

Encore[®] Mobile Powder Spray System with Feed Hopper

Customer Product Manual
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Section 1

Safety

Introduction

Read and follow these safety instructions. Task- and equipment-specific warnings, cautions, and instructions are included in equipment documentation where appropriate.

Make sure all equipment documentation, including these instructions, is accessible to all persons operating or servicing equipment.

Qualified Personnel

Equipment owners are responsible for making sure that Nordson equipment is installed, operated, and serviced by qualified personnel. Qualified personnel are those employees or contractors who are trained to safely perform their assigned tasks. They are familiar with all relevant safety rules and regulations and are physically capable of performing their assigned tasks.

Intended Use

Use of Nordson equipment in ways other than those described in the documentation supplied with the equipment may result in injury to persons or damage to property.

Some examples of unintended use of equipment include

- using incompatible materials
- making unauthorized modifications
- removing or bypassing safety guards or interlocks
- using incompatible or damaged parts
- using unapproved auxiliary equipment
- operating equipment in excess of maximum ratings

Regulations and Approvals

Make sure all equipment is rated and approved for the environment in which it is used. Any approvals obtained for Nordson equipment will be voided if instructions for installation, operation, and service are not followed.

All phases of equipment installation must comply with all federal, state, and local codes.

Personal Safety

To prevent injury follow these instructions.

- Do not operate or service equipment unless you are qualified.
- Do not operate equipment unless safety guards, doors, or covers are intact and automatic interlocks are operating properly. Do not bypass or disarm any safety devices.
- Keep clear of moving equipment. Before adjusting or servicing any moving equipment, shut off the power supply and wait until the equipment comes to a complete stop. Lock out power and secure the equipment to prevent unexpected movement.
- Relieve (bleed off) hydraulic and pneumatic pressure before adjusting or servicing pressurized systems or components. Disconnect, lock out, and tag switches before servicing electrical equipment.
- Obtain and read Material Safety Data Sheets (MSDS) for all materials used. Follow the manufacturer's instructions for safe handling and use of materials, and use recommended personal protection devices.
- To prevent injury, be aware of less-obvious dangers in the workplace that often cannot be completely eliminated, such as hot surfaces, sharp edges, energized electrical circuits, and moving parts that cannot be enclosed or otherwise guarded for practical reasons.

Fire Safety

To avoid a fire or explosion, follow these instructions.

- Do not smoke, weld, grind, or use open flames where flammable materials are being used or stored.
- Provide adequate ventilation to prevent dangerous concentrations of volatile materials or vapors. Refer to local codes or your material MSDS for guidance.
- Do not disconnect live electrical circuits while working with flammable materials. Shut off power at a disconnect switch first to prevent sparking.
- Know where emergency stop buttons, shutoff valves, and fire extinguishers are located. If a fire starts in a spray booth, immediately shut off the spray system and exhaust fans.
- Clean, maintain, test, and repair equipment according to the instructions in your equipment documentation.
- Use only replacement parts that are designed for use with original equipment. Contact your Nordson representative for parts information and advice.

Grounding



WARNING: Operating faulty electrostatic equipment is hazardous and can cause electrocution, fire, or explosion. Make resistance checks part of your periodic maintenance program. If you receive even a slight electrical shock or notice static sparking or arcing, shut down all electrical or electrostatic equipment immediately. Do not restart the equipment until the problem has been identified and corrected.

Grounding inside and around the booth openings must comply with NFPA requirements for Class II, Division 1 or 2 Hazardous Locations. Refer to NFPA 33, NFPA 70 (NEC articles 500, 502, and 516), and NFPA 77, latest conditions.

- All electrically conductive objects in the spray areas shall be electrically connected to ground with a resistance of not more than 1 megohm as measured with an instrument that applies at least 500 volts to the circuit being evaluated.
- Equipment to be grounded includes, but is not limited to, the floor of the spray area, operator platforms, hoppers, photoeye supports, and blow-off nozzles. Personnel working in the spray area must be grounded.
- There is a possible ignition potential from the charged human body. Personnel standing on a painted surface, such as an operator platform, or wearing non-conductive shoes, are not grounded. Personnel must wear shoes with conductive soles or use a ground strap to maintain a connection to ground when working with or around electrostatic equipment.
- Operators must maintain skin-to-handle contact between their hand and the gun handle to prevent shocks while operating manual electrostatic spray guns. If gloves must be worn, cut away the palm or fingers, wear electrically conductive gloves, or wear a grounding strap connected to the gun handle or other true earth ground.
- Shut off electrostatic power supplies and ground gun electrodes before making adjustments or cleaning powder spray guns.
- Connect all disconnected equipment, ground cables, and wires after servicing equipment.

Action in the Event of a Malfunction

If a system or any equipment in a system malfunctions, shut off the system immediately and perform the following steps:

- Disconnect and lock out electrical power. Close pneumatic shutoff valves and relieve pressures.
- Identify the reason for the malfunction and correct it before restarting the equipment.

Disposal

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

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Section 2

System Setup

Introduction

See Figure 2-1. The Encore Mobile Powder Spray System is a complete manual powder spray system mounted on a sturdy four-wheel cart. The system includes a manual spray gun, two-piece controller, powder pump and pick-up tube, 25- or 50-lb (11.3- or 22.7-kg) powder feed hopper, and all powder and air tubing required for operation.

Follow the procedures in this section to prepare the system for operation.

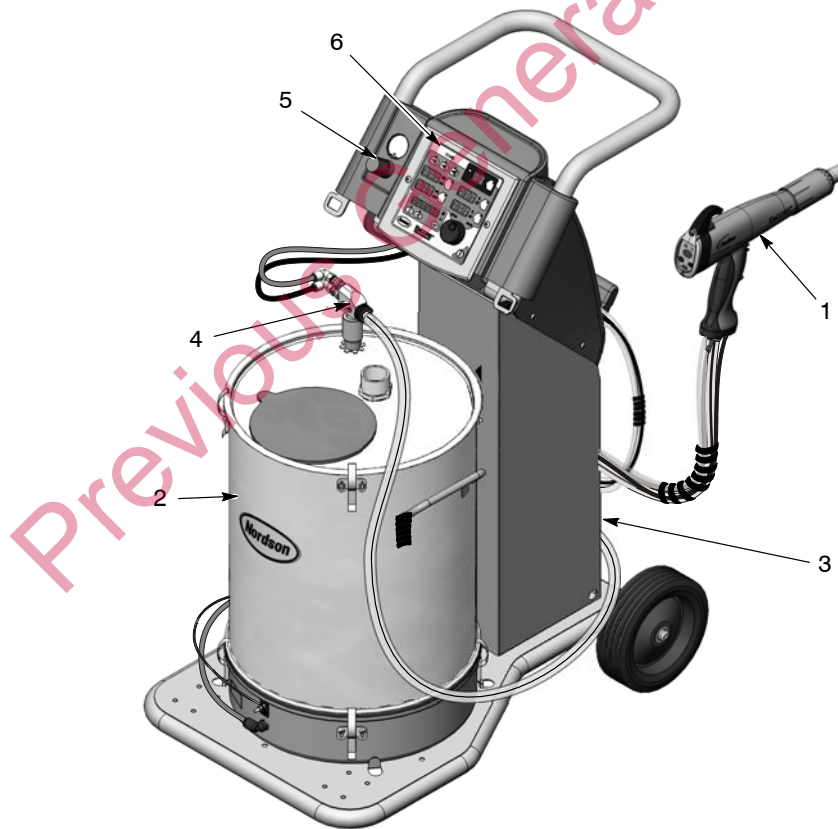


Figure 2-1 Encore Mobile Powder Spray System with Powder Feed Hopper

- | | |
|-----------------------|-----------------------------|
| 1. Encore spray gun | 4. Encore powder feed pump |
| 2. Powder feed hopper | 5. Fluidizing air regulator |
| 3. Cart tower | 6. Spray gun controller |

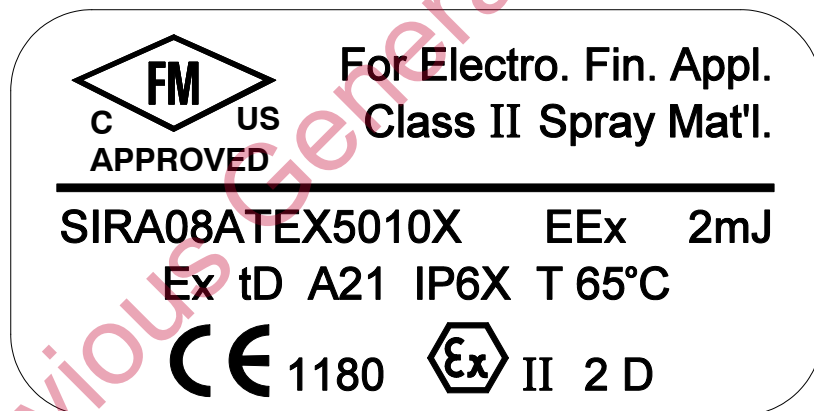
Note: Power unit portion of controller is installed in rear of cart tower.

Specifications

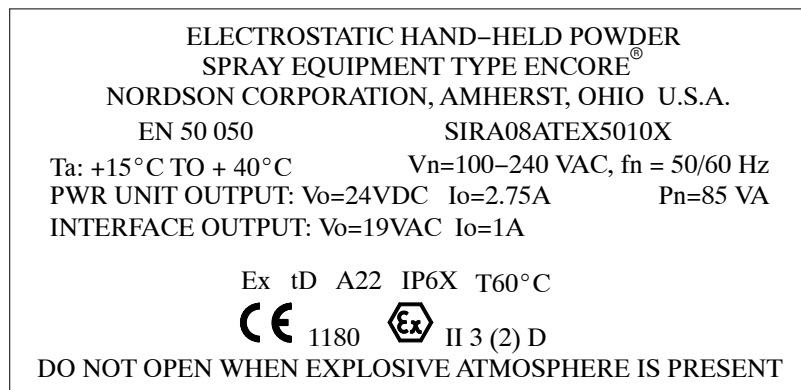
Model	Input Rating	Output Rating
ENCORE Applicator	+/- 19 VAC, 1 A	100 KV, 100 μ A
ENCORE Interface Control Unit	24 VDC, 2.75 A	+/- 19 VAC, 1A
ENCORE Controller Power Unit	100–240 VAC, 50/60 Hz, 85 VA	24 VDC, 2.75 A

- Input Air: 6.0–7.6 bar (87–110 psi), <5 μ particulates, dew point <10 °C (50 °F)
- Max Relative Humidity: 95% non-Condensing
- Ambient Temperature Rating (Encore System): +15 to +40 °C (59–104 °F)
- Hazardous Location Rating for Applicator: Zone 21 or Class II, Division 1
- Hazardous Location Rating for Controls: Zone 22 or Class II, Division 2
- Dust Ingress Protection: IP6X
- Hopper Capacity: 11.3 or 22.7 kg (25 or 50 lb)

Applicator Certification Label



Power Unit and Gun Interface Controllers Certification Label



System Connections

System Diagram

NOTE: This diagram does not show system grounds. The system and its components must all be connected to a true earth ground.

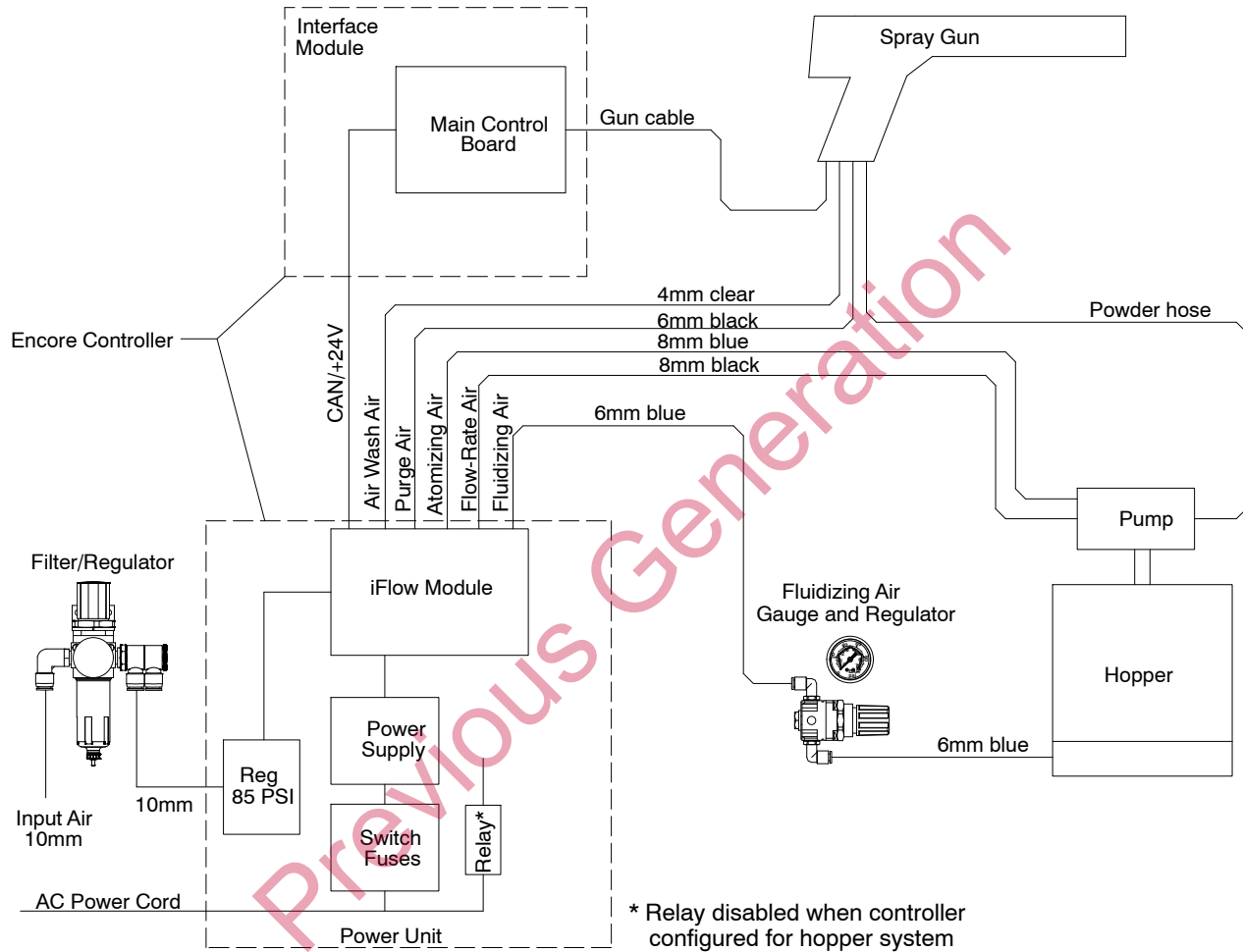


Figure 2-2 Encore Manual Powder System Block Diagram

Controller Connections

The Encore Spray Gun Controller is a two piece unit, consisting of an interface module and a power unit, connected by a network/power interconnect cable.

The **power unit** houses a 24Vdc power supply, circuit board, and iFlow® air control manifold.

The **interface module** houses the operator interface panel, which contains the displays and controls used to make controller function settings and spray settings, and the spray gun driver board.

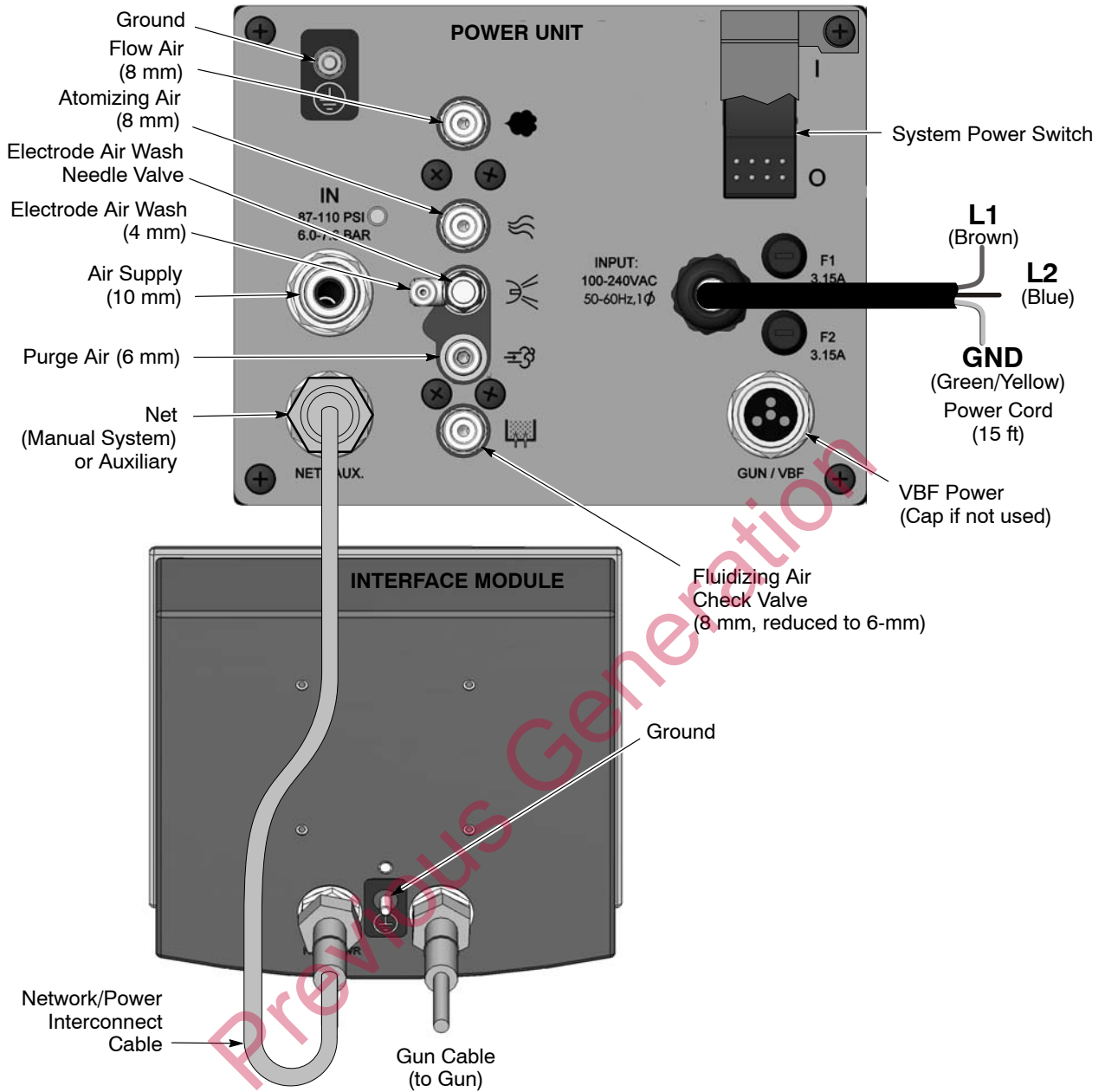


Figure 2-3 Encore Gun Controller Connections

Hopper Installation

1. Unclamp the hopper lid and remove the vent hose and hose clamps.
2. Place the hopper on the cart platform so that the bottom of the fluidizing pan fits into the cutout in the cart platform.
3. Connect the 10-mm stem x 6-mm tube reducer to the 10-mm elbow fitting on the fluidizing pan.
4. Connect the 6-mm blue fluidizing air tubing to the reducer.
5. Connect the ring-tong terminal on the 1-ft green/yellow ground cable shipped with the system to the ground stud on the side of the fluidizing pan, then plug the cable into the grounding socket on the cart base.
6. Install the hose clamp over the end of the vent hose and connect the hose to the vent stack on the lid. Tighten the clamp to secure the hose.

NOTE: Before turning on the controller interface, route the other end of the vent hose into the spray booth. This prevents the very fine powder particles in the vented fluidizing air from contaminating the spray room.

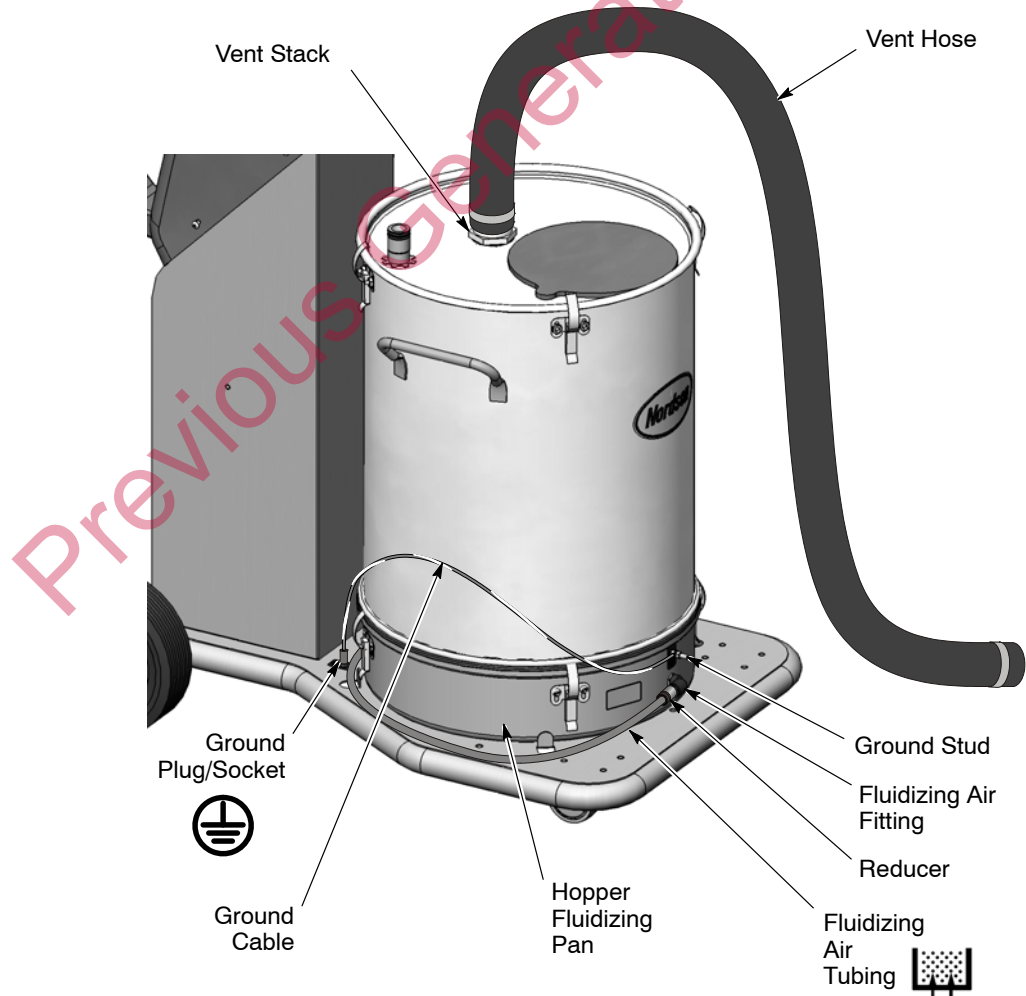


Figure 2-4 Hopper Installation

Pump Installation

Pump Mounting



CAUTION: Pump adapter O-rings are conductive silicone, to provide a ground connection between the pump body and the pickup tube or hopper lid. Do not replace these O-rings with non-conductive O-rings.

The system is shipped with pump adapter for the Encore pump. The hopper is shipped with a pump adapter used for other types of pumps. To mount the pump on the hopper:

1. See Figure 2-5. Pull the pickup tube assembly out of the pump mount.
2. Unscrew the adapter from the pickup tube.
3. Screw the new adapter onto the pickup tube.
4. Re-install the pickup tube assembly into the pump mount then install the pump into the new adapter with a slight twisting motion.

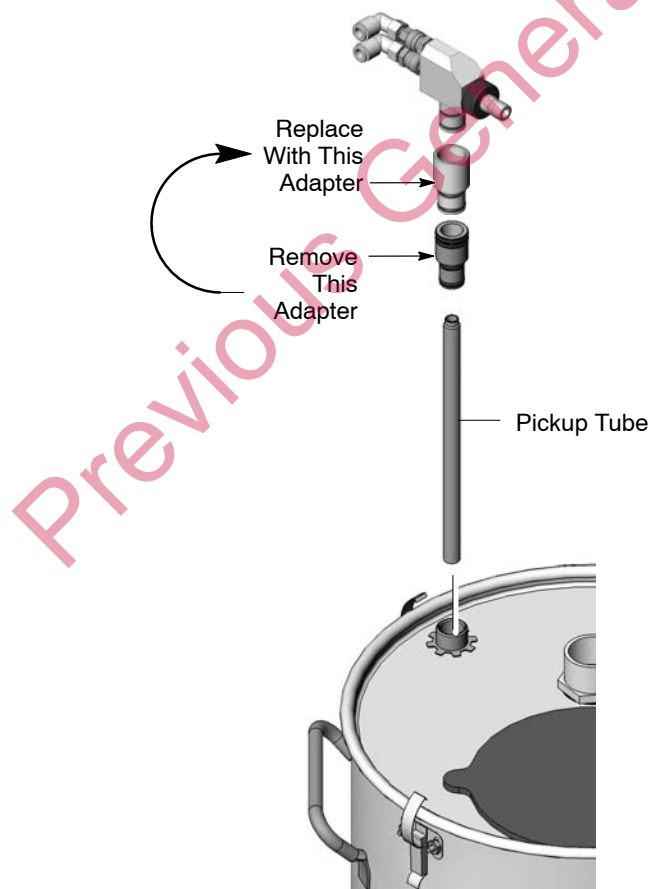


Figure 2-5 Pump Mounting

Pump Connections

1. Plug the blue atomizing air and black flow-rate air tubing into the pump tube fittings as shown in Figure 2-6.
2. Push the powder feed hose onto the barbed throat holder.

