

Select Coat® Series



ASYMTEK

Qadence™ Closed-Loop Flow Control

Owner's Manual

Revision 06

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1 Introduction

1.1 Overview

Qadence Closed-Loop Flow Control closes the dispensing loop of the conformal coating process. Qadence Closed-Loop Flow Control aids in the setup process as well as monitors and controls the amount of material dispensed on the product. Qadence Closed-Loop Flow Control is designed for use with the SL-94X prime and SL-1040 conformal coating systems equipped with the DV-09, SC-280N, SC-300/350, SC-400, and the SC-450. This manual contains the installation, setup, operation, maintenance, and service instructions.

Qadence Closed-Loop Flow Control functions in a monitoring capacity on the SL-940 Core, SL-1040, or with Laser Fan Width Control (LFWC).

This manual is intended primarily as a reference for trained process engineers and service technicians. However, others unfamiliar with Nordson flow control may also find this manual useful as a general introduction. This section covers the following topics:

- [System Description](#)
- [System Components](#)
- [Specifications](#)

1.2 Safety First

Qadence Closed-Loop Flow Control operation involves air pressure, electrical power, mechanical devices, 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 flow control.

1.3 System Description

The Qadence Closed-Loop Flow Control consists of the following:

- Flow Meter Assembly
- Flow Meter Cable

The Qadence Closed-Loop Flow Control product features an inline volumetric flow meter for feedback and a software component in EasyCoat 6.1.1.19 and higher to repeatedly control the volume of material applied to a printed circuit board. Contact Technical Support for additional information.

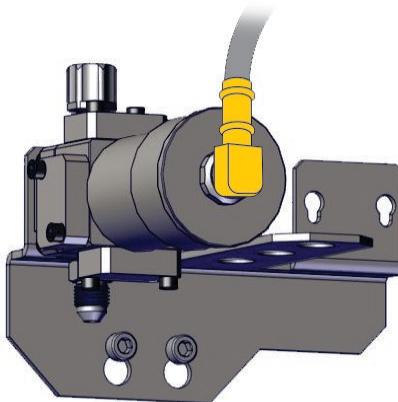


Figure 1-1 Flow Meter Assembly

1.4 System Components

1.4.1 Flow Meter Assembly

The flow meter is a positive displacement flow-sensing sensor contained in a stainless steel casing. The meter has a 1/8" npt female connections to the fluid system. The top of the flow meter has an electrical output that is connected to the coating systems accessories board. The flow meter assembly is mounted on the rear panel inside the coating cell.

1.4.2 Flow Meter Cable

The flow meter cable connects to the flow meter and the other end plugs into the accessories board providing 24VDC power and signal input.

1.5 Specifications

Table 1-1 Flow Control Specifications

Characteristic	Specification
Flow Range	1 - 100 ml/min (0.03 - 3.38 fl oz/min)
Viscosity range	20 - 1200 cps
Process Control	+/- 0.03 ml, 3 sigma
Measurement Repeatability	+/- 0.01 ml, 3 sigma
Resolution	0.001 ml/pulse
Temperature Range	20 - 50°C (68 - 122°F)
Software	EasyCoat 6.1.1.19 and higher
Material Compatibility, Wetted Parts	
Housing and Piston	Stainless Steel
Seals	PTFE

2 Safety

2.1 Overview

This section is intended to provide basic safety information necessary for operating and servicing the Qadence Closed-Loop Flow Control system. This section covers the following topics:

- [Safety First](#)
- [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 coating 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

Qadence Closed-Loop Flow Control operation 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.

2.2.1 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

2.3 Basic Safety Precautions and Practices

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



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

2.3.1 Safety of Personnel

- Only trained personnel should be permitted to perform installation, operation, maintenance, and troubleshooting procedures on the flow meter assembly.
- 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 flow meter assembly, position the applicator at the front of the dispensing 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 conformal coating system if personnel are in danger.
- Unplug power source before performing service or maintenance on the conformal coating system.
- 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 conformal coating system is operating.
- To prevent burn injury, wear thermal gloves when working around heater tooling and fluid heaters.
- Make sure all facility power sources are safely grounded.
- Routinely inspect all air hoses and electrical cables for damage.
- Make sure power cords and air supply hoses do not cross a walkway or aisle.
- Maintain a clean and orderly work area.
- Remove the flow meter assembly completely from the conformal coating system before cleaning or performing maintenance.
- Relieve pneumatic pressure before adjusting or servicing pressurized components.

2.3.2 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 conformal coating system.
- Know the SDS recommendations for treatment of injury resulting from exposure to hazardous materials.
- 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).

2.3.3 Preventing Equipment and Workpiece Damage

- Immediately push the Emergency Machine Off (EMO or E-Stop) button on the conformal coating system if the coating system, flow control, or a workpiece is in danger of being damaged.
- Use standard Electrostatic Static 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 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 flow meter assembly (that are not normally wetted), immediately contact Technical Support.
- Use only replacement parts that are designed for use with the original equipment.



WARNING!

The flow meter assembly 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. Consult with your fluid supplier for recommendations on personal protective equipment and safety practices.

2.4 Decommissioning

Table 2-1 Recommended Decommissioning Procedures

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

2.5 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

2.6 Emergency Shutdown

In the event of an emergency or malfunction, press the EMO (E-Stop) button on the conformal 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.

2.7 Safety Warning Labels

Warning labels on your equipment point out areas where personnel must use extreme caution to prevent serious injury and property damage. Table 2-2 shows the safety warning label that will be found on the shipping tag of the flow meter assembly. Refer to the applicable coating system Installation, Operations, and Maintenance Manual for important safety information and conformal coating system label locations.



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

Table 2-2 Safety Warning Label

Warning Type	Label/ Symbol	Part Number	Hazard
Kerosene Present		6122205	Warns that the flow meter is shipped with a small amount of kerosene. Refer to the SDS for safety precautions.

3 Installation and Setup

3.1 Overview

Qadence Closed-Loop Flow Control is designed for use on Nordson Select Coat Series Coating Systems. This section includes installation instructions and covers the following topics:

- [Unpacking the Flow Meter Assembly](#)
- [SL- 940 Flow Meter Initial Installation](#)
- [SL-1040 Flow Meter Initial Installation](#)
- [Priming the Fluid System](#)

3.2 Safety First

Qadence Closed-Loop Flow Control operation 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.

3.3 Unpacking the Flow Meter Assembly

Every care has been taken when packaging your new flow meter assembly. However, we recommend that you look for obvious damage and verify contents against the packing slip.

The flow meter assembly will be shipped with a small amount of kerosene. Refer to the SDS when unpacking the flow meter assembly.

Retain the case for storage of the flow meter 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 SL- 940 Flow Meter Initial Installation



WARNING! Follow SDS recommendations for the proper handling and disposal of all materials when changing material/flushing fluid system. Always wear appropriate Personal Protective Equipment (PPE) as recommended by facility safety practices and the material manufacturer's SDS.

Tools and Materials Needed:

- Cable Ties
- Allen Wrench Set
- Loctite 567
- Torque Wrench 0-100 in-lbs
- PTFE Tape

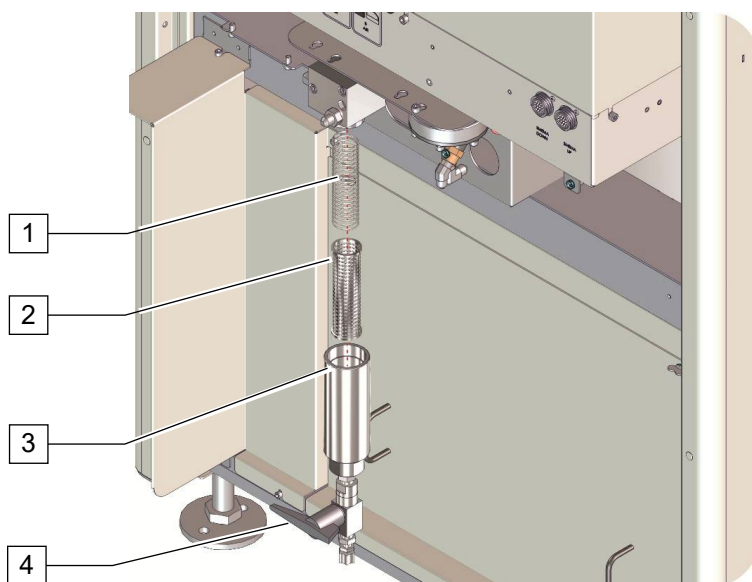
3.4.1 Removing the Old Hardware



WARNING! Follow SDS recommendations for the proper handling and disposal of all materials when cleaning the fluid filter. Always wear appropriate Personal Protective Equipment (PPE) as recommended by facility safety practices and the material manufacturer's SDS. To prevent eye injury or irritation, wear safety goggles while performing this procedure.

To remove the old hardware:

1. Flush the fluid system, see [5.4.1 Fluid System Flushing Routine](#).
2. Perform a service shutdown. Refer to the *SL-940 Installation, Operations, and Maintenance Manual*.
3. Remove the fluid system cover. Refer to the *SL-940 Installation, Operations, and Maintenance Manual*.
4. Unscrew the housing (Figure 3-1).
 - > The fluid filter is located inside the housing.
5. Remove and discard, the old fluid filter.
 - > Retain the fluid filter spring.



Item	Description	Item	Description
1	Fluid Filter Spring	3	Housing
2	Fluid Filter	4	Ball Valve

Figure 3-1 Fluid Filter Components

6. Install the Qadence fluid filter (Item 8) into the housing. See Table 7-1 for fluid filter part numbers.



NOTE Nordson recommends a 10um fluid filter (Item 8) when using Qadence. Utilizing a finer fluid filter may increase fluid filter maintenance frequency.

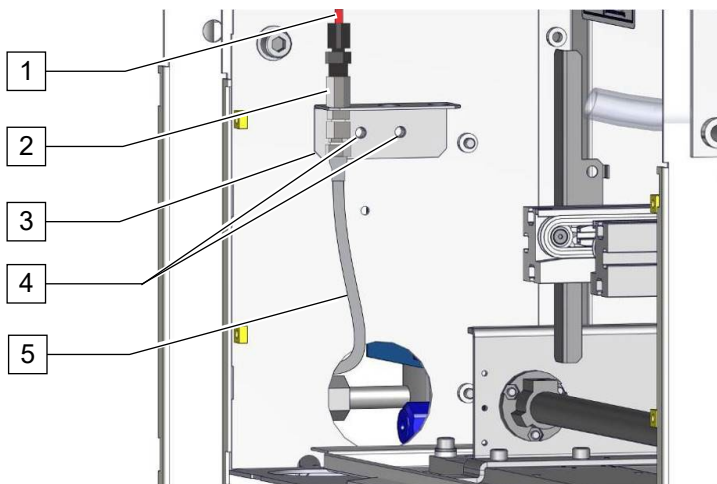
7. Reinstall the fluid filter spring inside the fluid filter.
8. Replace the housing.
9. Place or replace 10um filter element label onto filter housing.
10. Close the ball valve.
11. Open the left side curtain on the conformal coating system.

12. Disconnect the red fluid line from the fitting on the bracket (Figure 3-2).



WARNING! While disconnecting the fluid line, do not allow particles of PTFE tape and Loctite to enter the fluid line as this will contaminate the fluid system.

13. Disconnect the braided fluid line from the fitting on the bracket.
14. Remove and discard two (2) screws from the old bracket.
15. Discard the old bracket and fittings.



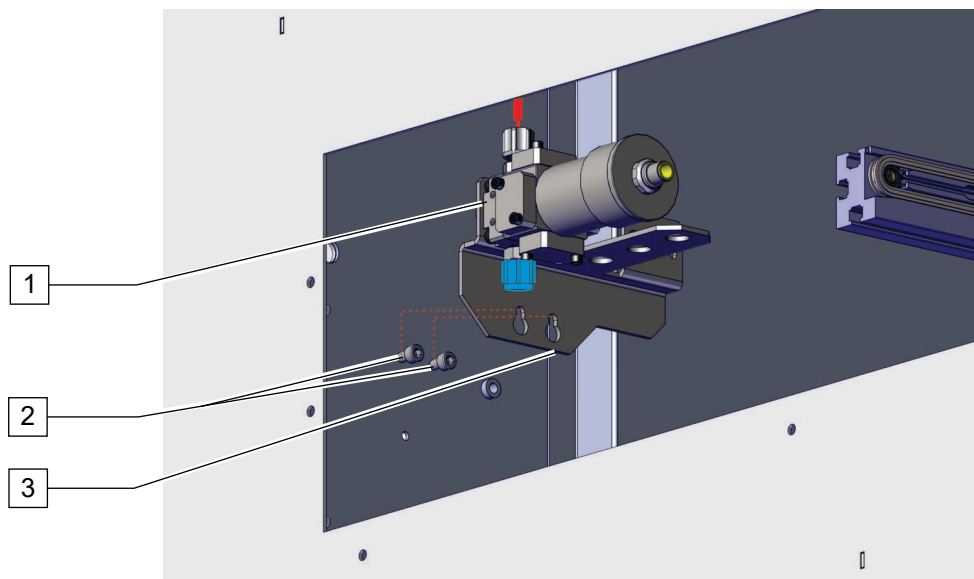
Item	Description
1	Red Fluid Line
2	Fitting
3	Bracket
4	Screws (2)
5	Braided Fluid Line

Figure 3-2 Removal of Fitting and Bracket (View from Left Side Curtain)

3.4.2 Installing the Flow Meter Assembly

To install the flow meter assembly (Figure 3-3):

1. Loosely, install the two (2) screws into the frame.
2. Install the flow meter assembly with the inlet facing the bottom onto the two (2) loosened screws.
3. Tighten the two (2) screws securing the flow control bracket to the rear panel.
4. Torque the two (2) screws to 118 Nm (87 in-lbs).



Item	Description
1	Flow Meter Assembly (Item 2)
2	Screws, M6 x 1.0 Socket x 12 (2)
3	Flow Control Bracket (Item 5)

*Figure 3-3 Installation of the Flow Meter Assembly
(View Through Left Side Curtain)*

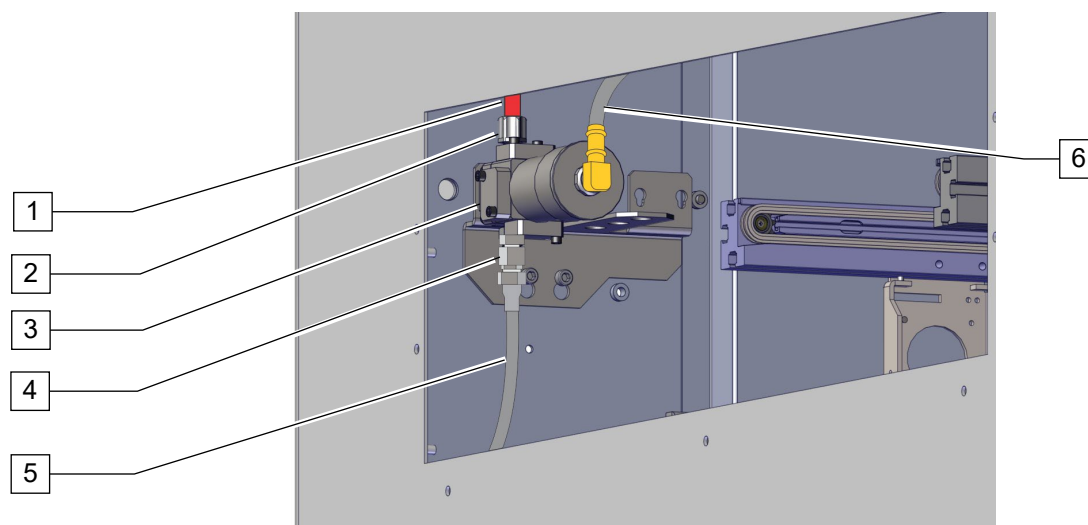
3.4.3 Connecting the Cable and Fluid Lines



WARNING! While connecting the fluid line, do not allow particles of PTFE tape and Loctite to enter the fluid line as this will contaminate the fluid system.

To connect the cable and fluid lines:

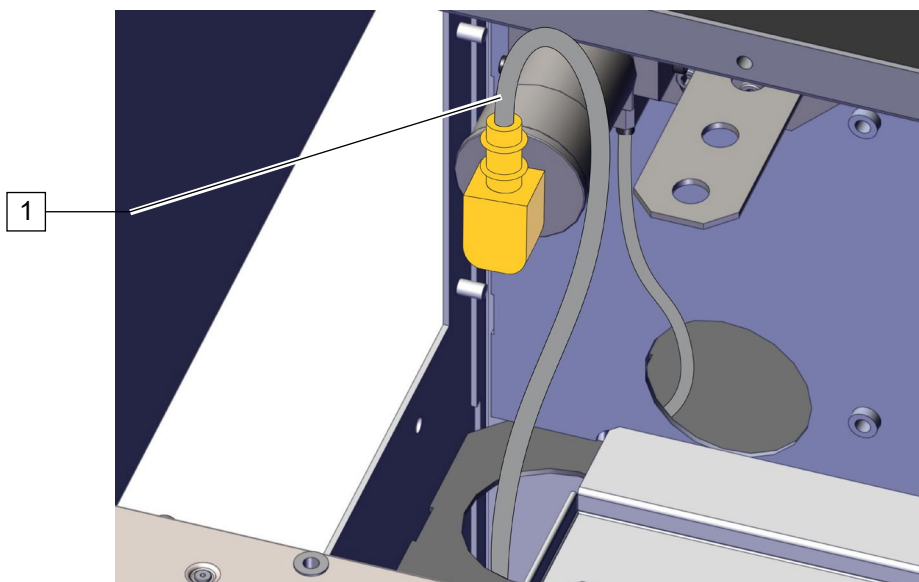
1. Connect the red fluid line to the top fitting of the flow meter (Figure 3-4).
2. Connect the braided line onto the bottom fitting of the flow meter.
3. Connect the flow meter cable into the flow meter.



