is necessary to properly purge the applicator before and after use. For assistance in performing this procedure, refer to the *Easy Coat Programming Manual*, or contact your Nordson Corporation representative.

4. Place a small waste container under the end of the extension. Start the purge program.
5. After completing the purge program, remove the waste container.

NOTE: If the nozzle or nozzle nut are not properly cleaned as described in the following steps, coating material may build up over time and clog the nozzle orifice. A clogged nozzle will cause restricted flow and pattern alteration. If this happens, immerse the nozzle and nozzle nut (if used) in an appropriate solvent (such as MEK). Soak overnight before cleaning.

NOTE: Do not expose the solenoid valve to solvents or coating material. Solvents could damage the valve, and coating material may clog it.

6. Remove the nozzle, or the nozzle nut and the nozzle from the extension. Immerse the parts in the appropriate cleaning solvent.



CAUTION: Use a Nordson nozzle brush to scrub the nozzle. Do not use a steel (or any other type) brush, which may damage the nozzle.

7. Dry the nozzle and nozzle nut and inspect the orifice for any blockage.

NOTE: If the nozzle orifice is blocked, insert an appropriately sized pin into the orifice against the direction of fluid flow. Clean the 12 air holes with a 0.36 mm (0.014 in.) pin.

8. Reinstall the parts or store all removed parts in a safe place.

Section 4

Maintenance

Section 4 Maintenance

1. Introduction



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

This section provides preventive maintenance procedures. Refer to the *Repair* section for complete disassembly and rebuilding procedures. For purging procedures, refer to the *Operation* section and the *Easy Coat Programming Manual*.



CAUTION: Obtain and read the Material Safety Data Sheets (MSDS) for all materials used.

NOTE: Do not expose the solenoid valve to solvents or coating material. Solvents could damage the valve, and coating material may clog it.

2. Daily

1. Use the purge program to flush the applicator with the appropriate solvent. Refer to the *Operation* section for complete purging procedures.
2. Remove the nozzle, or the nozzle nut and nozzle, and soak in an appropriate solvent.

3. Periodically

1. Remove the applicator from the manifold. Refer to the *Repair* section for disassembly procedures.
2. Remove the two O-rings from between the body and manifold.
3. Remove the needle, piston, and seals. Refer to the *Repair* section.
4. Soak the extension and body module in the solvent used with the coating material.
5. Clean and dry the extension and body.
6. Inspect the O-rings, hat seals, U-cup, needle, and seat. Replace parts that are damaged or worn.

NOTE: If you remove the U-cup, replace it with a new one.

Section 5

Troubleshooting

Section 5

Troubleshooting



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

1. Introduction

This section contains troubleshooting procedures. These procedures cover only the most common problems that you may encounter. If you cannot solve the problem with the information given here, contact your local Nordson representative for help.

Problem		Page
1.	Fluid leaks from nozzle or seat (applicator off)	5-2
2.	Fluid leaks from nozzle or seat (applicator on)	5-2
3.	Applicator spits fluid	5-2
4.	Air in fluid lines	5-3
5.	No fluid flows from nozzle when triggered	5-3
6.	Material dispenses irregular in Bead mode	5-4
7.	Swirl or monofilament pattern is not conical/round	5-4

2. Troubleshooting Charts

Problem	Possible Cause	Corrective Action
1. Fluid leaks from nozzle or seat (applicator off)	Contamination preventing ball from seating properly Needle binding Worn ball and seat Improper piston placement Improper preload tension	Use the purge program to completely flush the applicator. If the applicator still leaks, remove the nozzle and nozzle nut. Clean the nozzle and nozzle nut in an appropriate solvent. Use solvent and a brush to clean the extension end and ball tip. Inspect all of the parts and replace them as necessary. Rebuild the applicator and test it. Manually trigger the applicator and check for smooth needle operation. Clean the needle or purge the applicator as necessary. Disassemble the applicator and remove the needle. Inspect the ball and seat and replace them if worn. Rebuild the applicator using all new O-rings and seals. Refer to <i>Installing the Air Piston</i> in the <i>Repair</i> section. Refer to <i>Adjusting Preload Tension</i> in the <i>Repair</i> section.
2. Fluid leaks from nozzle or seat (applicator on)	Nozzle or nozzle nut not securely tightened on extension Damaged O-ring between nozzle and extension Kalrez O-ring on back of nozzle damaged or improperly seated	Wrench-tighten the nozzle or nozzle nut to 1.13 N•m (10 in.-lb). Remove the nozzle and inspect the O-ring. Replace the O-ring if necessary. Make sure the O-ring is properly seated. Remove the nozzle and inspect the O-ring. Replace the O-ring if necessary. Make sure the O-ring is properly seated.
3. Applicator spits fluid	Partially blocked ball and seat orifice or damaged nozzle or nozzle nut	Remove and clean the nozzle or the nozzle nut with an appropriate solvent. Use solvent and a brush to clean the extension end and ball tip. Check all of the parts for damage and replace them if necessary.

Problem	Possible Cause	Corrective Action
<p>4. Air in fluid lines</p>	<p>Low coating material level in reservoir</p> <p>Material leaking from fluid passage of nozzle to air assist holes</p>	<p>Check the coating material level in the reservoir. Purge the applicator to remove air.</p> <p>Remove and clean the nozzle, and check the condition of the nozzle O-ring. If it is damaged, replace the O-ring. Replace the nozzle by simultaneously applying upward force and turning the nozzle one quarter. Install the nozzle nut and tighten it to 1.13 N•m (10 in.-lb). Check for material build-up on the carbide seal surface or on the inside diameter of the nozzle nut.</p>
<p>5. No fluid flows from nozzle when applicator is triggered</p>	<p>Micro-adjust cap fully closed</p> <p>Blocked nozzle orifice or passageway in body</p> <p>Bad trigger solenoid valve</p> <p>Trigger air pressure not present or too low</p>	<p>Turn the micro-adjust cap 1/2 turn counterclockwise from fully closed.</p> <p>Remove the nozzle and clean it in an appropriate solvent. Use solvent and a brush to clean the extension end and needle tip. Replace the O-rings if necessary. If fluid still does not flow, disassemble the applicator and check the passageways for blockage. Rebuild the applicator and test.</p> <p>Depress the solenoid valve manual override button. If the solenoid does not actuate, check for 24 Vdc across the two pins at the solenoid connector. If voltage is present and the valve still does not actuate, replace it.</p> <p>Check the air pressure at the workcell gauge. Remove the trigger air line from the applicator and inspect for it blockage. If there is still no air pressure, the problem may be in the robot controller. Contact your Nordson Corporation representative for assistance.</p>

2. Troubleshooting Charts

(contd)

Problem	Possible Cause	Corrective Action
5. No fluid flows from nozzle when applicator is triggered (contd.)	Electrical problem at workcell Communications problem at workcell Lack of fluid pressure System in Full Dry mode	Contact your Nordson Corporation representative for assistance. Contact your Nordson Corporation representative for assistance. Move the Reservoir Pressure switch to the ON position. In the Coating Setup menu, choose Full Coat mode. (Use Easy Coat for DOS only.)
6. Material dispenses irregularly in Bead mode	Nozzle fluid passage dirty or damaged Carbide seat dirty or damaged Nozzle nut dirty or damaged Improper fluid pressure	Remove the nozzle and examine it under a microscope. Look for cured material in the nozzle orifice or look for a damaged cone area. A nozzle that is bent into the dispense seat will cause a deflected pattern. Replace the nozzle if damaged. Clean the carbide seat area using solvent or fine sandpaper. Inspect for chips or breaks. Replace the carbide seat if damaged. Examine the inside surface of the nozzle nut for material build-up or damage. If the nozzle fails to seat properly in the bottom, use a round brush or end mill to clean it. Replace the nozzle nut if damaged. Refer to process characterization in the programming manual.
7. Swirl or monofilament pattern is not conical/round	Air holes clogged Nozzle air holes damaged	Clean the 12 air holes with a 0.36 mm (0.014 in.) pin. Blow the air holes clean with compressed air. Check for damage or blockage under a microscope. If damaged, replace the nozzle.

Section 6

Repair

Section 6

Repair



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

1. Tools Required

The following tools are required to service the applicator:

- slotted screwdriver
- miniature Phillips-head screwdriver (shipped with applicator)
- spanner wrench (shipped with applicator)

The following tools are required to service the applicator. All of these tools are included in the applicator service kit. Refer to the *Parts* section of this manual for an illustration.

- base tool
- piston insertion tool
- retaining ring pliers
- ring and seal removal tool
- $\frac{3}{32}$ in. hex wrench
- ring and seal insertion tool
- module adjusting wrenches (2 per kit)

2. Preparation

Follow these procedures before disassembling the applicator.

Running a Characterization

Characterizations record the film patterns produced by the applicator. When the applicator is properly adjusted and calibrated, it will produce acceptable film patterns. By comparing characterization sheets made before and after disassembly and repair, you can be sure that your applicator is properly assembled and adjusted.

If the applicator operates properly, run a characterization before disassembling it. Save it for future reference. Refer to the *Easy Coat Programming Manual* for characterization procedures.

Preparing for Disassembly

1. Run the purge program (refer to the *Operation* section).
2. Turn off the reservoir pressure switch. Refer to the appropriate Select Coat fluid system manual for instructions.



WARNING: System or material pressurized. Relieve pressure. Failure to observe may result in spillage of coating material or solvent under pressure.

3. Pull up on the relief valve on the fluid reservoir to relieve the system pressure before opening the reservoir. Refer to the appropriate Select Coat fluid system manual for instructions.
4. Drain the coating material from the fluid system and flush with the recommended solvent. Refer to the appropriate Select Coat system manual for instructions.
5. Shut down the Select Coat system before removing the applicator from the robot. Refer to the appropriate Select Coat system manual for instructions.
6. If the applicator micro-adjust cap is adjusted to the correct setting, make a note of the setting for future reference.

3. Disassembly and Inspection

NOTE: Handle O-rings and seals carefully. If O-rings and seals are damaged, the applicator may leak or fail.

NOTE: Do not expose the solenoid valve to solvents or coating material. Solvents could damage the valve, and coating material may clog it.