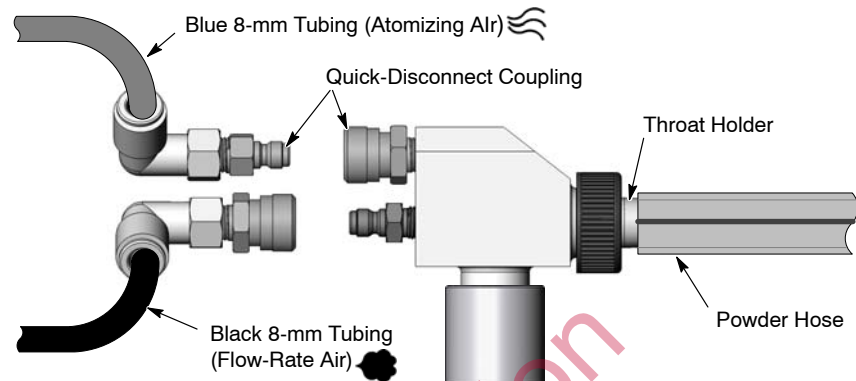


Figure 2-6 Pump Connections

NOTE: The pump is equipped with quick-connect couplings that allow you to quickly disconnect the air tubing when cleaning or repairing the pump. Pull back on the knurled coupling rings to disconnect them.

Spray Gun Connections

Unpack the spray gun. Uncoil the spray gun cable and the included 4-mm clear and 6-mm black air tubing. Make the following connections:

Gun Cable

See Figure 2-7.

1. Feed the spray gun cable into the back of the tower and up through the top front. This will allow you to bundle the cable with the purge and electrode air wash tubing.
2. Connect the cable to the interface module receptacle. The cable plug and receptacle are keyed.
3. Thread the cable nut onto the receptacle and tighten the nut securely.

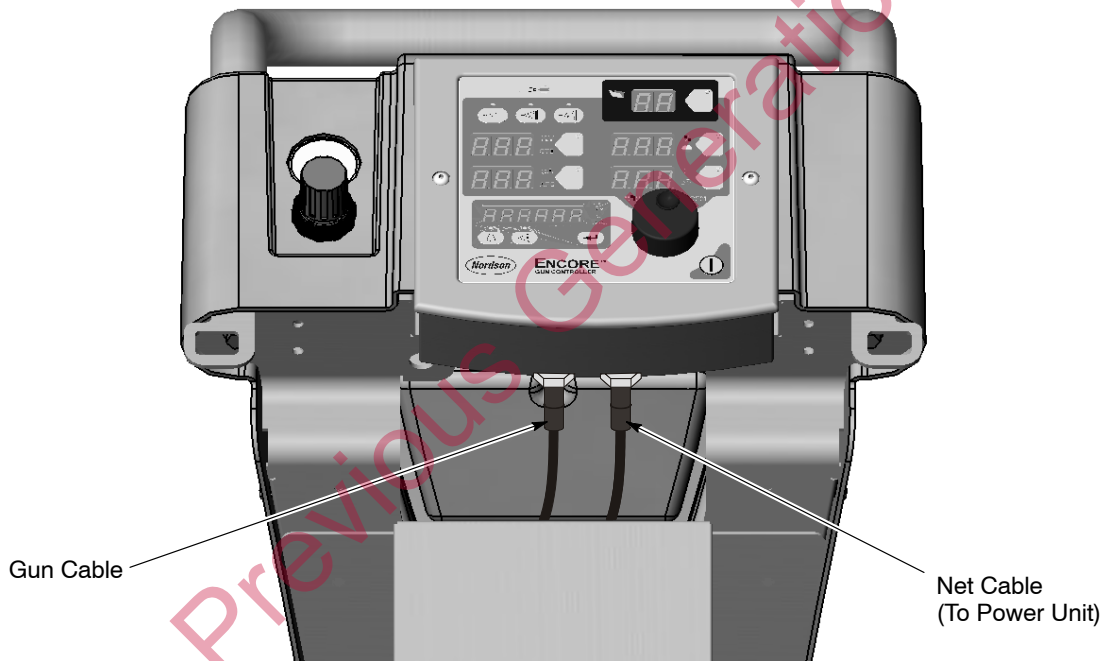


Figure 2-7 Connecting the Gun Cable to the Controller Interface Module

Spray Gun Air Tubing Connections

See Figures 2-8 and 2-9.

Clear 4-mm and black 6-mm air tubing is shipped with the spray gun.

1. Connect the 6-mm black air tubing to the quick-disconnect fitting in the gun handle.
2. Connect the 4-mm clear electrode air wash tubing to the barbed fitting in the gun handle.



Figure 2-8 Connecting Purge and Air Wash Tubing to the Spray Gun

3. Route the air tubing around the cart to the rear of the tower.
4. Connect the 4-mm clear electrode air wash tubing to the electrode air wash quick-disconnect fitting.
5. Connect the 6-mm black purge air tubing to the purge air quick-disconnect fitting.

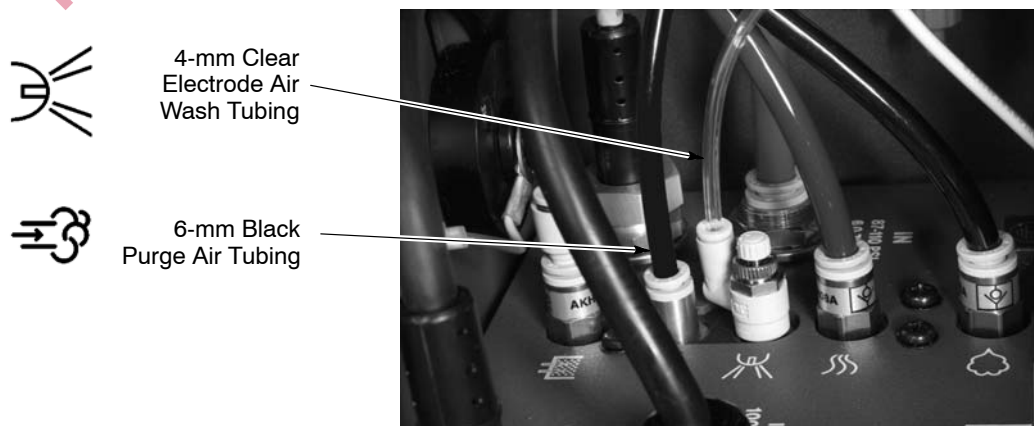


Figure 2-9 Connecting Purge and Air Wash Tubing to the Controller

Spray Gun Powder Tubing Connection

See Figure 2-10.

Push the barbed hose adapter into the end of the powder feed hose, then plug the adapter into the receptacle in the bottom of the spray gun handle.

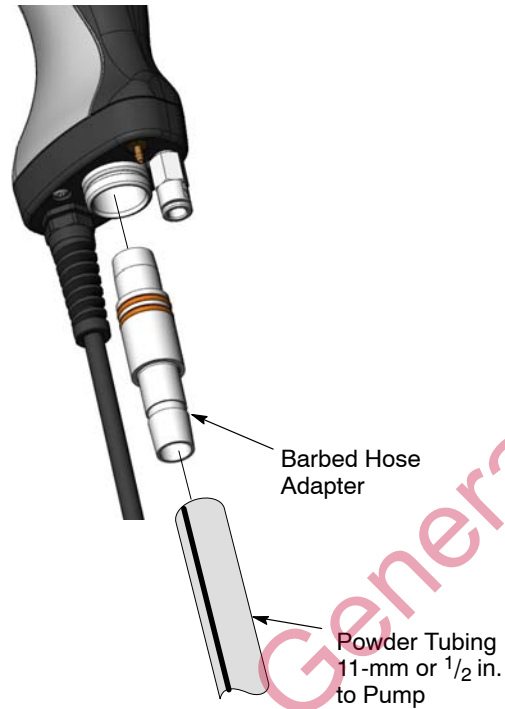


Figure 2-10 Connecting the Powder Tubing to the Spray Gun

Bundling Tubing and Cable

Use the sections of black spiral wrap supplied with the system to bundle together the spray gun cable, air tubing, and powder feed tubing.

System Air and Electrical Connections

System Air Supply

See Figure 2-11. Connect 10-mm air tubing from your compressed air supply to the system air filter in the power unit cabinet. The air supply pressure should be 6.0–7.6 bar (87–110 psi).

An optional input air kit with connectors, couplings, and 20 ft of 10 mm tubing is available. Refer to the *Parts* section for the kit contents and ordering information.

NOTE: Compressed air should be supplied from an air drop equipped with a self-relieving shutoff valve. The air must be clean and dry. A refrigerant or desiccant-type air drier and air filter/separators are recommended.

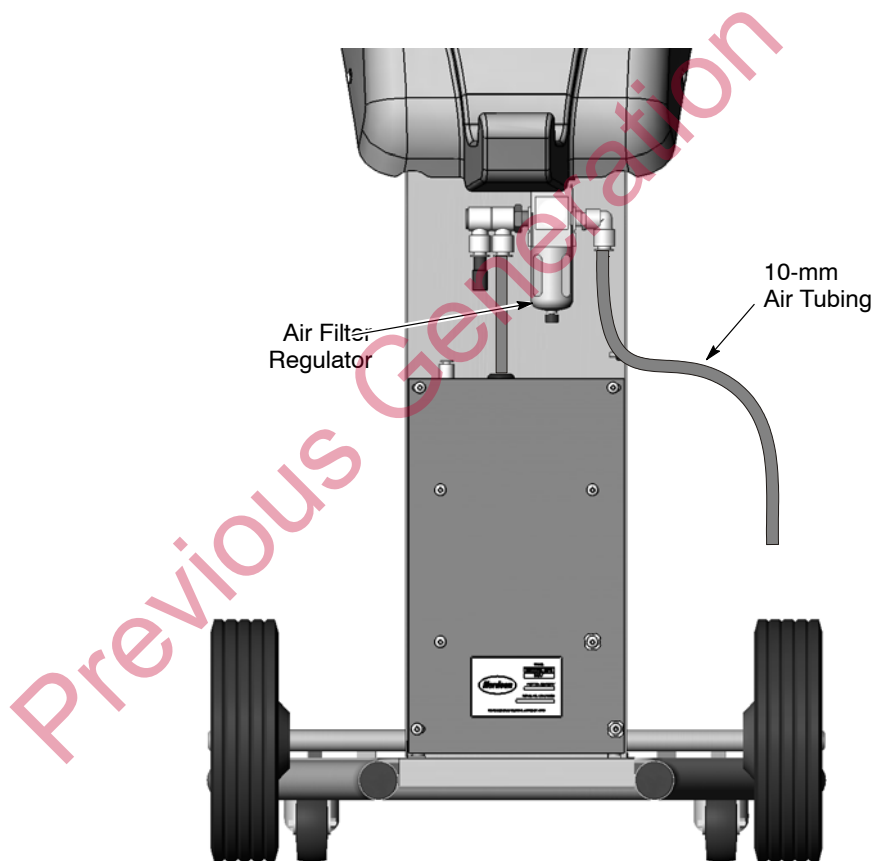


Figure 2-11 System Air Supply Connection

Electrical Connections

The controller is rated for 100–240 Vac at 50/60 Hz, single phase.

Wire the system power cord to a customer-supplied three-prong plug. Connect the plug to an electrical outlet that supplies the rated power.

Wire Color	Function
Blue	N (neutral)
Brown	L (hot)
Green/Yellow	GND (ground)

System Ground

See Figure 2-12. Use the ground cable attached to the lower ground stud on the cart to ground the system to a true earth ground.



Figure 2-12 System Ground Connection

Section 3

Operation



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



WARNING: This equipment can be dangerous unless it is used accordance with the rules laid down in this manual.



WARNING: All electrically conductive equipment in the spray area must be grounded. Ungrounded or poorly grounded equipment can store an electrostatic charge which can give personnel a severe shock or arc and cause a fire or explosion.

European Union, ATEX, Special Conditions for Safe Use

1. The Encore Manual Applicator shall only be used with associated Encore Interface Control Unit and Encore Controller Power Unit.
2. Equipment may only be used in areas of low impact risk.

Daily Operation

NOTE: The controller is shipped with a default configuration that will allow you to start spraying powder as soon as you finish setting up the system. Refer to *Controller Configuration* on page 3-17 for a list of the defaults and instructions on how to change them, if desired.

Startup

1. Turn on the spray booth exhaust fan.
2. Make sure the vent hose is connected to the vent stack on the hopper lid and routed into the spray booth.
3. Turn on the system air supply.
4. Remove the black rubber fill plug from the hopper lid and fill the hopper half full of powder.

NOTE: Do not fill the hopper more than half full. The fluidizing air will cause the powder to increase in volume.

Startup (contd)

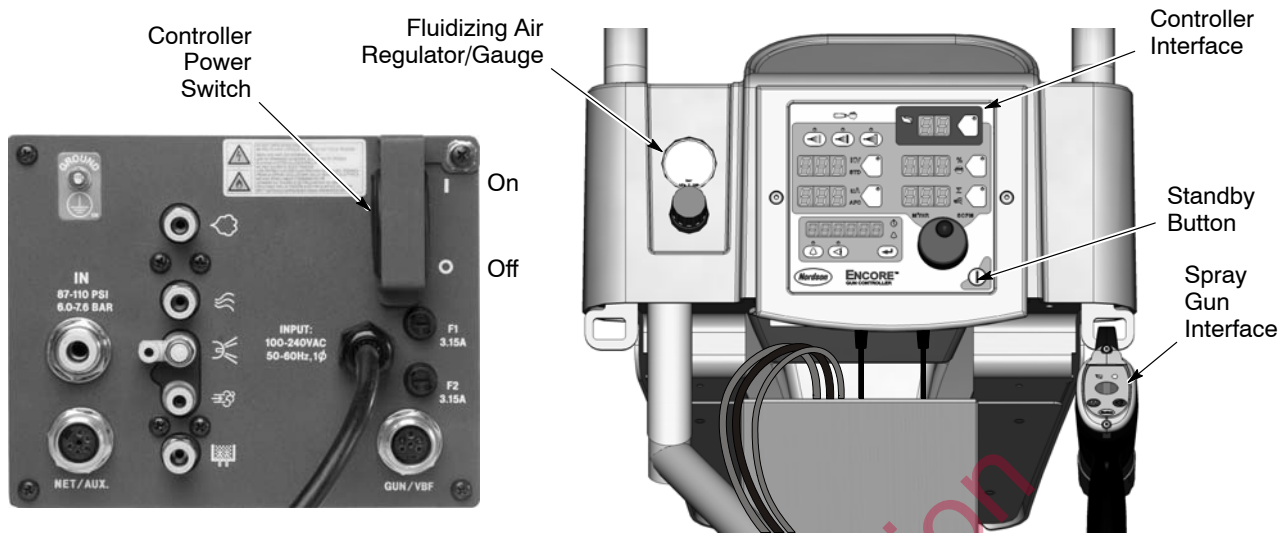


Figure 3-1 System Controls

5. Make sure the spray gun is not triggered, then turn on controller power. The displays and icons on the controller interface and gun interface will light.
6. The fluidizing air turns on when the interface is turned on. Adjust the fluidizing air pressure to 0.3–0.7 bar (5–15 psi). The pressure should be just enough so the powder in the hopper “boils” gently. Fluidize the powder for 5–10 minutes before spraying powder.
7. Point the spray gun into the booth and press the trigger to start spraying powder.

NOTE: If using **Total Flow** mode, the total air setpoint must be greater than zero or you will not be able to set % Flow Air and the gun will not spray powder. Refer to page 3-13 for more information.

8. Select the desired preset and start production.

The controller interface displays actual output when the gun is spraying and the current preset setpoints when the gun is off.

Factory Set Presets

Presets are recipes with electrostatic and powder flow setpoints for a particular part or application. 20 presets are available. Presets 1–3 are setup for you. Refer to *Preset Setup* on page 3-10 for preset setting instructions.

Preset	Electrostatic Output and Powder Flow	Setpoints			
		kV	μA	%	Σ
1	Max kV, 150 g/min (20 lb/hr)	100	30	45	3.0
2	Max kV, 300 g/min (40 lb/hr)	100	30	75	3.0
3	Select Charge 3 (deep recess), 150 g/min (20 lb/hr)	100*	60*	45	3.0

* Select Charge Mode settings are factory set and cannot be changed.

Spray Gun Operation

The spray gun interface and settings trigger allow you to change presets or powder flow settings, or purge the gun as needed, without using the controller Interface.

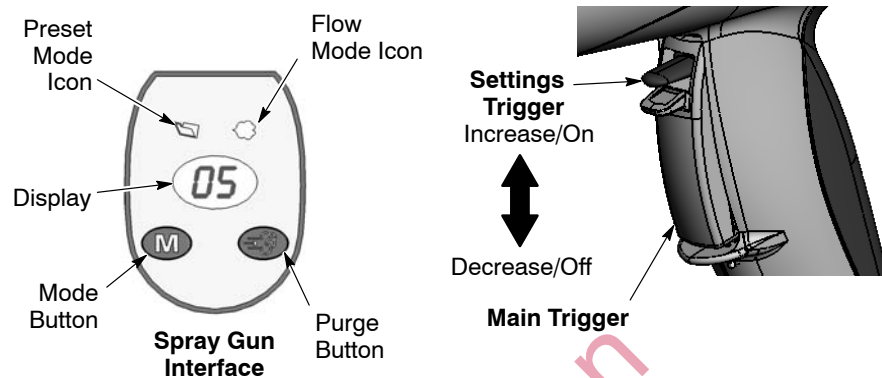


Figure 3-2 Gun Controls

Changing Presets with the Settings Trigger

1. See Figure 3-2. Release the main trigger. Presets cannot be changed while the gun is triggered on.
2. Press the **Mode** button until the **Preset Mode Icon** is lit. The display shows the current preset number.
3. Push the settings trigger up or down until the desired preset number is displayed on the spray gun interface.

NOTE: Unprogrammed preset numbers (presets where all setpoints are zero) are automatically skipped.

4. Press the main trigger. The system now sprays with the new preset settings.

Changing Powder Flow with the Settings Trigger

1. See Figure 3-2. Press the **Mode** button until the **Flow Mode** icon is lit.
2. Push the settings trigger up or down to change the flow setpoint. This can be done without releasing the main trigger.

The powder flow immediately changes. The new flow setpoint is displayed on both the spray gun interface and the controller interface.

NOTE: In **Total Flow** mode, the total air setpoint must be greater than zero or you will not be able to set % Flow Air and the gun will not spray powder. Refer to page 3-13 for more information.

Purging the Gun

1. See Figure 3-2. Point the gun into the booth and release the main trigger.
2. Press the **Purge** button. The purge will continue as long as the purge button is pressed.

NOTE: If the settings trigger is configured for Purge, then pressing up or down on the settings trigger purges the gun. Refer to *Controller Configuration* on page 3-17 for configuration instructions.

Purge the gun periodically to keep the powder path inside the spray gun clean. The purge length and frequency needed depend on the application.

NOTE: The purge air only cleans the spray gun powder path. To purge the powder hose, disconnect it from the pump and the gun, place the gun end inside the booth, and blow it out from the pump end with compressed air.

Standby Button

Use the **Standby** button shown in Figure 3-1 to shut off the interface and disable the spray gun during breaks in production. When the controller interface is off the spray gun cannot be triggered, and the spray gun interface is disabled.

To shut off the controller power, use the controller power switch on the power unit.

Electrode Air Wash Operation

Electrode air wash air continually washes the spray gun electrode to prevent powder from collecting on it. Electrode air wash turns on and off automatically when the spray gun is triggered on and off.

The air flow needle valve on the power unit is set at the factory for the most common applications (1-1/2 turns CCW from fully closed position), but can be adjusted if needed.

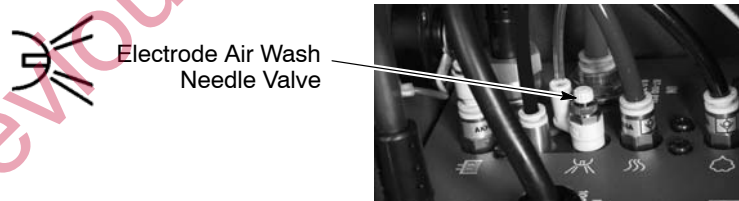


Figure 3-3 Electrode Air Wash Needle Valve Location

Changing Flat Spray Nozzles



WARNING: Release the spray gun trigger, turn off the interface, and ground the electrode before performing this procedure. Failure to observe this warning could result in a severe electrical shock.

1. Purge the spray gun and press the standby button to turn off the interface and prevent accidental gun triggering.
2. Unscrew the nozzle nut counterclockwise.
3. Pull the flat spray nozzle off the electrode assembly.

NOTE: Re-install the electrode if it comes out of the powder outlet tube.

4. Install a new nozzle on the electrode assembly. The nozzle is keyed to the electrode assembly. Do not bend the electrode wire.
5. Screw the nozzle nut onto the gun body clockwise until finger-tight.

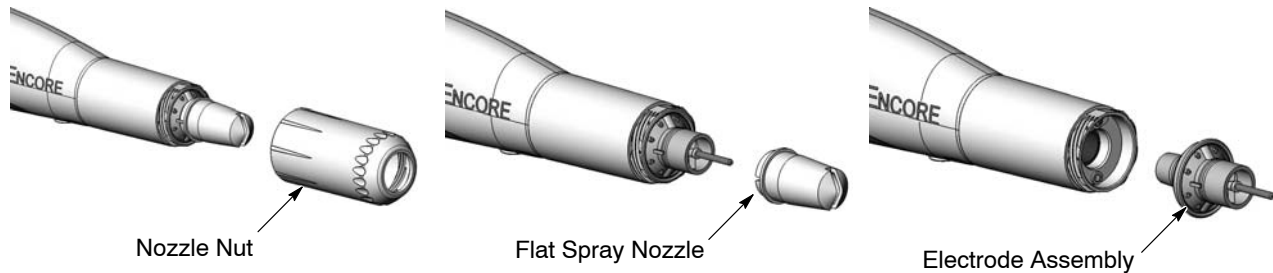


Figure 3-4 Changing a Flat Spray Nozzle

Changing Deflectors or Conical Nozzles



WARNING: Release the spray gun trigger, turn off the interface, and ground the electrode before performing this procedure. Failure to observe this warning could result in a severe electrical shock.

1. Purge the spray gun and press the standby button to turn off the interface and prevent accidental gun triggering.
2. Gently pull the deflector off the electrode assembly. If only changing the deflector, install the new one on the electrode assembly, being careful not to bend the electrode wire.
3. To change the entire nozzle, unscrew the nozzle nut counterclockwise.
4. Pull the conical nozzle off the electrode assembly.

NOTE: If the electrode assembly comes out of the powder outlet tube, re-install it.

5. Install a new conical nozzle on the electrode assembly. The nozzle is keyed to the electrode assembly.
6. Screw the nozzle nut onto the gun body clockwise until finger-tight.
7. Install a new deflector on the electrode assembly. Do not bend the electrode wire.

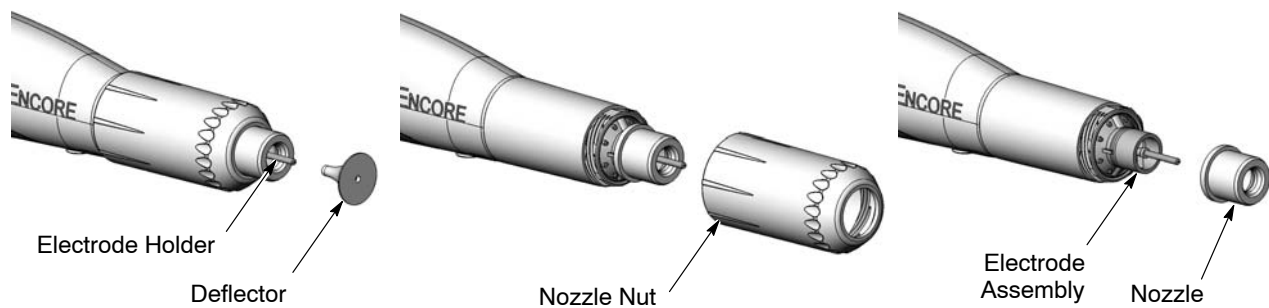


Figure 3-5 Changing a Conical Nozzle

Installing the Optional Pattern Adjuster Kit

An optional pattern adjuster kit with integral conical nozzle can be installed in place of a standard flat spray or conical nozzle.

NOTE: Deflectors are not included with the pattern adjuster kit; they must be ordered separately. The 38-mm deflector cannot be used with the kit.

1. Remove the deflector, nozzle nut, and conical nozzle, or the nozzle nut and flat spray nozzle.
2. Blow off the electrode assembly.
3. Install the integral conical nozzle onto the electrode assembly and screw the nozzle nut clockwise until finger-tight
4. Install a 16, 19, or 26-mm deflector onto the electrode holder.