Item	Description	Item	Description
1	Red Fluid Line	4	FTG, 1/8 NPT X 1/2-20 JIC (Item 1)
2	CONN, MALE, 1/4T X 1/8 NPT, DELRIN (Item 3)	5	Braided Fluid Line
3	Flow Meter Assembly (Item 2)	6	Flow Meter Cable (Item 4)

Figure 3-4 Connecting the Cable and Fluid Lines (View Through Left Side Curtain)

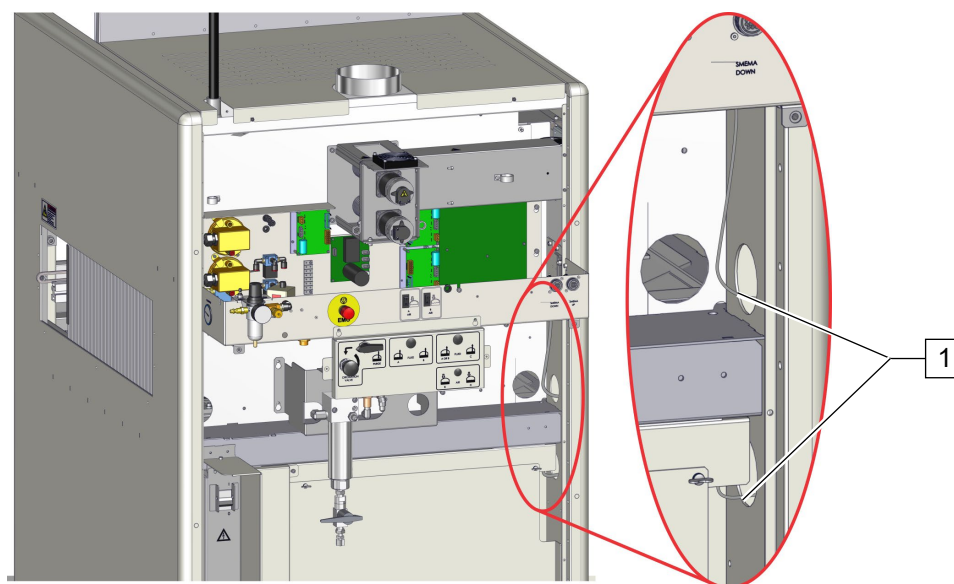
4. Route the flow meter cable down through the opening of the conformal coating system (Figure 3-5).



Item	Description
1	Flow Meter Cable (Item 4)

Figure 3-5 Routing the Flow Meter Cable (1)

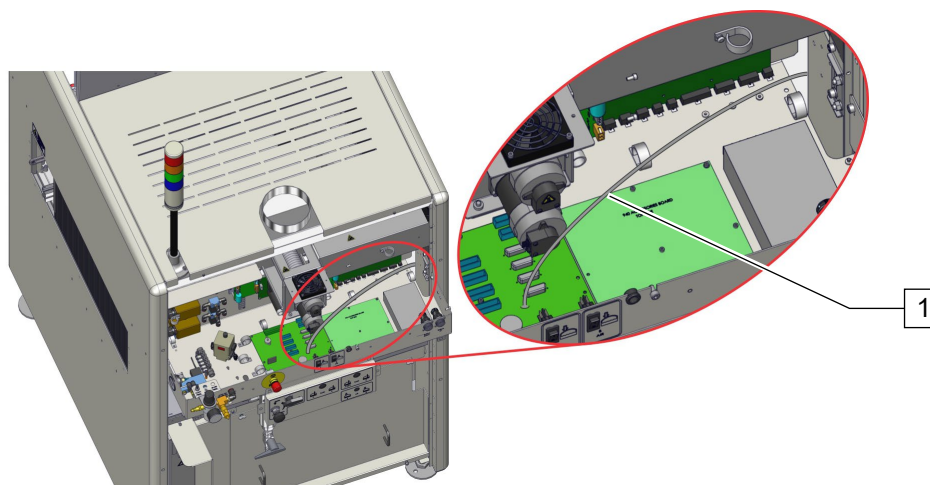
5. Continue to route the flow meter cable through the rear opening of the left rear wall of the conformal coating system following the current wire bundle routing (Figure 3-6).
6. Continue to route the flow meter cable upwards out the left rear opening along the side wall of the conformal coating system.



Item	Description
1	Flow Meter Cable (Item 4)

Figure 3-6 Routing the Flow Meter Cable (2)

7. Connect the flow meter cable to either J29 (Flow Meter 1) or J22 (Flow Meter 2), depending on your flow control configuration (Figure 3-7).



Item	Description
1	Flow Meter Cable (Item 4)

Figure 3-7 Routing the Flow Monitor Cable (3)

8. Utilize cable ties to secure the flow meter cable to the existing wire bundles.
9. Close the conformal coating system hood.
10. Close the front cabinet door.
11. Close the left side curtain.
12. Install the fluid system cover. Refer to the *SL-940 Installation, Operations, and Maintenance Manual*.
13. Configure EasyCoat for Qadence, see [4.5 Configuring EasyCoat Software](#).

3.5 SL-1040 Flow Meter Initial Installation

The following procedure shows how to configure for one flow meter. Repeat the procedure for configuring additional flow meters. This procedure assumes a fluid system is installed.

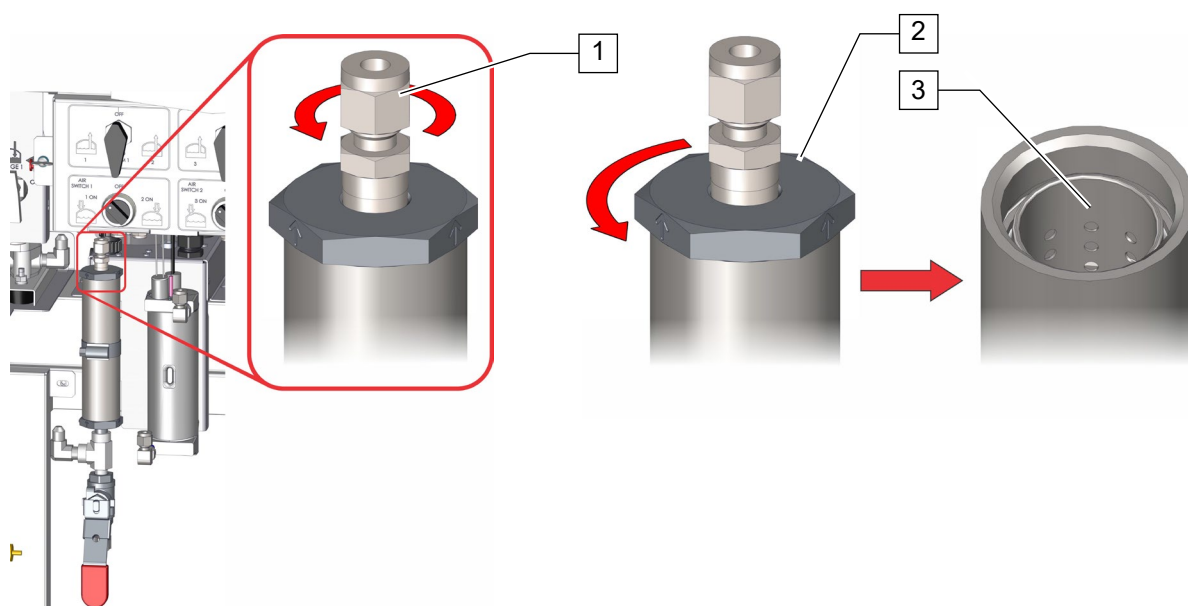
3.5.1 Removing the Fluid Filter



WARNING! Follow SDS recommendations for the proper handling and disposal of all materials when cleaning the fluid filter. Always wear appropriate Personal Protective Equipment (PPE) as recommended by facility safety practices and the material manufacturer's SDS. To prevent eye injury or irritation, wear safety goggles while performing this procedure.

To remove the fluid filter (Figure 3-8):

1. Flush the fluid system, see [5.4.1 Fluid System Flushing Routine](#).
2. Perform a service shutdown. Refer to the *SL-1040 Installation, Operations, and Maintenance Manual*.
3. Remove the fluid system cover. Refer to the *SL-1040 Installation, Operations, and Maintenance Manual*.
4. Loosen the tube fitting from the filter housing.
5. Loosen and remove the upper end cap.
 - > The fluid filter is located inside the housing.
6. Lift up and remove and discard the old fluid filter.



Item	Description
1	Tube Fitting
2	Upper End Cap
3	Fluid Filter

Figure 3-8 Fluid Filter Components

7. Install a Qadence fluid filter (Item, 8) into the housing. See Table 7-1 for fluid filter part numbers.



NOTE

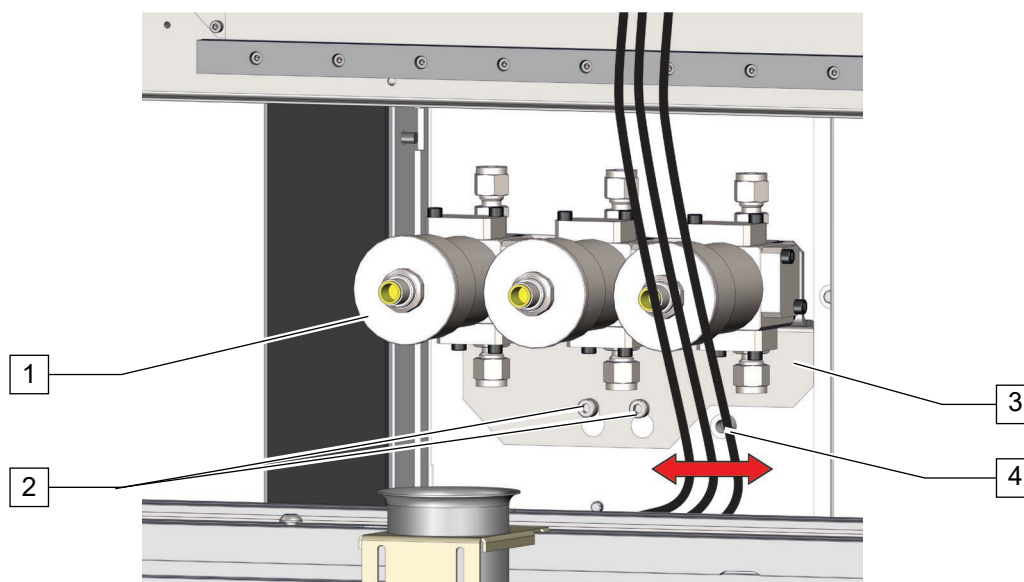
Nordson recommends a 10um fluid filter (Item 8) when using Qadence. Utilizing a finer fluid filter may increase fluid filter maintenance frequency

8. Reinstall the upper end cap onto the filter housing.
9. For initial installation:
 - a. Hand tighten the tube fitting.
 - b. Using a permanent marker, place a mark on the tube fitting for each 1/4 turn.
 - c. Tighten the tube fitting 1 1/4 turns.
10. For reinstallation:
 - a. Hand tighten the tube fitting.
 - b. Tighten the tube fitting 1/4 turns.
11. Place or replace 10um filter element label onto filter housing.

3.5.2 Installing the Flow Meter Assembly

To install the flow meter assembly (Figure 3-9):

1. Open the left side curtain on the conformal coating system.
2. Loosely, install the two (2) screws into the frame.
3. Install the flow meter assembly with the inlet facing the bottom onto the two (2) loosened screws.
 - > The fluid lines may have to be moved out of the way for ease of installation.
4. Tighten the two (2) screws securing the flow control bracket to the rear panel.
5. Torque the two (2) screws to 118 Nm (87 in-lbs).



Item	Description
1	Flow Meter Assembly (Item 2)
2	Screws
3	Flow Control Bracket
4	Fluid Lines

*Figure 3-9 Installation of the Flow Meter Assembly
(View Through Left Side Curtain)*

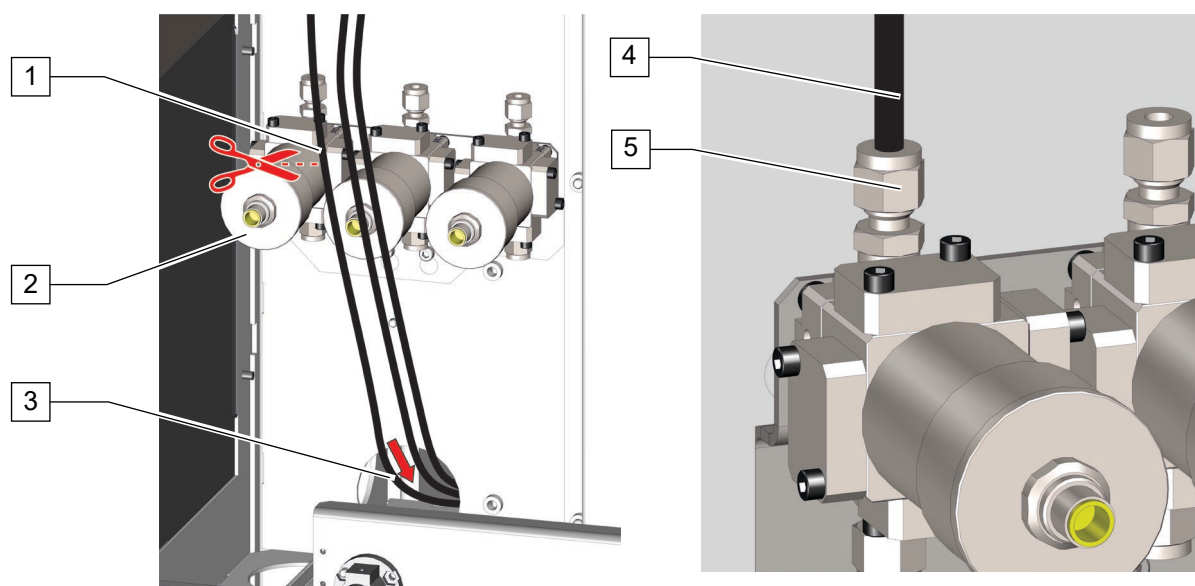
3.5.3 Connecting the Cable and Fluid Lines



WARNING! While connecting the fluid line, do not allow particles of PTFE tape and Loctite to enter the fluid line as this will contaminate the fluid system.

To connect the top fluid line (Figure 3-10):

1. Locate the fluid line to connect to the flow meter.
2. Center the fluid line to the center of the flow meter and cut the fluid line in half.
3. Connect the cut fluid line to the top fitting of the “out” port of the flow meter.
4. Route the bottom portion of the fluid line out the back of the coating system.
5. For initial installation:
 - a. Hand tighten the top fitting.
 - b. Using a permanent marker, place a mark on the top fitting for each 1/4 turn.
 - c. Tighten the top fitting 1 1/4 turns.
6. For reinstallation:
 - a. Hand tighten the top fitting.
 - b. Tighten the top fitting 1/4 turns.

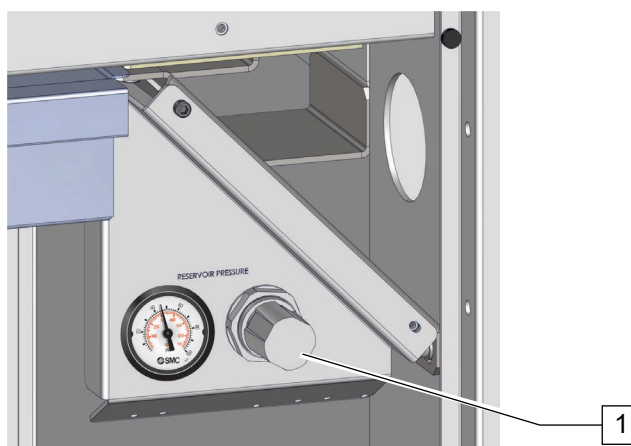


Item	Description	Item	Description
1	Fluid Line	4	Fluid Line
2	Flow Meter Assembly (Item 2)	5	CONN, Male, 1/4T X 1/8 NPT, DELRIN (Item 3)
3	Routing of Fluid Line		

Figure 3-10 Connecting the Fluid Line (View Through Left Side Curtain)

To flush the fluid line:

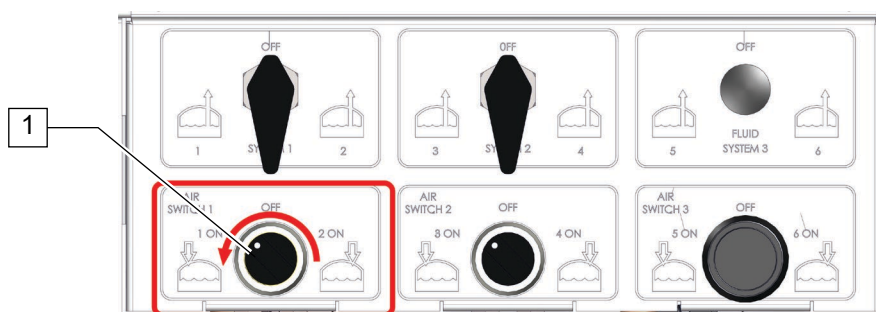
1. Open the fluid reservoir.
2. Pour at least one (1) gallon of IPA into the fluid reservoir.
3. Close the fluid reservoir.
4. Route the cut bottom portion of the fluid line into a waste container (Figure 3-10).
5. Power on the coating system. Refer to the *SL-1040 Installation, Operations, and Maintenance Manual*.
6. Rotate the reservoir pressure knob to 2.75 bar (40 psi) (Figure 3-11).



Item	Description
1	Reservoir Pressure Knob

Figure 3-11 Setting the Reservoir Pressure

7. Turn the Reservoir Air Switch 1 to the **ON (I)** position (Figure 3-12).
 - > Allow about a half gallon of IPA to clear the fluid line.



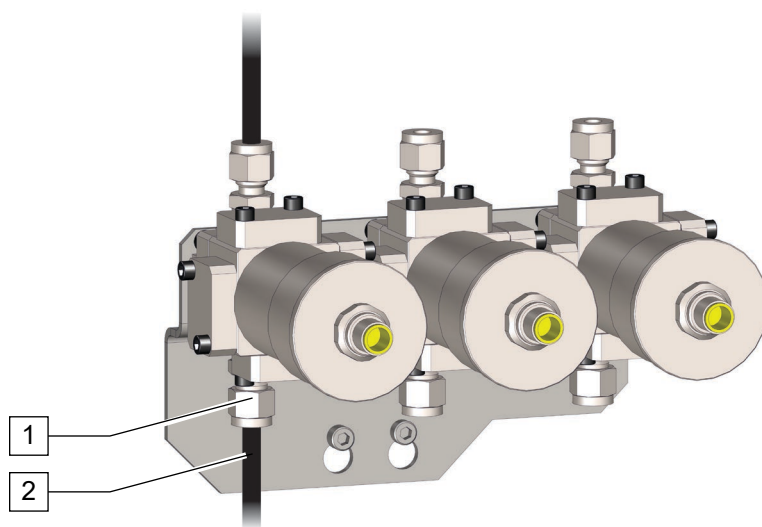
Item	Description
1	Reservoir Air Switch

Figure 3-12 Reservoir Air Switch to On

8. Rotate the reservoir pressure knob to 0 bar.
9. Perform a service shutdown. Refer to the *SL-1040 Installation, Operations, and Maintenance Manual*.

