Encore® HD Color-on-Demand® System

Customer Product Manual
Part 1612313–03
Issued 12/18

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

This document is subject to change without notice.
Check http://emanuals.nordson.com for the latest version.

CE

Nordson

NORDSON CORPORATION • AMHERST, OHIO • USA

Contact Us

Nordson Corporation welcomes requests for information, comments, and inquiries about its products. General information about Nordson can be found on the Internet using the following address: http://www.nordson.com.

Address all correspondence to:

Nordson Corporation
Attn: Customer Service
555 Jackson Street
Amherst, OH 44001

Change Record

Revision	Date	Change
01	1/18	Released.
02	7/18	Added system numbers to add nLighten option.

Table of Contents

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.

Section 2
Description

System Components

The Encore® HD Color-on-Demand® System has been carefully tested, inspected, and packaged prior to shipping. Upon receipt, inspect the shipping materials and components for visible damage. Report any visible damage immediately to the shipper and to your Nordson representative.

The Encore HD Color-on-Demand system consists of the components shown in Figure 2-1.

The system pump stand is shipped bolted to a pallet. The spray guns, controllers, and installation kits are shipped on a separate pallet.

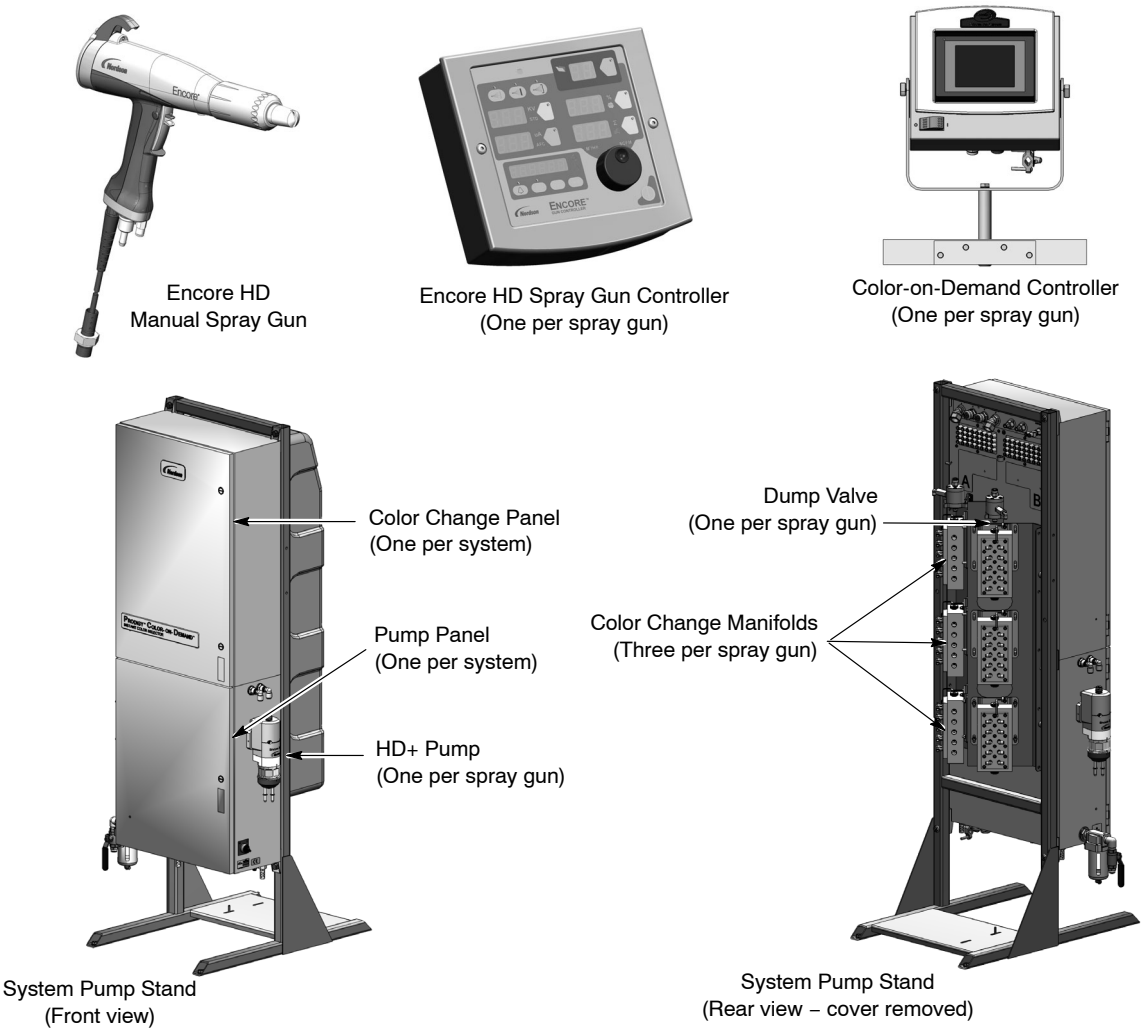


Figure 2-1 System Components

Pump Control Panel

The pump panel is the central electrical and pneumatic enclosure for the Color-on-Demand system. The pump panel houses the Encore HD+ pump (high-flow pumps), pump manifolds and control boards, air filter and pneumatic controls, and DC power supply.

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

Manifold Specifications

Output (Maximum)	23.5 kg (52 lb) per hour
Air Consumption	
Conveying Air	21–35 l/min (0.75–1.25 scfm)
Spray Gun Pattern Air	6–57 l/min (0.2–4.0 scfm)
Total Consumption	85–170 l/min (3–6 scfm)
Operating Air Pressures	
Pinch Valves	2.4–2.75 bar (35–40 psi)
Flow Control (to air cap/pump assist)	5.9 bar (85 psi)
Vacuum Generator	3.5 bar (50 psi)

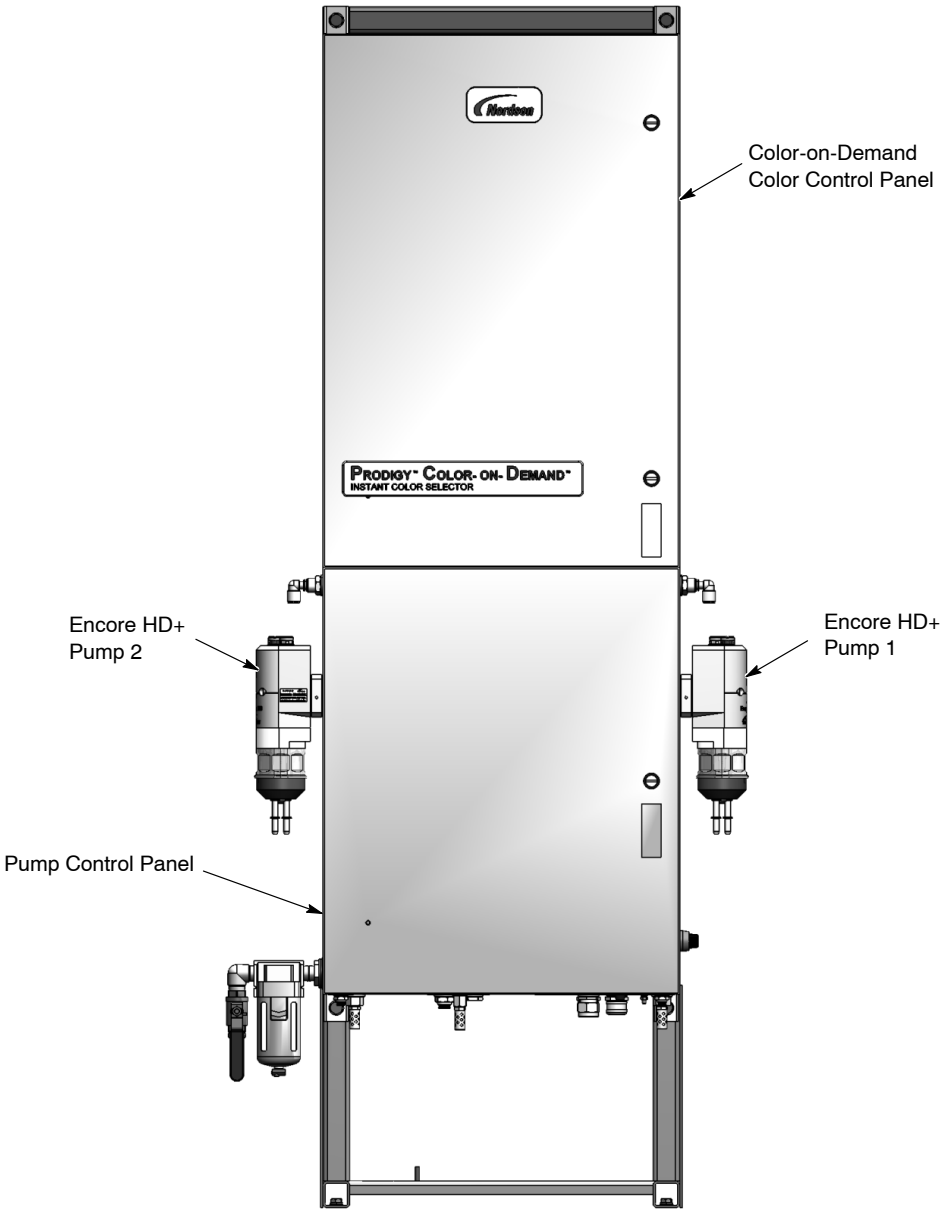


Figure 2-2 Manual Color-on-Demand System Panels

NOTE: On the inside of the pump cabinet, *Pump 1* is referred to as *Pump A* and *Pump 2* is referred to as *Pump B*.

Pump Control Panel Components

NOTE: One pump control board (13) controls one pump. If the system has two pumps, there are two control boards stacked on top of each other.

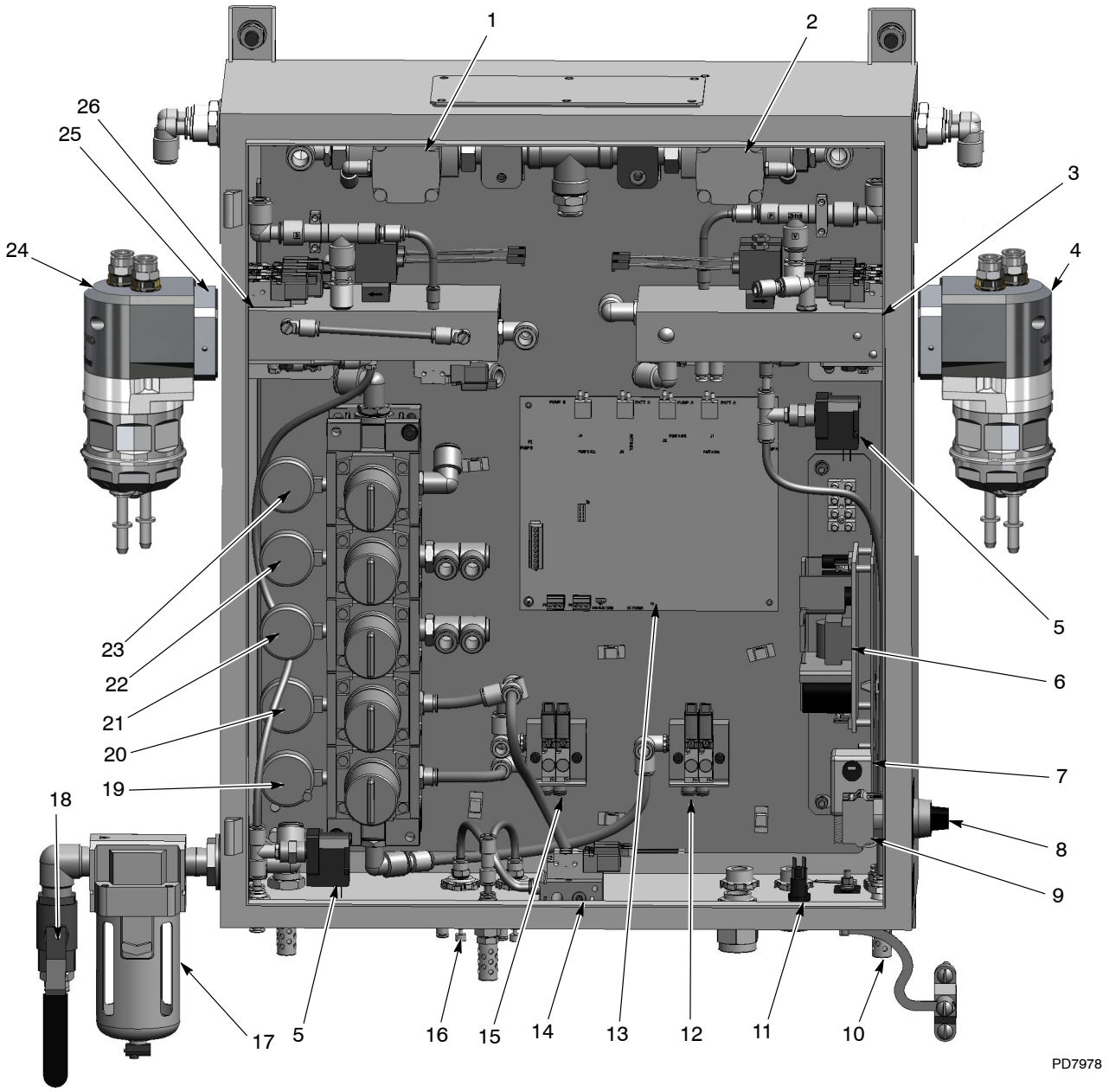


Figure 2-3 Pump Control Panel Components (Dual Pump System Shown)

1. Pump 2 purge valve
2. Pump 1 purge valve
3. Pump 1 control manifold
4. Pump 1
5. Pressure switch
6. 24 Vdc power supply
7. Line filter
8. Power switch
9. Contact block
10. Vacuum generator mufflers
11. Fuse, time delay, 3.15 A
12. Purge pilot manifold/solenoids
13. Pump control board
14. Electrode air wash manifold assembly
15. Pinch select manifold/solenoids
16. Flow control valve
17. Air filter
18. Air supply ball valve
19. Pinch low regulator/gauge
20. Pinch high regulator/gauge
21. Flow control regulator/gauge
22. Vacuum regulator/gauge
23. Purge regulator/gauge
24. Pump 2
25. Adapter plate
26. Pump 2 control manifold

Pump Control Panel Components *(contd)*

For wiring and pneumatic diagrams, refer to the foldouts in the back of this manual.

For pump repair and parts, refer to the *Encore HD Pump* manual.

HD+ Pump Manifold Components

The Encore HD+ powder feed pump transports precise amounts of powder from a feed source to a powder spray gun. The pump manifold controls the pump air and vacuum flow. The pump control board controls all manifold functions.

Table 2-1 Manifold Components

Item	Description	Function
1	Solenoid Valves	Control the air flow to the pump during operation. **NOTE:** Refer to *Solenoid and Control Valve Functions* on page 2-7 to identify each valve's specific function.
2	Pattern Air Flow Control Valve	Regulates the air pressure to the spray gun's nozzle, which shapes the powder spray pattern.
3	Pump Air Flow Control Valve	Regulates the positive air pressure to the fluidizing tubes, which dispenses the powder out of the tubes.
4	Vacuum Air Solenoid	Turns the airflow through the vacuum generator on or off.
5	Vacuum Generator	Works on the Venturi principle to generate the negative air pressure required to draw powder into the fluidizing tubes.

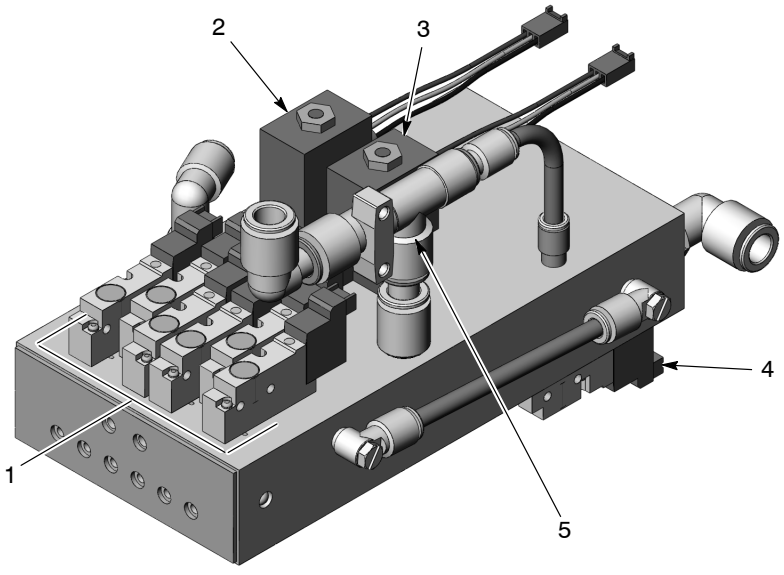


Figure 2-4 Pump Manifold Components

Solenoid and Flow Control Valve Functions

Figure 2-5 identifies the solenoid and flow control valve functions and the corresponding ports on the pump and manifold.>>> 1 <<<

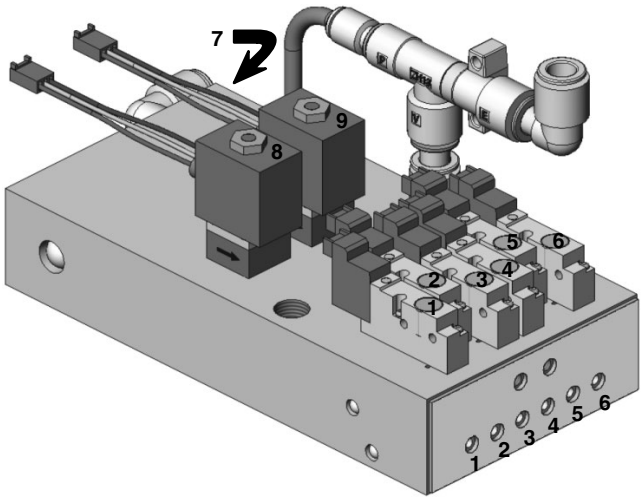


Figure 2-5 Solenoid and Flow Control Valve Functions

Item	Function	Item	Function
1	Left Side Delivery Pinch Valve	**6**	Right Side Delivery Pinch Valve
2	Left Side Fluidizing Tube	**7**	Vacuum Air (Bottom of Manifold)
3	Left Side Suction Pinch Valve	**8**	Pattern Air Flow Control
4	Right Side Suction Pinch Valve	**9**	Pump Air Flow Control
5	Right Side Fluidizing Tube		

Color-on–Demand Color Control Panel

See Figure 2-6. Air and power are supplied to the color control panel from the pump control panel.

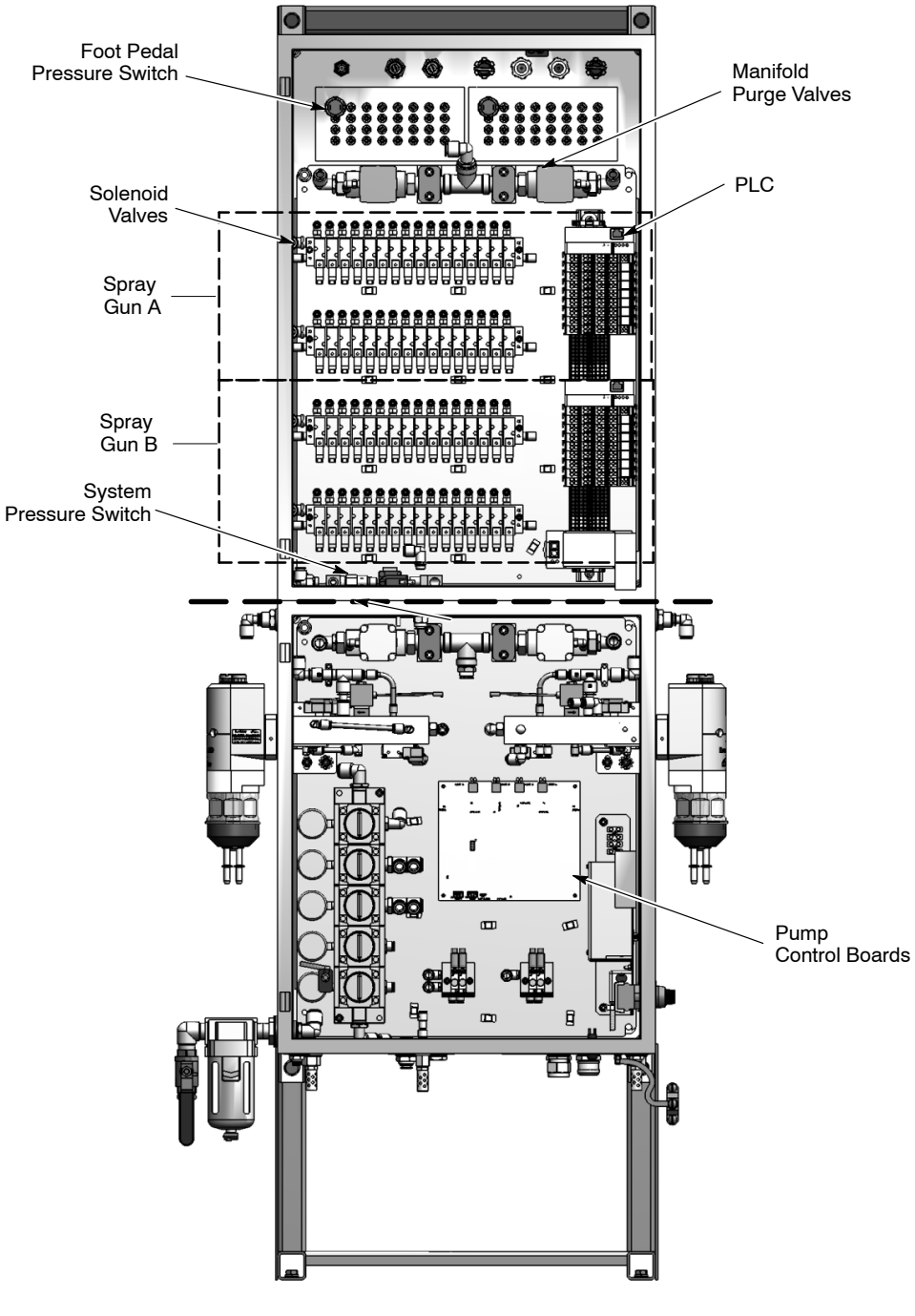


Figure 2-6 System Control Panels (Dual Spray Gun System)

The color control panel houses the PLC and solenoid valves that control the color change system. The PLC also interfaces with the pump control boards in the pump control panel to signal a color change start.

The Color-on-Demand controller provides the operator interface for the color change controls. The controller communicates with the color control panel through an ethernet cable.

Power is supplied to the Color-on-Demand controller from the color control panel through a separate power cable.

Other major components of the color control panel include the manifold purge valves, which provide manifold purge air during the color change cycle; the system pressure switch, which senses system air pressure and prevents a color change from starting if the air pressure drops below 70 psi; and the foot pedal pressure switches. When the operator steps on the foot pedal, it sends a signal to the pressure switch, which signals the PLC to initiate a color change.

Color Change Manifold

See Figure 2-7. The color change manifold consists of 3 valve blocks with 10 ports in the side of each block and ports at each end. Of the 30 side ports, 28 are powder inlet valves and one is a purge air inlet valve. A separate external dump valve is connected to the top outlet on the top block.

The manifold valve bladders are inflated to close the side ports and deflated to open them. The currently selected powder flows around the valve bladder and out the suction line to the HD+ pump. During a color change, air is exhausted from the *Dump 2* valve, allowing them to open so purge air can push the remaining powder in the suction lines and manifold out through the dump lines to the booth.

Color change cycle settings are made from the manual spray gun controller interface *(Tools>Purge)*. These settings determine the pump soft purge, pulse purge, and new color pre-load timing.

Both spray gun controllers must be set for the *Gun No: 1* network address. Refer to the *Encore HD Manual Powder Spray System Controller* manual for a description of the color change cycle and settings.

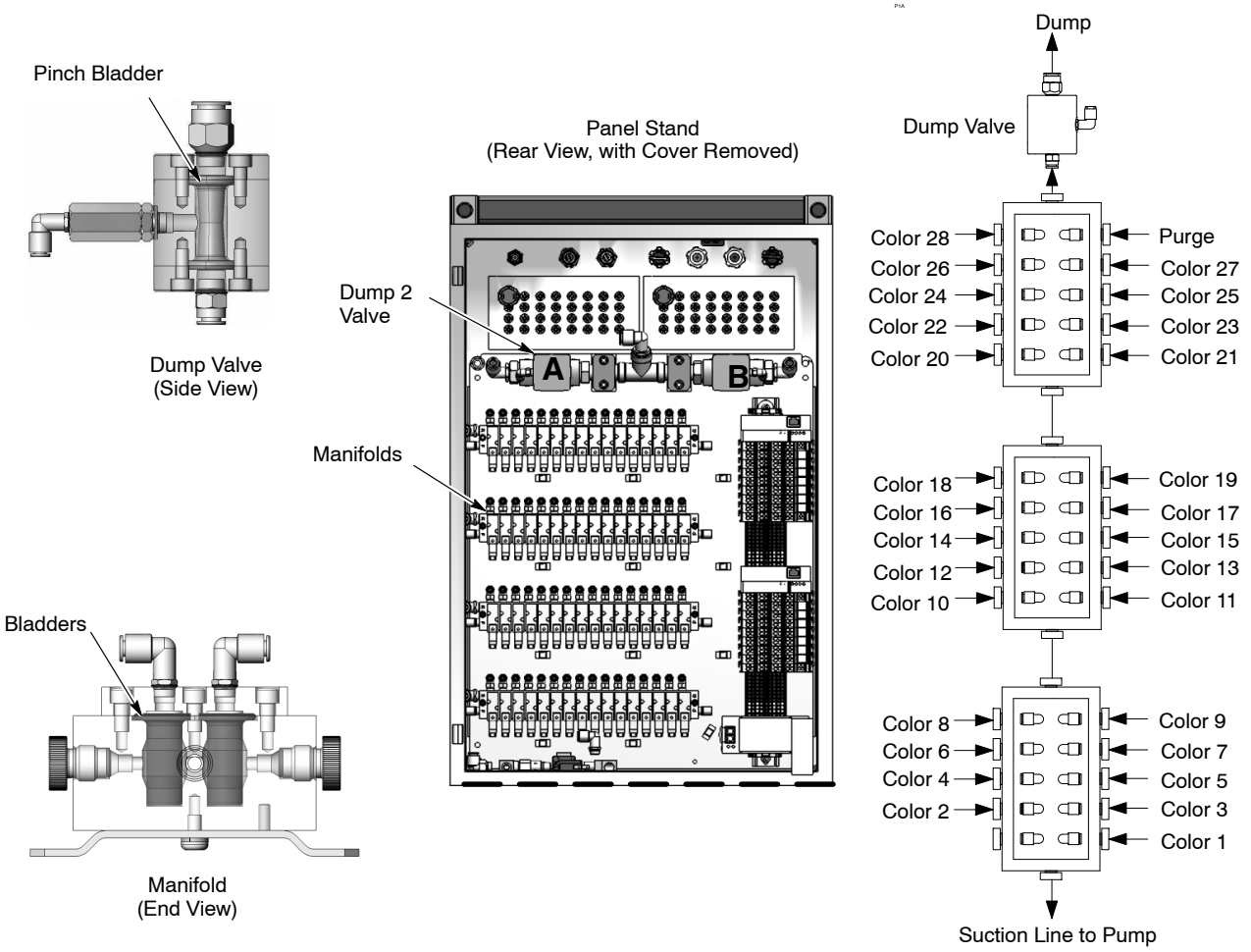


Figure 2-7 Color Change Manifold and Dump Valve

Section 3
Installation

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

Specifications

Electrical	100–240 V, 50/60 Hz, 275 VA max. 1 PH
Air Input Pressure	6.2–7.6 bar (90–110 psi) maximum
Air Flow Requirements	10 CFM during purge; 4–6 CFM during normal operation, depending on powder flow and atomizing air settings.
Weight *	125 kg (275 lbs)
Remote Control Input	24 V, 25 mA max
* Weight of stand with control panels, color change manifolds, and cover.	

System Pump Stand Installation

The system pump stand must be located as close to the powder feed hoppers as possible, since the maximum suction tubing length is 3 m (9.8 ft) from the manifold inlet ports to the pump adapters on the feed hoppers.

WARNING: The stand weighs 125 kg (275 lbs). Use approved lifting equipment to remove the stand from the shipping pallet and move it to its installation location.

1. Unbolt the stand from the shipping pallet and secure two nylon lifting straps to the horizontal bar at the top of the stand.
2. Secure the straps to the forks of a forklift or a crane hook.
3. Lift the stand off the pallet and move it to the chosen location.
4. Bolt the stand securely to the floor with the lag bolts included in the installation kit.

Controller Installation

Install the manual spray gun controller and Color-On-Demand Controller on a wall, panel, or platform rail before making any connections. Both controllers must be accessible to the operator at all times.

NOTE: Both *spray gun 1 controller* and *spray gun 2 controller* must be set for the *Gun No: 1* network address. Refer to the *Encore HD Manual Spray System Controller* manual for more information.

Pump Stand Mounting

The panel stand is shipped with a controller support arm. It can be bolted to the side of the stand with the included M8 x 30 bolts and washers. Use the universal mounting brackets and included fasteners to mount the controllers to the arm, securing the color controller above and spray gun controller below.

Grounding

Connect the ground strap to the controller ground stud and clamp it to a true earth ground.

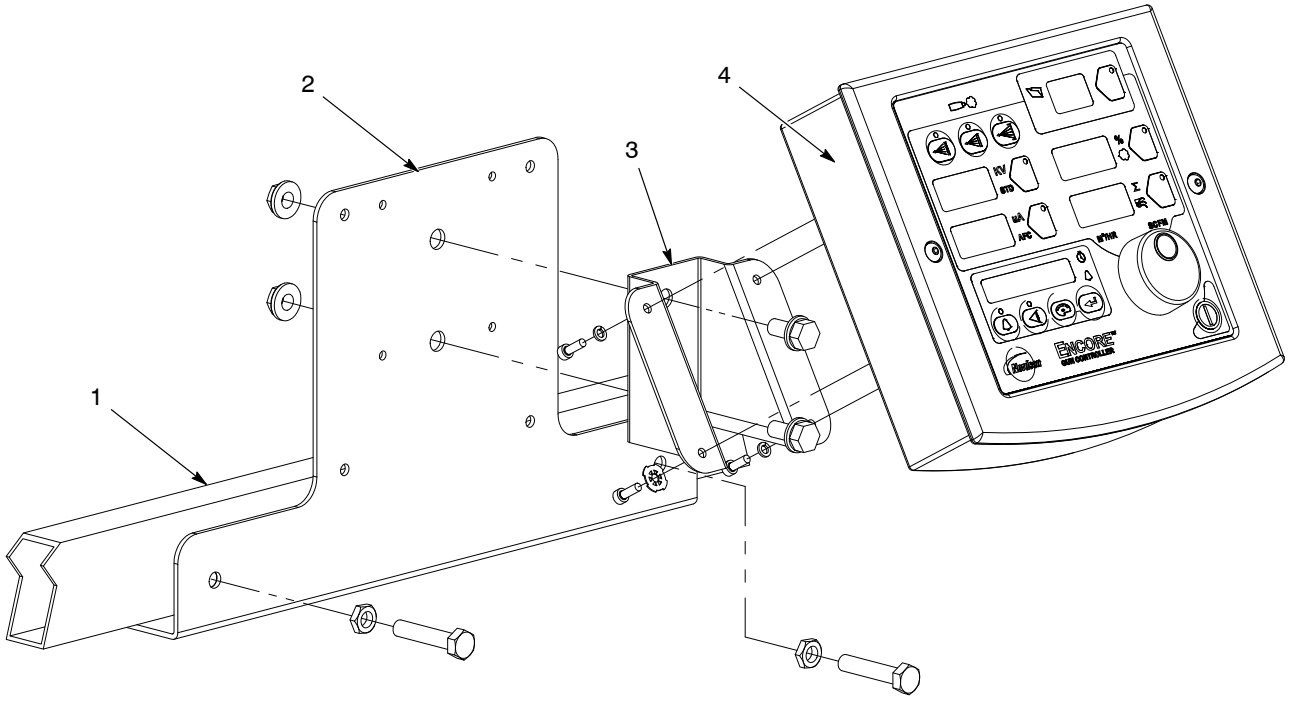


Figure 3-1 Controller Rail Mount Installation

1. Product stand arm
2. Controller rail mount bracket
3. Universal mounting bracket
4. Encore HD controller

Connection Diagram (Rear View of System)

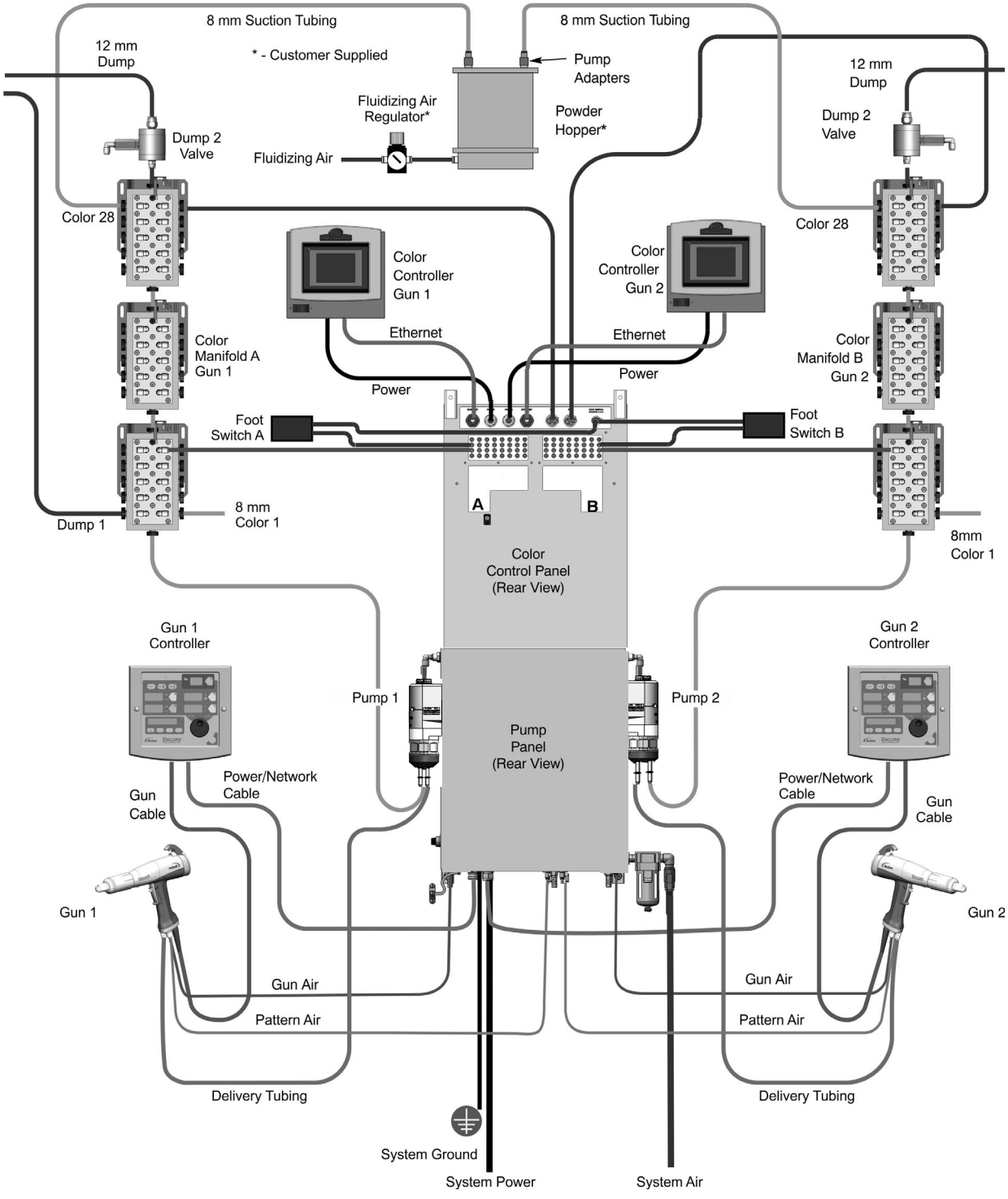


Figure 3-2 System Diagram (Dual Spray Gun System Shown)