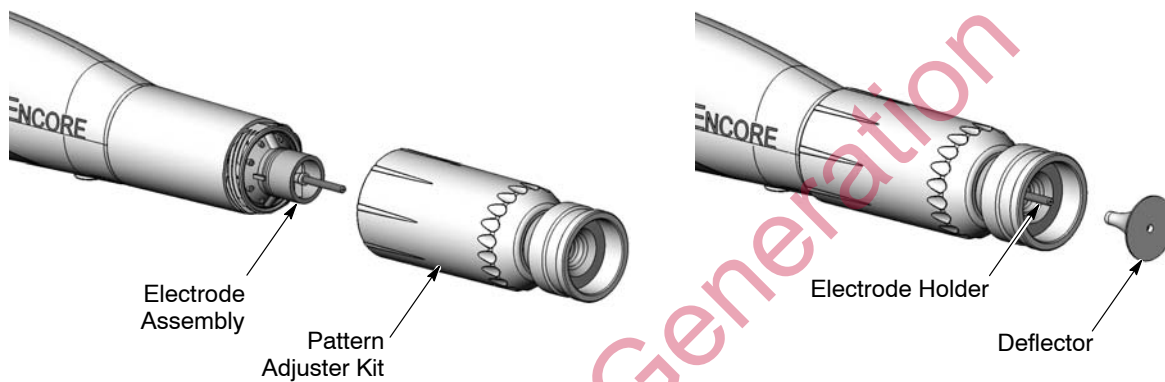


Figure 3-6 Pattern Adjuster Kit Installation

Shutdown

1. Purge the spray gun by pressing the Purge button until no more powder is blown from the gun.
2. Press the standby button to turn off the spray gun and interface.
3. Turn off the system air supply and relieve the system air pressure.
4. If shutting down for the night or a longer period of time, move the power unit switch to the OFF position to shut off system power.
5. Perform the *Daily Maintenance* procedures on page 3-7.

Maintenance



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



WARNING: Before performing the following tasks, turn off the controller and disconnect system power. Relieve system air pressure and disconnect the system from its input air supply. Failure to observe this warning may result in personal injury.

NOTE: If necessary, remove O-rings and clean parts using a cloth dampened with isopropyl or ethyl alcohol. Do not immerse plastic parts in alcohol. Do not get alcohol on the O-rings; it will cause them to swell. Do not use any other solvents.

Perform the *Shutdown* procedure before performing these procedures.

Component	Procedure
Spray Gun (Daily)	<ol style="list-style-type: none"> 1. Point the spray gun into the booth and purge the spray gun. 2. Shut off the system air supply and power. 3. Disconnect the powder feed hose adapter and blow out the spray gun powder path. 4. Disconnect the powder feed hose at the pump. Place the gun end of the hose inside the booth and blow out the hose from the pump end. 5. Remove the nozzle and electrode assembly and clean them with low-pressure compressed air and clean cloths. Check them for wear and replace if necessary. 6. Blow off the gun and wipe it down with a clean cloth.
Pump (Daily)	<ol style="list-style-type: none"> 1. Disconnect the pump air hoses and remove the pump from the pickup tube. 2. Disassemble the pump and clean all parts using low-pressure compressed air. 3. Replace any worn or damaged parts. <p>Refer to the Encore Powder Pump manual for instructions and spare parts.</p>
Controller (Daily)	Blow off the cart and controller with a blow gun. Wipe powder off the controller with a clean cloth.
System Air Filter (Periodically)	<p>Check the system air filter/regulator inside the cart tower. Drain the filter and change the filter element as needed. See Figure 2-11 for the filter location.</p> <p>Refer to <i>Parts</i> for the correct filter element. Older units had a white 5 micron particulate filter element, new units have a yellow 0.3 micron oil/water filter element. The elements are not interchangeable. If necessary, compare the OEM part number on the side of the filter/regulator with the OEM part number in the part description to ensure that you order the correct element.</p>
System Grounds	<p>Daily: Make sure the system is securely connected to a true earth ground before spraying powder.</p> <p>Periodically: Check all system ground connections.</p>
Hopper and Pickup Tube (Periodically)	Empty the hopper and clean the interior. Remove and clean the pickup tube. Clean the fluidizing plate and inspect it for signs of air contamination. If the plate is discolored and appears to be contaminated, replace it. Check your air supply and correct any contamination problems.

Using the Controller Interface

Use the controller interface to make preset settings, view help codes, monitor system operation, and configure the controller.

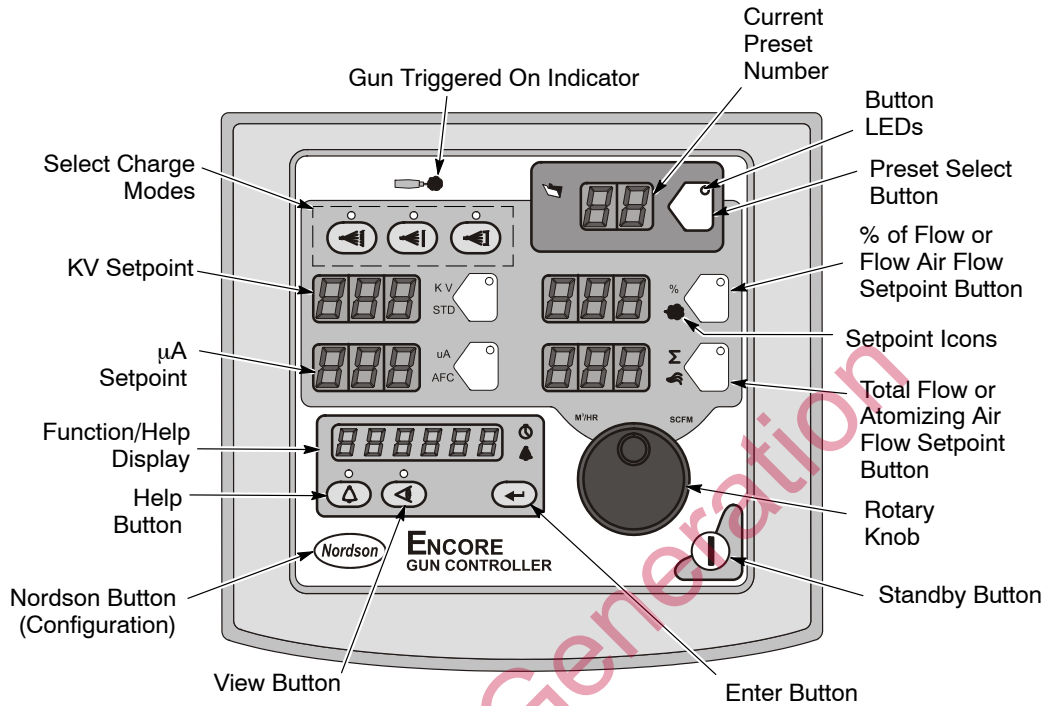


Figure 3-7 Controller Interface

The **Setpoint** icons light to indicate the configured or selected setpoints.

Setpoints include **Select Charge**, **KV**, **μ A**, **% of Flow** and **Total Flow**, or **Flow Air** and **Atomizing Air** flow rates.

To select a Preset or change a Preset setpoint, press the **Preset Select** button or a **Setpoint** button. The button LED lights to indicate that it is selected.

Use the **Rotary Knob** to change the selected setpoint: clockwise to increase, counter-clockwise to decrease. The setpoints reset to the minimum if increased past their maximum.



Selecting a Setpoint to Change



Changing a Selected Setpoint

Figure 3-8 Selecting and Changing Setpoints

Help Codes



The Help icon in the Function/Help display lights if a problem occurs.

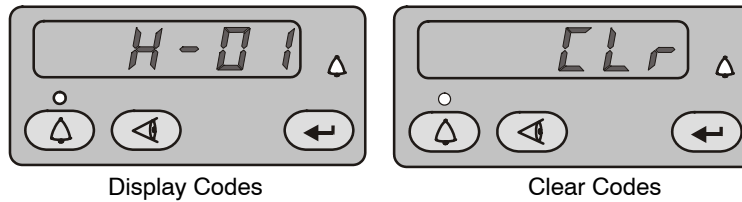


Figure 3-9 Displaying and Clearing Help Codes



Press the **Help** button to display the Help codes. The controller retains the last 5 codes in memory. Rotate the knob to scroll through the codes. The display blanks if there is no activity for 5 seconds.



To clear the Help codes, scroll through them until **CLr** is displayed, then press the **Enter** button. The Help icon stays lit until the controller clears the codes.

Refer to *Section 4, Troubleshooting* for help code troubleshooting, general system troubleshooting, resistance and continuity tests, and system wiring diagrams.

Maintenance Timer, Configuration, and Versions



Press the **View** button and turn the rotary knob to view, in the following order: Maintenance hours, Total hours, Gun Controller (GC), Gun Display (Gd), iFlow Module (FL) software versions and Hardware version (Hd). The Maintenance hour timer is set through the Controller Configuration on page 3-17. Total hours cannot be reset.



The Help icon lights if the maintenance timer is set and runs out.



To reset the maintenance timer, press the **View** button.



The Timer icon lights when the maintenance hours are displayed. While they are displayed, press the **Enter** button.

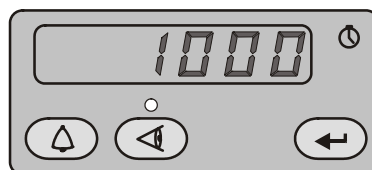


Figure 3-10 Displaying Maintenance Hours

Preset Setup

Presets are recipes with electrostatic and powder flow settings for specific parts or applications. The operator can quickly change spray settings simply by changing the preset number.

The controller can store 20 presets. Presets 1, 2, and 3 are programmed at the factory for the most common applications. Refer to page 3-2 for their setpoints. These setpoints can be adjusted as needed. Presets 4–17 can be programmed as needed.

Selecting Presets

1. Press the **Preset** button. The button LED lights.
2. Turn the rotary knob. The preset number increases from 1 to 20 then rolls over to 1.

The setpoints for the selected preset are displayed when the gun is off.

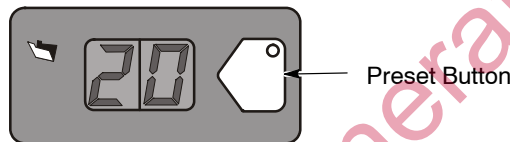


Figure 3-11 Preset Select

Electrostatic Settings

Electrostatic output can set in Select Charge mode, Custom mode, or Classic mode.

Select Charge[®] Mode

The Select Charge modes are non-adjustable electrostatic settings. The LEDs above the Select Charge mode buttons indicate the selected mode.

The Select Charge Modes and electrostatic setpoints are:

Mode 1	Re-Coat	100 kV, 15 μ A
Mode 2	Metallics	50 kV, 50 μ A
Mode 3	Deep Recesses	100 kV, 60 μ A

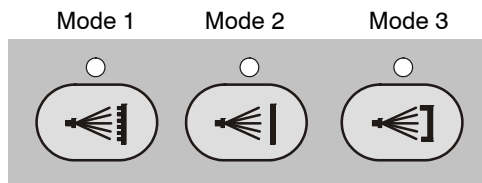


Figure 3-12 Select Charge Mode

NOTE: If the operator tries to adjust kV or μ A values while a Select Charge mode is selected, the controller will switch to Custom or Classic mode.

Custom Mode

Custom Mode is the factory default mode. In this mode, both kV and μ A can be adjusted independently. The STD and AFC icons are not displayed.

NOTE: Refer to *Controller Configuration* on page 3-17 for a list of the mode defaults and configuration instructions.

1. To set or change the kV setpoint, press the KV button. The button LED lights to show that kV is selected.
2. Turn the rotary knob to increase or decrease the kV setpoint. The setpoint is automatically saved if it does not change for 3 seconds, or when any button is pressed.
3. To set or change the μ A setpoint, press the μ A button. The button LED lights to indicate that μ A is selected.
4. Turn the rotary knob to increase or decrease the μ A setpoint. The setpoint is automatically saved if it does not change for 3 seconds, or when any button is pressed.

NOTE: The default μ A range is 10–50 μ A. The limits of the range can be adjusted. Refer to *Controller Configuration* on page 3-17.

- When the gun is not triggered the kV and μ A setpoints are displayed.
- When the gun is triggered the actual kV and μ A outputs are displayed.

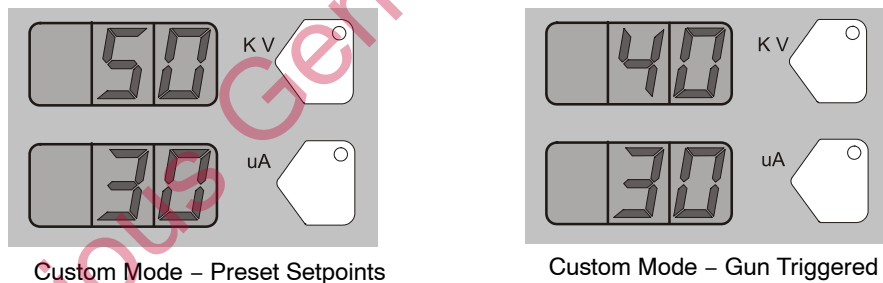


Figure 3-13 Custom Mode – Setpoints and Gun Triggered Displays

Classic Mode

To use Classic mode, the controller must be configured for it. Refer to *Controller Configuration* on page 3-17.

In Classic mode you can choose to control kV (STD) output or μ A (AFC) output, but not both at the same time.

Classic Standard (STD) Mode

Use the Standard mode to set kV. In Standard mode you cannot set μ A.

1. To set the kV setpoint, press the KV button. The button LED lights to show that kV is selected.

Classic Standard (STD) Mode *(contd)*

2. Turn the rotary knob to increase or decrease the kV setpoint. The setpoint is automatically saved if it does not change for 3 seconds, or when any button is pressed.
 - When the gun is not triggered the kV setpoint is displayed.
 - When the gun is triggered the actual kV and μA outputs are displayed.

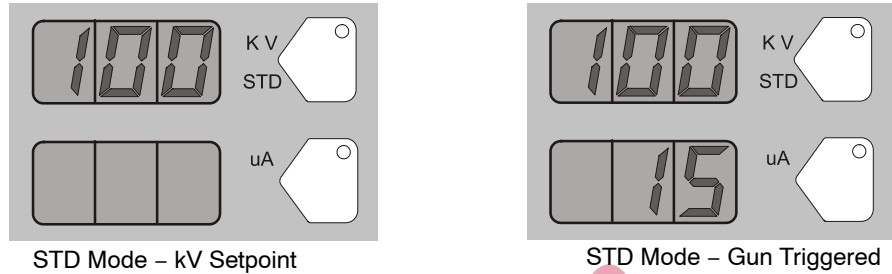


Figure 3-14 STD Mode – Setpoint and Gun Triggered Displays

Classic AFC Mode

Use the AFC mode to set μA output limits. In AFC mode you cannot adjust kV, it is automatically set to 100 kV.

1. To set the μA setpoint, press the μA button. The button LED lights to show that μA is selected.
2. Turn the rotary knob to increase or decrease the μA setpoint. The setpoint is automatically saved if it does not change for 3 seconds, or when any button is pressed.

NOTE: The default μA range is 10–50 μA . The limits of the range can be adjusted. Refer to *Controller Configuration* on page 3-17.

- When the gun is not triggered the μA setpoint is displayed.

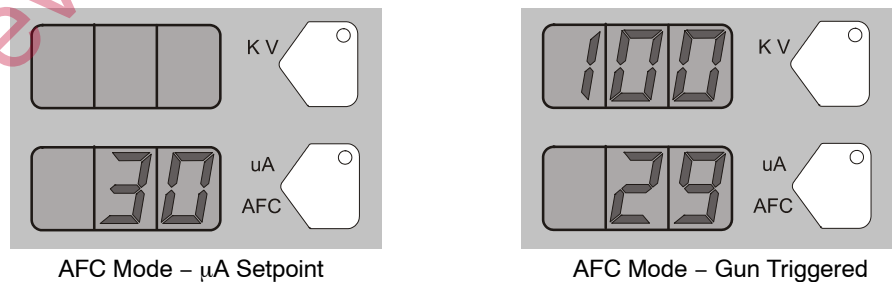


Figure 3-15 AFC Mode – Setpoint and Gun Triggered Displays

Powder Flow Settings

Two modes of powder flow control are available:

Smart Flow – This is the factory default mode. In this mode, you set Total Air (powder velocity) and Flow Air % (powder flow) setpoints. The controller automatically adjusts flow-rate and atomizing air flows to the pump based on the setpoints. When the controller is configured for Smart Flow mode, the % and Σ icons are lit.

Classic Flow – This is the standard method of setting powder flow and velocity, by setting flow air and atomizing air flow separately and balancing them manually for optimum results. When the controller is configured for Classic Flow mode, the flow and atomizing air icons are lit.

NOTE: Refer to *Controller Configuration* on page 3-17 for a list of the mode defaults and configuration instructions.



Figure 3-16 Powder Flow Icons

Smart Flow Mode Settings

In Smart Flow mode, Total Flow sets the velocity of the powder flow, while Flow Air % sets the powder flow rate. Powder velocity is inversely related to transfer efficiency; the higher the velocity the lower the transfer efficiency.

When making Smart Flow settings, set the Total Flow setpoint first to obtain the desired pattern size and penetration, then set the Flow Air % setpoint for the desired powder flow.

Flow Air %: 0–100%. The actual percentage range available varies depending on the total air setpoint and the maximum and minimum outputs for flow and atomizing air.

Total Flow Σ : 2.55–10.2 M³/HR, minimum 0.17 M³/HR increments, or 1.5–6.0 SCFM, minimum 0.1 SCFM increments.

See Tables 3-1 and 3-2 for examples of possible Smart Flow settings and their equivalents in Atomizing and Flow-rate Air pressures and flows. Figure 3-17 shows the effects of changes in Total Flow and Flow Air % settings.

The Smart Flow tables provide a range of possible Total Flow and Flow Air % setpoints. Read across to the vertical axis for the equivalent atomizing air flows and pressures. Read down to the horizontal axis for the equivalent flow-rate air flows and pressures.

The tables show that as you increase Total Flow powder velocity increases while the maximum Flow Air % remains the same. Conversely, for a given Total Flow setting, each increase in Flow Air % increases powder flow.

Smart Flow Mode Settings (contd)

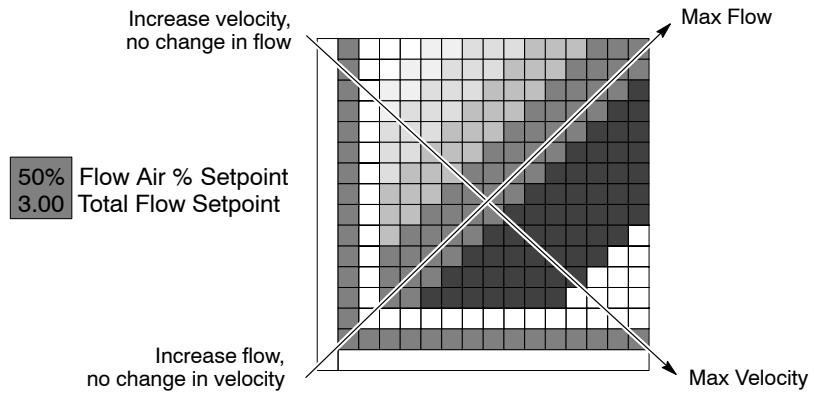


Figure 3-17 Reading the Smart Flow Tables

Setting Smart Flow Setpoints

To set flow air % or total flow Σ :

1. Press the % or Σ button. The LED on the selected button lights.
2. Turn the knob to increase or decrease the setpoint. The setpoint is automatically saved if it does not change for 3 seconds or when any button is pressed.

NOTE: If Total Flow is set to zero, the Flow Air % setpoint cannot be set to anything but zero, and powder cannot be sprayed. To set Flow Air %, set Total Flow to a value greater than zero.

- When the spray gun is not triggered the setpoints are displayed.
- When the spray gun is triggered the displays show actual flows.

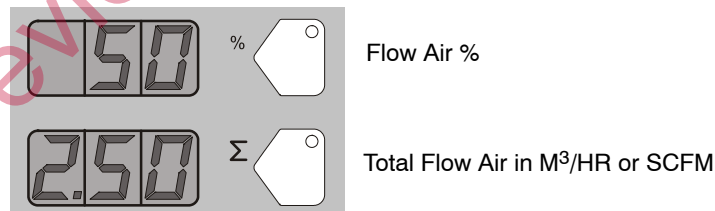


Figure 3-18 Smart Flow Mode – Flow Air % or Total Flow Σ

Smart Flow Settings – Metric Units

Powder Velocity (M ³ /Hr) (Total Flow)		Sure Coat w/100+ Pump: ♦ Air Flow Settings: 1.0 bar Atomizing 2.0 bar Flow Powder Output: 150 g/min. Max. Powder Flow Rate: ★
Low	<3.40	
Soft	3.40–4.25	
Medium	4.25–5.53	
Firm	5.53–7.23	
High	>7.23	

Table 3-1 Smart Flow Settings – Metric Units

Atomizing	0.4	0.85	X	X	67% 2.55	71% 2.97	75% 3.40	78% 3.82	80% 4.25	82% 4.67	83% 5.10	85% 5.52	86% 5.95	87% 6.37	88% 6.80 ★
	0.6	1.27	X	50% 2.54	57% 2.97	63% 3.39	67% 3.82	70% 4.24	73% 4.67	75% 5.09	77% 5.52	79% 5.94	80% 6.37	81% 6.79	82% 7.22
	0.9	1.70	33% 2.55	43% 2.97	50% 3.40	55% 3.82	60% 4.25	64% 4.67	67% 5.10	69% 5.52	71% 5.95	73% 6.37	75% 6.80	76% 7.22	78% 7.65
	1.2	2.12	29% 2.97	37% 3.39	45% 3.82	50% 4.24	55% 4.67	58% 5.09	62% 5.52	64% 5.94	67% 6.37	69% 6.79	71% 7.22	72% 7.64	74% 8.07
	1.6	2.55	25% 3.40	33% 3.82	40% 4.25	45% 4.67	50% 5.10 ♦	54% 5.52	57% 5.95	60% 6.37	63% 6.80	65% 7.22	67% 7.65	68% 8.07	70% 8.50
	1.9	2.97	22% 3.82	30% 4.24	36% 4.67	42% 5.09	46% 5.52	50% 5.94	53% 6.37	56% 6.79	59% 7.22	61% 7.64	63% 8.07	65% 8.49	67% 8.92
	2.3	3.40	20% 4.25	27% 4.67	33% 5.10	38% 5.52	43% 5.95	47% 6.37	50% 6.80	53% 7.22	56% 7.65	58% 8.07	60% 8.50	62% 8.92	64% 9.35
	2.7	3.82	18% 4.67	25% 5.09	31% 5.52	36% 5.94	40% 6.37	44% 6.79	47% 7.22	50% 7.64	53% 8.07	55% 8.49	57% 8.92	59% 9.34	61% 9.77
	3.1	4.25	17% 5.10	23% 5.52	29% 5.95	33% 6.37	38% 6.80	41% 7.22	44% 7.65	47% 8.07	50% 8.50	52% 8.92	55% 9.35	56% 9.77	58% 10.20
	3.5	4.67	15% 5.52	21% 5.94	27% 6.37	31% 6.79	35% 7.22	39% 7.64	42% 8.07	45% 8.49	48% 8.92	50% 9.34	52% 9.77	54% 10.19	X
	3.6	5.10	14% 5.95	20% 6.37	25% 6.80	29% 7.22	33% 7.65	37% 8.07	40% 8.50	43% 8.92	45% 9.35	48% 9.77	50% 10.20	X	X
		5.52	13% 6.37	19% 6.79	24% 7.22	28% 7.64	32% 8.07	35% 8.49	38% 8.92	41% 9.34	44% 9.77	46% 10.19	X	X	X
		5.95	13% 6.80	18% 7.22	22% 7.65	26% 8.07	30% 8.50	33% 8.92	36% 9.35	39% 9.77	42% 10.20	X	X	X	X
		M³/Hr	0.85	1.27	1.70	2.12	2.55	2.97	3.40	3.82	4.25	4.67	5.10	5.52	5.95
	BAR		0.2	0.3	0.5	0.8	1.1	1.4	1.7	2.0	2.3	2.6	2.9	3.2	3.5
Flow															

Smart Flow Settings – English Units

Powder Velocity (SCFM) (Total Flow)		Sure Coat w/100+ Pump: ♦ Air Flow Setting: 15 psi Atomizing 20 psi Flow Powder Output: 20 lb/hr Max. Powder Flow Rate: ★
Low	<2.00	
Soft	2.00–2.50	
Medium	2.75–3.25	
Firm	3.50–4.25	
High	>4.25	

Table 3-2 Smart Flow Settings – English Units

Atomizing	5	0.50	X	X	67% 1.50	71% 1.75	75% 2.00	78% 2.25	80% 2.50	82% 2.75	83% 3.00	85% 3.25	86% 3.50	87% 3.75	★88% 4.00
	9	0.75	X	50% 1.50	57% 1.75	63% 2.00	67% 2.25	70% 2.50	73% 2.75	75% 3.00	77% 3.25	79% 3.50	80% 3.75	81% 4.00	82% 4.25
	13	1.00	33% 1.50	43% 1.75	50% 2.00	56% 2.25	60% 2.50	64% 2.75	67% 3.00	69% 3.25	71% 3.50	73% 3.75	75% 4.00	76% 4.25	78% 4.50
	18	1.25	29% 1.75	38% 2.00	44% 2.25	50% 2.50	55% 2.75	58% 3.00	62% 3.25	64% 3.50	67% 3.75	69% 4.00	71% 4.25	72% 4.50	74% 4.75
	23	1.50	25% 2.00	33% 2.25	40% 2.50	45% 2.75	50% 3.00	54% 3.25	57% 3.50	60% 3.75	63% 4.00	65% 4.25	67% 4.50	68% 4.75	70% 5.00
	28	1.75	22% 2.25	30% 2.50	36% 2.75	♦ 42% 3.00	46% 3.25	50% 3.50	53% 3.75	56% 4.00	59% 4.25	61% 4.50	63% 4.75	65% 5.00	67% 5.25
	34	2.00	20% 2.50	27% 2.75	33% 3.00	38% 3.25	43% 3.50	47% 3.75	50% 4.00	53% 4.25	56% 4.50	58% 4.75	60% 5.00	62% 5.25	64% 5.50
	40	2.25	18% 2.75	25% 3.00	31% 3.25	36% 3.50	40% 3.75	44% 4.00	47% 4.25	50% 4.50	53% 4.75	55% 5.00	57% 5.25	59% 5.50	61% 5.75
	45	2.50	17% 3.00	23% 3.25	29% 3.50	33% 3.75	38% 4.00	41% 4.25	44% 4.50	47% 4.75	50% 5.00	52% 5.25	55% 5.50	57% 5.75	58% 6.00
	51	2.75	15% 3.25	21% 3.50	27% 3.75	31% 4.00	35% 4.25	39% 4.50	42% 4.75	45% 5.00	48% 5.25	50% 5.50	52% 5.75	54% 6.00	X
	52	3.00	14% 3.50	20% 3.75	25% 4.00	29% 4.25	33% 4.50	37% 4.75	40% 5.00	43% 5.25	45% 5.50	48% 5.75	50% 6.00	X	X
		3.25	13% 3.75	19% 4.00	24% 4.25	28% 4.50	32% 4.75	35% 5.00	38% 5.25	41% 5.50	43% 5.75	46% 6.00	X	X	X
		3.50	13% 4.00	18% 4.25	22% 4.50	26% 4.75	30% 5.00	33% 5.25	36% 5.50	39% 5.75	42% 6.00	X	X	X	X
		SCFM	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50
	PSI	3	5	8	12	16	20	24	29	34	38	42	47	51	
Flow															

Classic Flow Mode Settings

To use Classic Flow mode, the controller must be configured for it. Refer to Controller Configuration on page 3-17.