To connect the bottom fluid line (Figure 3-13):

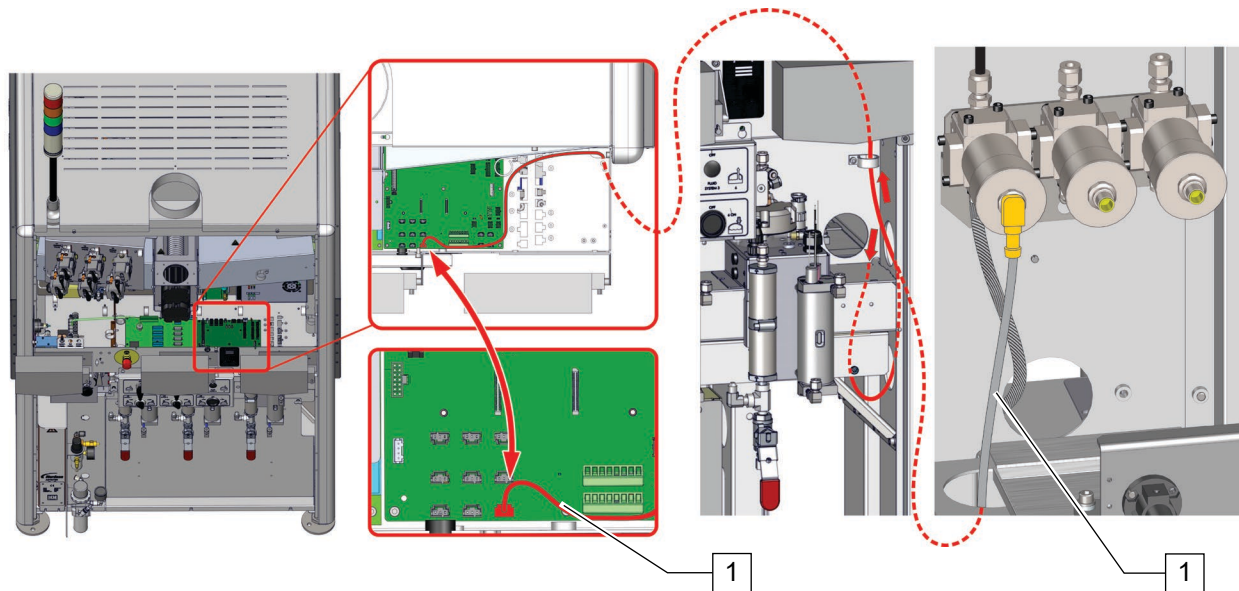
1. Reroute the fluid line from the waste container to the “in” port (bottom) on the flow meter.
2. For initial installation:
 - a. Hand tighten the bottom fitting.
 - b. Using a permanent marker, place a mark on the bottom fitting for each 1/4 turn.
 - c. Tighten the bottom fitting 1 1/4 turns.
3. For reinstallation:
 - a. Hand tighten the bottom fitting.
 - b. Tighten the bottom fitting 1/4 turns.



Item	Description
1	FTG, 1/8 NPT X 1/2-20 JIC (Item 3)
2	Fluid Line

*Figure 3-13 Installing the Bottom Fluid Line****To connect the power cable (Figure 3-14):***

1. Connect the flow monitor cable to the flow meter assembly.
2. Route the flow meter cable down through the opening of the conformal coating system.
3. Continue to route the flow meter cable through the rear opening of the left rear wall of the conformal coating system following the current wire bundle routing.
4. Continue to route the flow meter cable upwards out the left rear opening along the side wall of the conformal coating system.
5. Connect the flow meter cable to either J29 (Flow Meter 1) or J22 (Flow Meter 2), depending on your flow control configuration.
6. Utilize cable ties to secure the flow meter cable to the existing wire bundles.



Item	Description
1	Flow Meter Cable (Item 4)

Figure 3-14 Routing the Flow Meter Cable

7. Close the conformal coating system hood.
8. Close the front cabinet door.
9. Close the left side curtain.
10. Install the fluid system cover. Refer to the *SL-1040 Installation, Operations, and Maintenance Manual*.
11. Configure EasyCoat for Qadence, see [4.5 Configuring EasyCoat Software](#).

3.6 Priming the Fluid System

Before the system can be used, you must load the appropriate coating material and perform a priming routine. The priming routine flushes out debris and air that may be trapped within the fluid system. Proper priming is critical for quality results.

Tools and Materials Needed:

- 30 cm Clear Tubing
- Appropriate Coating Material
- Allen Wrench Set



WARNING! Do not use abrasives, filler materials, water, steam, or compressed air through the flow meter. Only non-aqueous solutions should be run through the flow meter.



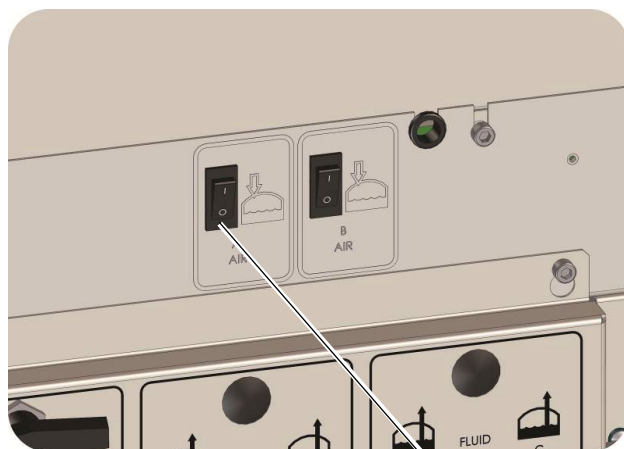
WARNING! Excessive air flow through system may cause permanent damage to flow meter.



NOTE Refer to the applicator technical manual being used for removal, installation, and adjustments.

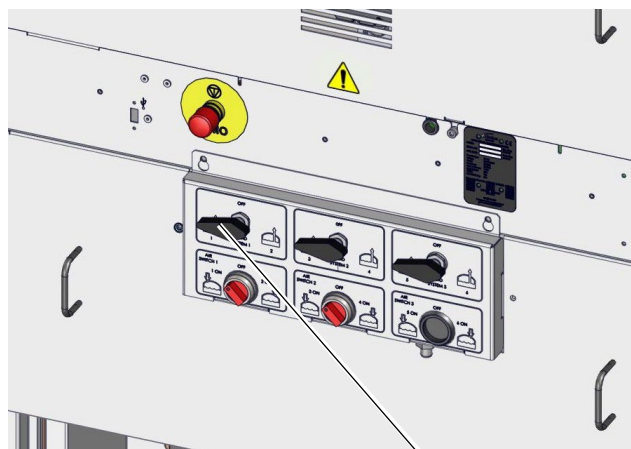
To setup for the priming routine:

1. Ensure the fluid reservoir has at least one (1) liter of appropriate coating material.
2. Close the reservoir lid.
3. For the SL-940, turn reservoir air pressure A switch to the **ON (I)** position, or turn Reservoir Switch 1 to the **ON (I)** position for the SL-1040 (Figure 3-15).



SL-940

1



SL-1040

1

Item	Description
1	Reservoir Air Pressure Switches

Figure 3-15 Reservoir Air Pressure Switches

4. Power on the coating system. Refer to the applicable conformal coating system Installation, Operations, and Maintenance Manual.
5. Double-click the **EasyCoat**  icon on the Windows desktop.
 - > The EasyCoat Operator Screen opens.
6. Set reservoir and fluid pressures to 68.94 kPa and 34.47 kPa (10 and 5 psi) respectively.
7. Configure the applicator(s). Refer to the *EasyCoat User Guide* or EasyCoat Help.
8. Click on **Edit > Edit Mode** from the EasyCoat Operator Screen to open the Edit Screen.
9. From the EasyCoat Edit Screen, select **Utilities > Pressure Adjust > Toolname** (Figure 3-16).

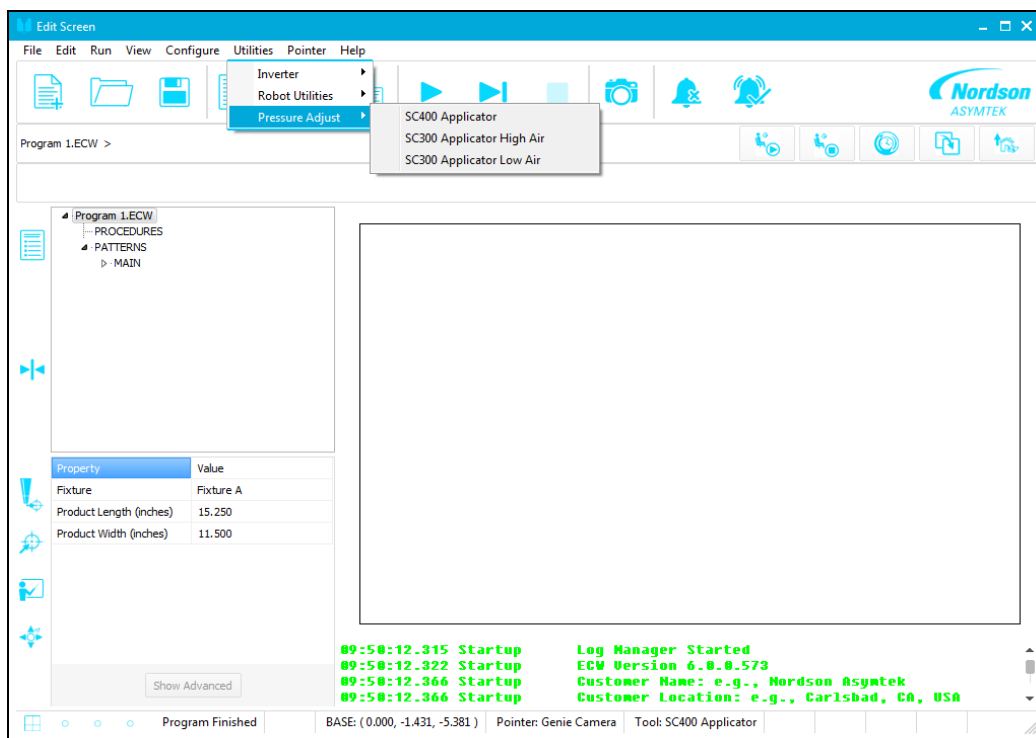


Figure 3-16 Utilities - Pressure Adjust Menu (SC-400 Selected)

10. Slide the fluid pressure bar to the left to reduce the Fluid Pressure to 0 kPA (0 psi) (Figure 3-17).

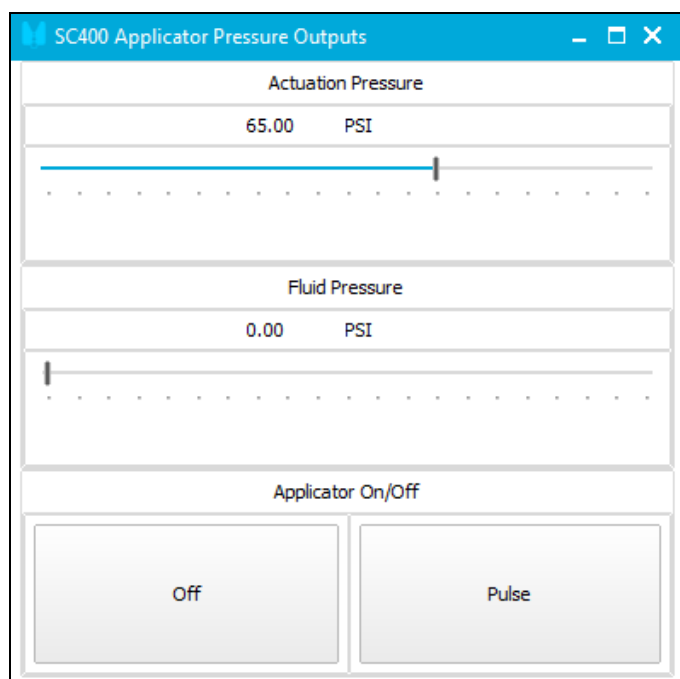


Figure 3-17 Fluid Pressure Adjust (SC-400 Selected)

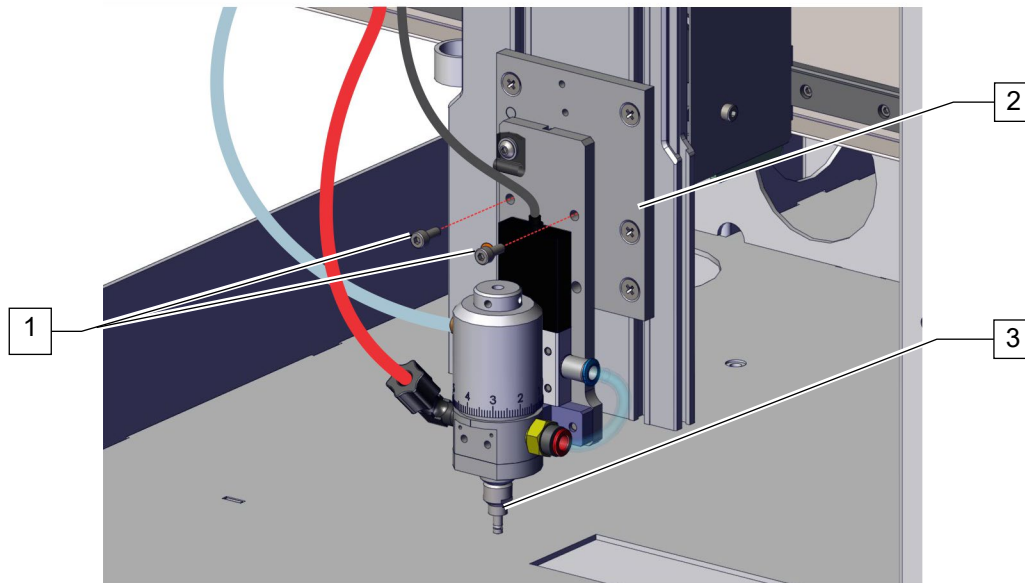
11. Lay towels or a cup under the applicator to collect fluid spills.
12. Refer to the applicable applicator(s) manual to perform one of the following steps depending on the applicator utilized:
 - a. For the SC-280, remove the nozzle and retaining nut.
 - b. For the SC-300/350, remove the air sleeve.
 - c. For the SC-400, remove the needle and retaining nut.
 - d. For the SC-450, remove the needle and retaining nut.
 - e. For the DV-09, remove the needle.



NOTE Residual fluid may flow from the applicator.

13. For SC-400, perform Step 14 through Step 21. All other applicators, perform the priming routine.

14. Loosen the two (2) screws and remove the applicator from the valve mount bracket keeping the air, fluid, and electrical lines connected (Figure 3-18).



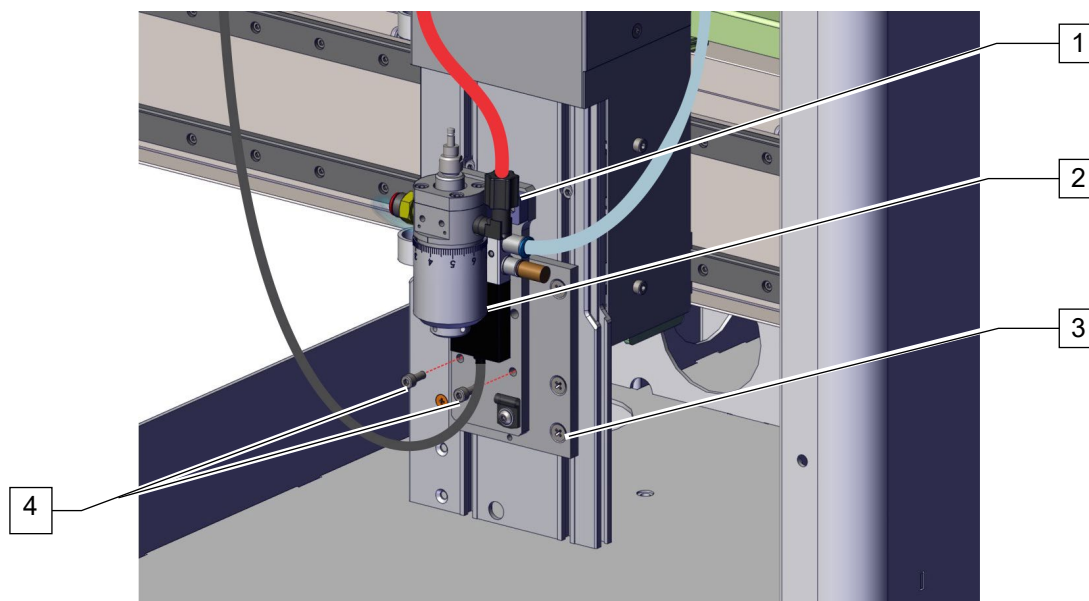
Item	Description
1	Screws (2)
2	Valve Mount Bracket
3	Nozzle Adapter

Figure 3-18 Removing the Applicator

15. Rotate the fluid inlet elbow fitting 180 degrees to avoid kinking (Figure 3-19).
16. Invert the applicator so that it is upside down.
17. Reinstall the applicator onto the valve mount bracket in the inverted position with two (2) screws.
18. Tighten the two (2) screws to temporarily hold the applicator.



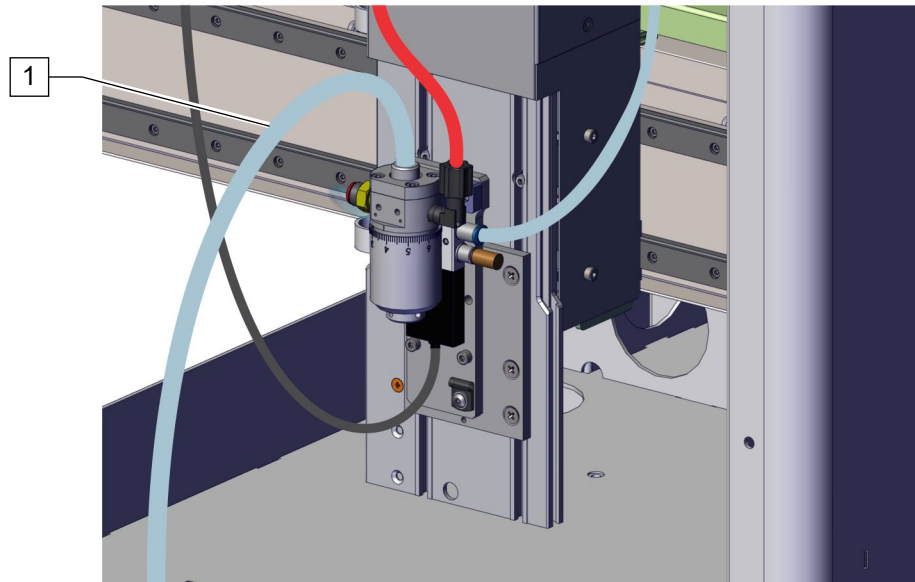
WARNING! Do not overtighten the screws as damage will occur to the mounting plate.



Item	Description
1	Fluid Inlet Elbow Fitting
2	Applicator
3	Valve Mount Bracket
4	Screws (2)

Figure 3-19 Installing the Applicator Inverted

19. Fit one end of the clear tubing over the tip of the fluid outlet (Figure 3-20).
20. Ensure the clear tubing is firmly seated and flush against the top of the needle nut threads.
21. Place the opposite end of the clear tubing into the waste container.



Item	Description
1	Clear Tubing (Item 6)

Figure 3-20 Installing the Clear Tubing

To perform the priming routine:

1. Click on **Edit > Edit Mode** from the EasyCoat Operator Screen to open the Edit Screen.
2. From the EasyCoat Edit Screen, select **Utilities > Pressure Adjust > Toolname** (Figure 3-21).

