PreciseCoat® Series

Nordson
ELECTRONICS SOLUTIONS

ASYMTEK

SC-400 PreciseCoat® Conformal Coating Jet

Owner's Manual

Revision 10

NOTICE

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1 Introduction

1.1 Overview

The SC-400 PreciseCoat Conformal Coating Jet is ideal for applying conformal coating materials to highly selective areas. This solution is designed for coating small substrates, substrates with high component density, and substrates where there are tight tolerances between coated and uncoated areas. The SC-400 jet reaches locations not accessible by other applicators, using a needle design with jetting action and fast pulse-width modulated control. Small volumes and better control of the material deliver a line width as small as 1.2 mm (0.05-inch) wide. The need for masking is eliminated because the flow is so closely controlled. Film thicknesses of 15 micrometers are achievable when using solvent-based materials.

Additional benefits of the SC-400 make its use in production even more valuable. Multiple dot sizes can be delivered from the same applicator, yielding small volumes with good volume control. The SC-400 also allows for clearance above large components on a board, and its performance is not affected by warped substrates. It is fully compatible with Select Coat Series Coating Systems.

This manual is intended primarily as a reference for trained process engineers and service technicians. However, others unfamiliar with Select Coat applicators may also find this manual useful as a general introduction.

1.2 Specifications

Table 1-1 Specifications

Specifications	
Operation	Electrically controlled, air open, spring close
Valve Pressure	448 kPa (65 +/- 5 psi)
Weight	500 gm (1.1 lb)
Typical Fluid Dispense Pressure	6.9 - 206.9 kPa (1 - 30 psi)
Max/Min Needle Length	13 mm (0.5-inch)/ 6 mm (0.25-inch)
Typical Coating Velocity	10 - 200 mm/sec (0.4 - 7.9 inch/sec)
Minimum On/Off Time (max frequency)	6 ms/6 ms (83.8 Hz.)
Fluid Feed System	Various options and material constructions available. Contact factory for more information. Typical: stainless steel components, PFTE hose, acetal fittings
Fluid Body	Aluminum
Fluid Seal	Rulon
Air Body	Aluminum
Solenoid	24 VDC, 5 watts
Software	Valve controlled by EasyCoat software

1.3 Dimensions

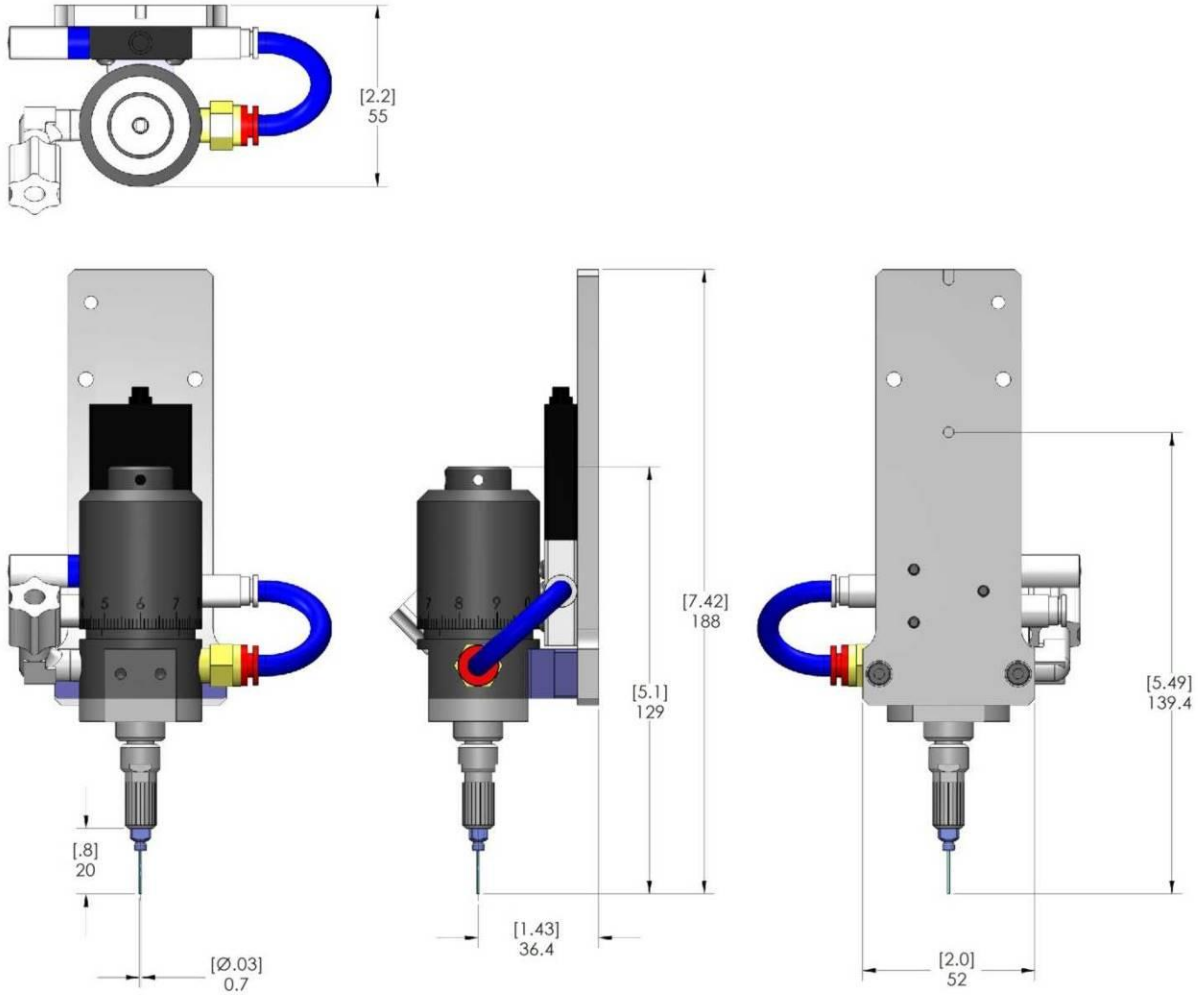


Figure 1-1 SC-400 Dimensions (mm)

2 Safety

2.1 Overview

This section is intended to provide basic safety information necessary for operating and servicing the SC-400 PreciseCoat Conformal Coating Jet. This section covers the following topics:

- Safety First
- Equipment Use
- Basic Safety Precautions and Practices
- Decommissioning
- Disposal
- Emergency Shutdown
- Safety Warning Labels

To further optimize safe operation, precautions and recommended practices are included with the procedures throughout this manual.

WARNING! Failure to comply with any of the safety recommendations could cause serious injury to the user or damage to the dispensing system.

NOTE Safety is considered a joint responsibility between the original equipment manufacturer (Nordson) and the end-user (owner). All safety precautions and practices should be in accordance with local regulations and facility policy.

2.2 Safety First

Coating system operation involves heat, air pressure, fluid pressure, mechanical and pneumatic devices, electrical power, and the use of hazardous materials. In addition to the safety precautions listed in this manual, refer to the safety section in the applicable coating system Installation, Operations, and Maintenance Manual prior to installing and operating the Select Coat applicator.

2.3 Equipment Use

2.3.1 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 misuse 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

2.4 Basic Safety Precautions and Practices

Compliance with the following recommended precautions and practices reduces the risk of personal injury or damage to property during applicator operation and maintenance.

WARNING! Failure to comply with any of the safety recommendations could cause serious injury to the user or damage to the coating system.

2.4.1 Safety of Personnel

- Only trained personnel should be permitted to perform installation, operation, maintenance, and troubleshooting procedures on the SC-400 PreciseCoat Conformal Coating Jet.
- There should always be a second person present when performing maintenance on a system that is powered up.
- Before performing maintenance or service on the SC-400 PreciseCoat Conformal Coating Jet, position the applicator at the front of the coating chamber. This will provide easy access to components and limit exposure to hazardous areas.
- Immediately push the red Emergency Machine Off (EMO) button on your coating system if personnel are in danger.
- Do not wear loose clothing or jewelry while operating the system. Tie back long hair to prevent it from being caught in moving parts.
- Do not touch moving parts while the coating system is operating.
- To prevent burn injury, wear thermal gloves when working around heater tooling and fluid heaters.
- Ensure all facility power sources are safely grounded.
- Routinely inspect all air hoses and electrical cables for damage.
- Ensure power cords and air supply hoses do not cross a walkway or aisle.
- Maintain a clean and orderly work area.
- Remove the SC-400 PreciseCoat Conformal Coating Jet completely from the coating system before cleaning or performing maintenance.
- Relieve pneumatic pressure before adjusting or servicing pressurized components.

2.4.2 Material Safety

- Follow Safety Data Sheet (SDS) recommendations for the proper handling, cleanup, and disposal of hazardous materials and fluids and their containers (i.e., syringes, cups, reservoirs, etc.) used with the coating system.
- Know the SDS recommendations for treatment of injury resulting from exposure to hazardous materials.
- Ensure the coating system ventilation is ON during handling and cleanup of all materials used with the coating system.

- Obtain the SDS from the applicable chemical supplier for chemical substances not provided with the equipment. These chemical substances include those used for processing, maintenance, and service of the equipment.
- Always wear appropriate Personal Protective Equipment (PPE) as recommended by facility safety practices and the material manufacturer's SDS.
- When working with multiple fluids, refer to the SDS to ensure the materials are compatible.
- If possible, save or recycle unused materials. Refer to the SDS before saving or recycling unused materials.
- DO NOT dispense toxic fluids (materials with a TLV of 200 ppm or lower).

2.4.3 Preventing Equipment and Workpiece Damage

- Immediately push the Emergency Machine Off (EMO or E-Stop) button on the coating system if the coating system, SC-400 PreciseCoat Conformal Coating Jet, or a workpiece is in danger of being damaged.
- Use standard Electrostatic Discharge (ESD) precautions when working near sensitive components. Always wear a grounding strap and connect it to the ESD ground before handling workpieces and/or equipment.
- Perform all recommended SC-400 PreciseCoat Conformal Coating Jet maintenance procedures at the suggested intervals.
- Immediately contain and clean up any caustic or conductive fluid spills as recommended in the material manufacturer's SDS.
- If fluid gets into internal portions of the SC-400 PreciseCoat Conformal Coating Jet (that are not normally wetted), immediately contact Technical Support.
- Use only replacement parts that are designed for use with the original equipment. Figure 7-1 contains illustrated parts list.

WARNING! The SC-400 PreciseCoat Conformal Coating Jet is a precision instrument of inherently simple and safe design. The use of any coating fluid and the related choice of solvent for cleaning, as well as all associated safety precautions, is the responsibility of the end-user. Refer to the SDS for recommendations on personal protective equipment and safety practices.

2.5 Decommissioning

Table 2-1 Recommended Decommissioning Procedures

Component	Disposition
Aluminum Parts	Recycle aluminum panels, shelves, doors, and hardware.
Steel Parts	Recycle steel parts and hardware.
Copper Wiring	Recycle copper wiring.
Electronic Components	Discard in accordance with local safety/environmental regulations.
Pneumatic Components	Recycle or discard in accordance with local safety/environmental regulations.

Component	Disposition
Printed Circuit Boards	Discard in accordance with local safety/environmental regulations.
Plastics	Recycle or discard in accordance with local safety/environmental regulations.

2.6 Disposal

Dispose of equipment and materials used in operation and servicing in accordance with local regulations.

Depending on the fluid dispensed and cleaning materials used, the following items may contain substances whose disposal might be regulated:

- Purge/Scale Cups
- Purge Boots
- Dispensing Needles/Nozzles
- Seats
- Luer Fittings
- Fluid Tubes
- Syringes

2.7 Emergency Shutdown

In the event of an emergency or malfunction, press the Emergency Machine Off (EMO or E-Stop) button on the coating system and perform the following steps:

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

2.8 Safety Warning Labels

Warning labels on your equipment point out areas where personnel must use extreme caution to prevent serious injury and property damage. Refer to the applicable coating system Installation, Operations, and Maintenance Manual for important safety information and dispensing system label locations.

WARNING! Comply with all safety warning labels on the coating system and optional equipment or serious injury to personnel or damage to the coating system may occur. Replace worn or damaged labels.

3 Installation and Configuration

3.1 Overview

The SC-400 PreciseCoat Conformal Coating Jet is designed for use on Select Coat Series Coating Systems. This section includes the following instructions:

- Unpacking the SC-400 Jet
- Installing the SC-400 PreciseCoat Jet
- Pneumatic, Electrical, and Fluid Connections
- Installing the Needle
- SC-400 EasyCoat Configuration

3.2 Safety First

Operation of the SC-400 PreciseCoat Conformal Coating Jet involves air pressure, electrical power, mechanical devices, and the use of hazardous materials. It is essential that every person servicing or operating the applicator fully understands all hazards, risks, and safety precautions. See *Section 2 - Safety* for additional information.

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

WARNING! Ensure the fluid system is completely depressurized prior to loosening any fittings in the fluid path. Failure to do so may cause serious injury to personnel.

3.3 Unpacking the SC-400 Jet

Every care has been taken when packaging the SC-400. However, we recommend that you look for obvious damage and verify contents against the packing slip.

Retain the case for storage of the SC-400 and accessories. Retain shipping cartons for future use. If an item needs to be returned to Nordson, obtain a Return Material Authorization (RMA) number from Technical Support, see *7.3 Parts Ordering Information*.

3.4 Installing the SC-400 PreciseCoat Jet

If the applicable applicator bracket is not installed on the Z-head, refer to the applicable coating system Installation, Operations, and Maintenance Manual for installation.

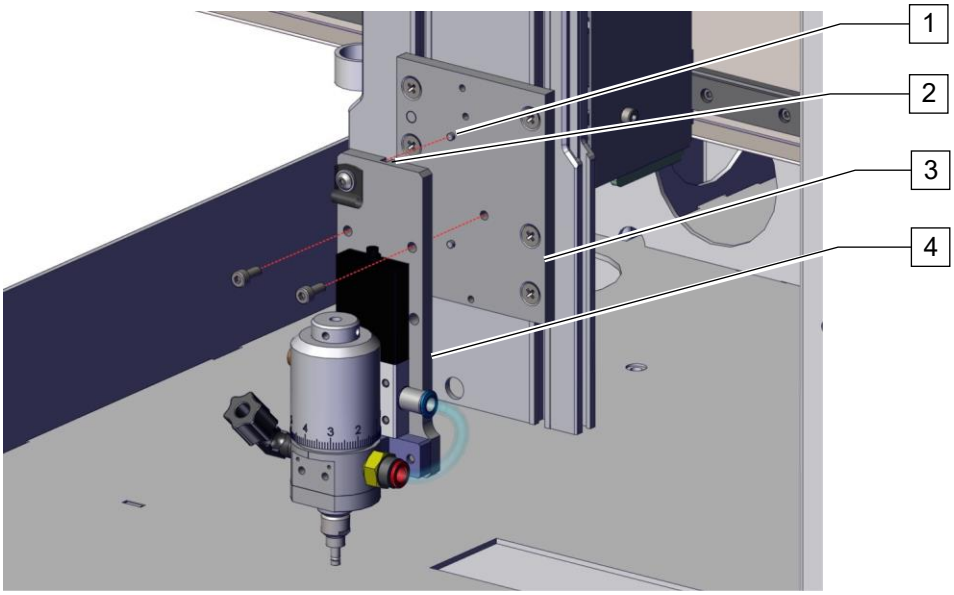
Tools and Materials Needed:

- Metric Allen Wrench Set
- Torque Wrench (0-50 in-lbs)

3.4.1 Single Applicator Bracket

To install the applicator:

1. Verify coating system is turned off. Press the **Stop** button on the front panel.
2. Open the front hood of the coating system.
3. Manually move the dispense head to the front of the coating system.
4. Align the alignment hole on the mounting plate of the SC-400 to the locating pin on the valve mount bracket (Figure 3-1).