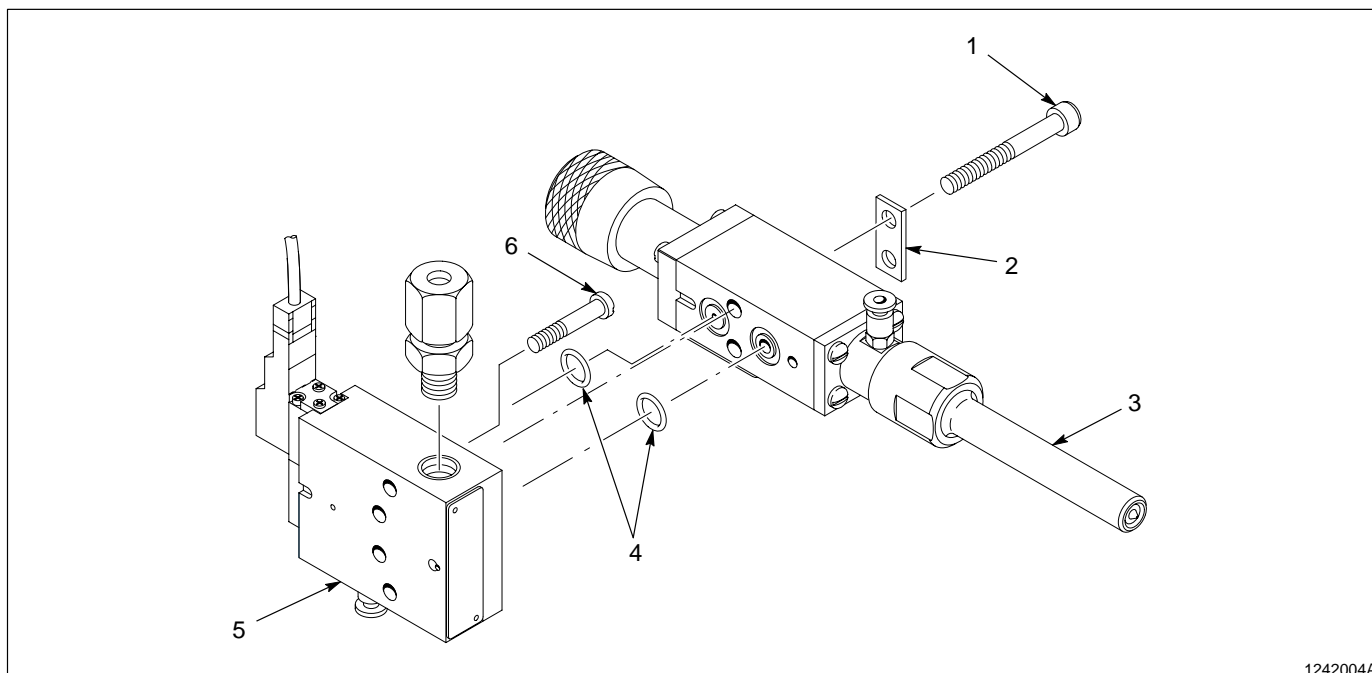
Removing the Applicator from the Manifold

See Figure 6-1.

1. Remove the nozzle nut (3) and extension from the applicator body.
2. Remove the screws (1) and the mounting plate (2) that hold the body module to the manifold (5).
3. Lift the applicator module up and off the manifold.
4. Remove the two O-rings (4) from the air and fluid ports between the body and manifold. Examine the O-rings and replace them if necessary.

Removing the Manifold from the Robot

1. See Figure 6-1. Disconnect the air line and fluid line from the manifold. Unplug the electrical connector from the solenoid valve.
2. Remove the screws (6) securing the manifold (5) to the Z-axis slide.



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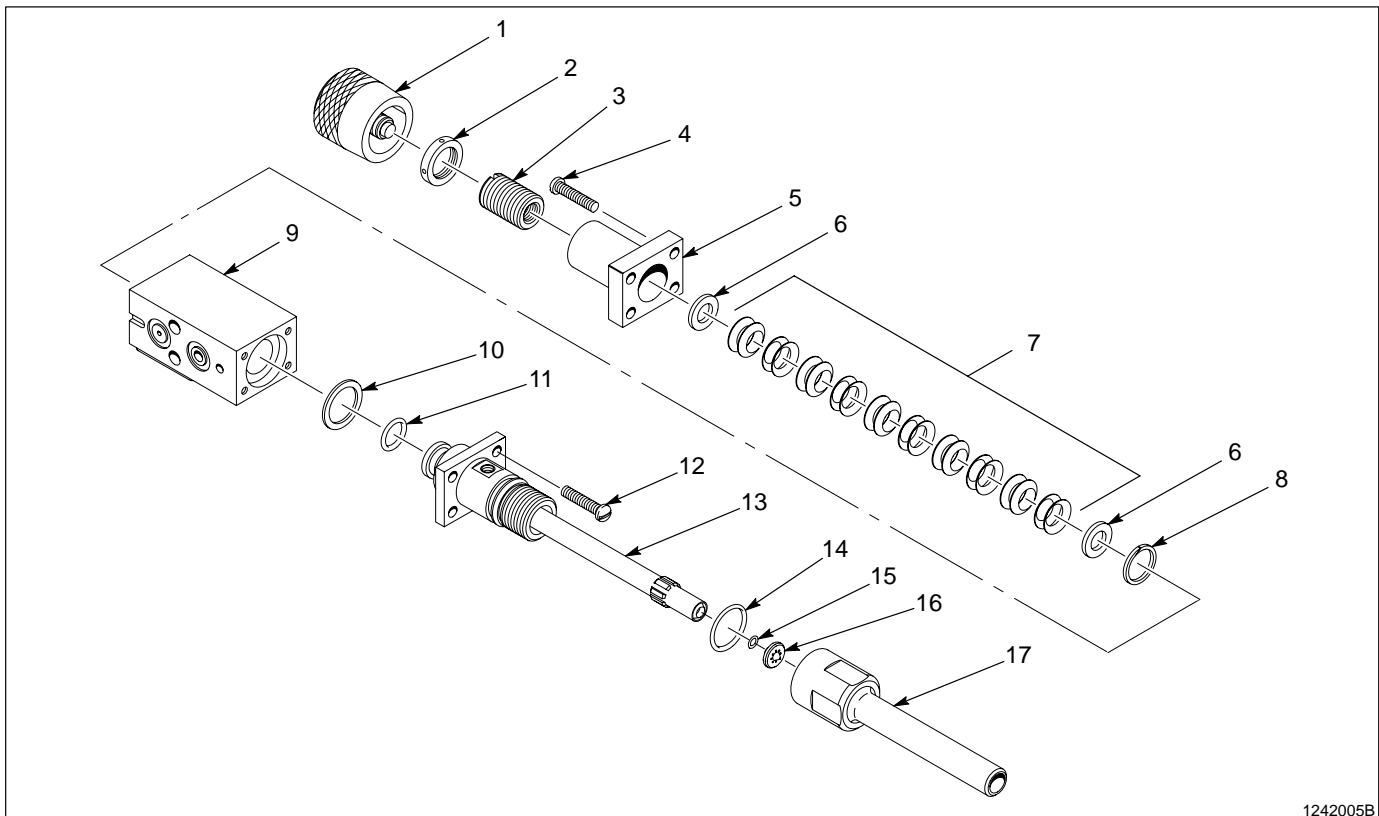
Fig. 6-1 Removing the Applicator and the Manifold

- | | | |
|-------------------|---------------|-------------|
| 1. Screw | 3. Nozzle nut | 5. Manifold |
| 2. Mounting plate | 4. O-rings | 6. Screw |

Removing the Micro-Adjust and Extension

See Figure 6-2.

1. Unscrew the micro-adjust cap (1) from the applicator. Examine the O-ring inside the cap. Replace the O-ring if necessary.
2. Remove the four screws (4) securing the applicator cap (5) to the applicator body (9). Remove the cap. Use a knife or similar small tool to remove the retaining ring (8) holding the flat washer (6) and spring washers (7) in place. Be careful not to lose the flat washer and spring washers. Place the washers on the blade of a small screwdriver for safekeeping.
3. Remove the four screws (12) from the extension (13) at the end of the applicator. Remove the extension from the applicator.
4. Remove the O-ring (11) and Delrin spacer (10) from the body. Inspect the O-ring and spacer and replace if necessary.



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Fig. 6-2 Removing the Micro-Adjust Cap and Extension

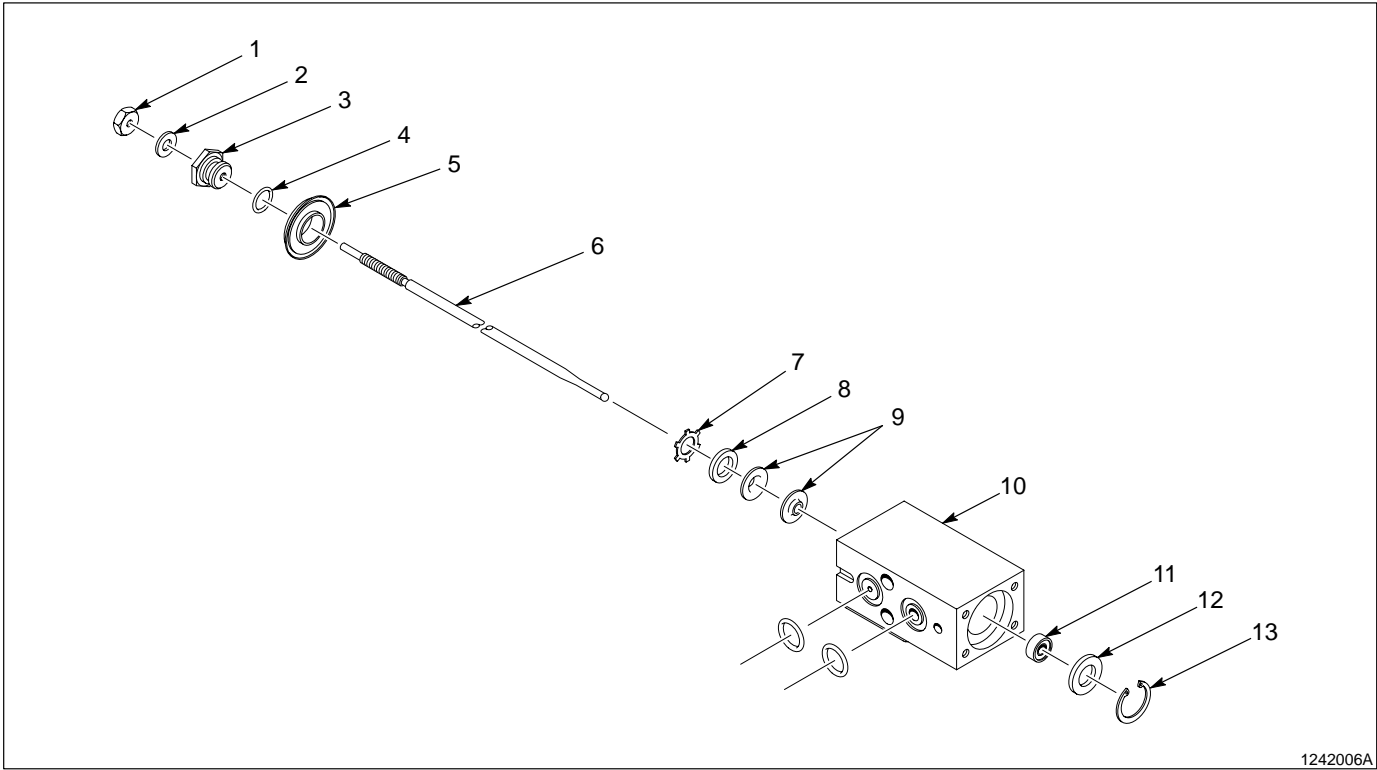
- | | | |
|---------------------|--------------------|-------------------|
| 1. Micro-adjust cap | 7. Spring washers | 13. Extension |
| 2. Preload lock nut | 8. Retaining ring | 14. O-ring |
| 3. Preload screw | 9. Applicator body | 15. Nozzle O-ring |
| 4. Screw | 10. Delrin spacer | 16. Swirl nozzle |
| 5. Applicator cap | 11. O-ring | 17. Nozzle nut |
| 6. Flat washer | 12. Screw | |

Removing the Needle, Piston, and Seals

See Figure 6-3.