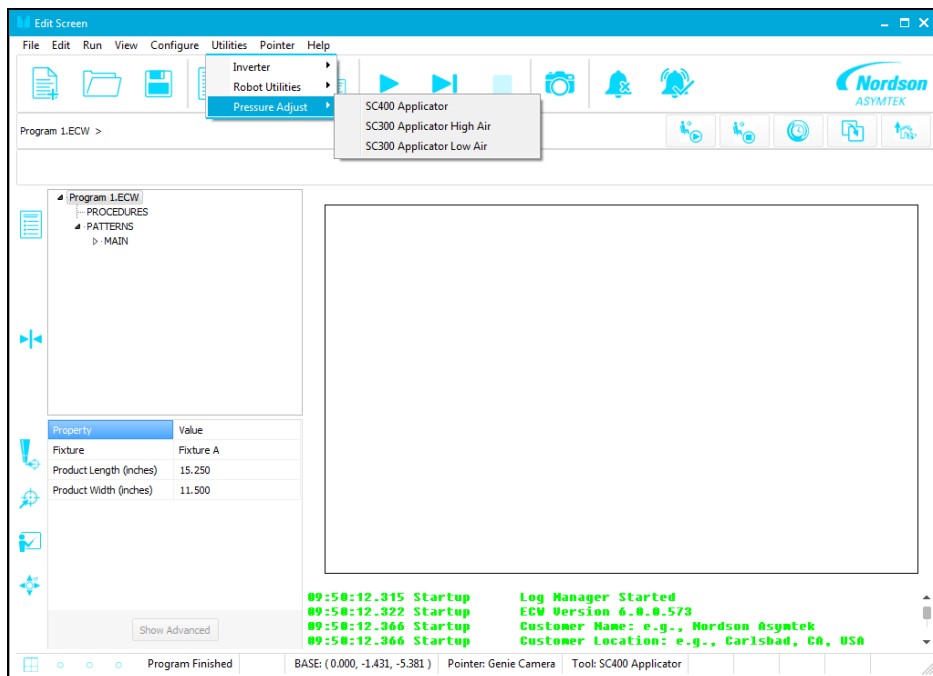


Figure 3-21 Utilities - Pressure Adjust (SC-400 Selected)

3. Press the **Applicator On/Off** button in the Applicator Pressure Outputs window (Figure 3-22).
 - > As soon as pressure is applied to the fluid reservoir and the applicator opens, fluid should flow to the applicator tip.
 - > Allow sufficient time for thicker coating fluids.

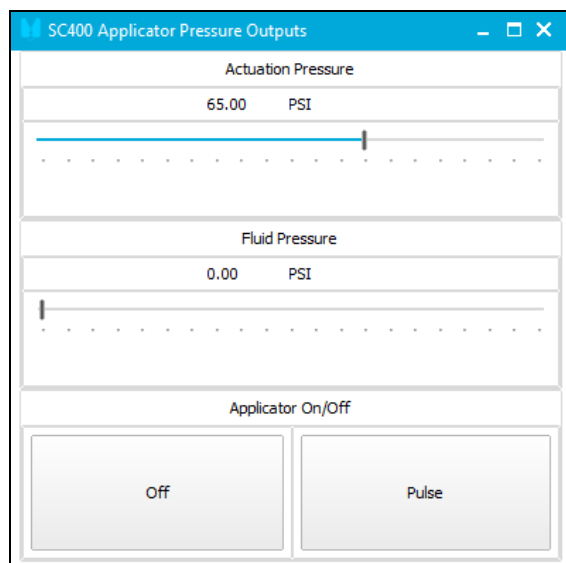


Figure 3-22 Pressure Outputs (SC-400 Selected)

4. Increase the fluid pressure slowly until the coating material begins to flow out of the select coat applicator (Figure 3-23).
5. Continue priming until the fluid flows through without bubbles or a break in the fluid stream.
 - > Toggle the fluid pressure off and on several times to ensure all air have been cleared.
 - > Increase and decrease fluid pressure to dislodge trapped air.
6. When a steady flow is obtained, slide the fluid pressure bar to the left to reduce the Fluid Pressure to 0 kPA (0 psi).

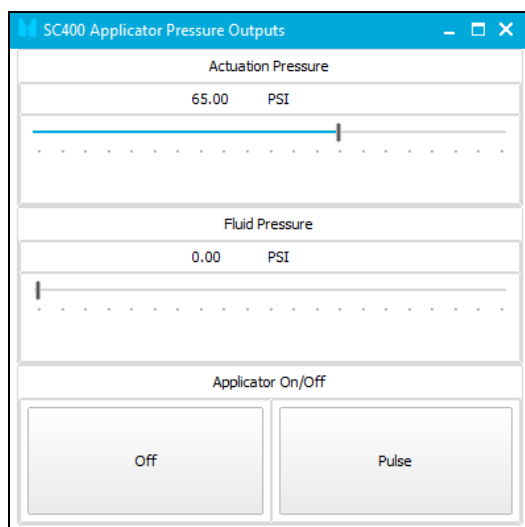
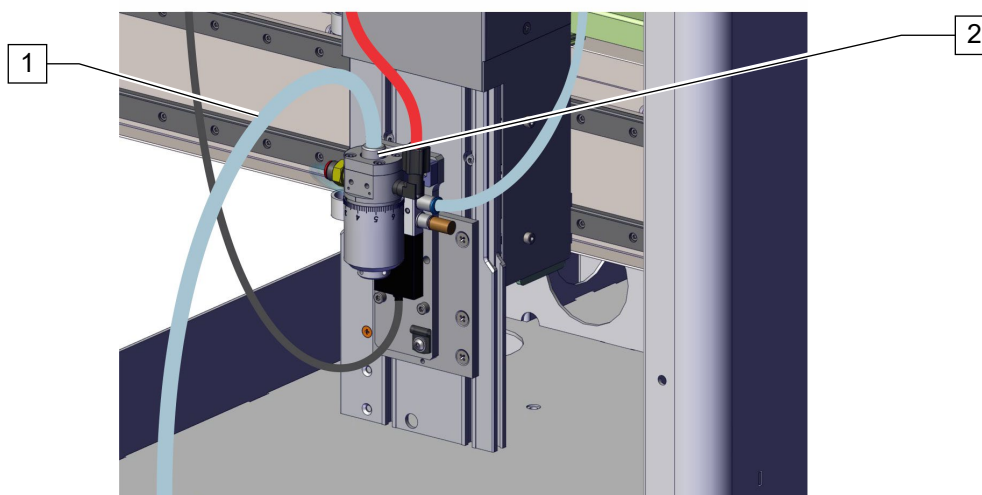


Figure 3-23 Fluid Pressure to Zero (SC-400 Selected)

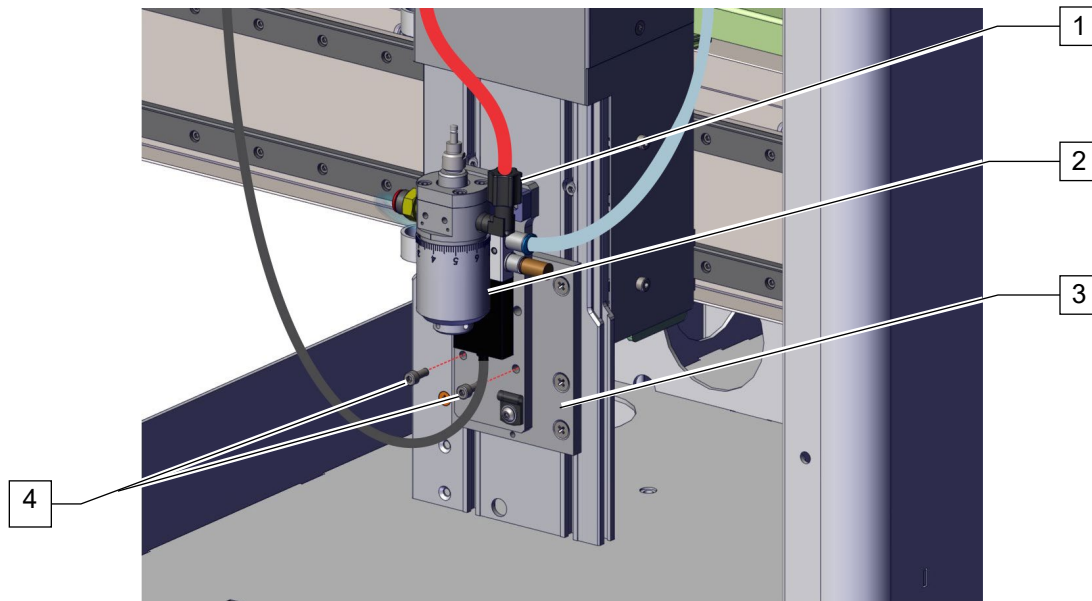
7. Remove the clear tubing from the fluid outlet and hold the clear tubing upright draining the fluid within the clear tubing into the waste container (Figure 3-24).
8. Discard the clear tubing once the fluid has completely drained into the waste container.



Item	Description
1	Clear Tubing (Item 6)
2	Fluid Outlet

Figure 3-24 Removing the Clear Tubing

9. Loosen the two (2) screws and remove the applicator from the valve mount bracket keeping the air, fluid, and trigger lines connected (Figure 3-25).
10. Rotate the fluid inlet elbow fitting 180 degrees to avoid kinking.



Item	Description
1	Fluid Inlet Elbow Fitting
2	Applicator
3	Valve Mount Bracket
4	Screws (2)

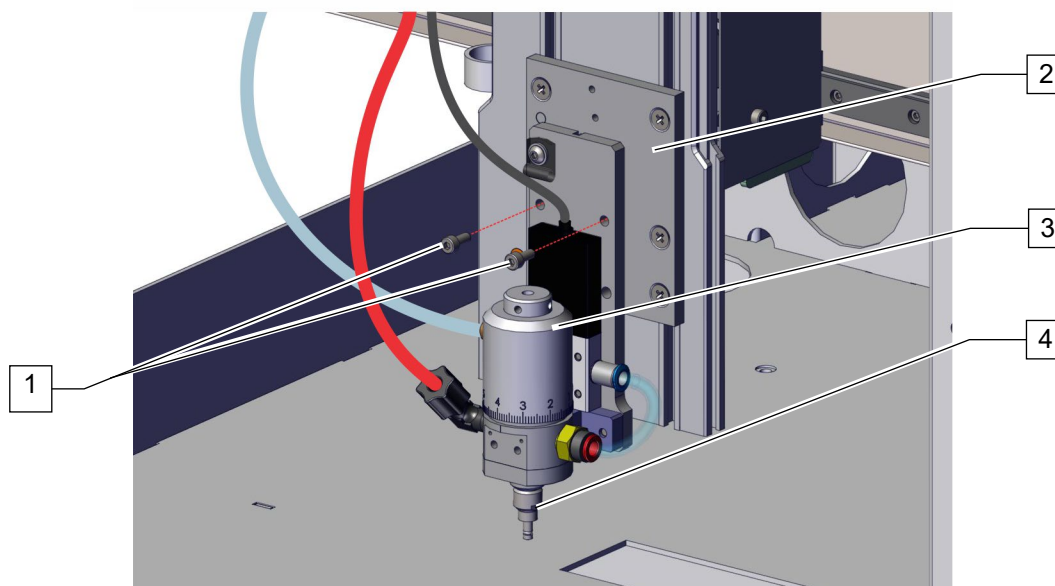
Figure 3-25 Removing the Applicator

11. Invert the applicator to the standard upright position (Figure 3-26).
12. Reinstall the applicator onto the valve mount bracket in the standard upright position with two (2) screws.
13. Tighten the two (2) screws securing the applicator to the valve mount bracket.



WARNING! Do not overtighten the screws as damage will occur to the mounting plate.

14. Refer to the applicable applicator(s) manual to perform one of the following steps depending on the applicator utilized:
 - a. For the SC-280, reinstall the nozzle and retaining nut.
 - b. For the SC-300/350, reinstall the air sleeve.
 - c. For the SC-400, reinstall the needle and retaining nut.
 - d. For the SC-450, reinstall the needle and retaining nut.
 - e. For the DV-09, reinstall the needle.
15. Configure EasyCoat for Qadence, see [4.4 Configuring EasyCoat Software for Qadence](#).



Item	Description
1	Screws (2)
2	Valve Mount Bracket
3	Applicator
4	Nozzle Adapter

Figure 3-26 Reinstalling the Applicator

4 Operation

4.1 Overview

This section provides flow control operating procedures. 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
- Configuring EasyCoat Software for Qadence
- Flow Control Setup
- Program Setup for Volume Monitoring
- Corrective Action Programming
- Error Action Programming
- Programming a Corrective Action in a Periodic Procedure
- Data Logging

4.2 Safety First

Qadence Closed-Loop Flow Control operation 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 Qadence Closed-Loop Flow Control measures the volume of conformal coating material dispensed on a printed circuit board and will adjust fluid pressure to keep the volume per product within specification limits.

The below flowchart provides a high-level overview of programming the Closed-Loop Flow Control within EasyCoat 6.1.1.19 and higher. The steps are discussed within the specific sections of this manual, applicable applicator manual, and the applicable coating system Installation, Operations, and Maintenance Manual.

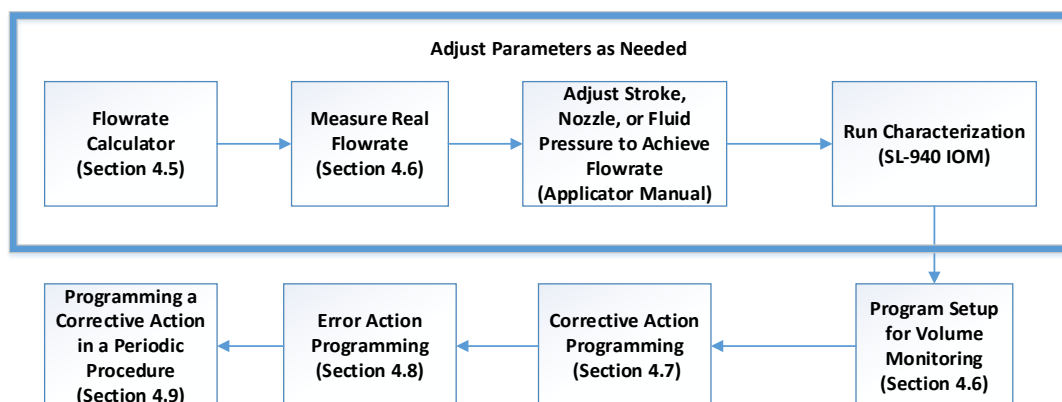


Figure 4-1 Theory of Operation

4.4 Configuring EasyCoat Software for Qadence

Qadence Closed-Loop Flow Control is a licensed feature within EasyCoat 6.1.1.19 and higher and requires a properly installed license to operate. The license will be installed at Nordson. For system upgrades, contact Technical Support.



NOTE Reconfiguring EasyCoat will remove the license key. Contact Technical Support if the license needs to be reactivated.

To configure EasyCoat software for Qadence:

1. Double-click the **EasyCoat** icon on the Windows desktop or enter the EasyCoat Configuration screen (Figure 4-2).
2. Select **Number of Fluid Systems**.
 - > If Qadence will be installed for dual fluid systems, select both applicable fluid systems.
3. Select **Flow Meter** for all applicable applicators.
4. Select **Electronic Pressure Control** and **Qadence** for all applicable applicators.
5. If dual simultaneous is being configured, select **Simultaneous**.
6. Click on **Apply**.
7. Click on **Configuration Complete**.

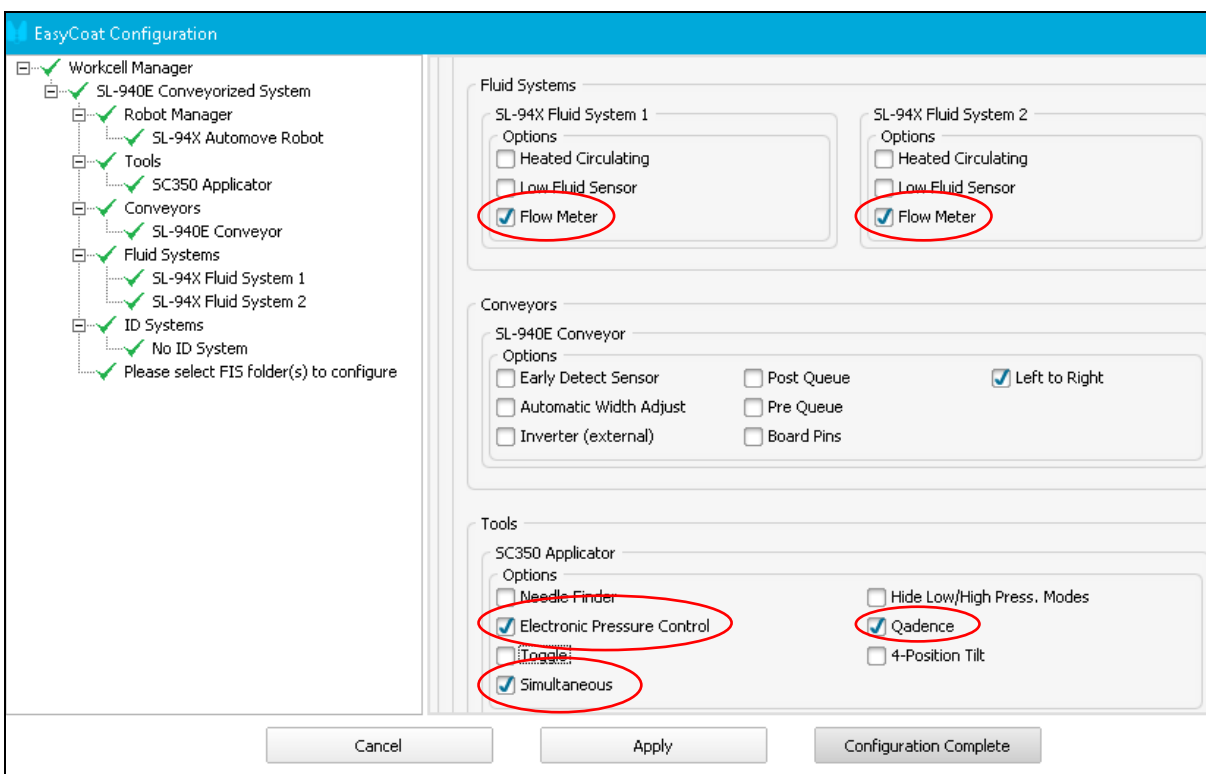


Figure 4-2 Flow Meter Configuration (Dual Fluid System Setup Shown)

- > ECW window appears indicating that the configuration is complete (Figure 4-3).