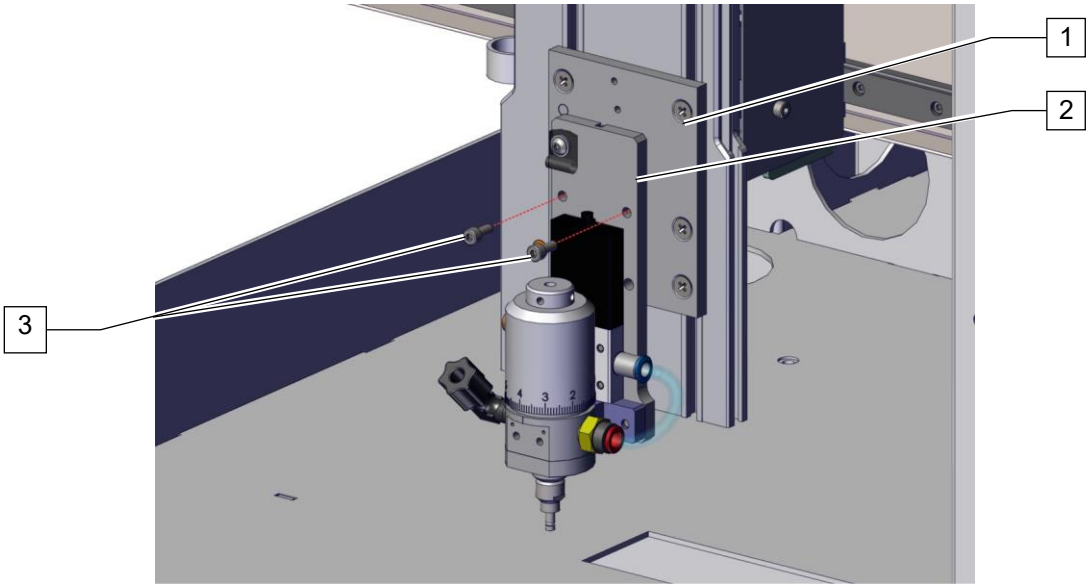
Item	Description
1	Locating Pin
2	Alignment Hole
3	Valve Mount Bracket
4	Mounting Plate (Item 28)

Figure 3-1 SC-400 Back Plate Alignment

5. Ensure there are no gaps between the mounting plate and valve mount bracket and adjust the position of the mounting plate until flush with the valve mount bracket (Figure 3-2).
6. Install the SC-400 to the valve mount bracket with two (2) screws and tighten.
7. Torque the two (2) screws to 2.82 Nm (25 in-lbs).

WARNING! Before tightening the screws, verify the mounting plate and valve mount bracket are flush with no gaps between them, or damage may occur.

8. Install the pneumatic, electrical, and fluid connections, see *3.5 Pneumatic, Electrical, and Fluid Connections*.



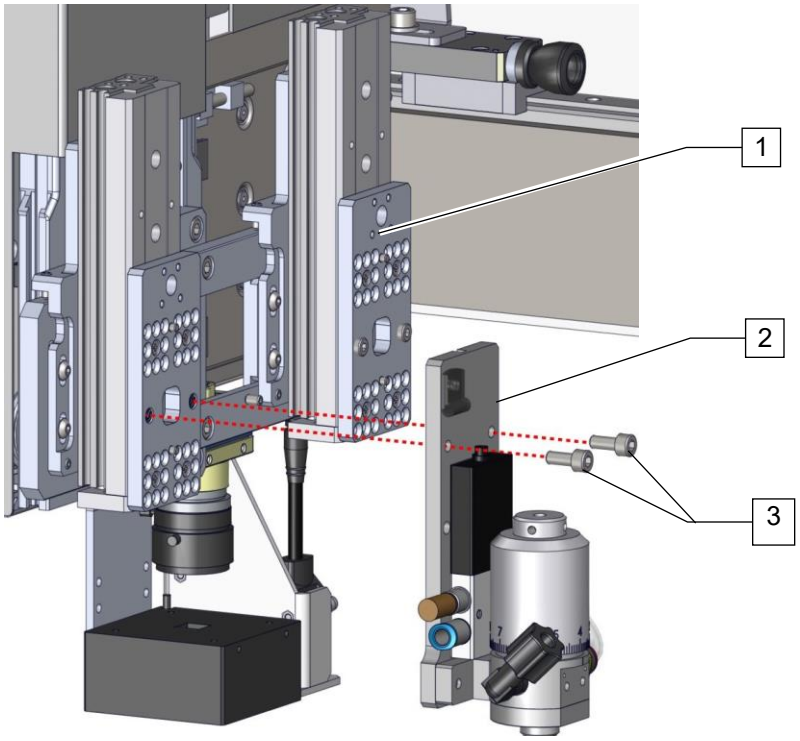
Item	Description
1	Valve Mount Bracket
2	Mounting Plate (Item 28)
3	Screws (2)

Figure 3-2 Installing the SC-400

3.4.2 Triple or Dual Applicator Bracket

To install the applicator (Figure 3-3):

1. Verify the coating system is turned off. Press the **Stop** button on the front panel.
2. Open the front hood of the coating system.
3. Manually move the dispense head to the front of the coating system.
4. Install two (2) screws securing the SC-400 mounting bracket to the applicator bracket.
5. Torque the two (2) screws to 2.82 Nm (25 in-lbs).
6. Install the pneumatic, electrical, and fluid connections, see *3.5 Pneumatic, Electrical, and Fluid Connections*.



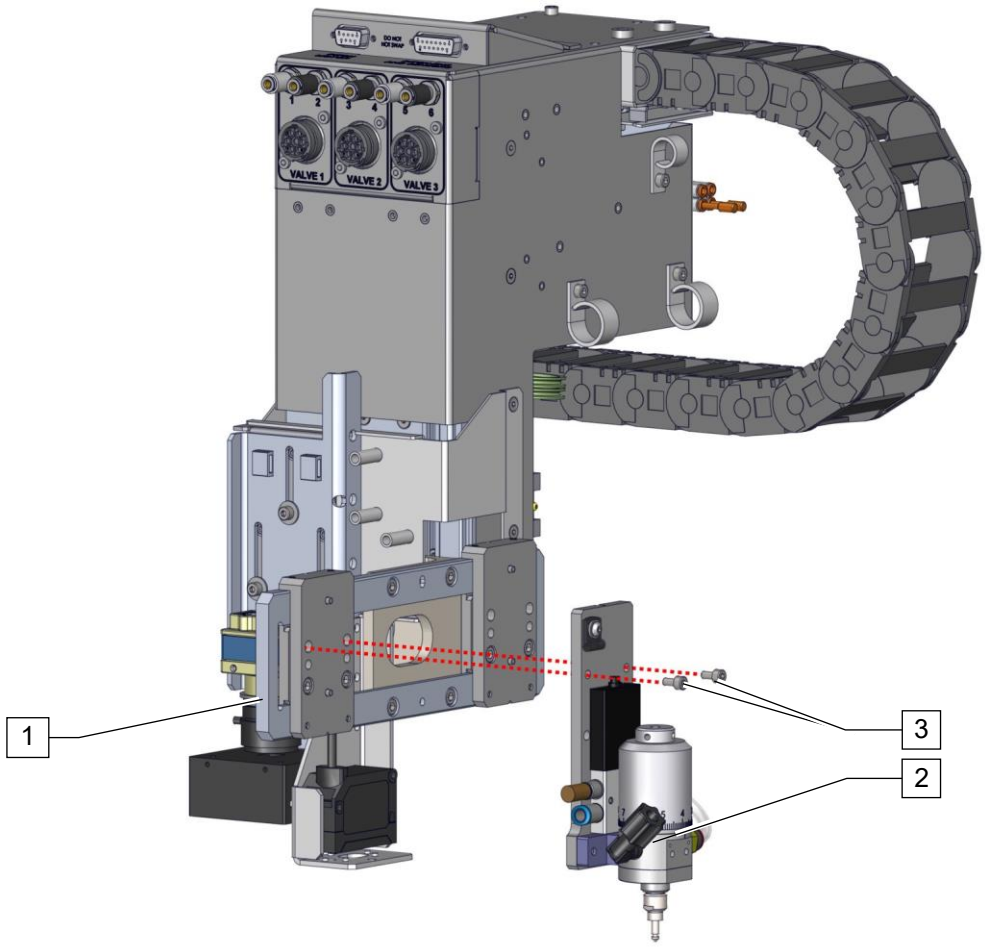
Item	Description
1	Triple Applicator Bracket
2	SC-400 Mounting Bracket
3	Screws (2)

Figure 3-3 Installing the SC-400

3.4.3 Triple or Dual Simultaneous Bracket in the Y-Axis

To install the applicator (Figure 3-4):

1. Verify the coating system is turned off. Press the **Stop** button on the front panel.
2. Open the front hood of the coating system.
3. Manually move the dispense head to the front of the coating system.
4. Install two (2) screws securing the SC-400 to the applicator bracket.
5. Torque the two (2) screws to 2.82 Nm (25 in-lbs).
6. Install the pneumatic, electrical, and fluid connections, see *3.5 Pneumatic, Electrical, and Fluid Connections*.



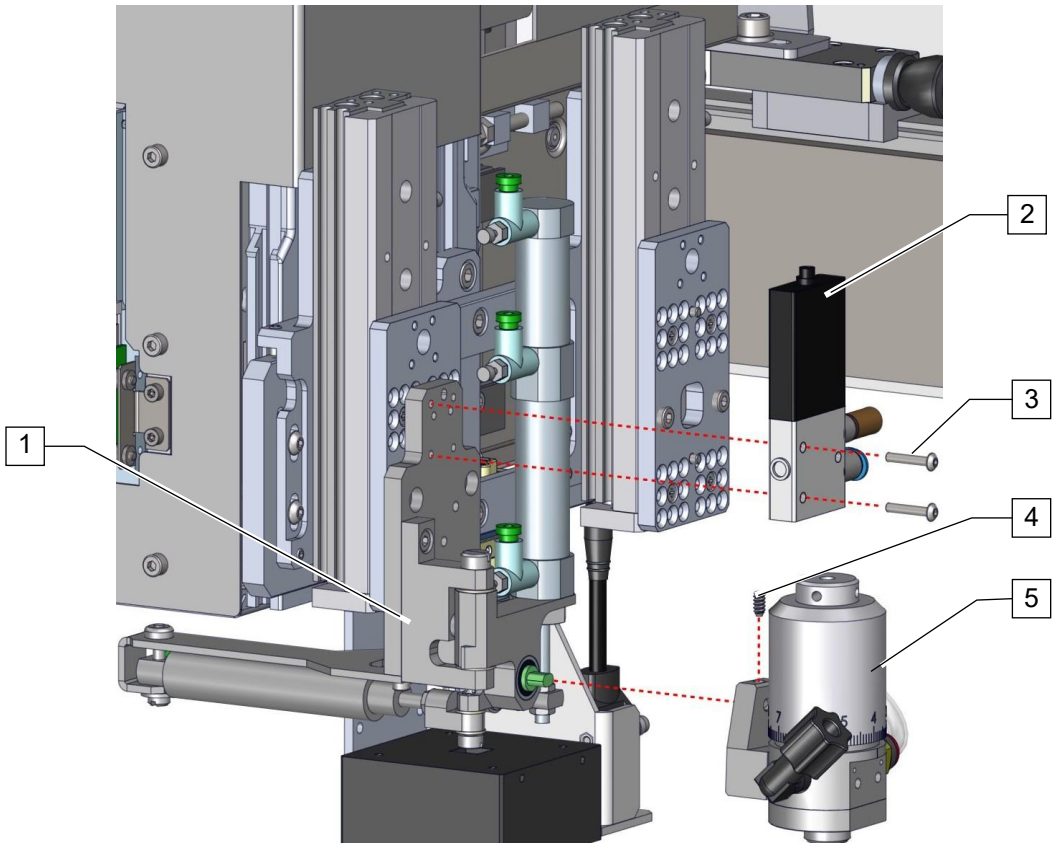
Item	Description
1	ESR, Brkt, Dual, Y-Axis, 94X
2	SC-400
3	Screws (2)

Figure 3-4 Installing the SC-400

3.4.4 Four Position Tilt and Rotate Mechanism

To install the applicator (Figure 3-5):

1. If not installed, install the four position tilt and rotate mechanism to the Z-head. Refer to the applicable coating system Installation, Operations, and Maintenance Manual.
2. Verify the coating system is turned off. Press the **Stop** button on the front panel.
3. Open the front hood of the coating system.
4. Manually move the dispense head to the front of the coating system.
5. Install the solenoid assembly to the four position tilt and rotate mechanism with two (2) screws.
6. Install the SC-400 on the tilt and rotate mechanism with one (1) set screw.
7. Torque the one (1) set screw to 2.82 Nm (25 in-lbs).
8. Install the pneumatic, electrical, and fluid connections, see *3.5 Pneumatic, Electrical, and Fluid Connections*.