In Classic Flow mode, flow air and atomizing air ranges are:

- Flow air from 0–5.95 M³/HR (0–3.5 SCFM in 0.05 increments).
- Atomizing air from 0–5.95 M³/HR (0–3.5 SCFM in 0.05 increments).

To set flow or atomizing air:

1. Press the Flow or Atomizing button. The LED on the selected button lights.
2. Turn the knob to increase or decrease the setpoints. The setpoints are automatically saved if they do not change for 3 seconds, or when any button is pressed.

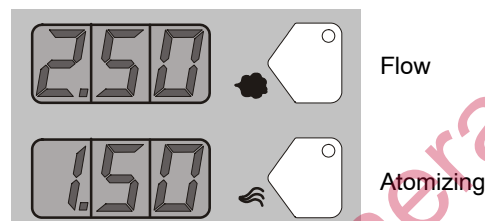


Figure 3-19 Classic Mode – Flow Air or Atomizing Air Setpoints

- When the spray gun is not triggered the setpoints are displayed.
- When the spray gun is triggered the actual flows are displayed.

Controller Configuration

Opening the Function Menu and Making Settings



Press and hold the Nordson button for 5 seconds. The Function/Help display lights to show the Function numbers and values. Use the Functions to configure the controller for your application.

The Function numbers are in the form F00–00 (Function number–value).

To scroll through the function numbers rotate the knob. To select the displayed function number, press the Enter button.

When the function is selected the function value blinks. To change the function value, rotate the knob. Press the Enter button to save the change and exit the value, so that rotating the knob now scrolls through the function numbers.

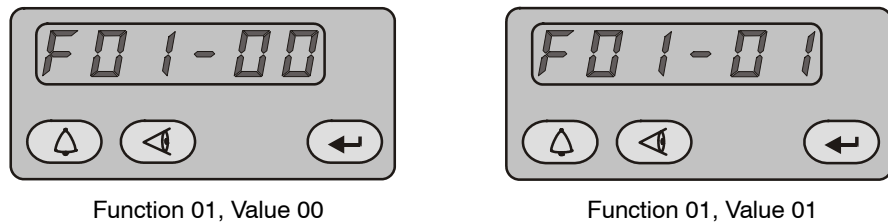


Figure 3-20 Displaying and Changing Configuration Functions

Table 3-1 Function Settings

Function Number	Function Name	Function Values	Default Value
F00	Gun Type	00=Encore	00
F01	Fluidizing	00=Hopper, 01=Box, 02= Disable	00
F02	Display Units	00=SCFM, 01=M ³ /HR	00
F03	Electrostatic Control	00=Custom, 01=Classic (STD, AFC)	00
F04	Powder Flow Control	00=Smart, 01=Classic	00
F05	Keypad Lockout	00=Unlocked, 01=Locked	00
F06	Vibratory Box Delay Off	on, 00–90 seconds, (on=continuous operation)	30 sec
F07	Maintenance Timer	00=Disable, 00–999 hours	00
F08	Settings Trigger Function	00=Increase/Decrease Preset or Flow, 01=Disable, 02=Flow only, 03=Preset only, 04=Purge, 05=Trigger	00
F09	Help Codes	00=Enable, 01=Disable	00
F10	Zero Reset (Flow)	00=Normal, 01=Reset (See Note below)	00
F11	Gun Display Errors	00=Flashing, 01=Disable	00
F12	µA Lower Limit	00=10 µA, 01=5µA, 02=1 µA	00
F13	µA Upper Limit	00=50 µA, 01=100 µA	00
F14	Total Hours	View Only	–
F15	Save/Restore/Reset	00=System Save, 01=System Restore, 02=Factory Reset	00
F16	Gun Display Brightness	00=Low, 01=Medium, 02=Maximum	01
F17	Number of Presets	01–20 presets	20

NOTE: Refer to *Section 4, Troubleshooting* for the Zero Reset procedure.

Vibratory Box Feeder On Continuously

NOTE: These instructions are only for systems equipped with vibratory box feeders. If your system uses a feed hopper, set function F01 to F01–00.

To set the vibrator motor to continuous operation, do the following:

1. Press the Nordson button for 5 seconds.
2. Set custom function F01 to F01–01 (Box Feeder).
3. Set F06 to F06–On. The default setting is F06–30. To set it to On, rotate the knob counterclockwise to decrement the numbers past 0 to On.

4. Press Enter to set the value to On, then press the Nordson button to exit the Functions menu.
5. To turn the vibrator on, press and release the spray gun trigger. The vibrator will stay on when the trigger is released.
6. To turn the vibrator off, press the Standby button or turn off controller power. To turn the vibrator back on press and release the spray gun trigger again.

Saving and Loading Preset and Function Settings

To save the current preset and function settings, set F15 to F15-00 and press Enter. All current preset and function settings are saved to memory.

To restore the saved preset and function settings, set F15 to F15-01 and press Enter. All the previously saved preset and function settings will be restored from memory.

To restore the system to the factory defaults, set F15 to F15-02, then press Enter.

Setting the Number of Presets

Custom Function F17 allows the user to set the number of valid presets between 1 and 20. For example, if the function is set to F17-05, then only 5 presets can be set up and toggled between on the interface and gun.

If the function is set to F17-01, then only the current settings on the interface are used, as if there are no presets.

Previous Generation

Section 4

Troubleshooting



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



WARNING: Before making repairs to the controller or spray gun, shut off system power and disconnect the power cord. Shut off the compressed air supply to the system and relieve the system pressure. Failure to observe this warning could result in personal injury.

These troubleshooting procedures cover only the most common problems. If you cannot solve a problem with the information given here, contact your local Nordson representative for help.

Help Code Troubleshooting



The Help icon in the Function/Help display lights if a problem occurs that the controller can sense.

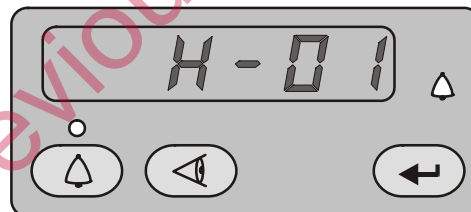


Figure 4-1 Displaying and Clearing Help Codes

Viewing Help Codes



Press the **Help** button to display the Help codes. The controller retains the last 5 codes in memory. Rotate the knob to scroll through the codes. The display will blank if there is no activity for 5 seconds.

Clearing Help Codes



To clear the help codes, press the **Help** button, then scroll through them until **CLr** is displayed, then press the **Enter** button. The Help icon will stay lit until the controller clears the codes.

Help Code Troubleshooting Chart

Code	Message	Correction
H07	Gun Open	Trigger the gun and check the display. If μA feedback is 0, check for a loose gun cable connection at the gun receptacle. Check for a loose connection to the power supply inside the gun. Perform the <i>Gun Cable Continuity Tests</i> on page 4-11. If the cable and the connections are okay, check the spray gun power supply.
H10	Gun Output Stuck Low	With the gun triggered on and the kV set to maximum, use a multimeter set for VRMS to check for voltage between J4 pins 1 and 2 on the main control board. If no voltage is present replace the main control board.
H11	Gun Output Stuck High	Make sure kV is set to 0 and the gun is triggered OFF. The μA display should read 0. If μA display is greater than 0, replace the main control board. Make sure trigger icon on the interface is off.
H12	Communications Fault CAN Bus	Check the power unit/interface interconnect cable. Make sure the cable connections are secure and the cable is not damaged. Refer to page 4-11 for the cable continuity test. Check the connections from the cable receptacle to the J1 terminal block on the main control board. If all connections are secure but the fault persists replace the cable.
H15	Over Current Fault (Cable or Gun Short)	This fault can occur if the gun tip touches a grounded part while spraying. This fault will turn the electrostatic output off. Clear the help codes to reset the fault and resume spraying. If the fault reoccurs, disconnect the spray gun power supply from the gun cable inside the gun and trigger the gun on. Refer to the <i>Power Supply Replacement</i> procedure in <i>Section 5, Repair</i> . If the H15 code does not reappear, then the power supply is shorted. Replace the spray gun power supply. If the help code reappears, check the gun cable continuity and replace it if shorted. Perform the <i>Gun Cable Continuity Tests</i> on page 4-11.
H19	Maintenance Timer Expired	The Maintenance Timer has exceeded its setting. Perform the scheduled maintenance, then reset the maintenance timer. Refer to <i>Section 3, Operation</i> , for reset instructions.
H21	Atomizing Air Valve Fault	Refer to the controller wiring diagrams in this section. Check the wiring harness connection to J8 and the proportional valve solenoid. Check the solenoid operation. Replace the valve if the solenoid is not working.
H22	Flow-Rate Air Valve Fault	Refer to the controller wiring diagrams in this section. Check the wiring harness connection to J7 and the proportional valve solenoid. Check the solenoid operation. Replace the valve if the solenoid is not working.
<i>Continued..</i>		

Code	Message	Correction
H23	Flow-Rate Air Flow Low Fault	<p>The flow setting may be too high for the system to achieve. Maximum air flow is dependent on factors including air tubing length, diameter, and pump type.</p> <p>Switch to Classic Flow mode. This mode lets you set and view actual flow-rate and atomizing air flow to help in diagnosing the problem.</p> <p>Check the tubing from the iFlow module to the powder pump for kinks or blockage. Make sure the check valves are not blocked. Disconnect the air tubing at the pump, clear the help codes, and trigger the gun. If the help code does not reappear, clean or replace the pump venturi nozzle or throat.</p>
H24	Atomizing Air Flow Low Fault	<p>Check the tubing from the iFlow module to the powder pump for kinks or blockage. Make sure the check valves are not blocked. Disconnect the air tubing at the pump, clear the help codes, and trigger the gun. If the help code does not reappear, clean or replace the pump venturi nozzle or throat.</p> <p>Check the system air supply pressure. Pressure must be above 5.86 bar (85 psi). Check the system filter and the tubing from the filter to the power unit for kinks or blockage.</p> <p>Refer to <i>Section 5, Repair</i> for procedures for using the iFlow Air Flow Verification Kit to check the operation of the iFlow module proportional valves and the output of the precision air pressure regulator.</p>
H25	Flow-Rate Air Flow High Fault	<p>Switch to Classic Flow mode. This mode lets you set and view actual flow-rate and atomizing air flow to help in diagnosing the problem.</p> <p>If the spray gun is triggered off when the help code appears, disconnect the air tubing from the appropriate air output fitting and plug the fitting. Clear the help codes. If the code does not reappear then the proportional valve is stuck open. Refer to <i>Section 5, Repair</i> for cleaning instructions.</p> <p>If the spray gun is triggered on when the help code appears, disconnect the air tubing from the appropriate output fitting and set the flow to zero. If air is still flowing from the fitting then plug the fitting and clear the help codes. If the code does not reoccur then the proportional valve is stuck open. Refer to <i>Section 5, Repair</i> for cleaning instructions.</p>
H26	Atomizing Airflow High Fault	<p>If the help code reoccurs and the controller interface is showing air flow, then check for leaks around the proportional valves or transducers on the iFlow module.</p> <p>If the help code persists, re-zero the module as described on page 4-9.</p> <p>Refer to <i>Section 5, Repair</i> for procedures for using the iFlow Air Flow Verification Kit to check the operation of the iFlow module proportional valves and the output of the precision air pressure regulator.</p>
H27	Trigger On during Power Up Fault	<p>This code appears if the gun was triggered on when the interface was turned on. Turn off the interface, wait for several seconds, then turn the interface back on, making sure the spray gun is not triggered on. If the fault reoccurs, check for a bad trigger switch.</p>
H28	EEPROM Data Version Changed	<p>Software version has been changed. This code will appear after a software update. Clear the fault. It should not reappear.</p>

Continued..

Code	Message	Correction
H31	Boost Valve Fault (J6)	Refer to the power unit wiring diagrams in Figures 4-6 and 4-7. Check the wiring harness connections to the valve solenoids. Check the solenoid operation by placing a finger on the solenoid and triggering the appropriate function. (The boost air solenoid should open when flow air is set to above 3.0 SCFM or 5.10 M ³ /Hr.) You should be able to feel the solenoid open and close if it is functioning correctly.
H32	Electrode Air Wash Valve Fault (J4)	Refer to the power unit wiring diagrams in Figures 4-6 and 4-7. Check the wiring harness connections to the valve solenoids. Check the solenoid operation by placing a finger on the solenoid and triggering the appropriate function. (The boost air solenoid should open when flow air is set to above 3.0 SCFM or 5.10 M ³ /Hr.) You should be able to feel the solenoid open and close if it is functioning correctly.
H33	Fluidizing Air Valve Fault (J5)	Refer to the power unit wiring diagrams in Figures 4-6 and 4-7. Check the wiring harness connections to the valve solenoids. Check the solenoid operation by placing a finger on the solenoid and triggering the appropriate function. (The boost air solenoid should open when flow air is set to above 3.0 SCFM or 5.10 M ³ /Hr.) You should be able to feel the solenoid open and close if it is functioning correctly.
H34	Purge Air Valve Fault (J10)	Refer to the controller wiring diagrams in this section. Check the wiring harness connections to the valve solenoids. Check the solenoid operation by placing a finger on the solenoid and triggering the appropriate function. You should be able to feel the solenoid open and close if it is functioning correctly.
H35	Vibratory Motor Valve Fault (VBF units only)	Check the J9 connection for the relay inside the power unit. If the harness becomes disconnected or the relay coil is damaged, this fault will appear.
H36	Communications Fault LIN Bus	See Figure 4-4. Check the gun cable connection at the main controller receptacle. See Figure 5-1. Check the cable/display module J3 connector inside the gun. Make sure the connectors and pins are not damaged and connection is secure. Check the gun cable for opens or shorts. If the gun display lights up, but shows CF and cable and connections are OK replace gun display module.
H41	24V Fault	Check the DC power supply located in the power unit. See Figure 4-6 for pinout. If the voltage is less than 22 Vdc replace the power supply. Turn on the power unit for this test.
H42	Main Board Fault (Interface)	Clear the fault and make sure kV is set to maximum 100 kV, trigger gun ON and check for the H-code to reappear. Check for a defective gun power supply or a gun cable. If the cable and the gun power supply are OK, replace the main board.
H43	μA Feedback Fault	Make sure kV is set to maximum 100 kV, trigger gun ON and check μA display. If μA display always reads >75 μA, even when the gun is more than 3 ft from a grounded surface, check the gun cable or the gun power supply. If the μA display reads 0 with the gun triggered on and close to a part, check the gun cable or the gun power supply. When the gun is triggered on and kV is set >0, the μA display should always read >0.

General Troubleshooting Chart

Problem	Possible Cause	Corrective Action
1. Uneven pattern, unsteady or inadequate powder flow	Blockage in spray gun, powder feed hose, or pump	<ol style="list-style-type: none"> 1. Purge the spray gun. Remove the nozzle and electrode assembly and clean them. 2. Disconnect the powder feed hose from the spray gun and blow out the gun with an air gun. 3. Disconnect the feed hose from the pump and gun and blow out the feed hose. Replace the feed hose if it is clogged with powder. 4. Disassemble and clean the pump. 5. Disassemble the spray gun. Remove the inlet and outlet tubes and elbow and clean them. Replace components as necessary.
	Nozzle, deflector, or electrode assembly worn, affecting pattern	Remove, clean, and inspect the nozzle, deflector, and electrode assembly. Replace worn parts as necessary. If excessive wear or impact fusion is a problem, reduce the flow rate and atomizing air flow.
	Damp powder	Check the powder supply, air filters, and dryer. Replace the powder supply if contaminated.
	Low atomizing or flow air pressure	Increase the atomizing and/or flow air flow.
	Improper fluidization of powder in hopper	Increase the fluidizing air pressure. If the problem persists, remove the powder from the hopper. Clean or replace the fluidizing plate if contaminated.
	iFlow module out of calibration	Perform the Re-Zero Procedure on page 4-9.
2. Voids in powder pattern	Worn nozzle or deflector	Remove and inspect the nozzle or deflector. Replace worn parts.
	Plugged electrode assembly or powder path	Remove the electrode assembly and clean it. Remove powder path if necessary and clean it.
	Electrode air wash flow too high	Adjust the needle valve at the power unit to decrease the electrode air wash flow.

Continued...

Problem	Possible Cause	Corrective Action
3. Loss of wrap, poor transfer efficiency	NOTE: Before checking possible causes, check the help code on the controller and perform the corrective actions recommended in this section.	
	Low electrostatic voltage	Increase the electrostatic voltage.
	Poor electrode connection	Remove the nozzle and electrode assembly. Clean the electrode and check for carbon tracking or damage. Check the electrode resistance as shown on page 4-10. If the electrode assembly is good, remove the gun power supply and check its resistance as shown on page 4-10.
Poorly grounded parts	Check the conveyor chain, rollers, and part hangers for powder buildup. The resistance between the parts and ground must be 1 megohm or less. For best results, 500 ohms or less is recommended.	
4. No kV output from the spray gun (display shows 0 kV when gun triggered), but powder is spraying	NOTE: Before checking possible causes, check the help code on the controller and perform the corrective actions recommended in this section.	
	Damaged gun cable	Perform the <i>Gun Cable Continuity Checks</i> on page 4-11. If an open or short is found, replace the cable.
	Spray gun power supply shorted	Perform the <i>Power Supply Resistance Test</i> on page 4-10.
5. Powder build up on the electrode tip	Insufficient electrode air wash flow	Adjust the electrode air wash needle valve at the power unit to increase the electrode air wash flow.
6. No kV output from the spray gun (display shows voltage or μA output), but powder is spraying	NOTE: Before checking possible causes, check the help code on the controller and perform the corrective actions recommended in this section.	
	Spray gun power supply open	Perform the <i>Power Supply Resistance Test</i> on page 4-10.
	Damaged gun cable	Perform the <i>Gun Cable Continuity Test</i> on page 4-11. If an open or short is found, replace the cable.
7. No kV output and no powder output	Malfunctioning trigger switch, display module, or cable	Check “Gun Triggered On” icon at top center of controller interface. If icon is not lit, check for H36 help code. Check trigger switch connections to display module, replace switch if necessary. Perform the <i>Gun Cable Continuity Test</i> on page 4-11. NOTE: It may be possible to use the settings trigger as the main trigger until repairs are made. Set Function F08 to F08-05. Refer to page 3-17.

Continued...

Problem	Possible Cause	Corrective Action
8. No purge air when Purge button is pressed	Malfunctioning spray gun display module, gun cable, or iFlow module purge solenoid valve; no air pressure, or kinked air tubing	If display module does not show PU when purge button is pressed, then module membrane switch is defective. Replace display module. If display module shows PU: Check the purge air tubing and solenoid valve on the iFlow manifold. Perform the <i>Gun Cable Continuity Test</i> on page 4-11.
9. Low Powder Flow or Powder Flow surging	Low supply air pressure	Input air must be greater than 5.86 bar (85 psi).
	Air pressure regulator set too low	Adjust the input regulator so that the pressure is greater than 5.86 bar (85 psi).
	Supply air filter plugged or filter bowl full – water contamination of flow controller	Remove bowl and drain water/dirt. Replace filter element if necessary. Clean system, replace components if necessary.
	Flow valve plugged (H24 or H25)	See <i>Proportional Valve Cleaning</i> in this section.
	Air tubing kinked or plugged (H24 or H25)	Check flow and atomizing air tubing for kinks.
	Pump throat worn	Replace pump throat.
	Pump not assembled correctly	Check and re-assemble pump.
	Pick-up tube blocked	Check for debris or bag (VBF units) blocking pick-up tube.
	Vibratory box feeder disabled (VBF units only)	Set the Custom Function F01 for a box feeder (F01-01). See <i>Controller Configuration</i> on page 3-17.
	Fluidizing air too high	If fluidizing air is set too high the ratio of powder to air will be too low.
	Fluidizing air too low	If fluidizing air is set too low the pump will not operate at peak efficiency.
	Powder hose plugged	Blow out powder hose with compressed air.
	Powder hose kinked	Checked for a kinked powder hose.
	Powder hose too long	Shorten hose.
	Gun powder path plugged	Check powder inlet tube, elbow, and electrode support for impact fusion or debris. Clean as necessary with compressed air.
	Flow and atomizing air tubing reversed	Check flow and atomizing air tubing routing and correct if incorrect.

Continued...

Problem	Possible Cause	Corrective Action
10. Gun display module shows CF	Loose gun display connection	See Figure 4-7. Check connector J3 (cable/display module) inside the gun. Check for loose or bent pins.
	Defective gun cable or gun display module (H36 code)	Perform the <i>Gun Cable Continuity Test</i> on page 4-11. Replace cable if damaged. Replace gun display module if cables and connections are good.
11. Preset cannot be changed from the spray gun	Settings trigger disabled	Check Custom Function F08 and set to enabled (F08-00). See <i>Controller Configuration</i> on page 3-17.
	No programmed preset available	Presets with no set values for flow rate and electrostatics are automatically skipped.
	Loose or defective trigger switch	See Figure 4-7. Check for a loose trigger switch connection. The trigger switch is plugged into the gun display module.
12. Powder flow cannot be changed from the spray gun	Settings trigger disabled	Check Custom Function F08 and set to enabled (F08-00). See <i>Controller Configuration</i> on page 3-17.
	Total air set to zero	If the total air is set to zero the flow percent cannot be adjusted. Change the total flow to a non-zero number.
	Loose or defective trigger switch	See Figure 4-7. Check for a loose trigger switch connection. The trigger switch is plugged into the gun display module.
13. VBF doesn't turn ON and Off with the gun trigger	VBF turned off	Set the Custom Function F01 for a box feeder (F01-01). See <i>Controller Configuration</i> on page 3-17.
14. Fluidizing Air is on all the time even when the gun is triggered Off	System is setup for a hopper	Set the Custom Function F01 for a box feeder (F01-01). See <i>Controller Configuration</i> on page 3-17.
15. No KV when gun is triggered ON, powder flow OK	KV set to zero	Set KV to a non-zero value.
	Check for Help Codes	Refer to Help Code Troubleshooting starting on page 4-2.
16. No powder flow when gun is triggered ON, kV OK	Total air set to zero	Change total flow to a non-zero number.
	Input air turned OFF	Check the gauge on the filter regulator and make sure the air is turned ON. See Figure 2-11.
	Check for Help Codes	Refer to Help Code Troubleshooting starting on page 4-2.
17. Gun flow % does not increment, always 0	Total air set to zero	If the total air is set to zero the flow percent cannot be adjusted. Change the total flow to a non-zero number.

Re-Zero Procedure

Perform this procedure if the controller interface indicates air flow when the spray gun is not triggered on, or if a Flow Air or Atomizing Air Flow High Help code (H25 or H26) appears.

Before performing a re-zero procedure:

- Make sure the air pressure being supplied to the system is higher than the minimum 5.86 bar (85 psi).
 - Make sure no air is leaking through the module output fittings or from around the solenoid valves or proportional valves. Re-zeroing modules with leaks will result in additional errors.
1. At the power unit, disconnect the flow and atomizing air tubing and install 8-mm plugs in the output fittings.
 2. Press the Nordson button for 5 seconds to display the controller functions. F00-00 is displayed.
 3. Rotate the knob until F10-00 is displayed.
 4. Press the Enter button, then rotate the knob to display F10-01.
 5. Press the Enter button. The controller will re-zero the flow and atomizing air and reset the function display to F10-00.
 6. Remove the plugs from the flow and atomizing air output fittings and reconnect the air tubing.

Spray Gun Power Supply Resistance Test

Use a megohm meter to check the resistance of the power supply, from the J2-3 feedback terminal at the connector to the contact pin inside the front end. The resistance should be between 280–320 megohms. If the reading is infinite, switch the meter probes. If the resistance falls outside this range, replace the power supply.