8. Click on **OK** to restart EasyCoat (Figure 4-3).

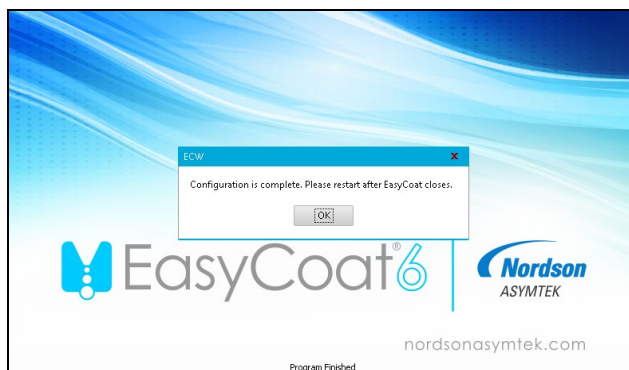
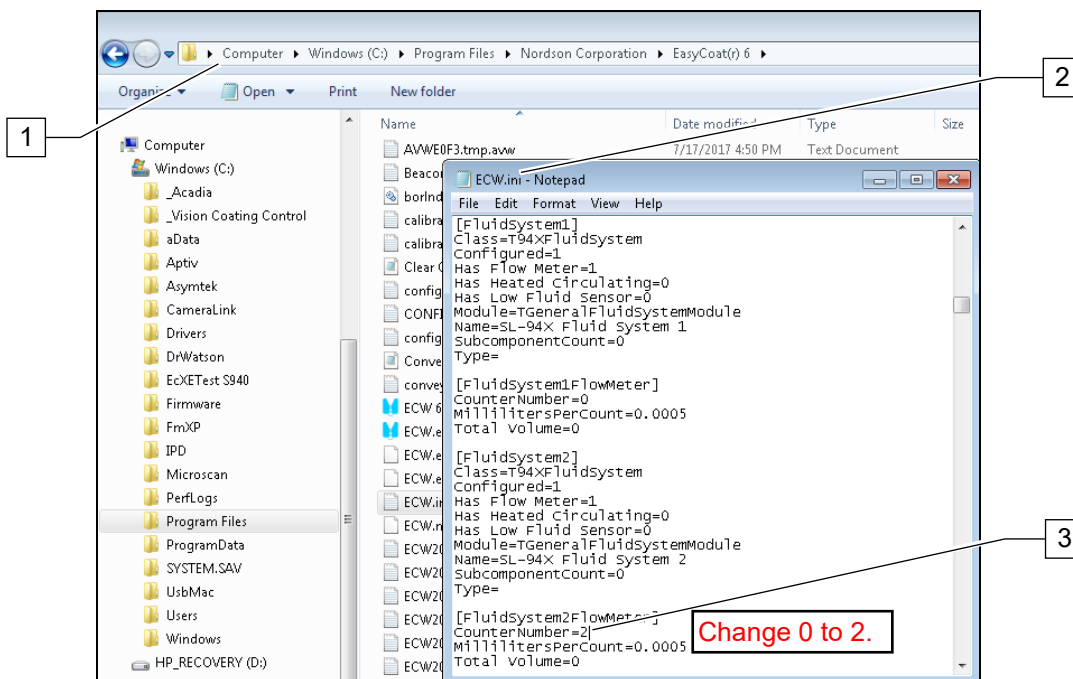


Figure 4-3 Configuration Complete

9. Open the EasyCoat folder (Figure 4-4).
- > The EasyCoat folder is usually named "C:\Program Files\Nordson Corporation\EasyCoat(r) 6".
10. For dual fluid systems, open the ECW.ini file in Notepad.
11. Fluid System 2 change CounterNumber from 0 to 2 to configure the dual fluid system.
12. Setup flow control, see [4.5 Flow Control Setup](#).



Item	Description
1	EasyCoat Program Folder
2	ECW.ini File
3	Fluid System 2 Counter Number = 2

Figure 4-4 EasyCoat File

4.5 Flow Control Setup

To access the flow control setup:

1. Double-click the **EasyCoat**  icon on the Windows desktop or enter the EasyCoat Configuration screen.
 - > The EasyCoat Operator Screen opens.
2. There are two methods to access the flow control setup (Figure 4-5):
 - a. From the EasyCoat Edit Screen, select **Edit > Edit Screen > Configure > Flow Control Setup >** and select the applicator configured for flow control.
 - b. From the EasyCoat Edit Screen, select **Edit > Edit Screen > Configure > Tools** and select the applicator configured for flow control.
3. Select **Flow Rate Setup** (Figure 4-6).

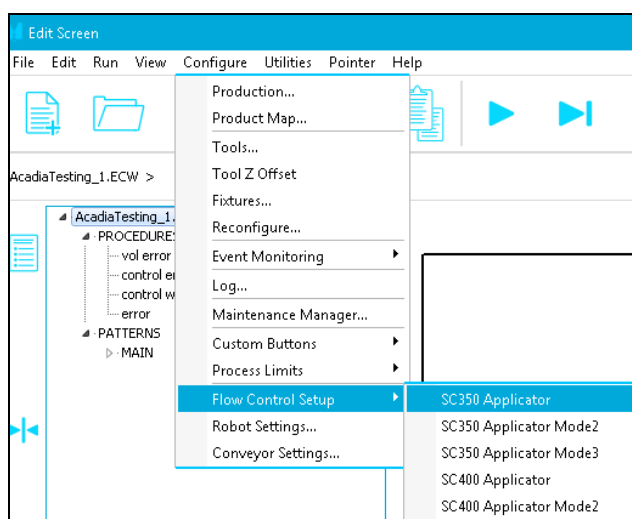


Figure 4-5 Tool Configuration Selection (1)

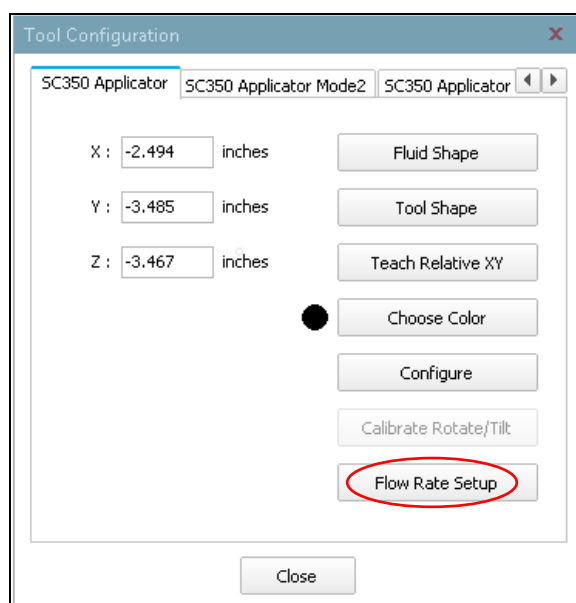


Figure 4-6 Tool Configuration Selection (2)

To set up flow control:

See Table 4-1 for flow control configuration descriptions.

1. Select the **Fluid System** that will be utilized (Figure 4-7).
2. Enter your target coating parameters in the **Flow Calculator** (Figure 4-7).
 - a. Target Thickness (Dry)
 - b. Coating Speed
 - c. Coating Width
 - d. % Solids
 - e. Bias
 - > Target flowrate will be automatically calculated and displayed.
3. Teach the **Flow Check Location** (Figure 4-7).
 - a. Jog robot to location where applicator will use to measure and calibrate.
 - b. Select **Teach Location**.
4. Enter the **Flow Check Settings** (Figure 4-7).
 - > All parameter settings may be adjusted as required.
 - a. Enter 0.5 seconds for the **Pre Dwell** time.
 - b. Enter 0.5 seconds for the **Post Dwell** time.
 - c. Enter 2.0 seconds for the **Duration** (minimum 0.1 ml required).
 - d. Enter 2 psi for the **Assist Pressure** (Only for spray applicators).
 - e. Select **Measure Flow**.
 - > The applicator will move to the flow check location and measure the flowrate.
 - > The flowrate will be displayed in the event monitor and in the **Measured Flowrate** block (Figure 4-8).
5. Enter the **Flow Control Settings** (Figure 4-9).
 - a. Enter the **Error Threshold (+/-)** value (minimum 0.1 ml/min).
 - b. Enter the **Max # of Attempts** value.
 - c. Select **Flow Control**.
 - > The applicator will move to the flow check location and the calibration routine will be performed.
 - > The calibration data will be displayed in the event monitor.
 - > The fluid pressure and flowrate blocks will be updated with each attempt.
6. Program setup for volume monitoring, see [4.6 Program Setup for Volume Monitoring](#).

Flow Control Setup SC350 Applicator

Fluid System: SL-94X Fluid System 1

Flow Calculator

Target Thickness: 75 μm

Coating Speed: 100 mm/s

Coating Width: 7.00 mm

% Solids: 100 %

Bias: 0 %

Target Flowrate: 3.150 ml/min

Flow Check Settings

Pre Dwell: 1.0 sec

Post Dwell: 1.0 sec

Duration: 6.0 sec

Assist Pressure: 2.000 psi

Measure Flow

Measured Flowrate: 3.310 ml/min

Flow Check Location

X: 10.87 Teach Location

Y: -64.03

Z: -37.13 Go To Location

Flow Control Settings

Current Fluid Pressure: 20.500 psi

Error Threshold (+/-): 0.050 ml/min

Max # of Attempts: 5

Flow Control

Close

Figure 4-7 Flow Control Configuration Window

Flow Check Settings

Pre Dwell: 1.0 sec

Post Dwell: 1.0 sec

Duration: 6.0 sec

Assist Pressure: 2.000 psi

Measure Flow

Measured Flowrate: 3.400 ml/min

02:18:14.334 Dispense

02:18:26.294 Dispense

02:18:26.387 Dispense

02:18:41.375 Dispense

02:18:41.388 Dispense

02:18:58.154 Dispense

02:18:58.167 Dispense

02:19:17.349 Dispense

02:19:17.362 Dispense

02:19:39.811 Dispense

02:19:39.824 Dispense

02:19:53.963 Dispense

02:19:53.977 Dispense

Measured FlowRate = 3.335 ml per minute

Calibration Volume = 0.333 cc

Measured FlowRate = 3.335 ml per minute

Calibration Volume = 0.331 cc

Measured FlowRate = 3.385 ml per minute

Calibration Volume = 0.339 cc

Measured FlowRate = 3.385 ml per minute

Calibration Volume = 0.332 cc

Measured FlowRate = 3.315 ml per minute

Calibration Volume = 0.332 cc

Measured FlowRate = 3.32 ml per minute

Calibration Volume = 0.340 cc

Measured FlowRate = 3.40 ml per minute

Figure 4-8 Measured Flowrate

Flow Control Settings

Current Fluid Pressure: 33.085 psi

Error Threshold (+/-): 0.050 ml/min

Max # of Attempts: 6

Flow Control

10:05:02.044 Dispense

10:05:07.722 Dispense

10:05:07.769 Runtime

10:05:07.769 Runtime

10:05:07.878 Runtime

10:05:07.910 Dispense

10:05:13.588 Dispense

10:05:13.635 Runtime

10:05:13.635 Runtime

10:05:13.728 Runtime

10:05:13.744 Dispense

10:05:19.469 Dispense

10:05:19.516 Runtime

10:05:19.516 Runtime

Attempt = 2

Measured Volume = 0.153 cc

Target Flowrate = 3.1500 ml/min

Measured Flowrate = 3.0700 ml/min

SC350 Applicator Left new pressure: 32.606 psi

Attempt = 3

Measured Volume = 0.153 cc

Target Flowrate = 3.1500 ml/min

Measured Flowrate = 3.0600 ml/min

SC350 Applicator Left new pressure: 33.085 psi

Attempt = 4

Measured Volume = 0.157 cc

Target Flowrate = 3.1500 ml/min

Measured Flowrate = 3.1400 ml/min

Figure 4-9 Flow Control

Table 4-1 Flow Control Configuration Descriptions

Category	Item	Description
Fluid System	Fluid System	The fluid system the applicator and flow meter are connected to.
Flow Calculator	Target Thickness	Target thickness of dry coating on a flat coupon.  NOTE Flat coupon serves as a reference for thickness performance on a populated board.
	Coating Speed	Desired coating speed.
	Coating Width	Estimates coating width based on applicator capability.
	% Solids	Percent of solids in coating material. See fluid data sheet.
	Bias	+/- bias to allow for fine tuning. The default is zero (0) unless adjustments need to be made.
	Target Flowrate	The calculated flowrate.
Flow Check Location	XYZ Values	Displays the X, Y, and Z of the taught location.
	Teach Location	Teaches the flowrate calibration location.
	Go To Location	Goes to the taught location.
Flow Check Settings	Pre Dwell	Delay time between pressure adjust and start of measurement.
	Post Dwell	Delay time after measurement and meter reading.
	Duration	Amount of time the measurement will last.
	Assist Pressure	Air assist pressure used for measurement. Specific to air assisted applicators.
	Measure Flow	System moves to flow check location and measures flowrate.
Flow Control Settings	Current Fluid Pressure	Reference of current fluid pressure.
	Error Threshold (+/-)	The tolerance band for calibration. This must be no more than 50% of the warning band tolerance, in the end measurement instruction.
	Max # of Attempts	The number of attempts to perform calibration.
	Flow Control	The system moves to flow check location and will adjust to a fluid pressure to meet the target flowrate. Stroke adjustments and nozzle size may also be used to achieve the target flowrate.

4.6 Program Setup for Volume Monitoring

Volume monitoring of coating commands allows for corrective and error actions to be performed if volume dispensed is outside the respective tolerance bands.

To perform program setup for volume monitoring:

See Table 4-2 for a description of flow measurement commands.

1. Bracket the coating instructions for the volume to be monitored (Figure 4-10).
 - a. Insert the **Begin Flow Measurement**  instruction.
 - b. Insert the **End Flow Measurement**  instruction.
2. Run flow control several times to achieve a consistent stable flow rate.
3. Run the program instructions a minimum of four (4) times to achieve a stable volume reading for the program.



NOTE If coating commands are adjusted or modified, repeat Step 3 and update target volume.

4. Enter the **Target Volume (cc)** obtained from Step 3 obtained.
5. Select the **Warning Procedure Name**.
6. Enter the **Warning Tolerance (+/- cc)**.
7. Select the **Error Procedure Name**.
8. Enter the **Error Tolerance (+/- cc)**.
9. For correction action programming, see [4.7 Corrective Action Programming](#).

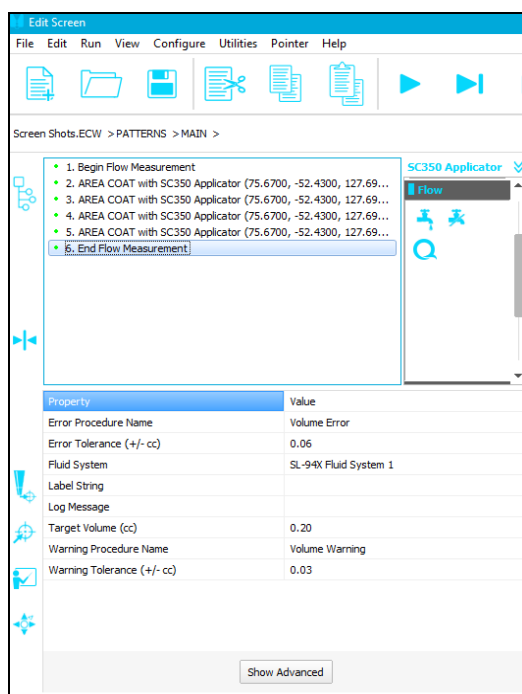


Figure 4-10 Flow Measurement Commands

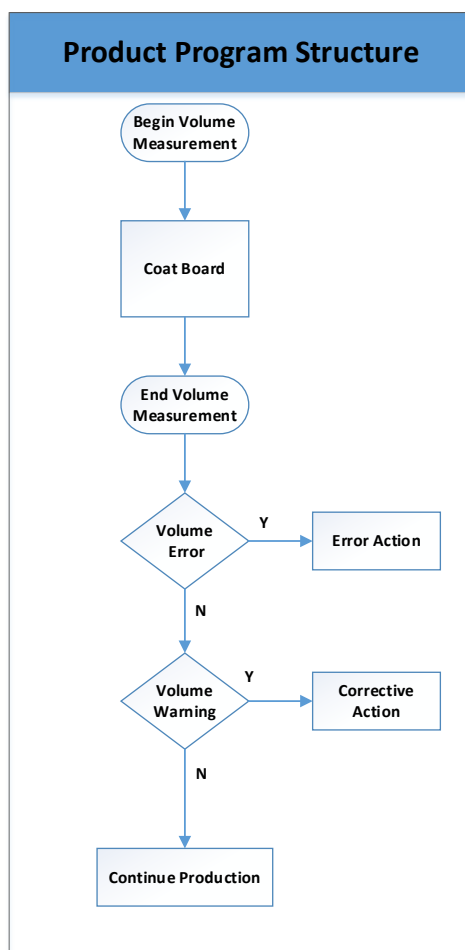


Figure 4-11 Product Program Structure

Table 4-2 Description of Flow Measurement Commands

Property	Description
Begin Flow Measurement	When to begin measuring volume dispensed.
End Flow Measurement	When to end measuring volume dispensed.
Error Procedure Name	The procedure called for error action.
Error Tolerance (+/- cc)	The tolerance for when to call error action.
Fluid System	The system the applicator and flow meter are connected to.
Label String	Not used.
Log Message	Text to preface the volume reading in the log file.
Target Volume (cc)	The target volume for bracketed coating commands.
Warning Procedure Name	The procedure called for corrective action.
Warning Tolerance (+/- cc)	The tolerance for when to call then corrective action.

4.7 Corrective Action Programming

A corrective action is triggered when the volume dispensed is outside the “Warning Tolerance”. Qadence Closed-Loop Flow Control and Laser Fan Width Control are corrective action control algorithms that will recalibrate the flow rate or fan width respectively when executed. Typical placement is in an independent procedure that is called from the warning band procedure call.

To program a corrective action:

See Table 4-3 for a description of flow control options.

1. Select or create the desired procedure.
2. Select the Flow category from the EasyCoat instruction list (Figure 4-12).
3. Select the **Flow Control**  to insert the flow control instruction into the procedure.
4. Select the **Control Type**.

 **NOTE** Typical control type for corrective action is Auto-Adjust. Cycle time should be considered if using Calibrate control type.

5. Enter an **Error Procedure Name**.
6. Select the applicable **Tool**.
7. For error action programming, see [4.8 Error Action Programming](#).