System Power, Ground, and Spray Gun Controller Connections

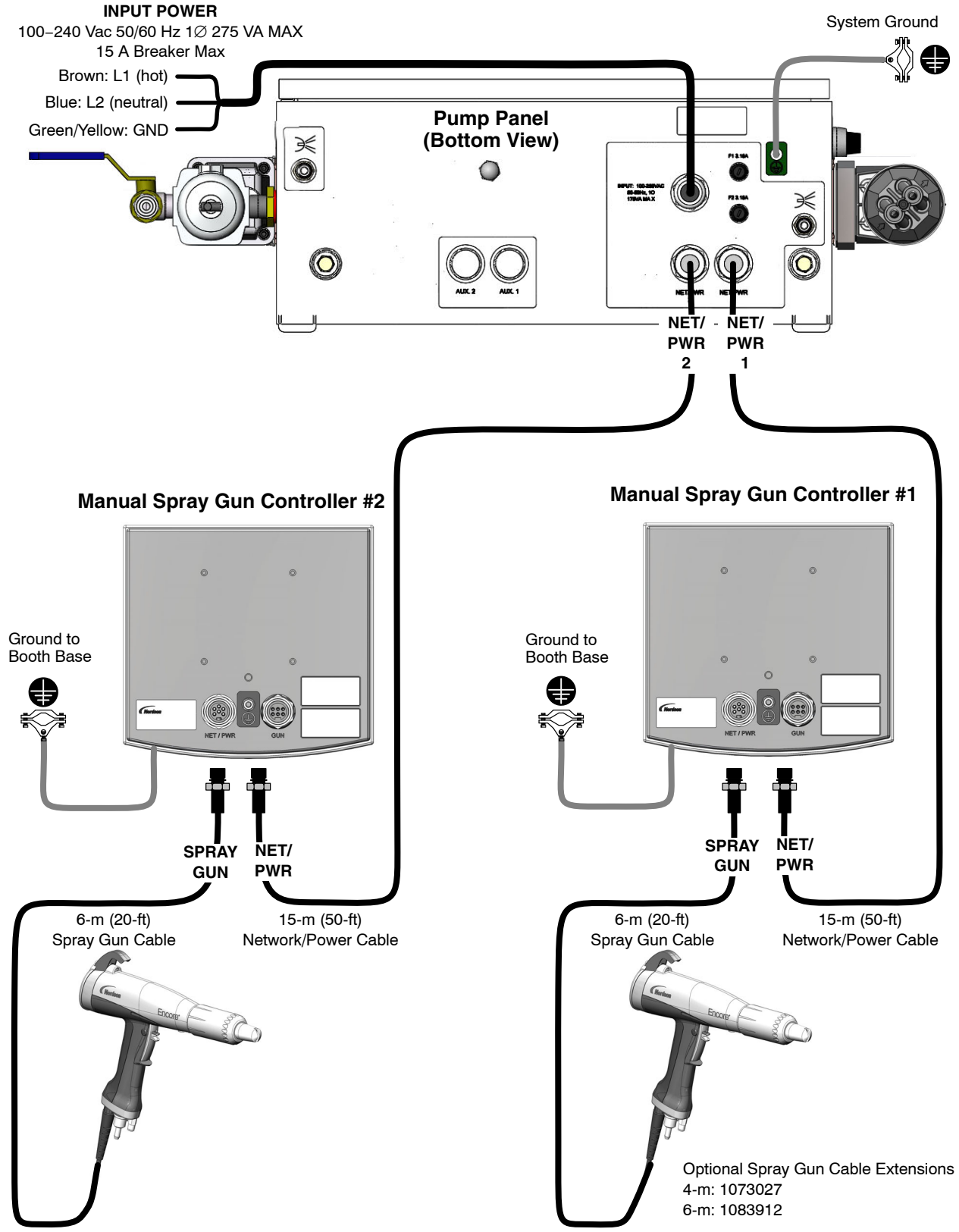


Figure 3-3 System Power, Ground, and Gun Controller Connections

System Air Supply and Spray Gun Air Connections

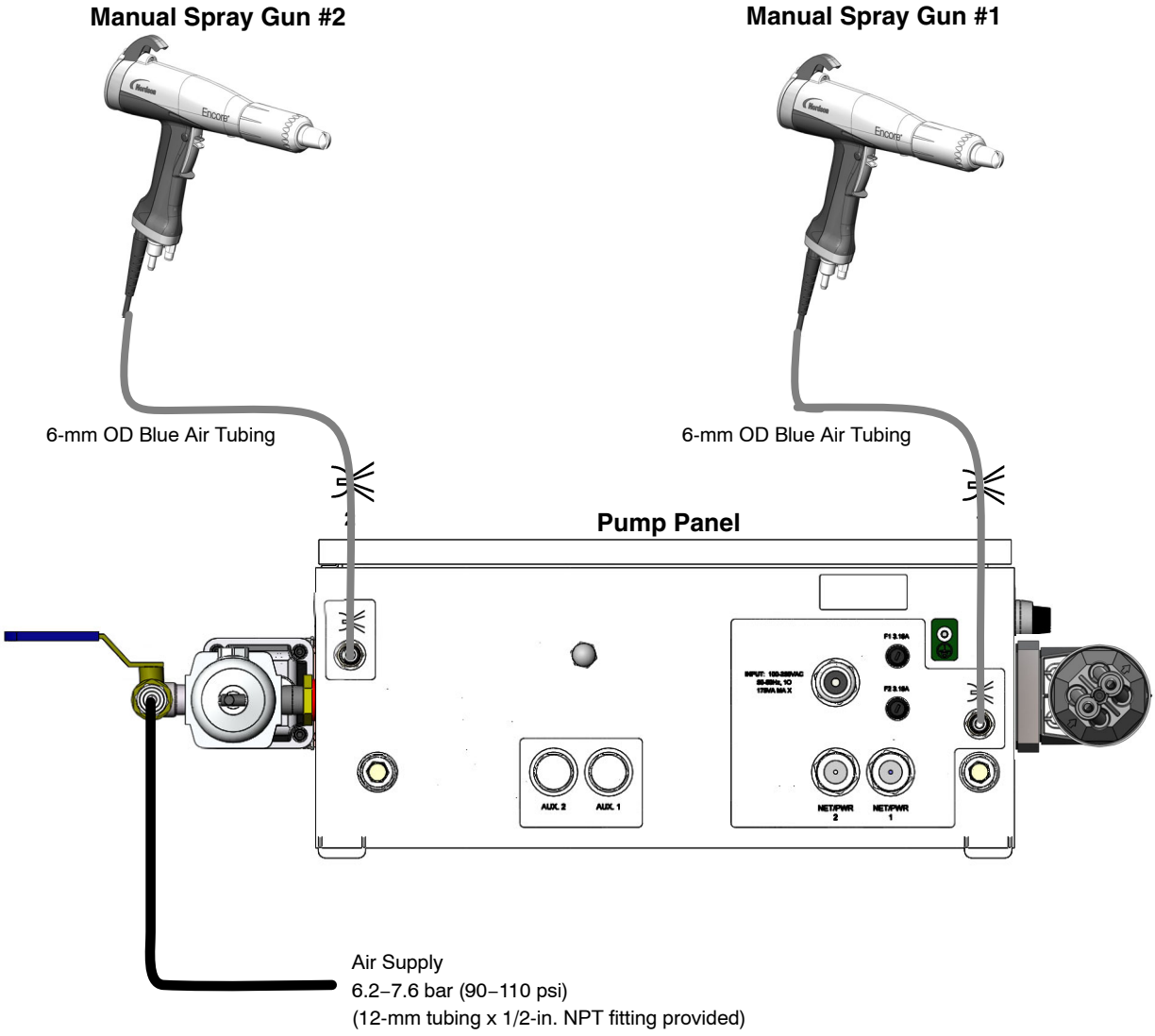


Figure 3-4 System Air Supply and Gun Air Connections

Encore HD Powder Spray Gun Installation

See Figure 3-5 for spray gun connection illustration. See Figure 3-2 for typical system diagram.

1. Connect the 6-mm pattern air tubing to the quick-disconnect fitting (1) in the spray gun handle. Connect the other end to the *Pattern Air* fitting on the power unit or pump panel.
2. Connect the 4-mm clear electrode air wash tubing to the barbed fitting (2) in the spray gun handle. Connect the other end to the spray gun air fitting on the power unit or pump panel.
3. Seat the O-rings (4) onto the barbed hose adapter (3). Push the barbed end of the hose adapter into the end of the powder hose, then plug the adapter into the powder inlet tube (5) in the bottom of the spray gun handle.
4. Connect the spray gun cable (6) to the spray gun connection on the back of the Encore HD controller.
5. Use the sections of black spiral wrap supplied with the system to bundle together the spray gun cable, air tubing, and powder hose.

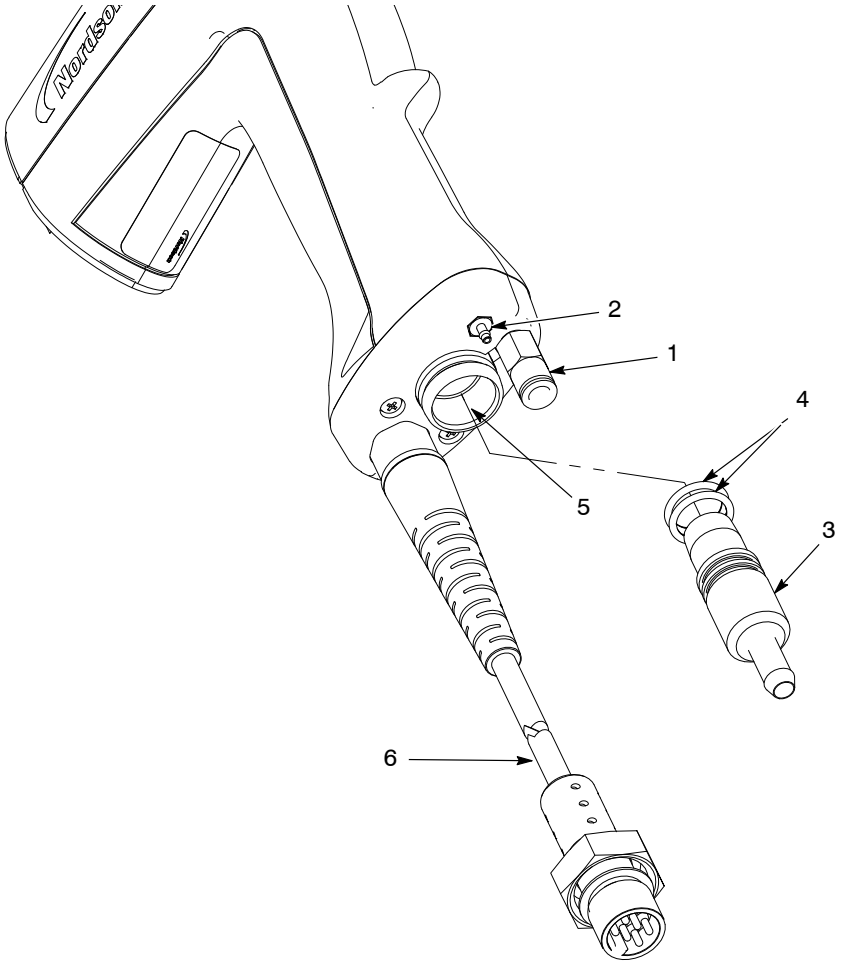


Figure 3-5 Spray Gun Connections

1. Quick disconnect
2. Barbed fitting
3. Hose adapter
4. O-rings
5. Powder inlet tube
6. Spray gun cable

Color-on-Demand Controller and Foot Switch Connections

1. Connect the power cables to the Color-on-Demand controllers.
2. Cut one of the RJ45 jacks off the 100-ft-long ethernet cable included in the ship-with kit, leaving a jack on the other end.
3. Remove the back from the controller and plug the ethernet cable into the socket as shown.
4. Pull the cut end of the cable through the provided ½-in. conduit connector and conduit to the color panel and route it inside the panel.
5. Connect the cable leads to the termination module as shown on page 3-9.
6. Connect the conduit to the controller and panel.
7. If using the foot switches, remove the bottom covers and install the provided connectors. Connect 6-mm tubing from the *FOOTSWITCH A & B* fitting to the *IN* fitting on the switch, and from the *OUT* fitting to the *SWA RTN* or *SWB RTN* ports on the tubing manifolds.

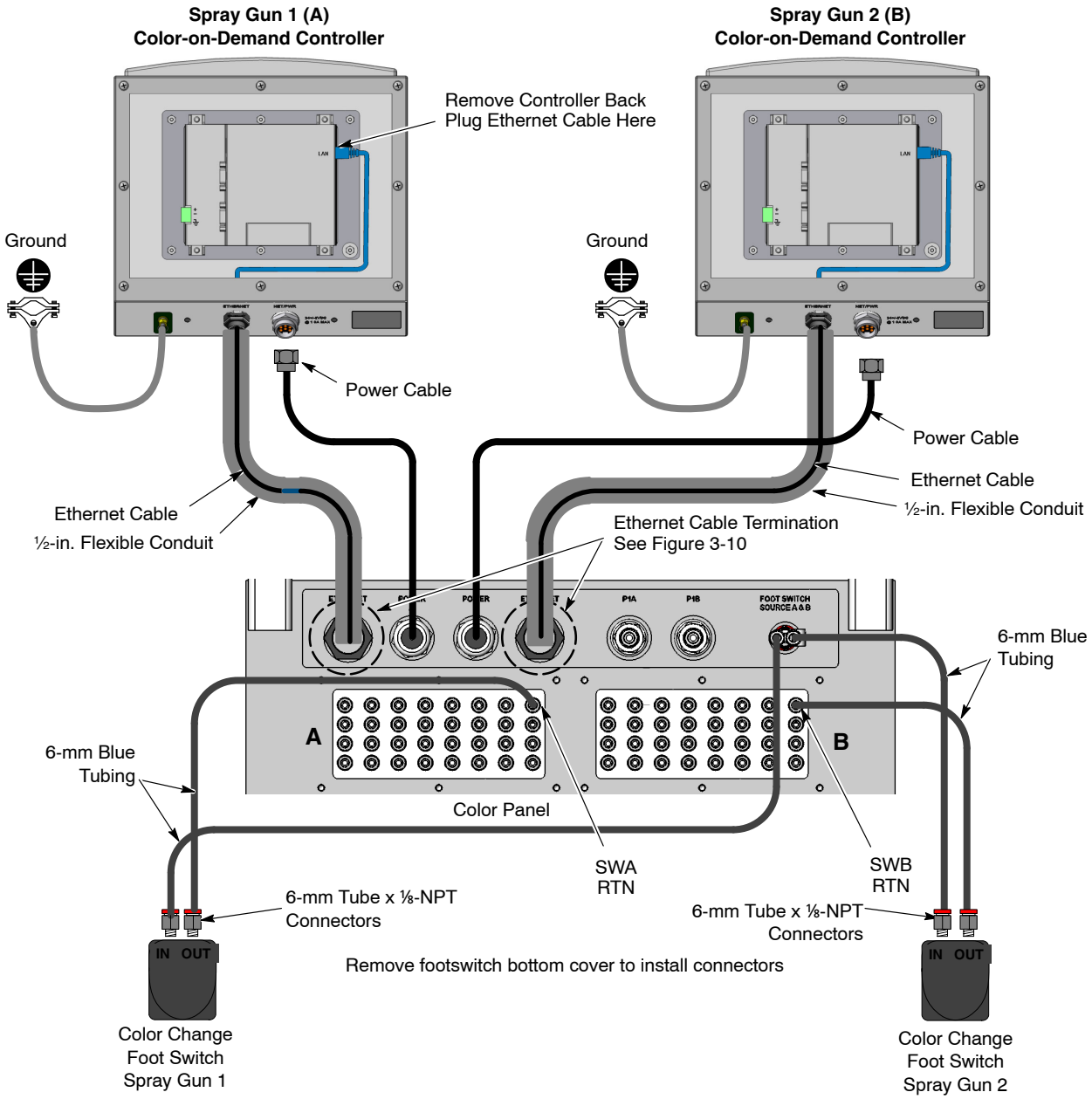


Figure 3-6 Color-on-Demand Controller and Foot Switch Connections

Ethernet Cable Termination

Follow these steps to complete the ethernet cable termination.>>> 2 <<<

1. Cut the RJ45 jack from one end of the ethernet cable.

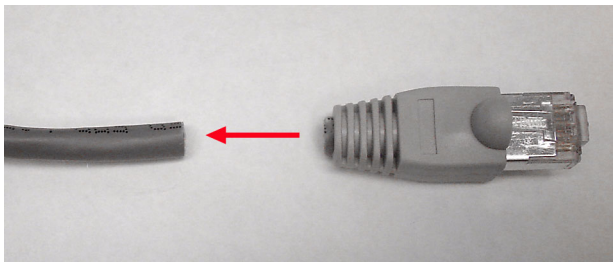


Figure 3-7 Ethernet Cable Termination, Step 1

2. Route the cut end of the ethernet cable into the color panel.
3. Trim back the cable jacket about 8 in.
4. Cut the foil, clear wrapper, and pull string on the cable.

Figure 3-8 Ethernet Cable Termination, Steps 3–4

5. Trim back the four twisted pair wires to approximately 2.25 in.

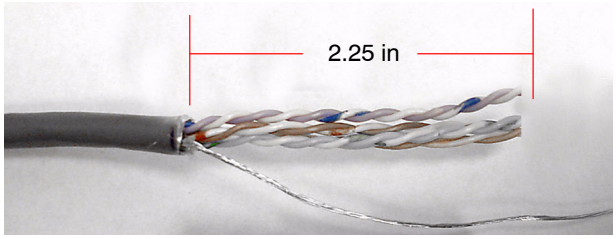


Figure 3-9 Ethernet Cable Termination, Step 5

6. See Figure 3-10. Arrange the twisted pair wires in the module according to the T568-B wiring scheme, with the ends at least 1/4 in. through the terminals. Retain the twists in the wires as close to the terminals as possible. Use a 110 punch-down tool to attach the wires.
7. Trim the ends of the wires as close to the termination module as possible.
8. Install the retention caps on the termination module.
9. Crimp a ground lug to the shield wire.
10. Assemble the ethernet termination case as shown. For rear-connect modules, snap the termination module into the bezel, then install the bezel into the adapter.

Use Type T568B cables.
Use T568-B wiring scheme.

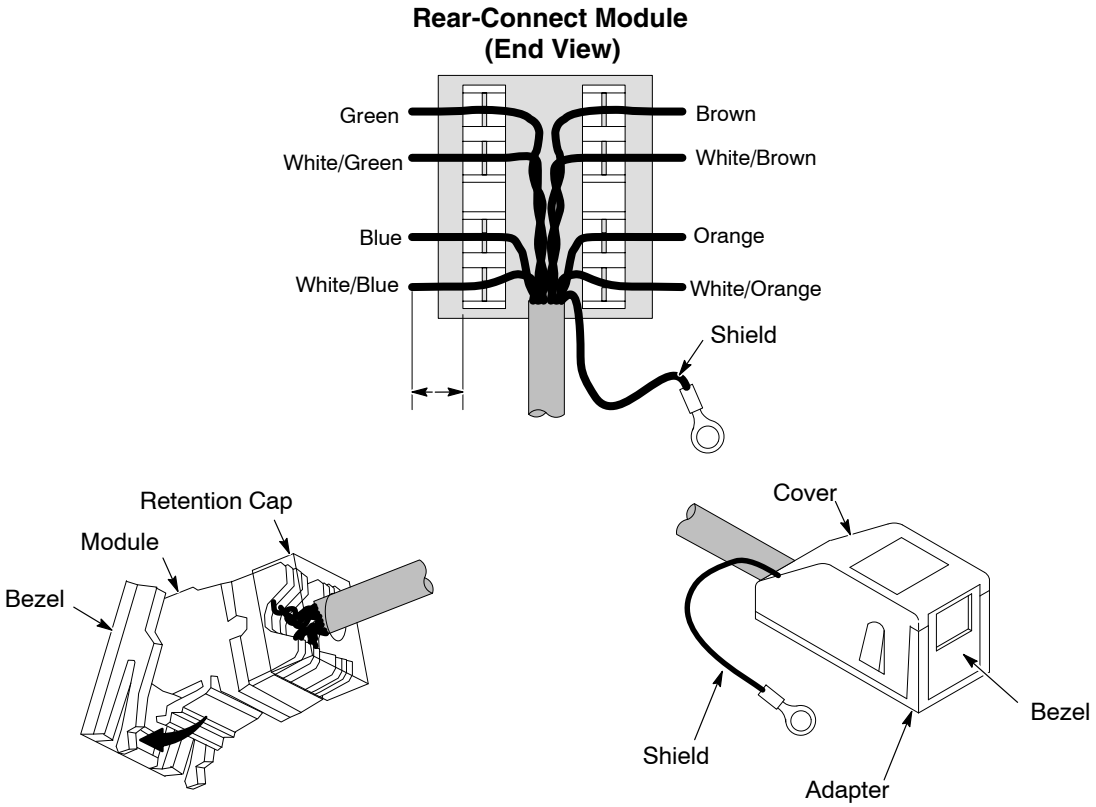


Figure 3-10 Ethernet Cable Connection to Termination Module

11. See Figure 3-11. Install the termination modules under the top side of the enclosure.
12. Connect the 1-m (3-ft) -long crossover cables from the termination modules to the PLCs.
13. Attach the termination module ground wires to the cabinet ground stud.

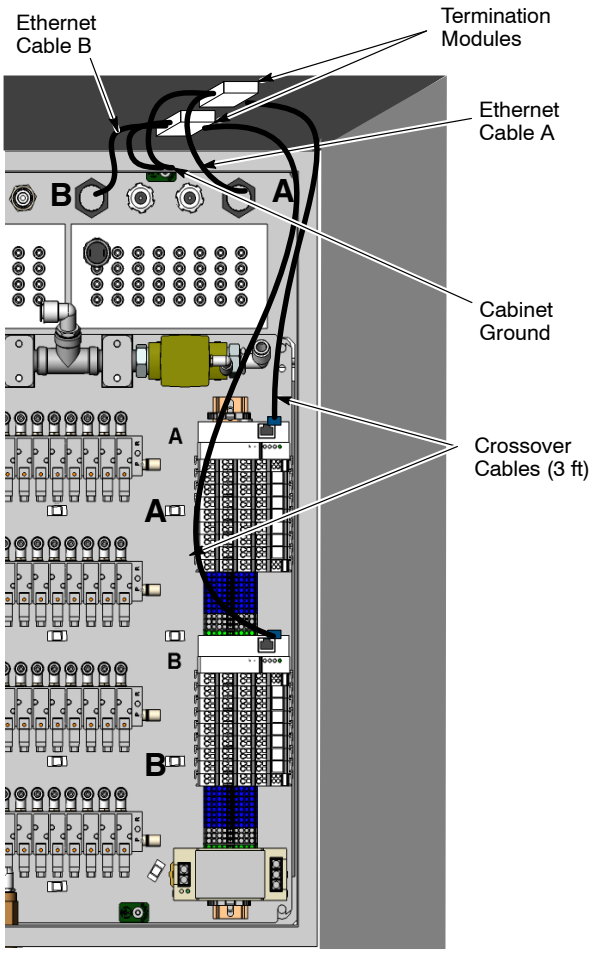


Figure 3-11 Ethernet Cable Termination Inside Color Control Panel

Delivery Tubing Installation

Connect 8-mm clear delivery tubing from the pump outlets to the spray guns. Observe tubing length guidelines, coil excess tubing in loops of at least 1 m (3 ft) diameter, and lay coil flat on floor.

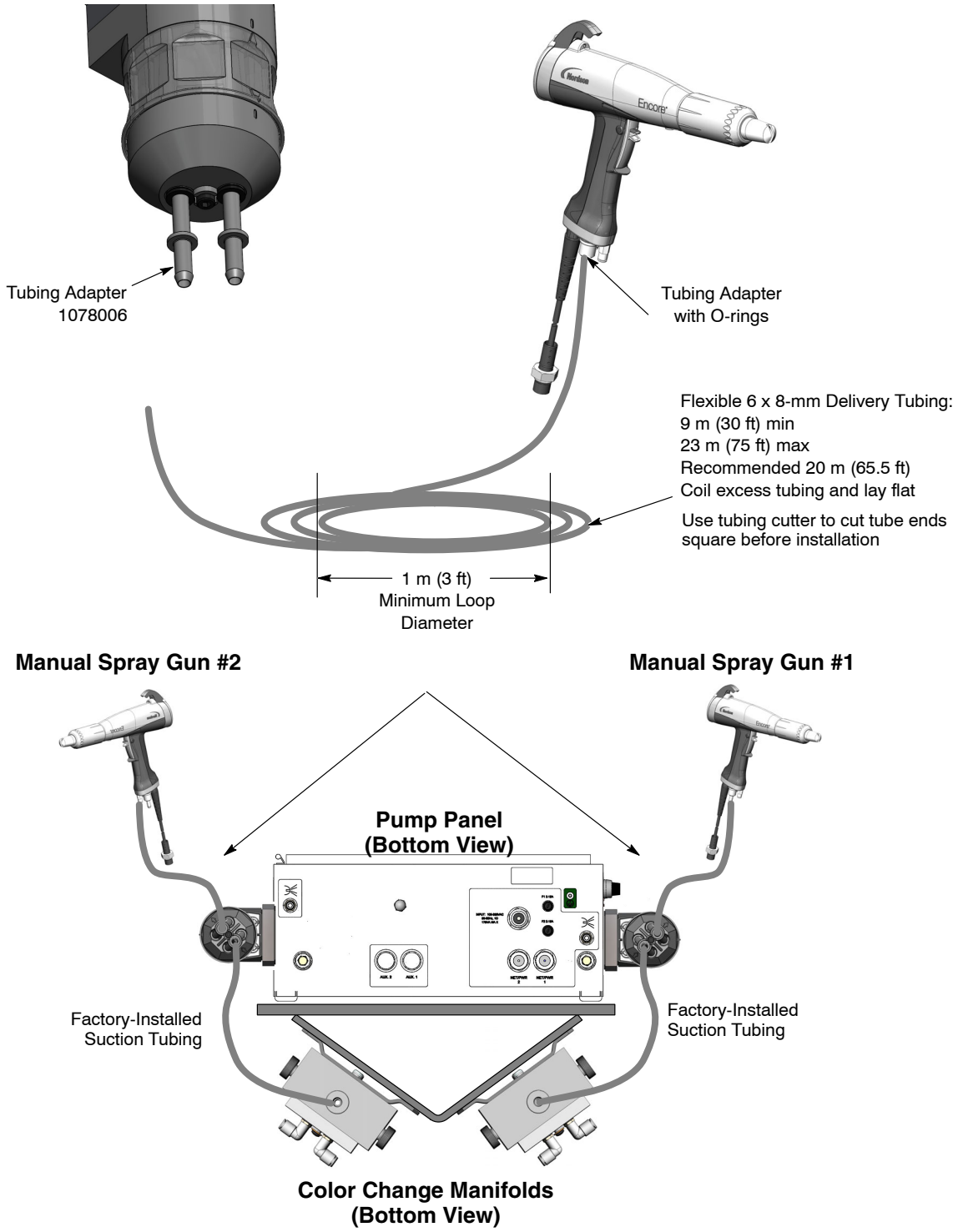


Figure 3-8 Delivery Tubing Installation

Suction and Dump Tubing Installation

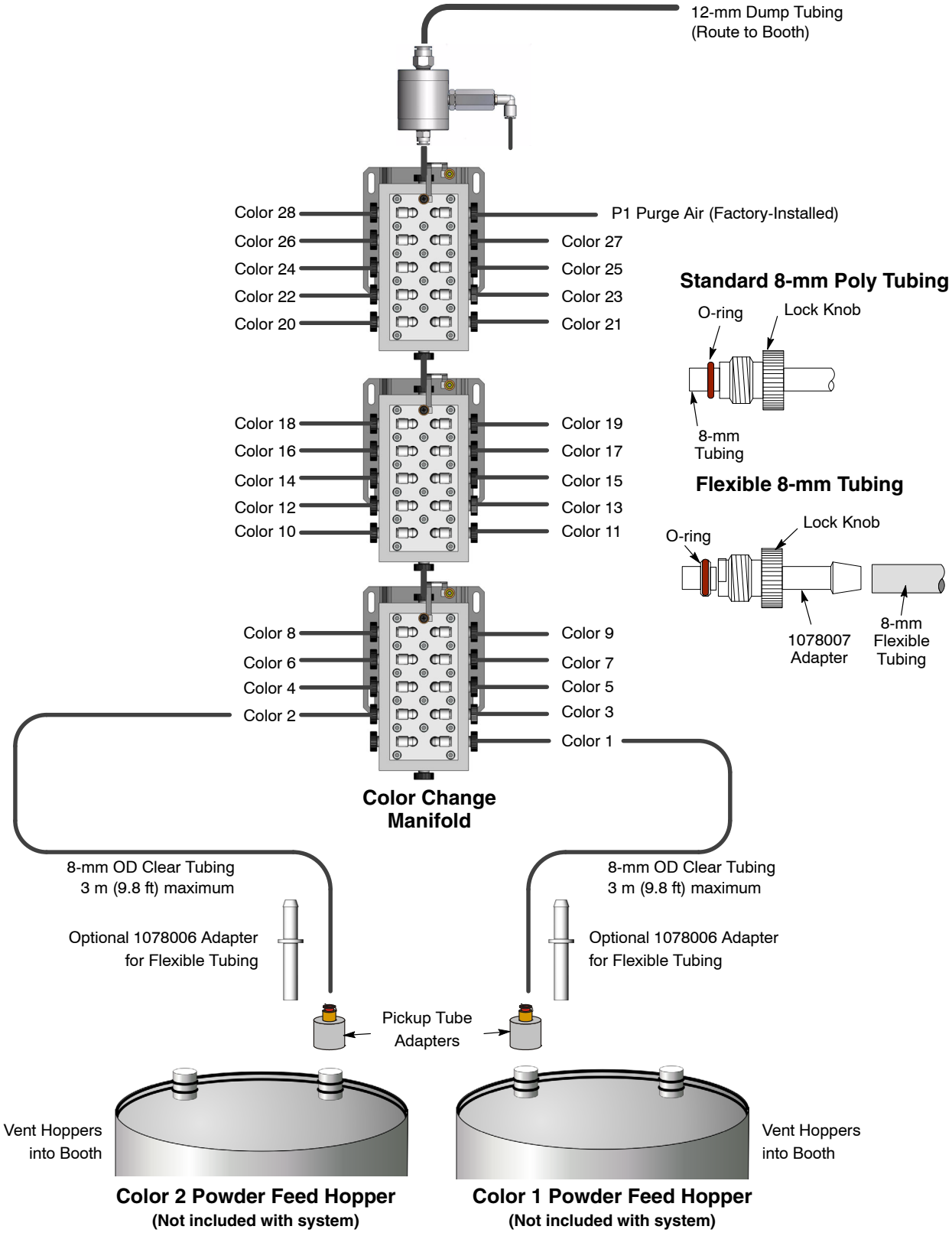
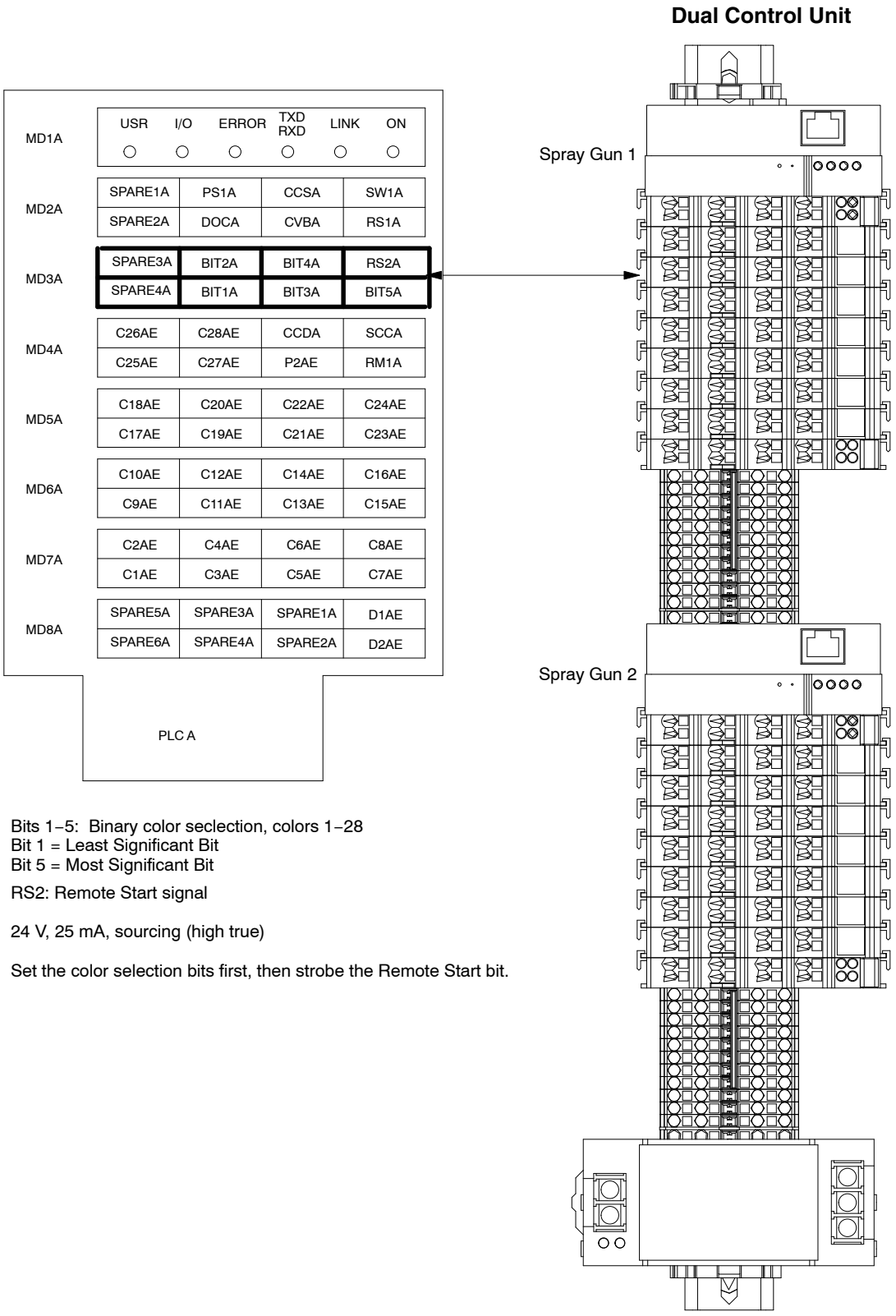


Figure 3-9 Suction and Dump Tubing Installation

Remote Color Selection and Color Change Start Option



Bits 1–5: Binary color seclection, colors 1–28
Bit 1 = Least Significant Bit
Bit 5 = Most Significant Bit

RS2: Remote Start signal

24 V, 25 mA, sourcing (high true)

Set the color selection bits first, then strobe the Remote Start bit.

Figure 3-10 Remote Color Selection and Color Change Start Connections

Section 4
Operation

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

Pump Control Panel Setup and Operation

Manifold and Pump Installation

Use the following instructions to install a pump and manifold into an existing pump panel.>>> 3 <<<

1. See Figure 4-1. Make sure that the gaskets on the pump (2) and manifold (5) are not damaged. If the gaskets are damaged, replace them.
2. Set the manifold onto the appropriate mounting bracket (4) against the pump panel wall (3). Secure the manifold with the mounting screws (6), but do not tighten the screws.
3. Secure the pump to the pump panel and manifold using the pump mounting screws (1). Tighten the pump mounting screws securely.
4. Tighten the manifold mounting screws securely.
5. Perform the *Configuration* procedure on page 4-7.

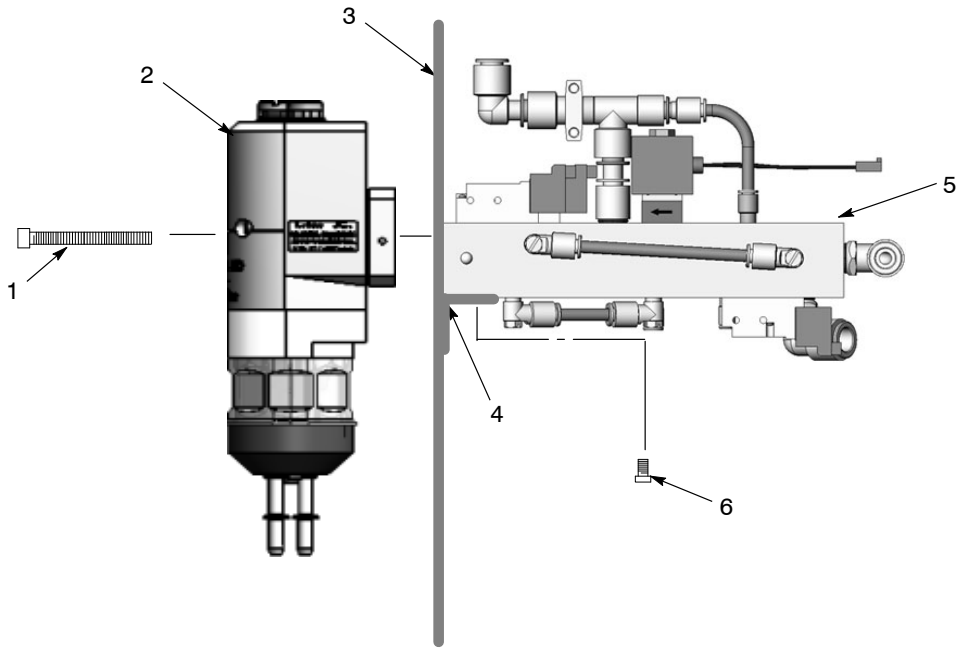


Figure 4-1 Pump and Manifold Installation

1. Mounting screws (2)
2. Pump
3. Pump panel wall
4. Manifold mounting bracket
5. Manifold
6. Manifold mounting screws (2)

Pump Control Board

CAUTION: The circuit board is an electrostatic-sensitive device. To prevent damage to the board while handling it, wear a grounding wrist strap connected to the pump panel or other ground.

Electrical and Pneumatic Connections

See Figure 4-2 and the following table for the control board connections. Refer to the circuit drawings in the back of this manual.

Item	Description
XD CR1	Pump 1 Pattern Air Pressure Transducer In/Out
XD CR2	Pump 1 Flow Air Pressure Transducer In/Out
XD CR 3	Pump 2 Pattern Air Pressure Transducer In/Out
XD CR4	Pump 1 Flow Air Pressure Transducer In/Out
J1	Pump 1 Pattern Air Flow Control Valve
J2	Pump 1 Pump Air Flow Control Valve
J3	Pump 2 Pattern Air Flow Control Valve
J4	Pump 2 Pump Air Flow Control Valve
J5	JTAG Programming/Debug/Connector
P1	Pump 1 Solenoid I/O Harness
P2	Pump 2 Solenoid I/O Harness
P3	DC Power In
P4	Purge Connector
P5	CAN Out Connector
P6	CAN In Connector
W1	CAN Network Termination Header

Switches and Indicators

See Figure 4-2 and the following table for the switches and indicators on the control board.