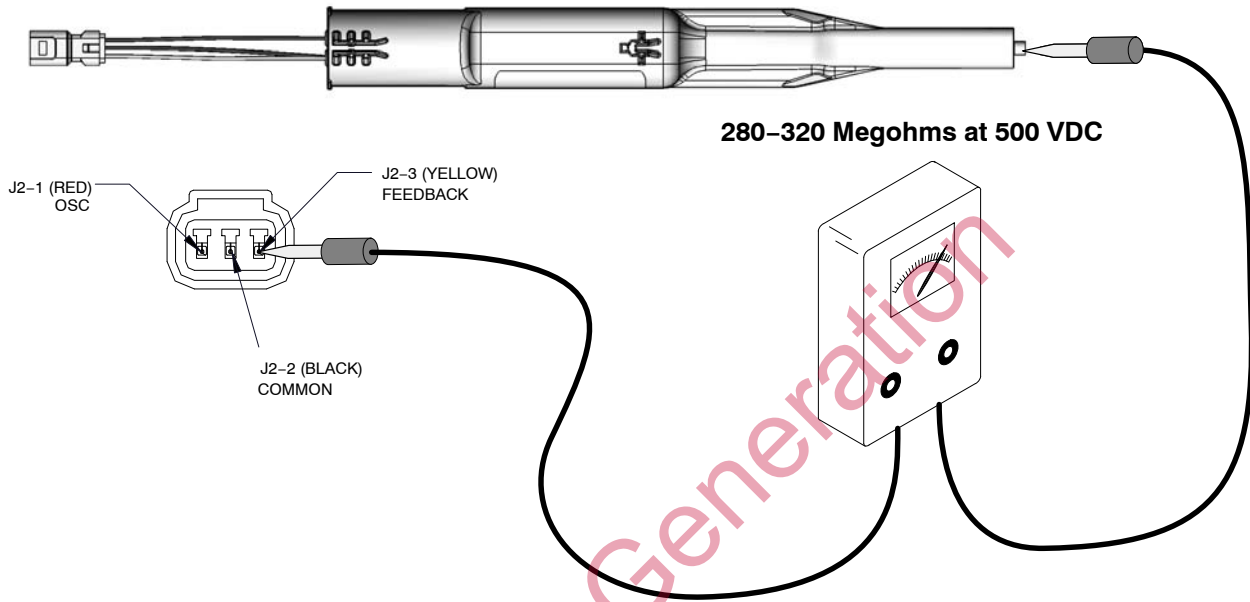


Figure 4-2 Power Supply Resistance Test

Electrode Assembly Resistance Test

Use a megohm meter to measure the resistance of the electrode assembly from the contact ring on the back to the antenna wire in the front. The resistance should be 19–21 megohms. If the resistance is out of this range replace the electrode assembly.

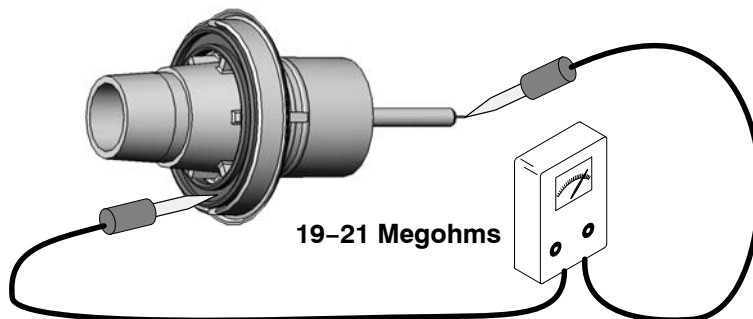


Figure 4-3 Electrode Assembly Resistance Test

Gun Cable Continuity Test

Test for continuity as follows:

- J1-1 and J3-3
- J1-2 and J2-2
- J1-2 and J3-2
- J1-3 and J2-1
- J1-4 and J3-1
- J1-5 and J2-3
- J1-6 and Ring-tong terminal on gun end.

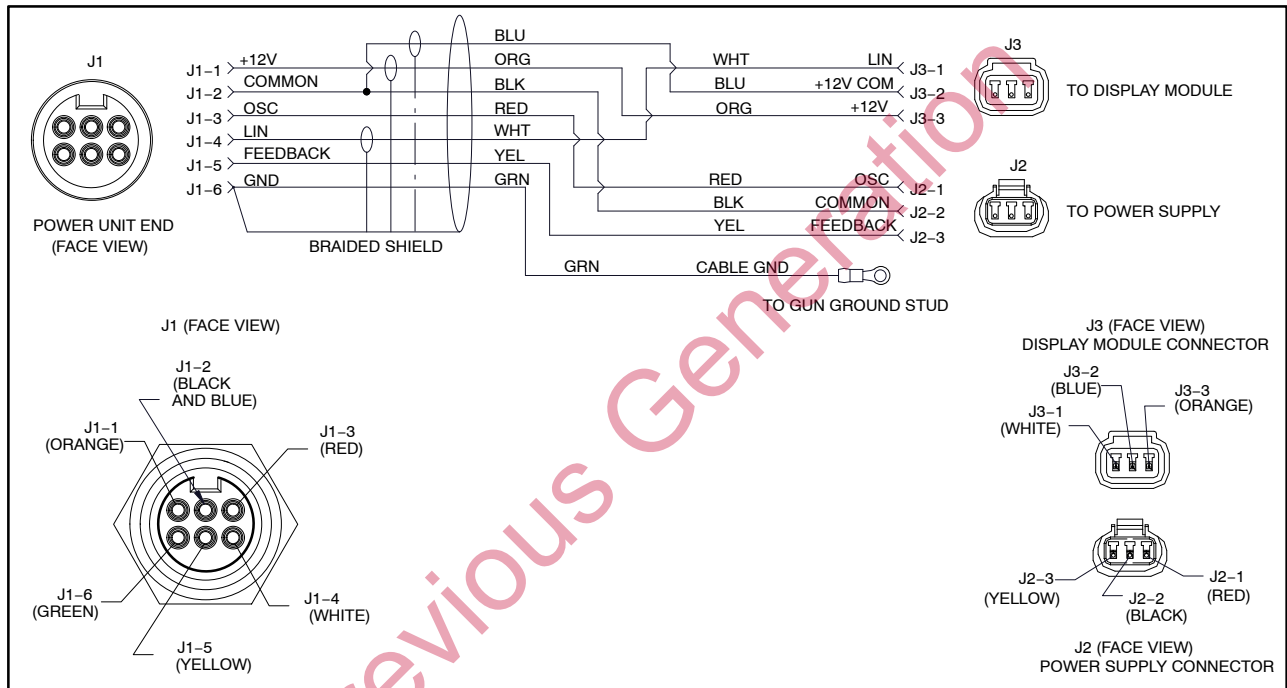


Figure 4-4 Gun Cable Wiring

Controller Interconnect Cable Test

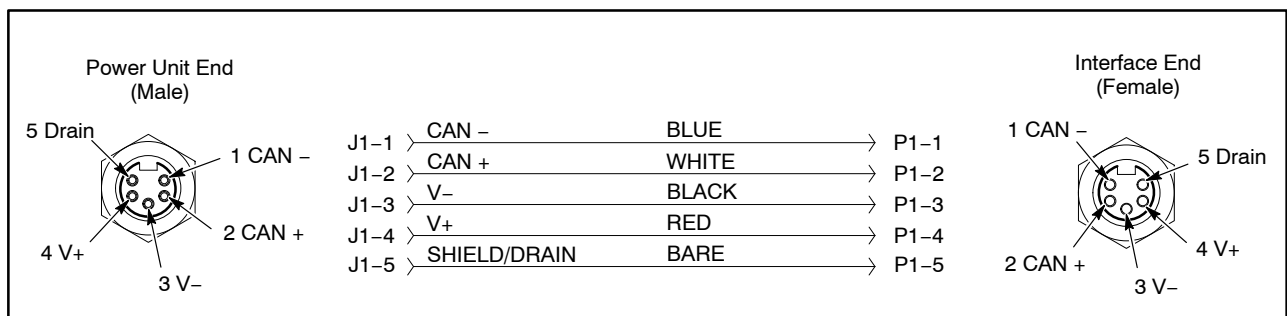


Figure 4-5 Controller Interconnect Cable Wiring

System Wiring Diagrams

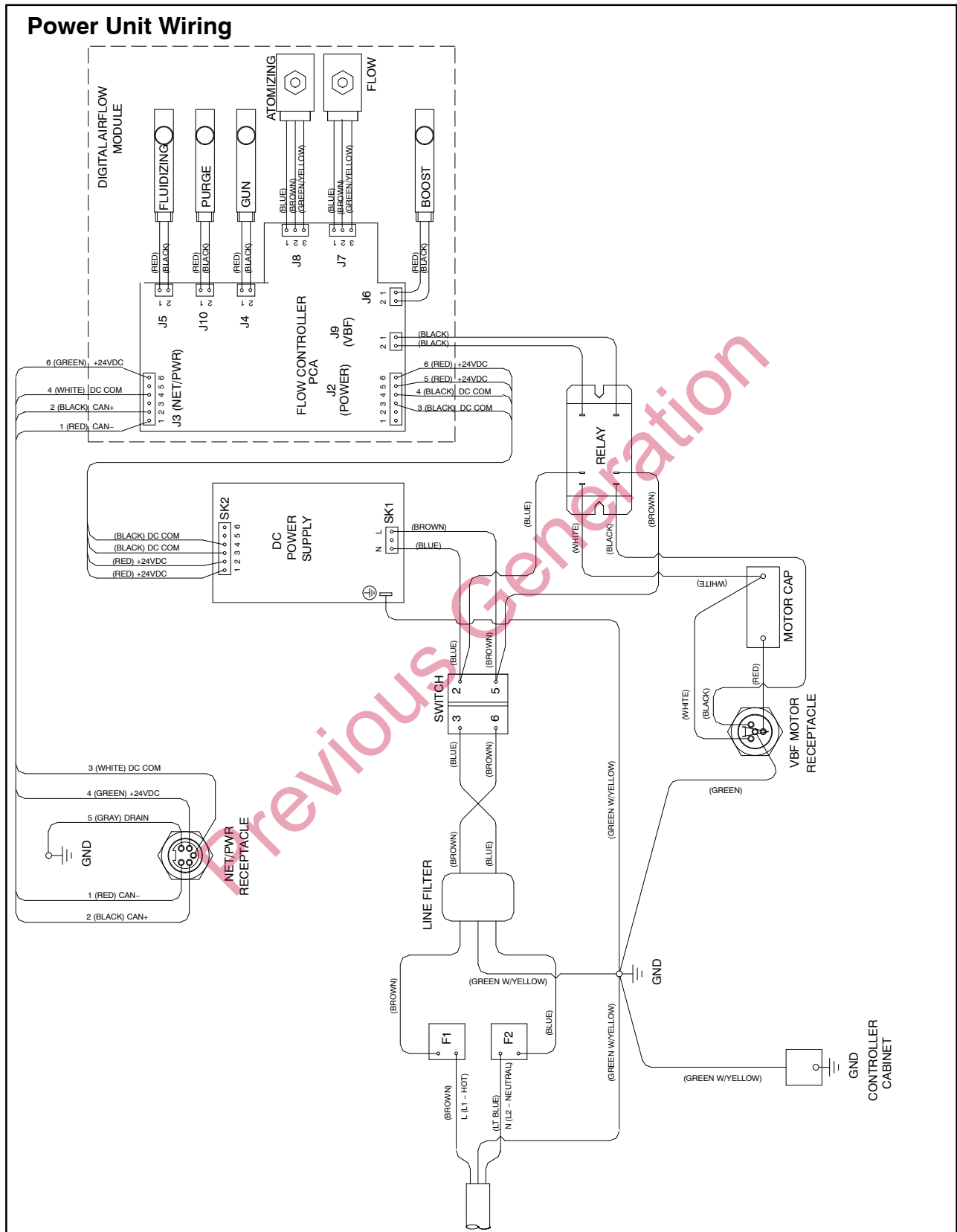


Figure 4-6 Power Unit Wiring Diagram

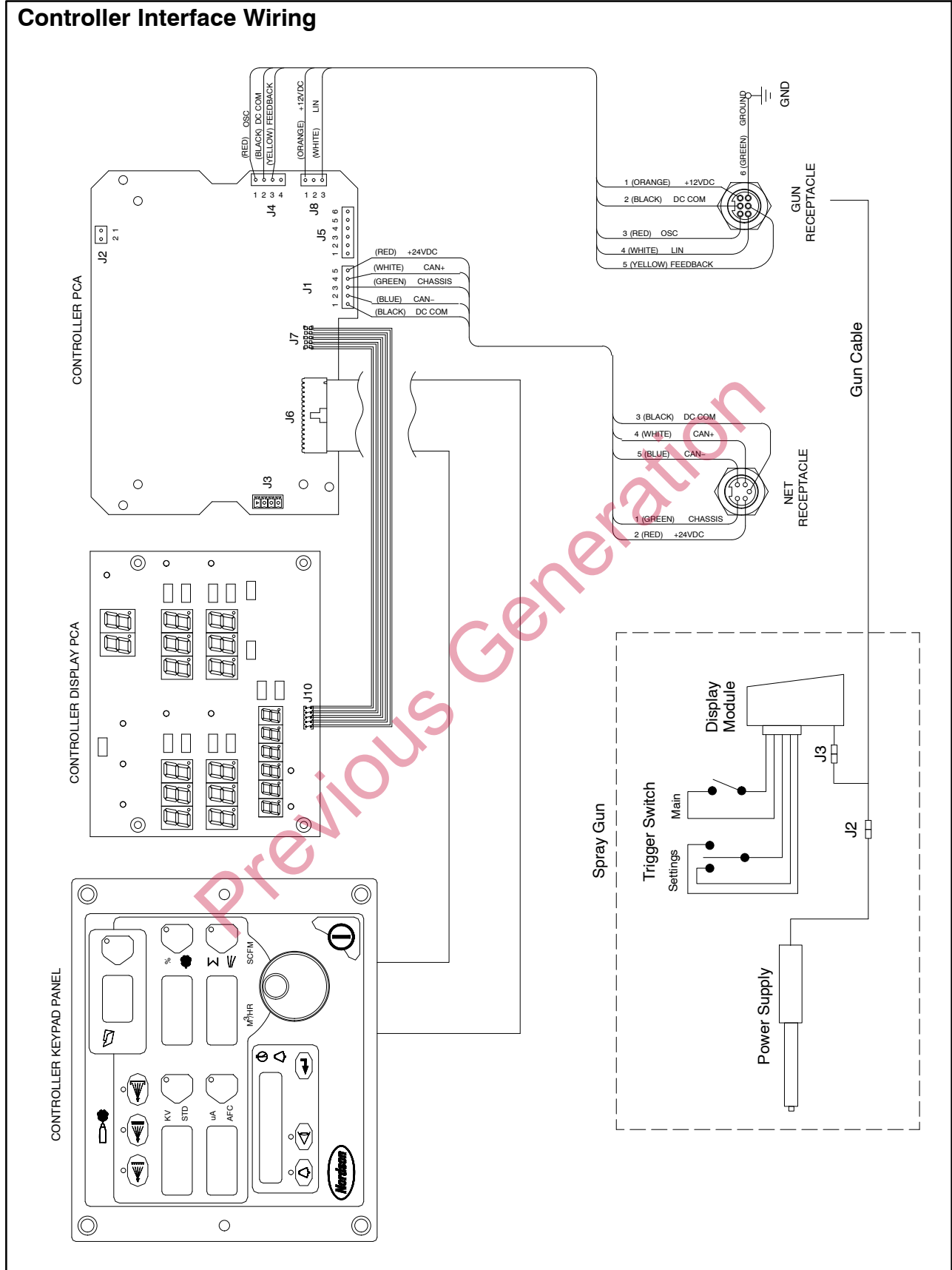


Figure 4-7 Controller Interface Wiring Diagram

Previous Generation

Section 5

Repair



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

Spray Gun Repair

Display Module Replacement

Display Module Removal

1. See Figures 5-1 and 5-3. Unscrew the top and bottom screws (12) holding the bezel (11), hook (10) and display module (9) onto the gun body.
2. Remove the bezel and slide the hook off the display module.
3. Carefully pull the display module away from the gun.
4. Insert a small screwdriver into the recess in the J3 gun cable/display module connectors to release the catch and disconnect them.
5. Carefully remove the adhesive support pad and the trigger switch header from the display module.
6. If the adhesive support pad remains stuck to the trigger switch header, carefully peel the pad off. Both the display module kit and trigger switch kit include new adhesive support pads.

Display Module Installation

1. On the display module (9), carefully clean the trigger switch header mounting surface and surrounding area with isopropyl alcohol. Allow the surface to dry completely before proceeding.
2. If you are installing a new trigger switch, remove the two liners from the connector side of the trigger switch header as shown in Figure 5-1.
3. Align the trigger switch header with the display module receptacle and push on the header to connect it. Apply even pressure on the header to seal it tightly against the display module.

Display Module Installation (contd)

4. Remove the liner from the new adhesive support pad and install it over the trigger switch header. Apply even pressure on the support pad to seal it to the display module.
5. Connect the J3 display module and cable connector together. The display module ground connector (A) is not used for this version of the gun.
6. Gently fold the trigger switch ribbon cable and display module cable into the gun, and install the display module onto the gun.
7. Slide the hook (10) onto the display module, then install the bezel (11).
8. Secure the module with the screws (12).

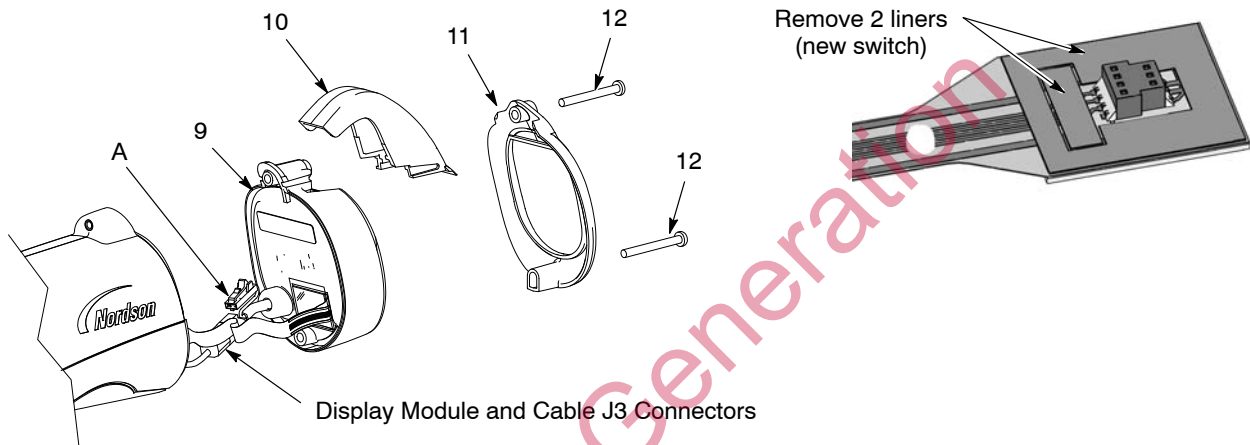


Figure 5-1 Display Module Replacement

- | | | |
|-------------------|--------------------|--------------------------|
| 9. Display module | 11. Bezel | A. Ground wire connector |
| 10. Hook | 12. M3 x 35 screws | |

Power Supply Replacement

Power Supply Removal

1. See Figure 5-1. Remove the display module as described in *Display Module Replacement*.
2. See Figure 5-2. Insert a small screwdriver into the recess in the J2 gun cable/power supply connectors to release the catch and disconnect the connectors.
3. Pull on the top of the bulkhead (8) to remove it from the gun.
4. Slide the power supply (6) out of the gun body and pull the power supply leads and connector out of the bulkhead.
5. Check the gasket on the bulkhead and replace it if it is damaged.

Power Supply Installation

1. Slide the new power supply into the upper cavity of the gun body, guiding the gun body ribs between the grooves on the power supply.
2. Press on the end of the power supply to ensure that the contact tip at the end of the gun body is firmly seated against the brass contact inside the power supply end.
3. Feed the power supply J2 connector through the bulkhead and connect it to the gun cable J2 connector.
4. Insert the bottom of the bulkhead behind the ground pad boss, then rock the top of the cover forward and snap it into place in the gun body.
5. Gently fold the trigger switch ribbon cable and gun cable/display cable and tuck them back into the gun.
6. Reinstall the display module and hook.

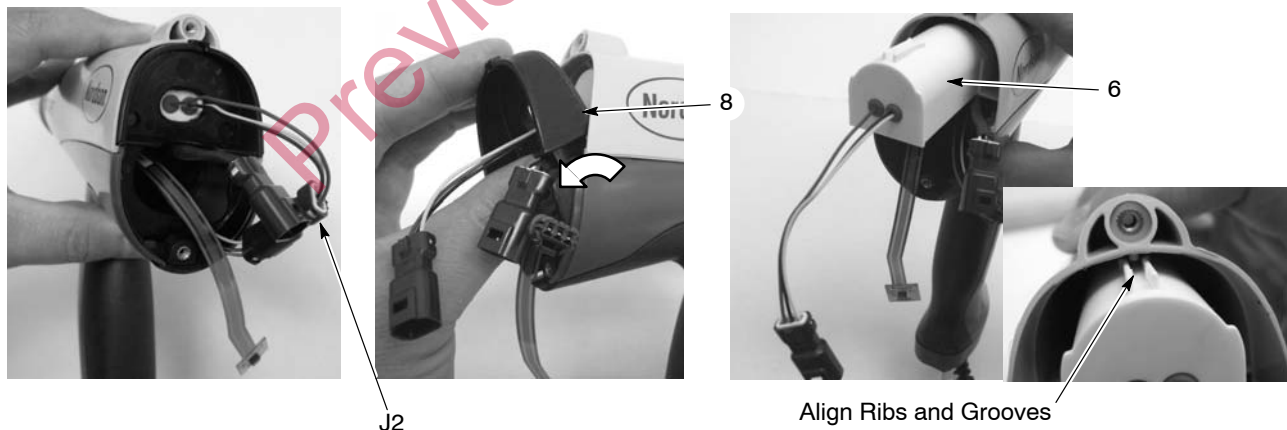


Figure 5-2 Power Supply Replacement

6. Power supply

8. Bulkhead

Trigger Switch, Gun Cable, and Handle Replacement

See Figure 5-3 and the figures accompanying the disassembly steps.

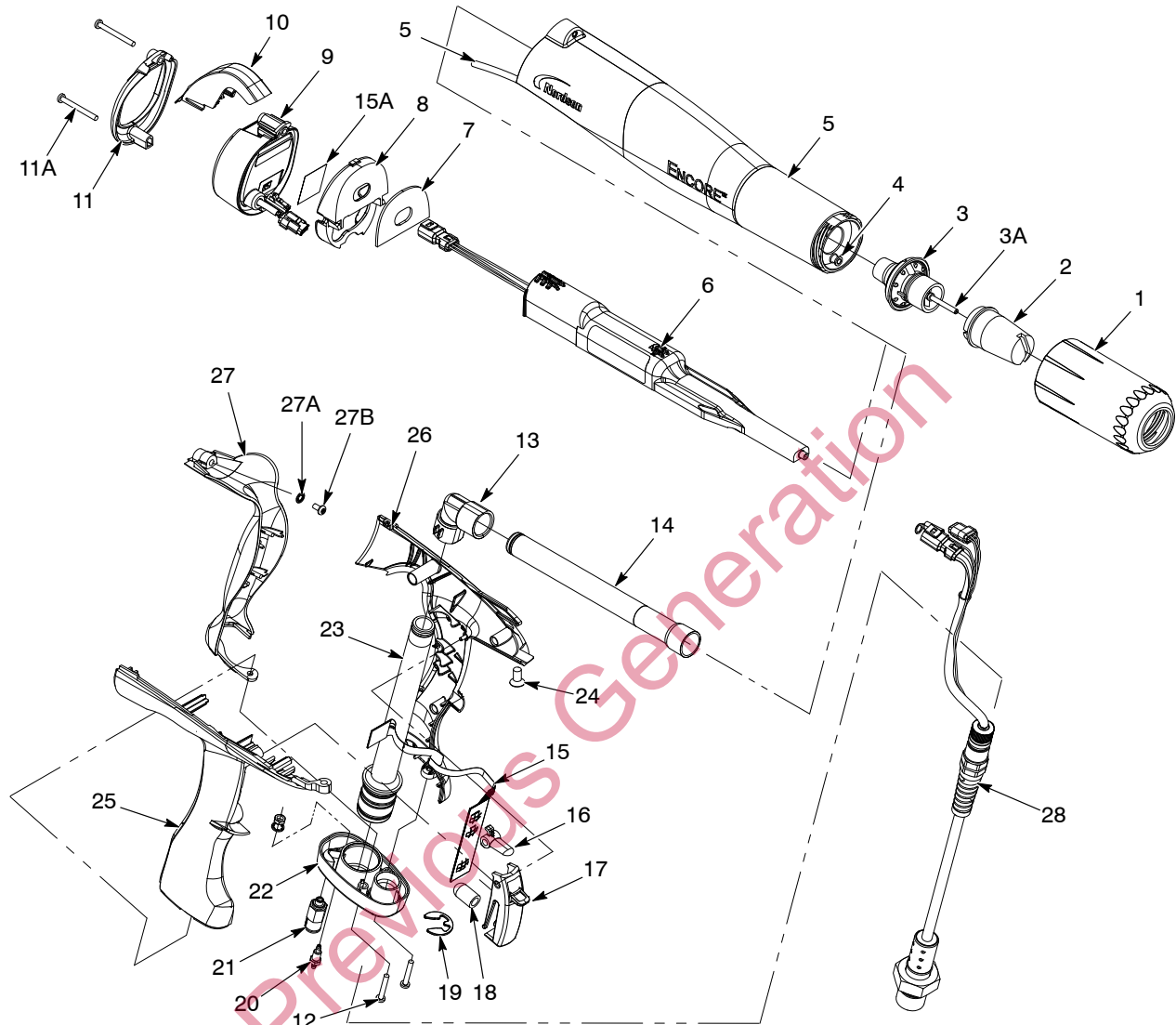


Figure 5-3 Exploded View of Spray Gun (Numbering is same as parts list)

- | | | |
|------------------------------------|------------------------------|-----------------------------|
| 1. Nozzle nut | 10. Hook | 20. Dual barbed fitting |
| 2. Nozzle | 11. Bezel | 21. Check valve (purge air) |
| 3. Electrode assembly | 11A. M3 x 35 screws | 22. Handle base |
| 3A. Electrode holder and electrode | 12. M3 x 20 screws | 23. Inlet tube with O-rings |
| 4. Filter assembly | 13. Elbow | 24. Nylon M5 x 10 screw |
| 4A. Electrode air wash tubing | 14. Outlet tube with O-rings | 25. Right handle |
| 5. Gun Body | 15. Trigger switch | 26. Left handle |
| 6. Power supply (multiplier) | 15A. Adhesive support | 27. Ground pad |
| 7. Gasket | 16. Settings trigger | 27A. M3 lockwasher |
| 8. Bulkhead | 17. Main trigger | 27B. M3 x 6 screw |
| 9. Display module | 18. Trigger actuator | 28. Cable (6 meter) |
| | 19. Retaining ring (cable) | |

Gun Disassembly

1. Remove the nozzle nut, nozzle, and electrode assembly (1, 2, and 3) from the gun.
2. Disconnect the powder feed hose adapter, black purge air tubing, and clear electrode air wash tubing from the gun handle.
3. Disconnect the gun cable from the controller interface module.
4. Remove the display module and power supply as described in *Display Module Replacement* and *Power Supply Replacement*.
5. See Figure 5-4. Remove the M5 x 10 nylon screw (24) from the gun body.