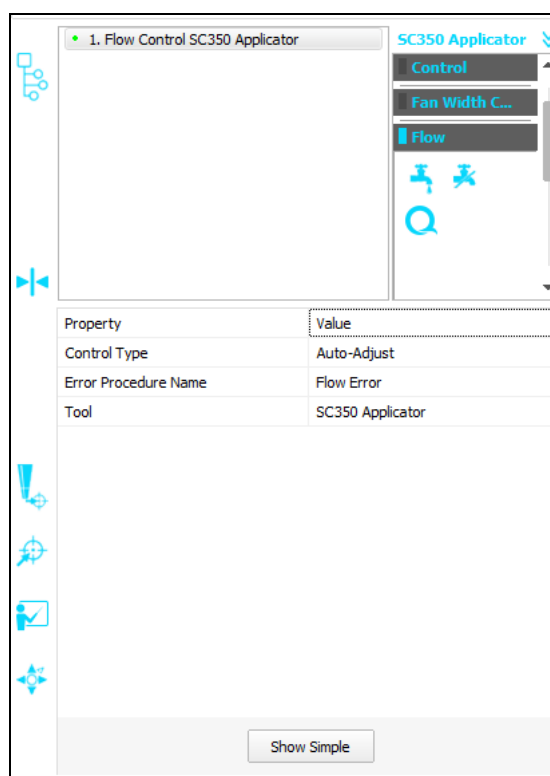


Figure 4-12 Flow Control Options

Table 4-3 Description of Flow Control Options

Property	Item	Description
Control Type	Calibrate	Calibration routine that uses the purge cup location and adjusts fluid pressure to achieve the target flowrate. Can provide most accurate readings for small volume programs.
	Measure	Measures the flowrate. Uses the purge cup location and measures the flowrate without adjustment.
	Auto-Adjust	Adjusts fluid pressure automatically using previous products data. Minimizes fluid waste while maximizing productivity by adjusting fluid pressure automatically using previous product data.
Error Procedure Name		The procedure is automatically called if the flowrate is outside the allowable limit after number of attempts have been exhausted.
Tool		Applicator that will use flow control.

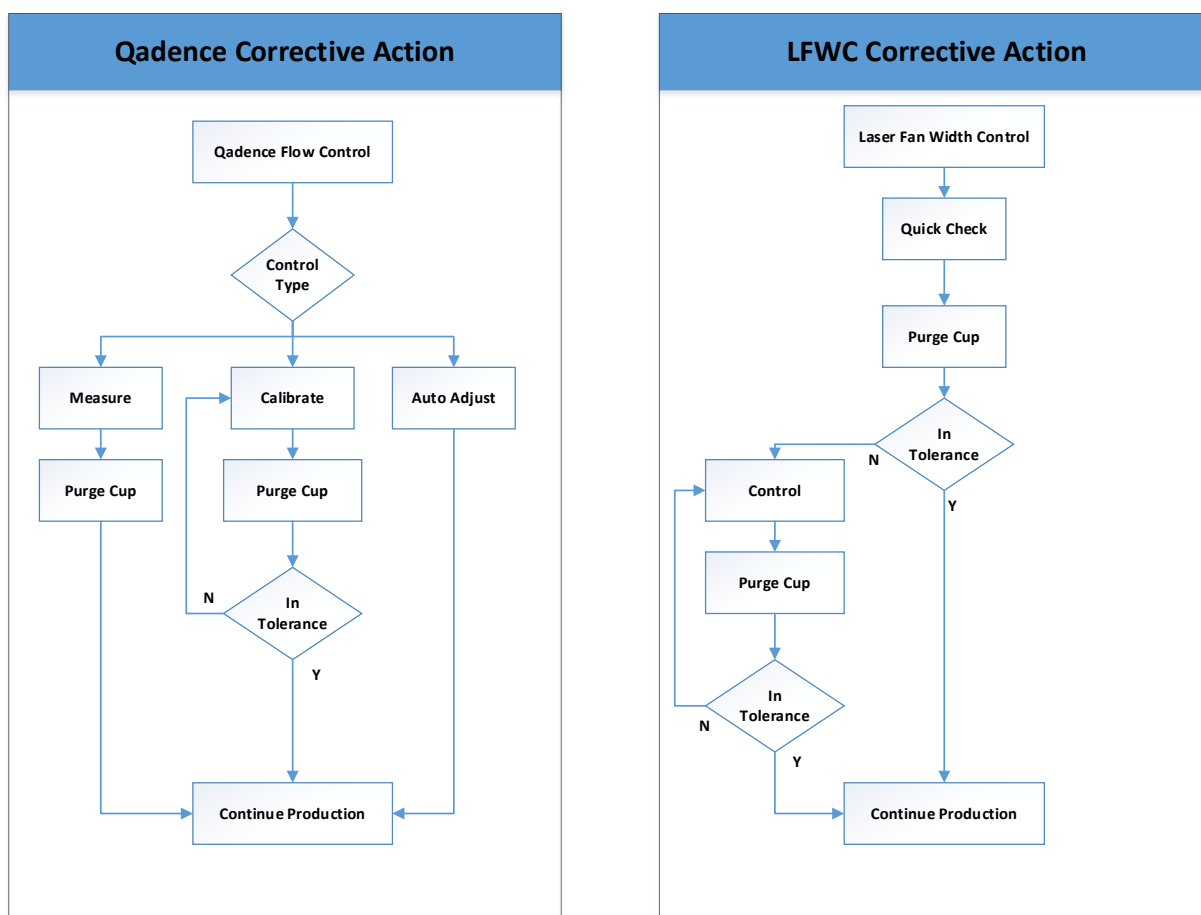


Figure 4-13 Corrective Action Flow Charts

Table 4-4 Description of Laser Fan Width Corrective Actions

Property	Description
Quick Check	Refer to the <i>Laser Fan Width Control Manual</i> .
Control	Refer to the <i>Laser Fan Width Control Manual</i> .

4.8 Error Action Programming

The error action is triggered when the volume dispensed is outside the “Error Tolerance”. Typical error action is stopping production and alerting the operator. More advanced options, like serial number flagging can be achieved with MES or FIS.

To program an error action:

See Table 4-5 for a description of error action options.

1. Select or create the desired procedure (Figure 4-14).
2. Insert **Log Message**.
3. Select **Event Level**.
4. Enter the **Log Message**.

 **NOTE** If desired, insert a laser fan width control or Qadence flow control instruction.

5. Select control type “Calibrate” for Qadence.

 **NOTE** For serial number flagging, with message, contact Technical Support.

6. For programming a corrective action in a periodic procedure, see [4.9 Programming a Corrective Action in a Periodic Procedure](#).

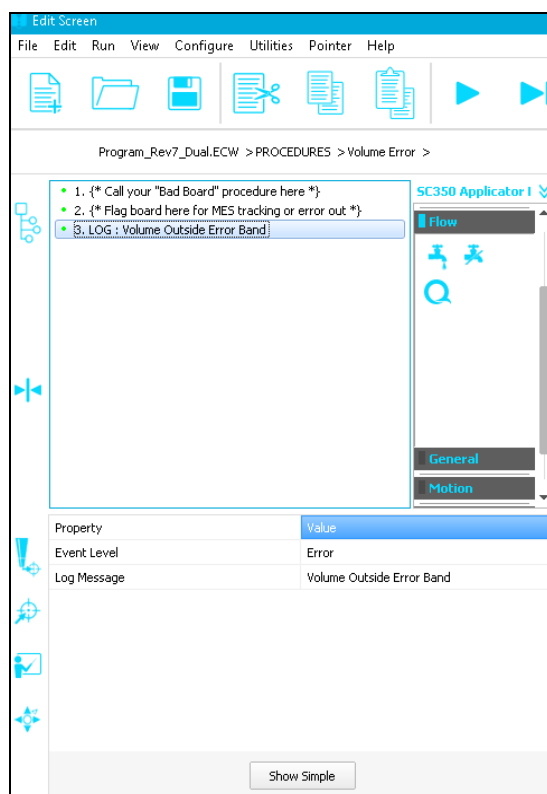


Figure 4-14 Error Action Options

Table 4-5 Description of Error Action Options

Property	Item	Description
Event Level	Event	Logs event in event viewer.
	Warning	Logs warning in event viewer.
	Error	Logs error and stop production.
Log Message		Desired log message.

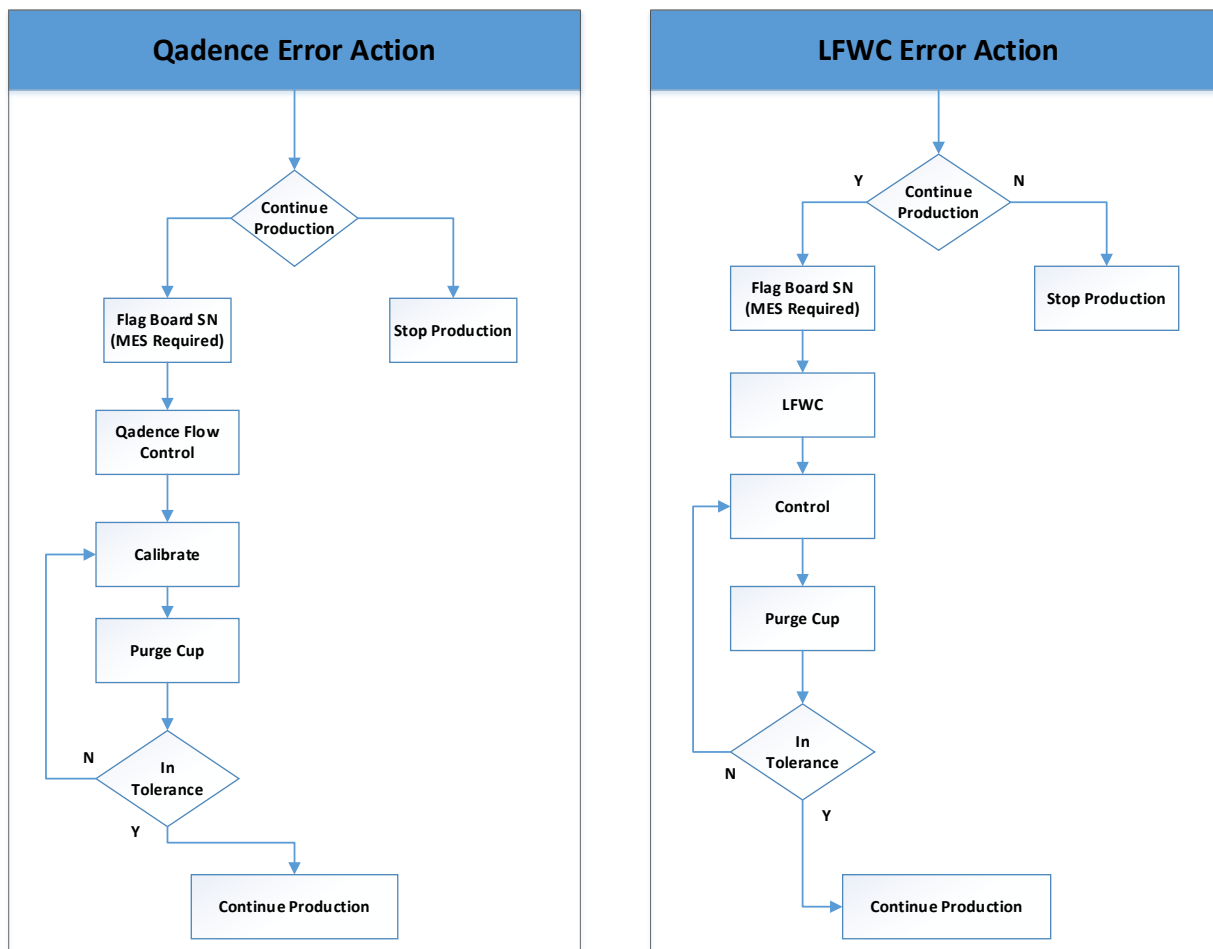


Figure 4-15 Error Action Flow Charts

Table 4-6 Description of Control Error Actions

Property	Description
Calibrate	Calibration routine that uses the purge cup location and adjusts fluid pressure to achieve the target flowrate.
Control	Refer to the <i>Laser Fan Width Control Manual</i> .

4.9 Programming a Corrective Action in a Periodic Procedure

If desired, corrective actions can be triggered in a periodic. The “End Flow Monitoring” instruction sets a “Status” flag each time it executes. Variable states include, “Ok”, “Warning”, and “Error”. The flag will be cleared after successful completion of any Qadence control types.

4.9.1 Activate the Periodic Procedure

To activate the periodic procedure:

See Table 4-7 for a description of periodic settings.

1. From the EasyCoat Edit Screen, select **Configure > Production**.
 - > The Production Configuration window opens (Figure 4-16).
2. Click on **Add Periodic Task**.
3. Select **Count** from the drop-down list in the **Mode** textbox.
4. Enter 1 (one) or greater for the value in the **Period (Products)** textbox.
5. Click on **OK**.
 - > You will return to the Edit Screen.

Production Configuration

Idle Settings

☐ Enable Idle Timer Timer Period: 0.000 sec

☐ Enable During Idle Timer Timer Period: 0.000 sec

Periodic Settings

Property	Value
Description	Volume Error
Mode	Count
Period (Products)	1

Add Periodic Task

Startup

☐ AutoStart AutoStart Delay: 10 sec

Homing

☐ Prompt Before Home

OK Cancel

Figure 4-16 Periodic Settings Window

Table 4-7 Description of Periodic Settings

Property	Item	Description
Mode	Count	Number of products.
Period (Products)		The number entered represents how many products will be processed before a periodic procedure is run.

6. Select or create a periodic procedure (Figure 4-17).
7. Create an "If" statement: ((SL-94X Fluid System Left Volume Status)=(Warning))
8. Insert flow control into the created "If" statement.
9. Insert end instruction.
10. For data logging, see [4.10 Data Logging](#).

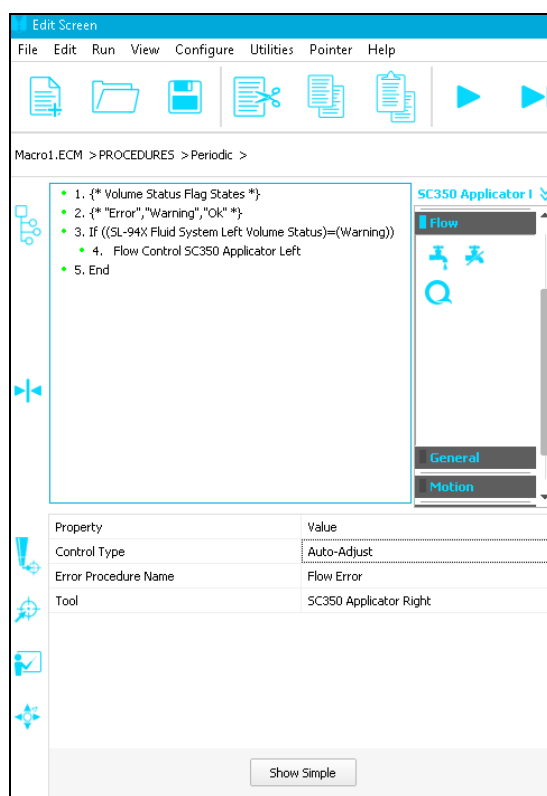


Figure 4-17 Periodic Procedure Calling Corrective Action Procedure Example

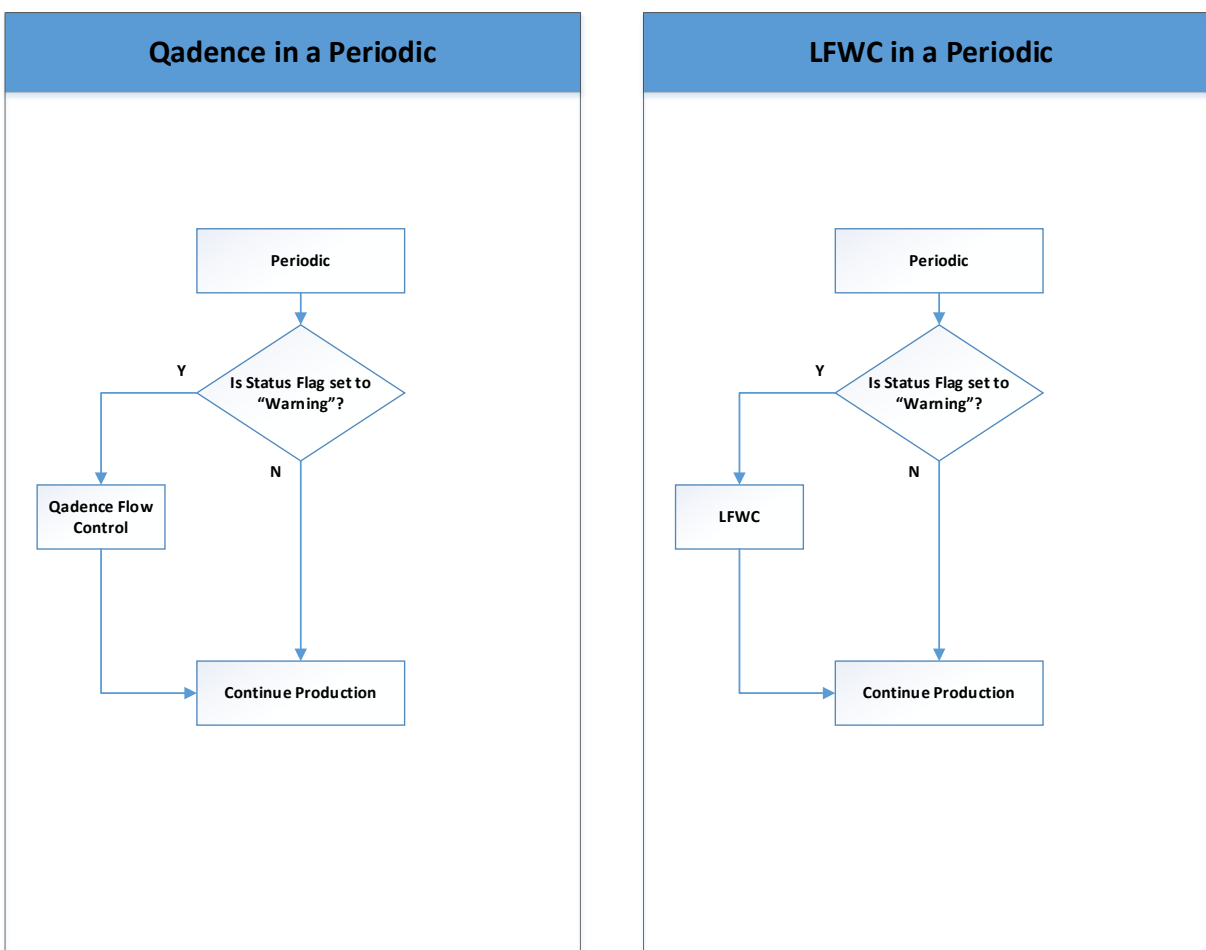


Figure 4-18 Periodic Flow Charts

Table 4-8 Description of Qadence in a Periodic

Property	Item	Description
Control Type	Calibrate	Calibration routine that uses the purge cup location and adjusts fluid pressure to achieve the target flowrate. Can provide most accurate readings for small volume programs.
	Auto Adjust	Adjusts fluid pressure automatically using previous products data. Minimizes fluid waste while maximizing productivity by adjusting fluid pressure automatically using previous product data.
	Measure	Measures the flowrate. Uses the purge cup location and measures the flowrate without adjustment.
Error Procedure Name		The procedure is automatically called if the flowrate is outside the allowable limit after number of attempts have been exhausted.
Tool		Applicator that will use flow control.