1. Carefully grasp the threaded end of the needle (6) and pull it out of the applicator body (10).
2. Inspect the needle and air piston seal for damage. If either are damaged, remove the jam nut (1), washer (2), seal lock nut (3), Viton O-ring (4), and air piston (5), as follows:
 - a. Use the two module adjusting wrenches to remove the jam nut from the needle. Hold one wrench steady at the top of the seal lock nut. Use the other wrench to loosen and remove the jam nut.
 - b. Remove the seal lock nut from the needle.
 - c. Remove the air piston from the seal lock nut. Refer to *Rebuilding the Applicator* in this section for replacement.
 - d. Inspect the Viton O-ring on the seal lock nut and replace it if necessary.
3. Firmly grasp the applicator body. Place the pronged end of the retaining ring removal tool under one of the tabs of the retaining ring (7). Gently lift up the tab to loosen the retaining ring to remove it. Inspect the retaining ring and replace it if necessary.
4. Remove the backup seal (8) and two hat seals (9) from the film coater body. Inspect the seals and replace them if they are damaged or if air has been leaking from the body weep hole.
5. Use the retaining ring pliers to remove the retaining ring (13) from the applicator body.
6. Remove the flat washer (12) from the applicator body.
7. Inspect the U-cup (11). Do not remove the U-cup unless it is damaged or fluid leaks from the body module weep hole. Removing the U-cup may damage it and cause fluid to leak from the applicator. Do not reuse the U-cup once it has been removed from the applicator.
8. To remove the U-cup, insert the tapered end of the needle into the piston side of the applicator body. Use it to push the U-cup out of the applicator body.

Removing the Needle, Piston, and Seals (contd)



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Fig. 6-3 Removing the Needle, Piston, and Seals

- | | | |
|------------------|-------------------|---------------------|
| 1. Jam nut | 6. Needle | 10. Applicator body |
| 2. Washer | 7. Retaining ring | 11. U-cup |
| 3. Seal lock nut | 8. Backup seal | 12. Flat washer |
| 4. Viton O-ring | 9. Hat seals | 13. Retaining ring |
| 5. Air piston | | |

Disassembling the Manifold

See Figure 6-4. Disassemble the manifold only if you need to inspect or clean it.

NOTE: Do not expose the solenoid valve to solvents or coating material. Solvents could damage the valve, and coating material may clog it.

1. Remove the male connectors (2, 4) from the manifold (3).
2. Remove the solenoid valve (1) from the manifold. Inspect the solenoid gasket (5). If it is damaged, replace the entire solenoid.

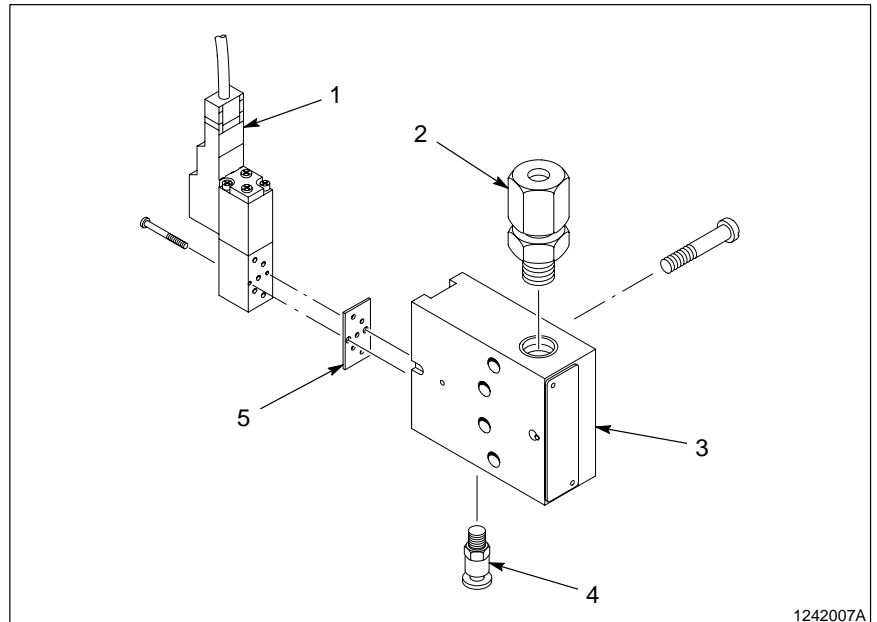


Fig. 6-4 Disassembling the Manifold

- | | |
|-------------------------|-----------------------|
| 1. Solenoid valve | 4. Male air connector |
| 2. Male fluid connector | 5. Solenoid gasket |
| 3. Manifold | |

4. Assembly

NOTE: Handle O-rings and seals carefully. If O-rings or seals are damaged, the applicator may leak or fail prematurely.

NOTE: Do not expose the solenoid valve to solvents or coating material. Solvents could damage the valve, and coating material may clog it.

Installing the U-cup and Seals

See Figure 6-6.

1. Hold the applicator body (10) with the piston side down and place the U-cup (12) (with the side containing the spring up) into the body. Do not snap the U-cup into place at this time.
2. Place the flat washer (13) into the applicator body on top of the U-cup. Push on the washer with the base tool to seat the U-cup into the bore. The U-cup should snap into place.
3. Using the retaining ring pliers, insert the retaining ring (14) into the groove in the body bore on top of the flat washer. Use the base tool to snap the retaining ring into place.
4. Form the new hat seals (9).
 - a. See Figure 6-5. With the concave sides facing one another, push the new hat seals over the point of the needle (about $\frac{1}{2}$ in. up from the ball), then remove the needle.
 - b. Place the hat seals together, concave sides facing one another.

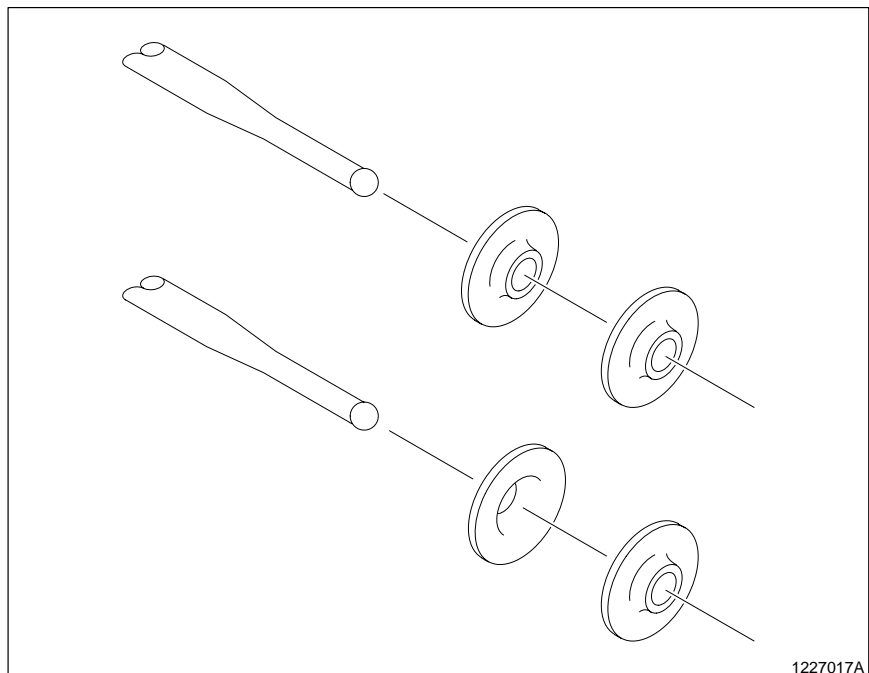
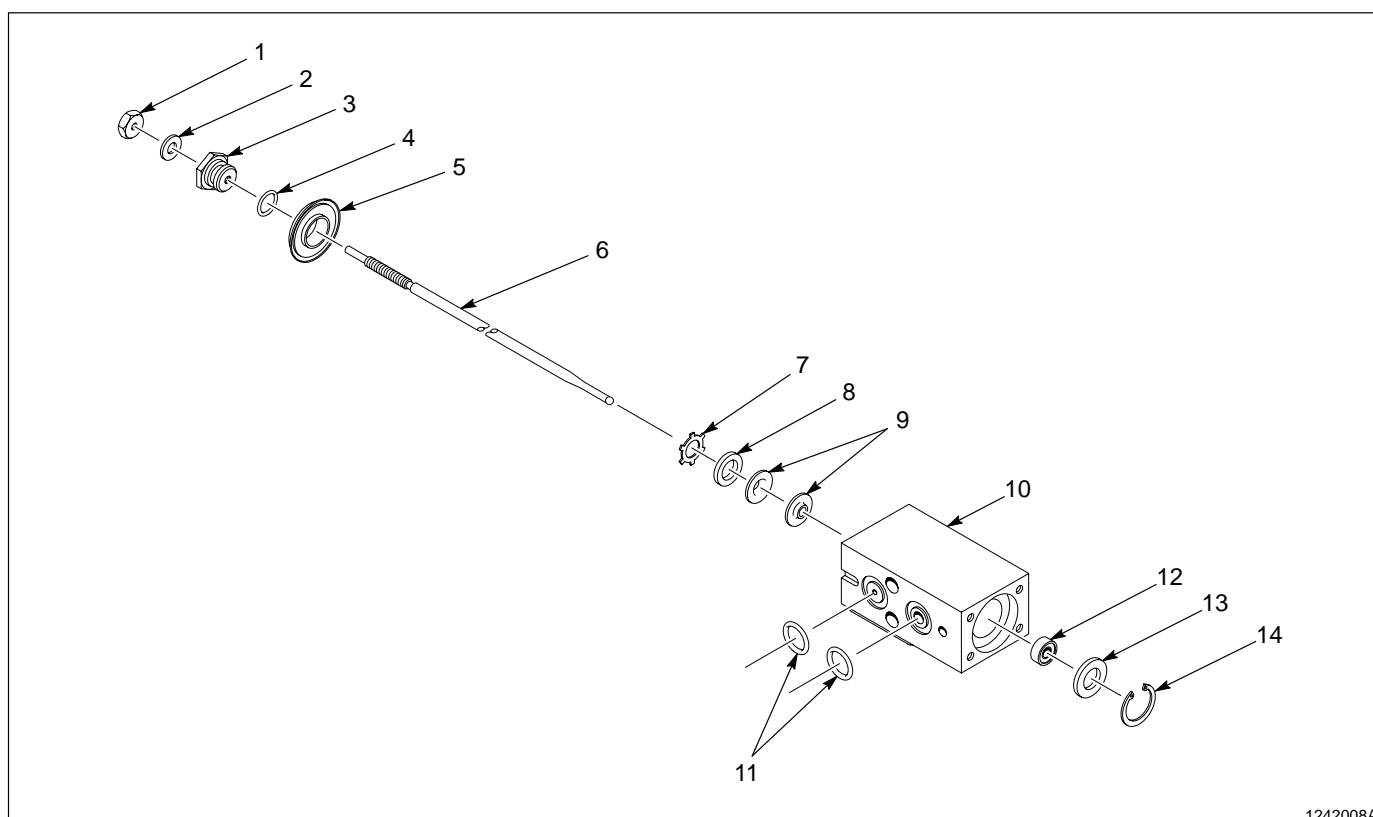


Fig. 6-5 Forming and Installing the Hat Seals

NOTE: Do not allow the U-cup, hat seals, or backup seal to slip onto the threaded section of the needle. The machined edge of the threads could damage the seals or U-cup.