Figure 5-4 Removing Gun Body Screw

6. See Figure 5-5. Grasp the handle in one hand and the gun body in the other. Press the thumbs of each hand together while pulling in opposite directions to separate the gun body from the handle.

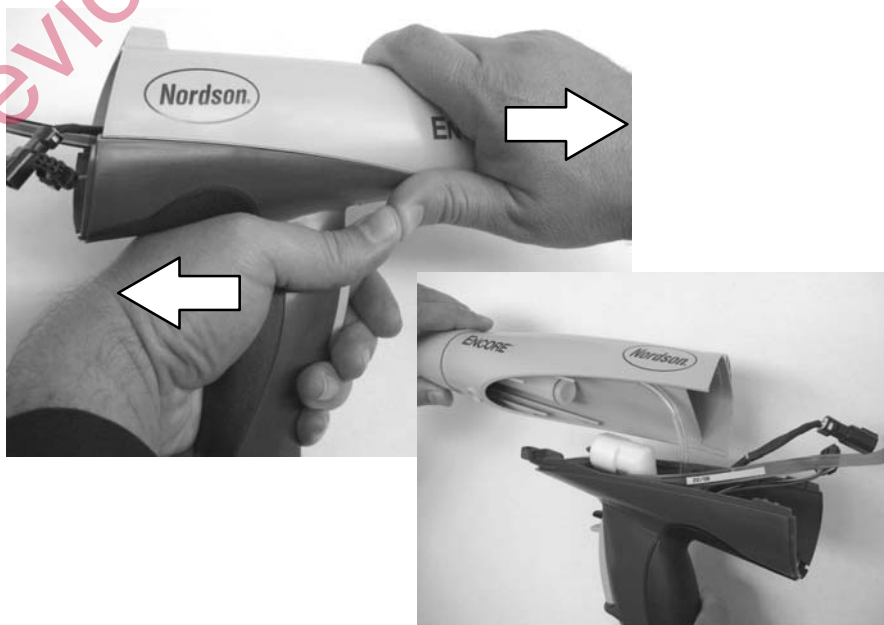


Figure 5-5 Separating Handle and Gun Body

7. See Figure 5-6. Remove the elbow (13) from the inlet tube (23).
8. Remove the two M3 x 20 screws (12) securing the handle base (22) to the handle assembly.
9. Pull the base away from the handle assembly about 25–50 mm (1–2 in.).
10. Pull the clear 4-mm tubing (4A, part of filter assembly) off the barbed fitting (20).

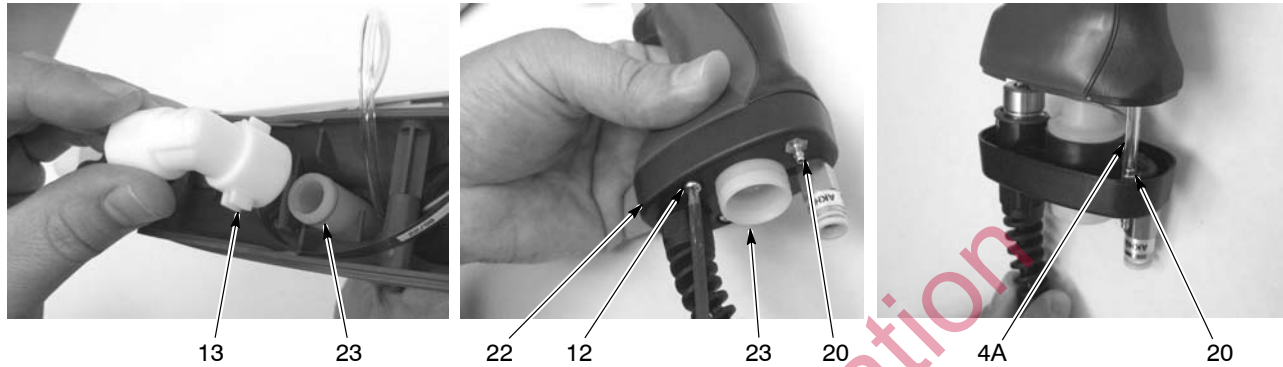


Figure 5-6 Removing the Elbow and Separating the Base from the Handle

4A. Clear 4-mm tubing
12. M3 x 20 screws

13. Elbow
20. Dual barbed fitting

22. Handle base
23. Inlet tube

11. See Figure 5-7. Gently pull the ground pad (27) away from the handle, starting with the bottom and rotating it up and away.



Figure 5-7 Removing the Ground Pad

12. See Figure 5-8. Remove the M3 x 6 screw and M3 lockwasher (27A, 27B) and disconnect the ring-tong ground terminal (part of cable, 28) from the ground pad (27).
13. See Figure 5-9. Separate the right and left handles (25, 26).
14. Remove the main trigger, settings trigger, and trigger actuator (16, 17, 18) from the right handle half.

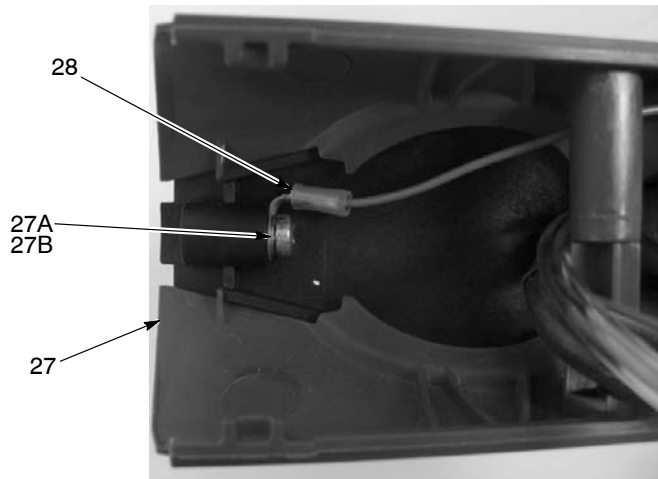


Figure 5-8 Removing the Ground Terminal from the Ground Pad (Top View)

- 15. If replacing the trigger switch (15), peel it off the right handle half.
- 16. Remove the inlet powder tube (23) from the base with a twisting motion.
- 17. Carefully remove the retaining ring (19) from the cable (it can spring off and get lost), then remove the cable (28) from the base.

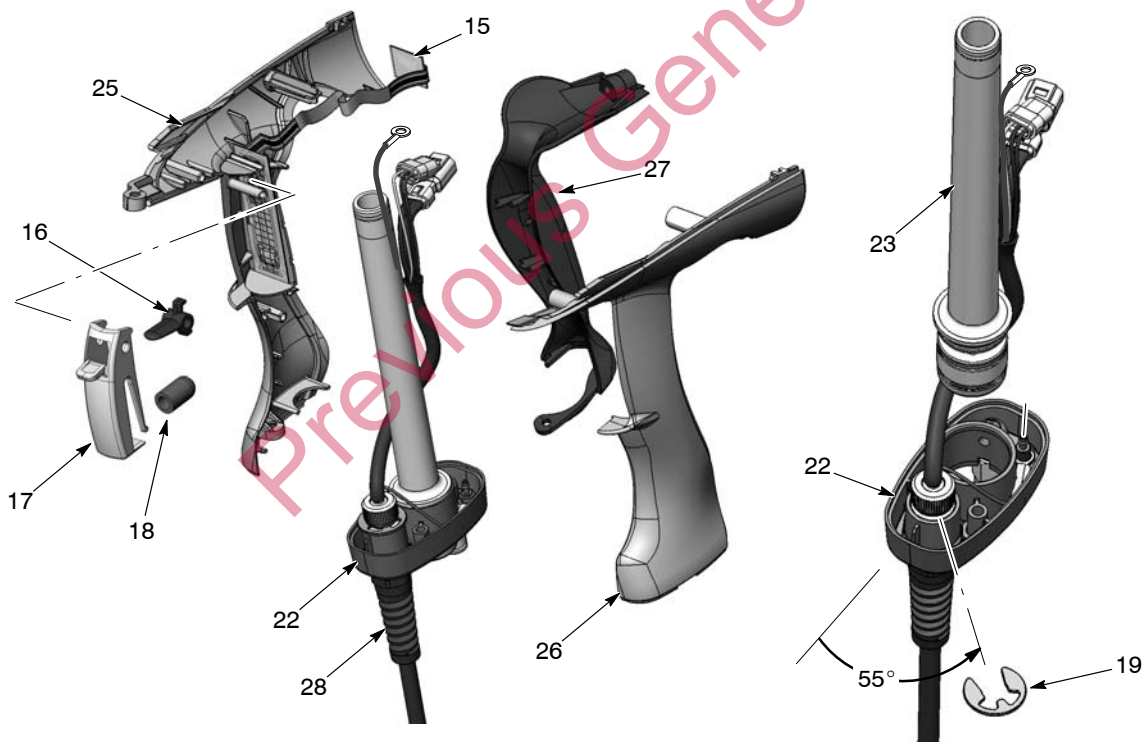


Figure 5-9 Completing Gun Disassembly

- | | | |
|----------------------|--------------------|-----------------|
| 15. Trigger switch | 19. Retaining ring | 26. Left handle |
| 16. Settings trigger | 22. Handle base | 27. Ground pad |
| 17. Main trigger | 23. Inlet tube | 28. Gun cable |
| 18. Actuator | 25. Right handle | |

Gun Re-assembly

1. See Figure 5-9. Feed the cable (28) through the handle base (22) and secure it to the base with the retaining ring (19). Position the retaining ring at the angle shown.
2. Install the inlet tube with O-rings installed (23) into the handle base (22).
3. See Figure 5-10. If removed, install the trigger switch (15) on the mounting flat of the right handle half (25), up against the tabs and bottom flat. Press firmly on the switch to secure it in place.
4. Assemble the actuator (18) on the main trigger (17) boss. Note the orientation of the settings trigger (16) gusset, then insert it into the main trigger. Align the pivot holes in the triggers then slide the triggers over the trigger pivot pin on the right handle half.

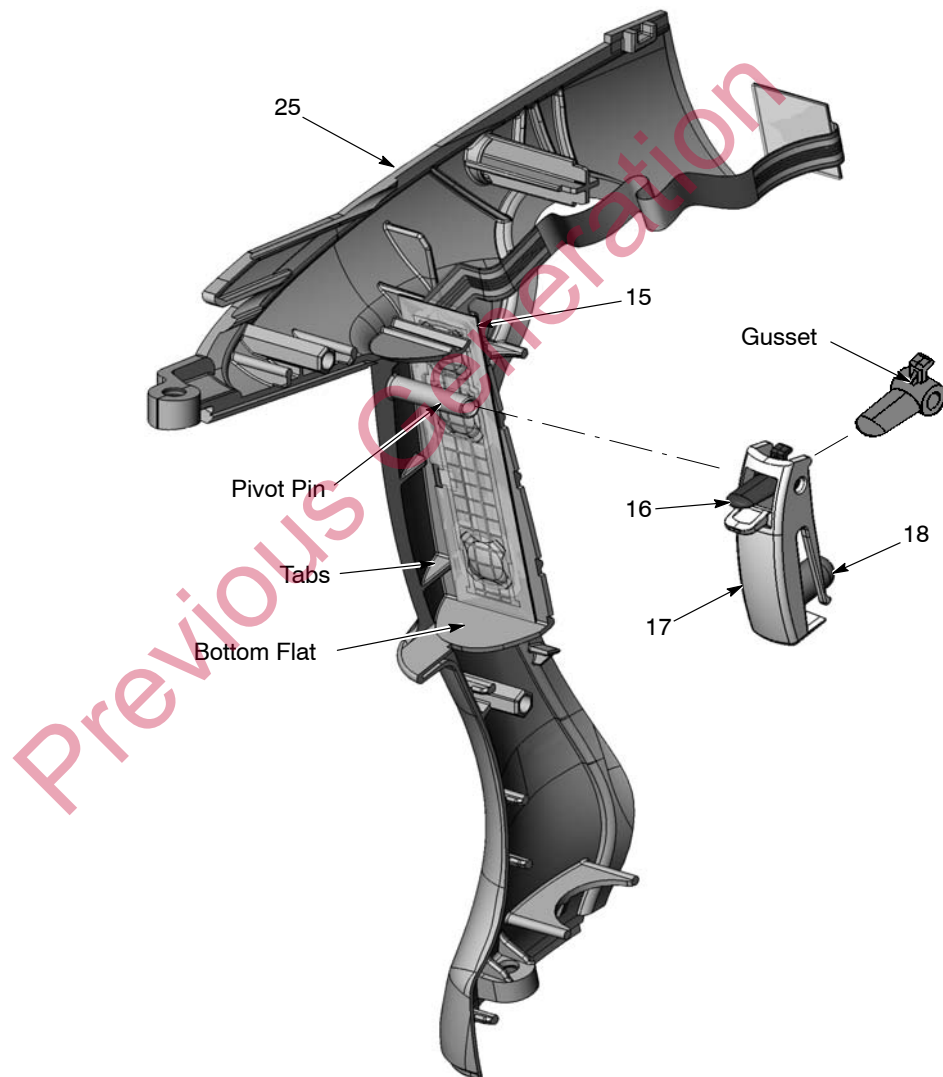


Figure 5-10 Trigger Switch and Trigger Mounting

- | | |
|----------------------|-----------------------|
| 15. Trigger switch | 18. Actuator |
| 16. Settings trigger | 25. Right handle half |
| 17. Main trigger | |

Gun Re-assembly (contd)

5. Align the right and left handle hex pins with their mating sockets and press the handles together.
6. See Figure 5-11. Feed the cable connectors and ground wire into the front of the handle, then slide the inlet tube through the tube guides into the handle assembly while routing the cable through the handle as shown. Stop when the base is about 1.5–2 inches from the bottom of the handle assembly.
7. Connect the 4-mm clear tubing (part of filter assembly, item 4) to the barbed fitting (20) in the handle base.

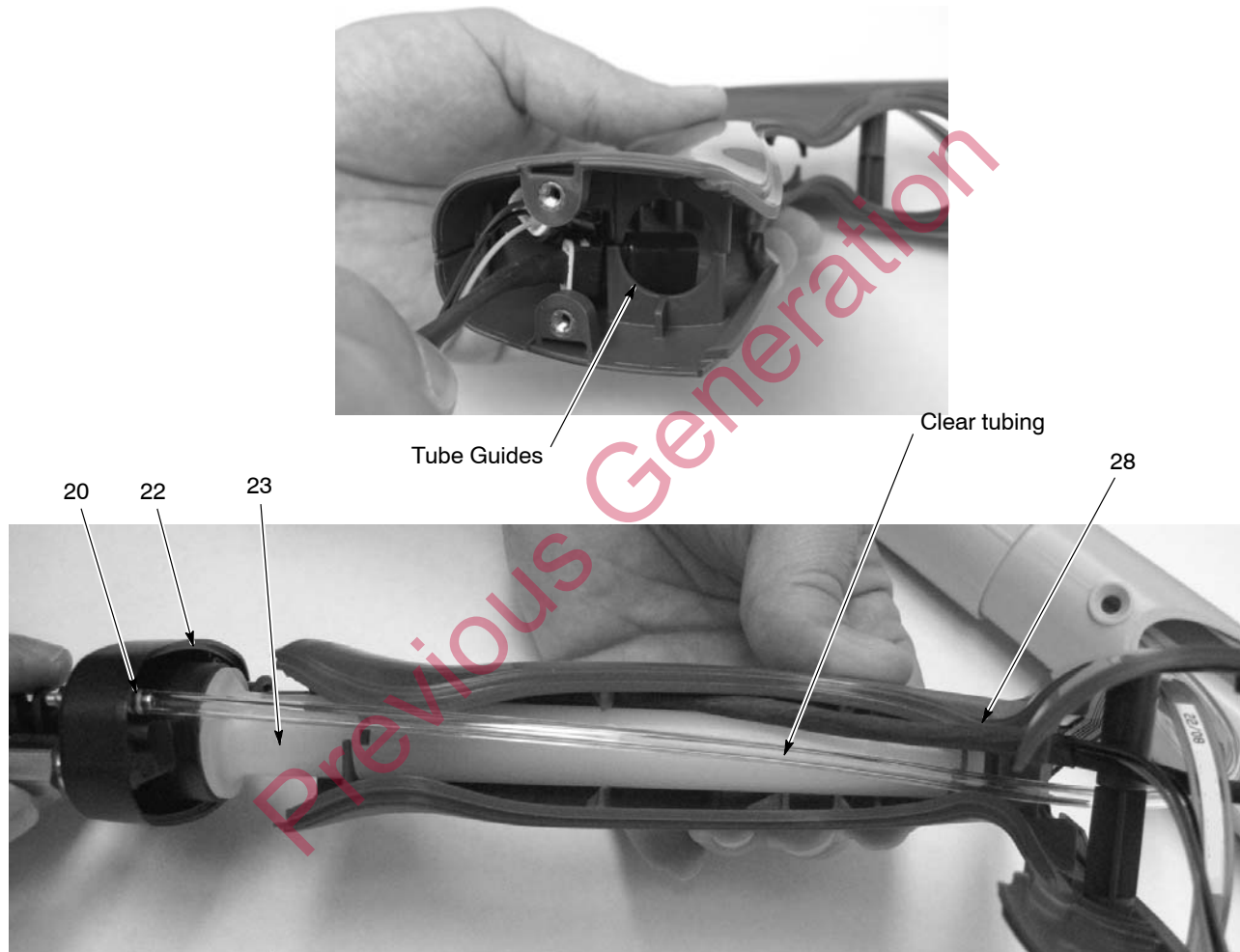


Figure 5-11 Assembling Handles and Base

20. Dual barbed fitting
22. Handle base

23. Inlet tube

28. Cable

8. See Figure 5-8. Connect the cable ground terminal to the inside boss of the ground pad (27) with the lockwasher and screw (27A, 27B).
9. See Figure 5-12. Hook the ground pad (27) behind the locator tabs on the rear of the handles and rotate the ground pad into position against the handle assembly.

10. Push up on the handle base (22) to seat it in the handle, then secure the handle base to the handle assembly with the two M3 x 20 screws (12). Hand tighten the screws only.



Figure 5-12 Assembling Ground Pad and Base to Handles

12. M3 x 20 screws

22. Handle base

27. Ground pad

11. See Figure 5-2. If you removed the power supply, slide it into the upper cavity of the gun body, guiding the guide ribs inside the gun body between the mating grooves on the power supply.
12. Press on the end of the power supply to ensure that the contact tip at the end of the gun body is firmly seated against the brass contact inside the power supply end.
13. See Figure 5-13. Position the lower edge of the bulkhead (8) behind the locator tabs in the rear of the handle assembly and rotate the top of the bulkhead forward until it snaps into place on the handle and gun body.
14. Feed the power supply J2 connector through the top opening in the bulkhead.
15. Route the trigger switch header and gun cable connectors through the bottom opening in the bulkhead.

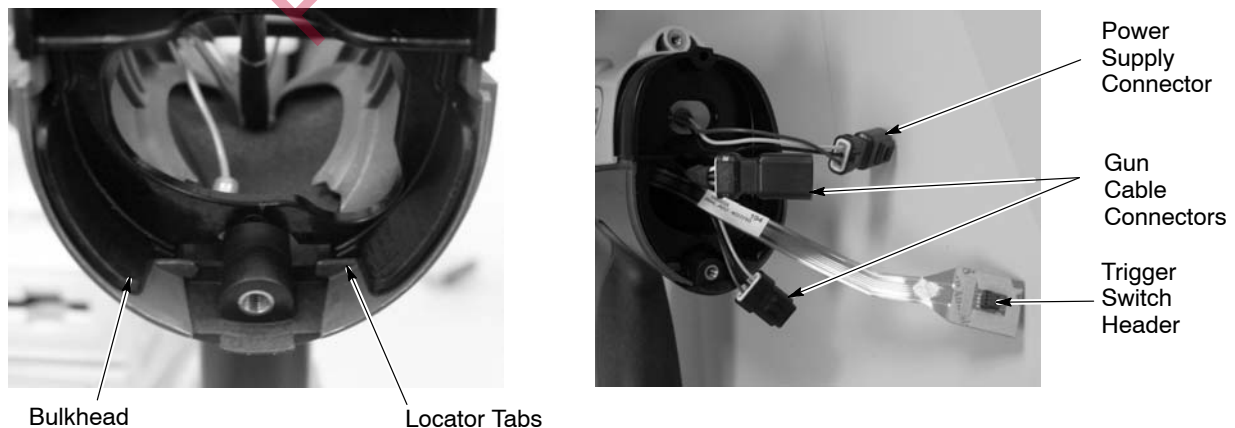


Figure 5-13 Assembling Bulkhead and Routing Cables

Gun Re-assembly (contd)

16. See Figure 5-14. Insert the outlet tube (14) with O-rings installed through the front of the gun body until the end is even with the end of the gun body.
17. Make sure the O-ring is installed in the groove on the inlet powder tube. Install the elbow (13) onto the end of the inlet tube.
18. Align the gun body assembly with the handle and slide them together, engaging the internal ribs of the gun body with the tabs in the handle.



Figure 5-14 Outlet Powder Tube Installation

13. Elbow

14. Outlet powder tube

19. See Figure 5-4. Install the M5 x 10 flat head nylon screw into the gun body to secure it to the handle.
20. Align the inside end of the powder tube with the elbow then push on the tube to seat it in the elbow.
21. Connect the J2 cable connector to the power supply connector.
22. Install the display module as described in *Display Module Replacement* on page 5-1. Make sure you remove both liners from the trigger switch header before connecting it to the display module.
23. See Figure 5-3. Install the electrode assembly into the front of the gun body. Make sure the electrode is not bent or broken.
24. Install the nozzle on the electrode assembly, making sure the keys in the electrode assembly slide into the slots on the nozzle.

25. Install the nozzle nut over the nozzle and rotate clockwise to secure.
26. Connect the 6-mm blue purge air tubing, 4-mm clear electrode air wash tubing, and powder feed hose adapter and hose to the gun.
27. Connect the gun cable to the controller interface module.
28. Turn on the interface and check the gun functions.

Interface Module Repair



WARNING: Shut off the controller and disconnect the power cord or disconnect and lock out power at a breaker or disconnect ahead of the controller before opening the controller enclosures. Failure to observe this warning could result in a severe electrical shock and personal injury.



CAUTION: Electrostatic sensitive device. To avoid damaging the controller circuit boards, wear a grounding wrist strap and use proper grounding techniques when making repairs.

Refer to *Section 4, Troubleshooting*, for the interface electrical schematic and harness connections. Refer to *Section 6, Parts* for repair kits.