Table 4-9 Description of Laser Fan Width Control in a Periodic

Property	Description
LFWC	Refer to the <i>Laser Fan Width Control Manual</i> .

4.10 Data Logging

A new data file folder is created each day and is located at:
"C:\Program Files\Nordson Corporation\EasyCoat(r) 6\Data".

4.10.1 Flowrate Control Data Logging

Flowrate control data logging provides a history of flowrate control.

To access data logging:

1. Double click on the **FlowData(YYYY, MM, DD).log** file (Figure 4-19).
 - > Flow data string is formatted as:
<MM/DD/YYYY, HH:MM:SS, AM/PM, Target Flowrate, Measured Flowrate, Fluid Pressure>.

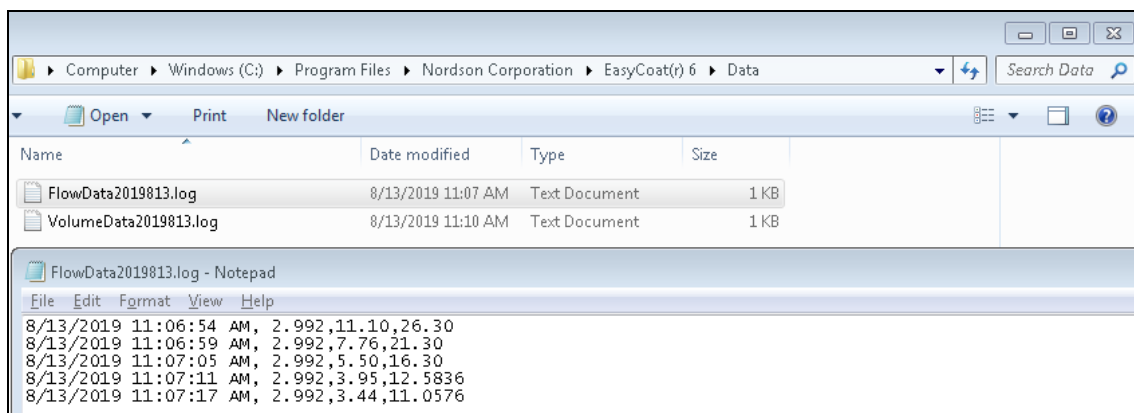


Figure 4-19 Flowrate Control Data Logging

4.10.2 Volume Data Logging

Volume data logging provides a history of volume dispensed.

To access volume data logging:

1. Double click on the **VolumeData(YYYY, MM, DD).log** file (Figure 4-20).
 - > Volume data string is formatted as:
<MM/DD/YYYY, HH:MM:SS, AM/PM, Program Name, Fluid System, Volume, cc>.

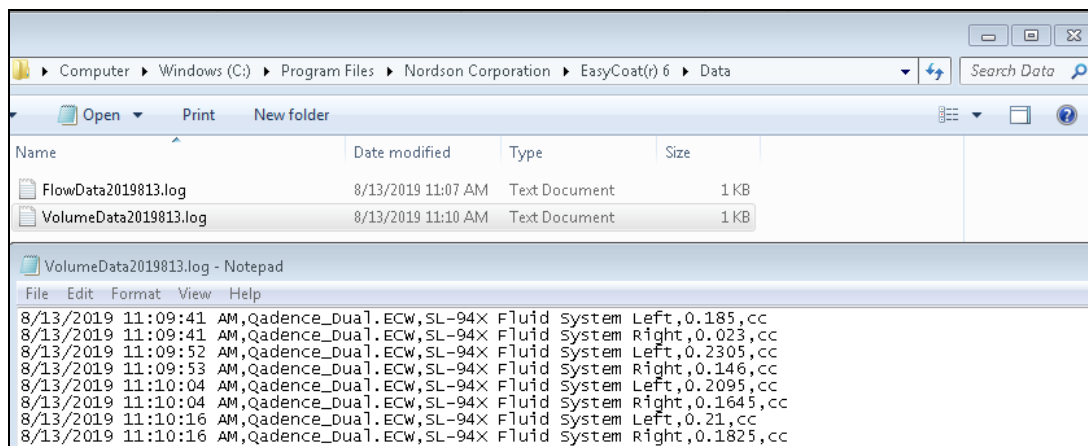


Figure 4-20 Volume Data Logging

5 Maintenance and Service

5.1 Overview

Performing the recommended maintenance and service procedures at suggested intervals increases the life of your flow control and ensures high quality coating performance for every production run. This section contains the following topics:

- [Recommended Facility Items](#)
- [Extended Idle, Storage, or Fluid System Service](#)
- [Replacing the Flow Meter Assembly](#)
- [Flow Meter Calibration](#)
- [Replacing the Flow Meter Cable](#)

5.2 Safety First

Qadence Closed-Loop Flow Control operation 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.

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 Extended Idle, Storage, or Fluid System Service



WARNING! If the conformal coating system is to remain idle for an extended period of time or service is required on a system component, flushing the system is required to prevent fluid from curing within the fluid system. If the system is not properly flushed prior to an extended idle, fluid system components may require replacement. Do not store the meter dry. Without solvent, residual fluid may cure and require replacement.



WARNING! If removing any fluid system components, fill with coating material's recommended solvent and seal fittings. Always store used fluid system components with manufacturers recommended solvent.

5.4.1 Fluid System Flushing Routine

The fluid system flushing routine is applicable to a non-circulating system.



WARNING! DO NOT use the same fluid system with a new material after a silicone material was used through the flow meter.



WARNING! Urethanes, co-polymers, and silicones, once cross-linked, cannot be removed from the flow meter. It is imperative that a complete solvent flush is performed prior to any extended idles, shutdowns, or services.



WARNING! Urethanes, co-polymers, and silicones must not be allowed to sit in the fluid system and flow meter for extended periods. Cured or partially cured fluid in the flow meter is not a warranty failure.



WARNING! Do not use abrasives, filler materials, water, steam, or compressed air through the flow meter. Only non-aqueous solutions should be run through the flow meter.



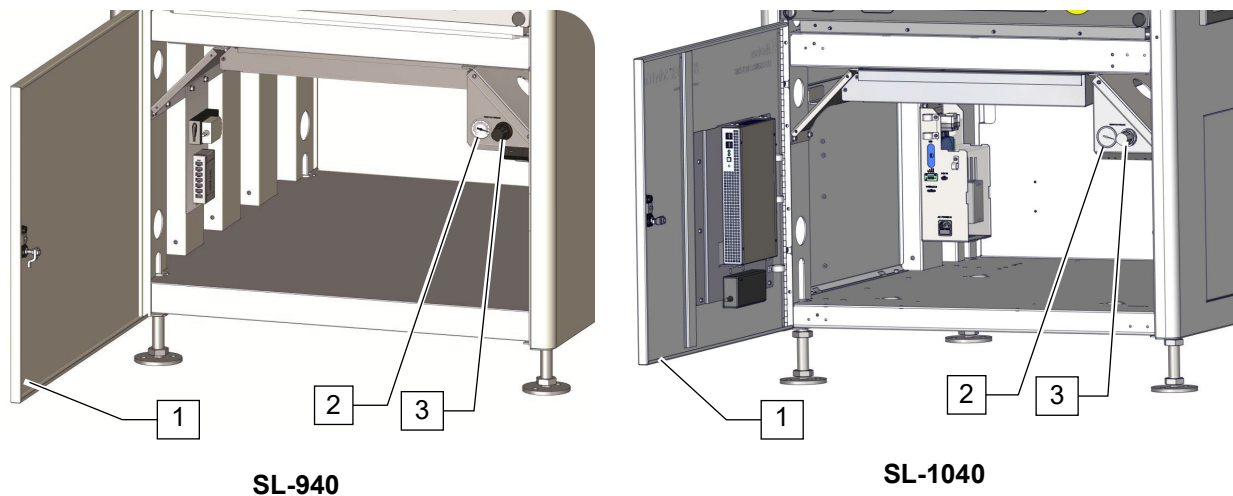
WARNING! Follow SDS recommendations for the proper handling and disposal of all materials when flushing the fluid system. Always wear appropriate Personal Protective Equipment (PPE) as recommended by facility safety practices and the material manufacturer's SDS. To prevent eye injury or irritation, wear safety goggles while performing this procedure.

Tools and Materials Needed:

- Recommended Manufacturers Solvent

To perform the flushing routine:

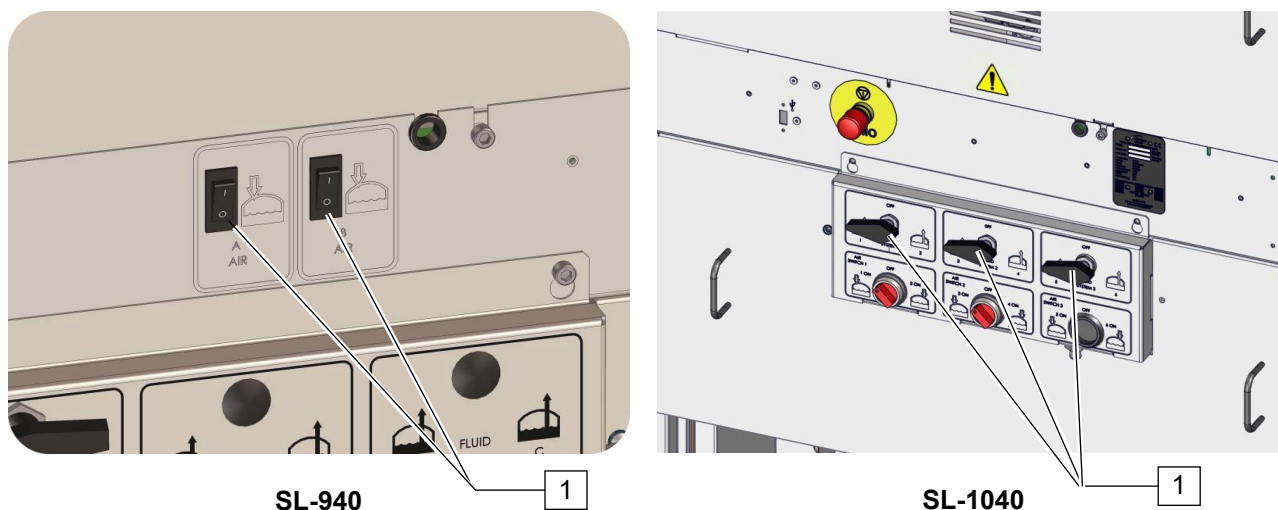
1. Reduce the fluid pressure of the correct fluid system to 0 kPa (0 psi).
 - > Refer to the *EasyCoat User Guide* or EasyCoat Help for instructions on adjusting fluid pressure.
2. Rotate the reservoir pressure regulator adjustment knob counterclockwise until the reservoir pressure gauge registers zero (0) psi (Figure 5-1).



Item	Description
1	Lower Cabinet Door
2	Reservoir Pressure Gauge
3	Reservoir Pressure Regulator

Figure 5-1 Lower Front Cabinet

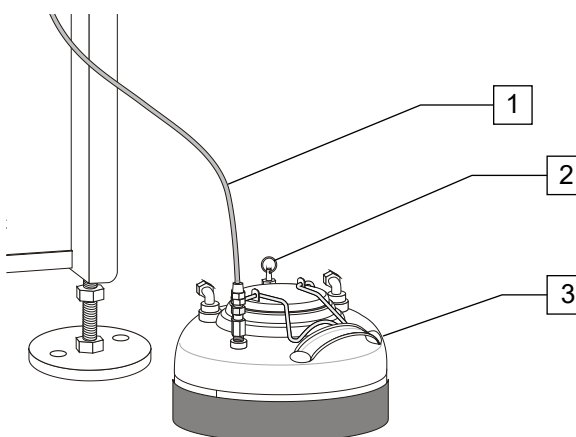
3. For the SL-940, turn reservoir air pressure switches to the **OFF (0)** position, or turn reservoir switches to the **OFF (0)** position for the SL-1040 (Figure 5-2).



Item	Description
1	Reservoir Air Pressure Switches (A & B)

Figure 5-2 Reservoir Air Pressure Switches

4. Relieve residual pressure in the fluid system by opening the pressure relief valve on the fluid reservoir (Figure 5-3).



Item	Description
1	Fluid Line
2	Pressure Relieve Valve
3	Fluid Reservoir

Figure 5-3 Fluid Reservoir

5. Connect the fluid line to a solvent reservoir or switch the material change over fluid valve (Figure 5-3).
6. Set reservoir and fluid pressures to 68.94 kPa and 34.47 kPa (10 and 5 psi) respectively.
7. Put the filter drain hose in a waste container and slowly open the filter drain valve.

8. For the SL-940, turn reservoir air pressure switches to the **ON (I)** position, or turn reservoir switches to the **ON (I)** position for the SL-1040.
9. Flush filter until solvent runs clear and close filter drain valve.



WARNING! Failure to drain and flush the filter housing properly will prevent all material from being flushed from the fluid system.

10. Put waste container under applicator.
11. Open the applicator.
12. Flush system with entire contents of solvent reservoir.
13. Drain residual fluid from filter, repeat Step 7 through Step 9.
14. If needed, refill solvent reservoir and repeat the procedure until the fluid system is completely flushed.
15. Once the fluid system is flushed, perform one of the following steps:
 - a. Prime the fluid system with the appropriate coating material, see [3.6 Priming the Fluid System](#).
 - b. If the fluid system will remain idle, prime the fluid system with manufacturer's solvent, see [3.6 Priming the Fluid System](#).

5.5 Replacing the Flow Meter Assembly



WARNING! If the conformal coating system is to remain idle for an extended period of time or service is required on a system component, flushing the system is required to prevent fluid from curing within the fluid system. If the system is not properly flushed prior to an extended idle, fluid system components may require replacement. Do not store the meter dry. Without solvent, residual fluid may cure and require replacement.



WARNING! If removing any fluid system components, fill with coating material's recommended solvent and seal fittings. Always store used fluid system components with manufacturers recommended solvent.



WARNING! Urethanes, co-polymers, and silicones, once cross-linked, cannot be removed from the flow meter. It is imperative that a complete solvent flush is performed prior to any extended idles, shutdowns, or services.



WARNING! Urethanes, co-polymers, and silicones must not be allowed to sit in the fluid system and flow meter for extended periods. Cured or partially cured fluid in the flow meter is not a warranty failure.



WARNING! Do not use abrasives, filler materials, water, steam, or compressed air through the flow meter. Only non-aqueous solutions should be run through the flow meter.



WARNING! Follow SDS recommendations for the proper handling and disposal of all materials when flushing the fluid system. Always wear appropriate Personal Protective Equipment (PPE) as recommended by facility safety practices and the material manufacturer's SDS. To prevent eye injury or irritation, wear safety goggles while performing this procedure.

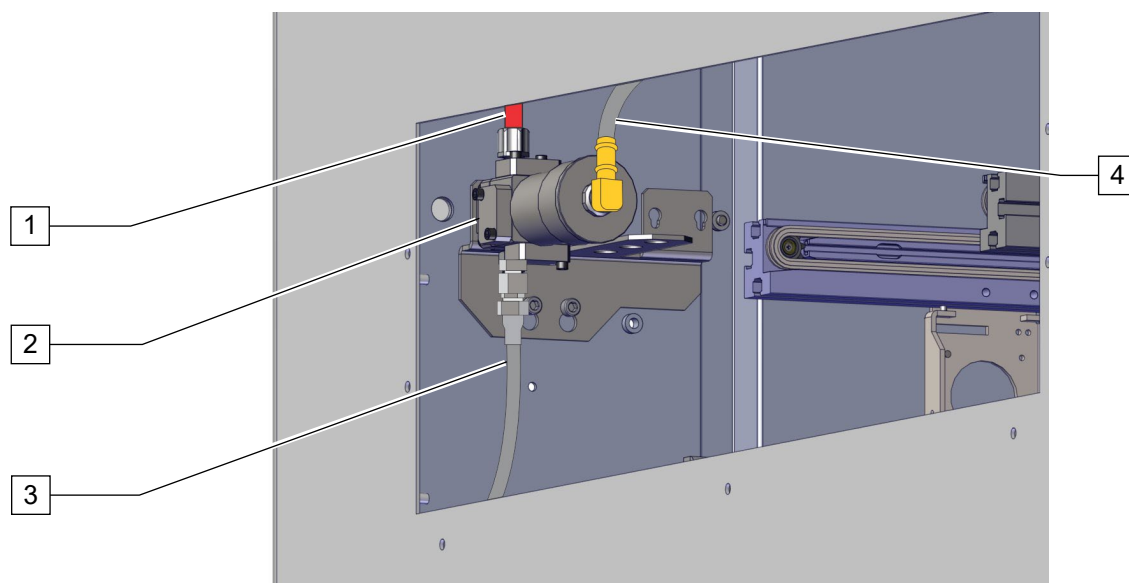
To remove the flow meter assembly:

1. Perform a fluid system flushing routine, see [5.4.1 Fluid System Flushing Routine](#).
 - > If a solvent is used to flush the system, make sure the fluid lines are clean and dry before resuming operations.
2. Perform a service shutdown. Refer to the applicable Installation, Operations, and Maintenance Manual.
3. Open the left side curtain.
4. Disconnect the flow meter cable from the flow meter assembly (Figure 5-4).
5. Disconnect the red fluid line from the flow meter assembly.



WARNING! Do not allow particles of PTFE tape and Loctite to enter the fluid line as this will contaminate the fluid system.

6. Disconnect the braided fluid line from the flow meter assembly.



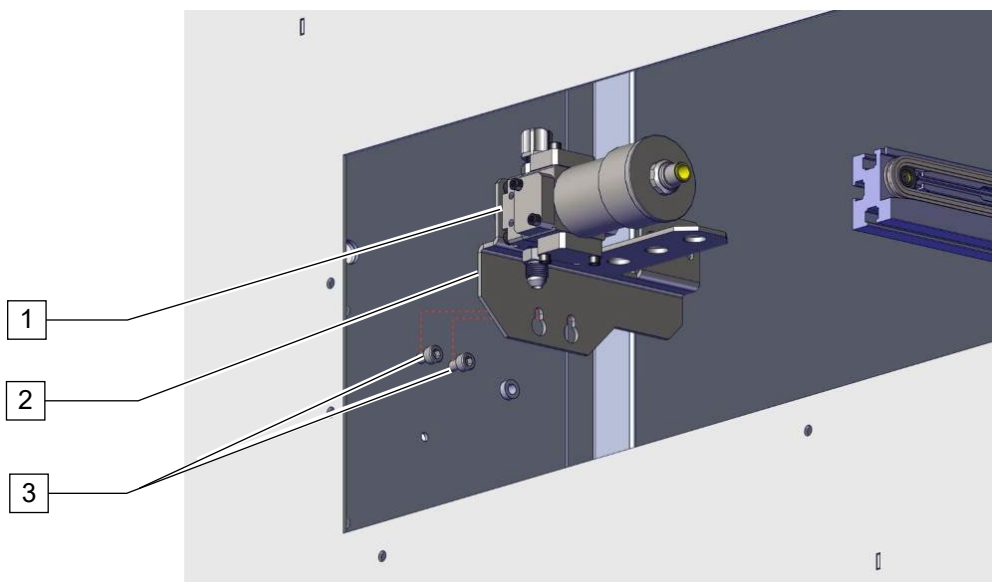
Item	Description
1	Red Fluid Line
2	Flow Meter Assembly (Item 2)
3	Braided Fluid Line
4	Flow Meter Cable (Item 4)

*Figure 5-4 Disconnecting the Cable and Fluid Lines
(View Through Left Side Curtain)*



WARNING! Do not allow particles of Loctite to enter the fluid line as this will contaminate the fluid system.