Item	Description
SW1	Node Address Switch
SW2	Console Address/Spray Gun Type Switch
PB1	Test Mode Switch (used for calibration)
PB2	Reset Switch
DS1	Power Indicator
DS2	Fault Indicator

P1 and P2 Pinouts

Pin	P1 Function	P2 Function
1	+24 Vdc	Not Used
2	+24 Vdc	Not Used
3	+24 Vdc	Not Used
4	+24 Vdc	Not Used
5	+24 Vdc	Not Used
6	+24 Vdc	Not Used
7	+24 Vdc	Not Used
8	Delivery 2 – Solenoid 6	Not Used
9	Pressure 2 – Solenoid 5	Not Used
10	Suction 2 – Solenoid 4	Not Used
11	Suction 1 – Solenoid 3	Not Used
12	Pressure 1 – Solenoid 2	Not Used
13	Delivery 1 – Solenoid 1	Pull up resistor for CCS
14	Vacuum – Solenoid 7	Color Change Status (CCS)

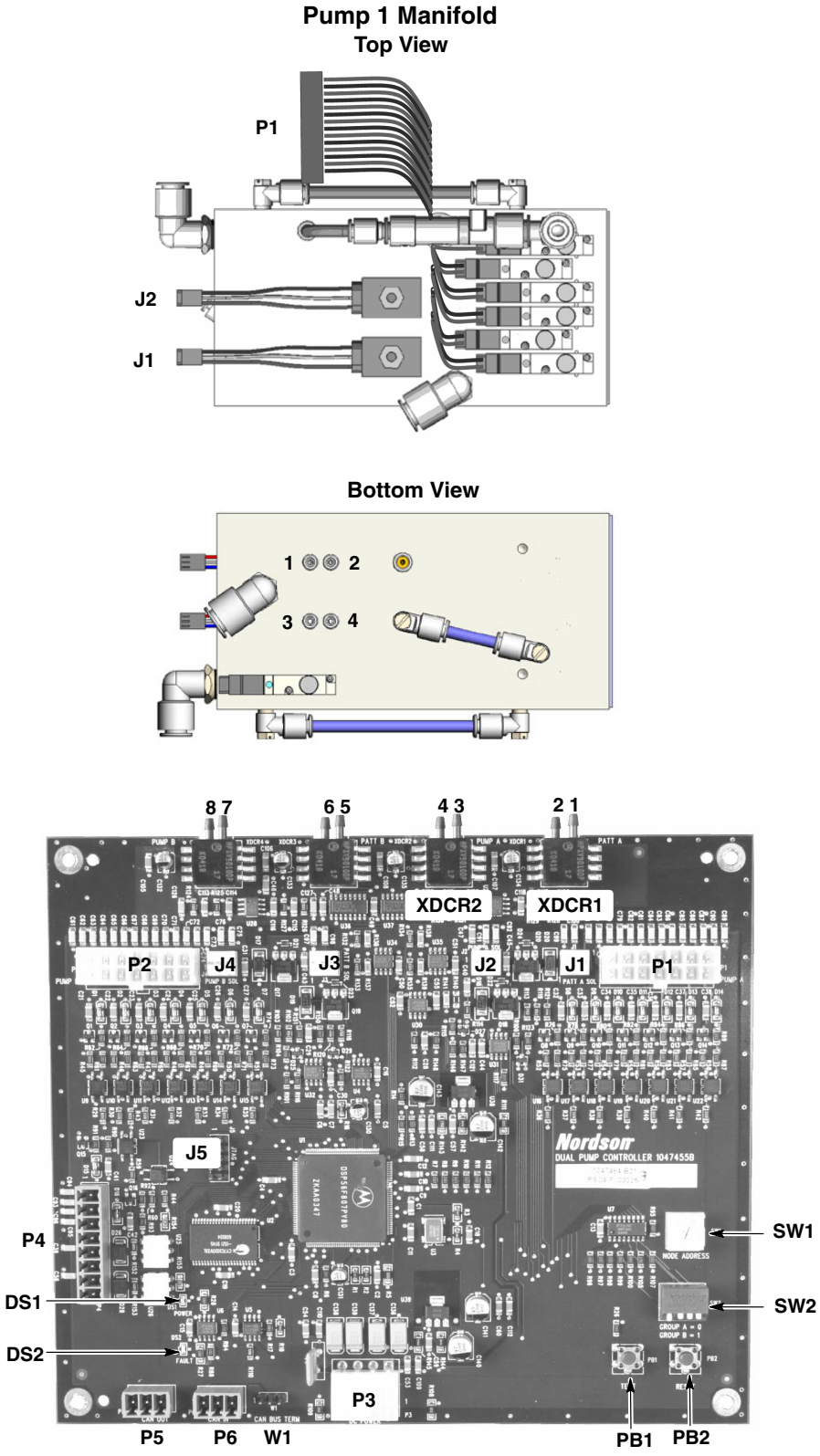


Figure 4-2 Control Board and Manifold Connections

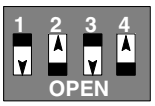
Note: The control board is shipped with air tubing labeled from 4–1 installed in the XDCR fittings. Connect the tubing to the appropriate fittings on the manifolds as illustrated.

Control Board Configuration

See Figure 4-3. Make sure that *SW1* and *SW2* are set as illustrated for the Color-on-Demand system.>>> 4 <<<

SW1 Position 1

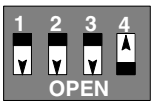
For Color-on-Demand System:



SW2

1 OPEN
2 CLOSED
3 OPEN
4 CLOSED

For Standard Manual Spray Gun System:



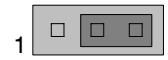
SW2

1 OPEN
2 OPEN
3 OPEN
4 CLOSED

Figure 4-3 SW1 and SW2 Settings

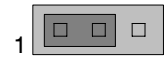
Network Termination

See Figure 4-4. The control board is shipped with a jumper across pins 2 and 3 of the *CAN BUS TERM* terminals. Move the jumper to pins 1 and 2.



W1
CAN BUS TERM

As-shipped position
(for dual spray gun system)



W1
CAN BUS TERM

Position for Color-on-Demand
single or dual spray gun system

Figure 4-4 CAN BUS TERM Jumper Settings

Configuration Procedure

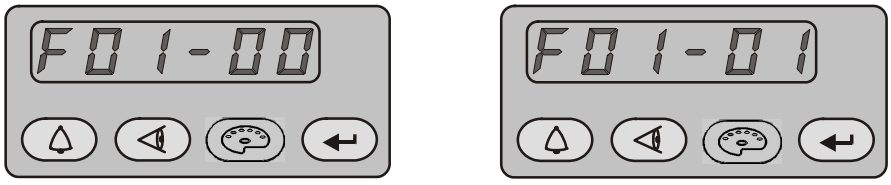
If replacing a control board or manifold, use this procedure to configure the system.>>> 5 <<<

Nordson Select and hold the *Nordson* button for five seconds. The *Function/Help* display lights to show the function numbers and values. Use the functions to configure the controller for the appropriate application.>>> 6 <<< See Figure 4-5.

The function numbers are in the form F00–00 (Function Number–Function Value).

Rotate the knob to scroll through the function. To select the displayed function number, select the *Enter* button.

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



Function 01, Value 00 Function 01, Value 01

Figure 4-5 Displaying and Changing Configuration Functions>>> 7 <<<

Use the function controls F-34 through F-37 to set the conveyance air and pattern air calibration values. See Table 4-2.

Table 4-2 Function Settings

Function Number	Function Name	Function Values	Default HDLV Mode
F34	Conveyance Air Constant A	3.500 to 4.500	4.000
F35	Conveyance Air Constant C	–0.500 to +0.500	0
F36	Pattern Air Constant A	1.500 to 4.500	4.000
F37	Pattern Air Constant C	–0.500 to +0.500	0

See the *Encore HD Manual Powder Spray System Controller* manual for more information on configuration settings.

Air and Powder Tubing Connections

See Figure 4-6 for the air and powder tubing connections for the pump and manifold.

NOTE: Only the *XDCR1* and *XDCR2* transducers on the control board are used for this application.

Item	Tubing	Function	Item	Tubing	Function
A	10-mm Blue	From Purge Air Source (Line Air Pressure)	**G**	10-mm Blue	Pump Assist/Pattern Air Flow Control 5.9 bar (85 psi)
B	8-mm Clear	Powder Suction from Feed Source	**H**	6-mm Blue	Spray Gun Pattern Air Flow Control (to spray gun)
C	8-mm Clear	Powder Delivery to Spray Gun	**1 – 2**	4-mm Clear	Pump 1 Pattern Air Pressure Transducer
D	8-mm Clear	Pinch Valve Air Pressure 2.0–2.75 bar (30–40 psi)			
E	10-mm Blue	Vacuum Air Generator Supply 3.45 bar (50 psi)	**3 – 4**	4-mm Clear	Pump 1 Flow Air Pressure Transducer
F	10-mm Blue	Vacuum Generator Vent			

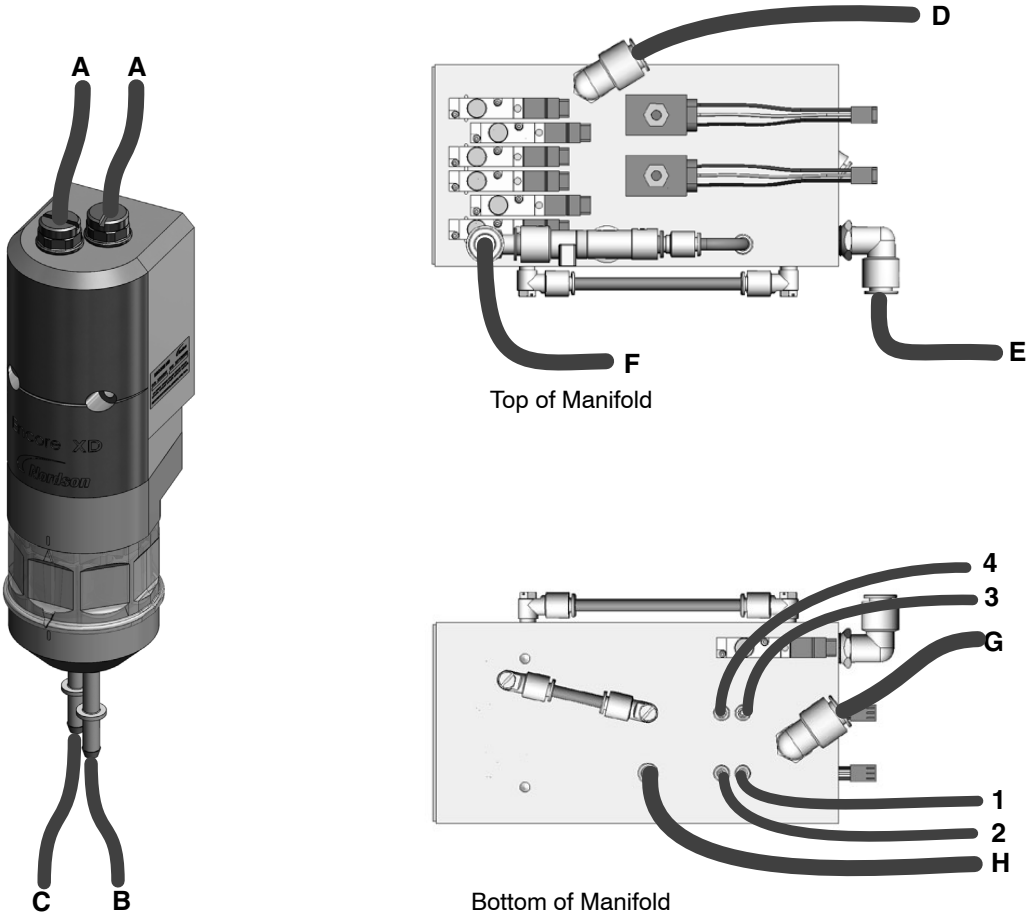


Figure 4-6 Powder and Air Tubing Connections

Operation

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

CAUTION: Do not adjust the regulators inside the pump cabinet. The regulators are factory-set and should not be adjusted without guidance from a Nordson representative.

Powder flow rate and pattern air flow is controlled by the spray gun controller operator interface settings. Refer to the *Operation* section of the controller manual for specific instructions.

The powder flow rate is controlled by specifying a setpoint from 0–100, equivalent to a percent of flow, which corresponds to a predefined pump cycle rate. Increasing the flow rate setting increases the cycle rate; decreasing the flow rate setting decreases the cycle rate.

Spray gun pattern air flow (in either scfm or m^3/hr) is regulated by the pattern air flow control valve on the pump manifold.

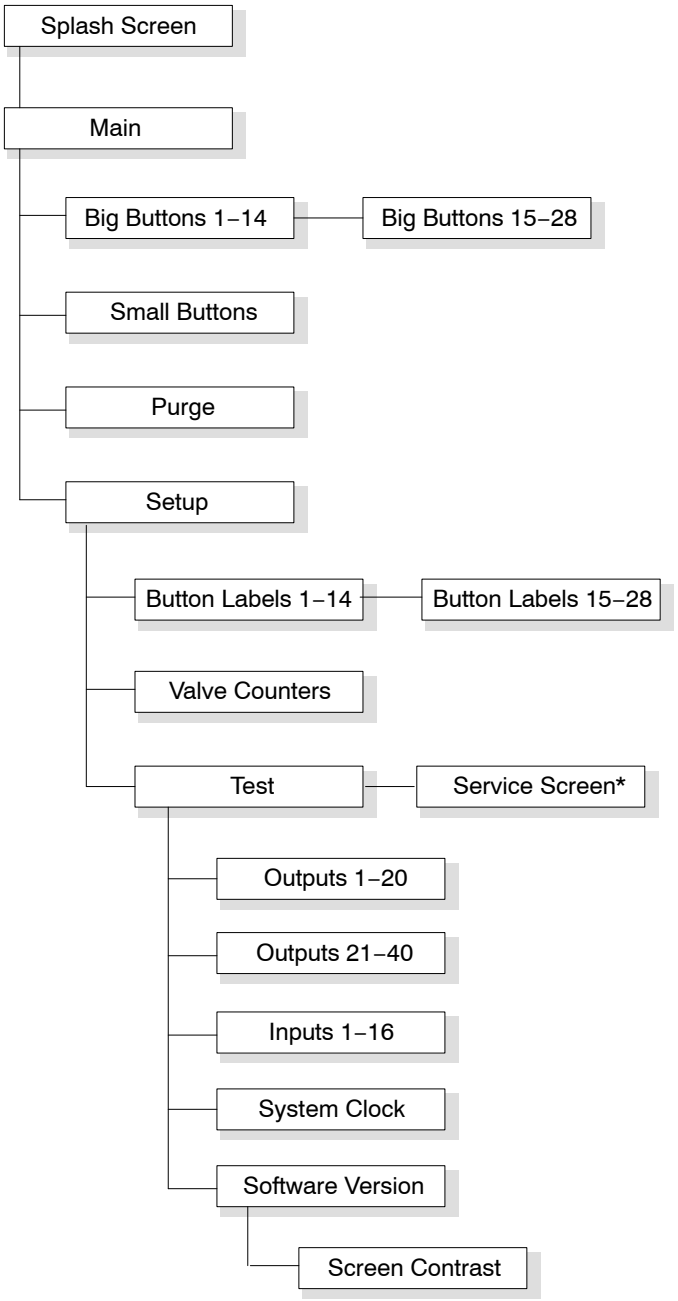
The color change cycle, which purges the pump, spray gun, delivery tubing, and suction lines of powder and loads a new color powder, is controlled by the *Purge* screen settings on the spray gun controller.

The color change system is controlled by the color control panel PLC and solenoid valves, and the pump control boards.

Colors are selected and color changes are initiated by the operator, using the color controller touch screen and the foot switch, or by a remote signal from a customer process controller.

Color-on-Demand Controller Setup and Operation

Screen Map



* Service Screen is for use by Nordson technical service representatives.

Figure 4-7 Color-on-Demand Controller Screen Map

Color Change without Suction Line Purge

When the color controller is turned on, the splash screen appears.

NOTE: Note that the controller power switch only turns the controller on and off. The color change PLC remains powered up until the system power switch is turned off.

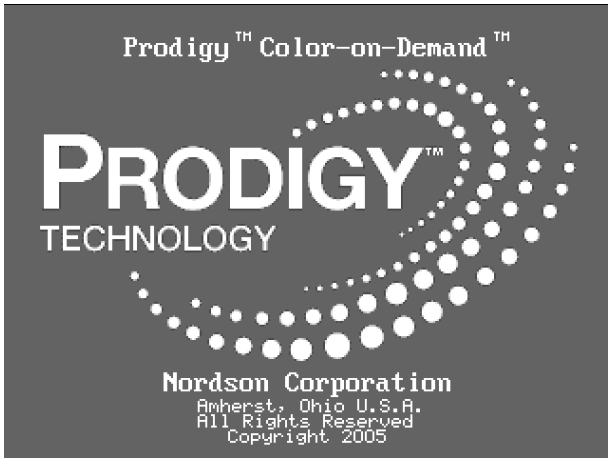


Figure 4-8 Splash Screen

Select the *Splash* screen to open the *Main* screen.

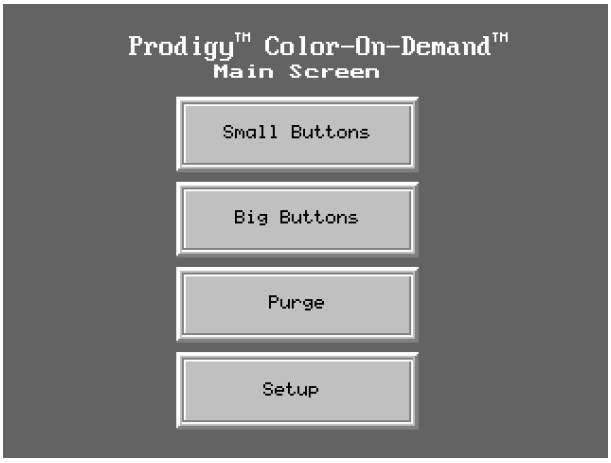


Figure 4-9 Main Screen

Choose the desired button size by selecting *Small Buttons* or *Big Buttons*.

The *Small Buttons* screen has all 28 color buttons on one screen:

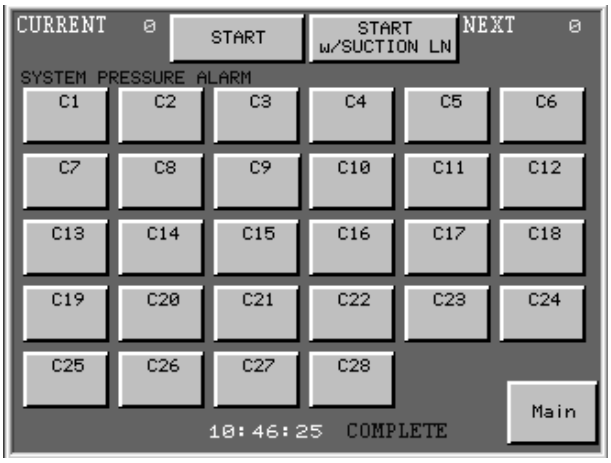


Figure 4-10 Small Buttons Screen

The *Big Buttons* screens have 14 color buttons on each of 2 screens:

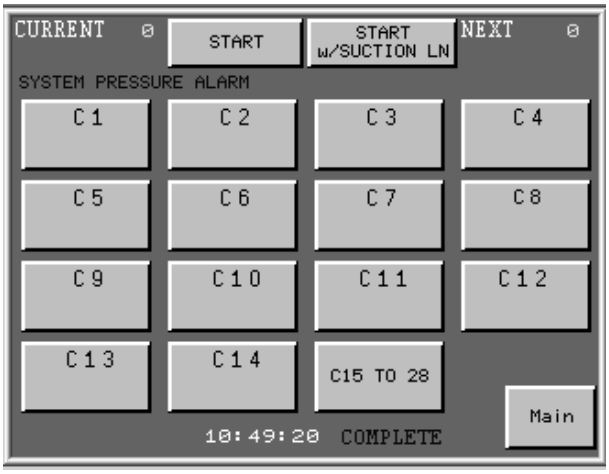


Figure 4-11 Big Buttons Screen

To change colors, either select the desired color button then the *Start* button; select the *Start* button and then select a color; or press the foot pedal then select the desired color button.

After starting a color change with the foot pedal or *Start* button, there are approximately 11 seconds (with factory default purge settings) to select a new color or the system will load the current color again.

When a new color is selected, it becomes the *Next* color while the color in the system is the *Current* color.

When the color change cycle is complete and the new color is loaded, the *Current* color and *Next* color will be the same. *COMPLETE* appears at the bottom of the screen.

Button Labeling

From the *Main* Screen, select *Setup*. Use the *Button Label* screens to enter labels for each color button and for the system.

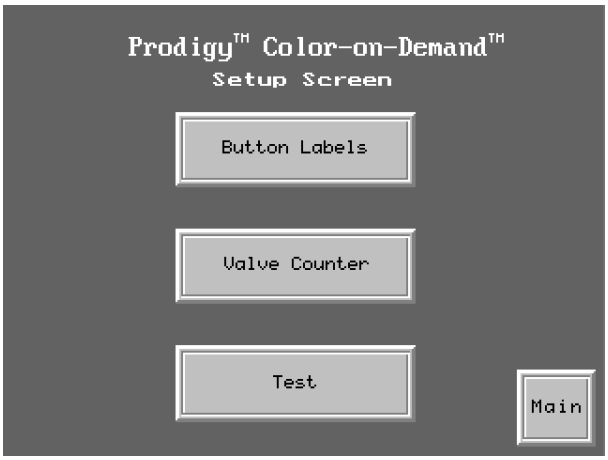


Figure 4-12 Setup Screen

The first screen has label buttons for colors 1 to 14, plus the label button for the system name. The system name appears in yellow at the bottom left of the color buttons screens.

Select the *More* button to go to the button label screen for colors 15–28.

To create a label for a color or the system name, select the label button. A keyboard screen appears. Enter a 6-character label for the color, or a 12-character label for the system.

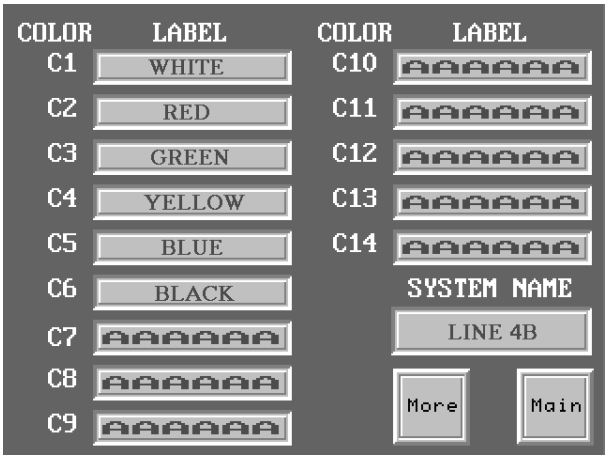


Figure 4-13 Button Label Screen (1 of 2)

Select *Main* to return to the Main screen.

System Cleaning

Before shutting down the system or removing air pressure from the system, the system must be cleaned by performing a system purge. This procedure can also be used to clean the system if it loses air pressure while operating.>>> 8 <<<

From the *Main* screen, *select Purge*. Select the *Clean* button, then *Start*.

The system performs a color change cycle without loading a new color. *COMPLETE* appears at the bottom of the screen when the cycle is complete.

Next time the system is started, select a color and perform a full color change to load the color.

Figure 4-14 Purge Screen

Color Change with Suction Line Purge

NOTE: To perform this procedure, the *Hopper Purge* function must be enabled. See the *Service Screen* section on page 5-6 to enable and disable the function.

Remove the suction line to be purged from the feed hopper and place the suction line in a hopper for excess powder disposal (waste).

From the color selection controller screen, select the desired color button, then select *Start w/Suction LN*. The default number of suction pulses is 12. The pulse range is from 1 to 50.

The next screen will offer a reminder to confirm if the suction line has been removed from the feed hopper.

Select the *Start* button to begin the suction line purge. The words *In Process* will flash on screen while system is cleaning the suction line.

When the system is done purging, the suction line the screen will revert back to the *Main* screen with the word *COMPLETE* showing at the bottom of the screen.

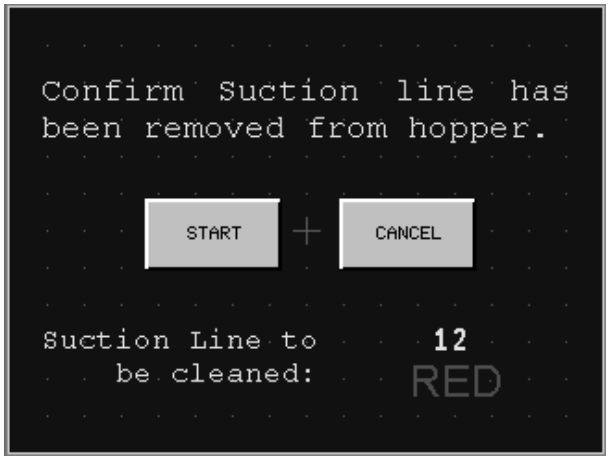


Figure 4-15 Screen display for CURRENT suction line purge

Valve Counters

Use the *Valve Counter* screen for maintenance. The recommended valve bladder change interval is 30,000 cycles. When this count is reached, disassemble the color change manifolds and install new bladders. Replacing the bladders before they fail will prevent color contamination and expensive unscheduled downtime.

Note that the *WARNING BLADDER MAINTENANCE* message will appear at the set count if enabled from the Service Screen. Refer to page 5-6 for more information on this screen.

Figure 4-16 Valve Counter Screen

System Clock

See Figure 4-17. To set the system clock, go to the *Test* screen, then select the *Set Clock* button.

Software Version

See Figure 4-17. Go to the *Test* screen, then *select Software Version.* This screen displays software version information. This information may be requested if calling for technical support.

Screen Brightness

After selecting the *Software Version* option, select the arrow buttons to adjust the brightness of the display screen.

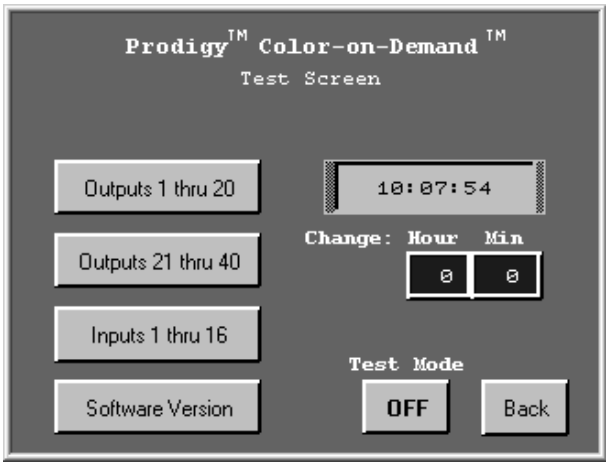


Figure 4-17 Test Screen

Section 5
Troubleshooting

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

These troubleshooting procedures cover only the most common problems. If a problem cannot be solved with the following information, contact a local Nordson representative for help.

Pump Control Panel

Problem	Possible Cause	Corrective Action
1. Reduced powder output (pinch valves are opening and closing)	Blockage in the powder tubing to the spray gun	Check the tubing for blockages. Purge the pump and spray gun.
	Defective pump air flow control valve	Clean the pump air flow control valve. Refer to *Flow Control Valve Cleaning* on page 6-2 for instructions. If the problem persists, replace the pump air flow control valve. Refer to *Flow Control Valve Replacement* on page 6-3 for instructions.
	Defective pump check valve	Replace the check valves.
2. Reduced powder output (pinch valves are not opening and closing)	Defective pinch valve	Replace the pinch valves and filter discs.
	Defective solenoid valve	Replace the solenoid valve. Refer to *Solenoid and Flow Control Valve Functions* on page 2-7 to determine which solenoid valve controls the affected pinch valve.
	Defective pump check valve	Replace the check valves.
3. Reduced powder input (loss of suction from feed source)	Blockage in the powder tubing from the feed source	Check the tubing for blockages. Purge the pump and spray gun.
	Loss of vacuum at the vacuum generator	Check the vacuum generator for contamination. Check the pump panel exhaust muffler. If the exhaust muffler appears to be plugged, replace it.
	Defective pump air flow control valve	Clean the pump air flow control valve. Refer to *Flow Control Valve Cleaning* on page 6-2 for instructions. If the problem persists, replace the pump air flow control valve. Refer to *Flow Control Valve Replacement* on page 6-3 for instructions.
4. Spray gun fan pattern changes	Defective pattern air flow control valve	Clean the pattern air flow control valve. Refer to *Flow Control Valve Cleaning* on page 6-2 for instructions. If the problem persists, replace the pattern air flow control valve. Refer to *Flow Control Valve Replacement* on page 6-3 for instructions.

Color-on-Demand Controller and Control Panel

SYSTEM PRESSURE ALARM: If this message appears on the screens, the system pressure has fallen below 70 psi and color changes cannot be started. Check the system compressed air supply.

For other color change system troubleshooting, use the *Output* and *Input* screens along with the color control panel labels. The PLC LEDs, solenoid valves, and air tubing are all coded on the labels for easy traceability. For example, when *color 1* is selected for spray gun1, the LEDs for C1AE on both the PLC and solenoid should light.

Refer to the diagrams and schematics in the back of this manual.

NOTE: Test Mode must be turned *OFF* before exiting the *Test* screen.

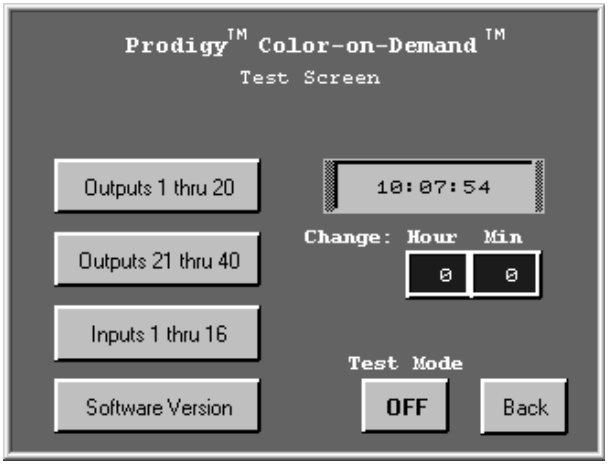


Figure 5-1 Test Screen

NOTE: Before triggering any outputs from the test screens, a system purge is strongly recommended. Refer to *System Cleaning* on page 4-14.

On either of the Output screens, select the *Test* button to toggle the test mode *ON* or *OFF*, then select an output button to turn the device on and off.

Inputs

This screen shows the status of the input signals. The LEDs on the top two PLC modules (MD2 and MD3) should light when the inputs are on. *Module 2* handles inputs from the system, while *Module 3* handles a binary 5-bit color selection signal and color change start signal from a remote customer device.

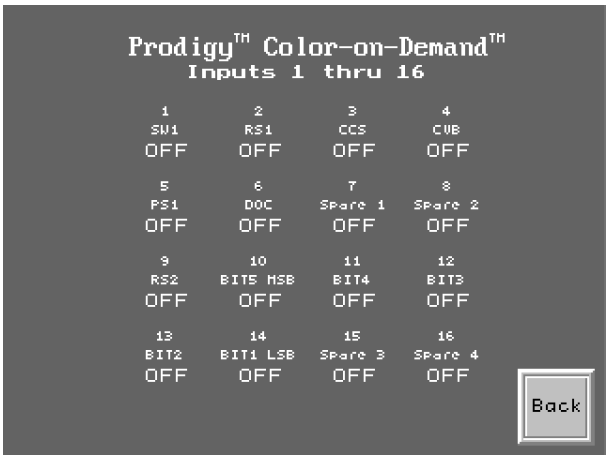


Figure 5-2 Inputs 1–16 Screen

Input Channel	Code	Function
1	SW1	Not Used
2	RS1	Remote Start 1: Signal from foot pedal pressure switch.
3	CCS	Color Change Status signal from pump control board.
4	CVB	Color Valve Back purge signal from pump control board.
5	PS1	Air pressure switch: prevents color change start if air pressure falls below 70 psi.
6	DOC	Dump Output Control signal from pump control board.
7, 8	Spares	
9	RS2	Remote Start 2: 24V remote start signal from customer device to PLC.
10	BIT 5	Binary 5-bit remote color selection inputs for colors 1–28 from customer device to PLC: BIT 1 = Least Significant Bit BIT 5 = Most Significant Bit Set the color selection bits first, then strobe RS2.
11	BIT 4	
12	BIT 3	
13	BIT 2	
14	BIT 1	
15, 16	Spares	N/A

Outputs

Selecting the *Output* screen buttons should light the LEDs on the PLC output modules and on the corresponding solenoid valves, and send an air signal to the appropriate valve bladder.

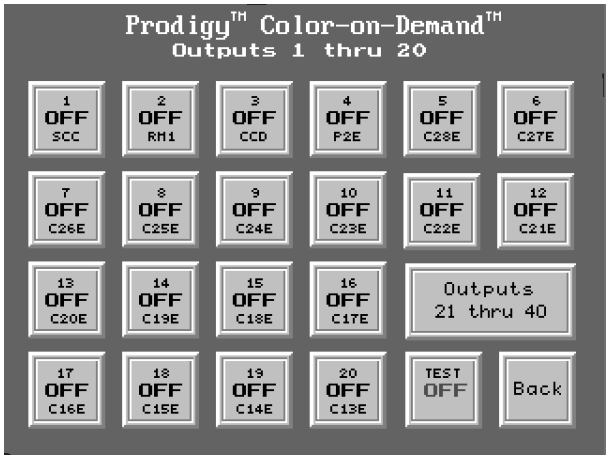


Figure 5-3 Outputs 1–20 Screen

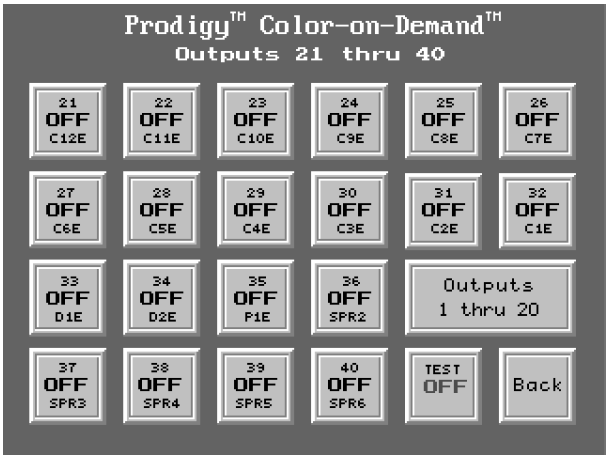


Figure 5-4 Outputs 21–40 Screen

Output Channel	Code	Function
1	SCC	Start Color Change signal to the pump control boards
2	RM1	Remote Monitor 1
3	CCD	Not Used
4	P2E	Purge 2 solenoid: Manifold purge air inlet actuation air
5–32	C28E–C1E	Color 28 to 1 solenoids
33	D1E	Dump 1 solenoid: Manifold dump outlet actuation air
34	D2E	Dump 2 solenoid: Dump valve actuation air
35	P1E	Purge 1 Solenoid
36–40	SPR1–6	Spares

Powder Flow

Lose Flow of One Color: Check for leaks in the siphon tubing from the manifold to the hopper. Check the tubing connections.

Lose Flow of Multiple Colors or All Colors: Check the tubing between the manifold and the dump valve. Check the pinch valve visible inside the dump valve body. If the pinch valve has failed, powder will be visible in the body cavity around the pinch valve.

Service Screen

The Service screen is used by Nordson technical service representatives.>>> 9 <<<

Dump Valve Counter Reset: Resets the counter. Can also be done from the *Valve Counter* screen.

Dump Valve Counter Preset: Allows the counter to be reset if accidentally reset from the *Valve Counter* screen.

Warning Count Set: When this value is exceeded by the valve counter, causes the *WARNING BLADDER MAINTENANCE* message to appear

Total Color Change Counter: Number of color change cycles initiated. Cannot be reset.

Status Arrows: Enables/Disables color change status arrows on operation screens. Default is *Off*.

Local Start Lockout: Enables/Disables color change start from the controller. Typically enabled when PLC remote color select and start is used.

Hopper Purge Enable: Enables/Disables option to purge the hopper suction line during a color change.

Suction Line Purge Pulses: Number of pulses used to purge the suction line.

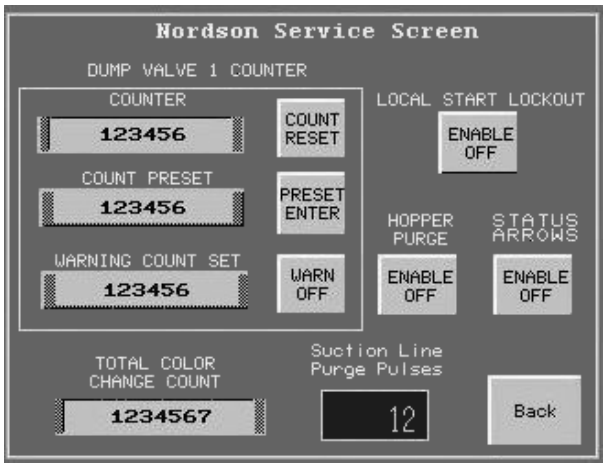


Figure 5-5 Service Screen

Section 6
Repair

Pump Control Panel Repair

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

To reduce downtime, keep a spare manifold in stock to install in place of one being repaired. Refer to *Manifold Parts* on page 7-7 for ordering information.

Repair of the manifold is limited to cleaning/replacing the flow control valves and replacing the solenoid valves.

Field replacement of other parts is not possible due to the need to calibrate the manifold at the factory using equipment not available in the field.

Preparation

NOTE: Tag all air tubing and wiring harnesses before disconnecting them from the manifold.