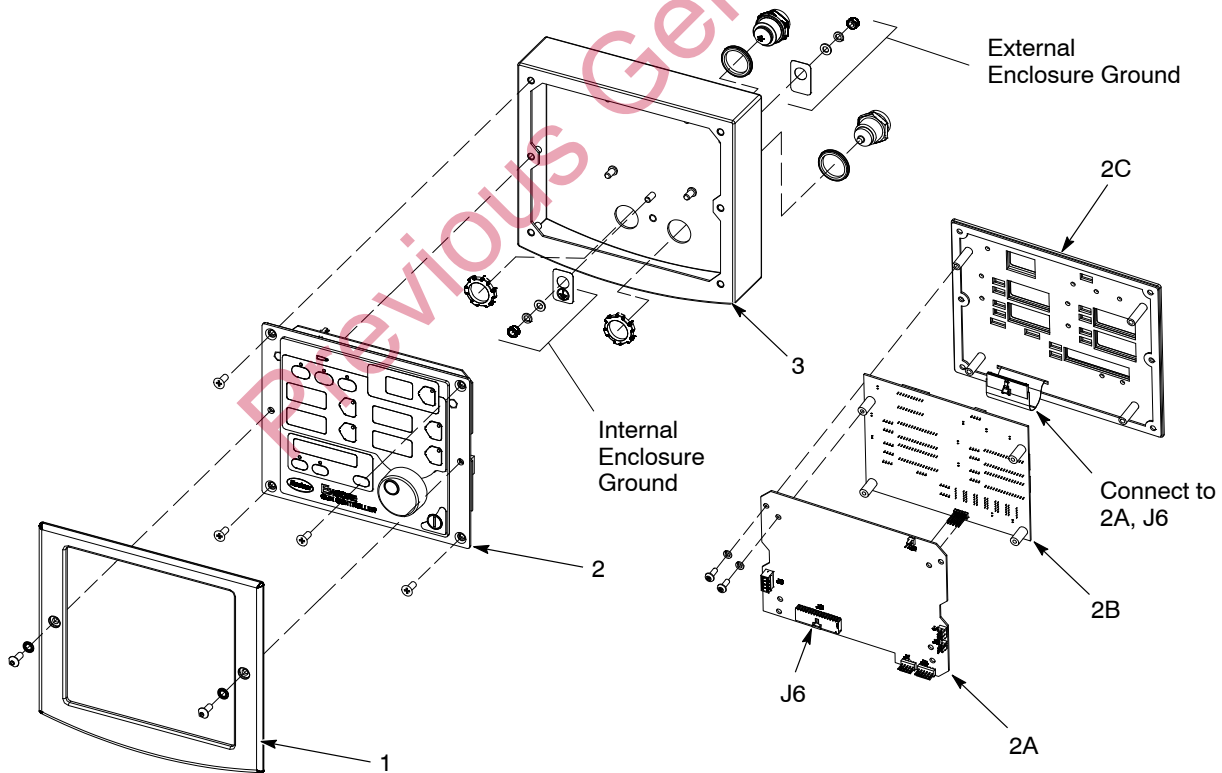


Figure 5-15 Interface Module Assembly

- | | | |
|------------------------|------------------------|------------------|
| 1. Bezel | 2A. Main Control Board | 2C. Keypad Panel |
| 2. Keypad/PCB Assembly | 2B. Main Display Board | 3. Enclosure |

Power Unit Repair



WARNING: Shut off the controller and disconnect the power cord or disconnect and lock out power at a breaker or disconnect ahead of the controller before opening the controller enclosures. Failure to observe this warning could result in a severe electrical shock and personal injury.



CAUTION: Electrostatic sensitive device. To avoid damaging the controller circuit boards, wear a grounding wrist strap and use proper grounding techniques when making repairs.

Refer to *Section 4, Troubleshooting*, for the power unit electrical schematic and harness connections.

Removing the Sub Panel

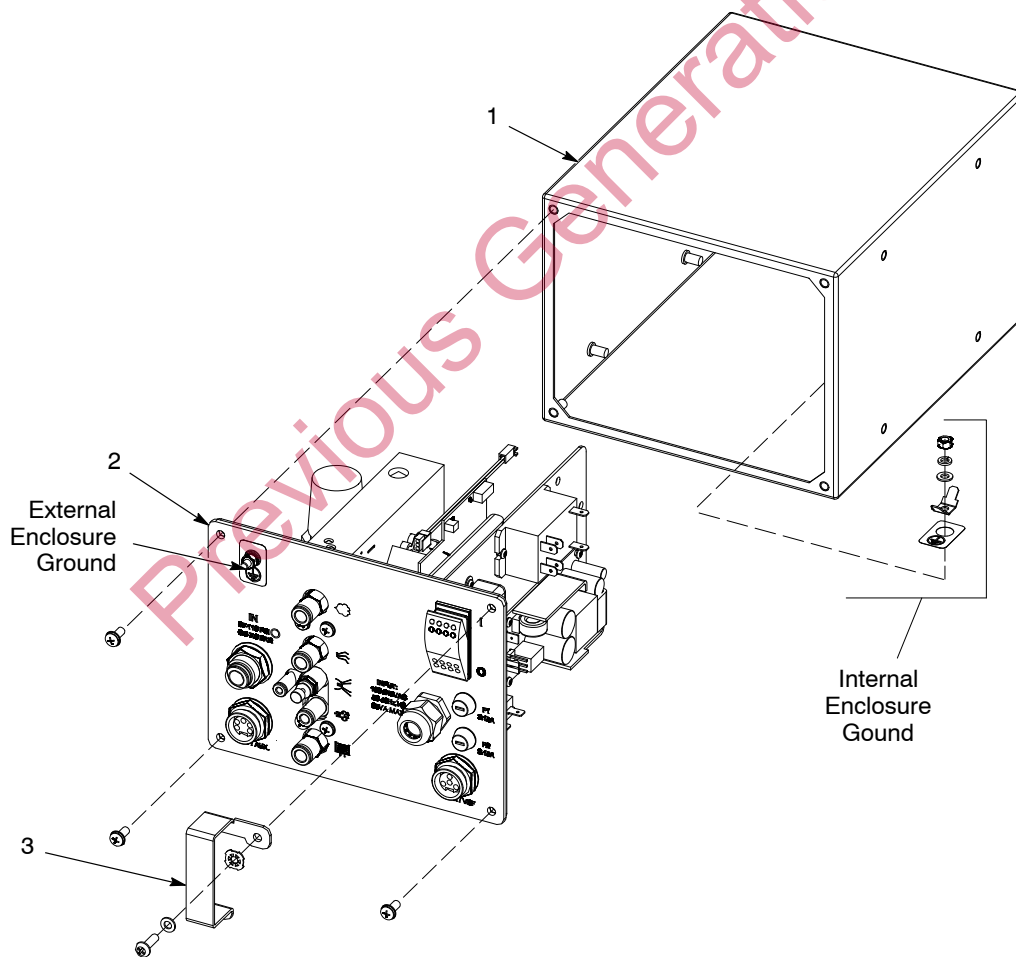


Figure 5-16 Sub Panel Removal

1. Enclosure

2. Sub Panel

3. Power Switch Guard

Sub Panel Components

Figure 5-17 is an exploded view of the components of the sub-panel. The major replaceable parts are called out. Refer to the following when making repairs:

- *Section 6, Parts* for parts and service kits.
- *Section 4, Troubleshooting*, for wiring diagrams and circuit board connections.
- *iFlow Module Repair and Regulator Replacement* for repair procedures.

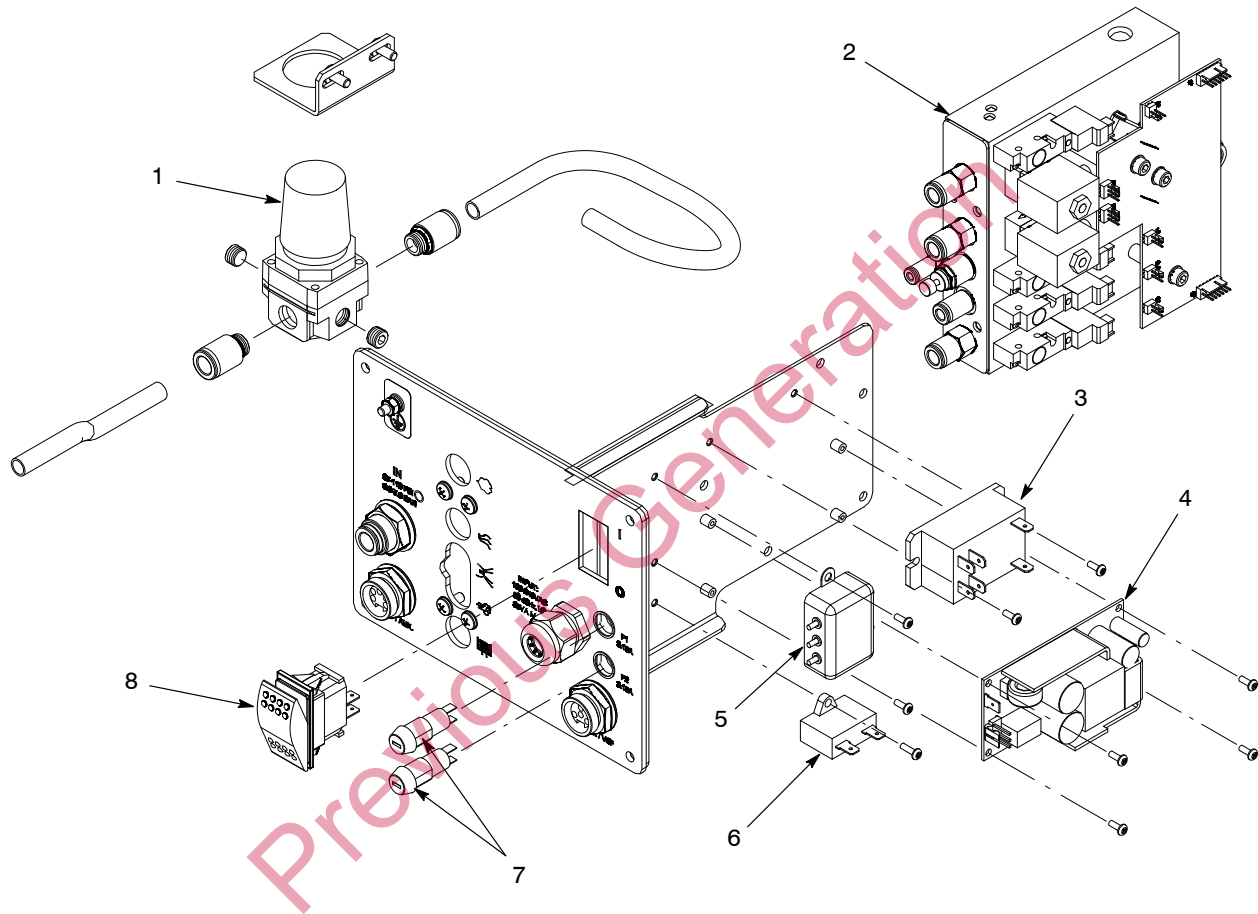


Figure 5-17 Sub Panel Parts Replacement

- | | | |
|-----------------|--------------------|---------------------------|
| 1. Regulator | 4. Power supply | 7. Fuses and fuse holders |
| 2. iFlow module | 5. Line filter | 8. Rocker switch |
| 3. Relay (VBF) | 6. Capacitor (VBF) | |

Regulator Replacement

Use the iFlow Air Verification Kit and this procedure to adjust the precision regulator (1) that supplies air to the iFlow module after replacing it.

NOTE: The plugs and connectors in the regulator ports are not supplied with a replacement regulator. Re-use the plugs and fittings from the old regulator.

Regulator Replacement *(contd)*

1. Disconnect the 4-mm electrode air wash tubing from the electrode air wash output. Disconnect the air tubing from the other outputs and plug them with 8-mm and 6-mm plugs.
2. Connect the manometer to the electrode air wash fitting by removing the orifice assembly from the clear 4-mm tubing and plugging the tubing into the fitting.
3. On the controller interface, set the flow-rate and atomizing air flows to 1 SCFM (1.70 m³/h).
4. Point the spray gun into the booth and trigger the gun on. The manometer should show a pressure reading.
5. Pull out the regulator knob and adjust it to slightly more than 85 psi (5.86 bar). The manometer reading should occasionally bounce higher, but never fall below 85.
6. Push in the regulator knob to lock the setting.

iFlow Module Repair

The iFlow module consists of a circuit board and air manifold, on which are mounted two proportional valves, transducers, and four solenoid valves.



CAUTION: The module circuit board is an electrostatic sensitive device (ESD). To prevent damage to the board when handling it, wear a grounding wrist strap connected to ground. Handle the board only by its edges.

Repair of the flow module is limited to cleaning or replacing the proportional valves, and replacing the solenoid valves, check valves, and fittings. Field replacement of other parts is not possible, due to the need to calibrate the module at the factory using equipment not available to the field.

Testing iFlow Modules

Use the iFlow Air Flow Verification Kit to check the output of the proportional valves for correct air flow output. Use the following procedure:



CAUTION: Handle the orifice assembly with care. Rough handling can damage the orifice and affect the manometer reading.

1. Disconnect the air tubing from the flow or atomizing air fitting and plug in the orifice assembly.
2. Set the controller Powder Flow mode to Classic Flow, then set the flow of the function (flow or atomizing air) you are checking to the lowest value in the *Flow to Pressure* chart on page 5-17.
3. Turn on the manometer. If desired, change the scale to read bar instead of psi. Refer to manometer documentation for instructions.
4. Point the spray gun into the booth and trigger the gun on.

5. Note the manometer reading.
6. Refer to the *Flow to Pressure* chart on the following page. Compare the manometer reading with the min/max acceptable range for the air flow.

Check the output pressure at different flow settings. If the manometer reading is within the acceptable range then the digital flow module is working correctly. If the reading is not within the acceptable range refer to the Troubleshooting procedures in *Section 4, Troubleshooting*.

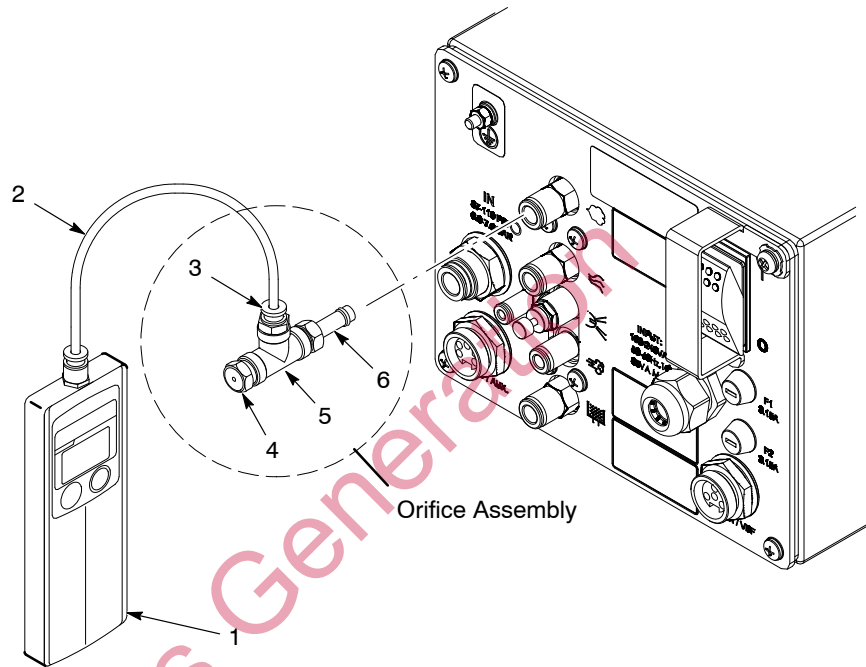


Figure 5-18 Air Verification Kit Usage

- | | |
|------------------------|----------------------------------|
| 1. Manometer | 4. Orifice |
| 2. Clear 4-mm tubing | 5. Tee |
| 3. 4-mm tube connector | 6. 8-mm quick disconnect adapter |

Flow to Pressure Chart

Air Flow Setting m3/hr (scfm)	Manometer Reading Minimum bar (psi)	Manometer Reading Maximum bar (psi)
0.00	0	0
0.85 (0.50)	0.1 (1)	0.2 (3)
1.25 (0.75)	0.1 (2)	0.3 (5)
1.65 (1.00)	0.3 (5)	0.5 (7)
2.10 (1.25)	0.5 (8)	0.7 (10)
2.50 (1.50)	0.8 (11)	1.0 (14)
2.95 (1.75)	1.0 (14)	1.2 (17)
3.35 (2.00)	1.2 (18)	1.5 (21)
3.75 (2.25)	1.4 (21)	1.7 (24)
4.20 (2.50)	1.7 (25)	1.9 (28)
4.60 (2.75)	2.0 (29)	2.2 (32)
5.05 (3.00)	2.3 (33)	2.5 (36)
5.50 (3.25)	2.5 (37)	2.8 (40)
5.95 (3.50)	2.8 (41)	3.0 (44)
6.35 (3.75)	3.0 (45)	3.3 (48)
6.80 (4.00)	3.4 (49)	3.6 (52)

Solenoid Valve Replacement

See Figure 5-19. To remove the solenoid valves (13), remove the two screws in the valve body and lift the valve off the manifold.

Make sure the O-rings furnished with the new valves are in place before installing the new valve on the manifold.

Proportional Valve Cleaning

See Figure 5-19. A dirty air supply can cause the proportional valve (6) to malfunction. Follow these instructions to disassemble and clean the valve.

1. Disconnect the coil (3) wiring from the circuit board (1). Remove the nut (2) and coil from the proportional valve (6).
2. Remove the two long screws (4) and two short screws (5) to remove the proportional valve from the manifold.



CAUTION: The valve parts are very small; be careful not to lose any. Do not mix the springs from one valve with those from another. The valves are calibrated for different springs.

3. Remove the valve stem (8) from the valve body (11).
4. Remove the valve cartridge (10) and spring (9) from the stem.

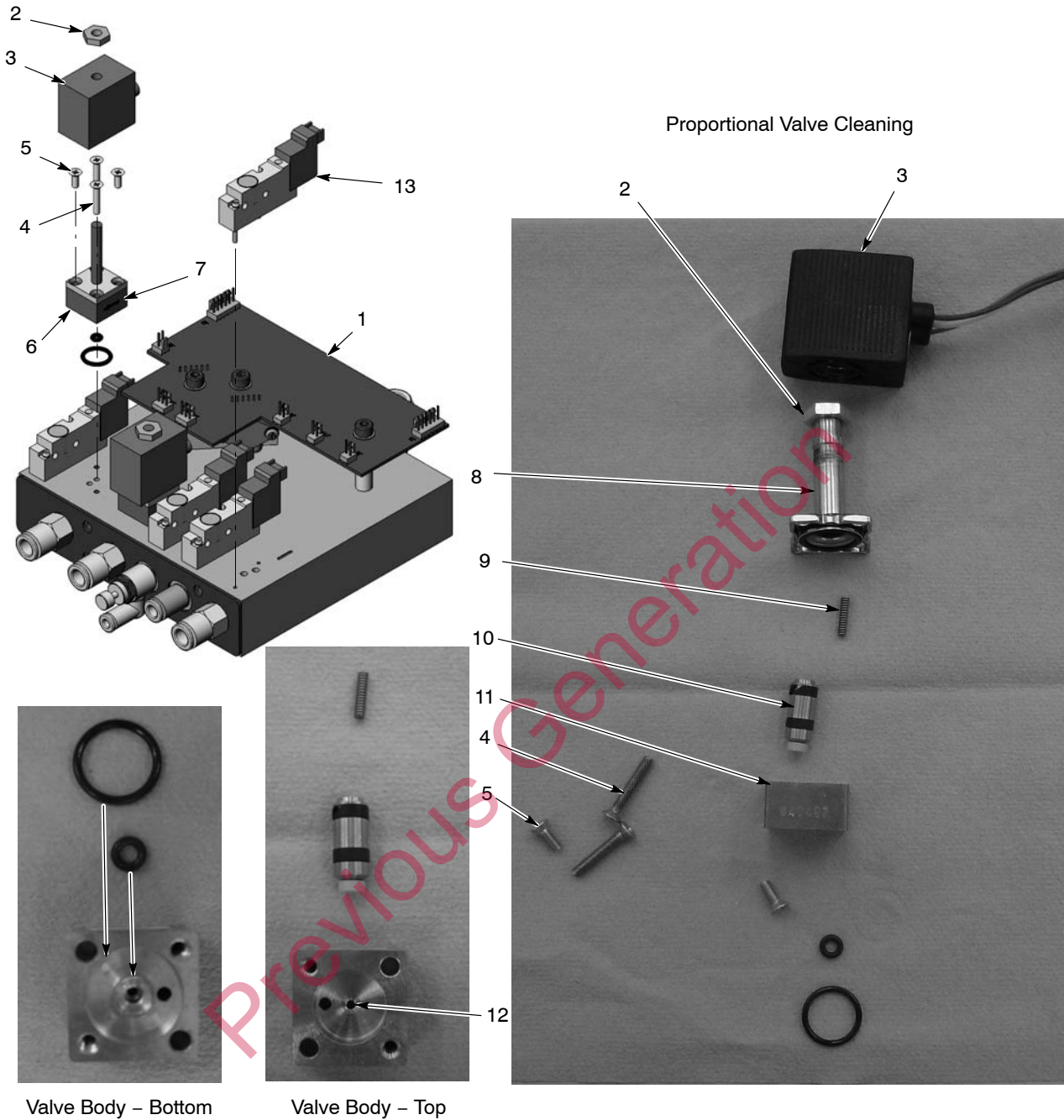


Figure 5-19 iFlow Module Repair – Solenoid Valve Replacement and Proportional Valve Cleaning or Replacement

- | | | |
|--|----------------------------|---------------------|
| 1. Circuit board | 6. Proportional valve (2) | 10. Cartridge |
| 2. Nut-coil to proportional valve (2) | 7. Direction of flow arrow | 11. Valve body |
| 3. Coil-proportional valve (2) | 8. Stem | 12. Orifice |
| 4. Long screws-valve to manifold (2) | 9. Spring | 13. Solenoid valves |
| 5. Short screws-valve stem to body (2) | | |

5. Clean the cartridge seat and seals, and the orifice in the valve body. Use low-pressure compressed air. Do not use sharp metal tools to clean the cartridge or valve body.
6. Install the spring and then the cartridge in the stem, with the plastic seat on the end of the cartridge facing out.
7. Make sure the O-rings furnished with the valve are in place on the bottom of the valve body.
8. Secure the valve body to the manifold with the long screws, making sure the arrow on the side of the body points toward the outlet fittings.
9. Install the coil over the valve stem, with the coil wiring pointing toward the circuit board. Secure the coil with the nut.
10. Connect the coil wiring to the circuit board.

Proportional Valve Replacement

See Figure 5-19.

If cleaning the proportional valve does not correct the flow problem then replace the valve. Remove the valve by performing steps 1 and 2 of *Proportional Valve Cleaning*.

Before installing a new valve, remove the protective cover from the bottom of the valve body. Be careful to not lose the O-rings under the cover.

Previous Generation

Previous Generation

Section 6

Parts

Introduction

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

This section covers parts for the spray gun, controller, and mobile system. Refer to the following manuals for pump and hopper parts and repair information.

Encore System Operator Card: 1088668
Encore Generation II Powder Feed Pump: 1095927
Encore 150 and 300-mm Lance Extensions: 1093657
Pattern Adjuster Kit for Lance Extensions: 1100013
Pattern Adjuster Kit for Encore Manual Spray Guns: 10984490
Hoppers: 1062942, Nordson NHR-X-XX Powder Feed Hoppers

System Part Numbers

Use these part numbers to order complete systems.

Part	Description	Note
1097075	SYSTEM, mobile powder, 25-lb hopper, Encore	
1097074	SYSTEM, mobile powder, 50-lb hopper, Encore	

Spray Gun Parts

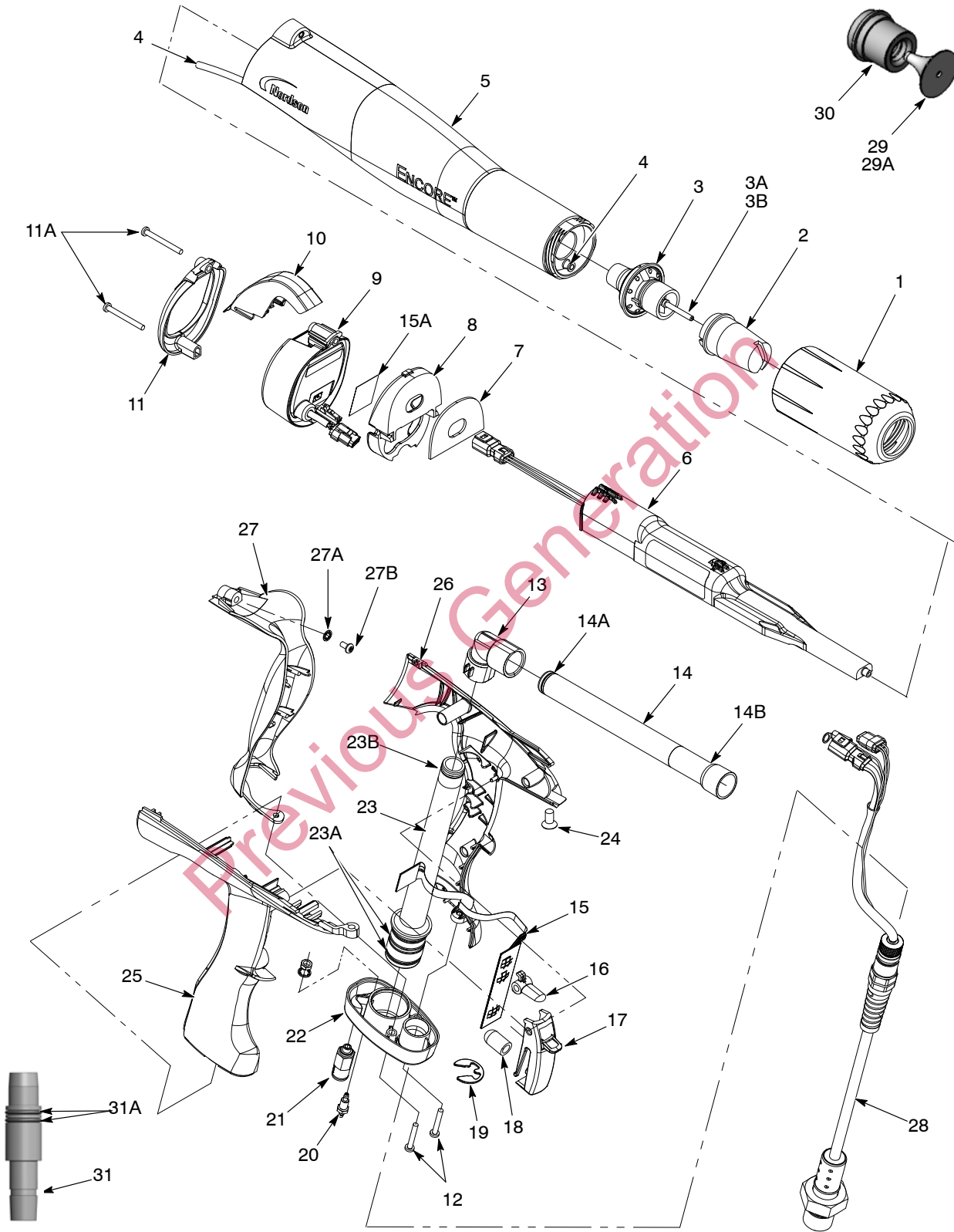


Figure 6-1 Exploded View of Encore Manual Spray Gun and Accessories

See Figure 6-1.