7. Loosen, but do not remove, two (2) screws, securing the flow control bracket to the conformal coating system (Figure 5-5).
8. Remove the flow control bracket with the flow meter assembly.



Item	Description
1	Flow Meter Assembly (Item 2)
2	Flow Control Bracket (Item 5)
3	Screws (2)

*Figure 5-5 Flow Meter Assembly Removal
(View through Left Side Curtain)*

To install the flow meter assembly:

1. Install the flow meter assembly, see [3.4.2 Installing the Flow Meter Assembly](#) for the SL-940 or see [3.5.2 Installing the Flow Meter Assembly](#) for the SL-1040.
2. Prime the fluid system with the appropriate coating material, see [3.6 Priming the Fluid System](#).

5.6 Flow Meter Calibration



NOTE The flow meter is a positive displacement meter and field calibration is not required.

1. If calibration is desired, perform the following steps.
2. In the ECW.ini file, set milliliterspercount=1.
3. Using the flow monitoring instructions and a spot command, dispense a volume into a high-resolution graduated cylinder or scale cup.
4. If a scale cup is used, weigh the sample and convert to volume with specific gravity of material.
5. Divide volume dispensed by the volume reported in the Event Log of the Operator window.
 - > Volume reported with a constant of one (1) is equal to the number of pulses.
6. In the ECW.ini file, set milliliterspercount= (the new constant from Step 5).

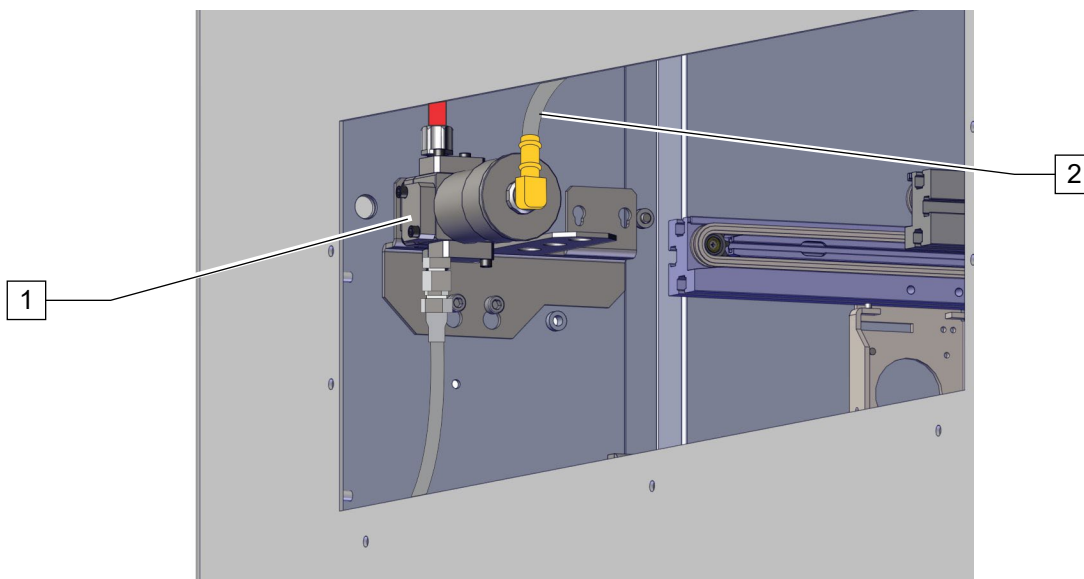
5.7 Replacing the Flow Meter Cable

Tools and Materials Needed:

- Cable Ties
- Loctite 567
- Allen Wrench Set

To remove the flow meter cable:

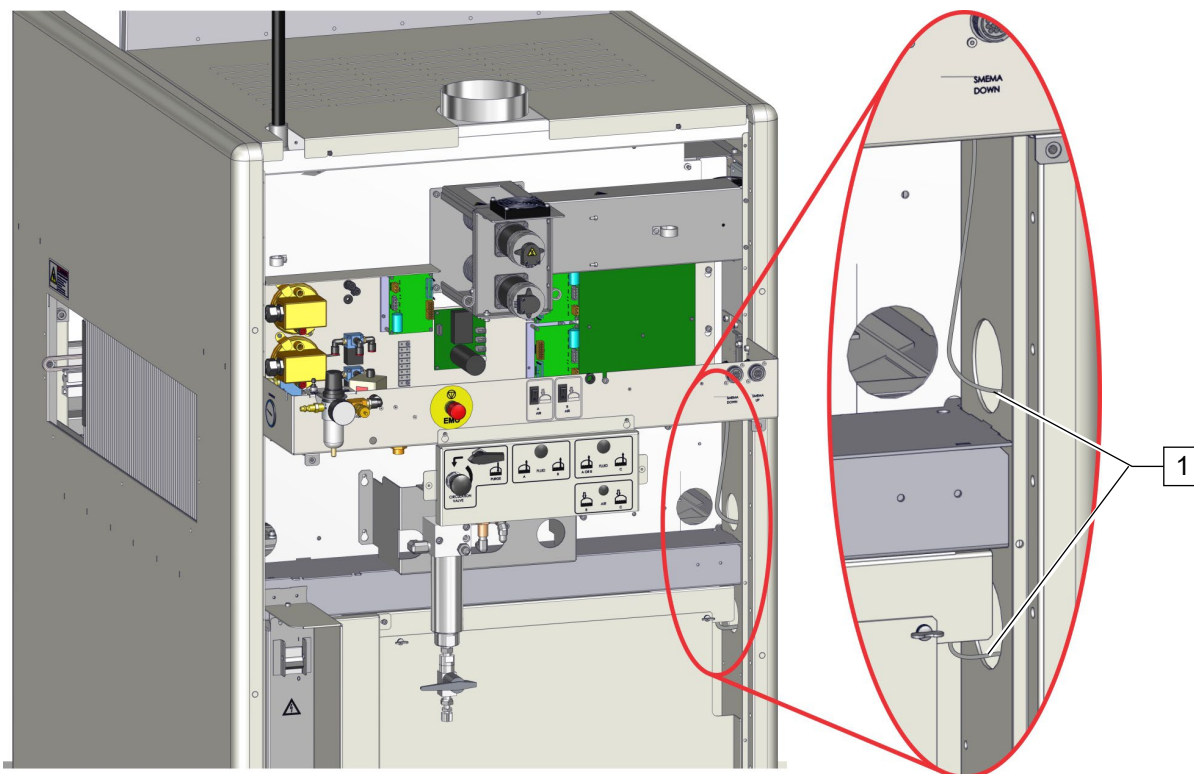
1. Perform a fluid system flushing routine, see [5.4.1 Fluid System Flushing Routine](#).
2. Perform a service shutdown. Refer to the applicable Installation, Operations, and Maintenance Manual.
3. Open the left curtain on the conformal coating system.
4. Disconnect the flow meter cable from the flow meter assembly (Figure 5-6).



Item	Description
1	Flow Meter Assembly (Item 2)
2	Flow Meter Cable (Item 4)

Figure 5-6 Flow Meter Cable Removal (1)
(View Through Left Side Curtain)

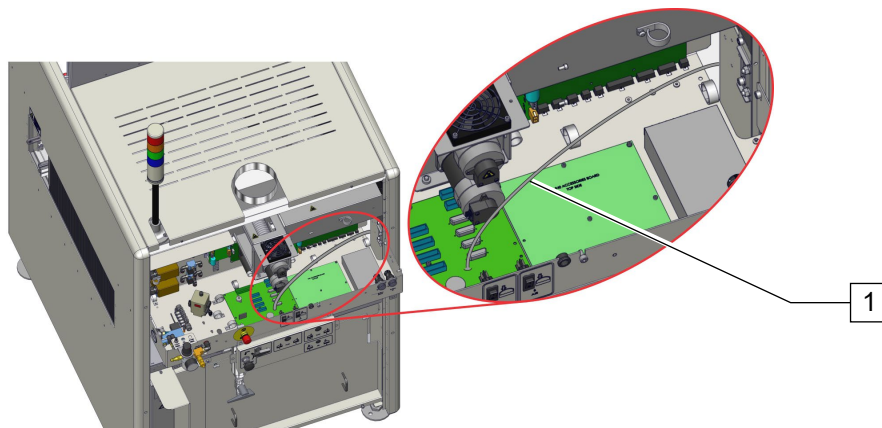
5. For the SL-940, follow the routing of the flow meter cable, remove the cable ties as you remove the flow meter cable from the conformal coating system (Figure 5-7).



Item	Description
1	Flow Meter Cable (Item 4)

Figure 5-7 Flow Meter Cable Removal (SL-940) (2)

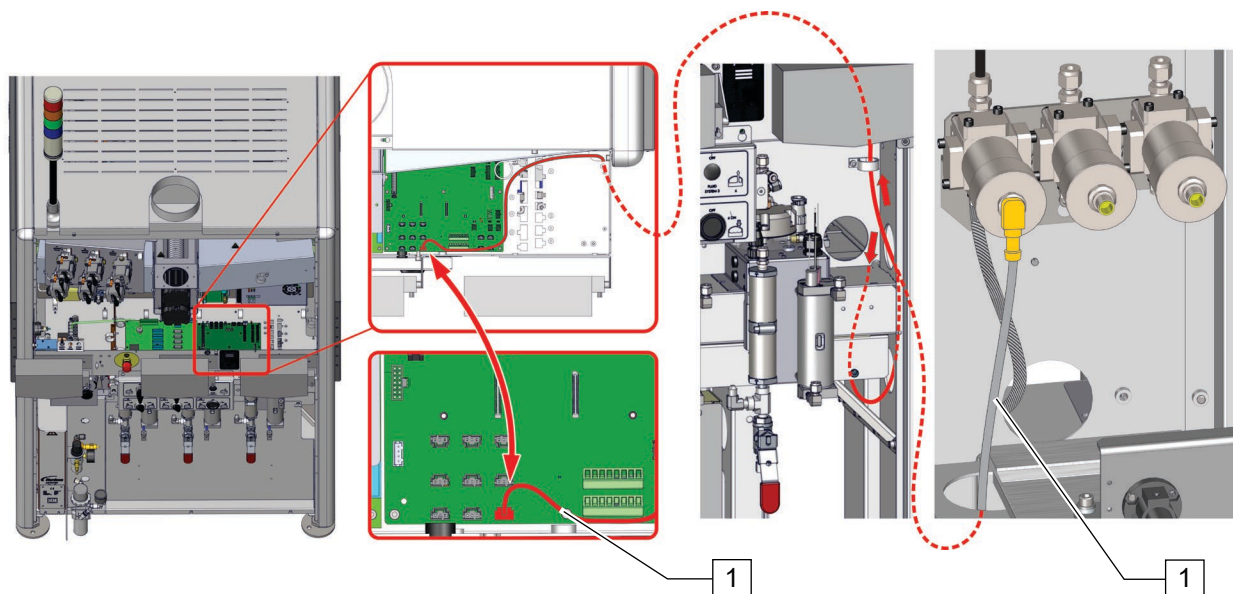
- Disconnect the flow meter cable to J29 (Flow Meter 1) or J22 (Flow Meter 2), depending on your flow control configuration (Figure 5-8).
- Discard the flow meter cable.



Item	Description
1	Flow Meter Cable (Item 4)

Figure 5-8 Flow Meter Cable Removal (SL-940) (3)

6. For the SL-1040, follow the routing of the flow meter cable, remove the cable ties as you remove the flow meter cable from the conformal coating system (Figure 5-9).
 - a. Disconnect the flow meter cable to J29 (Flow Meter 1) or J22 (Flow Meter 2), depending on your flow control configuration (Figure 5-9).
 - b. Discard the flow meter cable.



Item	Description
1	Flow Meter Cable (Item 4)

Figure 5-9 Removing the Flow Meter Cable (SL-1040)

To install the flow meter cable:

1. Connect the cable and fluid lines for the SL-940, see [3.4.3 Connecting the Cable and Fluid Lines](#) or for the SL-1040, see [3.5.3 Connecting the Cable and Fluid Lines](#).
2. Prime the fluid system with the appropriate coating material, see [3.6 Priming the Fluid System](#).

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 identifies troubleshooting symptoms, recovery procedures, hierarchy, and setup variables.



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

6.2 Safety First

Qadence Closed-Loop Flow Control operation 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! 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 Flow Control Troubleshooting

Symptom	Probable Cause	Corrective Action
Error message "Fluid System Error" appears.	Air trapped down stream of meter.	See Air Trapped Down Stream of Meter symptom for corrective actions.
	Wrong fluid system selected.	Select correct fluid system in drop down of flow control window (Figure 4-7).
	Flow meter plumbed to wrong fluid system.	Verify flow meter is connected to the correct physical fluid system.
	Wrong counter number assigned to ECW.ini.	Verify correct meter number assigned in ECW.ini (CounterNumber 0 for Fluid System 1 and CounterNumber 2 for Fluid System 2).
	Flow meter is connected to the wrong input.	Verify meter is connected to the correct input, J29 (Flow Meter 1) or J22 (Flow Meter 2).
	Nozzle is clogged.	Remove and clean nozzle.
	Applicator On/Off button is Off.	Turn on applicator button.
	Reservoir or fluid pressure is too low.	Increase both pressures. Ensure reservoir pressure is at least 34.47 kPA (5 psi) greater than the fluid pressure.

Symptom	Probable Cause	Corrective Action
Flow meter reading is 0, but fluid is coming out of nozzle.	Wrong fluid system selected.	Select correct fluid system in drop down of flow control setup window (Figure 4-7).
	Flow meter is plumbed to wrong fluid system.	Verify flow meter is connected to the correct physical fluid system.
	Wrong counter number assigned in ECW.ini.	Verify correct meter number assigned in ECW.ini (CounterNumber 0 for Fluid System 1 and CounterNumber 2 for Fluid System 2).
	Flow meter is connected to the wrong input.	Verify meter is connected to the correct input, J29 (Flow Meter 1) or J22 (Flow Meter 2).
Flow meter is reading is unstable or varying greatly.	Air trapped down stream of meter.	See air trapped down stream of meter symptom for corrective actions.
Control loop is overshooting.	Air trapped down stream of meter.	See air trapped down stream of meter symptom for corrective actions.
	Measurement duration is too short.	Increase duration. Need > 0.1 ml.
	Increase dwell timers.	Increase to 1 second. More than 1 second is not needed.
Flow rate calculator is not accurate.	One or more inputs is not accurate.	1) Review target inputs and update appropriately. 2) Dry/wet thickness and solvent content review. 3) Adjust parameters to achieve preferred coating results. 4) Adjust bias to achieve preferred coating pattern.
	Other factors affect coating pattern outcome (ie. Board topography and surface tension).	Adjust bias to achieve preferred coating pattern.
Maximum or minimum pressure limit reached.	Nozzle or stroke setting.	Increase or decrease nozzle size to stroke accordingly.
Air trapped down stream of meter.		1) Run an extended purge. 2) Increase fluid pressure (adjust either stroke or other parameters to achieve target nozzle flowrate). 3) Increase volume of fluid dispensed (dispense time) during calibration routine. 4) Perform an inverted purge. See 3.6 Priming the Fluid System , using coating fluid instead of solvent. 5) Reprime the system, see 3.6 Priming the Fluid System .

7 Parts Replacement

7.1 Overview

This section includes general information for ordering recommended spares and replacement parts for your flow control.



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

Qadence Closed-Loop Flow Control operation 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 Nordson 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 | • Billing Address |
| • Shipping Address | • Part Number and Description of Part |
| • Purchase Order Number | • Quantity |
| • Coating System Serial Number
(found on back panel) | • 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, Nordson 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 Nordson 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.

Table 7-1 Flow Control - Illustrated Parts List

Kit Part Number	Kit Name	Item Number	Description	Quantity
6122200	OPT, SGL QADENCE, CONTROL (SL-940)			
		1,2,3,4,5	ASSY, SGL FLOW METER, SL-94X	1
6651330	OPT, BRKT+1X_QADENCE, CONTROL (SL-1040)			
			SCREW, M6 X 1.0 SOCKET X 12	
		1,2,3,4,5	ASSY, BRKT+1X, FLOW METER, SL-1040	
SOLD AS INDIVIDUAL PARTS				
		8	SCREEN, REINFORCED, 10um (.0004")	

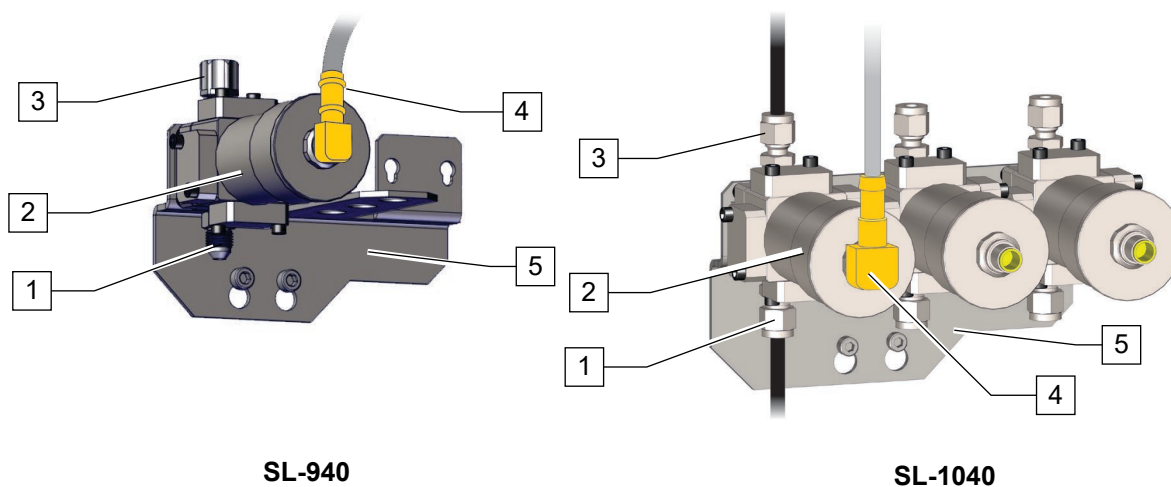


Figure 7-1 Illustrated Parts



Electronics Solutions

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www.nordson.com/electronics