1. On the color change controller, go to the *Purge* screen and select *CLEAN* and *START* to perform a system purge.

WARNING: Shut off and lock out system electrical power and relieve system air pressure before performing the following tasks. Failure to relieve air pressure may result in personal injury.

2. Shut off system power and air pressure. Relieve the system air pressure.
3. Tag the pump manifold air tubing, then disconnect the tubing from the manifold.

Preparation *(contd)*

CAUTION: The circuit board is an electrostatic-sensitive device (ESD). To prevent damage to the board while handling it, wear a grounding wrist strap connected to the pump panel or other ground.

4. Tag and disconnect the flow control valve and solenoid valve wiring harnesses from the circuit board below the manifold.
5. Remove the pump from the pump panel.
6. Remove the two screws securing the manifold to the mounting bracket. Relocate the manifold assembly to a clean work surface.

Flow Control Valve Cleaning

A dirty air supply can cause the flow control valves to malfunction. Follow these instructions to disassemble and clean the flow control valves.>>> 10 <<<

1. See Figure 6-1. Remove the nut (1) and coil (2) from the flow control valve.
2. Remove the two long screws (10) to remove the flow control valve from the manifold.

CAUTION: The valve parts are very small. Be careful not to lose any parts. Do not mix the springs from one valve with those from another. The valves are individually calibrated with the springs installed.

3. Remove the two short screws (3), then remove the valve stem (4) from the valve body (7).
4. Remove the valve cartridge (6) and spring (5) from the stem.
5. Clean the cartridge seat, seals, and the orifice (9) 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 (5) and then the cartridge (6) in the stem, with the plastic seat on the end facing out.
7. Make sure the O-rings (8) furnished with the valve are in place on the bottom of the valve body (7).
8. Secure the valve body (7) to the manifold with the long screws (10), making sure the arrow on the valve body points toward the solenoid valves (12).
9. Install the coil (2) on the stem, with the coil wiring pointing away from the solenoid valves (12). Secure the coil with the nut (1).

Flow Control Valve Replacement

If cleaning the flow control valve does not correct the flow problem, replace the flow control valve.>>> 11 <<<

See Figure 6-1. Remove the valve by removing the nut (1), coil (2), and long screws (10).

Before installing a new valve, remove the protective cover from the bottom of the valve body (7). Be careful not to lose the O-rings (8) under the cover.

Solenoid Valve Replacement

See Figure 6-1. To remove the solenoid valves, remove the two screws (11) in the valve body and lift the solenoid valve (12) off the manifold.

Make sure the gasket furnished with the new solenoid valve are in place before installing it on the manifold.

Manifold Installation

Refer to *Installation* on page 4-2 for instructions for installing the manifold and pump into the pump panel.

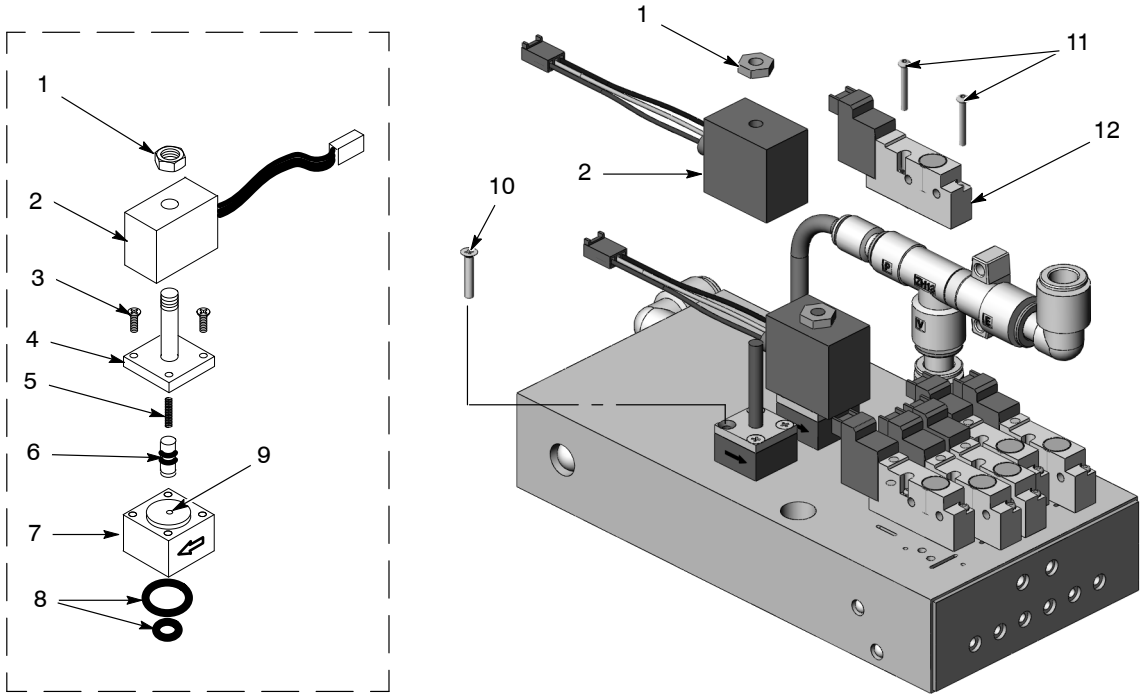


Figure 6-1 Manifold Repair

1. Nut
2. Coil
3. Short screws (2)
4. Valve stem
5. Spring
6. Cartridge
7. Valve body
8. O-rings (2)
9. Orifice
10. Long screws (2)
11. Screws (2)
12. Solenoid valve

Circuit Board Replacement

CAUTION: Observe the following cautions when removing or installing the circuit board. Failure to observe these cautions may result in equipment damage.

- The circuit board is an electrostatic-sensitive device (ESD). Wear a grounding wrist strap connected to the pump panel or other ground.
- Turn off and relieve air pressure to the pumps before removing the circuit board.
- Do not disconnect the air tubing from the circuit board. The transducers are very delicate and will break if the air tubing is removed.

The circuit board replacement kit comes with detailed removal, installation, and calibration instructions. Follow the instructions carefully to avoid damaging the circuit board.

Color-on-Demand Controller and Control Panel Repair

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 any component of the system, disconnect and lock out power at the system disconnect. Shut off the system air supply at the ball valve on the pump panel and relieve the system air pressure.

Repair of the Color-on-Demand controller and color control panel is limited to replacement of components. Refer to to the foldouts in the back for pneumatic and electrical diagrams.

Manifold Repair

The color change manifold consists of three identical valve modules connected together with tubing and mounted on a V-shaped panel.

Repair of the manifold modules consists of disassembly, cleaning, and reassembly. The following kits are available for repair:

- Bladder Kit: 10 valve bladders and filter discs
- O-ring Kit: 12 O-rings for tubing connections

Repair Procedure

See Figure 6-2.

1. Disconnect the air tubing from the elbow fittings (1).
2. Unscrew the side lock knobs (8) and pull the powder tubing out of the ports.
3. Unscrew the top and bottom lock knobs.
4. Remove the fasteners (10) securing the module bracket (11) to the panel. Save the fasteners for reuse.
5. Lift the module away from the panel and move it to a clean workbench.
6. Unscrew the nut (4) securing the ground jumper (7) to the bracket stud. Remove the screw (3) nut, lock washer (5), and flat washer (6).
7. Remove the 16 socket screws (2) securing the cover (16) to the manifold (12) and lift the cover off the manifold.
8. Remove the filter discs (15), valve bladders (13), and bladder supports (14) from the manifold (12).
9. Remove the bladder supports (14) from the valve bladders (13).
10. Blow out the manifold (12), cover (16), and bladder supports (14). Make sure all traces of powder have been removed.
11. Insert the bladder supports (14) into the new valve bladders (13), with the hole closest to the end of the support going in first.
12. Insert the new valve bladders (13) into the manifold (12), with the flat edges on the flanges facing to the center of the manifold.
13. Install the new filter discs (15) in the cover (16).
14. Install the cover (16) on the manifold (12) and thread the 16 screws (2) in finger tight.
15. Tighten the screws (2) in a crisscross pattern, a turn at a time, until all are tight. Be careful not to overtighten the screws or the manifold (12) threads could be damaged.
16. Secure the ground strap (7) to the module bracket (11) with the screws (3), flat washer (6), lock washer (5), and nut (4).
17. Install the manifold (12) on the panel.
18. Slide the lock knobs (8), then the O-rings (9), on the powder tubing.
19. Insert the tubing into the manifold ports until it bottoms out, then screw the lock knobs into the ports until tight.

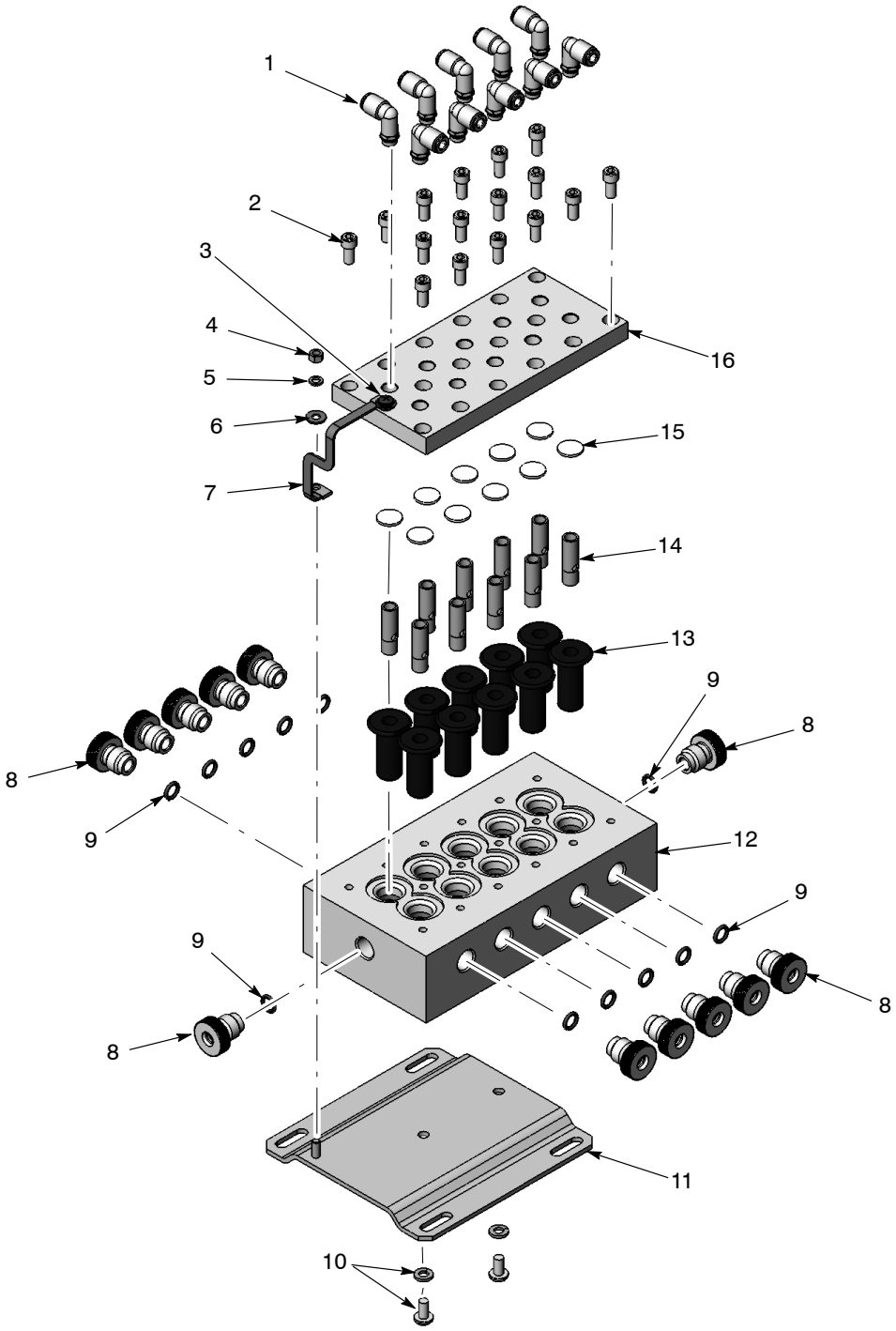


Figure 6-2 Manifold Exploded View

1. Elbow fitting
2. Socket screw
3. Screw
4. Nut
5. Lock washer
6. Flat washer
7. Ground jumper
8. Side lock knob
9. O-ring
10. Fasteners
11. Module bracket
12. Manifold
13. Valve bladder
14. Bladder support
15. Filter disc
16. Cover

Dump Valve Repair

See Figure 6-3. Use the insertion tool shipped with the Encore HD+ pump pinch valve kit to install the dump valve pinch valve Refer to the *Encore HD+ Pump* manual for a detailed pictorial procedure.

1. Remove the eight socket head screws (2) from the valve caps (3) and remove the caps.
2. Place the valve body (5) in a padded vise.
3. Grasp the large bottom flange of the pinch valve (4) and pull it out of the valve body (5).
4. Clean the valve body (5).
5. Install the insertion tool through the valve body (5). Put the *UP* end of the new pinch valve in the tool. The *UP* end of the pinch valve fits into the smaller counterbore in the valve body (5).
6. Pinch the *UP* end of the pinch valve (4) through the insertion tool and pull on the other end of the tool until the pinch valve is through the valve body (5).
7. Install the cap with the 12-mm fitting (1) over the *UP* end of the pinch valve, and the cap (3) with the 8-mm fitting (6) on the other side, and tighten the screws (2) in a crisscross pattern. Do not overtighten the screws or the valve body threads could be damaged.

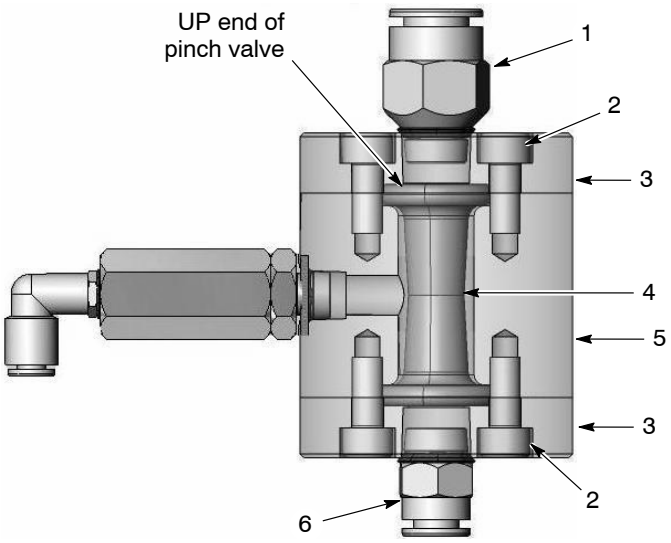


Figure 6-3 Dump Valve Cross-Section View

1. 12-mm fitting
2. Socket head screw
3. Cap
4. Pinch valve
5. Valve body
6. 8-mm fitting

Section 7
Parts

Introduction

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

Using the Illustrated Parts List

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

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

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

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

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

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

Item	Part	Description	Quantity	Note
—	0000000	Assembly	1	
1	000000	• Subassembly	2	A
2	000000	• • Part	1	

System Manuals

Reference Documentation

For additional information related to other components in the system, reference the following documentation:

Document Title	Document Part Number
Encore HD Manual Powder Spray System	1612632
Color-on-Demand System Operator Card	1605548
Encore HD and XT Manual Powder Spray System Controller	1604870
Encore HD Manual Powder Spray Gun	1604869
Encore HD Pump	1605708

System Numbers

Single Spray Gun System

With nLighten™ Option	Standard Systems	Descriptions	Quantity
1613913	1612630	SYSTEM, Color-on-Demand, manual, single, Encore HD	
1604125	1604125	• CONTROL UNIT, interface, Encore XT	1
1603160	1603160	• SPRAY GUN, assembly, manual, Encore HD	1
–––––––	–––––––	• CONTROLLER, COD, single pump, Encore HD	1
1605276	1605276	• KIT, ship-with, spray system	1
1067148	1067148	• KIT, ship-with, Color-on-Demand	1
1101491	1101491	• KIT, controller interface	1
1611977	–––––––	• KIT, nLighten, LED, Encore	1

Dual Spray Gun System

With nLighten Option	Standard System	Description	Quantity
1613914	1612631	SYSTEM, Color-on-Demand, manual, dual, Encore HD	
1604125	1604125	• CONTROL UNIT, interface, Encore XT	2
1603160	1603160	• SPRAY GUN, assembly, manual, Encore HD	2
–––––––	–––––––	• CONTROLLER, COD, dual pump, Encore HD	1
1605276	1605276	• KIT, ship-with, spray system	2
1067148	1067148	• KIT, ship-with, Color-on-Demand system	2
1101491	1101491	• KIT, controller interface	2
1611977	–––––––	• KIT, nLighten, LED, Encore	2

Pump Panel Replacement Parts

See Figure 7-1 and refer to the following parts list.

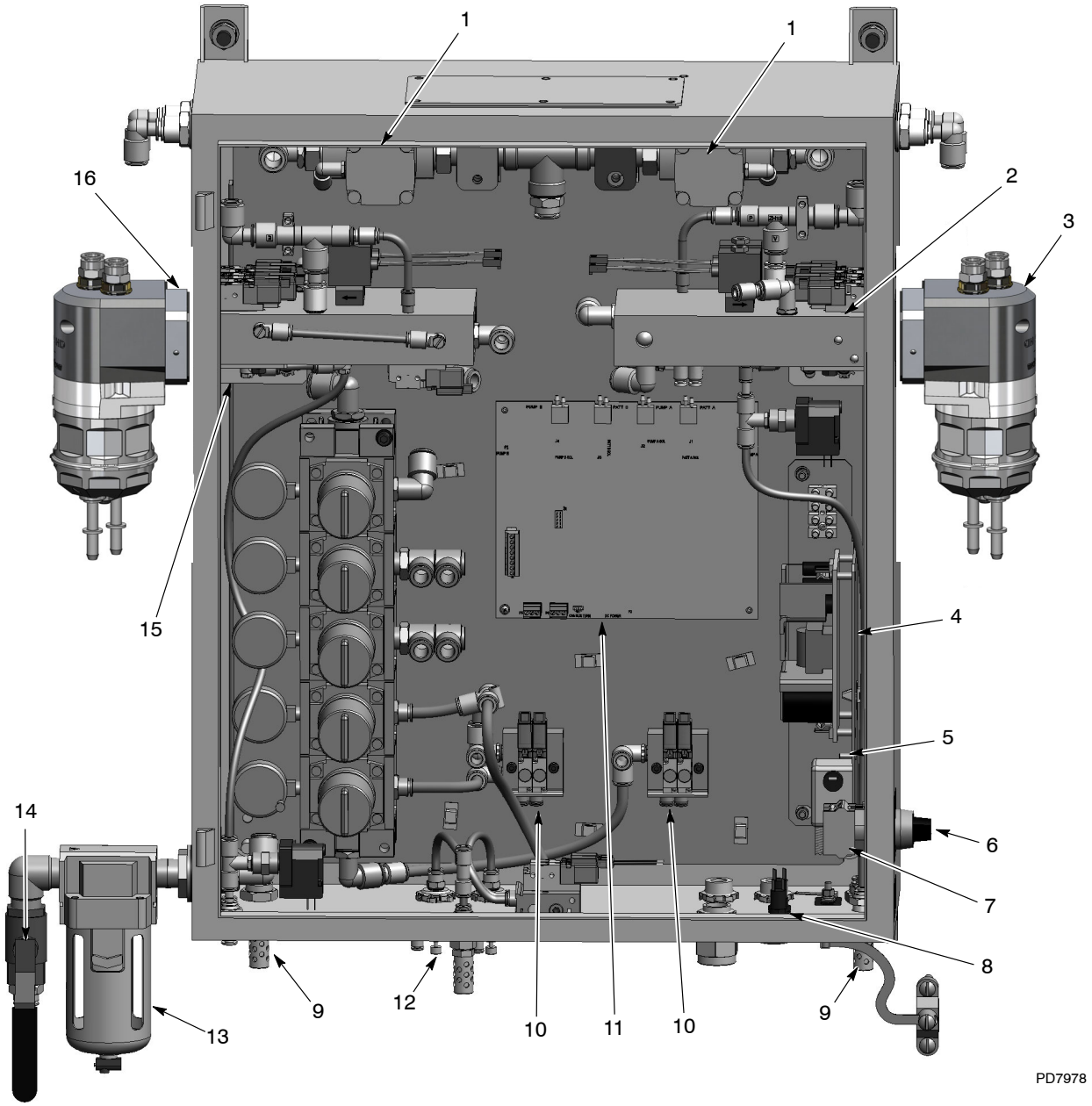


Figure 7-1 Pump Panel Replacement Parts (Dual Pump System Shown)

Item	Part	Description	Quantity	Note
1	303132	VALVE, $^{3}/_{4}$ in. I/O, air operated	AR	A
2	------	MANIFOLD ASSEMBLY, HDLV pump control	AR	A, B
3	1610978	PUMP ASSEMBLY, hi-flow, Encore HD	AR	A
4	1043906	POWER SUPPLY, 24, 5, 12 Vdc, 60 W	1	
5	334805	FILTER, line, RFI, power, 10A	1	
6	334806	SWITCH, round, 2 position, 90 degree	1	
7	288806	CONTACT BLOCK, 2 N.O. contacts	1	

Item	Part	Description	Quantity	Note
8	1009090	FUSE, time delay, 215 series, 3.15 A, 5 x 20 mm	2	
9	1034396	MUFFLER, exhaust, $^1/_4$ in. NPT male	AR	C
10	1099534	VALVE, solenoid, 3 port, 24 V, with adapter	AR	A, D
11	1101498	KIT, PCA replacement, pump control	1	B
12	1082612	VALVE, flow control, 4mm x 1/8 UNI	AR	
13	1062366	FILTER, air, $^1/_2$ in. NPT	1	
NS	1064136	• FILTER ELEMENT, air, 5 micron, AF40	1	
14	901151	VALVE, ball, $^1/_2$ in. NPT	1	
15	1064964	SWITCH, pressure	AR	
16	1606840	ADAPTER,		
NS	1604832	HARNESS SET, single air wash	AR	
NS	1604833	HARNESS SET, dual air wash	AR	

NOTE A: Quantities for AR items vary depending on number of spray guns in system.

B: When replacing manifold, perform calibration procedure as described in *Manual Spray Gun Controller* manual.

C: When replacing board, refer to instruction sheet shipped with kit for switch settings. Also perform calibration procedure as described in *Manual Spray Gun Controller* manual.

D: If using an old harness with three positions, use the supplied adapter. If using a new a harness with two positions, the supplied adapter can be discarded.

AR: As Required

NS: Not Shown

Manifold Parts

Manifold

See Figure 7-2 and refer to the following parts list.

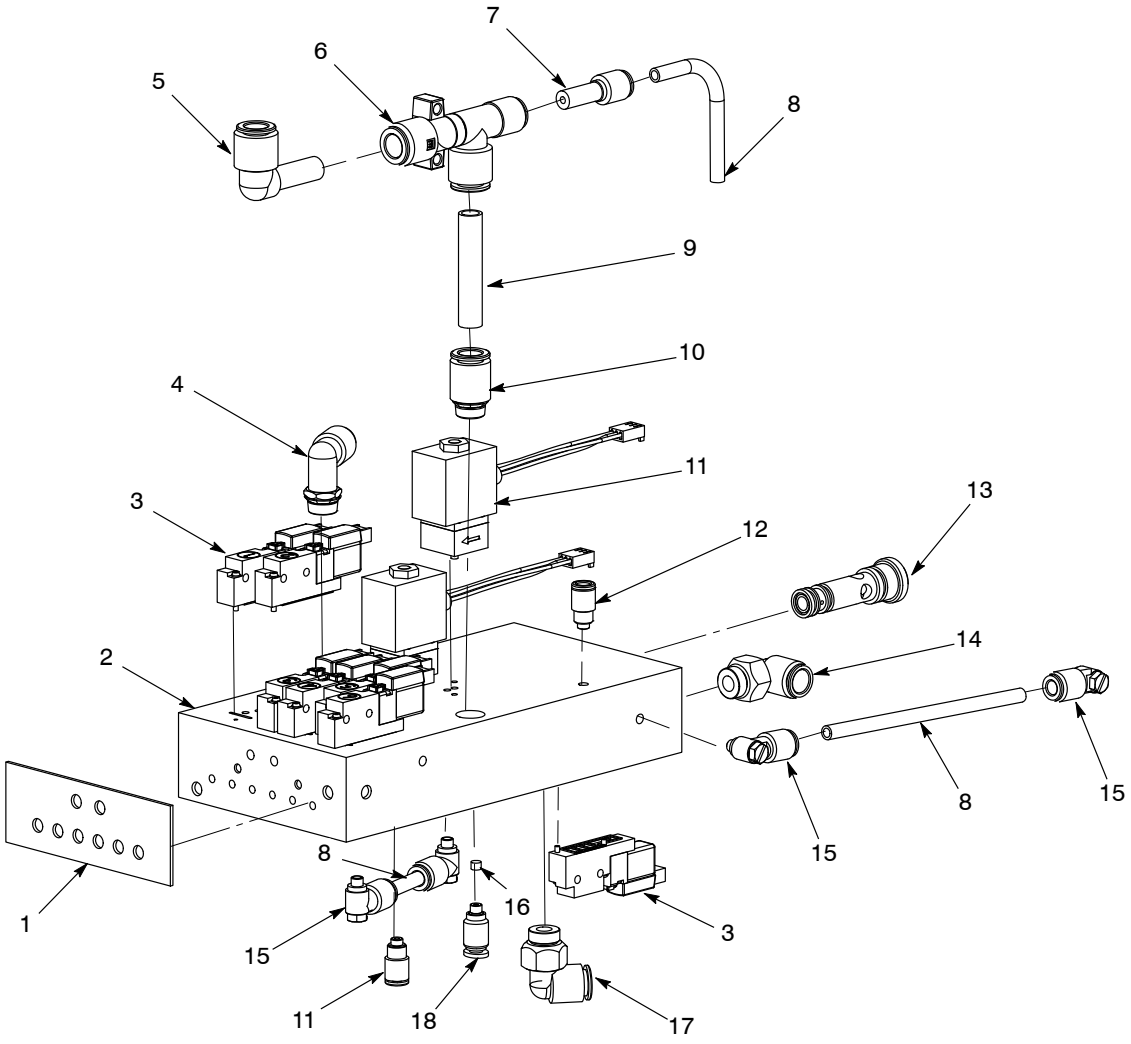


Figure 7-2 Manifold Parts

Item	Part	Description	Quantity	Note
—	1101343	MANIFOLD ASSEMBLY, HDLV pump control, Generation III	1	
1	1053510	• GASKET, face, HDLV pump control manifold	1	
2	------	• MANIFOLD, HDLV pump control	1	
3	1099534	• VALVE, solenoid, three-way, with connector	7	B
4	972277	• CONNECTOR, male, elbow, 8-mm x $^1/_4$ in. universal	1	
5	1052893	• ELBOW, plug in, 10-mm tube x 10-mm stem, plastic	1	
6	1052920	• PUMP, vacuum generator	1	
7	972286	• REDUCER, 8-mm stem x 6-mm tube	1	
8	900742	• TUBING, polyurethane, 6-mm OD x 4-mm ID, blue	AR	
9	1052894	• NIPPLE, push in, 10-mm tube x 10-mm tube, plastic	1	
10	972283	• CONNECTOR, male, with internal hex, 10-mm tube x $^1/_4$ in. universal	1	
11	1098501	• KIT, flow control valve, pump control	2	
12	328524	• CONNECTOR, male, with internal hex, 6-mm tube x M5	2	
13	------	• ORIFICE	2	A
14	972125	• CONNECTOR, male, elbow, 10-mm tube x $^1/_4$ in. universal	1	
15	972310	• CONNECTOR, male, universal elbow, 6-mm tube x M5	4	
16		• FILTER, 0.168 dia x 0.240-in. long, 20 micron	4	
17	972125	• CONNECTOR, male, elbow, 10-mm tube x $^1/_4$ in. universal	1	
18	1062009	• CONNECTOR, male, with internal hex, oval collar, 4-mm tube x M5	4	

NOTE A: These are not serviceable parts. Do not remove these from the manifold.

B: If using an old harness with three positions, use the supplied adapter. If using a new harness with two positions, the supplied adapter can be discarded.

AR: As Required

Air and Powder Tubing

See Figure 7-3 and refer to the following parts list.>>> 12 <<<

Item	Part	Description	Item	Part	Description
A	900740	10-mm Blue polyurethane	**F**	900740	10-mm Blue polyurethane
B	173101	8-mm Clear polyethylene	**G**	900740	10-mm Blue polyurethane
C	173101	8-mm Clear polyethylene	**H**	900742	6-mm Blue polyurethane
D	173101	8-mm Clear polyethylene	**1, 8**	900617	4-mm Clear polyurethane
E	900740	10-mm Blue polyurethane			

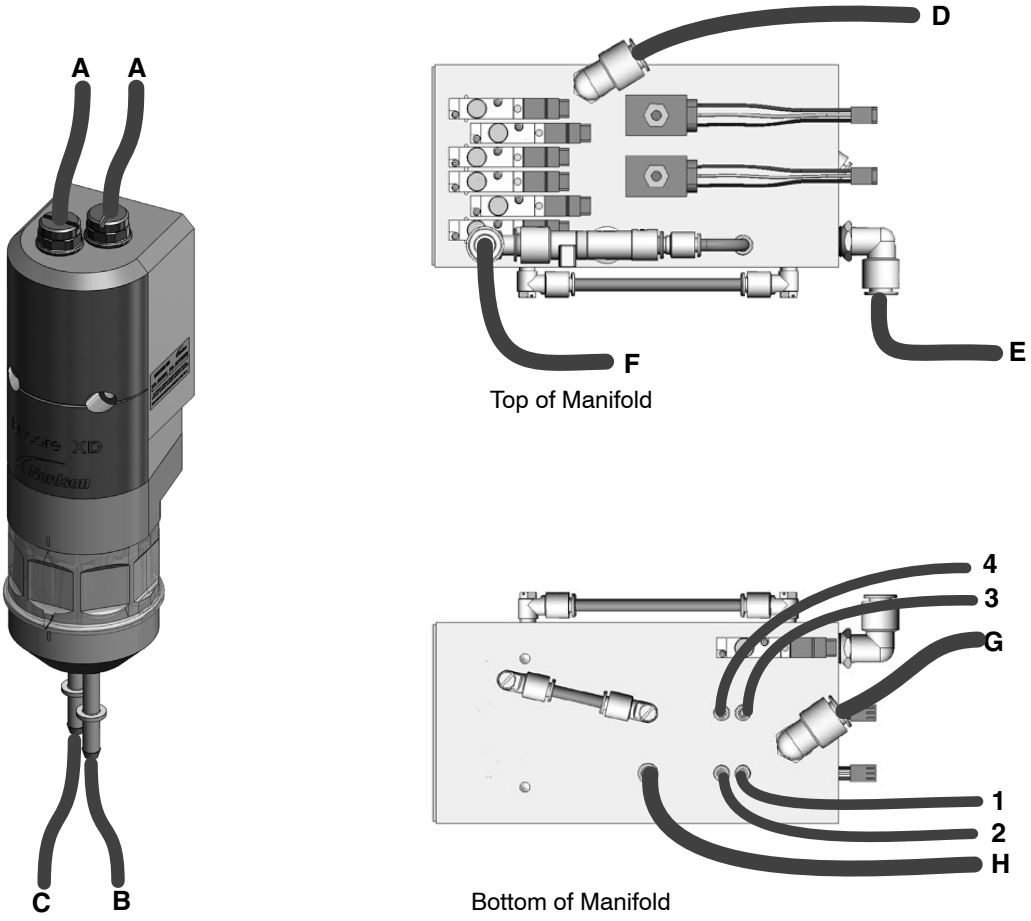


Figure 7-3 Air and Powder Tubing Part Numbers

PCA Replacement Parts

PCA Replacement Kit

See Figure 7-4 and refer to the following parts list.

Part	Description	Note
1101498	KIT, PCA, replacement, pump control	

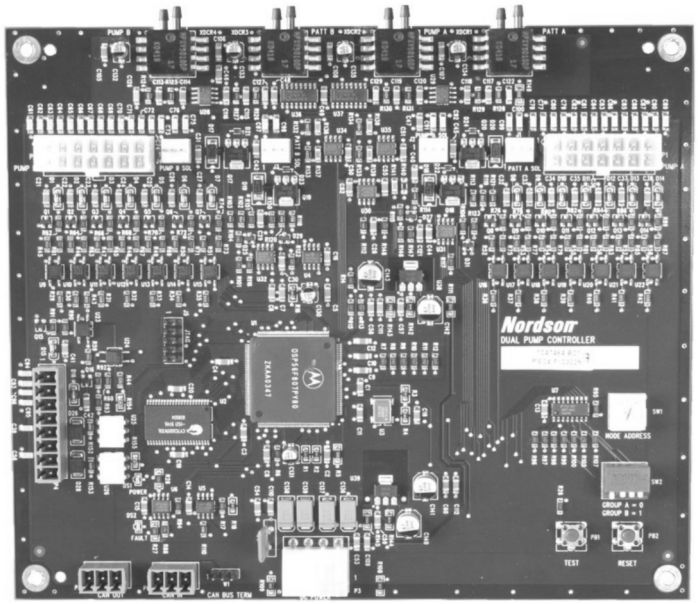


Figure 7-4 PCA Replacement Kit

Color-on-Demand Controller and Control Panel Parts

Controller Kit Parts

See Figure 7-5 and refer to the following parts list.

Item	Part	Description	Quantity	Note
—	1101491	KIT, controller interface, color change III	1	
1	1101488	• CONTROLLER interface, color change III	1	A
2	129592	• KNOB, clamping, M6 x 12 mm long	2	
3	129590	• SPACER, cabinet, friction	2	
4	982649	• SCREW, hex, machine, M10 x 22 mm	1	
5	983405	• WASHER, lock, split, M10, steel, zinc	1	
6	288828	• KIT, bracket, mounting, rail	1	
7	982500	• SCREW, hex, machine, M8 x 16 mm	1	
8	984707	• NUT, hex, M8, steel, zinc	1	
9	240976	• CLAMP, ground w/wire	1	
10	------	• BRACKET, base, manual control interface	1	
11	------	• BRACKET, post, manual control	1	
12	------	• BRACKET, mounting, U, manual control	1	
NOTE A: See Figure 7-5 and accompanying parts list for serviceable parts.				

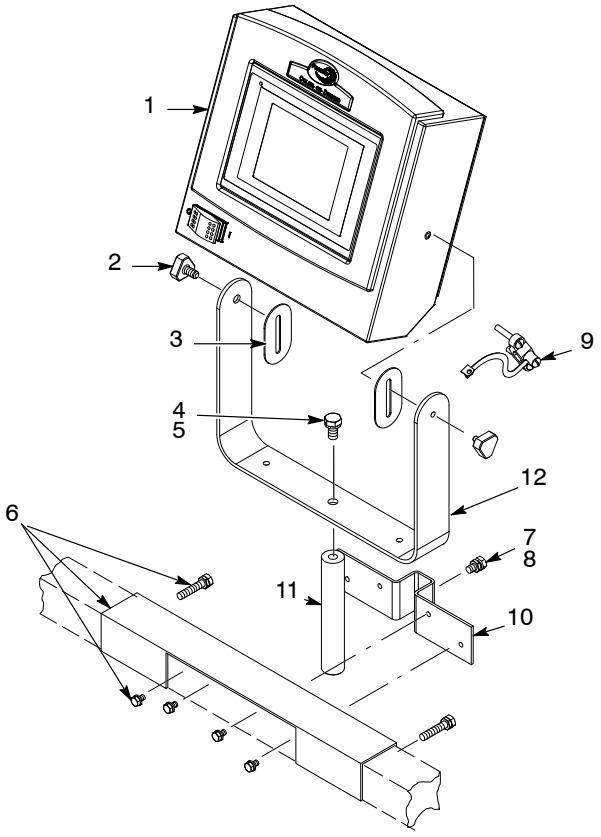


Figure 7-5 Controller Kit Parts

Controller Parts

See Figure 7-6 and refer to the following parts list.

Item	Part	Description	Quantity	Note
—	1604870	CONTROL UNIT, interface, Encore, COD	1	
1	1604855	• PANEL, keypad, Encore HD controller	1	
2	1085084	• PCA, main controller display, Encore HD	1	B
3	1601341	• PCA, main control, Encore HD	1	B
4	983403	• WASHER, lock, split, M4, steel, zinc	8	
5	982308	• SCREW, pan head, recessed, M4 x 10, zinc	8	
6	982636	• SCREW, button, socket, M5 x 12, zinc	2	
7	983127	• WASHER, lock, internal, M5, zinc	2	
8	984526	• NUT, lock, $^1/_2$ in. conduit	2	
9	939122	• SEAL, conduit fitting, $^1/_2$ in., blue	2	
10	1082734	• ENCLOSURE, controller interface, Encore HD	1	
11	240674	• TAG, ground	2	
12	983021	• WASHER, flat, 0.203 x 0,406 x 0.040, brass	2	
13	983401	• WASHER, lock, split, M5, steel, zinc	2	
14	984702	• NUT, hex, m5, brass	2	
15	1082759	• RECEPTACLE, net, controller interface, Encore HD	1	A
16	1082709	• RECEPTACLE, gun, Encore HD	1	A
17	982286	• SCREW, flat, slotted, M5 x 10, zinc	4	

NOTE A: Receptacles include harnesses.

B: Items 2 and 3 are sold together as kit 1604025.