- c. Carefully slide the hat seals over the point of the needle until they are approximately $\frac{3}{4}$ in. below the threaded section of the needle. Examine the hat seals for scratches, cracks, or tears. If the hat seals are defective, start with unformed hat seals and repeat steps 4 and 5.
5. See Figure 6-6. Insert the needle (6) into the piston side of the applicator body.
6. Install a backup seal (8) over the hat seals. Using the ring and seal insertion tool, carefully seat the backup seal in the applicator body.
7. Place the retaining ring (7) over the needle, with the tabs on the retaining ring pointing toward the threaded end of the needle.



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Fig. 6-6 Installing the U-Cup and Seals

- | | | |
|------------------|---------------------|--------------------|
| 1. Jam nut | 6. Needle | 11. O-ring |
| 2. Washer | 7. Retaining ring | 12. U-cup |
| 3. Seal lock nut | 8. Backup seal | 13. Flat washer |
| 4. Viton O-ring | 9. Hat seals | 14. Retaining ring |
| 5. Air piston | 10. Applicator body | |

Installing the Nozzle Nut Adapter

See Figure 6-7.

1. Place the adapter (2) into the carbide seat assembly (1). Use a flat, smooth surface and press down on the carbide seat to force the adapter up until it is fully seated.
2. Place the nozzle (4) into the nozzle nut (3).
3. Screw the nozzle nut onto the seat assembly.

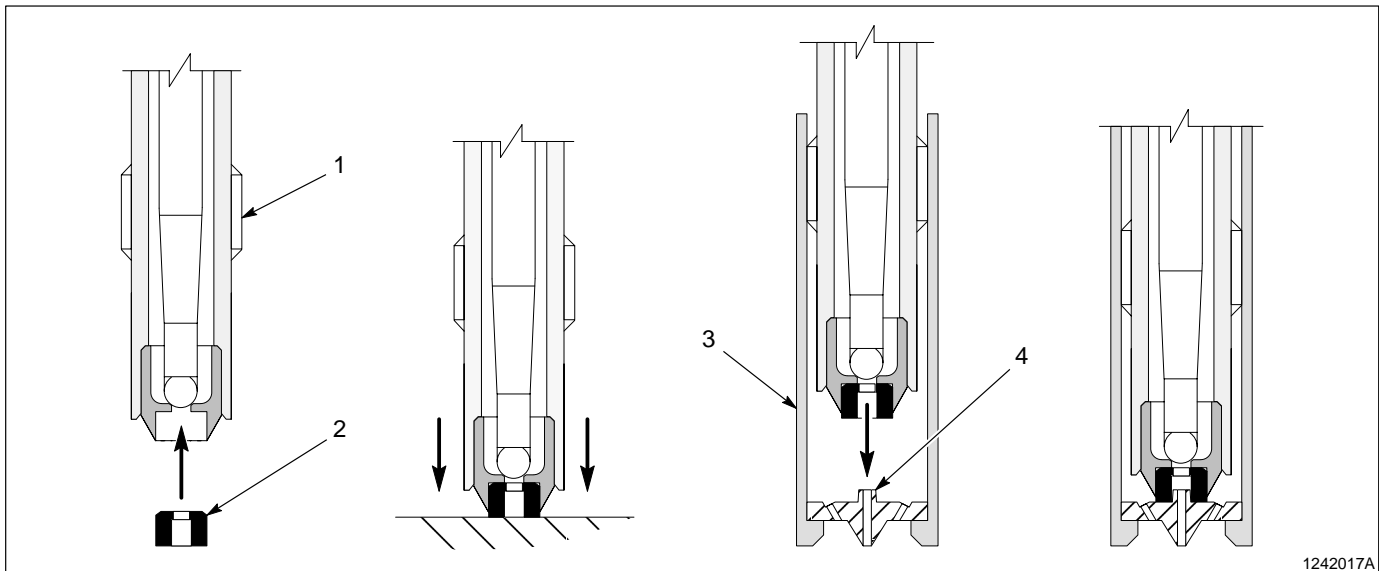


Fig. 6-7 Inserting the Nozzle Adapter

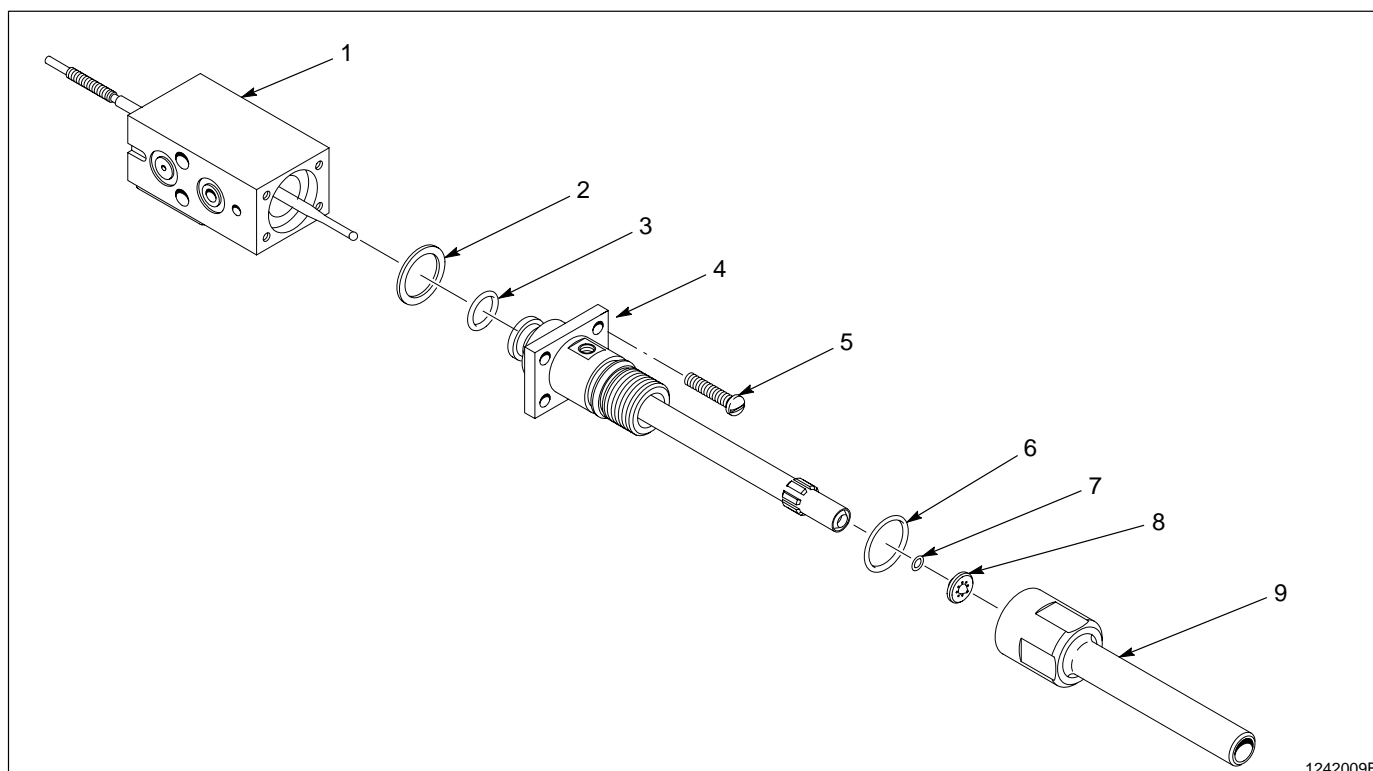
- | | | |
|--------------------------|---------------|-----------|
| 1. Carbide seat assembly | 3. Nozzle nut | 4. Nozzle |
| 2. Adapter | | |

Note: Use this adapter only when old issue nozzles (nozzles that do not contain an O-ring groove) are used with a new issue applicator.

Installing the Extension

See Figure 6-8.

1. Place the Delrin thrust washer (2) in the applicator body (1).
2. Install the O-ring (3) into the groove of the extension.
3. Carefully slide the extension (4) into the applicator body. Be careful not to pinch the O-ring during assembly.
4. Inspect the extension flange after installing it on the applicator body. Make sure the flange is flush and square against the applicator body.
5. Carefully insert the needle into the extension.
6. Place the applicator assembly (with fluid and air ports face down) on a flat surface. While applying hand pressure to the body and extension flange, install and tighten four screws (5) to hold the extension in place.



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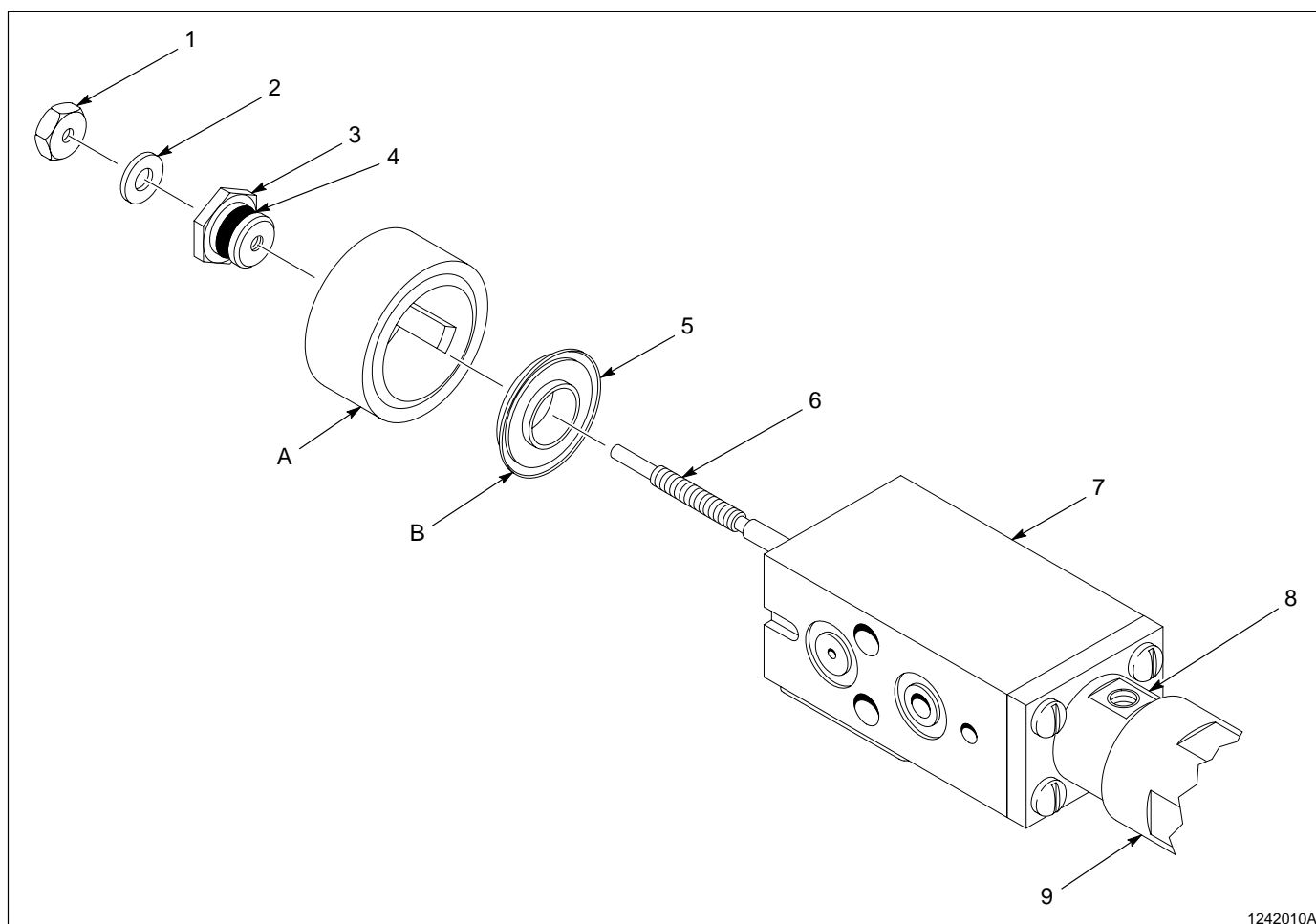
Fig. 6-8 Installing the Extension

- | | | |
|-------------------------|--------------|------------------|
| 1. Applicator body | 4. Extension | 7. Nozzle O-ring |
| 2. Delrin thrust washer | 5. Screw | 8. Swirl nozzle |
| 3. O-ring | 6. O-ring | 9. Nozzle nut |

Installing the Air Piston

See Figure 6-9.