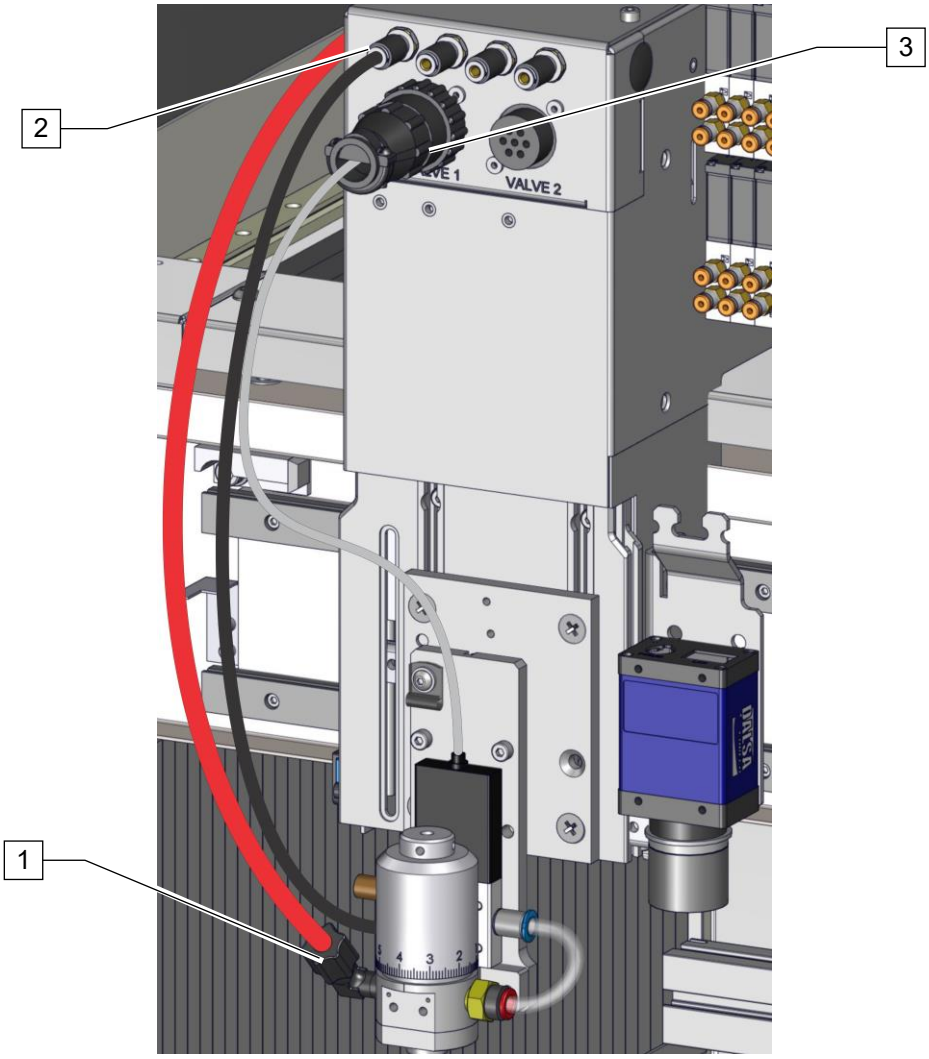
Item	Description	Item	Description
1	Kit, Rotate/Tilt, SC-300, 940	4	Set Screw
2	Assy, Solenoid, SC-400 (Item 33)	5	SC-400
3	Screws (2)		

Figure 3-5 Installing the SC-400

3.5 Pneumatic, Electrical, and Fluid Connections

To connect the pneumatic, electrical, and fluid connections (Figure 3-6):

1. Connect fluid line (red tubing) to the elbow on the applicator.
2. Connect the main air (clear tubing) to the blue quick-connect fitting on the bulkhead.
3. Connect the 9-pin electrical connector to the receptacle on the bulkhead.
4. Verify cables and connections are secured to account for the X, Y, and Z-axes motion of the robot.
5. Close the front hood of the coating system.
6. Install a needle, see *3.6 Installing the Needle*.



Item	Description
1	Fluid Line
2	Main Air
3	Electrical Connector

Figure 3-6 Installing the Lines and Electrical Connection

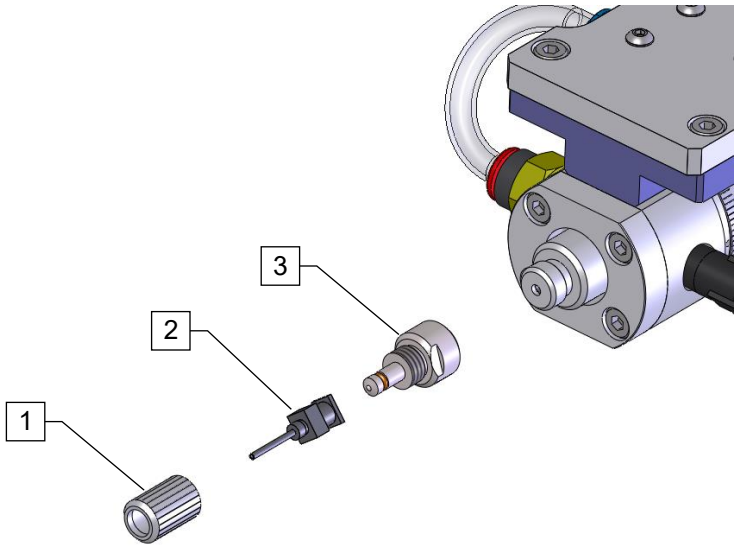
3.6 Installing the Needle

To install a needle (Figure 3-7):

1. If required, perform a service shutdown. Refer to the applicable coating system Installation, Operations, and Maintenance Manual.
2. Open the front hood of the coating system.
3. Manually move the dispense head to the front of the coating system.
4. Install the needle onto the nozzle adapter.
   > See (Items 38 - 41) for available needle options.
5. Install the retaining nut over the needle and tighten by hand onto the nozzle adapter.

WARNING! Do not use a wrench or pliers to tighten as damage may occur.

6. Insert the needle, retaining nut, and nozzle adapter onto the SC-400.
7. Close the front hood of the coating system.
8. Setup the SC-400, see *3.7 SC-400 EasyCoat Configuration*.



Item	Description
1	Retaining Nut (Items 23, 47, and 48)
2	Needle (Items 38 - 41)
3	Nozzle Adapter (Items 21, 47, and 48)

Figure 3-7 Disassembling the Needle

3.7 SC-400 EasyCoat Configuration

To configure EasyCoat for the SC-400:

1. Configure the EasyCoat software for the SC-400. Refer to the *EasyCoat User Guide* or EasyCoat Help for detailed instructions on software configuration.
2. Position the SC-400 at the purge cup by running the appropriate macro or moving the SC-400 to the front of the machine.
3. Adjust the fluid pressure and actuation pressure settings as appropriate depending on the fluid viscosity and application requirements needed to achieve the target flow rates.
4. Click on **Edit > Edit Mode** from the EasyCoat Operator Screen to open the Edit Screen.
5. From the EasyCoat Edit Screen, select **Utilities > Pressure Adjust > SC400 Applicator** (Figure 3-8).

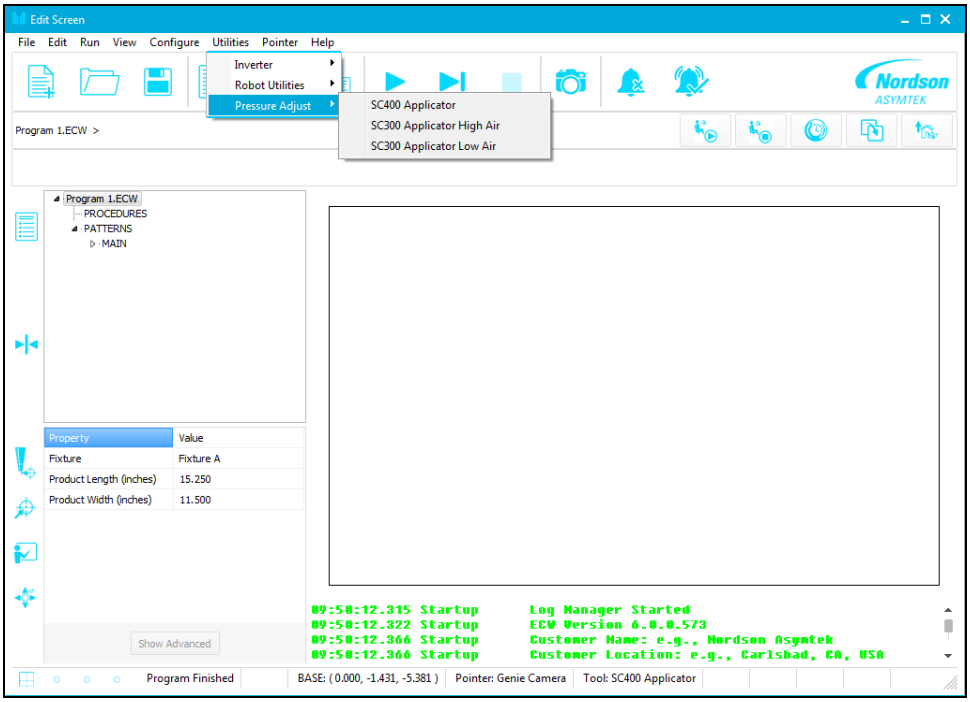


Figure 3-8 Utilities - Pressure Adjust (SC-400)

6. Select the applicable SC-400 tool.

   > The Pressure Outputs window opens.

7. Slide the pressure bars to achieve the desired pressures (Figure 3-9):

   a. Set Actuation Pressure to 458 kPa (65 psi).

8. Fill the reservoir with fluid. Refer to the applicable coating system Installation, Operations, and Maintenance Manual. If the viscosity control system is being used, refer to the applicable Viscosity Control System Manual.

9. Perform a priming routine. Refer to the applicable coating system Installation, Operations, and Maintenance Manual.

10. Perform optimization, see *4.5 Optimization*.

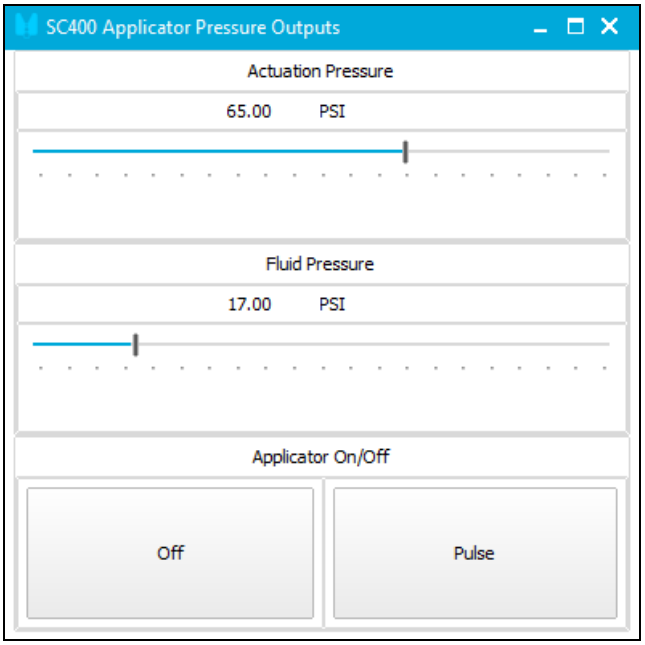


Figure 3-9 Pressure Outputs (SC-400)

4 Operation

4.1 Overview

This SC-400 PreciseCoat Conformal Coating Jet is designed for use on Select Coat Series Coating Systems. For complete system operating procedures, refer to the applicable coating system Installation, Operations, and Maintenance Manual. This section covers the following topics:

- Theory of Operation
- Control Components
- Optimization
- Modes of Operation
- Application Settings
- Parameter Settings

4.2 Safety First

Operation of the SC-400 PreciseCoat Conformal Coating Jet involves air pressure, electrical power, mechanical devices, and the use of hazardous materials. It is essential that every person servicing or operating the applicator fully understands all hazards, risks, and safety precautions. See *Section 2 - Safety* for additional information.

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

4.3 Theory of Operation

The SC-400 PreciseCoat Jet is a normally closed, air-actuated, spring-return mechanism, which uses a needle and seat to control precise volumes of material. Air, pressurized between 448 kPa (65 +/- 5 psi), is regulated by a high-speed solenoid to retract the needle assembly from the seat. Fluid, fed into the fluid body, flows through the seat at the tip of the needle. When the air is exhausted, the needle travels rapidly to the closed position.

4.4 Control Components

The following features affect performance of the SC-400 and are typically adjusted to fit your application. Contact Technical Support for additional information.

4.4.1 Fluid Pressure

Fluid pressure should be set so that the fluid flowrate leads to the appropriate coating thickness at the chosen robot speed. In general, higher fluid pressure results in a larger volume of material dispensed.

4.4.2 Stroke Adjustment/Micro-Adjust

The stroke adjustment controls the travel distance of the needle assembly. Turn counterclockwise to increase needle assembly travel, turn clockwise to decrease travel. An increase of travel distance will often result in a larger volume of material dispensed and will have an effect on the turn-on and turn-off characteristics of the dispense pattern. Each graduation mark on the stroke adjustment and cap is equal to .01 mm. One complete turn of the cap will equal 1 mm.

4.4.3 Solenoid Valve

The solenoid valve controls the SC-400 operation. When energized, it allows air in the air body to compress a spring and thereby raise the needle assembly. When de-energized, the air is released and the spring forces the piston down so that the needle tip contacts the seat.

4.4.4 Needle

The main factor controlling flowrate and coating thickness is a combination of needle diameter, needle length, fluid pressure, micro-adjust, and fluid viscosity. Needle size is determined based on the application and fluid properties. Other parameters are adjusted in accordance with needle choices.

4.4.5 EasyCoat Parameters

In addition to the SC-400 hardware configuration and settings, parameters are established within EasyCoat software to control the size, thickness, quality and location of coating spots, lines, and larger area coat patterns. Below is a list of available parameters and their effect on the coating result. For information on dispense parameters, refer to the *EasyCoat User Guide* or EasyCoat Help.

Table 4-1 Software Parameters and Typical Values

Recommended Settings		Comments
Parameter	**Value**	
Valve Pressure	65 psi	< 65 psi may result in the jet not fully opening. > 65 psi may result in the jet not closing at the end of each cycle.
Fluid Pressure	1-30 psi	Final value will depend on the fluid properties, needle gage, needle length, the micro-adjust setting and desired results.
Dispense Height	0.5-1 mm	Setting the dispense height too low risks dragging along the substrate. Setting the dispense height too high increases splash and reduces accuracy.
Speed (Line command)	1-100 mm/sec	In timing mode, the speed ultimately determines line width, thickness, and spacing. Not applicable in spacing mode.
Pass Width (Area Coat command)	0.5-5 mm	Adjust as required to achieve the desired results. Lower pass widths result in more overlap.
Start Distance (Line and Area Coat commands)	Automatic	Be sure to run a full Characterization process first.
Stop Distance (Line and Area Coat commands)	Automatic	Be sure to run a full Characterization process first.
On Time (Spot command)	0.010 seconds minimum	Longer On Times result in more spots fired at the same XY location. Adjust as required to achieve the desired results.
Duration (Timing Mode)	0.060 minimum	How long the jet is open (on) during each cycle.
Period (Timing Mode)	0.0120 seconds minimum	Total time between cycles. Period – Duration = Time remaining for the jet to fully exhaust before the next cycle begins. (Commonly referred to as “off time”).
Spacing (Spacing Mode)	.5-5 mm	Distance between dots along any given line. In Spacing Mode Dot cycle timing is ignored.

4.5 Optimization

Before the SC-400 can be used effectively, the parameters must be optimized to match the coating fluid's unique properties.

4.5.1 Program a Test Spot

To program a test spot:

1. Refer to the *EasyCoat User Guide or* EasyCoat Help and create a program to dispense a test spot into the End Idle cup. Use a spot time of 0.010 seconds and a dispense height at least 30 mm above the top rim of the cup.
2. Enter the following for the SC-400 tool parameters:
   a. On Time: 0.010 seconds
   b. Mode: Timing
   c. Period: 0.012 seconds
   d. Duration: 0.006 seconds
3. Set the SC-400 micro-adjust to 1/2 turn open.
4. Set Actuation Pressure to 448 kPa (65 psi).
5. Set Fluid Pressure to 69 kPA (10 psi).
6. Select **Run > Step** from the Edit Screen menu bar or select the **Step** button on the toolbar to dispense one spot and while closely observing the needle tip.
   > A single spot of coating fluid should eject from the needle into the End Idle cup.