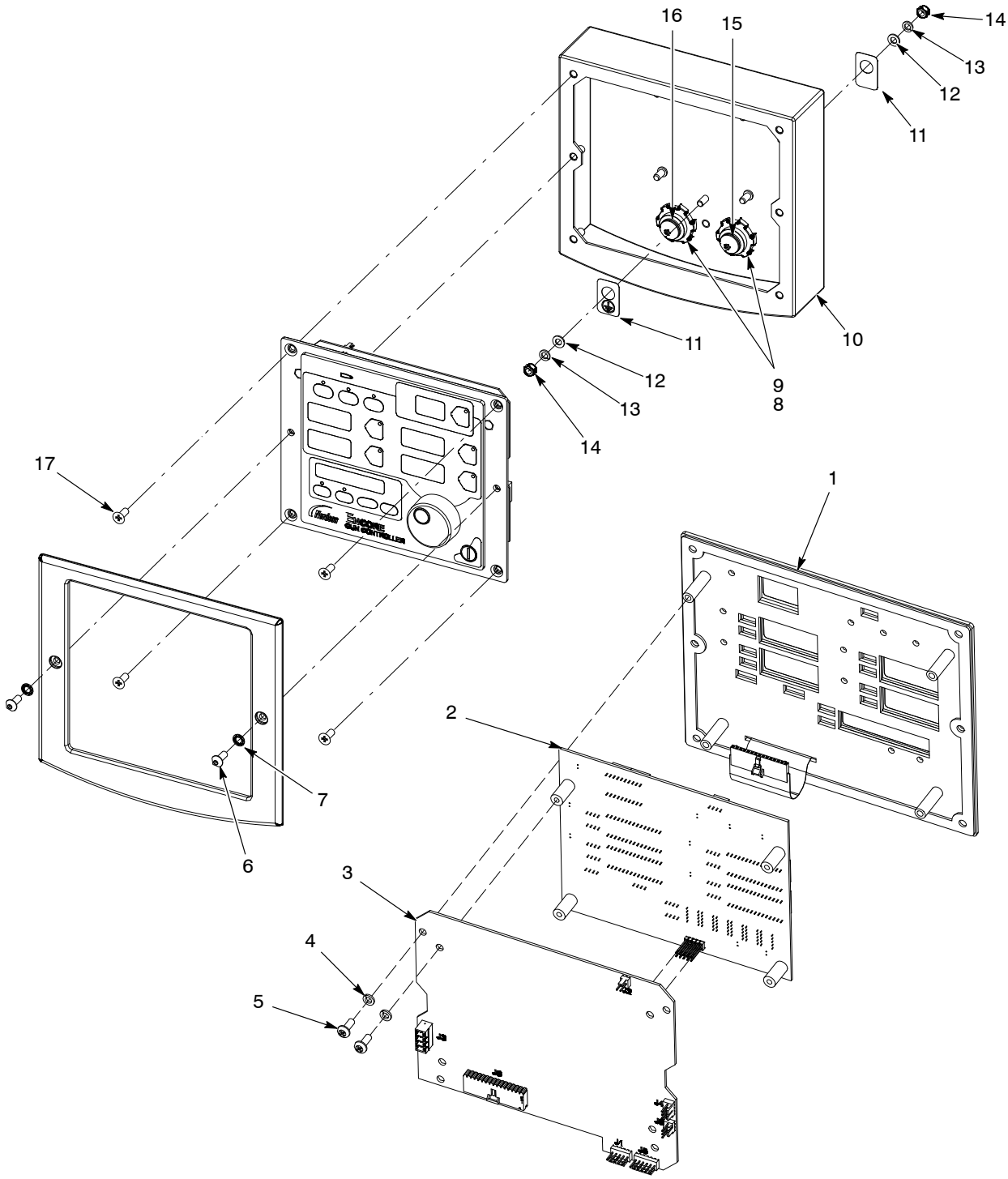


Figure 7-6 Controller Parts

Color Change Control Panel Parts

See Figure 7-7 and refer to the following parts list.

Item	Part	Description	Quantity	Note
—	------	CONTROLLER, single or dual color changer	1	
1	1101489	• CONTROL UNIT, dual pump color changer, PLC	1	A
2	1101459	• CONTROL UNIT, single pump color changer, PLC	1	A
3	303132	• VALVE, 3/4 in. NPT, air operated	AR	B
4	1095074	• SWITCH, pressure, N.O., 30 psi	AR	B
5	1068324	• VALVE, solenoid, 3 port, 24V, N.O., w/o leads	AR	C
6	1068325	• VALVE, solenoid, 3 port, 24V, N.C., w/o leads	AR	C
NS	173101	• TUBING, polyethylene, 8 mm x 6 mm, natural	AR	D
NS	900742	• TUBING, polyurethane, 6/4 mm, blue	AR	D
NS	900618	• TUBING, polyurethane, 8 mm OD, blue	AR	D
NS	900740	• TUBING, polyurethane, 10 mm OD, blue	AR	D
NS	226690	• TUBING, polyurethane, 12 mm OD, blue	AR	D

NOTE A: Select appropriate control unit for your system. Parts break down on following pages.
C: One required per spray gun.
D: 31 N.O. valves and 1 N.C. valve required per spray gun.
E: Order in increments of 1 ft.
AR: As Required
NS: Not Shown

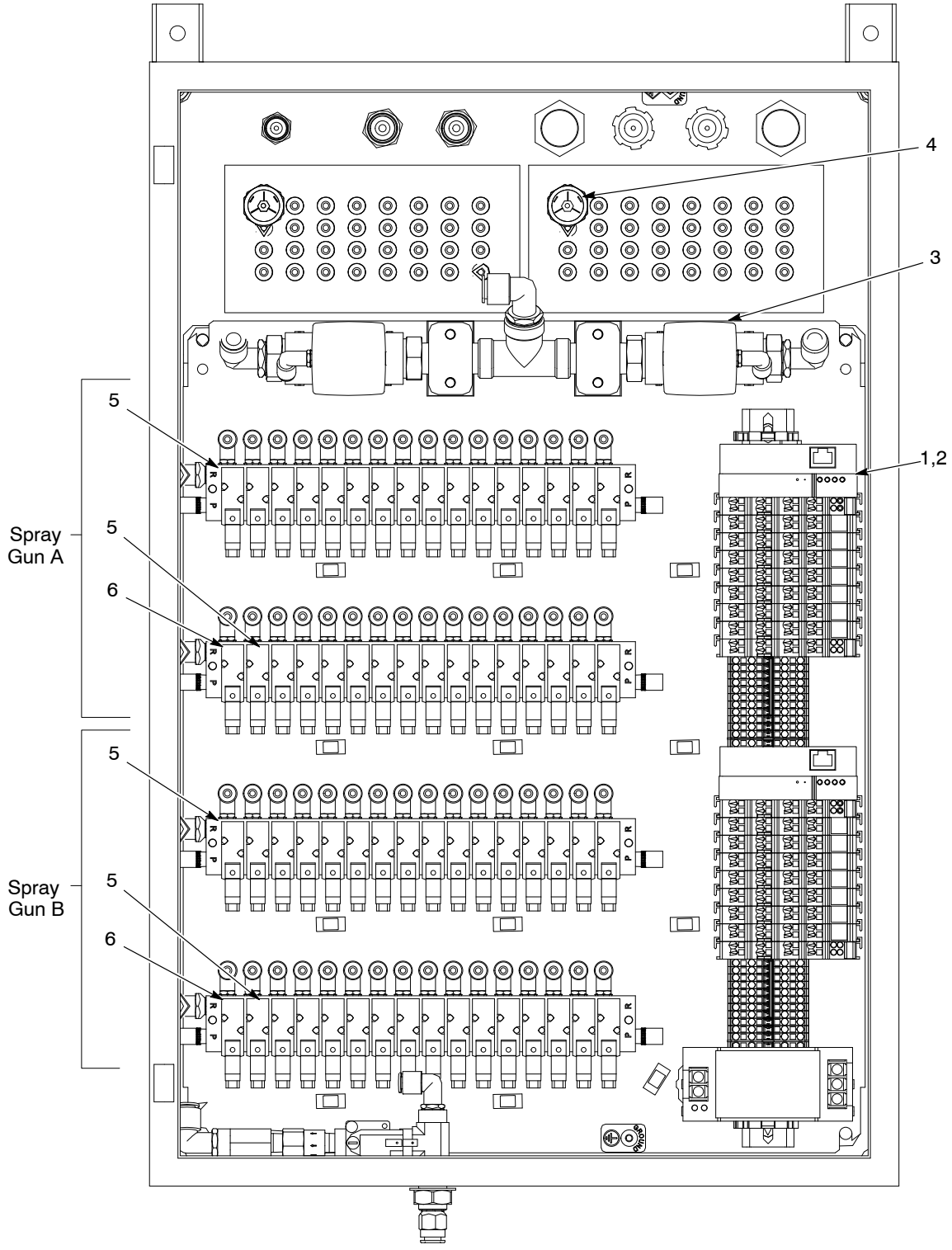


Figure 7-7 Color Control Panel Parts

Control Unit (PLC) Parts

See Figure 7-8 and refer to the following parts list.

Item	Part	Description	Quantity	Note
—	1101489	CONTROL UNIT, dual pump color changer, PLC	1	
—	1101459	CONTROL UNIT, single pump color changer, PLC	1	
1	1105978	• CONTROLLER, programmed, COD, Gen III	AR	A, D
2	1064193	• MODULE, 8-channel digital input, Wago, 750-430	AR	B, D
3	1064195	• MODULE, 8-channel digital output, Wago, 750-530	AR	C, D
4	1064191	• MODULE, end, carrier, Wago, 750-600	1	
5	1064192	• POWER SUPPLY, 90W, 24Vdc, 3.75 amps, DIN rail	1	D

NOTE A: Two required for dual control unit, one for single.
B: Four required for dual control unit, two for single.
C: Ten required for dual control unit, five for single.
D: Installation by a qualified Nordson service representative is recommended for these parts.
AR: As Required

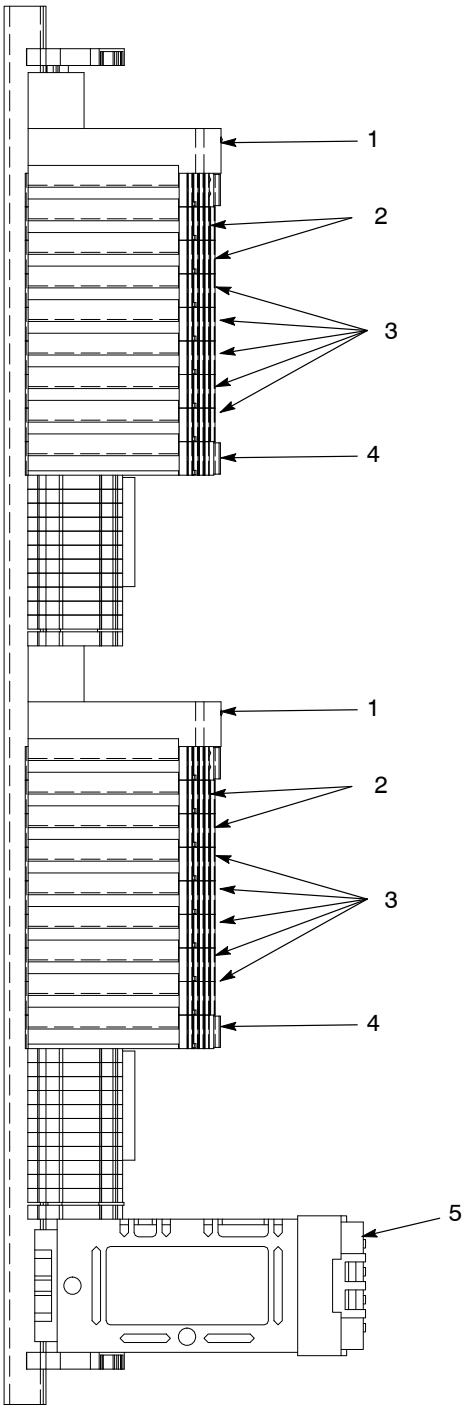


Figure 7-8 Control Unit (PLC) Parts

Ship-With Kit Parts

Part	Description	Quantity	Note
1067148	KIT, ship-with, Color-on-Demand system	1	
1072866	• CABLE, Ethernet CAT5E, 50 ft	1	
248375	• CONDUIT, flexible, bulk, 1/2 in. (50 ft)	AR	A
1058224	• CONNECTOR, Ethernet, RJ45-to-IDC, CAT5	1	
1078555	• BOX, surface mount, Ethernet	1	
226690	• TUBING, polyurethane, 12/8 mm, blue (50 ft)	AR	A
1064948	• SWITCH, foot, air, 3-way, 100 psi	AR	
900742	• TUBING, polyurethane, 6/4 mm, blue (100 ft)	AR	A
1065711	• CABLE, Ethernet crossover, CAT5E, RJ45, 3 ft	1	
------	• UNION, reducer, 12 mm tube x 8 mm tube	1	
972141	• CONNECTOR, male, 6 mm tube x 1/8 in. unithread	2	
911110	• UNION, bulkhead, 12 mm tube x 12 mm tube	2	
933071	• TERMINAL, ringtong, ins, 22–18, 10	1	

NOTE A: Order replacements in increments of 1 ft.

AR: As Required

Color Change Manifold Parts

See Figure 7-9 and refer to the following parts list.

Item	Part	Description	Quantity	Note
—	1094892	MANIFOLD, module, Color-on-Demand, assembly		
1	972126	• CONNECTOR, male, elbow, 6 mm tube x 1/8 in. unithread	10	
2	981225	• SCREW, socket head, 1/4–20 x 0.625 in.	16	
3	1045837	• SCREW, pan head, M5 x 12, w/lockwasher	1	
4	983021	• WASHER, flat, 0.203 x 0.406 x 0.040, brass	2	
5	984702	• NUT, hex, M5, brass	1	
6	983401	• WASHER, lock, split, M5, steel, zinc	1	
7	246458	• JUMPER, ground, 4 in.	1	
8	1047934	• KNOB, lock, powder tube	12	
8A	940117	• O-RING, silicone, .312 x .438 x .063 in.	12	C
9	945115	• O-RING, Viton, 8.00 x 2.00	12	A
10	1080408	• DISC, filter, HDLV pump	10	B
11	------	• SUPPORT, Color-on-Demand bladder	10	
12	------	• VALVE BLADDER, color changer, 0.12 W, , Color-on-Demand	10	B
13	------	• MANIFOLD, color changer, Color-on-Demand	1	
14	------	• BRACKET, color changer	1	
15	983409	• WASHER, lock, split, M6, steel, zinc	2	
16	982499	• SCREW, pan head, slotted, M6 x 12, zinc	2	
17	------	• COVER, manifold, color changer, Color-on-Demand	1	

NOTE A: Available in packages of 12. Order 1065983: KIT, Color-on-Demand, O-ring, 12-pack

B: Available in packages of 10 bladders and 10 filter discs. Order 1065982: KIT, Color-on-Demand, bladder, 10-pack

C: Internal O-ring for lock knob.

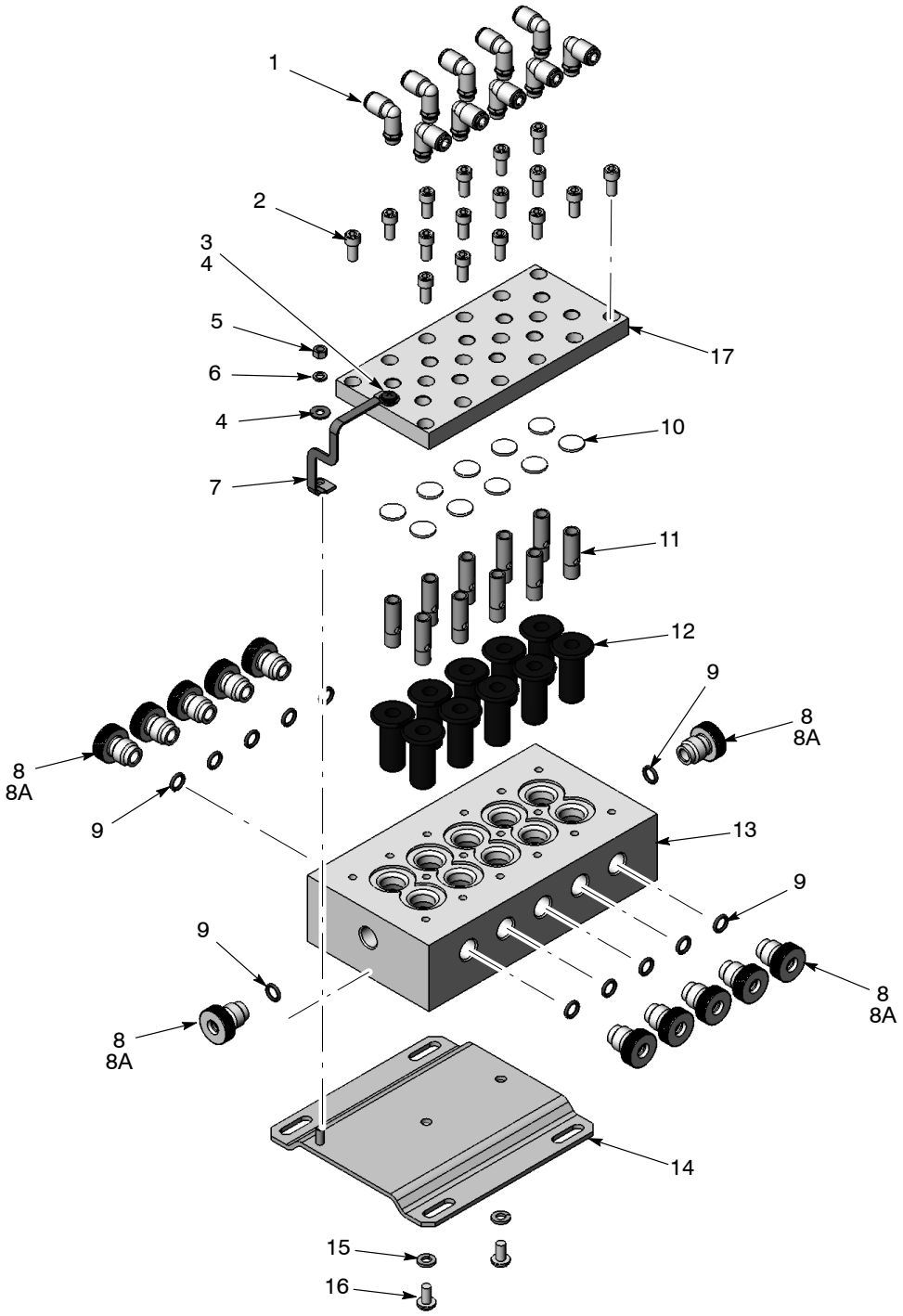


Figure 7-9 Color Change Manifold Parts

Dump Valve Parts

See Figure 7-10 and refer to the following parts list.

Item	Part	Description	Quantity	Note
—	1074720	VALVE, dump, Color-on-Demand	1	
1	971104	• CONNECTOR, male, 12 mm x 1/4 in. unithread	1	
2	1064886	• SCREW, socket head, M6 x 14, zinc	8	
3	------	• CAP, dump valve, Color-on-Demand	2	
4	1066626	• VALVE, pinch, HDLV pump	1	A
5	1074028	• BODY, dump valve, Color-on-Demand	1	
6	972126	• CONNECTOR, male, elbow, 6 mm x 1/8 in. unithread	1	
7	971121	• CONNECTOR, male, 8 mm x 1/4 in. unithread	1	
8	1075460	FILTER, inline, $^{1}/_{8}$-in. NPT	1	
NOTE A: To replace, order 1066626: KIT, dump valve, pinch valve, 4-pack. Use insertion tool shipped with pump pinch valve kit to install.				

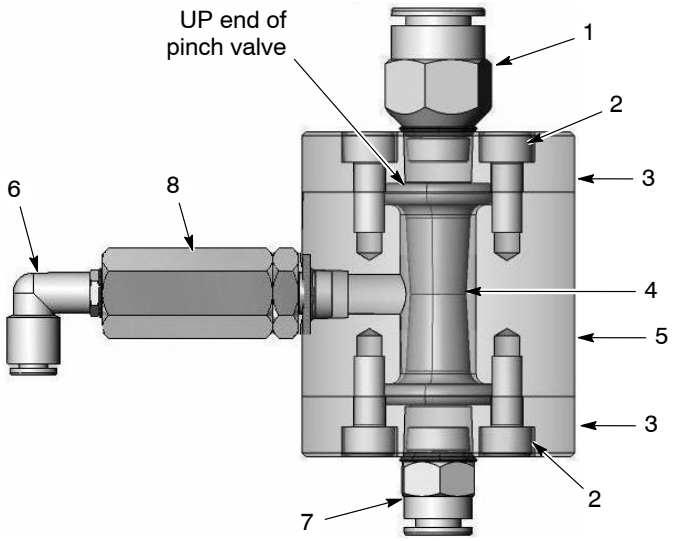


Figure 7-10 Dump Valve Parts

This page intentionally left blank.

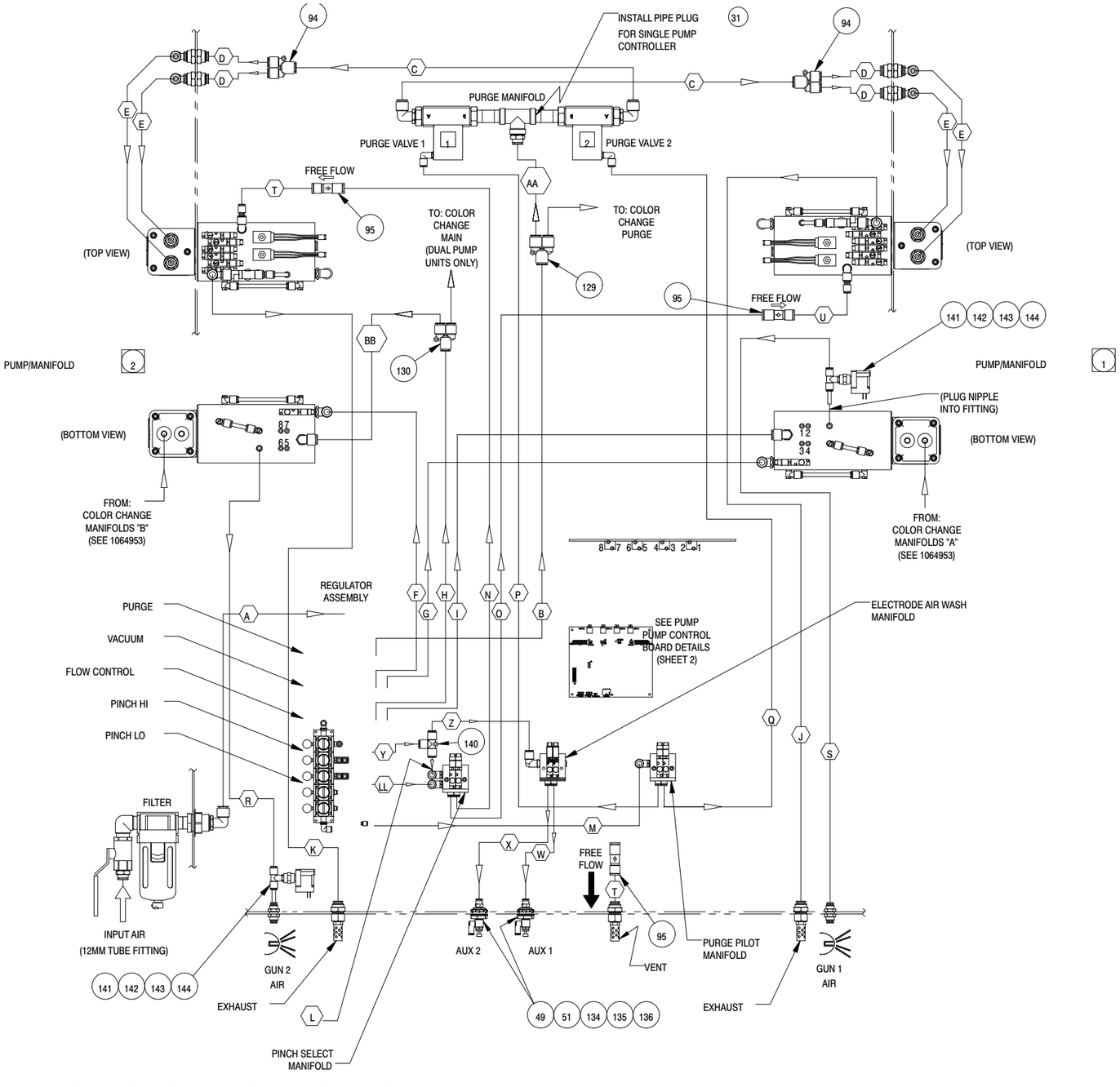
Section 8
System Diagrams

CONNECTIONS FOR PUMP CONTROL HARNESS

PIN NO.	WIRE COLOR	FUNCTION	PIN NO.	WIRE COLOR	FUNCTION
1	RED	SOLENOID COMMON (+24 VDC)	8	BLACK	DELIVERY PINCH VALVE, SOLENOID 6
2	RED	SOLENOID COMMON (+24 VDC)	9	BLACK	PRESSURE SOURCE, SOLENOID 5
3	RED	SOLENOID COMMON (+24 VDC)	10	BLACK	SUCTION PINCH VALVE, SOLENOID 4
4	RED	SOLENOID COMMON (+24 VDC)	11	BLACK	SUCTION PINCH VALVE, SOLENOID 3
5	RED	SOLENOID COMMON (+24 VDC)	12	BLACK	PRESSURE SOURCE, SOLENOID 2
6	RED	SOLENOID COMMON (+24 VDC)	13	BLACK	DELIVERY PINCH VALVE, SOLENOID 1
7	RED	SOLENOID COMMON (+24 VDC)	14	BLACK	VACUUM, SOLENOID 7

SW2				
	BIT 1	BIT 2	BIT 3	BIT 4	SETTING
DEFAULT	OPEN	OPEN	OPEN	CLOSED	MANUAL GUN
	OPEN	CLOSED	OPEN	CLOSED	COLOR ON DEMAND

Figure *8-6 Pump Control Panel Wiring Diagram*



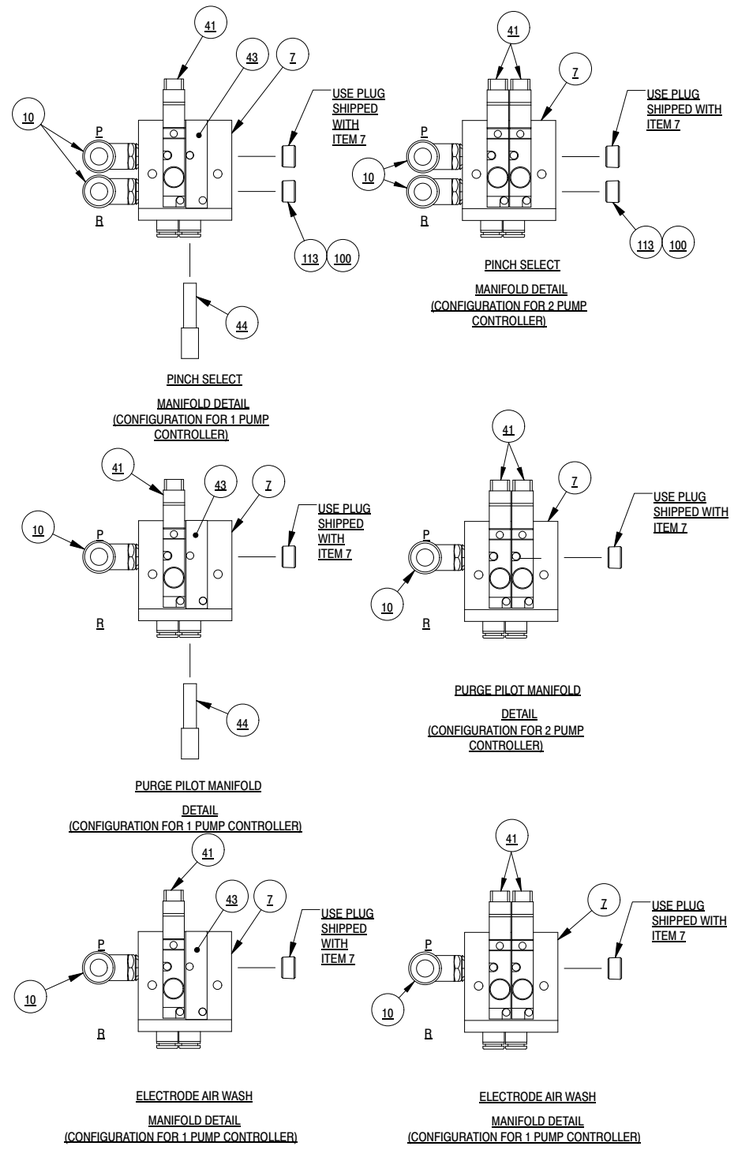
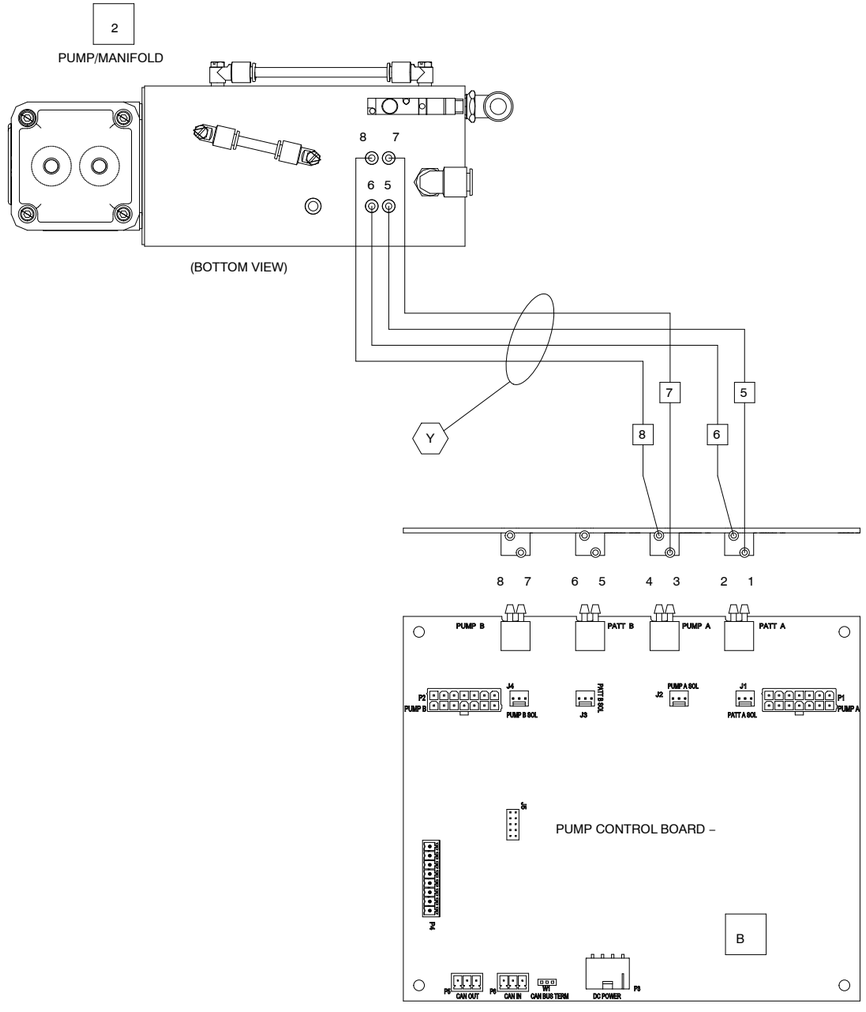
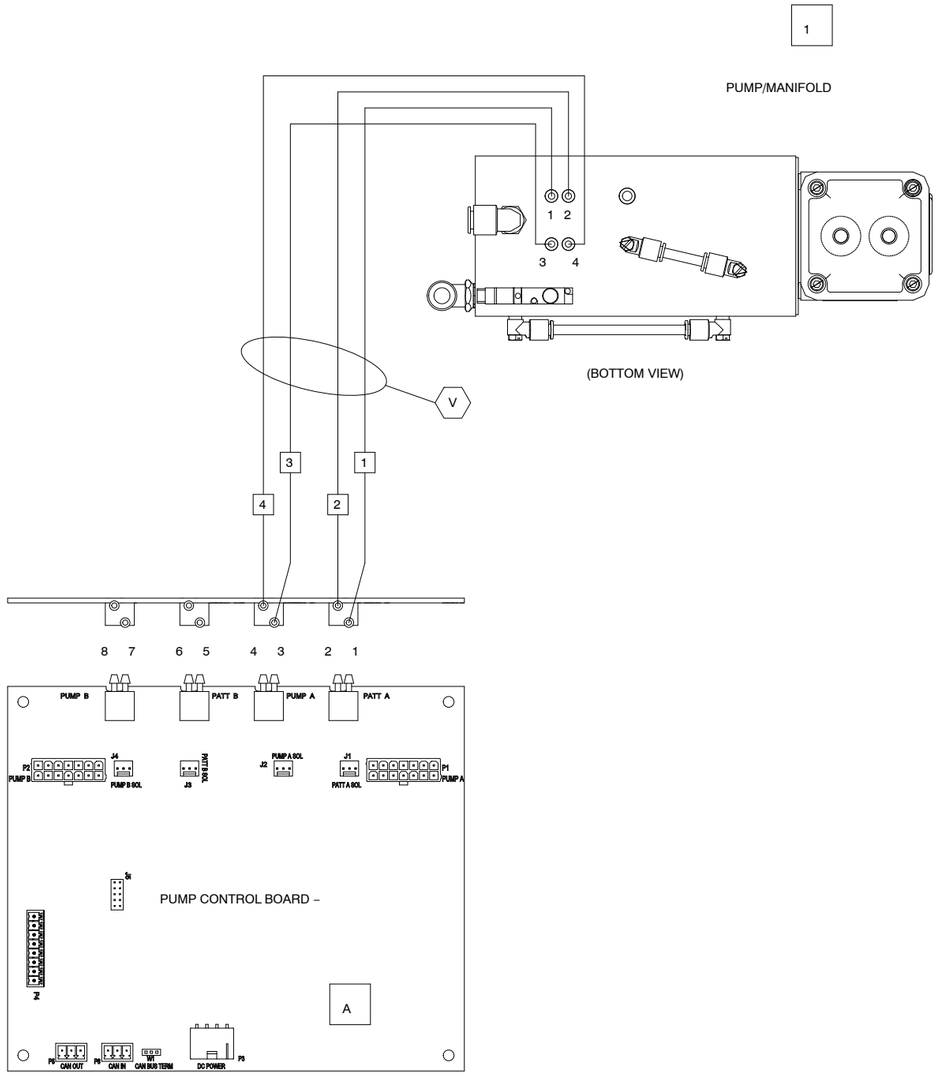