1. Roll the new air piston seal lip (B) on a flat surface to form the lip. The piston seal lip must hang down toward the applicator, so the piston will fit properly in the piston insertion tool (A).
2. Coat the seal area of the piston insertion tool with Parker O-ring lubricant or an equivalent lubricant. Orient the piston assembly as shown, then install it into the piston insertion tool. Make sure the entire assembly fits into the tool.
3. Inspect the air piston seal. There should be no gaps or folds between the piston insertion tool bore and the lip of the piston seal. Replace the piston seal if necessary.
4. Invert the piston insertion tool (piston side down) and place it on a flat surface.
5. Lubricate a new Viton O-ring (4) with Parker O-ring lubricant, or an equivalent lubricant. Install the O-ring in the groove on the chamfered end of the seal lock nut (3).
6. Lubricate the air piston bore (in the body) with Parker O-ring lubricant, or an equivalent lubricant. Press the seal lock nut into the top of the piston insertion tool and into the piston. Apply pressure to insert and secure the seal lock nut.
7. Seat the needle. Invert the applicator and carefully press the needle down against a flat surface until it bottoms out against the seat at the end of the extension.
8. Place the piston insertion tool (with piston and seal lock nut installed) onto the top of the needle. Turn the piston insertion tool clockwise, threading the seal lock nut onto the needle, until the lip of the tool seats in the chamfer on top of the applicator body (7).
9. Continue winding the piston into the bore until the tool disengages from the seal lock nut. The top of the seal lock nut should be flush to within 0.25 mm (0.010 in.) above the top of the body.
10. Retract the needle by approximately 3.18 mm (0.125 in.). Do not pull the air piston (5) out of the bore.
11. Place the jam nut (1) and washer (2) on the needle, over the seal lock nut. Place one of the module adjusting wrenches on the seal lock nut. Place the other wrench on the jam nut. Using one wrench to hold the seal lock nut stationary, tighten the jam nut with the other wrench.
12. Seat the needle again.



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Fig. 6-9 Installing the Air Piston

- | | | |
|------------------|--------------------|--------------------------|
| 1. Jam nut | 5. Air piston | 9. Nozzle nut |
| 2. Washer | 6. Needle | A. Piston insertion tool |
| 3. Seal lock nut | 7. Applicator body | B. Piston seal lip |
| 4. Viton O-ring | 8. Extension | |

Installing Spring Washers

Before installing the spring washers and micro-adjust cap, read the *Adjusting Response Times* procedure. After the applicator is completely assembled, you may have to remove the micro-adjust cap and applicator cap to add or remove spring washers to obtain the performance required for your application.

Adjusting Response Times

The applicator may require adjustment for optimum response times. The number of spring washers and the preload screw tension can be adjusted to yield the desired response time. Removing spring washers and increasing the preload screw tension shortens response times. Adding spring washers and loosening the preload screw tension lengthens response times. See Figures 6-10 to 6-12.

Follow these guidelines to determine appropriate response times:

1. Characterize the applicator with the appropriate material. Refer to the system manual and the *Easy Coat Programming Manual*.

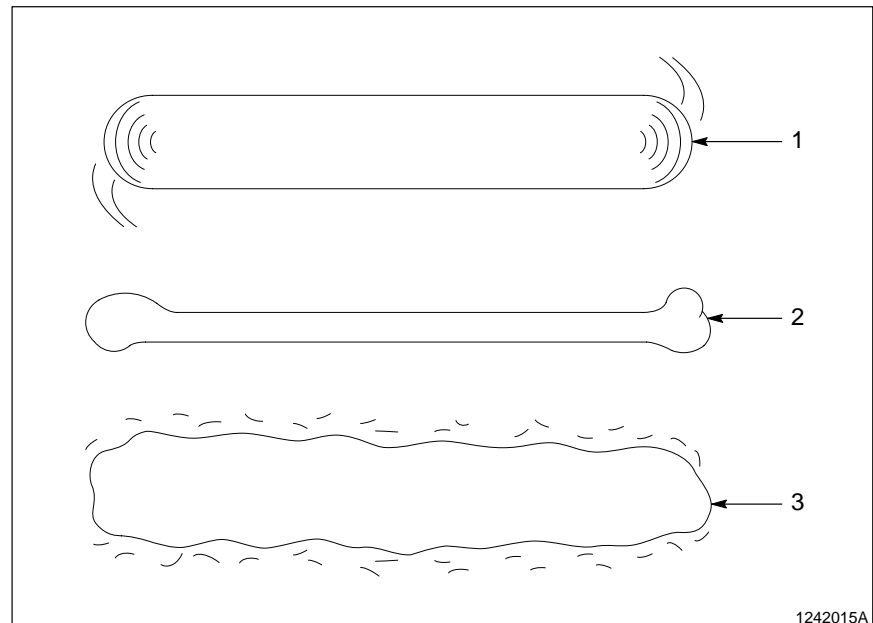


Fig. 6-10 Unacceptable Film Patterns

- | | |
|--|---|
| 1. Monofilament pattern with areas not filled, stringers on ends | 3. Swirl pattern with splatter, very poor edge definition |
| 2. Bead with large bulbs at end | |

2. Look at the film pattern to see if it is acceptable. See Figure 6-10 and refer to the following guidelines for examples of unacceptable patterns.

- If the pattern is not acceptable, adjust the micro-adjust cap, fluid pressure, or Z height. Refer to the appropriate Select Coat system manual for fluid pressure and Z height adjustment.
- If the monofilament pattern is either not filling in areas or has stringers at the pattern end (1), air-assist pressure spikes are occurring. Lower the air assist pressure slightly or lower the Z height. Change to a larger nozzle, increase the fluid pressure slightly, or run at a slower velocity (more material flow is required to fill in the pattern).

- If the bead has large ends (2), the fluid flow is too large. Run the bead coats at a higher velocity, set the bead pressure slightly lower or use a smaller nozzle.
 - If the swirl pattern has splatter or very poor edge definition (3), check the nozzle seal for proper seating. If material weeps out of the air assist holes, splatter and poor edge definition occurs. Splatter is also caused by too much material flow and/or too much air assist pressure. Adjust pressures to achieve optimal patterns.
3. If the pattern does not improve, adjust the preload screw $1/4$ turn from the original setting. After each adjustment, recharacterize the applicator and determine if the film pattern is acceptable.
 4. If the pattern still does not improve, you may need to add or subtract spring washers. If the bead has bulbs at the ends, remove one group of springs.

NOTE: Spring washers are usually added or removed in groups of four.

Installing/Adjusting Spring Washers

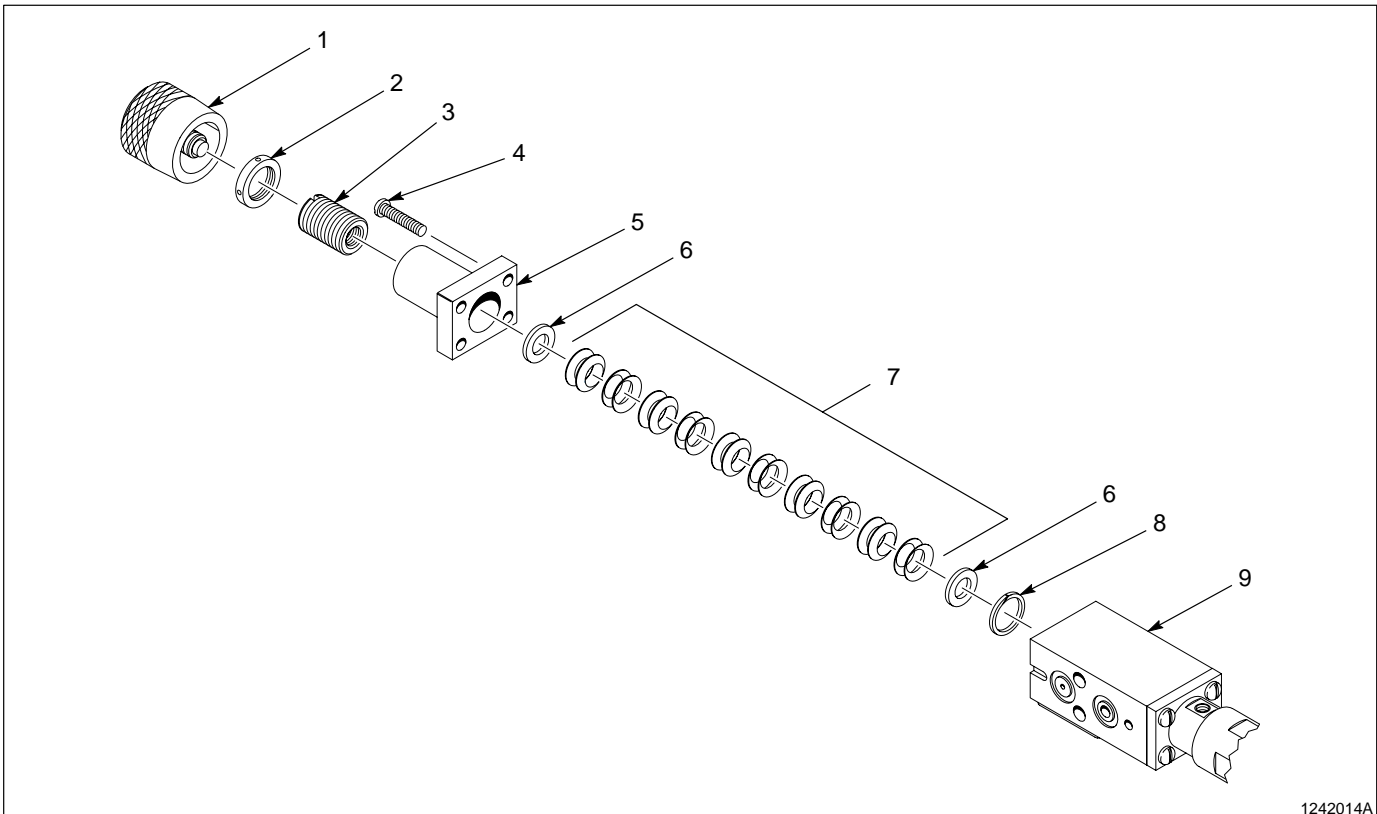
NOTE: Disregard steps 1–6 if you are assembling the applicator. Follow steps 1–6 if you are adjusting the number of spring washers in an assembled applicator.