NOTE Utilize a blacklight to assist the observation if your fluid contains UV tracer, or put a sheet of white paper under the needle tip when dispensing.

7. Optimization is complete if test spots are being dispensed each time by selecting the **Step** button. If not proceed to Step 8.
8. Increase the fluid pressure and repeat Step 6 until a dot is dispensed or you reach 345 kPa (50 psi) fluid pressure. If you reach 345 kPa (50 psi) fluid pressure and a dot is not dispensed, proceed to Step 9.
9. Reduce the fluid pressure to 0 kPa (0 psi) and open the micro-adjust counterclockwise one tick mark.
10. Repeat Step 5 through Step 7 until a dot is dispensed.
11. If the micro-adjust is opened one full turn, 345 kPa (50 psi) fluid pressure is achieved, and no dots are being dispensed, see *6.3 Troubleshooting Procedures.*

4.6 Modes of Operation

There are two different ways to use the SC-400, spacing mode and timing mode.

In spacing mode, line speed values are limited by the software relative to dot spacing, ensuring that lines are continuous from beginning to end. EasyCoat spaces the dots per the spacing value. Novice users are advised to begin using spacing mode.

In timing mode, jet frequency is fixed by the user settings. The jet will fire at the same frequency regardless of line speed. Thus, line speed ends up determining how far apart the dots will be spaced which ultimately controls the line's width and thickness.

Timing mode allows for greater flexibility and potentially higher UPH. Refer to the *EasyCoat User Guide* or EasyCoat Help for detailed instructions on programming. Contact Technical Support for more information on utilizing timing mode effectively.

4.7 Application Settings

Final setting depends on the fluid used and overall application requirements. These settings are intended as starting points if needed. Contact Technical Support for further development.

4.7.1 Tool Configuration Settings - Lines (Spacing Mode)

Table 4-2 Sample Application Settings - Lines (Spacing Mode)

Initial Settings		Comments
Category	**Unit**	
1. Valve Pressure	65 psi	
2. Stroke Adjustment/ Micro-adjustment	0.45 turns	• Adjust until a steady stream is produced (higher setting for higher velocities). • Smaller micro-adjust settings produce smaller lines. • Use a large micro-adjust for a higher repeatability.
3. Fluid Pressure	5 psi	Higher fluid pressure yields higher repeatability.
4. Spacing	2 mm	• Amount a dot should be ejected every 2 mm. • Longer OFF times ensure that the needle completely closes. • Longer ON times ensure that the valve completely fills with fluid.
5. Needle	20-gauge	Gauge is dependent on fluid viscosity.
6. Dispense Height	3 mm	Adjust the height if necessary. Lower heights are more repeatable.

4.7.2 Tool Configuration Settings - Dots (Timing Mode)

Table 4-3 Sample Application Settings - Dots (Timing Mode)

Initial Settings		Comments
Category	Unit	
1. Valve Pressure	65 psi	
2. Stroke Adjustment/ Micro-adjustment	0.4 turns	• Adjust until shots are consistent (higher setting for higher viscosities). • Smaller micro-adjust settings produce smaller dots. • Larger micro-adjust settings yield a higher velocity jet (i.e. more travel).
3. Fluid Pressure	4 psi	Fluid dependent.
4. Timing	5 ms / 15 ms	• OFF time needs to be long enough so a second shot is not produced. • Longer ON times will ensure that the valve completely fills with fluid.
5. Needle	20-gauge	Gauge is dependent on fluid viscosity.
6. Dispense Height	3 mm	Lower heights are more repeatable.
7. Spot Time	10 ms	Increase spot time for multiple dots in the same location.

4.8 Parameter Settings

See Table 4-4 for a list of settings that affect jet performance. Values are application dependent. Refer to the *EasyCoat User Guide* or EasyCoat Help for detailed software instructions. Values are saved in the EasyCoat configuration and program files. A column is provided for you to record your current settings.

Table 4-4 Hardware Settings

Location	Category	Unit	Current Settings
On Valve	Stroke adjustment	Graduated marks (1 mm) 1 full turn = 100 ticks	
Rear of system	Input Air Pressure	kPa (psi)	
Machine Front Panel	Fluid Pressure	kPa (psi)	
Machine Front Panel	Valve Pressure	kPa (psi)	

Table 4-5 Blank Parameter Table

Location	Parameter	Current Settings
In Software	Valve Pressure	
In Software	Fluid Pressure	
On Valve	Stroke Setting	
On Valve	Needle Size	
In Software	Dispense Height	
In Software	Pass Width	
In Software	Speed (Line)	
In Software	On Time (Spot)	
In Software	Duration (Timing Mode)	
In Software	Period (Timing Mode)	
In Software	Spacing (Spacing Mode)	
Measured	Flow Rate	

5 Maintenance and Service

5.1 Overview

Performing the recommended maintenance and service procedures at suggested intervals increases the life of your SC-400 Series PreciseCoat Jet and ensures high quality coating performance for every production run. This section contains the following procedures:

- Recommended Facility Items
- Removal and Cleaning the Needle
- Removing the SC-400
- Disassembly, Cleaning, and Assembly of the SC-400
- Removing and Replacing the Needle Seat Assembly
- Removing and Replacing the Solenoid Assembly
- Daily Needle Maintenance

5.2 Safety First

Operation of your SC-400 PreciseCoat Conformal Coating Jet involves air pressure, electrical power, mechanical devices, and the use of hazardous materials, and sometimes may involve heat. It is essential that every person servicing the dispensing system or components fully understands all hazards, risks, and safety precautions. See *Section 2 - Safety* for important safety information.

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

WARNING! Ensure the fluid system is completely depressurized prior to loosening any fittings in the fluid path. Failure to do so may cause serious injury to personnel.

5.3 Recommended Facility Items

In addition to the supplied accessories and tools, it is recommended that the following items be available at your facility:

- Personal Protective Equipment recommended in applicable SDS
- Bench Lamp and Magnifier Set
- Ultrasonic Cleaning System
- Air-gun and compressed, dry air
- Appropriate fluid collection and disposal container
- Solvent appropriate for the fluid used
- O-ring type lubricant
- Disposable towels, cleaning swabs and brushes

5.4 Routine Maintenance

Table 5-1 Routine Maintenance Procedures

Procedure	Frequency	Instructions
Clean needle	As needed	See *5.5 Removal and Cleaning the Needle*.
Flush Film Coater with appropriate solvent	Monthly	Refer to the applicable coating system Installation, Operations, and Maintenance Manual.
Clean and inspect shaft and body module	Every 6-12 months	1. Remove the SC-400 from the mounting bracket, see *5.6 Removing the SC-400*. 2. Soak the shaft and body module in the solvent used with the coating material. 3. Clean and dry the shaft and body. 4. Inspect the O-rings, thrust bearing, body, and needle seat assembly. Replace parts that are damaged or worn.

5.5 Removal and Cleaning the Needle

NOTE It is not necessary to remove the applicator from the coating system to replace or clean the needle.

To remove and clean the needle (Figure 5-1):

1. Depressurize the SC-400, see *5.6.1 Depressurizing the SC-400* and perform Step 1 through Step 11.
2. Wipe the fluid residue from the needle assembly.

WARNING! Follow the Safety Data Sheet (SDS) recommendations for all fluids used with the dispensing system. The SDS provides material usage instructions, disposal instructions, and safety precautions.

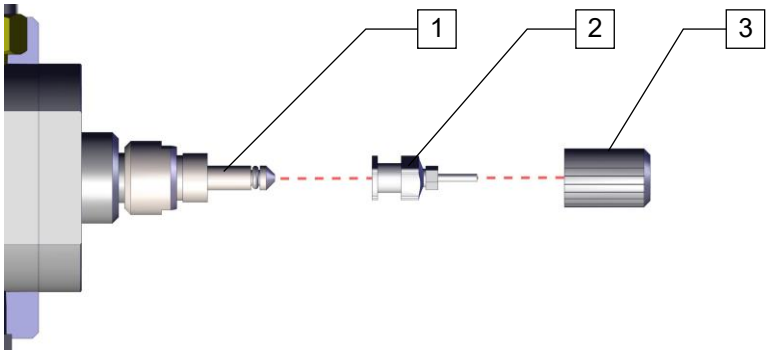
3. Remove the retaining nut and needle from the nozzle adapter by hand.

NOTE Residual fluid may flow from the SC-400.

4. Without rotating the nozzle adapter, install a spare needle of the same size and retaining nut onto the nozzle adapter.
5. Clean the initial needle with the appropriate solvent depending on fluid used and inspect thoroughly for damage before reusing.

WARNING! Use a needle brush to scrub the needle. Do not use a steel brush or any other type of brush that will damage the nozzle carbide tip.

6. Remove the retaining nut securing the spare needle.
7. Install the needle, see *3.6 Installing the Needle*.



Item	Description
1	Nozzle Adapter (Items 21, 47, and 48)
2	Needle (Items 38 - 41)
3	Retaining Nut (Items 23, 47, and 48)

Figure 5-1 Disassembling the Needle

5.6 Removing the SC-400

WARNING! Do not use metal objects when cleaning the wetted parts. Damage to these parts may result. Use the cotton swabs and brushes supplied in the service kit.

Tools and Materials Needed:

- SC-400 Start-Up Kit (Item 47)
- Parker O-Ring Lubricant
- PTFE Tape
- Phillips Screwdriver

5.6.1 Depressurizing the SC-400

To depressurize SC-400:

1. If the system is equipped with an optional brush box, run the appropriate macro to clean the needle, if not proceed to Step 2.
2. Flush the fluid system with an appropriate solvent. Refer to the applicable coating system Installation, Operations, and Maintenance Manual. If the viscosity control system is being used, refer to the applicable Viscosity Control System Manual.

NOTE If a solvent is used to flush the system, make sure the fluid lines are clean and dry before resuming operations.

3. Click on **Edit > Edit Mode** from the EasyCoat Operator Screen to open the Edit Screen.
4. From the EasyCoat Edit Screen, select **Utilities > Pressure Adjust > SC400 Applicator** (Figure 5-2).

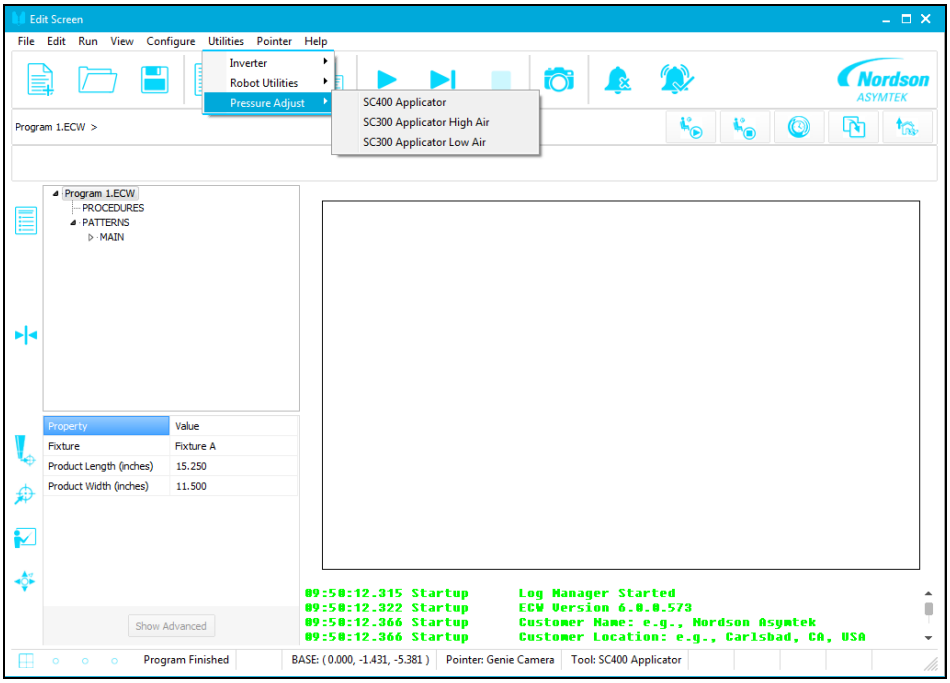


Figure 5-2 Utilities - Pressure Adjust Menu (SC-400)

5. Depressurize the fluid system using the fluid pressure switch located at the back of the coating system. If the coating system includes a circulating pump, turn the pump pressure switch to OFF to stop circulating the coating material. Refer to the applicable coating system Installation, Operations, and Maintenance Manual. If the viscosity control system is being used, refer to the applicable Viscosity Control System Manual.
6. Slide the fluid pressure bar to the left to reduce the SC-400 Fluid Pressure to 0 kPA (0 psi) prior to needle inspection, removal, cleaning, or replacement (Figure 5-3).
7. Position the SC-400 at the purge cup by running the appropriate macro or manually moving the SC-400 to the purge cup.
8. Toggle **the Applicator On/Off** button in the EasyCoat software to turn off the pressure.
   > No fluid should dispense. If fluid does dispense, continue to dispense until all residual pressure is relieved.

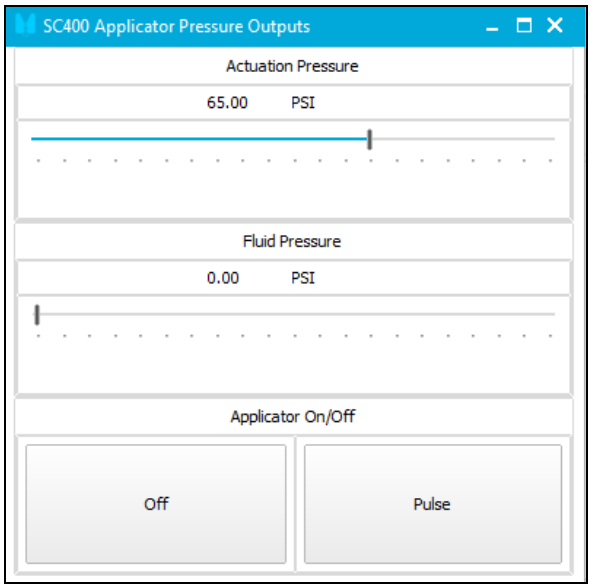


Figure 5-3 Fluid Pressure to Zero (SC-400)

9. Use the **Go To Front** button  to move the SC-400 to the front center of the dispensing area.
10. Open the front hood of the conformal coating system.
11. Lay towels or a cup under the SC-400 to collect fluid spills.
12. Disconnect the pneumatic, electrical, and fluid connections, see *5.6.2 Disconnecting the Pneumatic, Electrical, and Fluid Connections*.