Figure *8-7 Pump Control Panel Pneumatic Diagram (Sheet 1 of 2)*



PUMP CONTROL

BOARD "B" DETAIL



PUMP CONTROL

BOARD "A" DETAIL

Figure *8-8 Pump Control Panel Pneumatic Diagram (Sheet 2 of 2)*

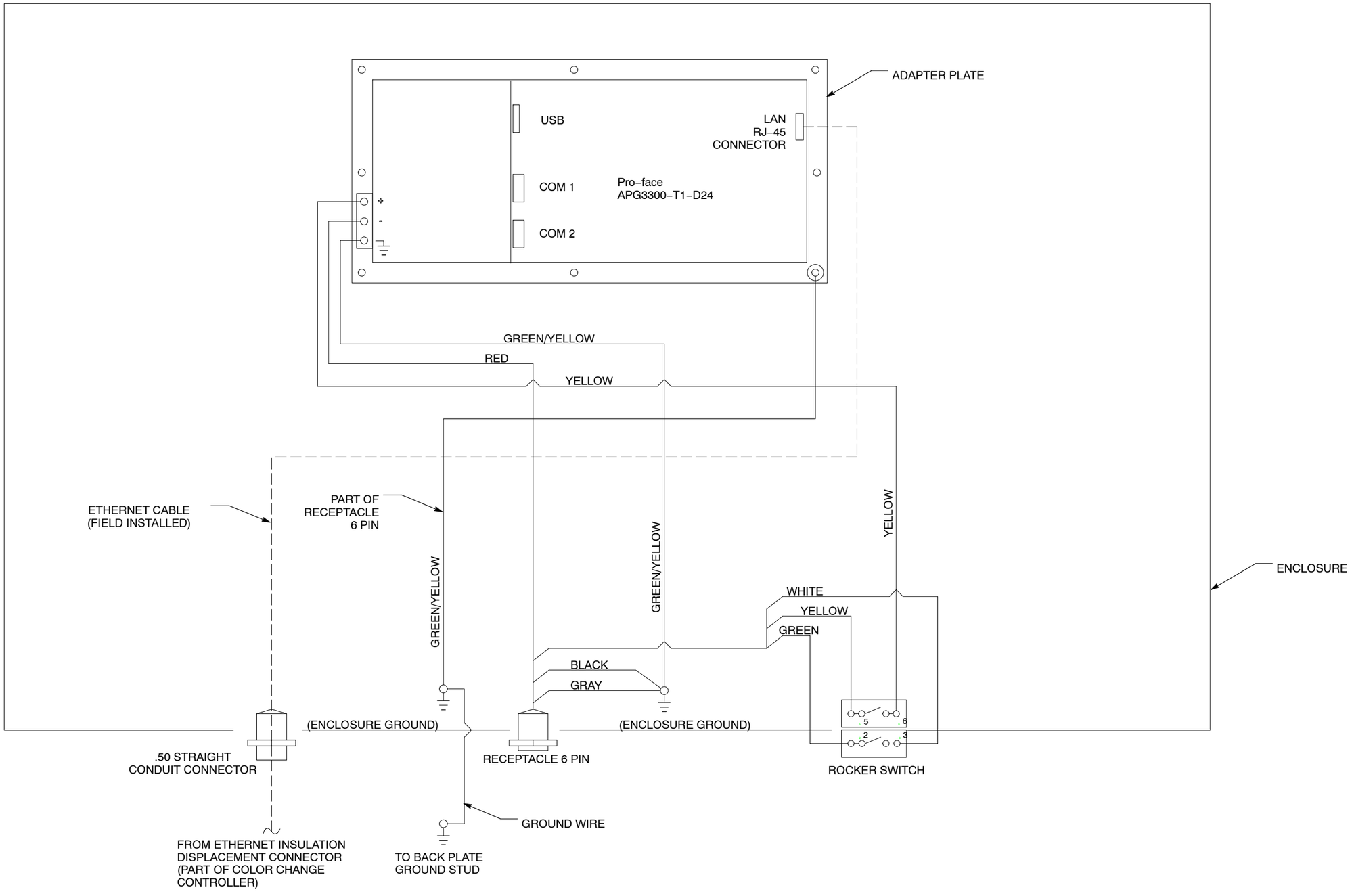


Figure *8-9 Color-on-Demand Controller Wiring Diagram*

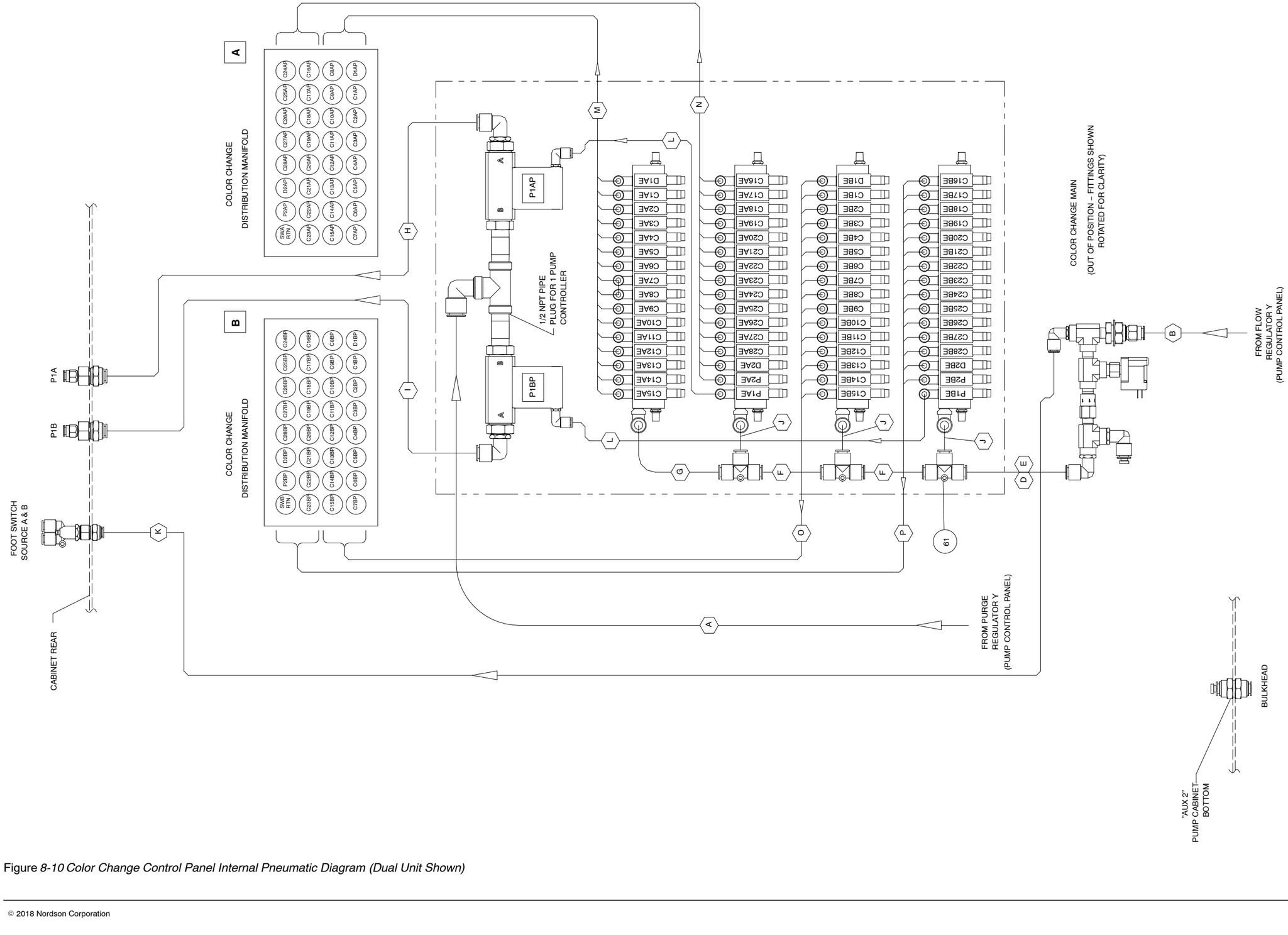


Figure *8-10 Color Change Control Panel Internal Pneumatic Diagram (Dual Unit Shown)*

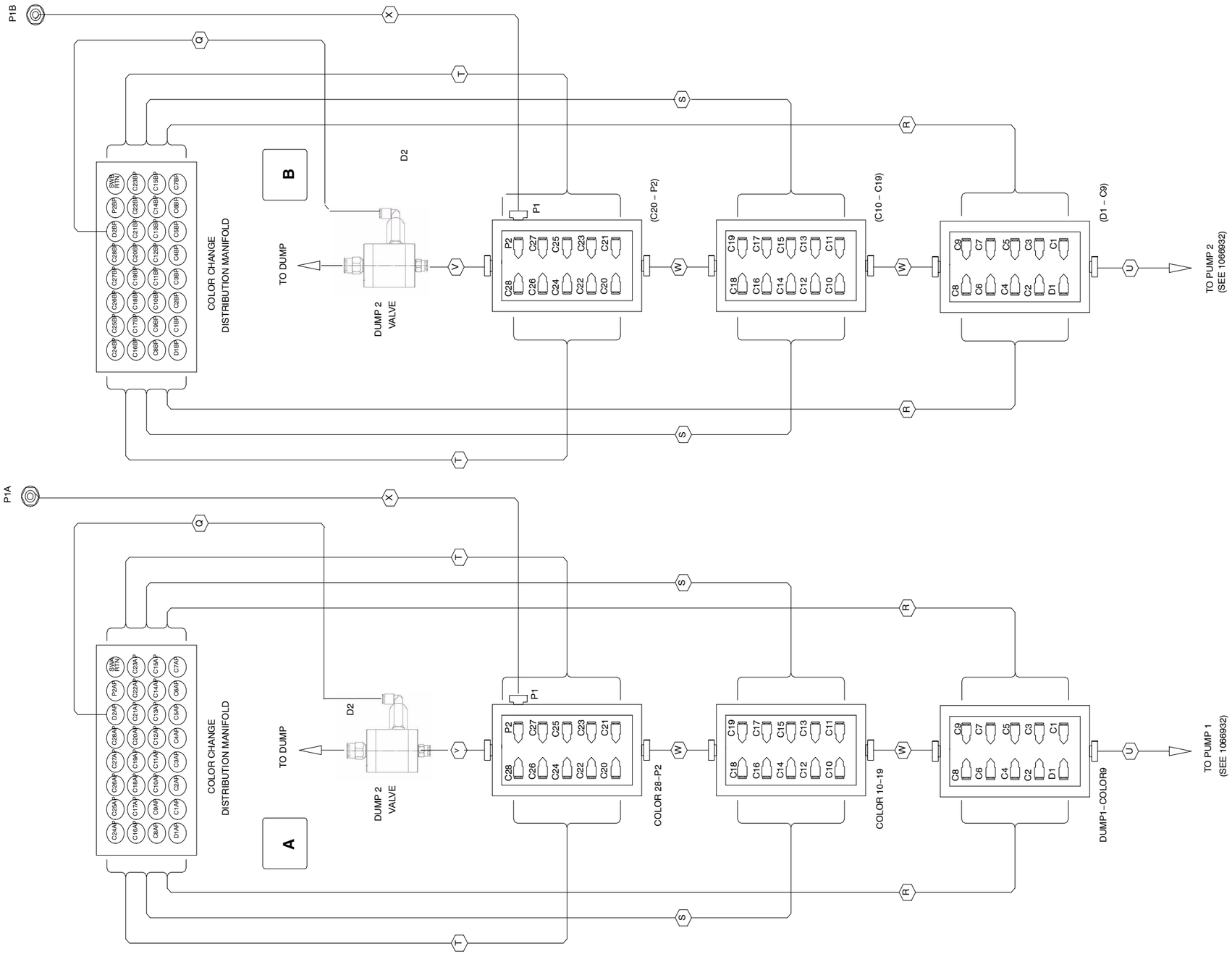


Figure *8-11 Color Change Control Panel External Pneumatic Diagram (Dual Unit Shown)*

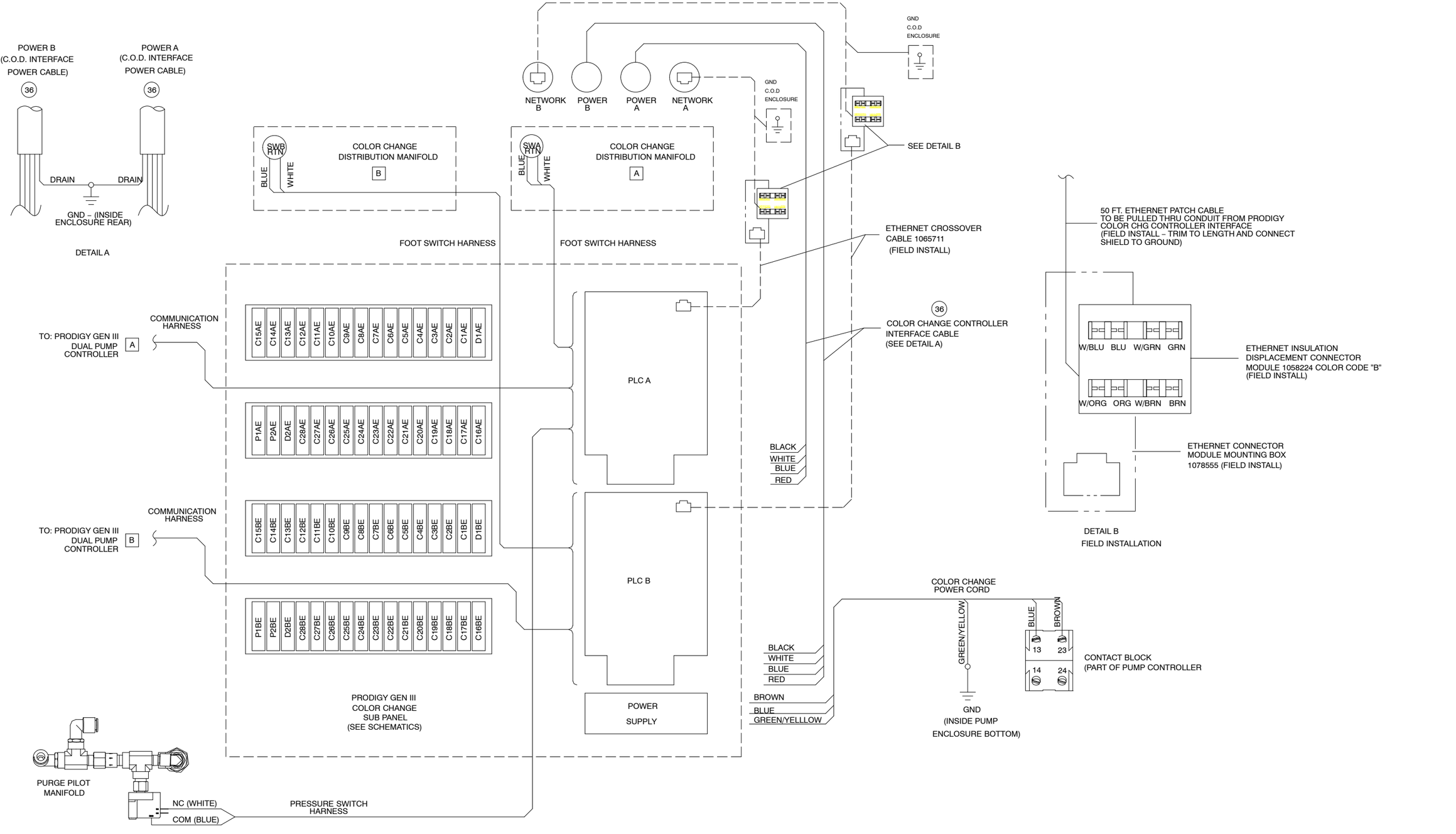


Figure *8-12 Color Change System Wiring Diagram (Dual Unit, Sheet 1 of 2)*

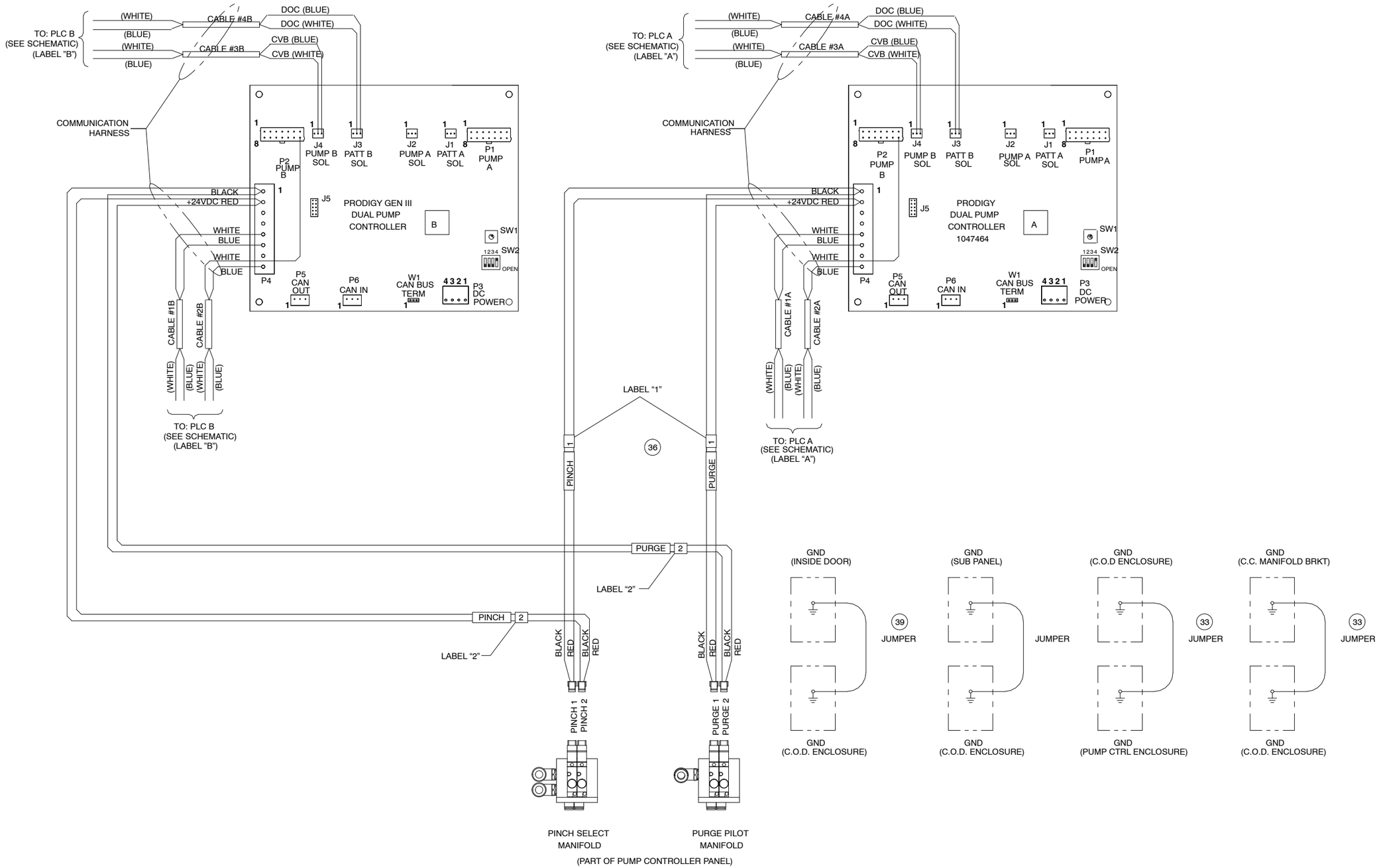


Figure *8-13 Color Change System Wiring Diagram (Dual Unit, Sheet 2 of 2)*

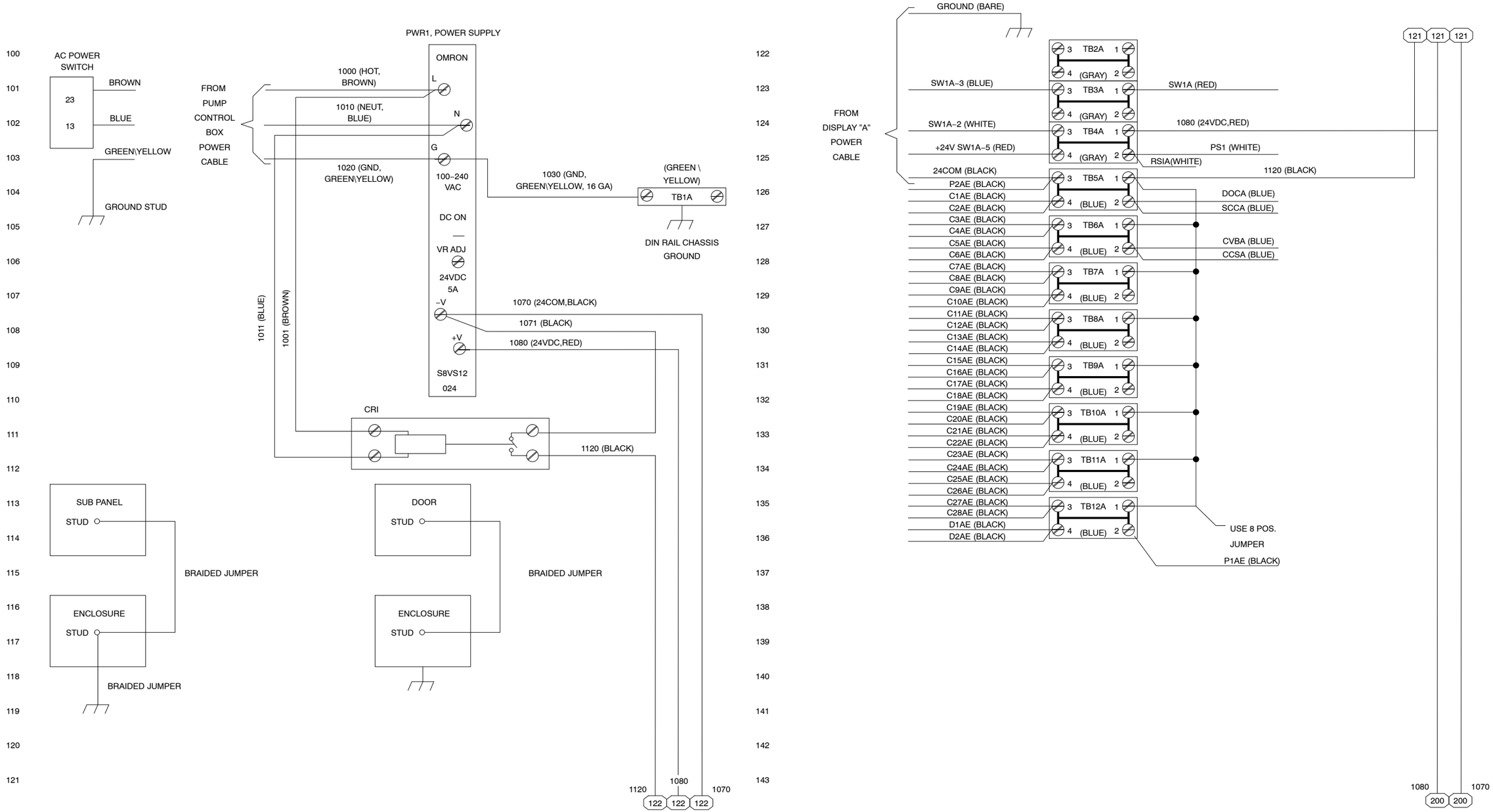
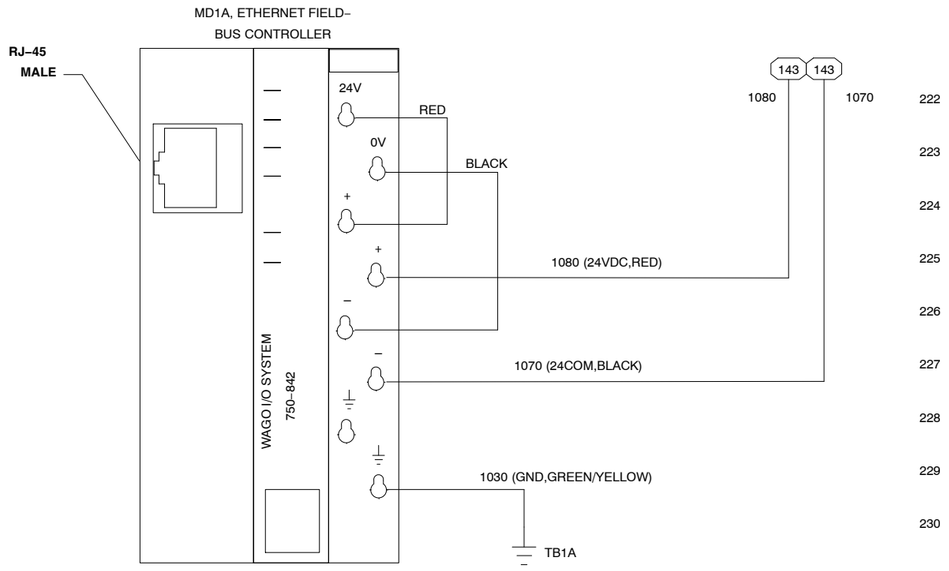
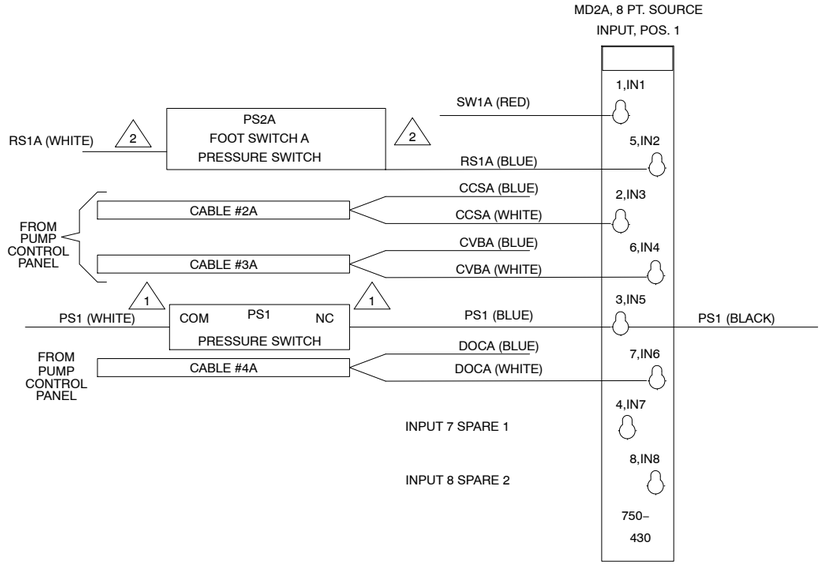


Figure *8-14 Color-on-Demand Control Panel Schematic (Dual Unit, Sheet 1 of 10)*





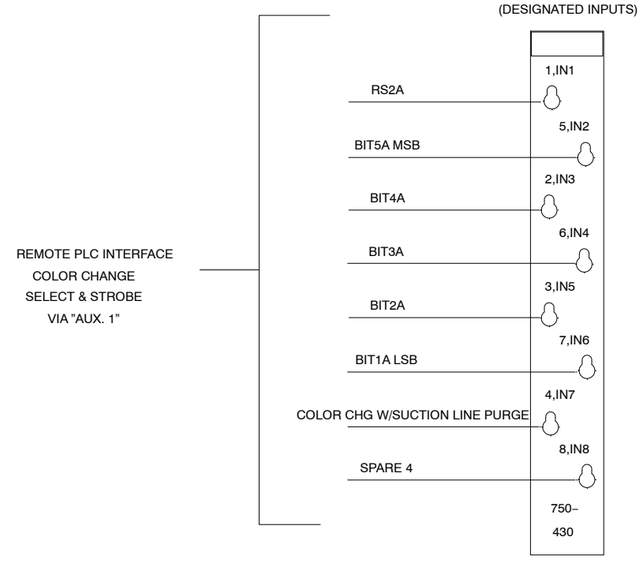
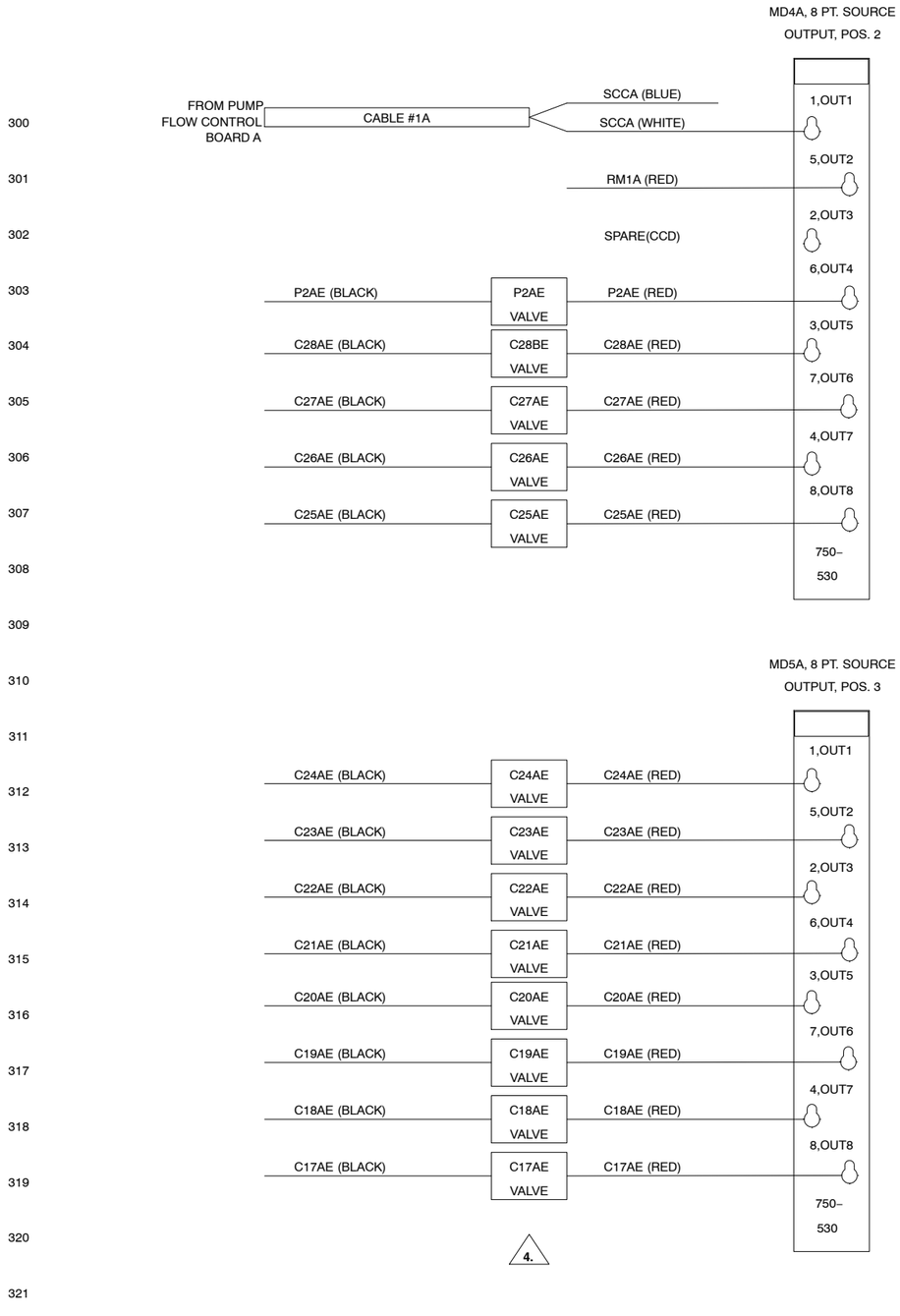


Figure *8-15 Color-on-Demand Control Panel Schematic (Dual Unit, Sheet 2 of 10)*



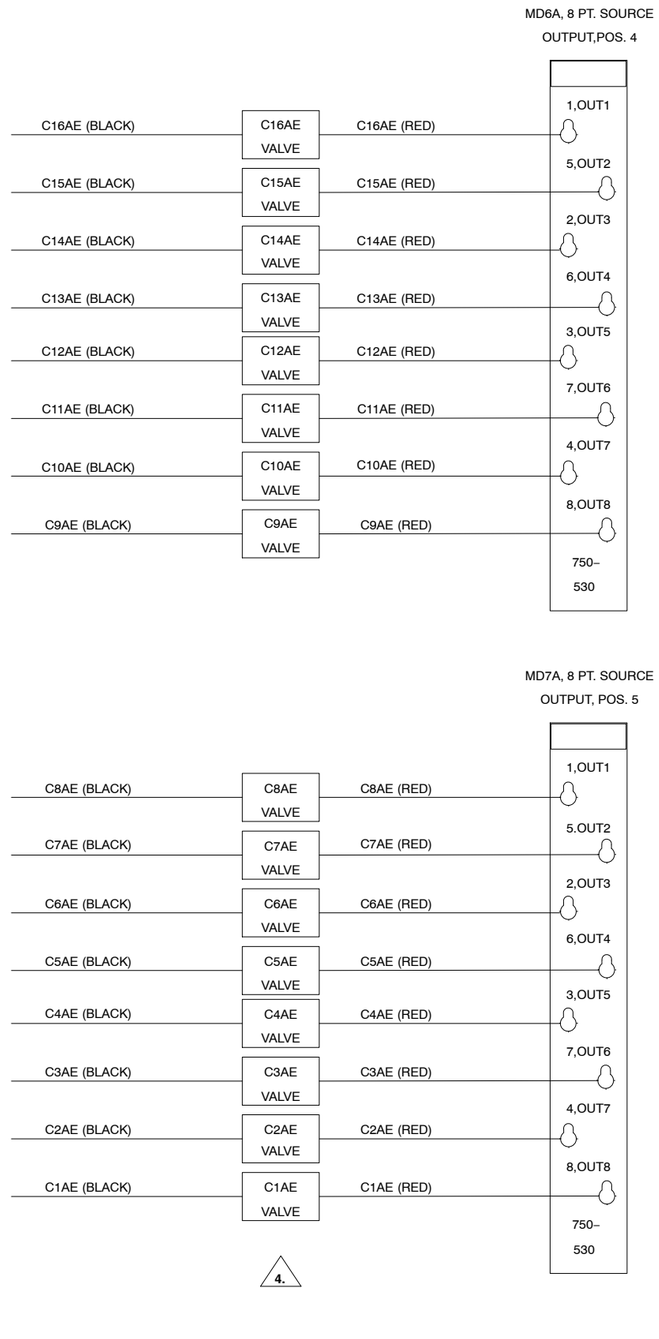
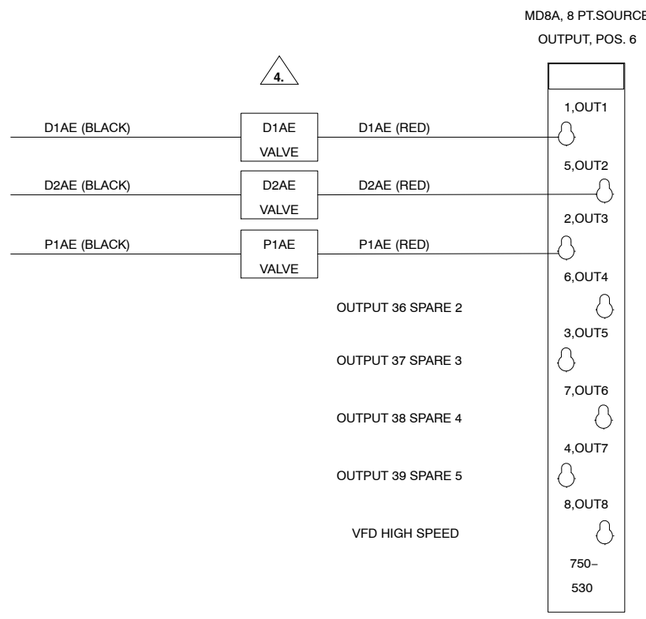