1. See Figure 6-11. Remove the micro-adjust cap (1) from the applicator.
2. Remove the four screws (4) securing the applicator cap (5) to the applicator body (9).
3. Carefully remove the applicator cap.
4. Use a knife or similar small tool to remove the retaining ring (8). Hold the flat washers (6) and spring washers (7) in place. Be careful not to scratch or cut any surfaces of the applicator.
5. Pull the flat washers and spring washers out of the applicator cap. Place the flat washers and spring washers over the blade of a small screwdriver for safekeeping. Pay attention to the order and orientation of the spring washers and flat washers.
6. See Figure 6-12. Add or subtract spring washers as necessary.

Installing/Adjusting Spring Washers (contd)

NOTE: See Figure 6-12. Make sure the spring washers are correctly oriented.

7. See Figure 6-11. Install the flat washers (6) and spring washers (7) in the order illustrated.
8. See Figure 6-11. Install the retaining ring into the groove in the applicator cap.
9. Adjust the preload tension by following the *Adjusting Preload Tension* procedure on next page.



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Fig. 6-11 Adjusting the Spring Washers

- | | | |
|---------------------|-------------------|--------------------|
| 1. Micro-adjust cap | 4. Screw | 7. Spring washers |
| 2. Preload lock nut | 5. Applicator cap | 8. Retaining ring |
| 3. Preload screw | 6. Flat washer | 9. Applicator body |

Adjusting Preload Tension

NOTE: Disregard steps 1 and 2 if you are assembling the applicator. Follow steps 1 and 2 if you are adjusting the number of spring washers in an assembled applicator.

See Figure 6-11.

1. If you have not already done so, remove the micro-adjust cap (1) from the applicator.
2. Use the spanner wrench supplied with the applicator to remove the preload lock nut (2). Loosen the preload screw (3).
3. Tighten the preload screw until you feel light contact between the preload screw (3) and the flat washer (6).
4. See Figure 6-12. Continue tightening the screw the required number of turns.
5. See Figure 6-11. Install the preload lock nut (2).
6. Use the spanner wrench to turn the preload lock nut to lock the preload screw into place.
7. Install the micro-adjust cap. Calibrate the micro-adjust mechanism using the *Calibrating the Micro-Adjust Mechanism* procedure.

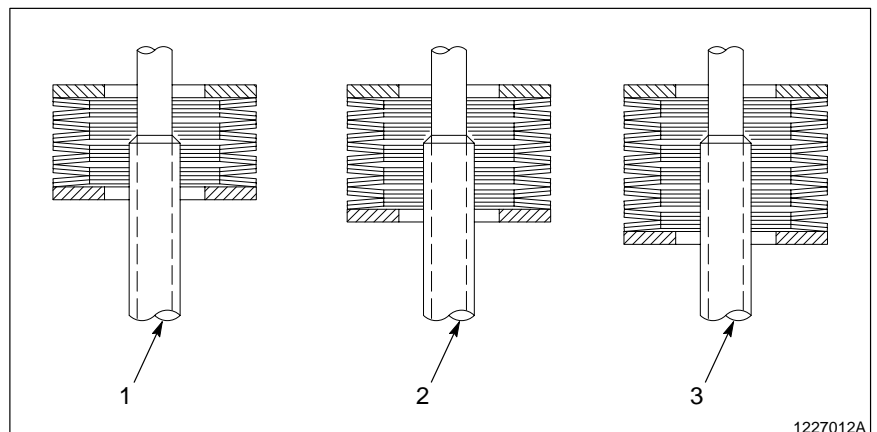


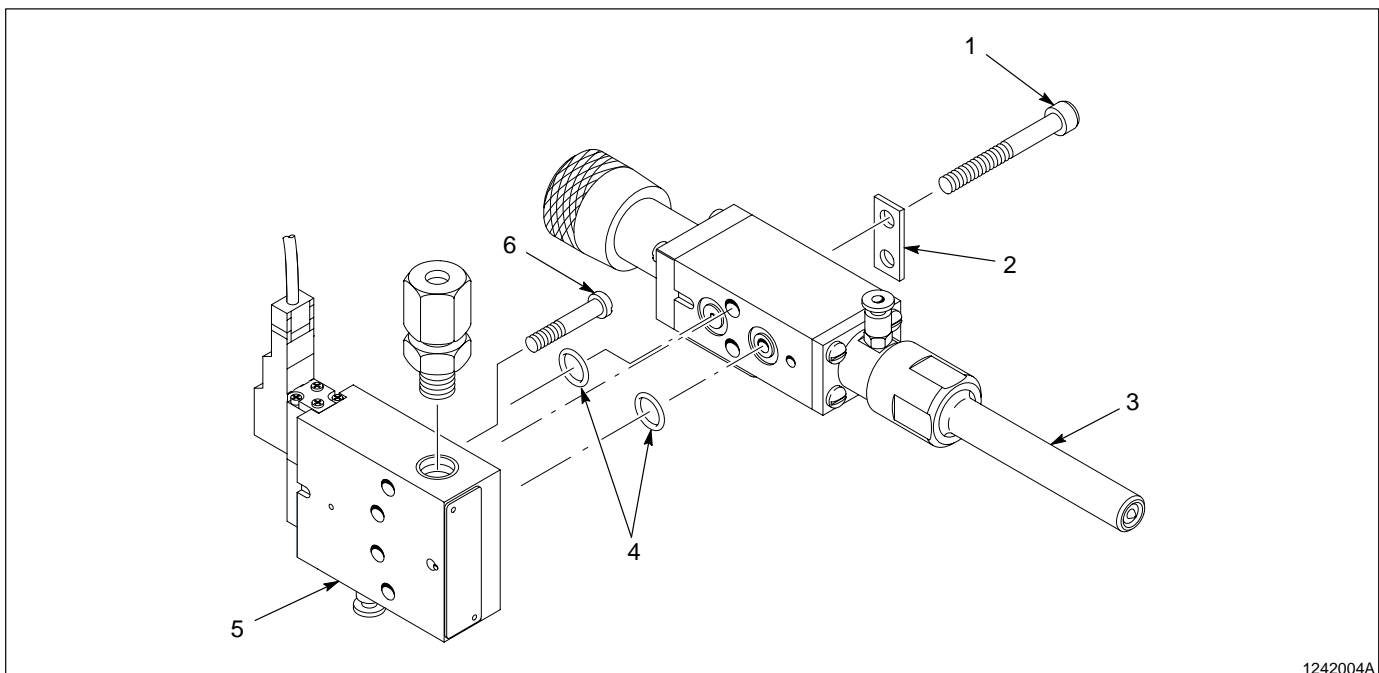
Fig. 6-12 Adjusting the Preload Tension (Springs Oriented as Shown)

- | | |
|--|---|
| 1. 16 springs ($\frac{5}{8}$ turn preload) | 3. 24 springs ($\frac{7}{8}$ turn preload) |
| 2. 20 springs ($\frac{3}{4}$ turn preload)
factory setting | |

Installing the Applicator on the Manifold

See Figure 6-13.

1. Reinstall the two O-rings (4) in the air and fluid ports between the body and manifold.
2. Place the applicator over the locating pins on the manifold (5).
3. Secure the applicator to the manifold using the mounting plate (2) and screws (1).



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Fig. 6-13 Installing the Applicator on the Manifold

- | | | |
|-------------------|---------------|-------------|
| 1. Screw | 3. Nozzle nut | 5. Manifold |
| 2. Mounting plate | 4. O-rings | 6. Screw |

Installing the Solenoid Valve

See Figure 6-14.

1. If you removed the solenoid valve gasket, place the gasket (2) (convex side up) over the drilled ports in the top of the manifold.

NOTE: All three ports and two mounting holes must be visible through the gasket. These are the dark holes shown in Figure 6-14.

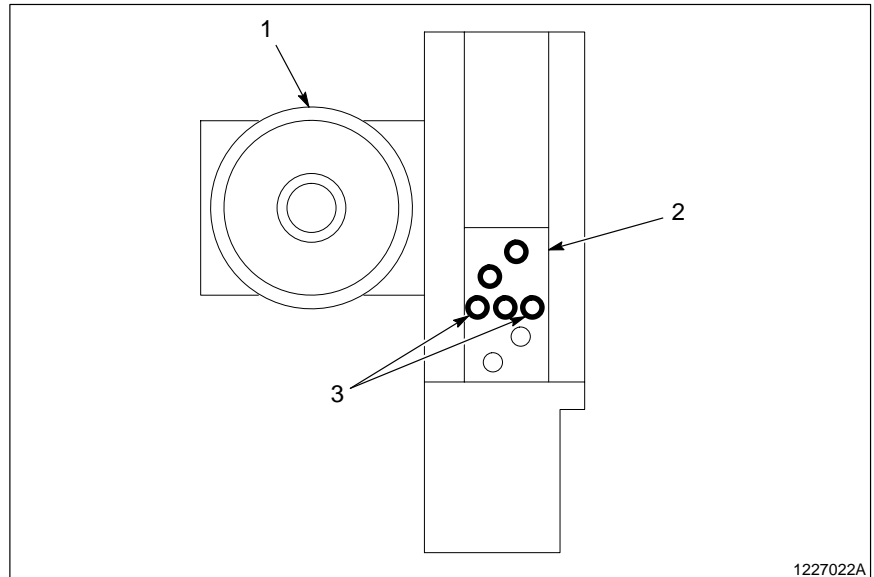


Fig. 6-14 Installing the Solenoid Valve Gasket

- | | |
|---------------------|-------------------|
| 1. Micro-adjust cap | 3. Mounting holes |
| 2. Gasket | |
2. Place the solenoid valve on the manifold, over the gasket. Place the solenoid mounting screws in the mounting holes (3) and tighten it with the miniature phillips head screwdriver shipped with the applicator. Do not over-tighten the screws.

Installing the Applicator onto the Robot

1. Mate the slots on the back side of the manifold with the locating pins on the robot Z-axis slide. Reattach with the mounting screws.
2. Reattach the airline and fluid line from the workcell to the applicator. Plug in the solenoid valve connector.

5. Calibrating the Micro-Adjust Mechanism

After rebuilding the applicator, calibrate the micro-adjust mechanism. If you have noted the original setting as described in *Preparation*, set the micro-adjust cap to that setting. If you did not record the original setting, use the following steps to calibrate the micro-adjust mechanism.

1. See [Figure 6-14](#). Use the micro-adjust cap (1) to gently seat the needle in the extension.
2. Open the micro-adjust cap by turning $\frac{1}{2}$ turn counterclockwise. The piston and needle travel is adjusted by turning the micro-adjust cap.
 - Turning the micro-adjust cap clockwise decreases the piston and needle travel, which decreases coating material flow.
 - Turning the micro-adjust cap counter-clockwise increases the piston and needle travel, which increases coating material flow.