5.6.2 Disconnecting the Pneumatic, Electrical, and Fluid Connections

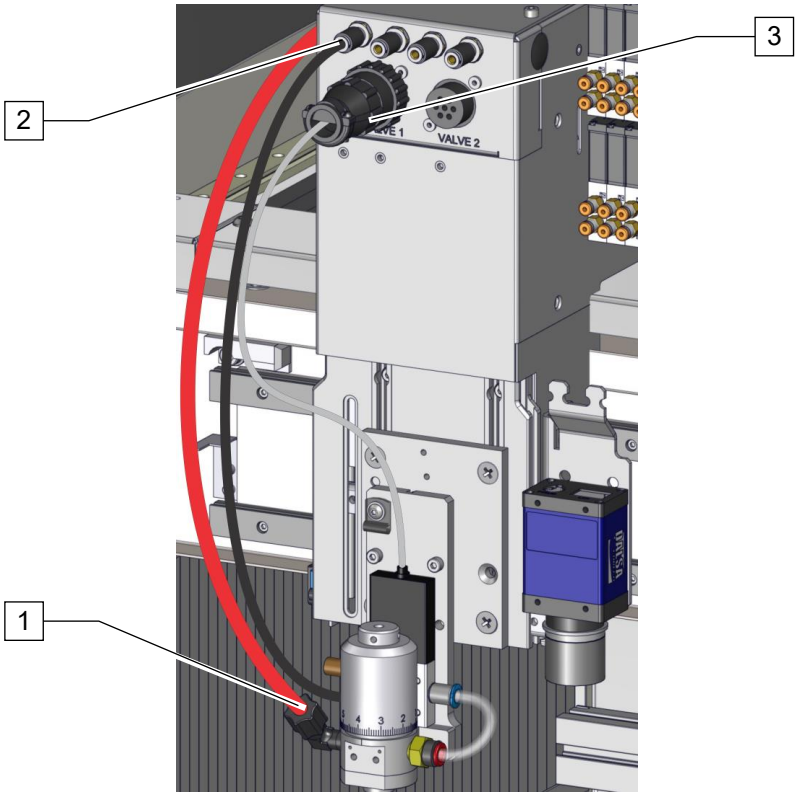
WARNING! Protect the solenoid valve and other non-wetted parts from contact with fluid. Do not immerse in solvent.

To disconnect the pneumatic, electrical, and fluid connections (Figure 5-4):

1. Depressurize the SC-400, see *5.6.1 Depressurizing the SC-400*.
2. Perform a service shutdown. Refer to the applicable coating system Installation, Operations, and Maintenance Manual.
3. Disconnect the electrical connection to the solenoid.
4. Disconnect the fluid line (red tubing) from the elbow fitting and place the fluid line over the purge cup for residual fluid.

NOTE If only the SC-400 is to be removed, seal the fluid system immediately using the appropriate cap or plug. Plugging the fluid lines prevents fluid curing due to air exposure.

5. Disconnect the main air (clear tubing) from the elbow fitting on the SC-400.



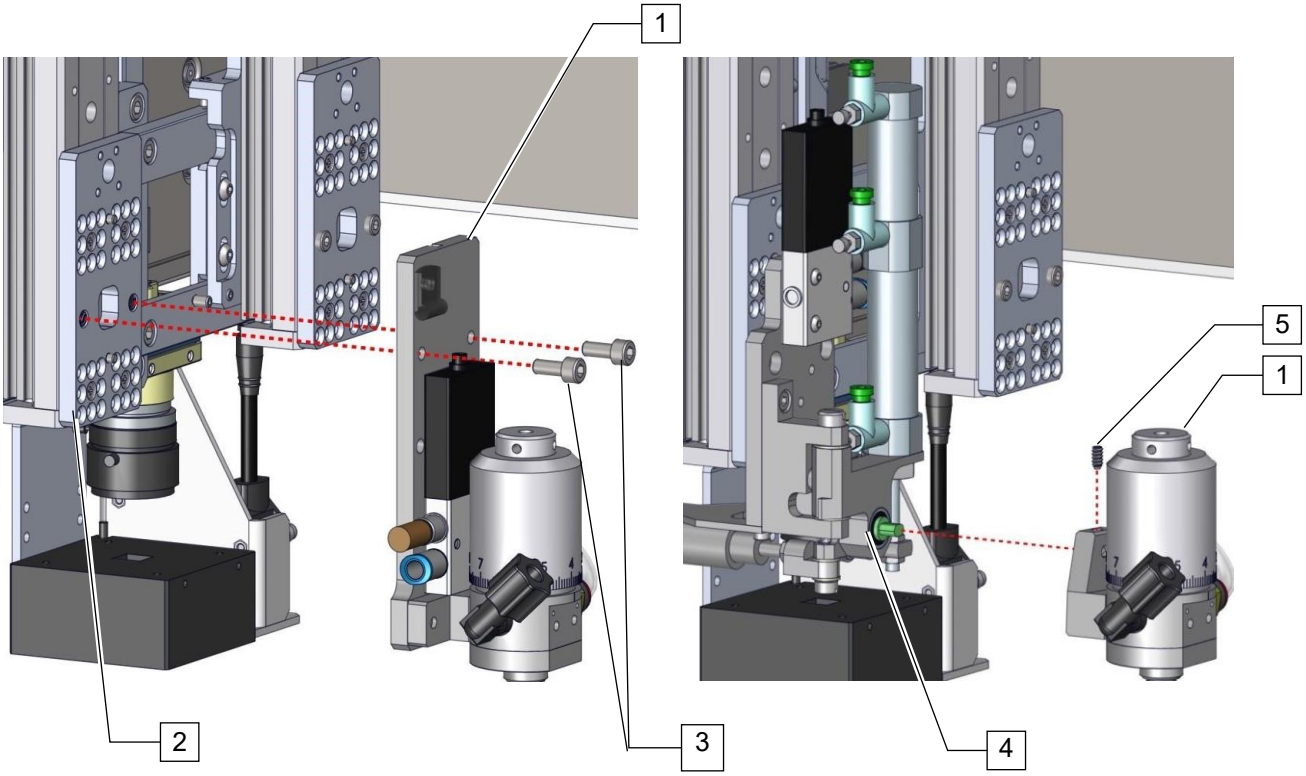
Item	Description
1	Fluid Line
2	Main Air
3	Electrical Connector

Figure 5-4 Disconnecting the Electrical, Fluid, and Pneumatic Lines

5.6.3 Removing the SC-400 from the Coating System

To remove the SC-400 (Figure 5-5):

1. Depressurize the SC-400, see *5.6.1 Depressurizing the SC-400*.
2. Disconnect the pneumatic, electrical, and fluid connections, see *5.6.2 Disconnecting the Pneumatic, Electrical, and Fluid Connections*.
3. If the fixed bracket is installed, remove two (2) screws securing the SC-400 to the applicator bracket. If the four position tilt and rotate bracket is installed, remove one (1) set screw securing the applicator to the applicator bracket.
4. Remove the SC-400 from the platform area.



Fixed Option **Four Position Tilt and Rotate Option**

Item	Description
1	SC-400
2	Triple Applicator Bracket
3	Screws (2)
4	Four Position Tilt and Rotate Mechanism
5	Set Screw

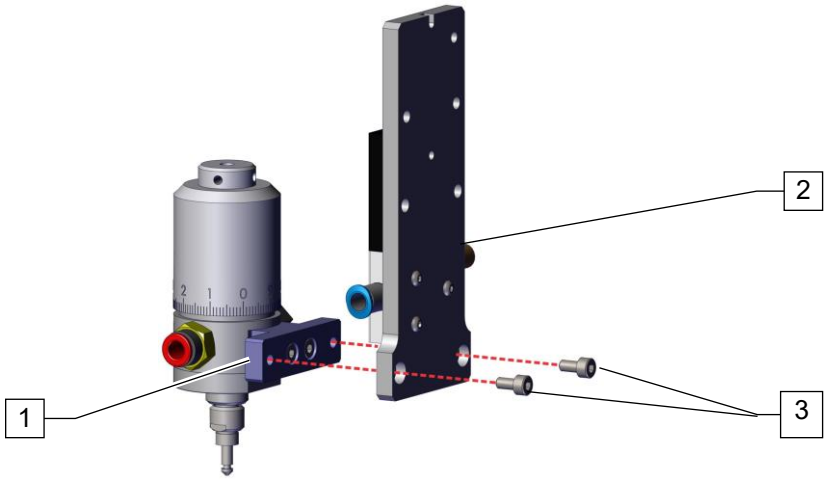
Figure 5-5 Removing the SC-400

5.7 Disassembly, Cleaning, and Assembly of the SC-400

5.7.1 SC-400 Disassembly and Cleaning

To disassemble and clean the SC-400:

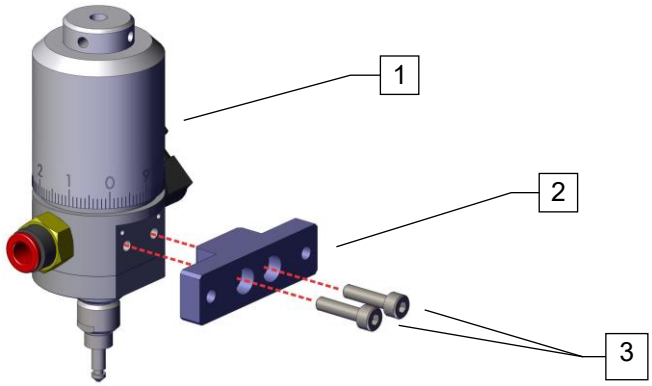
1. Remove the two (2) screws from the mounting bracket to the mounting plate (Figure 5-6). Skip to Step 2 if the SC-400 was mounted to the four position tilt and rotate mechanism.



Item	Description
1	Mounting Bracket (Item 24)
2	Mounting Plate (Item 28)
3	Screws (2)

Figure 5-6 Removing the SC-400 from the Mounting Plate

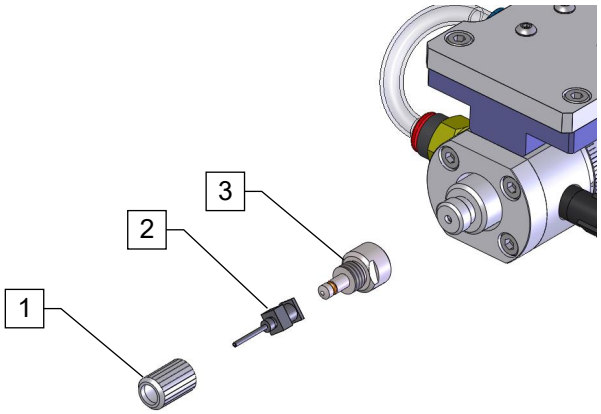
2. Remove the two (2) screws from the mounting bracket to the SC-400 (Figure 5-7).



Item	Description
1	SC-400 (Item 1)
2	Mounting Bracket (Item 24)
3	Screws (2)

Figure 5-7 Removing the SC-400 from Mounting Bracket

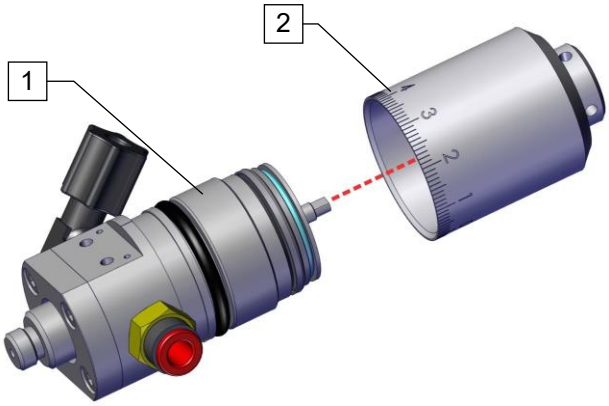
3. Remove the needle, retaining nut, and nozzle adapter and soak in appropriate solvent (Figure 5-8).



Item	Description
1	Retaining Nut (Items 23, 47, and 48)
2	Needle (Items 38 - 41)
3	Nozzle Adapter (Items 21, 47, and 48)

Figure 5-8 Removing the Retaining Nut, Needle, and Nozzle Adapter

4. Turn the micro-adjust air cap counterclockwise and remove from the SC-400 body (Figure 5-9).

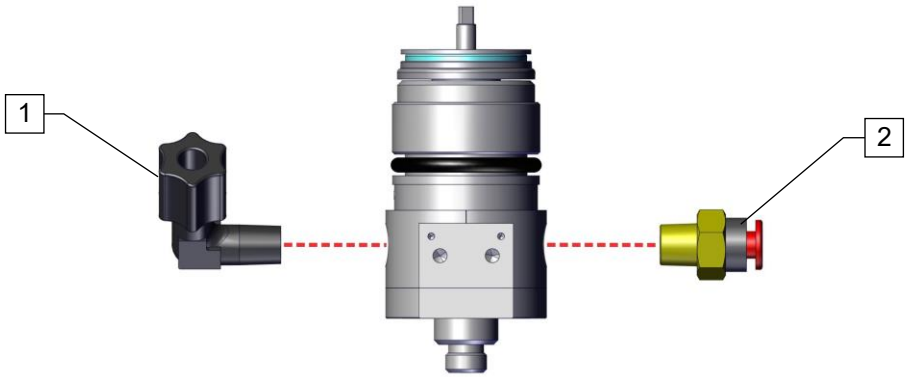


Item	Description
1	SC-400 Body
2	Micro-Adjust Air Cap

Figure 5-9 Removing the Micro-Adjust Air Cap

5. Remove the elbow from the SC-400 body and clean as appropriate (Figure 5-10).
6. Remove the male fitting from the SC-400 body and clean as appropriate.

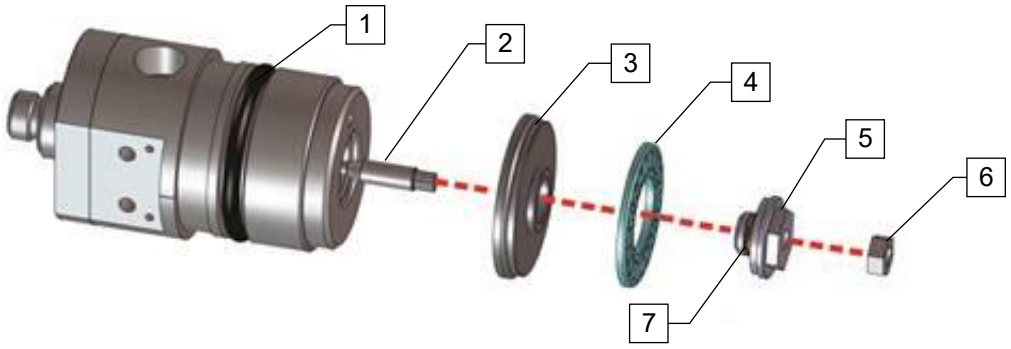
WARNING! Prevent the SC-400 body from contacting fluid as damage an occur. Replace or thoroughly clean the SC-400 body if there is contact.



Item	Description
1	Elbow
2	Male Fitting

Figure 5-10 Removing the Fittings

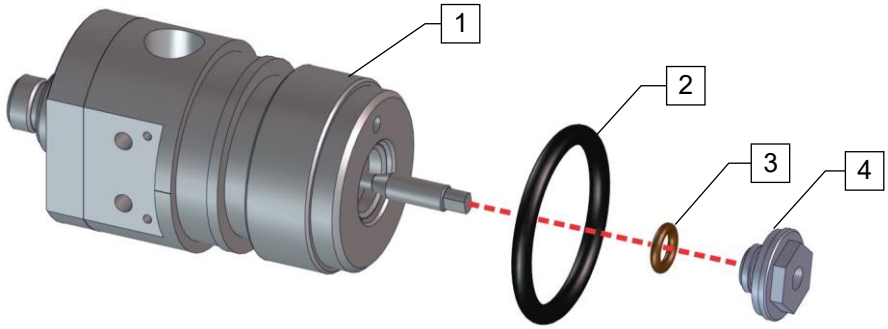
7. Use two (2) wrenches to loosen the lock nut from the seal lock nut (Figure 5-11).
8. Remove the lock nut, seal lock nut, thrust bearing, and piston assembly from the packing cartridge.