Figure *8-16 Color-on-Demand Control Panel Schematic (Dual Unit, Sheet 3 of 10)*



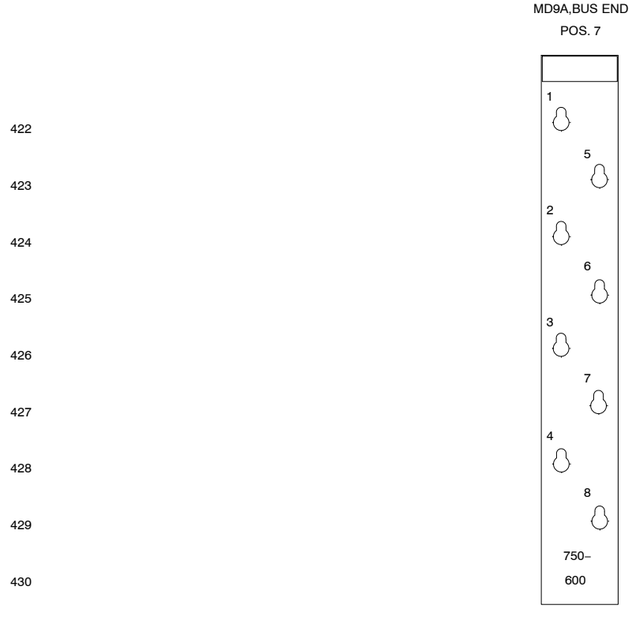


Figure *8-17 Color-on-Demand Control Panel Schematic (Dual Unit, Sheet 4 of 10)*

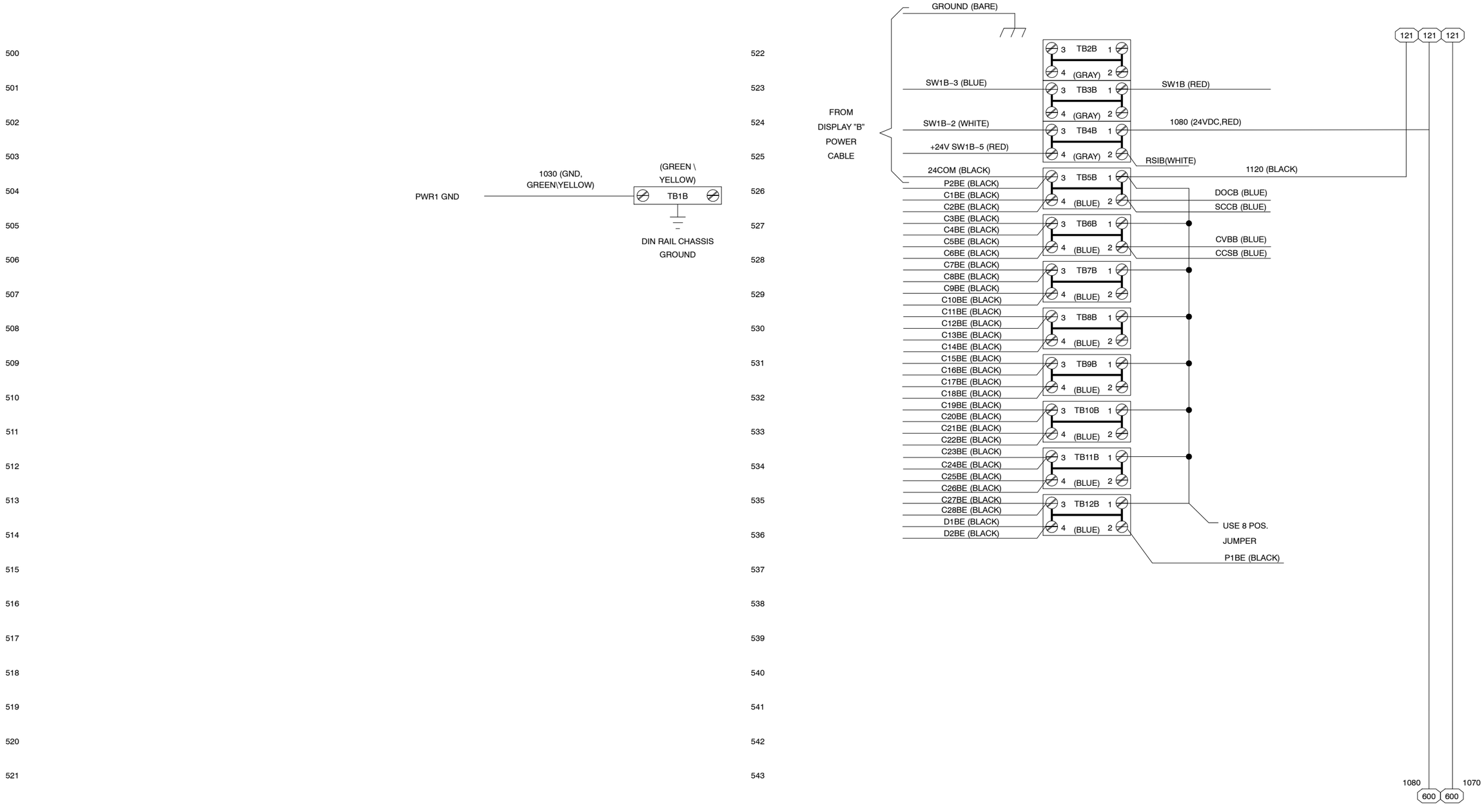


Figure *8-18 Color-on-Demand Control Panel Schematic (Dual Unit, Sheet 5 of 10)*

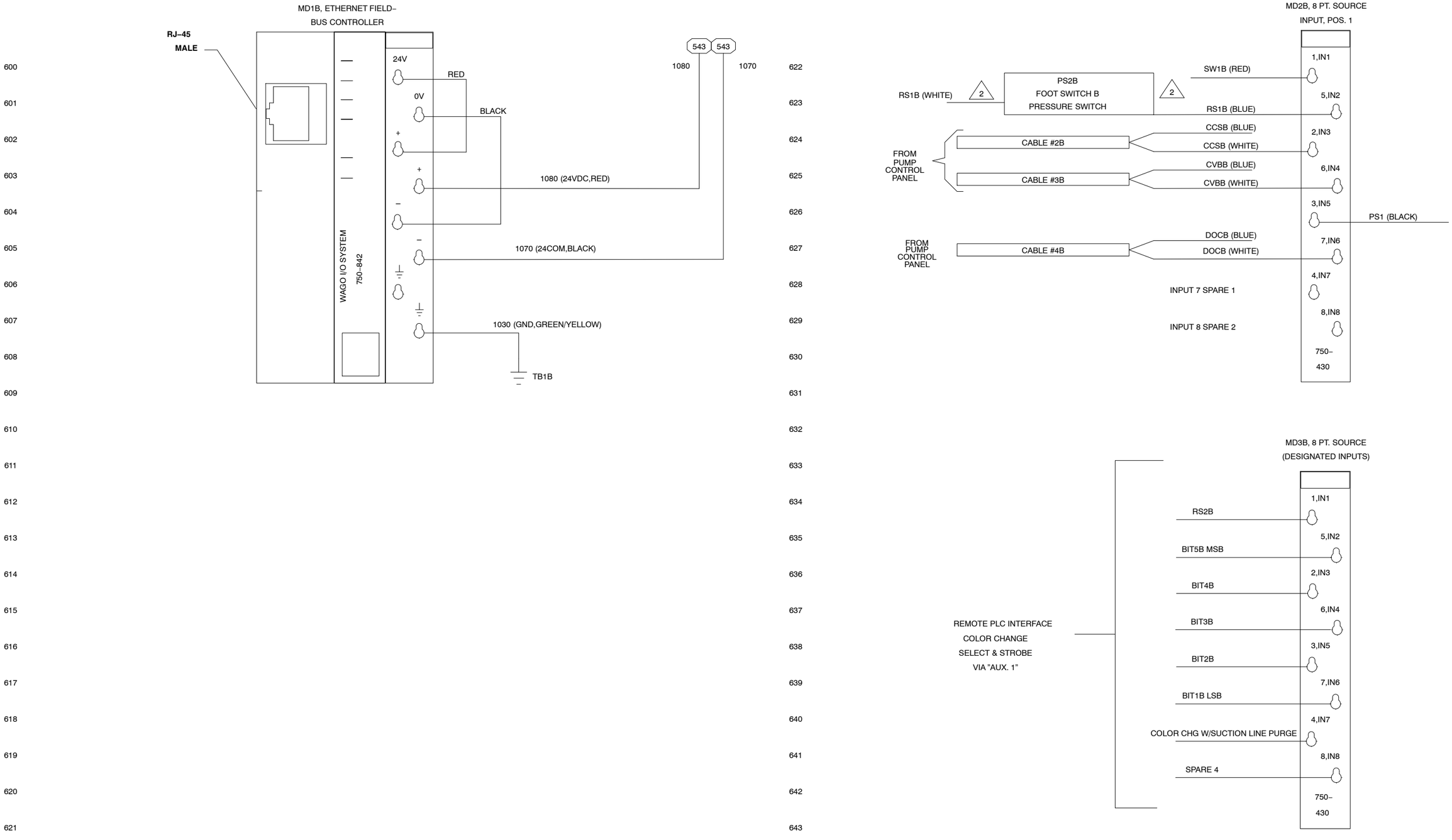
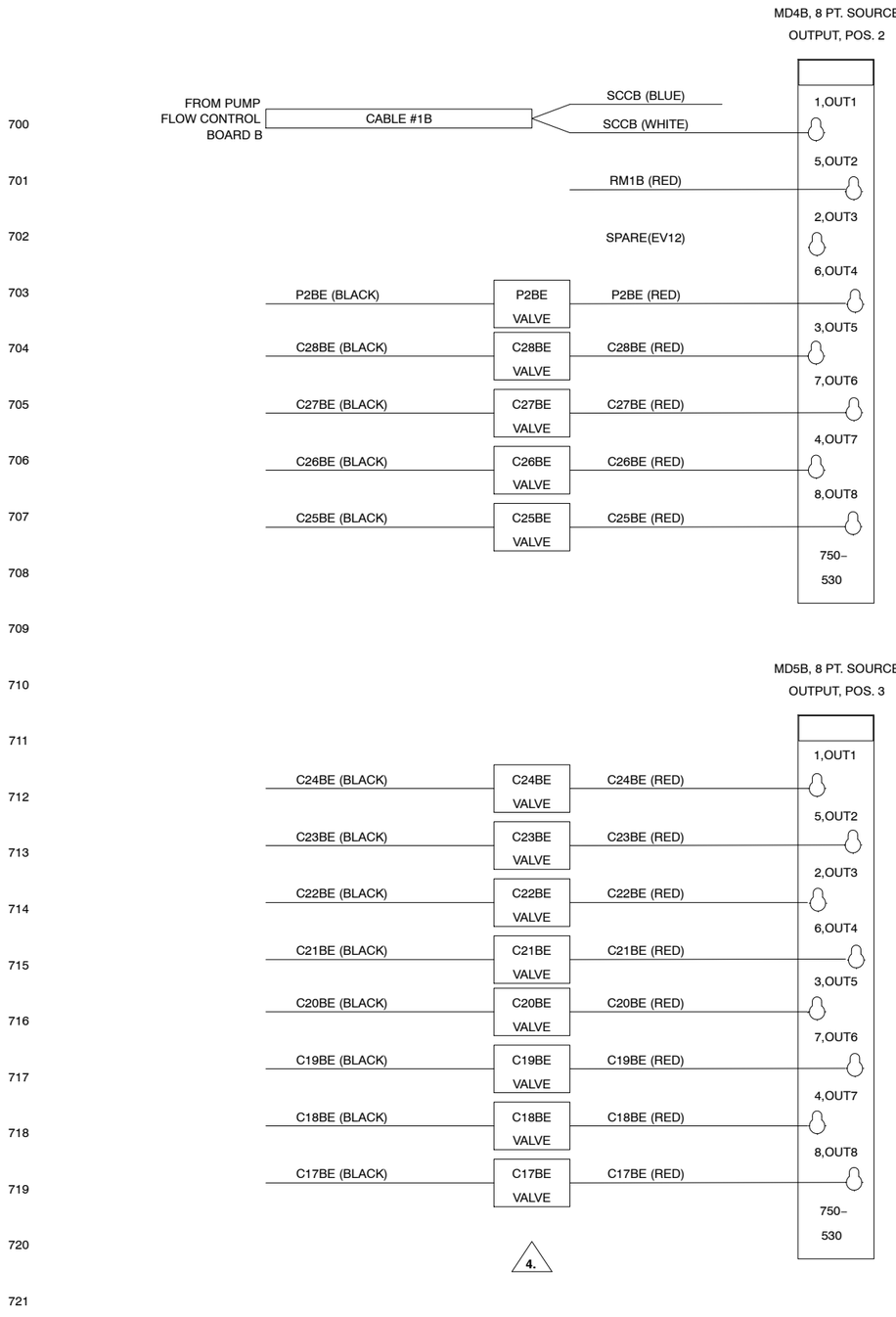


Figure *8-19 Color-on-Demand Control Panel Schematic (Dual Unit, Sheet 6 of 10)*



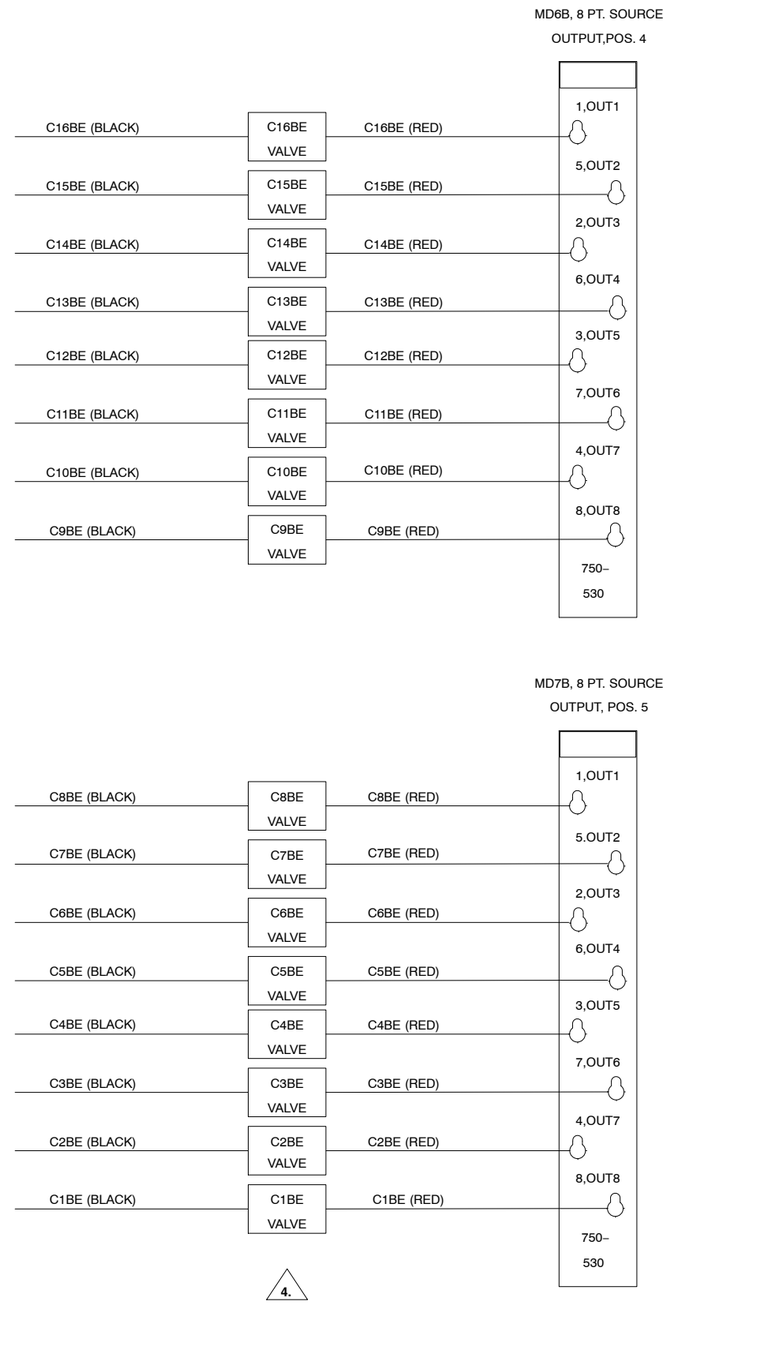
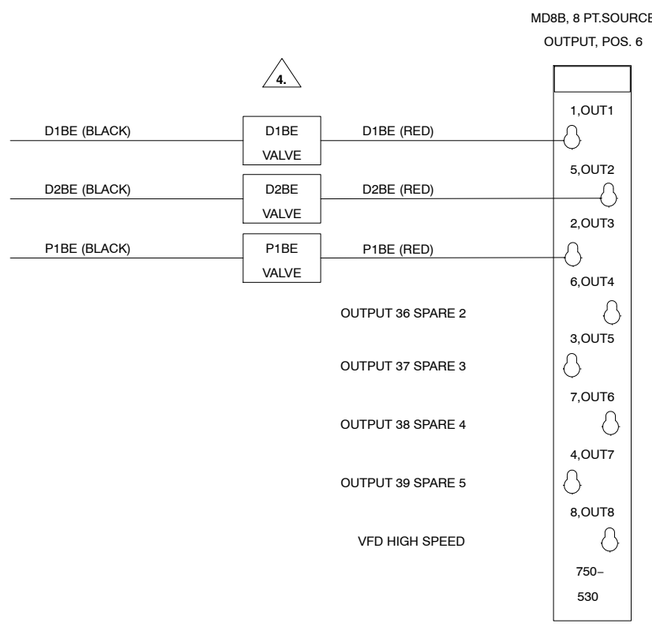


Figure *8-20 Color-on-Demand Control Panel Schematic (Dual Unit, Sheet 7 of 10)*



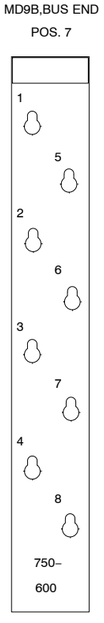


Figure *8-21 Color-on-Demand Control Panel Schematic (Dual Unit, Sheet 8 of 10)*

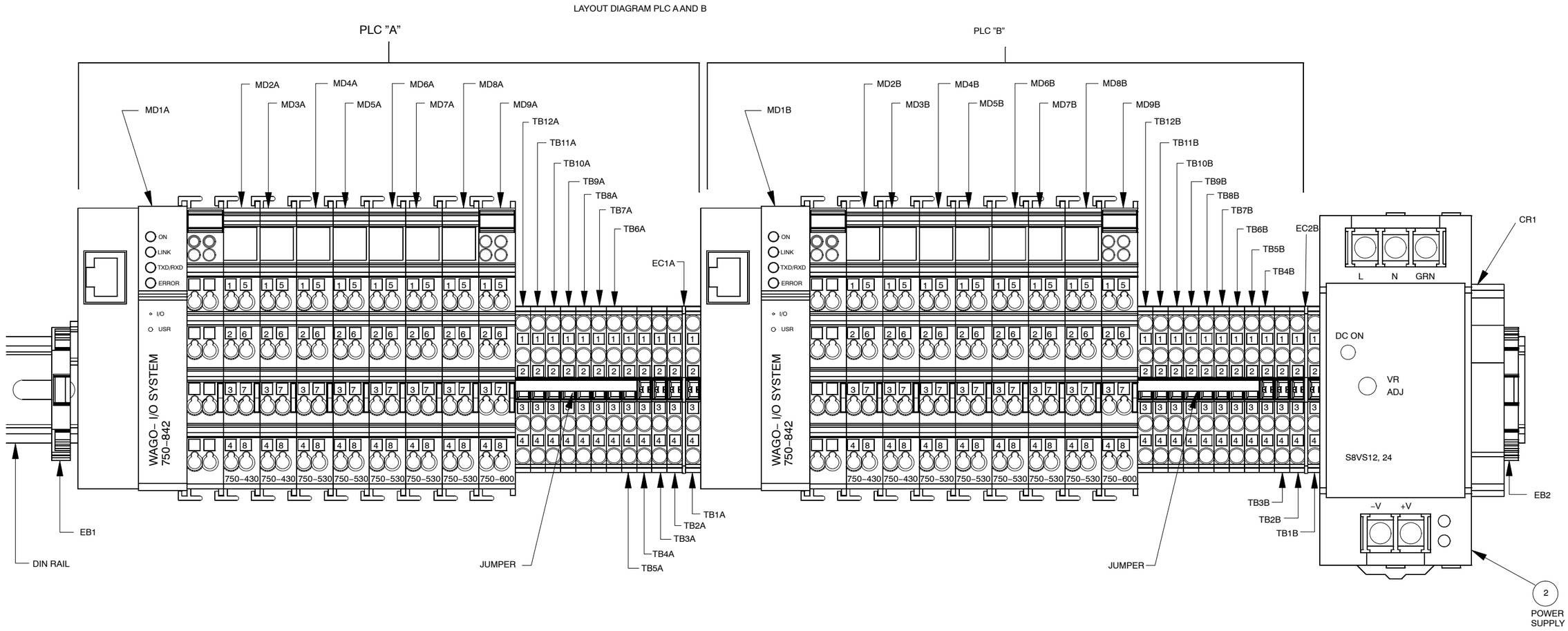


Figure *8-22 Color-on-Demand Control Panel Schematic (Dual Unit, Sheet 9 of 10)*

LAYOUT DIAGRAM PLC A AND B

COLOR–ON–DEMAND CONTROLS PLC LABELS

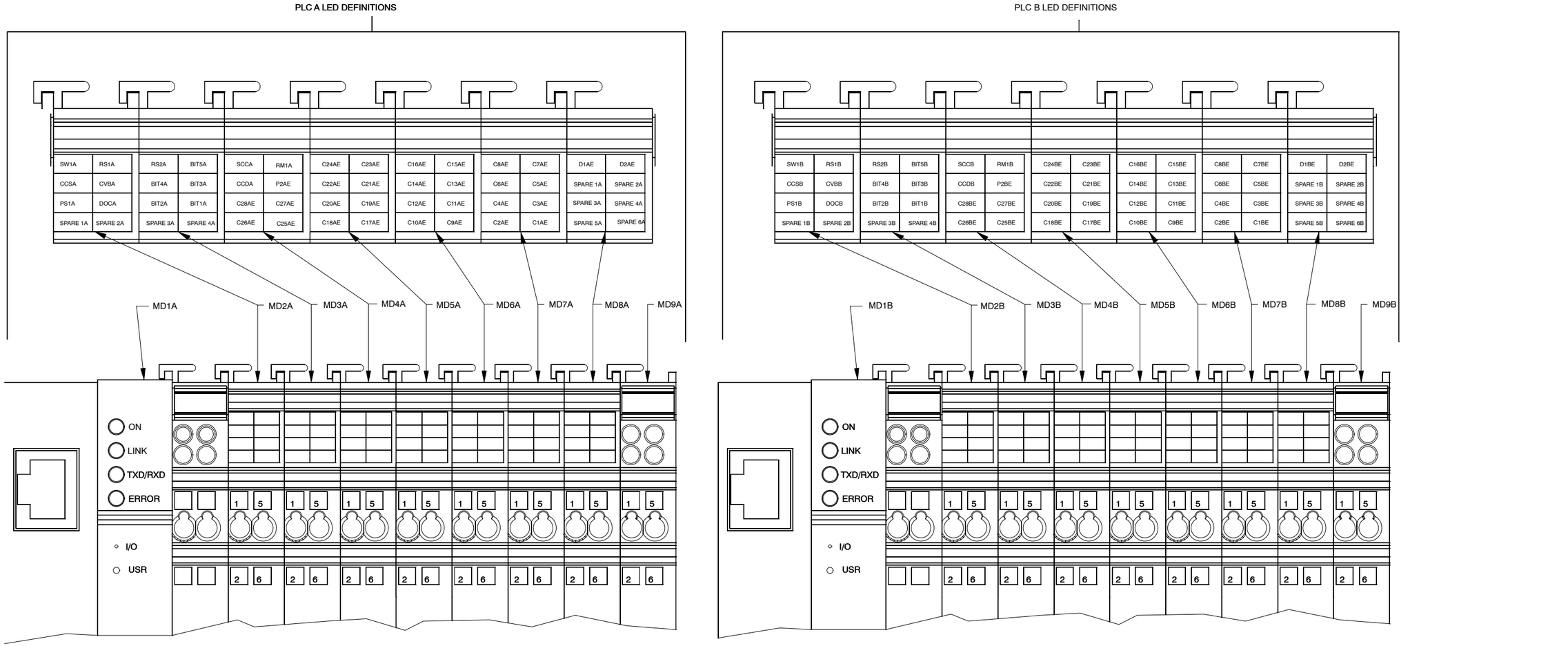


Figure *8-23 Color-on-Demand Control Panel Schematic (Dual Unit, Sheet 10 of 10)*

EU DECLARATION of Conformity

Product: Encore HD

Models: Color-on-Demand

Description: One or two manual spray gun powder pump system used for delivering powder to the spray gun with quick color change.

Applicable Directives:
2006/42/EC - Machinery Directive
2014/35/EU - Low-Voltage Directive
2014/30/EU - Electromagnetic Compatibility Directive

Standards Used for Compliance:

EN/ISO12100 (2011)	EN55011 (2009)	NFPA79 (2015)
EN60204 (2006)	EN61000-6-2 (2005)	
	EN61000-6-3 (2007)	

Principles:
This product has been manufactured according to good engineering practice.
The product specified conforms to the directive and standards described above.

Vance Wilson

Date: 24Jan2018

Vance Wilson
Engineering Manager
Industrial Coating Systems
Amherst, Ohio, USA

Nordson Authorized Representative in the EU
Contact: Operations Manager
Industrial Coating Systems
Nordson Deutschland GmbH
Heinrich-Hertz-StraBe 42-44
D-40699 Erkrath

Encore® HD and XT Manual Powder Spray System Controller

Customer Product Manual
Part 1604870-05
Issued 04/18

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

This document is subject to change without notice.
Check http://emanuals.nordson.com/finishing for the latest version and available local languages.

NORDSON CORPORATION • AMHERST, OHIO • USA

Contact Us

Nordson Corporation welcomes requests for information, comments, and inquiries about its products. General information about Nordson can be found on the Internet using the following address: http://www.nordson.com.

Address all correspondence to:

Nordson Corporation
Attn: Customer Service
555 Jackson Street
Amherst, OH 44001

Notice

Trademarks

Part 1604870-05

Change Record

Revision	Date	Change
01	01/14	New release
02	09/14	Re-zero procedure revised
03	01/15	New equipment labels
04	10/15	Revised illustrations and content
05	04/18	Revised some illustrations for new pump. Updated Certification Label.

Table of Contents

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 Safety Data Sheets (SDS) for all materials used. Follow the manufacturer's instructions for safe handling and use of materials, and use recommended personal protection devices.
- 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 SDS 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.

Section 2
Description

Introduction

See Figure 2-1. This manual covers the Encore® HD and XT manual powder spray system controller.

Figure 2-1 Encore HD/XT Manual Powder Spray System Controller

The system controller is used with the Encore HD with HDLV technology and the Encore XT with venturi technology. The Encore HD and XT controller may be used in the following systems:

- Encore HD and XT Wall Mount Systems
- Encore HD and XT Mobile Systems
- Encore HD and XT Rail Mount Systems
- Encore HD and XT Single and Dual Stand Alone
- Encore HD Color-on-Demand® Systems
- ColorMax® Powder Coating Systems
- Prodigy® to Encore Upgrade Systems

Specifications

Model: Encore HD and XT Interface Controller	
Input voltage rating	24 VDC, 2.75 A
Output voltage rating	+/– 19 VAC, 1A
Input air	6.0–7.6 bar (87–110 psi), <5µ particulates, dew point <10 °C (50 °F)
Maximum relative humidity	95% non-condensing
Ambient temperature rating	+15 to +40 °C (59–104 °F)
Hazardous location rating	Zone 22 or Class II, Division 2
Enclosure rating	IP6X, Dust ingress protection

Equipment Label

Controller Certification Label

1606122–02

Section 3
System Setup

Rail Mount Installation

See Figure 3-1. Use the hardware shipped with the mounting kit to mount the controller to the pump cabinet stand as described below. Tighten all hardware securely.

NOTE: Bracket can be oriented top to bottom or bottom to top. Pictured below is the most common system orientation (bottom to top).

1. Install the controller rail mount bracket (2) to the arm on the product stand (1).
2. Install the controller (4) to the universal mounting bracket (3).
3. Install the universal mounting bracket (3) to the controller rail mount bracket (2).

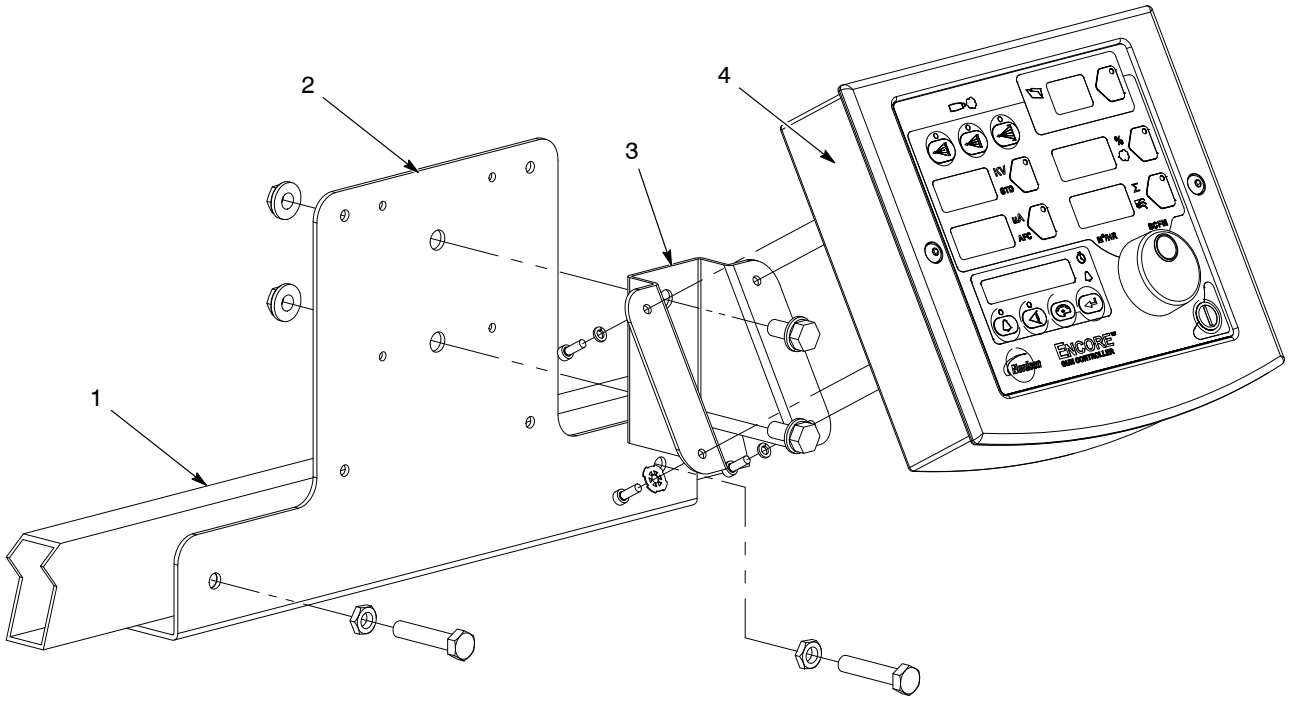


Figure 3-1 Controller Rail Mount Installation (Bottom to Top Orientation)

1. Product stand arm
2. Controller rail mount bracket
3. Universal mounting bracket
4. Encore HD controller

System Connections

System Diagram

WARNING: This diagram does not show system grounds. All conductive equipment in the spray area must be connected to a true earth ground. Use the grounding block supplied with the Nordson system.

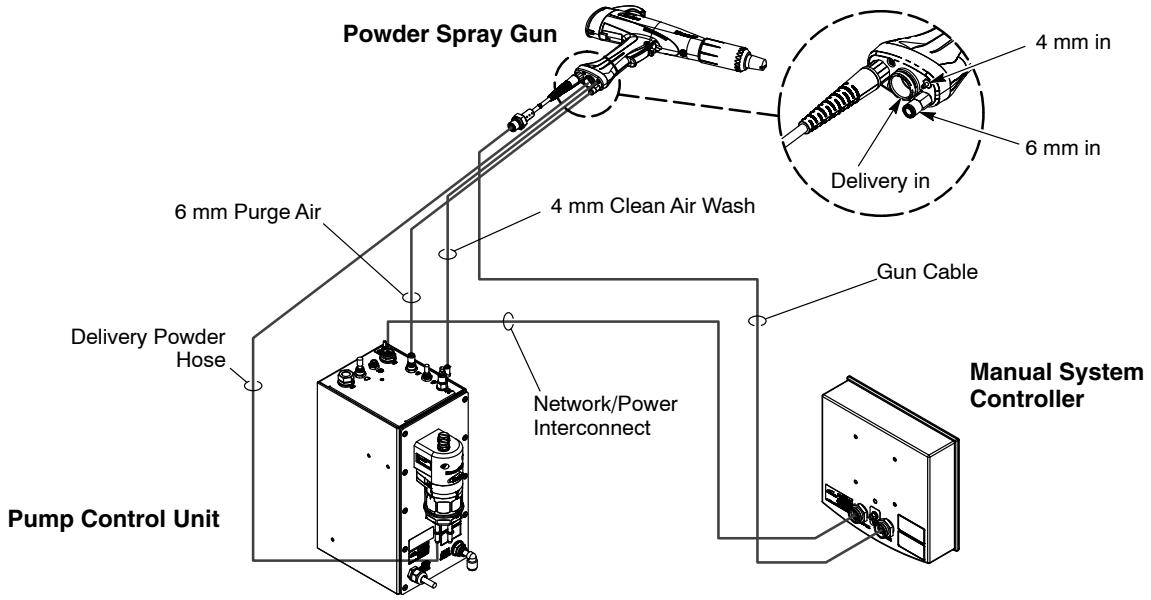


Figure 3-2 Typical HD System Diagram

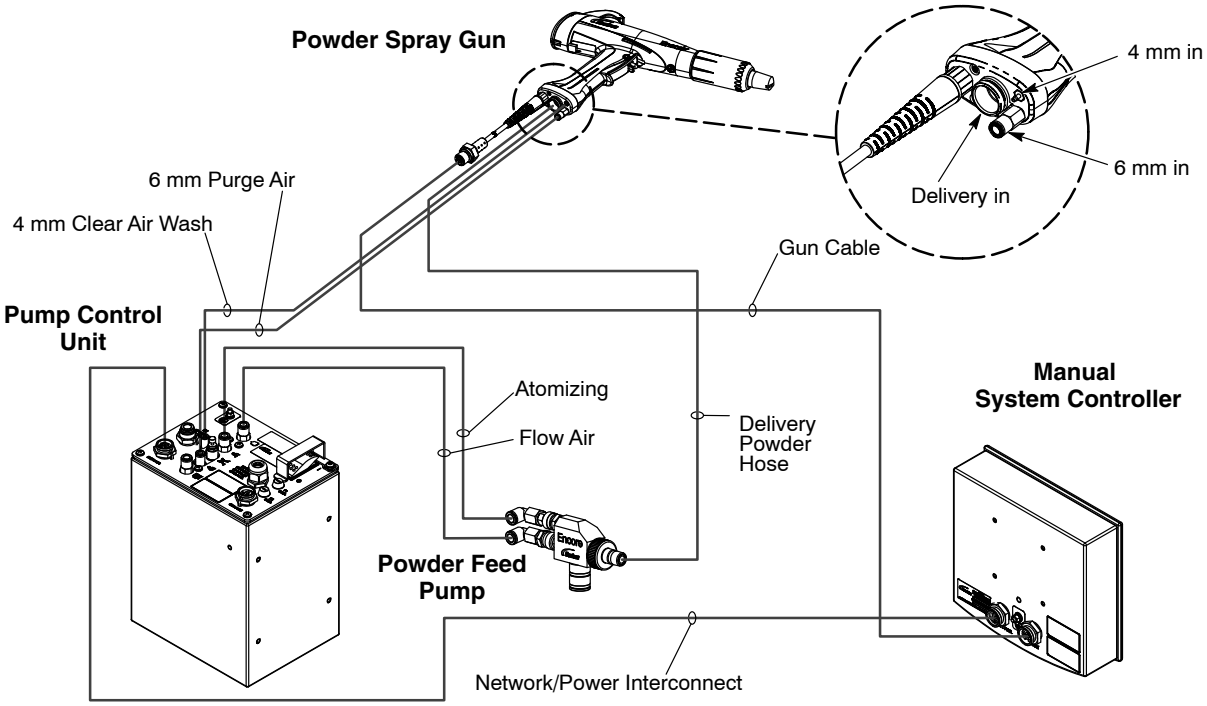


Figure 3-3 Typical XT System Diagram

Controller Connections

The system controller contains the displays and controls used to make controller function settings and spray settings.

See Figure 3-4. Use the network/power interconnect cable to connect the controller to the pump cabinet.

1. Securely attach the socket end of the interconnect cable to the NET/PWR plug (1) in the back of the controller.
2. Securely attach the pin ends of the interconnect cable to the NET/PWR 1 plug (2) in the top of the pump cabinet.
3. Repeat steps 1 and 2 to attach a second controller to the NET/PWR 2 plug at the top of the pump stand for a dual-gun system.

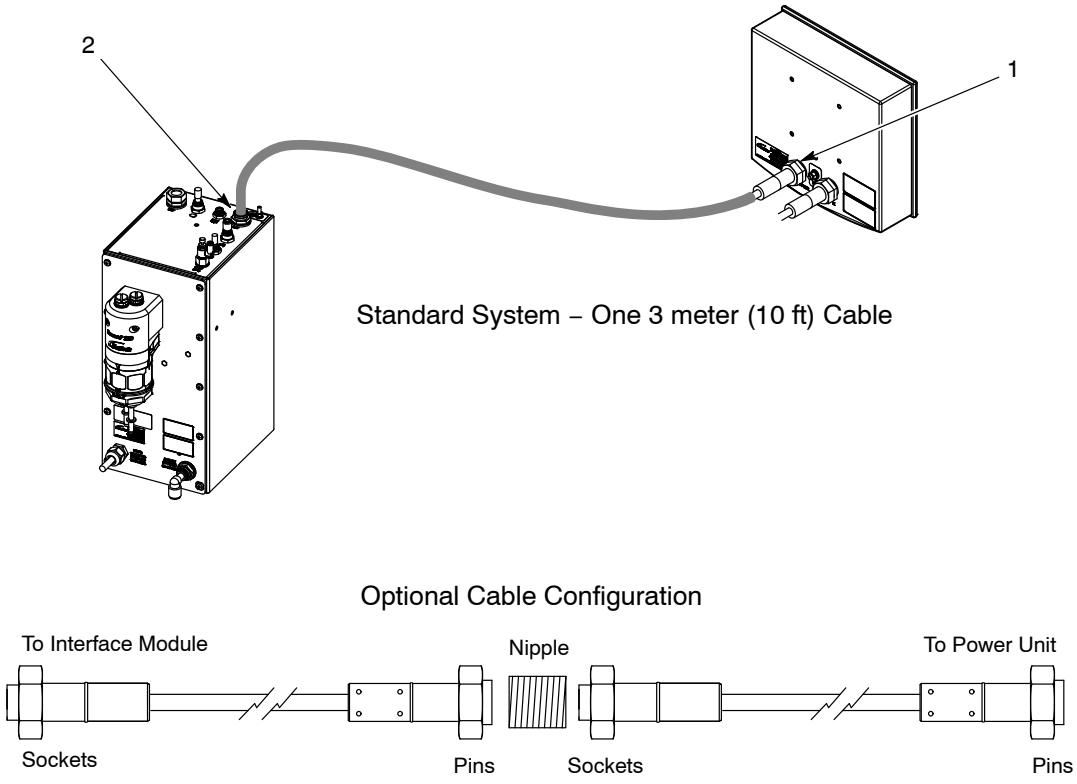


Figure 3-4 Encore Controller Interconnect Cable Connection

Section 4
Operation

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

WARNING: This equipment can be dangerous unless it is used in 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 XT manual applicator or the Encore HD manual applicator shall only be used with the Encore XT and HD interface controller and the Encore XT controller power unit or the Encore HD controller power unit over the ambient temperature range of +15 °C to +40 °C.
2. Equipment may only be used in areas of low impact risk.
3. Caution should be taken when cleaning plastic surfaces of the Encore controller and interface. There is a potential for static electricity build up on these components.

Daily Operation

WARNING: All conductive equipment in the spray area must be connected to a true earth ground. Failure to observe this warning may result in a severe shock.

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 4-20 to reference a list of the defaults and preset change instructions.

Initial Startup

With no parts in front of the gun and the fluidizing and flow rate set to 0%, trigger the gun and record the µA output. Monitor the µA output daily, under the same conditions. A significant increase in µA output indicates a probable short in the gun resistor. A significant decrease indicates a resistor or voltage multiplier requiring service.

Startup

Figure 4-1 System Controls – Mobile System Shown

The following controller functions must be set up before operation:

Table 4-1 Function Settings

Function Number	Function Name	Function Values	Default HDLV Mode
F00	Gun Type	00=Encore XT/HD, 02=Robot	00
F01	Fluidizing	00=Hopper, 01=Box, 02=Disable	02
F18	Pump Type	00=Venturi, 01=HDLV, 02=COD	00
F19	Control Type	00=Local, 01=External	00
F20	Gun Number	1–4	00

When power is activated at the pump cabinet, the controller is turned on.

Upon startup, the function/help display screen will quickly scroll through various function settings, displaying the following information:

Table 4-2 Startup Display

Screen Code		Description
EncorE	Encore	Controller Type
xct	XT	Controller Type
HdLV Venturi CoD	HDLV or Venturi or COD	System Type
Loc Ext	Loc or Ext	Local or External Control
Gun-1	Gun – 1, – 2, …	Gun Number, 1 – 4
GC-0.00	GC – X.XX	Gun Controller, Software Version
Gd-0.00	Gd – X.XX	Gun Display Module, Software Version
FL-0.00	FL – X.XX	Flow Module, Software Version

Select the desired preset and start production. Refer to *Presets* on page 4-5 for preset programming instructions.

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

Standby Button

Use the **Standby** button shown in Figure 4-1 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 controller power, use the power switch on the pump control unit.

Factory Set Presets

Presets are programmed electrostatic and powder flow setpoints for a particular part or application. Up to 20 presets can be programmed.