NOTE: Do not open the micro-adjust cap more than 1.5 turns from fully closed.

6. Testing the Applicator

1. Cycle the applicator and check for air leaks. Refer to the appropriate Select Coat system manual for procedures.
2. Fill the fluid system with a compatible solvent and check for fluid leaks. Refer to the appropriate Select Coat system manual for procedures.
3. Flush and fill the fluid system with coating material.
4. Characterize the applicator (refer to the *Easy Coat Programming Manual* for procedures). Compare this characterization to the one done before the applicator was disassembled. Adjust the reassembled applicator as necessary.

Section 7

Parts

Section 7

Parts

1. Introduction

To order parts, call the Nordson Customer Service Center or your local Nordson representative. Use this five-column parts list, and the accompanying illustration, to describe and locate parts correctly.

Using the Illustrated Parts List

Numbers in the Item column correspond to numbers that identify parts in illustrations following each parts list. The code NS (not shown) indicates that a listed part is not illustrated. A dash (—) is used when the part number applies to all parts in the illustration.

The six-digit number in the Part column is the Nordson Corporation part number. A series of dashes in this column (- - - - -) means the part cannot be ordered separately.

The Description column gives the part name, as well as its dimensions and other characteristics when appropriate. Indentions show the relationships between assemblies, subassemblies, and parts.

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

- If you order the assembly, items 1 and 2 will be included.
- If you order item 1, item 2 will be included.
- If you order item 2, you will receive item 2 only.

The number in the Quantity column is the quantity required per unit, assembly, or subassembly. The code AR (As Required) is used if the part number is a bulk item ordered in quantities or if the quantity per assembly depends on the product version or model.

Letters in the Note column refer to notes at the end of each parts list. Notes contain important information about usage and ordering. Special attention should be given to notes.

2. Applicator Parts

See Figure 7-1.

Item	Part	Description	Quantity	Note
—	234 237	Applicator, SC-204, high speed, swirl assembly	1	
—	226 315	• Applicator, SC-200, high speed, swirl module	1	
1	115 590	• • Cap, micro-adjustment, with O-ring	1	
2	145 461	• • Nut, locking	1	
3	145 463	• • Screw, preload, adjustment	1	
4	981 023	• • Screw, fillister head, steel, #6-32 x 0.625 in.	8	
5	145 462	• • Cap, applicator	1	
6	983 259	• • Washer, flat, e, 0.497 OD x 0.280 x 0.060 in.	3	
7	145 466	• • Spring, washer, disc, 0.4920 in. OD	24	
8	954 013	• • Ring, backup, single, $\frac{7}{16} \times \frac{9}{16}$	1	
9	984 100	• • Nut, hex, machine, #5-40	1	
10	983 006	• • Washer, flat, e, 0.141 x 0.281 x 0.032 in.	1	
11	168 833	• • Nut, seal, lock, piston, 5-40	1	
12	940 090	• • O-ring, Viton, 0.208 ID x 0.070 in. wide	1	
13	115 055	• • Piston, air	1	
—	234 242	• • Gun, seat, assembly, SC-200 high speed, swirl	1	
14	-----	• • • Needle	1	
15	-----	• • • Extension seat, SC-200 swirl	1	
16	986 502	• • Ring, retaining, internal, 43, push on	1	
17	115 054	• • Seal, backup, 0.270 x 0.435 in.	1	
18	168 831	• • Seal, hat, formed, 0.125 in. dia needle	2	
19	168 823	• • Body gun, SC-200 high speed, noncirculating	1	
20	940 119	• • O-ring, Thiokol, 0.313 x 0.438 x 0.062 in.	2	
21	168 824	• • U-Cup, spring loaded, Ekonol, 0.312 x 0.13 in.	1	
22	986 115	• • Ring, retaining, internal, 0.500 in., basic	1	
23	168 825	• • Spacer, Delrin, 0.705 x 0.535 x 0.040 in.	1	
24	709 774	• • O-ring, Kalrez, 0.375 x 0.500 x 0.063 in.	1	
25	940157	• • O-ring, Viton, black, 0.562 x 0.688 in.	1	
26	226 307	• • Nut, nozzle, SC-200 high speed, swirl	1	
27	972 185	• • Connector, male, $\frac{1}{8}$ T x #10-32 NPT	1	
NS	145 468	• • Wrench, spanner, miniature	1	
28	168 834	• Manifold, SC-204 high speed	1	

Continued on next page

Item	Part	Description	Quantity	Note
29	145 460	• Valve, micro, solenoid, 4 way, with connector	1	
30	-----	• • Gasket	1	
31	-----	• • Screw, attachment	1	
32	971 235	• Connector, male, Delrin, 1/4 T x 1/8 NPT	1	
33	981 099	• Screw, fillister head, #8-32 x 1.00 in., slotted, zinc	2	
34	168 806	• Plate, mounting, SC-204	1	
35	981 847	• Screw, socket head, #10-32 x 1.625 in.	2	
36	-----	Nozzle, swirl, 12HS, with O-ring	1	A
37	332 496	• O-ring, Kalrez, 0.070 ID x 0.040 in. wide	1	

NOTE A: Refer to *Nozzles* for a list of the nozzles available for the applicator.
 NS: Not Shown

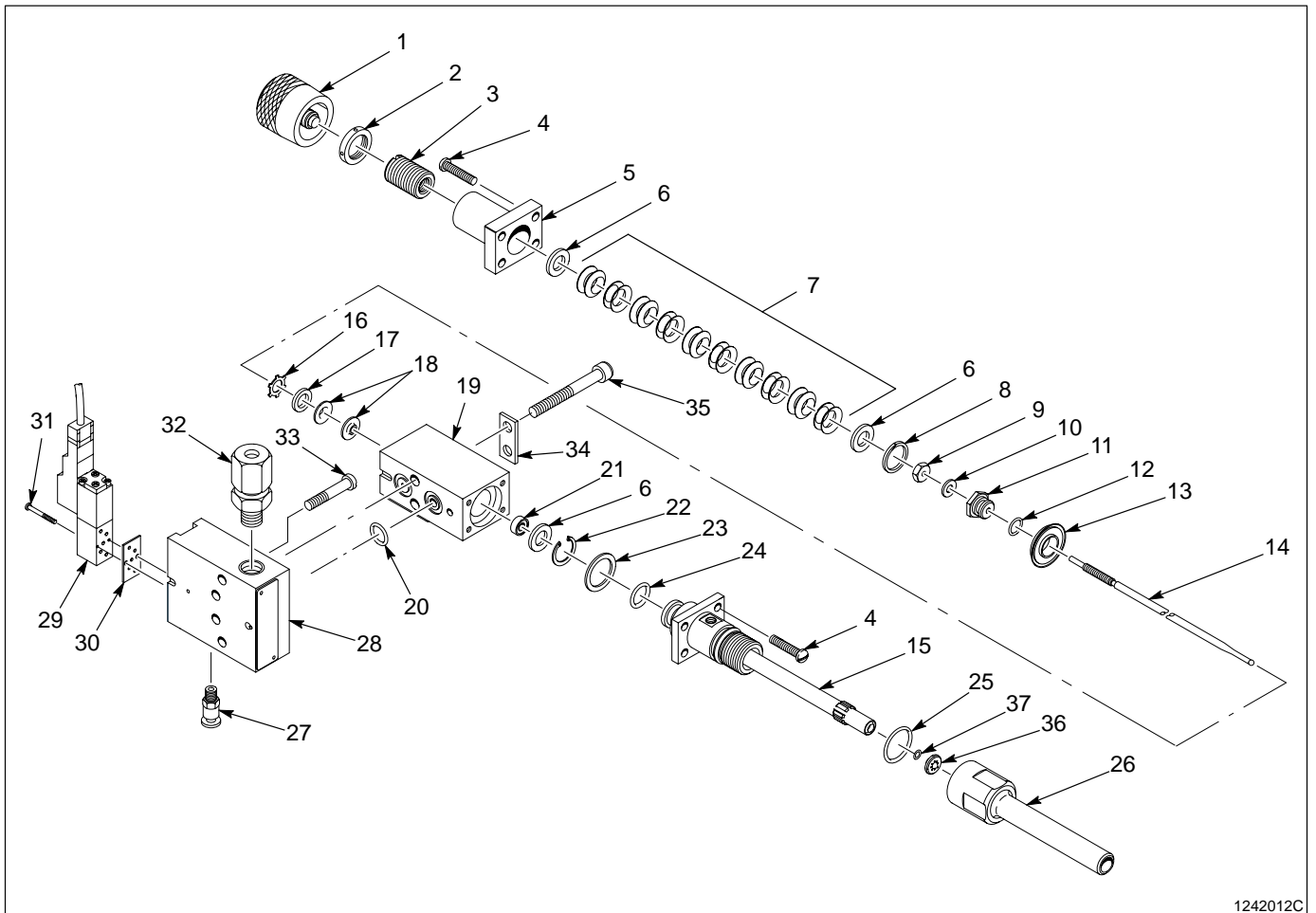


Fig. 7-1 Slim Swirl Applicator Parts (Exploded View)

3. Service Kit

The service kit, part 329 355, consists of replacement parts and tools. See Figure 7-1 and refer to the following list for the replacement parts included with the service kit.

Item	Part	Description	Quantity	Note
—	329 355	Service kit, swirl	1	
6	983 259	• Washer, flat, e, 0.497 x 0.280 x 0.060 in.	3	
8	954 013	• Ring, backup, single, $\frac{7}{16}$ x $\frac{9}{16}$ in.	1	
12	940 090	• O-ring, Viton, 0.208 ID x 0.070 w	1	
13	115 055	• Piston, air	1	
17	115 054	• Seal, backup, 0.270 x 0.435 in.	1	
18	168 831	• Seal, hat, formed, 0.125 in. diameter needle	3	
20	940 119	• O-ring, Thiokol, 0.313 x 0.438 x 0.060 in.	3	
21	168 824	• U-cup, spring loaded, Ekonol, 0.310 x 0.130 in.	1	
22	986 115	• Ring, retaining, internal, 0.500 in., basic	1	
23	168 825	• Spacer, Delrin, 0.705 x 0.535 x 0.040 in.	1	
24	709 774	• O-ring, Kalrez, 0.375 x 0.500 x 0.063 in.	1	
37	332 496	• O-ring, Kalrez, 0.070 ID x 0.040 w	2	
NS	329 345	• Adapter, nozzle, swirl	2	A