Item	Description	Item	Description
1	O-Ring (Items 10, 46, and 47)	5	Seal Lock Nut
2	Packing Cartridge	6	Lock Nut
3	Piston Assembly	7	O-Ring (Items 6, 46, and 47)
4	Thrust Bearing		

Figure 5-11 Removing the Packing Cartridge Components

9. Remove and discard the O-ring (Items 10, 46, and 47) from the SC-400 body (Figure 5-12).
10. Remove and discard the O-ring (Items 6, 46, and 47) from the seal lock nut.

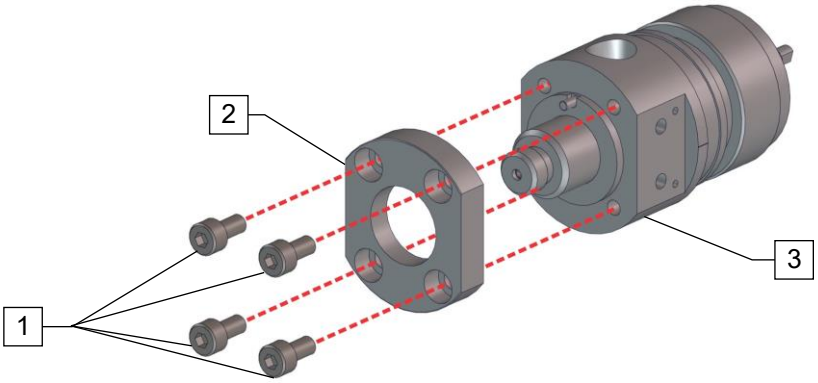


Item	Description
1	SC-400 Body
2	O-Ring (Items 10, 46, and 47)
3	O-Ring (Items 6, 46, and 47)
4	Seal Lock Nut

Figure 5-12 Removing the O-Rings

11. Remove the four (4) screws from the seat retainer (Figure 5-13).

12. Remove the seat retainer from the SC-400 body. Clean with the appropriate solvent as necessary.

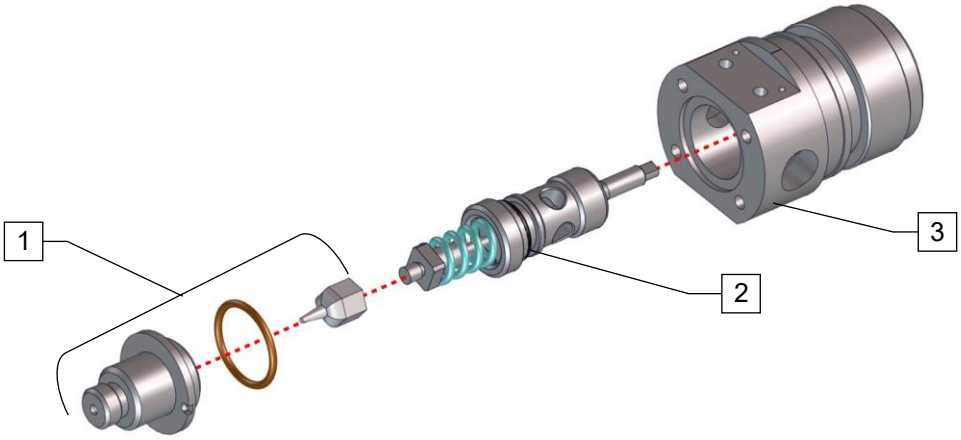


Item	Description
1	Screws (4)
2	Seat Retainer
3	SC-400 Body

Figure 5-13 Removing the Seat Retainer from the SC-400 Body

13. Remove the needle seat assembly and packing cartridge from the SC-400 body (Figure 5-14).

NOTE The packing cartridge can only be removed from the spring side.

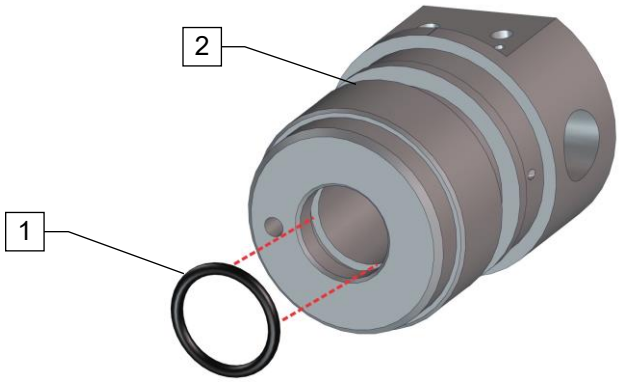


Item	Description
1	Needle Seat Assembly
2	Packing Cartridge
3	SC-400 Body

Figure 5-14 Removing Packing Cartridge from SC-400 Body

WARNING! Prevent the SC-400 body from contacting fluid as damage an occur. Replace or thoroughly clean the SC-400 body if there is contact.

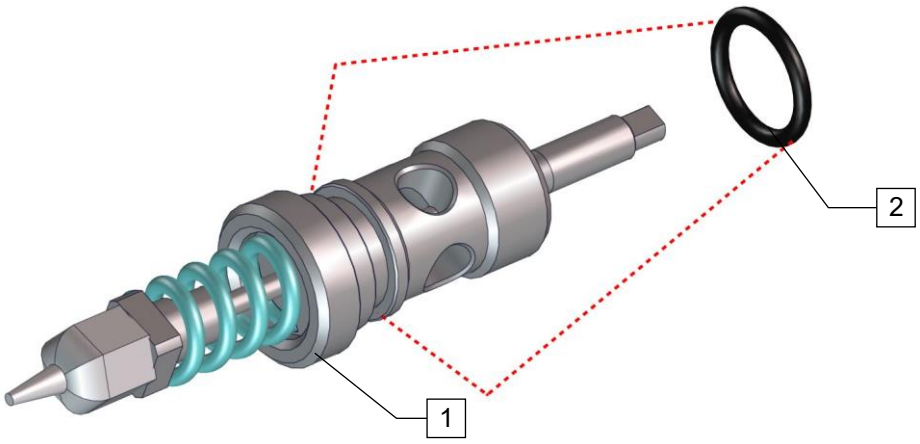
14. Remove and discard the O-ring from inside the SC-400 body (Figure 5-15).



Item	Description
1	O-Ring (Item 9, 46, and 47)
2	SC-400 Body

Figure 5-15 Removing O-Ring

15. Remove and discard the O-ring from the packing cartridge (Figure 5-16).



Item	Description
1	Packing Cartridge
2	O-Ring (Items 14, 46, and 47)

Figure 5-16 Removing the Needle Seat and O-Ring from the Packing Cartridge

16. Clean remaining wetted parts and inspect thoroughly for wear or damage.

5.7.2 SC-400 Assembly

To assemble the SC-400:

1. Apply a thin coat of O-ring lubricant to the O-ring (Item 9, 46, and 47) and insert into the SC-400 body (Figure 5-15).

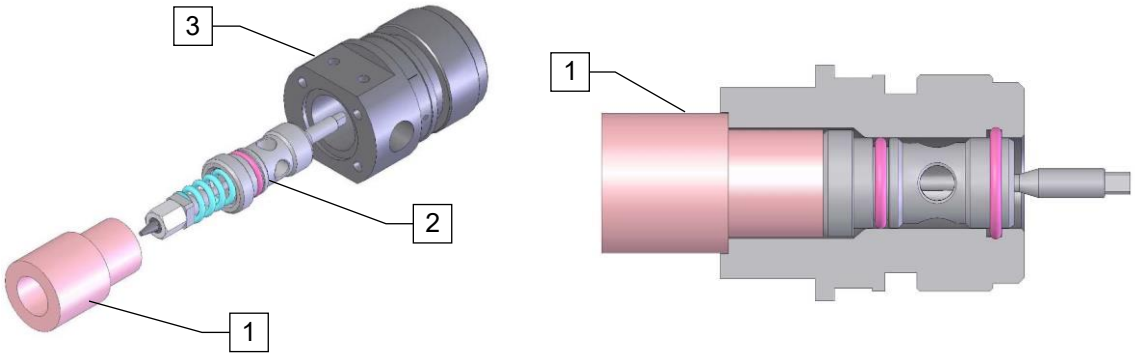
WARNING! Special care should be taken when handling O-rings and seals. If O-rings and seals are damaged, the film coater may leak or fail prematurely.

2. Install the needle seat onto the packing cartridge (Figure 5-16).
3. Apply a thin coat of O-ring lubricant to the O-ring (Items 14, 46, and 47) and slide onto the packing cartridge.

WARNING! Special care should be taken when handling O-rings and seals. If O-rings and seals are damaged, the film coater may leak or fail prematurely.

4. Insert the packing cartridge by hand using the cartridge insertion tool (Item 47) (Figure 5-17). Press in until the tool contacts the SC-400 body.

NOTE Cartridge insertion tool is packaged with the start-up kit (Item 47).



Item	Description
1	Cartridge Insertion Tool (Item 47)
2	Packing Cartridge
3	SC-400 Body

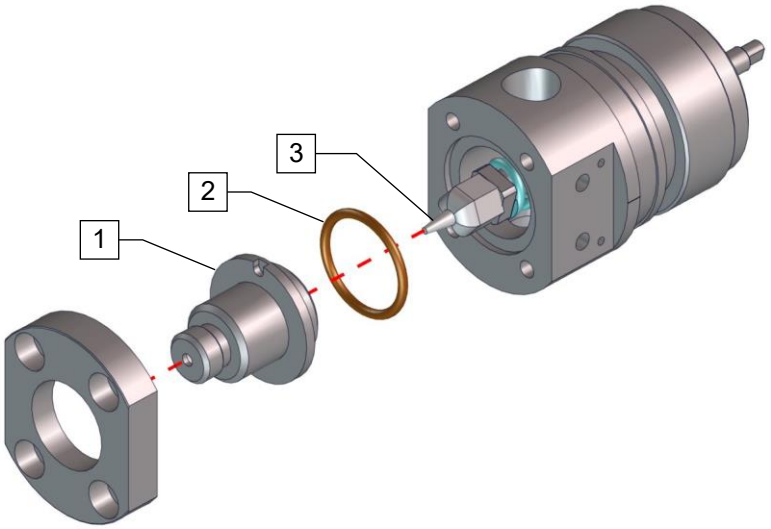
Figure 5-17 Packing Cartridge Assembly

5. Apply a thin coat of O-ring lubricant to the O-ring (Items 16, 46, and 47) and slide onto the seat (Figure 5-18).

WARNING! Special care should be taken when handling O-rings and seals. If O-rings and seals are damaged, the film coater may leak or fail prematurely.

NOTE The O-ring is packaged with the needle seat assembly (Item 17).

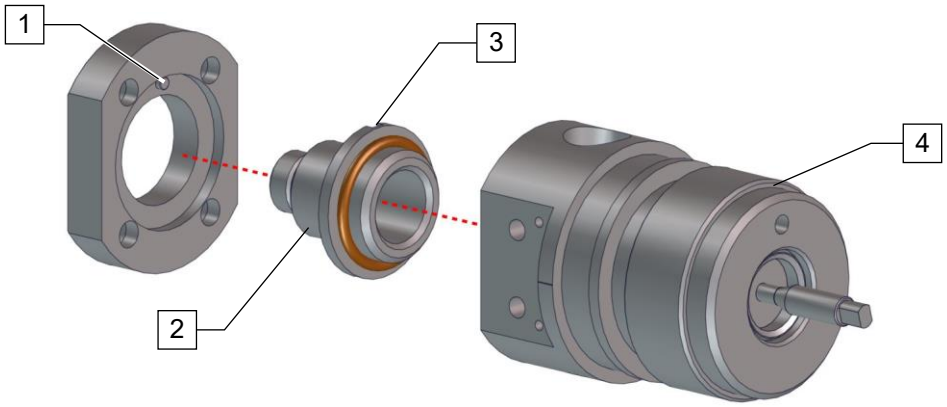
6. Install the seat retainer onto the needle seat.



Item	Description
1	Needle Seat Assembly (Item 17)
2	O-Ring (Items 16, 46, and 47)
3	Needle Seat

Figure 5-18 Aligning the Needle Seat with the Seat Retainer

7. Orient the alignment hole on the needle seat assembly with the SC-400 body alignment pin and insert the needle seat assembly onto the SC-400 body (Figure 5-19).



Item	Description
1	Alignment Pin
2	Needle Seat Assembly (Item 17)
3	Alignment Groove
4	SC-400 Body

Figure 5-19 Installing the Needle Seat Assembly to the SC-400 Body

8. Attach seat retainer to the SC-400 body using the four (4) screws (Figure 5-13).

NOTE Tighten the four (4) screws evenly to guide needle into seat.

9. Apply a thin coat of O-ring lubricant to the O-ring and install the O-ring (Items 10, 46, and 47) onto the SC-400 body (Figure 5-12).

WARNING! Special care should be taken when handling O-rings and seals. If O-rings and seals are damaged, the film coater may leak or fail prematurely.

10. Apply a thin coat of O-ring lubricant to the O-ring and install the O-ring (Items 6, 46, and 47) onto the seal lock nut (Figure 5-12).

WARNING! Special care should be taken when handling O-rings and seals. If O-rings and seals are damaged, the film coater may leak or fail prematurely.

11. Apply a thin coat of O-ring lubricant to the threads of the packing cartridge, the piston seal of the piston assembly, and all sides of the thrust bearing (Figure 5-11).

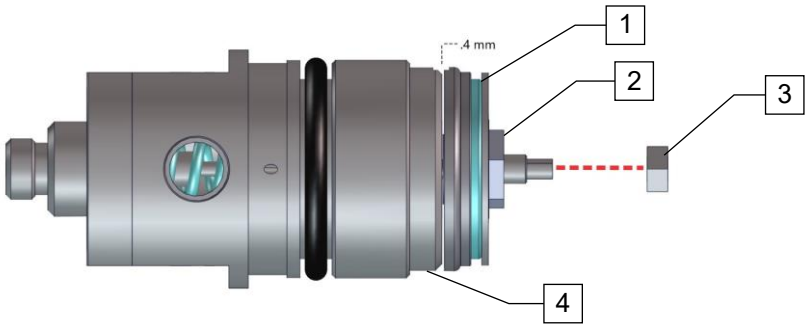
12. Install the lock nut, seal lock nut, thrust bearing, and piston assembly onto the packing cartridge.

13. Set the height of the piston assembly:
    a. Turn seal lock nut clockwise until it bottoms out against the SC-400 body (Figure 5-20).

    NOTE Stop turning the seal lock nut when you feel resistance.

    b. Turn the seal lock nut counter-clockwise 1/2 turn max.
        - This will set the gap to approximately 0.4 mm between the SC-400 body and the piston assembly.
    c. Install and tighten the lock nut.