Item	Part	Description	Quantity	Note
–	1102650	HANDGUN assembly, Encore	1	
1	1081638	• NUT, nozzle, handgun	1	
2	1081658	• NOZZLE, flat spray, 4 mm	1	A
3	1106076	• ELECTRODE ASSEMBLY, packaged	1	
3A	1106078	• • ELECTRODE, spring contact, packaged	1	
3B	1106071	• • HOLDER, electrode, M3, Encore	1	
4	1088558	• FILTER ASSEMBLY, handgun	1	
5	1088506	• KIT, body assembly, handgun, Encore	1	
6	1084821	• POWER SUPPLY, 100 kV, negative, Encore, packaged	1	
7	1088502	• GASKET, multiplier cover, handgun	1	G
8	1102624	• COVER, bulkhead, multiplier, handgun	1	G
9	1100986	• KIT, handgun display module, Encore	1	
NS	1085631	• • SUPPORT, adhesive, handgun, Encore	1	E
10	1087760	• HOOK, handgun	1	
11	1102648	• BEZEL, shield, plated	1	G
11A	345071	• SCREW, pan head, recessed, M3 x 35, BZN	2	G
12	760580	• SCREW, philips head, M3 x 20, zinc plate	2	
13	1081532	• ELBOW, powder tube, handgun	1	F
14	1085024	• KIT, powder outlet tube, Encore	1	F
14A	1081785	• • O-ring, silicone, 0.468 x 0.568 x 0.05 in.	1	
14B	941113	• • O-ring, silicone, 0.438 x 0.625 x 0.094 in.	1	
15	1101872	• KIT, trigger switch, Encore	1	
NS	1085631	• • SUPPORT, adhesive, handgun, Encore	1	E
16	1081540	• TRIGGER, setting, handgun	1	
17	1089095	• TRIGGER, main, handgun, Encore	1	
18	1087783	• ACTUATOR, main trigger switch	1	
19	1081777	• RETAINING RING, external, 10 mm	1	
20	1081616	• FITTING, bulkhead, barb, dual, 10–32 x 4 mm	1	
21	1081617	• CHECK VALVE, male, M5 x 6 mm	1	
22	1087762	• BASE, handle, handgun	1	
23	1085026	• KIT, powder inlet tube, Encore	1	
23A	1084773	• • O-ring, silicone, 18 mm ID x 2 mm wide	2	
23B	1081785	• • O-ring, silicone, 0.468 x 0.568 x 0.05 in.	1	
24	1088601	• SCREW, flat head, recess, M5x 10, Nylon	1	
25	1087550	• HANDLE, handgun, right	1	
26	1087551	• HANDLE, handgun, left	1	
27	1102621	• HANDLE, ground pad, handgun, Encore	1	G
27A	983520	• WASHER, lock, internal, M3, zinc	1	G
27B	982427	• MACHINE SCREW, pan head, recessed, M3 x 6, zinc	1	G
28	1102625	• CABLE ASSEMBLY, handgun, 6 meter	1	G
29	1083206	• DEFLECTOR assembly, conical, 26 mm	1	A

Continued...

Item	Part	Description	Quantity	Note
29A	1098306	• • O-RING, Viton, 3 mm x 1.1 mm wide	1	B
30	1082060	• NOZZLE, conical	1	A
31	1106200	• KIT, hose adapter, hose, handgun, Encore	1	
31A	940156	• • O-ring, silicone, 0.563 x 0.688 x 0.063 in.	2	
NS	900617	• TUBE, polyurethane, 4 mm OD, clear	AR	C
NS	900741	• TUBING, polyurethane, 6/4 mm, black	AR	C
NS	900620	• TUBING, poly, spiral cut, 3/8 in. ID	AR	C
NS	1085168	CABLE, 6-wire, shielded, handgun, 6 meter extension	1	D

NOTE A: Standard flat spray nozzle, and conical nozzle and deflector shipped with spray gun. Refer to the following pages for optional nozzles.

B: This O-ring is a component of all deflectors.

C: Order in increments of one foot or one meter.

D: Optional part, not included with spray gun. Order separately.

E: Use to secure and seal trigger switch header to display module.

F: Also available in wear or impact resistant materials. Refer to *Options*.

G: Available in 1102653 Kit, Upgrade, handgun, Encore to upgrade older guns to 1102650 gun configuration.

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Spray Gun Options

Miscellaneous Spray Gun Options

See Figure 6-1.

Item	Part	Description	Quantity	Note
13	1096695	ELBOW, powder tube, Encore, wear resistant	1	
13	1096696	ELBOW, powder tube, Encore, impact resistant	1	
14	1096698	KIT, powder outlet tube, wear resistant	1	
14A	1081785	• O-ring, silicone, 0.468 x 0.568 x 0.05 in.	1	
14B	941113	• O-ring, silicone, 0.438 x 0.625 x 0.094 in.	1	
NS	1093604	EXTENSION, lance, 150 mm, Encore	1	
NS	1093605	EXTENSION, lance, 300 mm, Encore	1	
NS	1100012	KIT, pattern adjuster, Encore, lance extensions	1	

Flat Spray Nozzles

The 4-mm flat spray nozzle is shipped with the spray gun. All other flat spray nozzles are optional.

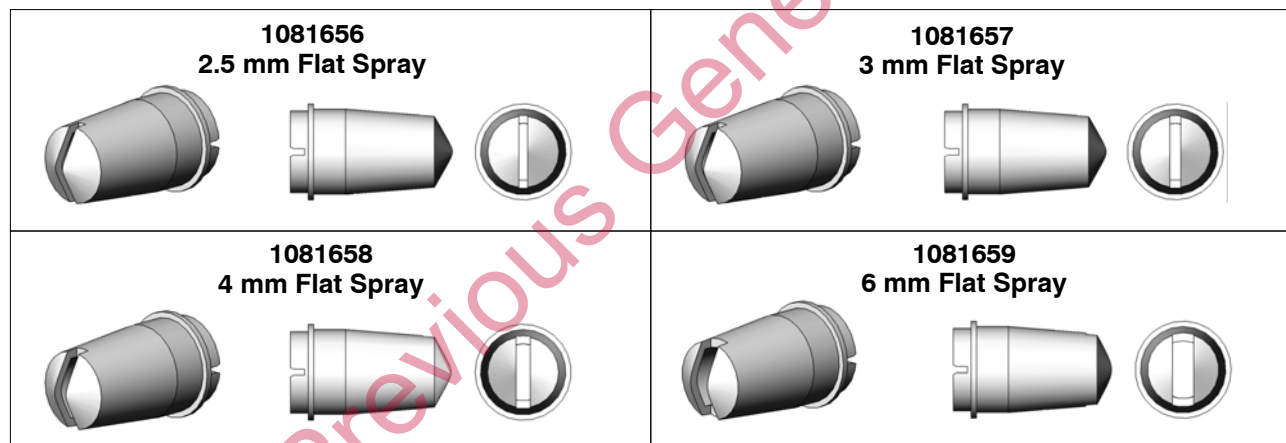


Figure 6-2 Flat Spray Nozzles

Conical Nozzle and Deflectors

A conical nozzle and 26-mm deflector is shipped with the spray gun. All other deflectors are optional.

NOTE: All deflectors include the O-ring, item 23A, listed in the spray gun parts list.

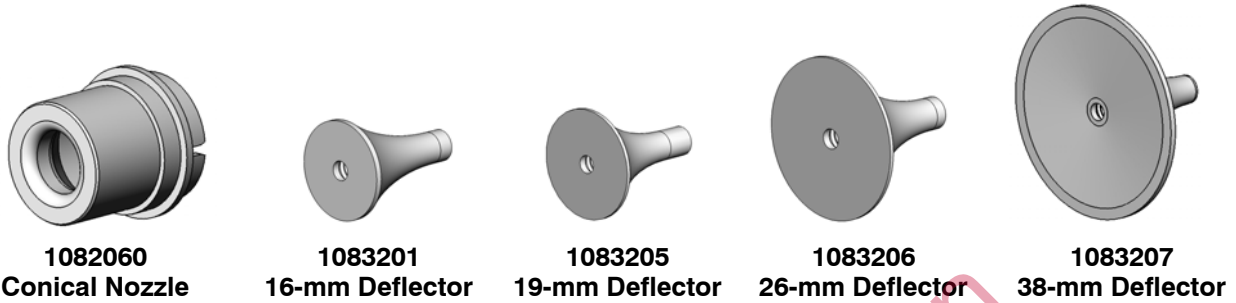


Figure 6-3 Conical Nozzle and Deflectors

Optional Cross Cut Nozzles

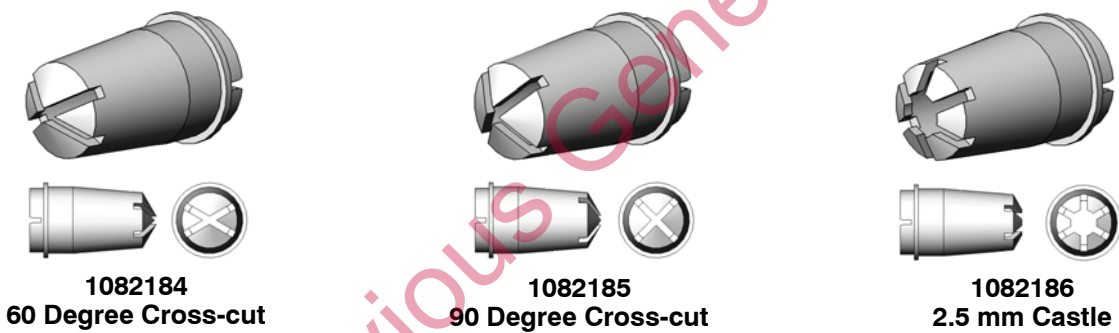
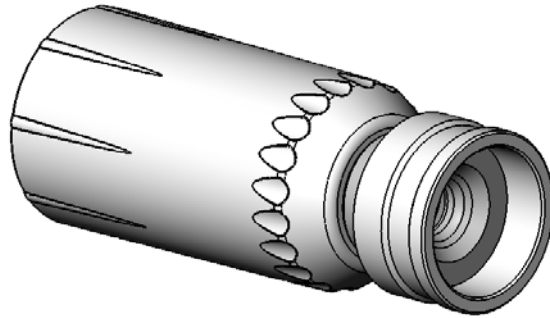


Figure 6-4 Cross-cut Nozzles

Optional Pattern Adjuster Kit

The pattern adjuster kit includes an integral conical nozzle. 16, 19, and 26-mm deflectors can be used with the kit. The deflectors are not included with the kit; they must be ordered separately.



1098417
Kit, Pattern Adjuster, Manual Gun, Encore

Figure 6-5 Pattern Adjuster Kit

Previous Generation

Controller Parts

Interface Parts Exploded View

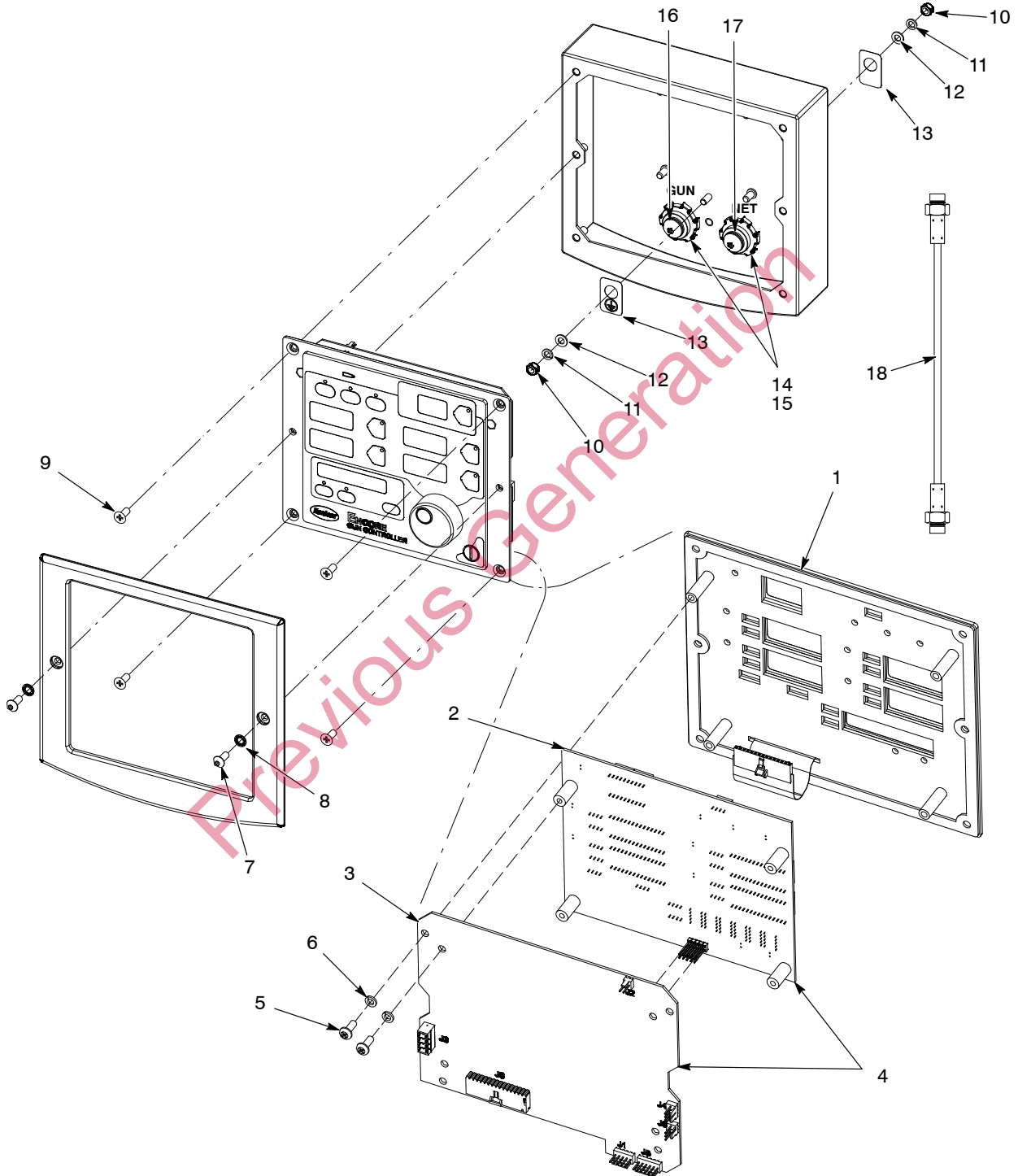


Figure 6-6 Interface Parts

Interface Parts List

Refer to Figure 6-6.

Item	Part	Description	Quantity	Note
-	1087276	CONTROL UNIT, interface, Encore, packaged	1	
1	1087271	• PANEL, keypad, Encore controller, packaged	1	
2	1085084	• KIT, PCA, main controller display, Encore, packaged	1	
3	1085085	• KIT, PCA, main control, Encore, packaged	1	
4	1085080	• KIT, PCA, control unit, interface, Encore	1	
5	982308	• SCREW, pan head, recessed, M4 x 10, zinc	8	
6	983403	• WASHER, lock, split, M4, steel, zinc	8	
7	982636	• SCREW, button, socket, M5 x 12, zinc	2	
8	983127	• WASHER, lock, internal, M5, zinc	2	
9	982286	• SCREW, flat, slotted, M5 x 10, zinc	4	
10	984702	• NUT, hex, m5, brass	2	
11	983401	• WASHER, lock, split, M5, steel, zinc	2	
12	983021	• WASHER, flat, 0.203 x 0.406 x 0.040, brass	2	
13	240674	• TAG, ground	2	
14	939122	• SEAL, conduit fitting, 1/2 in., blue	2	
15	984526	• NUT, lock, 1/2 in. conduit	2	
16	1082709	• RECEPTACLE, gun, Encore	1	A
17	1082759	• RECEPTACLE, net, controller interface, Encore	1	A
18	1080719	CABLE, interface/controller, 30 in.	1	B
NOTE A: Receptacles include harnesses.				
B: The cable is not included with the interface. Order replacements separately.				

Power Unit Parts List

Refer to Figure 6-7.

Item	Part	Description	Quantity	Note
-	1082815	POWER UNIT, controller, Encore, packaged	1	
1	1082714	• MODULE, iFlow, Encore, packaged	1	A
2	1068173	• RELAY, two pole, 30 amp, PCB/panel mount	1	
3	982824	• SCREW, pan head, recessed, M3 x 8 w/internal lockwasher	9	
4	1083053	• POWER SUPPLY, 24 VDC, 60 watt	1	
5	1082764	• FILTER, line, w/terminals	1	
6	1083021	• CAPACITOR, film, type 7124, 2.0 μ F	1	
7	939122	• SEAL, conduit fitting, 1/2 in. blue	3	
8	240674	• TAG, ground	3	
9	933469	• LUG, 90, double, 0.250, 0.438 in.	1	
10	983021	• WASHER, flat, 0.203 x 0.406 x 0.040 in., brass	3	
11	983401	• WASHER, lock, split, M5, steel, zinc	3	
12	984702	• NUT, hex, M5, brass	3	
13	1027067	• CORD, power, 15 ft (4.6 meters)	1	
14	288804	• FUSE HOLDER, panel mount, 5 x 20	2	
15	1009090	• FUSE, time delay, 215 series, 3.15A, 5 x20mm	2	
16	322404	• SWITCH, rocker, DPST, dust-tight	1	
17	972808	• CONNECTOR, strain relief, 1/2 in. NPT	1	
18	971109	• UNION, bulkhead, 10 mm x 10 mm tube	1	
19	900740	• TUBING, polyurethane, 10/6.5-7 mm	AR	B
20	972283	• CONNECTOR male, w/internal hex, 10 mm tube x 1/4 in. unithread	2	
21	-	• PLUG, pipe, socket, standard, 1/8 in. RPT, steel, zinc	2	
22	-	• REGULATOR, 1/8, 1/4 in. NPT, 7-125 psi	1	
23	984526	• NUT, lock, 1/2 in. conduit	2	
24	1082771	• RECEPTACLE, net, controller, Encore	1	C
25	1082770	• RECEPTACLE, output, VBF, controller, Encore	1	C

NOTE A: Refer to iFlow Module Parts in this section for repair parts.

B: Order in increments of one foot.

C: Receptacles include harnesses.

AR: As Required

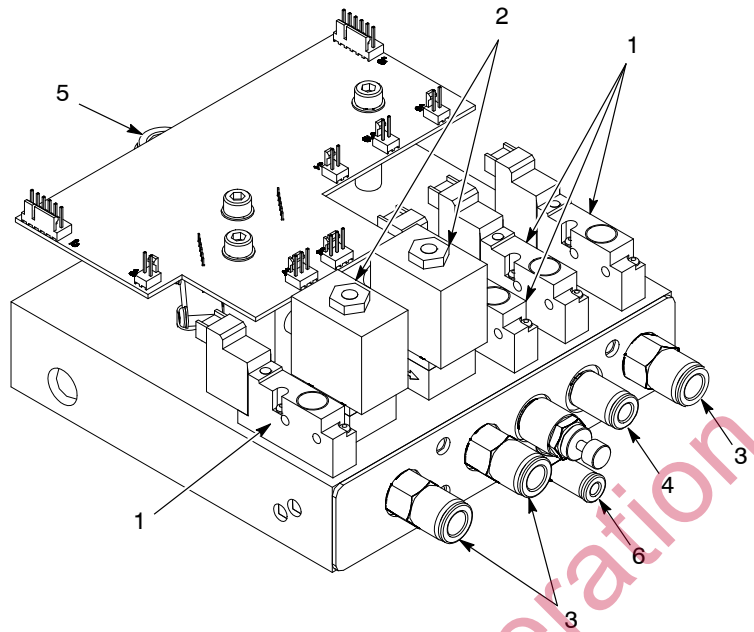
iFlow Module Parts

Figure 6-8 iFlow Module Parts

Item	Part	Description	Quantity	Note
-	1082714	MODULE, iFlow, Encore, packaged	1	
1	1099288	<ul style="list-style-type: none"> VALVE, solenoid, 3-way, w/connector 	4	
2	1027547	<ul style="list-style-type: none"> VALVE, proportional, solenoid, sub-base 	2	
3	1030873	<ul style="list-style-type: none"> VALVE, check, M8 tube x 1/8 in. unithread 	3	
4	972399	<ul style="list-style-type: none"> CONNECTOR, male, w/internal hex, 6 mm tube x 1/8 in. unithread 	1	
5	972125	<ul style="list-style-type: none"> CONNECTOR, male, elbow, 10 mm tube x 1/4 in. unithread 	1	
6	1082612	<ul style="list-style-type: none"> VALVE, flow control, 4 mm X 1/8 in. unithread 	1	

System Components and Parts

Part	Description	Quantity	Note
1018157	REGULATOR assembly, 0–25 psi, 0–1.7 bar, vertical	1	A
1070536	HOPPER, packaged, NHR-2-50	1	B
1071420	HOPPER, packaged, NHR-2-25	1	B
972286	REDUCER, 8-mm stem x 6-mm tube	1	C
972262	REDUCER, 10-mm stem x 6-mm tube	1	D
148256	PLUG, 10-mm, tubing	1	E
1101092	FILTER/REGULATOR, assembly, coalescing, with fittings (SMC, AWM-20-02BE-CR)	1	F, G
1101127	• FILTER ELEMENT, air, coalescing, 0.3 micron	1	F, G

NOTE A: Fluidizing air regulator mounted next to interface module.
 B: Hopper is shipped with manual 1062942. Refer to this manual for hopper parts, including the pickup tube.
 C: Installed in power unit fluidizing air output fitting.
 D: Install in 10-mm elbow in hopper fluidizing pan.
 E: Plugs unused port in system air filter/regulator output fitting.
 F: To replace the original Festo filter/regulator element, order 1085654.
 G: This filter/regulator replaces the SMC 5-micron particulate filter/regulator, which is now an option. To order the 5-micron filter/regulator or filter element, refer to Options on page 6-14.

Powder Hose and Air Tubing

Powder hose and air tubing must be ordered in increments of one foot.

Part	Description	Note
768176	Powder hose, 11 mm antistatic	
768178	Powder hose, 12.7 mm (1/2 in.) antistatic	
900648	Powder hose, 11 mm blue	
900650	Powder hose, 12.7 mm (1/2 in.) blue	
900617	Air tubing, 4 mm, clear	
900742	Air tubing, 6 mm, blue	
900741	Air tubing, 6 mm, black	
900618	Air tubing, 8 mm, blue	
900619	Air tubing, 8 mm, black	
900740	Air tubing, 10 mm, blue	

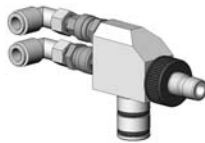
Options

Part	Description	Quantity	Note
1091429	KIT, input air, Encore manual systems	1	
972841	• CONNECTOR, male, 10 mm tube x 1/4 in. unithread	1	
971102	• CONNECTOR, male, 10 mm tube x 3/8 in. unithread	1	
973500	• COUPLING, pipe, hydraulic, 1/4 in., steel, zinc	1	
973520	• COUPLING, pipe, hydraulic, 3/8 in., steel, zinc	1	
900740	• TUBING, polyurethane, 10 mm, blue	20 ft	A
1096786	FILTER/REGULATOR, assembly, with fittings (particulate)	1	B
1097103	• FILTER ELEMENT, air, 5 micron	1	B

NOTE A: Order replacement tubing in increments of one foot.
 B: OEM assembly part number AW20-02BE-CR. Order the correct filter element for your filter/regulator. Elements are not interchangeable.

Pump Parts

Each Encore pump is shipped with a manual containing installation, repair, and parts information. Encore pump manuals can also be downloaded from the internet in PDF format from <http://emanuals.nordson.com/finishing>.



Encore Generation II Powder Feed Pump
Refer to manual part number 1095927



Encore Generation I Powder Feed Pump
Refer to manual part number 1093013

Figure 6-9 Encore Pump Versions

Pump Adapter Kit

The system is shipped with an Encore pump adapter for use with the Encore Powder Pump. This adapter replaces the pump adapter with four external O-rings shipped with the hopper.

Item	Part	Description	Quantity	Note
1	1085679	KIT, pump adapter, Encore pump	1	
2	941145	• O-RING, silicone, conductive, 0.625 x 0.812 in.	2	

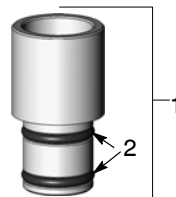


Figure 6-10 Encore Pump Adapter Kit