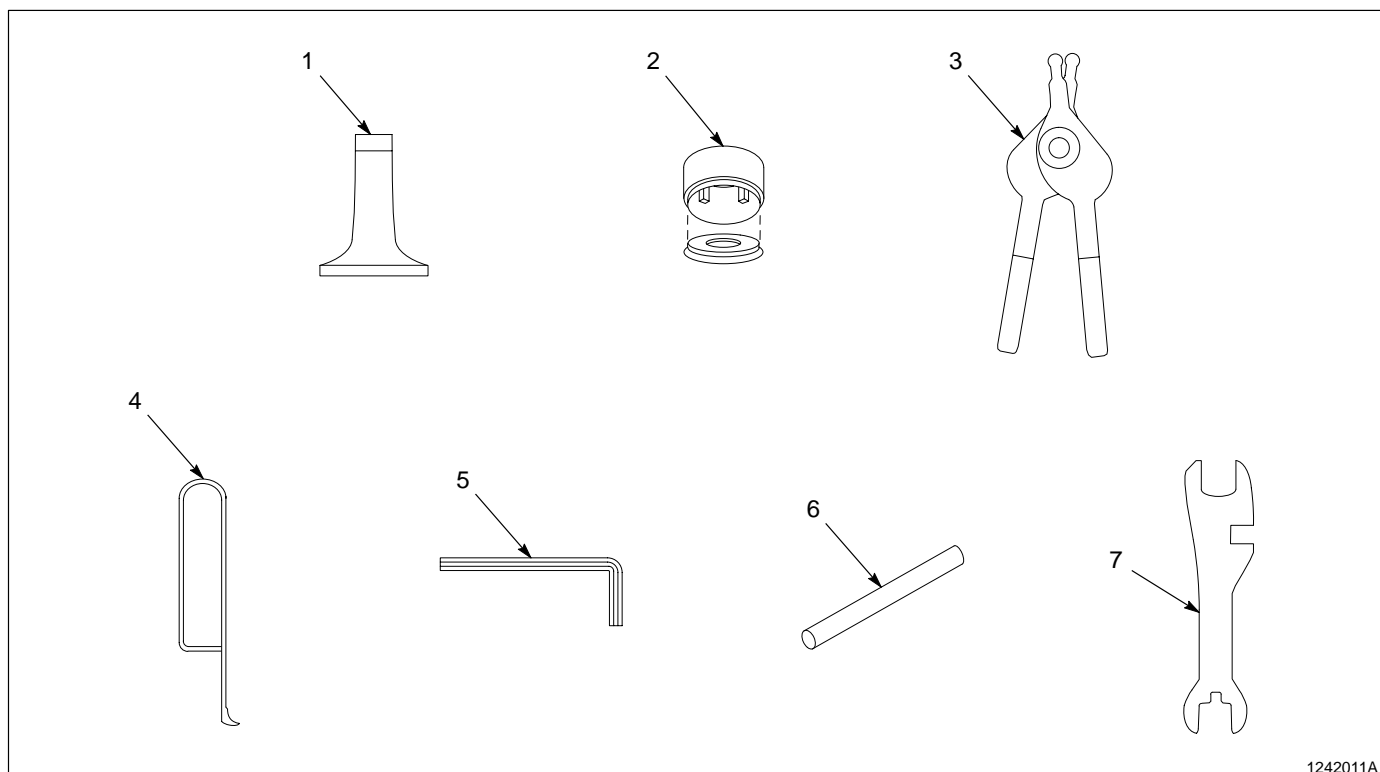
NOTE A: Use this adapter only when using old-issue nozzles (nozzles that do not contain an O-ring groove) with a new-issue applicator.

NS: Not Shown

Continued on next page

See Figure 7-2 and refer to the following list for the tools included with the service kit, part 329 355.

Item	Part	Description	Quantity	Note
1	272 824	• Base, seal kit	1	
2	274 973	• Tool, piston insertion	1	
3	175 540	• Pliers, removal, retaining ring	1	
4	272 821	• Tool, retaining ring removal	1	
5	129 612	• Wrench, Allen, hex, $\frac{3}{32}$ in.	1	
6	115 059	• Insertion tool, ring and seal	1	
7	901 911	• Wrench, adjusting, module	2	



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Fig. 7-2 Applicator Service Kit Tools

4. Nozzles

Use the following two lists to order swirl nozzles with O-rings (329 XXX series and 338 XXX series) or standard swirl nozzles (234 XXX series and 322 XXX series).

**Swirl Nozzles with O-rings
(329 XXX PTFE Coated
Bronze Series and 338 XXX
Stainless Steel Series)**

See Figure 7-3. Swirl nozzles with O-rings (329 XXX series and 338 XXX series) cannot be used with a standard applicator that requires (234 XXX series and 322 XXX) series swirl nozzles.

Item	Part (PTFE Coated Bronze)	Part (Stainless Steel)	Description	Quantity	Note
1	329 346	338 738	Nozzle, swirl, 0.008, 12HS, with O-ring	1	
1	329 347	338 739	Nozzle, swirl, 0.012, 12HS, with O-ring	1	
1	329 348	338 740	Nozzle, swirl, 0.016, 12HS, with O-ring	1	
1	329 349	338 741	Nozzle, swirl, 0.020, 12HS, with O-ring	1	
1	329 350	338 742	Nozzle, swirl, 0.025, 12HS, with O-ring	1	
1	329 351	338 743	Nozzle, swirl, 0.030, 12HS, with O-ring	1	
1	329 352	338 744	Nozzle, swirl, 0.040, 12HS, with O-ring	1	
1	329 353	338 745	Nozzle, swirl, 0.050, 12HS, with O-ring	1	
1	329 420		Nozzle, swirl, seal, 0.020, 10 pack	1	A
1	329 421		Nozzle, swirl, seal, 0.020, 25 pack	1	A
1	329 422		Nozzle, swirl, seal, 0.025, 10 pack	1	A
1	329 423		Nozzle, swirl, seal, 0.025, 25 pack	1	A
1	329 424		Nozzle, swirl, seal, 0.030, 10 pack	1	A
1	329 425		Nozzle, swirl, seal, 0.030, 25 pack	1	A

NOTE A: This part is included in a discounted economy pack.

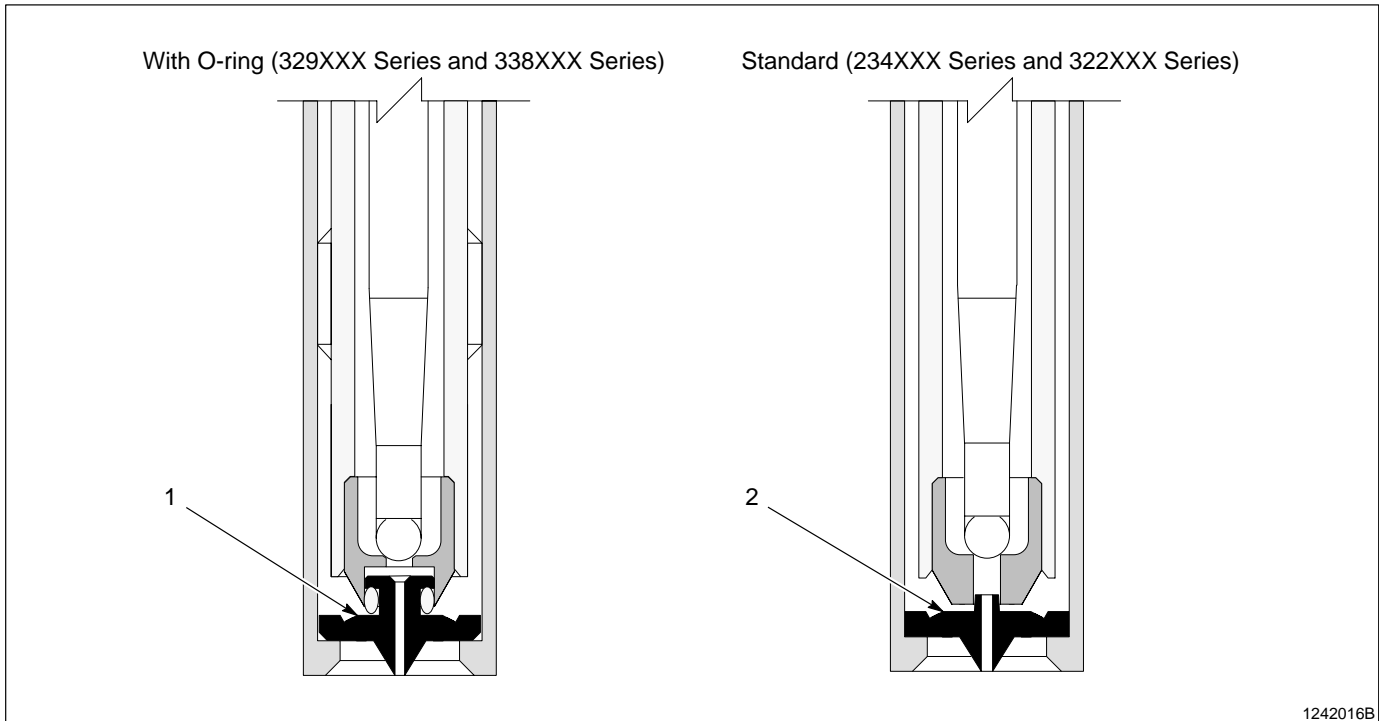
**Standard Swirl Nozzles
(234 XXX Series and
322 XXX Series)**

See Figure 7-3. Standard swirl nozzles (234 XXX series and 322 XXX series) cannot be used with an updated applicator that requires 329 XXX series or 338 XXX series swirl nozzles, unless used with swirl nozzle adapter (part 329 345).

Item	Part	Description	Quantity	Note
2	234 286	Nozzle, swirl, 0.008, 12H, slim	1	
2	234 287	Nozzle, swirl, 0.012, 12H, slim	1	
2	234 288	Nozzle, swirl, 0.016, 12H, slim	1	
2	234 289	Nozzle, swirl, 0.020, 12H, slim	1	
2	234 290	Nozzle, swirl, 0.025, 12H, slim	1	
2	234 291	Nozzle, swirl, 0.030, 12H, slim	1	
2	234 292	Nozzle, swirl, 0.040, 12H, slim	1	
2	234 293	Nozzle, swirl, 0.050, 12H, slim	1	
2	322 329	Nozzle, swirl, 0.020, slim, 10 pack	1	A
2	322 330	Nozzle, swirl, 0.020, slim, 25 pack	1	A
2	322 331	Nozzle, swirl, 0.025, slim, 10 pack	1	A
2	322 332	Nozzle, swirl, 0.025, slim, 25 pack	1	A
2	322 333	Nozzle, swirl, 0.030, slim, 10 pack	1	A
2	322 334	Nozzle, swirl, 0.030, slim, 25 pack	1	A

NOTE A: This part is included in a discounted economy pack.

4. Nozzles (contd)



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Fig. 7-3 Swirl Nozzles

5. Spare Parts

See Figure 6-7.

Item	Part	Description	Quantity	Note
1	234 242	Gun, seat assembly	1	
2	329 345	Adapter, nozzle, swirl	1	A
3	226 307	Nut, nozzle, swirl	1	

NOTE A: Use this adapter only with the standard swirl nozzle (234 XXX series and 322 XXX series).

6. Nozzle Cleaning Kit

Use the following chart to order components of the nozzle cleaning kit.

Part	Description	Quantity
901 934	Kit, nozzle cleaning	1
901 916	• Vise, pin	1
901 935	• Probe, vial (0.003 in.)	1
901 922	• Probe, vial (0.007 in.)	1
901 923	• Probe, vial (0.011 in.)	1
901 924	• Probe, vial (0.014 in.)	1

7. Nozzle Brush

Use the following part number to order a nozzle brush.

Part	Description	Quantity
901 905	Brush, nozzle	1

8. Programming Pointer Assembly

The programming pointer assembly is used as an aid for programming spray patterns.

Part	Description	Quantity
270 493	Pointer, O-ring, assembly, slim swirl	1
940 120	• O-ring, hotpaint, 0.375 x 0.500 x 0.063 in.	1