    NOTE Ensure the seal lock nut does not move when tightening the lock nut.



Item	Description
1	Piston Assembly
2	Seal Lock Nut
3	Lock Nut
4	SC-400 Body

Figure 5-20 Setting Height of Piston Assembly

14. Apply PTFE tape to the elbow and install the elbow to the port where the spring is visible (Figure 5-10).
15. Install a male fitting to the opposite side of SC-400 body (Figure 5-10).
16. Apply a thin coat of O-ring lubricant to the edge of the piston assembly and threads of SC-400 body (Figure 5-9).
17. Install the micro-adjust air cap onto SC-400 body (Figure 5-9).
18. Install the SC-400 on the coating system, see *3.4 Installing the SC-400 PreciseCoat Jet*.
19. If a cap or plug was used to plug the fluid lines, remove the cap or plug.
20. Install the pneumatic, electrical, and fluid connections, see *3.5 Pneumatic, Electrical, and Fluid Connections.*
21. Install the needle, see *3.6 Installing the Needle*.
22. Verify cable and connections are secured to account for the X, Y, and Z axis motion of the robot.
23. Setup the SC-400, see *3.7 SC-400 EasyCoat Configuration*.
24. Perform optimization, see *4.5 Optimization*.

5.8 Removing and Replacing the Needle Seat Assembly

NOTE It is not necessary to remove the SC-400 from the coating system to clean the needle.

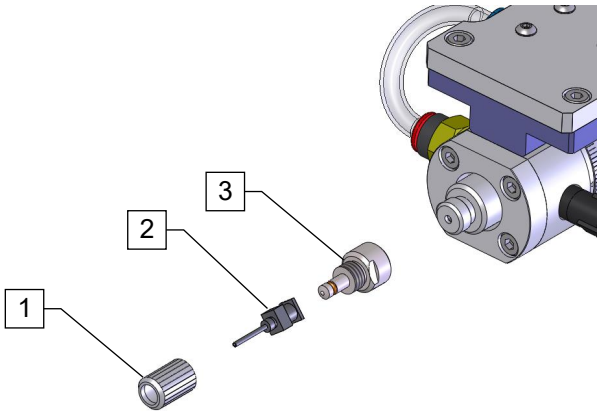
Tools and Materials Needed:

- 3 mm Hex Wrench
- 9/64-inch Hex Wrench
- Phillips Screwdriver
- Needle Seat Assembly (Item 17)

To remove the needle seat assembly:

1. Depressurize the SC-400, see *5.6.1 Depressurizing the SC-400* and perform Step 1 through Step 10.
2. Remove the needle, retaining nut, and nozzle adapter (Figure 5-21).

NOTE Residual fluid may flow from the SC-400.

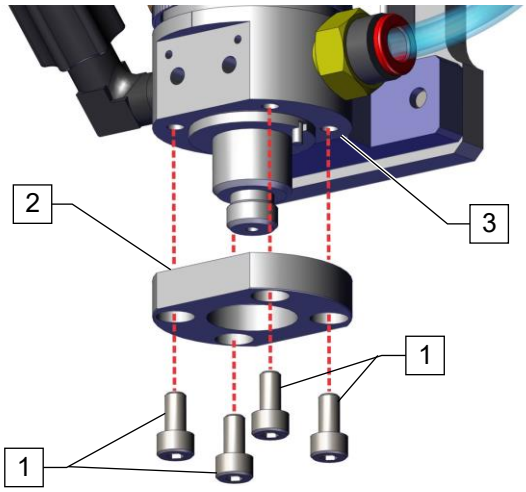


Item	Description
1	Retaining Nut (Items 23, 47, and 48)
2	Needle (Items 38 - 41)
3	Nozzle Adapter (Items 21, 47, and 48)

Figure 5-21 Removing the Retaining Nut, Needle, and Nozzle Adapter

3. Remove the four (4) screws from the seat retainer (Figure 5-22).
4. Remove the seat retainer from the SC-400 body.

NOTE Residual fluid may flow from the SC-400.

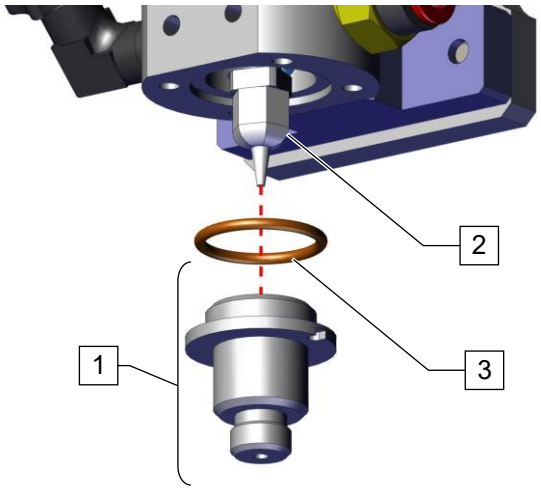


Item	Description
1	Screws (4)
2	Seat Retainer
3	SC-400 Body

Figure 5-22 Removing the Seat Retainer from the SC-400 Body

5. Remove the needle seat assembly from the packing cartridge (Figure 5-23).

NOTE Residual fluid may flow from the SC-400.



Item	Description
1	Needle Seat Assembly (Item 17)
2	Packing Cartridge
3	O-Ring (Items 16, 46, and 47)

Figure 5-23 Removing Packing Cartridge from SC-400 Body

To install the needle seat assembly:

NOTE There may be some residual fluid that may flow from the SC-400.

1. Apply a thin coat of O-ring lubricant to the O-ring (Items 16, 46, and 47) and slide onto the seat (Figure 5-23).

WARNING! Special care should be taken when handling O-rings and seals. If O-rings and seals are damaged, the film coater may leak or fail prematurely.

NOTE The O-ring is packaged with the needle seat assembly (Item 17).

2. Orient the alignment hole on the needle seat assembly with the SC-400 flange alignment pin and insert the needle seat assembly onto the SC-400 body (Figure 5-23).
3. Attach seat retainer to the SC-400 body using the four (4) screws (Figure 5-22).
4. Insert the needle, retaining nut, and nozzle adapter onto the SC-400 (Figure 5-21).
5. Close the front hood of the conformal coating system.
6. Setup the SC-400, see *3.7 SC-400 EasyCoat Configuration*.
7. Perform optimization, see *4.5 Optimization*.

5.9 Removing and Replacing the Solenoid Assembly

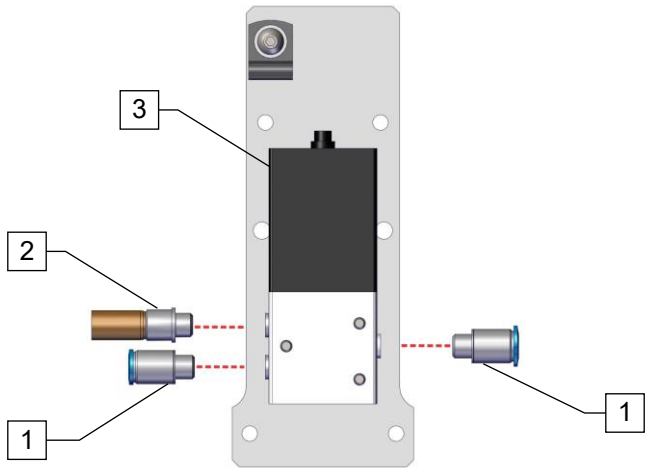
WARNING! Protect the solenoid assembly and other non-wetted parts from contact with fluid. Do not immerse in solvent.

Tools and Materials Needed:

- 3 mm Hex Wrench
- Phillips Screwdriver
- 9/64-inch Hex Wrench

To remove the solenoid valve:

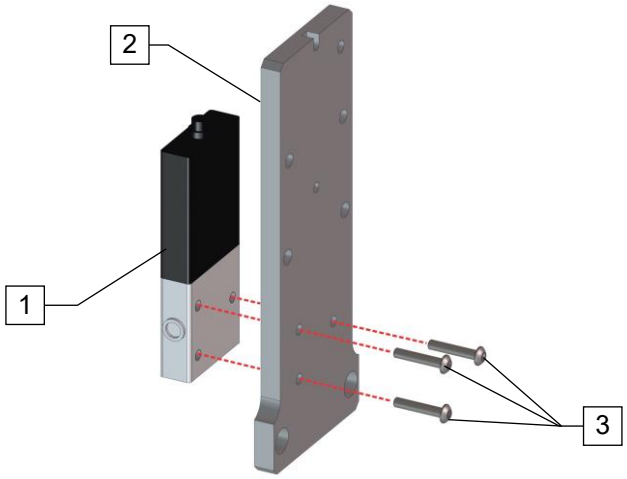
1. Depressurize the SC-400, see *5.6.1 Depressurizing the SC-400*.
2. Disconnect the pneumatic, electrical, and fluid connections, see *5.6.2 Disconnecting the Pneumatic, Electrical, and Fluid Connections*.
3. Remove the SC-400 from the coating system, see *5.6.3 Removing the SC-400 from the Coating System*.
4. Remove the two (2) screws from the mounting bracket to the mounting plate (Figure 5-6).
5. Remove the silencer and the two (2) male fittings from the solenoid assembly (Figure 5-24).



Item	Description
1	Male Fittings (2)
2	Silencer
3	Solenoid Assembly

Figure 5-24 Removing the Fittings

6. Remove the three (3) screws holding the solenoid assembly to the mounting plate (Figure 5-25).



Item	Description
1	Solenoid Assembly
2	Mounting Plate
3	Screws (3)

Figure 5-25 Removing the Solenoid Assembly

To install the solenoid assembly:

1. Install the three (3) screws securing the solenoid assembly to the mounting plate (Figure 5-25).
2. Install the silencer and the two (2) male fittings into the solenoid assembly (Figure 5-24).
3. Install the two (2) screws securing the mounting bracket to the mounting plate (Figure 5-6).
4. Install the SC-400 to the coating system, see *3.4 Installing the SC-400 PreciseCoat Jet*.
5. Connect the pneumatic, electrical, and fluid connections, see *3.5 Pneumatic, Electrical, and Fluid Connections*.
6. Verify cable and connections are secured to account for the X, Y, and Z axis motion of the Z-head.
7. Close the front hood of the conformal coating system.
8. Setup the SC-400, see *3.7 SC-400 EasyCoat Configuration*.
9. Perform optimization, see *4.5 Optimization*.

5.10 Daily Needle Maintenance

If the needle is not maintained properly, quality and needle performance will be affected. Therefore, routine needle maintenance procedures become a crucial component. The coating system platform comes equipped with integrated needle maintenance tools. Frequency of occurrence can be programmed to time or board count. Each routine can also be executed or demand at any time. For information on programming the macros, refer to the *EasyCoat User Guide* or EasyCoat Help.

5.10.1 Solvent Cup

The solvent cup is meant to be filled with solvent. Anytime the SC-400 is not dispensing, the needle should be submerged in the solvent.

5.10.2 Purge Cup

The purge cup is for purging of any solvent left inside or outside the needle after it is withdrawn from the solvent cup. This is to ensure a clean start on the first coating instruction.

5.10.3 Brush Box

Some coating materials may require more aggressive cleaning that will require the use of the brush box. The brush box is a metal box with a brush inside. The bristles face upward for a pre-programmed subroutine can be run to automatically scrub the needle’s tip back and forth across the bristles. Solvent can be added to the brush box to enhance the cleaning process.

5.10.4 Overnight Shutdown

If production is not running continuous operations, the nozzle tip can be left in the solvent cup overnight or until the next shift begins. Otherwise remove the needle and drop the needle in a closed solvent cup for storage.

6 Troubleshooting

6.1 Overview

To quickly identify problems, look for obvious signs such as burnt, missing, damaged, or loose parts, as well as obstructions and spills. Recurring problems indicate there may be other root causes. Table 6-1 through Table 6-3 identify troubleshooting symptoms, recovery procedures, hierarchy, and setup variables. These procedures cover only the most common problems that you may encounter. If you cannot solve the problem with the information given here, contact Technical Support.

NOTE Refer to the *EasyCoat User Guide* or EasyCoat Help for recovery procedures pertaining to EasyCoat.

6.2 Safety First

Operation of the SC-400 PreciseCoat Conformal Coating Jet involves air pressure, electrical power, mechanical devices, and the use of hazardous materials. It is essential that every person servicing or operating the applicator fully understands all hazards, risks, and safety precautions. See *Section 2 - Safety* for additional information.

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

WARNING! Ensure the fluid system is completely depressurized prior to loosening any fittings in the fluid path. Failure to do so may cause serious injury to personnel.

WARNING! DO NOT hot swap connections when working with electrical and pneumatic power supplies. Turn the main circuit breaker off before disconnecting the external power plug from the facility.

6.3 Troubleshooting Procedures

Table 6-1 SC-400 Troubleshooting

Symptom	Possible Cause	Recovery
SC-400 does not actuate	Dry mode enabled	Check button and software selection.
	Control cable plugged into wrong socket	Switch to the other one.
	Control cable open	Replace SC-400.
SC-400 actuates but no fluid comes out	Reservoir depressurization	Check switch position.
	No fluid pressure	Check pressure settings.
	Micro-adjust closed	Open it.
	Needle clogged	Clean or replace, *5.5 Removal and Cleaning the Needle*.
Chronic needle contamination and/or clogging	Poor needle maintenance	Clean needle, *5.5 Removal and Cleaning the Needle*.
Bubbles in coating	Improper purging	Run priming routine. Refer to the applicable coating system Installation, Operations, and Maintenance Manual.
	Excessive fluid pressure	Reduce pressure.
Dripping from needle tip	Wrong hardware or parameters	Contact Technical Support.
No Fluid Dispensed	Fluid-related problems	Replace fluid. Refer to the applicable coating system Installation, Operations, and Maintenance Manual. If the viscosity control system is installed, refer to the applicable Viscosity Control System Manual.
	Clogged needle	Clean wetted components.
	Air in fluid path	Prime for a continuous period. Refer to the applicable conformal coating system Installation, Operations, and Maintenance Manual.
	Worn or damaged needle	Replace needle, *5.5 Removal and Cleaning the Needle*.
	Solenoid stuck or frozen	Replace solenoid, if defective, see *5.9 Removing and Replacing the Solenoid Assembly*.
	Electrical connection	Reseat the connections and inspect the pins.
	Pneumatic connection	Verify pneumatic tubing is properly connected. Verify that both facility and valve air pressure is adequate.
Poor Quality Dispensing	Any of the causes above	As above.
	Changed software settings	Check program parameters and valve configuration values.
	Worn or damaged needle	Replace needle, *5.5 Removal and Cleaning the Needle*.

Symptom	Possible Cause	Recovery
	Damaged needle assembly	Check for wear or damage upon disassembly and replace as indicated.
Leakage of air	Worn or damaged solenoid	Replace solenoid, see *5.9 Removing and Replacing the Solenoid Assembly*.
	Improper assembly	Reassemble, see *5.7.2 SC-400 Assembly*.
Irregular Sound	Pneumatic connection	Verify pneumatic tubing is properly connected. Verify that both facility and valve air pressure is adequate.
	Improper assembly	Reassemble, see *5.7.2 SC-400 Assembly*.

Table 6-2 SC-400 Troubleshooting Hierarchy

Inputs to Valve	Outputs	Notes
Fluid	Dispense flowrate and spray pattern	If this is a new process, contact Technical Support for assistance in process development. If this is a qualified process, fluid properties may have changed. The fluid may have been mishandled or set-up incorrectly, or could be beyond the normal storage life. In addition, air bubbles are a common problem with fluids that are handled, for example poured from one container to another. Improper handling can introduce air to the fluid supply, which results in intermittent shots.
Fluid Pressure		Verify that the fluid supply has been set up correctly and that fluid is free to flow through to the SC-400. Verify the pressure settings are correct. Insufficient fluid pressure results in small shot volumes. Too much fluid pressure leads to larger shot volumes.
Valve Pressure	Consistent On/Off times	To get a consistent response time for the Valve On and Off function, the valve air pressure should be 448 kPa (65 +/- 5 psi).
Solenoid Control Signal	Audible valve actuation	A worn solenoid will move slowly or not at all, which leads to poor quality or no dispensed volume. The solenoid is a 2-wire device. Failure modes include “open” and “short”. If wiring to the solenoid is open, it will not fire. If there is a short, drive circuitry will shutdown.

Table 6-3 SC-400 Troubleshooting Setup Variables

Component	Quality	Troubleshooting Questions
Needle	Size and cleanliness	Is it the correct size? Was the old needle replaced? Was it cleaned completely? Does a new needle have the same behavior?
Stroke Adjustment	Adjustment position	Was the stroke adjustment assembly removed? Was the zero point set correctly? Is the needle assembly worn or damaged, and is it free to travel to the seated position?
Fluid body packing set	Location and orientation	Was the packing set damaged during cleaning? Was it replaced? Does a new set have the same behavior?
Connections	Location and orientation	If the SC-400 was removed from the system and disassembled, was it re-assembled in a correct and repeatable way? Was it installed correctly?
Unacceptable dispense pattern	Verify On/Off times are to process specification	Review On/Off times per process specification.

7 Parts Replacement

7.1 Overview

This section contains parts lists and exploded view drawings that will aid in ordering replacement parts for the SC-400 PreciseCoat Jet.

WARNING! Parts replacement should only be performed by a trained service technician. Nordson assumes no liability for personal injury or property damage that may occur as a result of spare parts being replaced by a non-certified technician.

7.2 Safety First

Operation of the SC-400 PreciseCoat Conformal Coating Jet involves air pressure, electrical power, mechanical devices, and the use of hazardous materials. It is essential that every person servicing or operating the applicator fully understands all hazards, risks, and safety precautions. See *Section 2 - Safety* for additional information.

WARNING! DO NOT hot swap connections when working with electrical and pneumatic power supplies. Turn the main circuit breaker off before disconnecting the external power plug from the facility.

7.3 Parts Ordering Information

7.3.1 Placing Your Order

Customers can order spare parts by contacting Customer Service. Contact information is listed in the front of this manual. Spare parts can also be ordered online through our Internet Web Store. To set up a web store account, send an email to americas.es.cs@nordson.com.

When ordering parts, be prepared to provide the following information:

- Your Company Name
- Shipping Address
- Purchase Order Number
- Coating System Serial Number (found on back panel)
- Billing Address
- Part Number and Description of Part
- Quantity
- Shipping Instructions with Collect Account Number

7.3.2 Shipping Instructions

When ordering parts, specify which carrier you prefer to use and provide your shipping account number. If no instructions are received, Technical Support will determine the best shipping method and items will be shipped prepaid with the shipping charge added to the invoice.

7.4 Warranty

Contact Technical Support for any warranty issues pertaining to spare parts. Wear items and consumables are covered under warranty against manufacturer defect only. Expected lifetimes for these parts will vary based upon application and use.

Consumable parts are generally considered as parts that are replaced on a frequency of > 1 per calendar year under expected regular usage. In most cases, these parts are “wetted parts” that make contact with the dispensed fluid. Wear items are those items that have been identified to have limited life expectancy (less than 5 years) but are not considered consumables. Wear items are often highly application dependent, high user-touch, or adjusted parts.

7.5 Credit and Exchanges

Contact Technical Support for credit or exchanges of recommended spare parts or refurbished components (components restored to original specifications but not sold as new).

7.5.1 Return Material Authorization

Contact Technical Support to obtain a Return Material Authorization (RMA) before returning any parts.

NOTE Find your local Technical Support contact on the web page, www.nordsonasymtek.com.

7.6 Record Keeping

The type of service performed should be recorded in the dispensing system maintenance records. Dates, part numbers/serial numbers of replaced parts, names of technicians, and other pertinent data should be recorded.

7.7 Unpacking and Inspecting Replacement Parts

Replacement parts are shipped to distributor or customer facilities in individual shipping cartons. Review the packing slip to ensure that the correct parts were received. Contact Technical Support if any discrepancies are discovered.

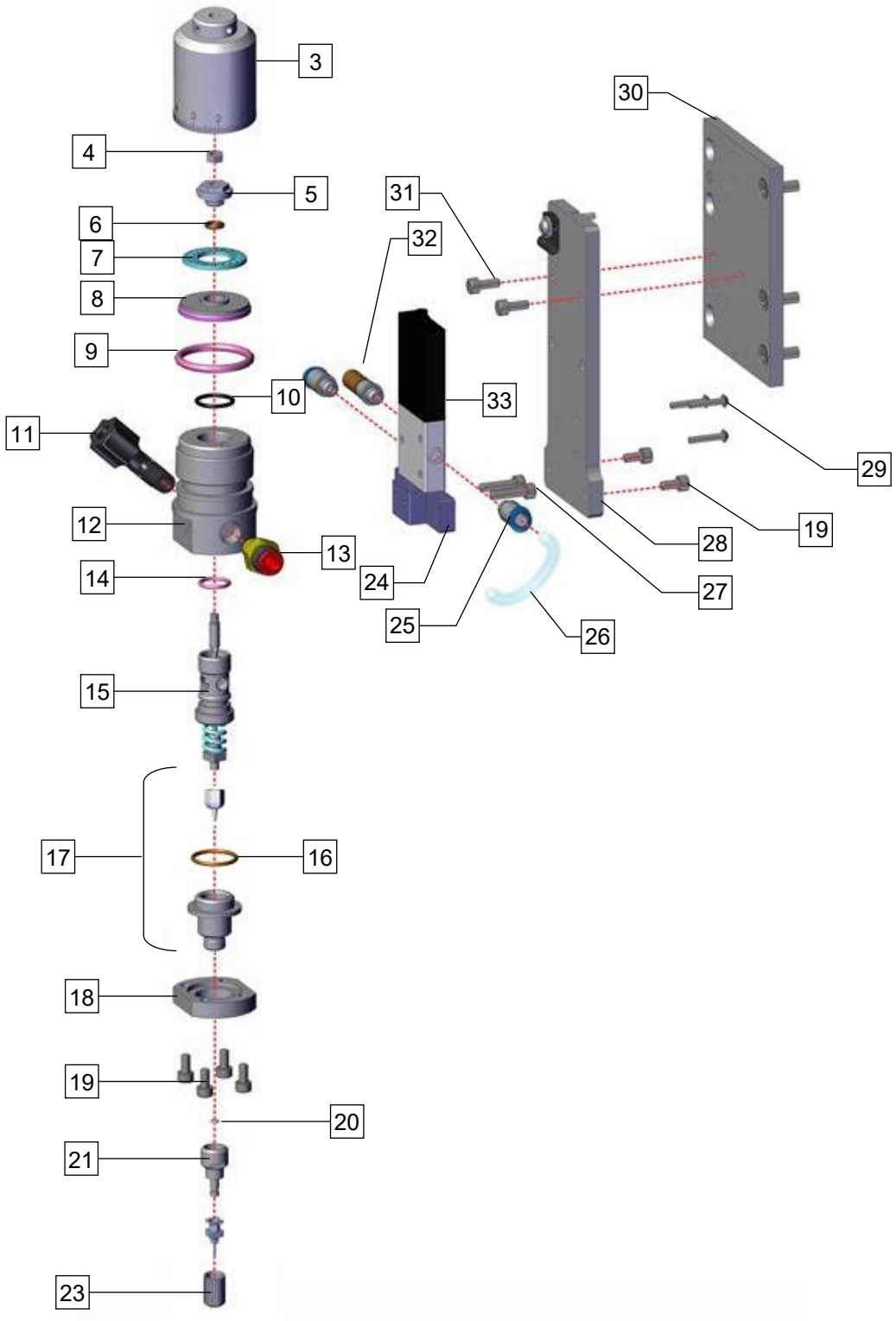
Before unpacking your spare parts, visually inspect the carton for damage. If applicable, check the ShockWatch and the Tip N’ Tell stickers for indications of improper shipping and handling. Inform the freight carrier of any damage.

7.8 Cleaning and Inspection

Always clean the area made visible after a failed part is removed from the dispensing system. Inspect the area for signs of what may have caused the part to fail. This may help prevent future part damage. When removing parts that will be reinstalled, visually inspect them for damage. If undamaged, retain them for reinstallation. Replace damaged parts and hardware as appropriate.

7.9 Spare Parts List

Use the following tables to locate the item number corresponding to a procedure in this technical manual. Nearly all spare parts are sold as part of a spares kit, with a few exceptions. To order parts, access www.nordson.com/electronics, use the search feature to search for a kit part number or part description to locate the appropriate spares list, and follow the instructions in that file to complete the ordering process. Contact Technical Support for questions.



Kit Part Number	Kit Name	Item Number	Part Description	Quantity
7211541	**KIT, SERVICE, SC-400**	**46**		
		8 (incl.#4)	PISTON ASSEMBLY, H20	1
		15	CARTRIDGE,PACKING,SS,U CUP	1
		6	O-RING, VITON, 208 ID X 0.70W, BR	1
		14	O-RING, VITON	1
		9	O-RING, VITON, BLK, .562 X .688	1
		16	O-RING	1
		10	O-RING, P28	1
		7	BEARING, THRUST, 15 X 28 MM	1
		17	NEEDLE SEAT, A7A-S, SUS	1
		8 (incl.#4)	SEAL, LOCK NUT	1
7211542	**KIT, START-UP, SC-400**	**47**		
		35	CARD,TEST SELECT COAT SYSTEM(PKG OF 100)	1
			BRUSH, TUBE, 1/4X6"	1
			BRUSH,TUBE,.02'	3
			CLEANING BRUSH, DV-2000	5
			WRENCH,ALLEN,HEX,3MM	1
			TOOL,SEAL REMOVAL,PLASTIC	1
			ASSY, NZLADAPTER,SS,SC-400/SC-280	1
			TOOL,INSERTION,PACKING CART	1
			WRENCH,ADJ,MODULE	2
		6	O RING,VITON,.2081D X .070W,BR, 10409	1
		14	O RING,VITON, .438X .563X.0063	1
		9	O RING,VITON,BLK .562X .688,10415	1
		16	O RING,VITON,.6761D X .070W,BR	1
		10	O-RING,P28	1
		15	CARTRIDGE,PACKING,SS,U CUP	1
6113932	**ASSY, NZL ADAPTER, SS, SC-400/SC-280**	**48**		
		20	O-RING, KALREZ, .070 ID X .04 W	
		23	NUT, RETAINING, NEEDLE ADAPTER	
			TOOL, O-RING, SC-400 ADPT	
		21	NOZZLE ADAPTER, SS, SC-400	
6139389	**KIT, SERVICE, SC-400, CIRC, CONE**			
		8 (incl.#4)	PISTON ASSEMBLY, H20	1
		15	CARTRIDGE,PACKING,SS,U CUP	1
		6	O-RING, VITON, 208 ID X 0.70W, BR	1
		14	O-RING, VITON	1
		9	O-RING, VITON, BLK, .562 X .688	1
		16	O-RING	1
		10	O-RING, P28	1
		7	BEARING, THRUST, 15 X 28 MM	1
			SEAT,NDL,A7A-S,SUS,CRCL,CONE	1
			SEAL, LOCK NUT	1
6655247	**KIT, O-RING, SC-400**			
		9	O-RING, VITON, BLK, .562 X .688	2
		10	O-RING, P28	3
		14	O-RING, VITON	3
		16	O-RING	4

6655248	**RETAINER, SEAT, SC400**			
		18	RETAINER,SEAT,SC-400	1
		19	SCREW, M4 X 0.7, SOCKET CAP,X8	4
6655249	**MNT, BRACKET, W/SOLENOID, SC-400**			
		24	BRACKET,MOUNTING,SC-400	1
		25	FITTING,MALE,M7X1/4T	1
		26	TUBING,170ID X .250OD,POLYURE	1
		27	SCREW, M4 X 0.7 SOCKET X 16	2
		28	PLATE,MOUNTING,SC-400	1
		19	SCREW, M4 X 0.7, SOCKET CAP,X8	2
		29	SCREW,M3.5X0.6X16	3
		31	SCREW, M4 X 0.7, SOCKET X 12	2
		32	SILENCER,M7	1
		33	SOLENOID ASSY,3WAY,1/4-1/4	1
SOLD AS INDIVIDUAL PARTS				
		1	ASSY, SC-400 APPLICATOR, CM	1
		2	APPLICATOR, BASE, SC-400	1
		3	ASSY, MICROADJ, SC-400	1
		5	SEAL, LOCK NUT	1
		6	O-RING VITON 208ID X 0.70W, BR	1
		8 (incl.#4)	PISTON ASSEMBLY, H20	1
		11	ELBOW, 1/4TUBE X 1/8NPTM	1
		12	BODY, SC-400	1
		13	FITTING, MALE 1/8 NPT, 1/4OD	1
		15	CARTRIDGE,PACKING,SS,U CUP	1
		17	NEEDLE SEAT, A7A-S, SUS	1
			ESR, APPLICATOR, NO RTD, CIRC, SC-400	1
			ASSY, APPLICATOR, SC-400, CRCLT	1
			BODY, SC-400, CRCLT	1
			ASSY,SOLENOID,3WAY,RTD,1/4-1/4	1
			ASSY, RTD, SC-400	1
			RETAINING SEAT, SC-400, CRCLT	1
			SEAT, NDL, A7A-S, SUS, CRCL, CONE	1
			SEPARATOR, FLUID, SC-400, CRCLT, ESR	1
		37	NEEDLE, 16GA, 1/2", SS (12)	1
		38	NEEDLE, 18GA, 1/2", SS (12)	1
		39	PKG, NEEDLE, 20GA, 1/2", SS (12)	1
		40	NEEDLE, 22GA, 1/2", SS (12)	1
		41	NEEDLE, 23GA, 1/2", SS (12)	1
		42	NEEDLE, 25GA, 1/2", SS (12)	1
			NEEDLE, 18GA, 1/4", SS (12)	1
			NEEDLE, 20GA, 1/4", SS (12)	1
			NEEDLE, 21GA, 1/4", SS (12)	1
			NEEDLE, 22GA, 1/4", SS (12)	1
		35	CARD, TEST SELECT COAT SYSTEM (PKG OF 100)	1

Figure 7-1 Exploded View

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