The system is shipped with presets 1–3 already programmed. See Table 4-3 and 4-4 for default preset values for the both the HD and XT systems. Refer to *Presets* on page 4-5 for programming instructions.

Table 4-3 HD System Factory Set Presets

Preset	Electrostatics, Powder Flow	kV	µA	%	≈
1	Max kV, 150 g/min (20 lb/hr)	100	30	35	0.7
2	Max kV, 300 g/min (40 lb/hr)	100	30	80	1.0
3	Select Charge 3 (deep recess), 150 g/min (20 lb/hr)	100*	60*	35	0.7
* Select Charge Mode settings are factory set and cannot be changed.					

Table 4-4 XT System Factory Set Presets

Preset	Electrostatics, Powder Flow	kV	µA	%	∑
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.					

Using the Controller Interface

Interface Components

Use the controller interface to make preset settings, view help codes, monitor system operation, and configure the controller. See Figure 4-2.

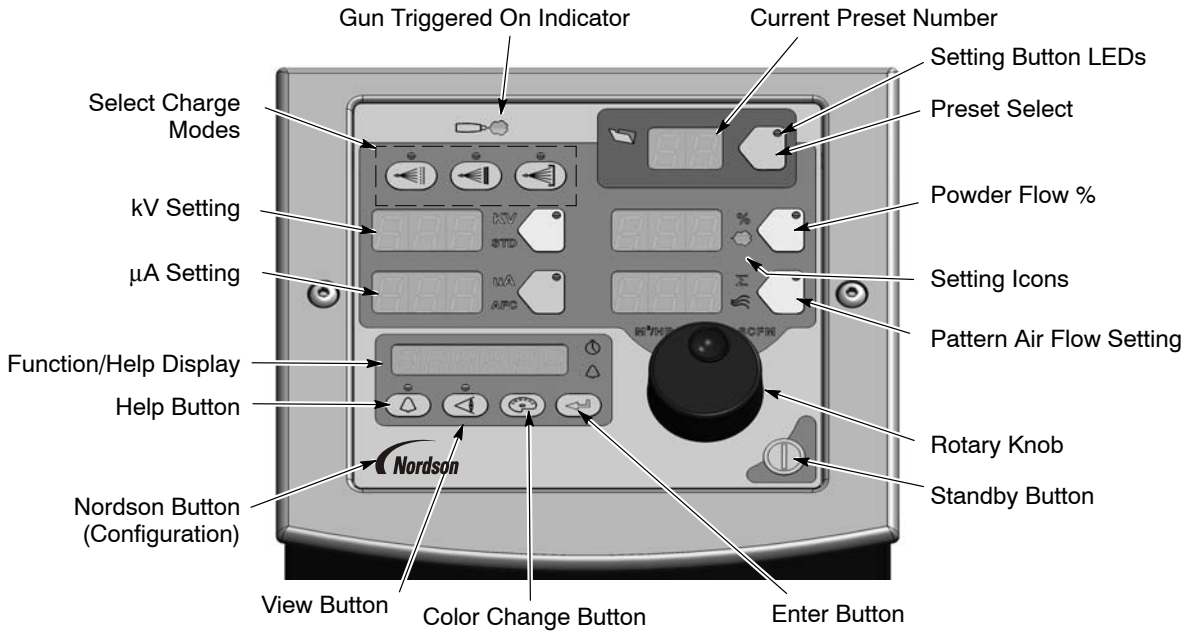


Figure 4-2 Controller Interface

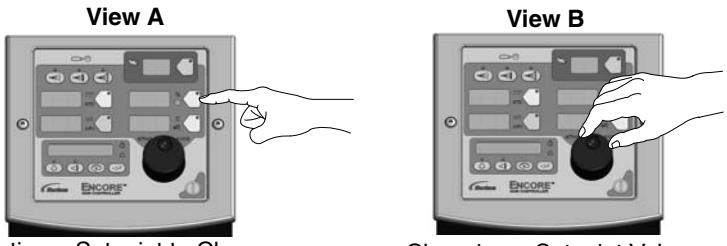
Changing a Factory Configured Preset or Setpoint Value

See Figure 4-3.

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

The **Setpoint** icons will light to indicate the factory configured or operator selected setpoint values, allowing adjustments to be made to the following flow settings: **Select Charge Mode, kV, µA, Powder Flow %,** and **Pattern Air**.

Refer to View B. 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 Setpoint Value

Figure 4-3 Selecting and Changing Setpoint Values

Presets

See Figure 4-4. The preset select button allows the operator to quickly change spray settings simply by changing the preset number. The operator can program the electrostatic and powder flow setpoints depending on the part being sprayed.

The controller can store 20 presets. Presets 1, 2, and 3 are programmed at the factory for the most common applications. Presets 4–20 can be programmed as needed. Refer to page 4-4 for the factory configured preset setpoint values.

Programming or Changing a Preset

1. Press the **Preset** button. The button LED lights.
2. Turn the **Rotary Knob**. The preset number increases from 1 to 20 then resets to 1.
3. With the desired preset selected, begin production. All preset electrostatic and powder flow values will be used.
4. To change a preset value, first choose the desired preset by using the **Rotary Knob**. Once the preset is selected, change the electrostatic and powder flow settings to the desired values.

5. The preset number will begin blinking, indicating a change has been made. **Save immediately** by pressing **Enter**. The preset number will only blink for a 5 second window. If the changes are not saved within this time frame, the change will only be temporary and the preset will switch back to the previous setting.
6. To begin production without saving the new settings, do not press **Enter**. The new values will be used for the current job, but the preset will keep original values for future use.

The setpoints for the selected preset are displayed when the gun is not triggered.

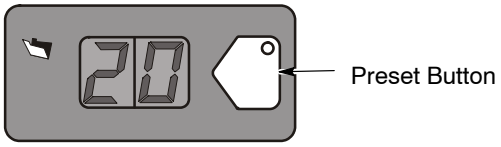


Figure 4-4 Preset Select

Electrostatic Settings

Electrostatic output can be set to Select Charge® mode (preconfigured), Custom mode, or Classic mode. Refer to the *Controller Configuration* section on page 4-20 to program Custom or Classic mode using the F03 function.

Select Charge® Mode

Select Charge mode provides 3 preconfigured electrostatic settings for common paint applications. The LEDs above the Select Charge mode buttons indicate the selected mode.

The Select Charge Modes and factory settings are:

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

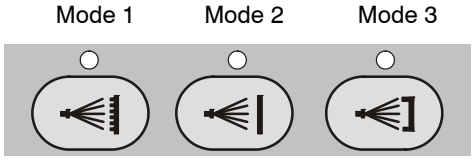


Figure 4-5 Select Charge Mode

NOTE: If the operator tries to adjust kV or µA 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. Custom mode allows the operator to adjust both kV and µA independently. STD and AFC icons are not displayed in Custom mode.

NOTE: Refer to *Controller Configuration* on page 4-20 for a list of the mode defaults and configuration instructions.

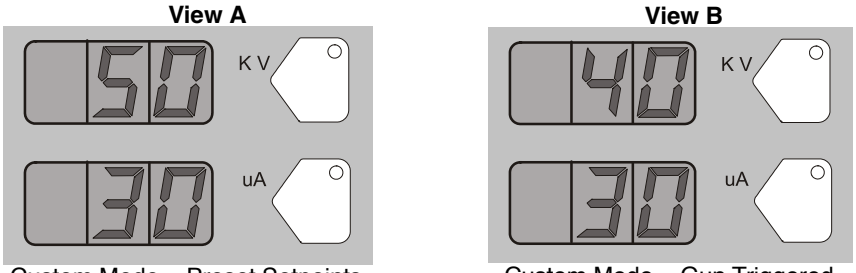
1. To set or adjust kV, press the **kV** button. The button LED lights to show that kV is selected.
2. Turn the **Rotary Knob** to increase or decrease the kV setpoint. The setpoint is automatically saved if it does not change for 3 seconds, or when any button is pressed.
3. To set or change the µA setpoint, press the **µA** button. The button LED lights to indicate that µA is selected.
4. 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 using function code F12 for the lower range and F13 for the upper range. Refer to *Controller Configuration* section on page 4-20.

Electrostatic Display:

Refer to View A. When the gun is not triggered the kV and µA setpoints are displayed.

Refer to View B. When the gun is triggered the actual kV and µA outputs are displayed.



Custom Mode – Preset Setpoints

Custom Mode – Gun Triggered

Figure 4-6 Custom Mode – Electrostatic Displays

Encore Nano Feedback Control Mode (NFC)

To configure the controller for the NFC function, set the Electrostatic Control (F03) to the Custom mode (Custom= 00).

Use the NFC mode to adjust and set both kV and µA in lower value range.

See Function Settings on *Controller Configuration* section on page 4-20.

µA NFC Range and Settings

NFC mode allows the user to adjust the µA setting in increments of 0.1 µA below the value of 10.0 µA.

For example, the user can set the µA settings from 12, 11, 10, 9.9, 9.8, 9.7, ….. through 0.1.

kV NFC Range and Settings

NFC mode allows the user to adjust the kV setting in increments of 1 kV below the value of 25 kV.

For example, the user can set the kV settings from 25, 24, 23, 22, ….. through 0.

Classic Mode

Classic Mode allows you to control kV (STD) output or µA (AFC) output, but not both at the same time.

NOTE: To use Classic mode, the controller must be configured under function setting F03. Refer to *Controller Configuration* on page 4-20.

Adjust kV: Classic Mode: Standard (STD)

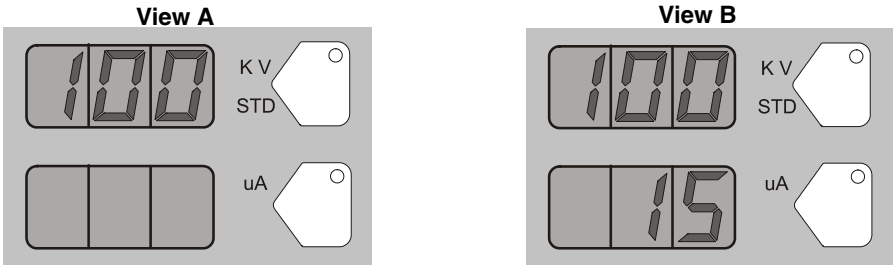
NOTE: Use the Classic Standard mode to adjust and set kV. µA cannot be adjusted in standard mode.

1. To adjust 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 automatically saves in 3 seconds or when any button is pressed.

Electrostatic Display:

Refer to View A. When the gun is not triggered the kV setpoint is displayed.

Refer to View B. When the gun is triggered the actual kV and µA outputs are displayed.



Gun Not Triggered
kV Setpoint Displays

Gun Triggered
Actual kV & µA Output Displays

Figure 4-7 STD Mode – Electrostatic Displays

Adjust µA: Classic Mode: AFC

NOTE: Use the AFC mode to adjust and set µA output limits. kV cannot be adjusted in AFC mode. kV setting is automatically set to 100 kV.

1. To adjust µA, 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 4-20.

Electrostatic Display:

Refer to View A. When the gun is not triggered the µA setpoint is displayed.

Refer to View B. When the gun is triggered the actual kV and µA outputs are displayed.

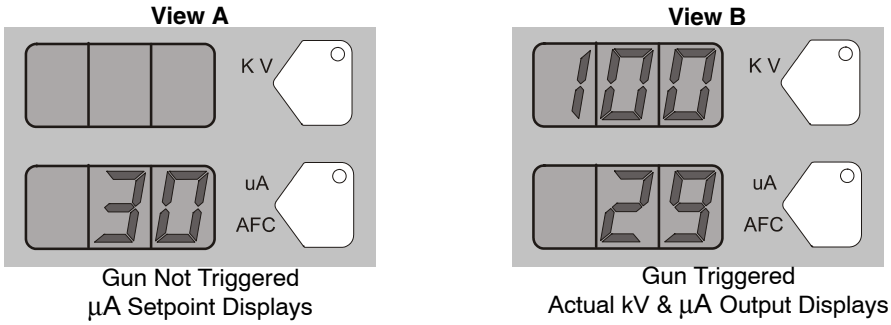


Figure 4-8 AFC Mode – Electrostatic Displays

Help Codes

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

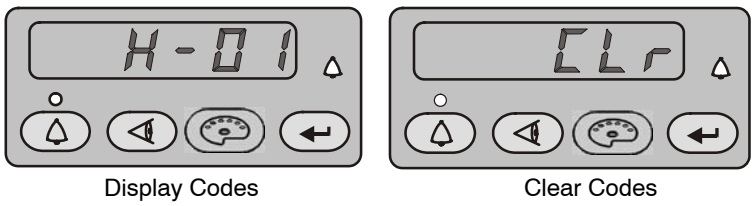


Figure 4-9 Displaying and Clearing Help Codes

To display the Help codes, press the **Help** button. The controller retains the last 5 codes in memory. Use the **Rotary 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 5, Troubleshooting*, for help code troubleshooting, general system troubleshooting, and controller wiring diagram.

Assist Air Setting, Fast Flow Setting, and Software Versions

 The **View** button allows the user access to adjust Assist Air, Fast Flow preset values and to view software versions. See Tables 4-5 and 4-8.

Press the **View** button consecutively to display, in order, the following functions:

Table 4-5 View Button Functions

Function Code	Function Name	Description
AA 00	Assist Air Setting	Allows user to set value between −50% and +50%
FF 0	Fast Flow Setting	Allows user to choose between 0 (Normal) and F (Fast)
GC – X.XX	Gun Controller Software Version	View only
Gd – X.XX	Gun Display Module Software Version	View only
FL – X.XX	Flow Module Software Version	View only
Hd – X.XX	Hardware Version for Main Control Board	View only

To adjust the Assist Air or Fast Flow settings:

1. Press the **View** button until the appropriate code is displayed. The code AA or FF will be blinking.
2. Press the **Enter** button to select. The value will now be blinking.
3. Use the **Rotary Knob** to select the desired setting.
4. Press **Enter** to save.
5. After 5 seconds the display will go blank. If **Enter** is not pressed, the value will automatically save.

NOTE: Adjustments to Assist Air and Fast Flow preset values only affect the preset you are currently viewing. A user can program as many as 20 presets, and each preset must be adjusted individually where required.

Powder Flow Settings

HD Powder Flow Settings

NOTE: Powder flow control modes can only be adjusted for Venturi systems. Refer to the *XT Powder Flow Settings* section for more details.

Powder flow is controlled by a timing sequence that is stored in a software look-up table. The cycle rate of the pump coupled with the suction duration, controls the number of pulses as well as the size of each pulse of powder. Each setpoint from 1–100 has its own recipe for pump operation. As you change the powder flow set point, these parameters change to increase or decrease the mass powder flow. Unlike the venturi technology, the powder mass flow is not affected by the pattern air setting. The pattern air will change the delivery velocity as the powder exits the gun as well as change the atomization of the powder cloud.

- Powder flow output from 0–100%
- Pattern air from 0.20–4.00 cfm in 0.05 increments

Setting Powder Flow Setpoints

To set flow or pattern air:

1. Press the **Flow** or **Pattern** button. The green LED on the selected button lights up.
2. Turn the **Rotary Knob** to increase or decrease the setpoints. The setpoint is automatically saved if it does not change for 3 seconds or when any button is pressed.

Flow or Pattern Setpoint Display:

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

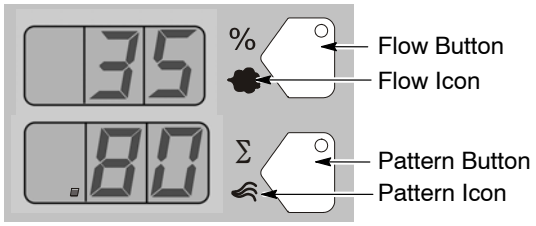


Figure 4-10 Flow or Pattern Setpoints

NOTE: Increasing pattern air will not increase powder flow output.

XT Powder Flow Settings

Two modes of powder flow control are available for XT systems:

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 and atomizing air to the pump based on the setpoints. When the controller is configured for Smart Flow mode, the % and ∑ icons are lit.

Classic Flow – This is the standard method of setting powder flow and velocity, by setting flow air and atomizing air flows 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 4-20 for a list of the mode defaults and configuration instructions.

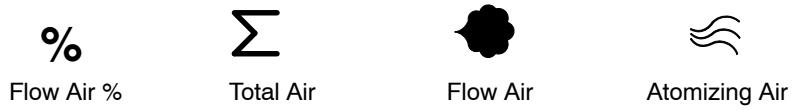


Figure 4-11 Powder Flow Icons

Smart Flow Mode

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 ∑: 2.55–10.2 M^3/HR, minimum 0.17 M^3/HR increments, or 1.5–6.0 SCFM, minimum 0.1 SCFM increments.

See Tables 4-6 and 4-7 for examples of possible Smart Flow settings and their equivalents in Atomizing and Flow Air pressures and flows. Figure 4-12 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 flow and pressure. Read down to the horizontal axis for the equivalent flow-air flow and pressure.

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.

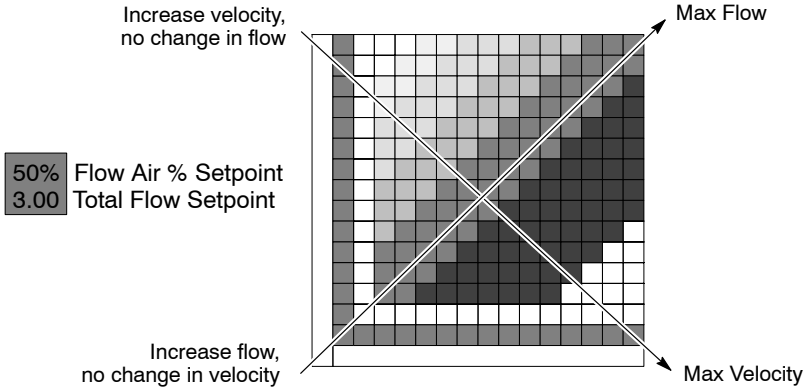


Figure 4-12 Reading the Smart Flow Tables

Setting Smart Flow Setpoints

To set flow air % or total flow ∑ :

1. Press the **%** or ∑ button. The LED on the selected button lights.
2. Turn the **Rotary 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.

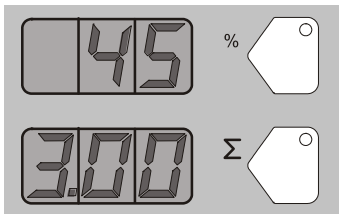


Figure 4-13 Smart Flow Mode – Flow Air % or Total Flow ∑

Smart Flow Settings – Metric Units

Powder Velocity (M^3/Hr) (Total Flow) Σ		**Air Flow Settings:** 1.0 bar Atomizing 2.0 bar Flow **Powder Output:** 150 g/min.
Low	<3.40	
Soft	3.40–4.25	
Medium	4.25–5.53	
Firm	5.53–7.23	
High	>7.23	**Max. Powder Flow Rate: ★**

Table 4-6 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
		M^3/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) Σ		**Air Flow Setting:** 15 psi Atomizing 20 psi Flow **Powder Output:** 20 lb/hr
Low	<2.00	
Soft	2.00–2.50	
Medium	2.75–3.25	
Firm	3.50–4.25	
High	>4.25	**Max. Powder Flow Rate: ★**

Table 4-7 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

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

- Flow air from 0–5.95 M^3/HR (0–3.5 SCFM in 0.05 increments).
- Atomizing air from 0–5.95 M^3/HR (0–3.5 SCFM in 0.05 increments).

To set flow or atomizing air:

1. Press the **Flow** or **Atomizing** button. The green LED on the selected button lights.
2. Turn the **Rotary Knob** to increase or decrease the setpoints. The setpoint is automatically saved if it does not change for 3 seconds or when any button is pressed.

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

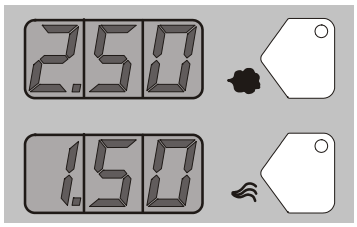


Figure 4-14 Classic Mode – Flow Air or Atomizing Air Flow Setpoints

Color Change Purge

NOTE: Before starting the purge cycle, make sure the guns are aimed into the booth.

NOTE: Always remove the pickup tube from the powder source and place into an appropriate collector before pressing the color change button.

Refer to Figure 4-2 for controller interface illustration.

HDLV System Purge

Purge Choices

For an HDLV system without Color-on-Demand, the purge choices are:

- **SINGLE**- Only the gun connected to this controller is purged when the Color Change key is pressed.
- **DUAL** - Both guns (two gun systems) are purged.
- **DISABLED** - Color Change key is disabled. Automatically selected if the Gun Type is set to HDLV-COD or EXTNAL-COD
- **REMOTE** - Purging is controlled by the iControl system.

HDLV Purge Cycle Instructions

 The color change purge button allows the operator to automatically begin the purge cycle.

Press the **Color Change** button on the controller and then press **Enter** ↵.

The Automatic Purge Cycle operates as follows:

Cycle 1 – **Soft Purge** – Assist air is directed through the pump and siphon tubing back to the powder supply (Soft Siphon), then through the pump and delivery tubing to the spray gun (Soft Gun). This clears the pump, tubing, and gun of powder.

Cycle 2 – **Pulse Purge** – Purge air is directed in pulses from the pump to the powder supply (Siphon Pulses), then from the pump to the spray gun (Gun Pulses). Pulse On sets duration of each pulse, Pulse Off sets time between pulses.

HDLV Purge Settings

(F26) SOFT SIPHON: 1.00–10.00 seconds, in 0.25 steps, default is 8 seconds.

(F27) SOFT GUN: 1.00–10.00 seconds, in 0.25 steps, default is 8 seconds.

(F28) PULSE ON: 0.1–1.00 seconds, in 0.05 steps, default is 0.5 seconds.

(F29) PULSE OFF: 0.1–2.00 seconds, in 0.05 steps, default is 1.5 seconds.

(F30) SIPHON PULSES: 1–99 pulses, default is 7.

(F31) GUN PULSES: 1–99 pulses, default is 13.

NOTE: Refer to functions F22 through F33 in the *Controller Configuration* section on page 4-20 for more information.

Color-on-Demand (COD) System Purge

Press the **Color Change** button on the Color-on-Demand controller and then press **Enter** ↲. Refer to the *Prodigy Color-on-Demand Manual System* manual for more detail.

The Automatic COD Purge Cycle operates as follows:

1. **Manifold Purge** – The dump valve opens. The pump speeds up to 100% of flow to pump the remaining powder out of the manifolds.
2. **Soft Purge** – Assist air is directed through the pump and siphon tubing back to the powder supply (Soft Siphon), then through the pump and delivery tubing to the spray gun (Soft Gun). This clears the pump, powder tubing, and gun of powder.
3. **Pulse Purge** – Purge air is directed in pulses from the pump to the powder supply (Siphon Pulses), then from the pump to the spray gun (Gun Pulses). Pulse On sets duration of each pulse, Pulse Off sets time between pulses.
4. **Powder Pre-Load** – The new color powder is pumped to the spray gun for the set time at 100% of flow to load the system for production.

The color change cycle is started by the operator or by a remote signal to the Color-On-Demand controller. The operator starts the color change by selecting a new color and touching the **Start** button on the touch screen, or by pressing a foot pedal then selecting a new color before the powder pre-load begins.

NOTE: Powder type, humidity, tubing length, and other variables can change the effectiveness of these settings. You may have to adjust these settings to avoid color cross-contamination and maintain performance.

COD Purge Settings

(F33) MANIFOLD PURGE: 0–10.00 seconds, in 0.25 steps, default is 2 seconds.

(F26) SOFT SIPHON: 2.00–10.00 seconds, in 0.25 steps, default is 3.5 seconds.

(F27) SOFT GUN: 1–10.00 seconds, in 0.25 steps, default is 2 seconds.

(F28) PULSE ON: 0.1–2.00 seconds, in 0.05 steps, default is 0.5 seconds.

(F29) PULSE OFF: 0.1–2.00 seconds, in 0.05 steps, default is 1.5 seconds.

(F30) SIPHON PULSES: 1–99 pulses, default is 20.

(F31) GUN PULSES: 1–99 pulses, default is 18.

(F32) POWDER PRE-LOAD: 0–99 seconds, default is 4.

NOTE: To return to the factory defaults, manually reset F15 to 02. Refer to the *Controller Configuration* section on page 4-20 for more information.

Controller Configuration

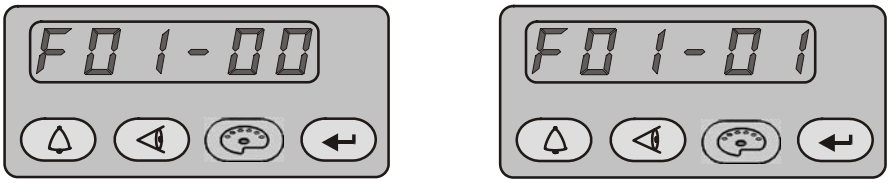
Opening the Function Menu and Setting Preferences

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–Function 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.



Function 01, Value 00 Function 01, Value 01

Figure 4-15 Displaying and Changing Configuration Functions

Table 4-8 Function Settings

Function Number	Function Name	Function Values	Description	Default HDLV Mode (Encore HD)
F00	Gun Type	00=Encore XT/HD 02=Robot	Customize for type of gun being used. Must be programmed during initial setup.	00
F01	Fluidizing	00=Hopper 01=Box 02=Disable	Customize for type of fluidizing system used. Must be programmed during initial setup.	Varies
F02	Display Units	00=SCFM 01=M^3/HR	Choose standard cubic feet per minute or cubic meters per hour.	00
F03	Electrostatic Control	00=Custom 01=Classic	Choose custom or classic feedback control mode. See page 4-6 for more information.	00
F04	Powder Flow Control	00=Smart 01=Classic	Choose smart or classic mode. See page 4-12 for more information.	N/A
F05	Keypad Lockout	00=Unlocked 01=Preset Only 02=All Locked 03=Preset Locked 04=Reset Password	00 = All keypad functions are unlocked. 01 = All keypad functions are locked except preset functions. 02 = All keypad functions are locked. 03 = All preset functions are locked; other keypad functions can be adjusted. 04 = Reset password.	00
F06	Vibratory Box Delay Off	00–90 Seconds On=Continuous Operation	Sets the number of seconds the vibratory box continues to operate after the gun trigger is released. Choose from 0 to 90 seconds, or choose ON for continuous operation.	30

Continued...

Function Number	Function Name	Function Values	Description	Default HDLV Mode (Encore HD)
F07	Maintenance Timer, Gun	00=View Timer 01=Set Timer (000=Disable through 999) 02=Reset (00, 01)	Sets a timer for when gun maintenance is due. 00 is view only. 01 allows you to choose 000 to disable the timer, or choose from 1 to 999 days. 02 resets the timer to 00.	000
F08	Setting Trigger Function	00=Increase/Decrease 01=Disable 02=Flow 03=Preset 04=Purge 05=Trigger	Sets the desired function for the spray gun trigger.	00
F09	Help Codes	00=Enable 01=Disable	Enable or disable help codes.	00
F10	Zero Reset (Flow)	00=Normal 01=Reset	Refer to page 5-13 for the Zero Reset procedure.	00
F11	Gun Display Errors	00=Flashing 01=Disable	Enable or disable gun display errors. Display will flash when an error occurs if enabled.	00
F12	µA Lower Limit	00=10 µA 01=5µA	See page 4-7 for more information on µA settings.	00
F13	µA Upper Limit	00=50 µA 01=100 µA	See page 4-7 for more information on µA settings.	00
F14	Total Hours	00=Gun Total Hours 01=Pump Total Hours	View total hours the pump and gun have been used. View only.	00
F15	Save/Restore/Reset	00=System Save 01=System Restore 02=Factory Reset	Save new settings, restore to previously saved settings, or return to factory settings.	00
F16	Gun Display Brightness	00=Low 01=Medium 02=Maximum	Sets brightness for gun display.	01
F17	Number of Presets	01–20 Presets	Choose from 1 to 20 presets. See page 4-5 for more information.	20

Continued...

Function Number	Function Name	Function Values	Description	Default HDLV Mode (Encore HD)
F18	Pump Type	00=Venturi 01=HDLV 02=COD	Customize for the pump type being used. Must be programmed during initial setup.	01 or 02
F19	Control Type	00=Local 01=External	Customize for local or external/remote control. Must be programmed during initial setup.	00
F20	Gun Number	1–4	Set number of guns being used. Must be programmed during initial setup.	00
F21	Maintenance Timer, Pump	00=View Timer 01=Set Timer (000=Disable through 999) 02=Reset (00, 01)	Sets a timer for when pump maintenance is due. 00 is view only. 01 allows you to choose 000 to disable the timer, or choose from 1 to 999 days. 02 resets the timer to 00.	00
F22	Purge	00=Disable 01=Single 02=Dual 03=Remote	Sets desired purge functionality. See page 4-18 for more information.	01
F23	Reserved	Reserved		0
F24	Reserved	Reserved		0
F25	Pattern Air Delay	0.00 – 5.00 Seconds in 0.25 Increments	Sets the number of seconds the pattern air continues to operate after the gun trigger is released. Choose from 0 to 5 seconds in 0.25 increments.	0.00

Continued...

Function Number	Function Name	Function Values	Description	Default HDLV Mode (Encore HD)
F26	Soft Siphon	1–10 Seconds in 0.25 Increments	Sets the number of seconds that assist air is directed through the pump and siphon tubing back to the powder supply (Soft Siphon), then through the pump and delivery tubing to the spray gun (Soft Gun). This clears the pump, powder tubing, and gun of powder.	8.00
F27	Soft Gun	1–10 Seconds in 0.25 Increments	Sets the number of seconds that assist air is directed through the pump and siphon tubing back to the powder supply (Soft Siphon), then through the pump and delivery tubing to the spray gun (Soft Gun). This clears the pump, powder tubing, and gun of powder.	8.00
F28	Pulse ON	0.1–0.95 Seconds in 0.05 Increments	Pulse On sets duration of each pulse. Pulse Off sets time between pulses. See F30–F31, below.	0.50
F29	Pulse OFF	0.1–0.95 Seconds in 0.05 Increments		1.50
F30	Siphon Pulses	1–99	Purge air is directed in pulses from the pump to the powder supply (Siphon Pulses), then from the pump to the spray gun (Gun Pulses).	7
F31	Gun Pulses	1–99		13
F32	Powder Pre–Load	1–99	The new color powder is pumped to the spray gun for the set time at 100% of flow to load the system for production.	4

Continued...

Function Number	Function Name	Function Values	Description	Default HDLV Mode (Encore HD)
F33	Manifold Purge	0–10 Seconds in 0.25 Increments	The dump valve opens and the pump speeds up to 100% of flow to pump the remaining powder out of the manifolds.	2.00
F34	Conveyance Air Constant A	3.500 to 4.500	The calibration constant should match the numbers on the calibration sticker found on the back of the corresponding manifold. Use default values only if the sticker is damaged.	4.000
F35	Conveyance Air Constant C	–0.500 to +0.500		0
F36	Pattern Air Constant A	1.500 to 4.500		4.000
F37	Pattern Air Constant C	–0.500 to +0.500		0

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.

NOTE: If you configure F19=01 External (Robot Gateway), then there are only 10 presets.

NOTE: If the function is set to F17–01, then only 1 preset will be available for use.

HD System Shutdown

For HD systems, complete the following steps:

NOTE: Always remove the pickup tube from the powder source and place into an appropriate collector before pressing the color change button.

NOTE: Before starting the purge cycle, make sure the guns are aimed into the booth.

1. For HD systems, press the **Color Change** button to start cleaning the system of residual powder.
2. Purge the spray gun by pressing the **Purge** button on back of spray gun until no more powder is blown from the gun.
3. Press the **Standby** button to turn off the spray gun and interface.
4. Turn off the system air supply and relieve the system air pressure at the pump cabinet.
5. If shutting down for the night or a longer period of time, shut off system power.
6. Perform the *Maintenance* procedures on page 4-27.

XT System Shutdown

For XT systems, complete the following steps:

NOTE: Before starting the purge cycle, make sure the guns are aimed into the booth.

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 *Maintenance* procedures on page 4-27.

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.

Daily maintenance for the controller should include blowing off the interface module with a blow gun. Wipe any residual powder off the controller with a clean cloth.

Periodically check all system ground connections.

Section 5
Troubleshooting

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

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 Nordson technical support at (800) 433−9319 or 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.

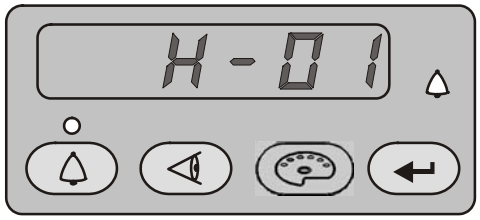


Figure 5-1 Displaying and Clearing Help Codes

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 enter. The Help icon will stay lit until the controller clears the codes.

Help Code Troubleshooting Chart

Code	Message	Correction
H00	No Gun Number	Gun cannot be set to 0, must be a number from 1–4. Refer to the *Startup* section on page 4-2 for more information on setting up gun numbers.
H01	EEPROM Read Failed	Reset the fault (press the Nordson key to open the fault screen). This fault will sometimes occur when the software is upgraded.
H07	Gun Open	Trigger the gun and check the display. If the 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 *Gun Cable Continuity Tests* as described in the spray gun manual. If the cable and the connections are okay, check the spray gun high voltage 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 the µA display is greater than 0, replace the main control board. Make sure the trigger icon on the interface is not lit.
H12	Communications Fault CAN Bus	Check that the gun number is set correctly. See F20 in the *Controller Configuration* section on page 4-20. Check the DIP switch setting on the pump controller. Check the interface interconnect cable. Make sure the cable connections are secure and the cable is not damaged. Refer to *Gun Cable Continuity Tests* in your spray gun manual. 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. Route the network cable away from sources of electrostatics (hopper, gun cables, powder hose). Verify proper grounding. Verify network terminations are set correctly for non-standard systems.
H15	Over Current Fault (Cable or Gun Short)	This fault can occur if the gun tip touches a grounded part while spraying. This fault turns the electrostatic output off. Release the trigger to reset the fault and resume spraying. If the fault reoccurs, disconnect the spray gun high voltage power supply from the gun cable inside the gun (J2) and trigger the gun on. Refer to the *Power Supply Replacement* procedure in the spray gun manual. If the H15 code does not reappear, then check the high voltage power supply for issues. If the help code reappears, check the gun cable continuity and replace it if shorted. Perform *Gun Cable Continuity Tests* as described in your spray gun manual.
H19	Gun Maintenance Timer Expired	The Maintenance Timer has exceeded its setting. Perform the scheduled maintenance, then reset the maintenance timer. See F07 in the *Controller Configuration* section on page 4-20 for reset instructions (F07-02).

Continued...

H20	Pump Maintenance Timer Expired	The Pump Maintenance Timer has exceeded its setting. Perform the scheduled maintenance, then reset the maintenance timer. See F21 in the *Controller Configuration* section on page 4-20 for reset instructions (F21-02).
H21	Pattern Air Valve Fault	Refer to the controller wiring diagrams in the pump control unit manual. Check the wiring harness connection (J8) to the proportional valve solenoid. Check the solenoid operation. Replace the valve if the solenoid is not working.
H22	Conveyance Air Valve Fault	Refer to the controller wiring diagrams in the pump control unit manual. Check the wiring harness connection (J7) to the proportional valve solenoid. Check the solenoid operation. Replace the valve if the solenoid is not working.
H23 (HD)	Conveyance Air Flow Low Fault Flow is lower than setpoint. System cannot reach setpoint.	Check if input pressure is greater than 87 psi (5.9 bar). Make sure and correct H49 or H50 faults if present. Check for blocked powder delivery line to spray gun. Check for blocked powder tubes. Check if internal regulator is set to 85 psi (5.7 bar) with gun triggered ON. Check for blockage in proportional valve. Check for oil/water contamination. Perform the *Conveyance Air Flow Verification for HD* procedure on page 5-13. Check for water and/or oil contamination in the transducer filters by removing the board from the flow manifold. Replace filters with 1604436.
H23 (XT)	Flow Air Flow Low Fault	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. Switch to Classic Flow mode. This mode lets you set and view actual flow-rate and atomizing air flow so you can diagnose the problem. 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. Check the system air supply pressure. Input pressure must be above 87 psi (5.9 bar). Check the system filter and the tubing from the filter to the power unit for kinks or blockage. Refer to the *Repair* section in the *Encore XT Manual Powder Spray Systems* manual for procedures using the iFlow Air Flow Verification Kit (1039881) to check the operation of the iFlow module proportional valves and the output of the precision air pressure regulator.

Continued...

H24 (HD)	Pattern Air Flow Low Fault	Check if input pressure is greater than 87 psi (5.9 bar). Check for blocked airline to spray gun. Check if internal regulator is set to 85 psi (5.7 bar) with gun triggered ON. Check for blockage in proportional valve. Check for oil/water contamination. Use the flow verification tool (1039881) with its instructions and connect to the pattern air output. Check for water and/or oil contamination in the transducer filters by removing the board from the flow manifold. Replace filters with 1604436.
H24 (XT)	Atomizing Air Flow Low Fault	See H23 (XT).
H25 (HD)	Conveyance Air Flow High Fault Flow is higher than setpoint. System unable to turn it down.	Check if input pressure is less than 110 psi (7.6 bar). Check if internal regulator is set to 85 psi (5.7 bar) with the spray gun triggered ON. Check for contamination in the proportional valve. Check for oil/water contamination. Trigger the spray gun OFF and reset the fault. If the fault returns without triggering the spray gun ON, remove the 8 mm tube plug from the pump control unit labeled flow. Check that no air is leaking from the port. If air is leaking, remove the proportional valve and clean it. If air is not leaking, plug the 8 mm port and perform the *Re-Zero Procedure* on page 5-13. Perform the *Conveyance Air Flow Verification for HD* procedure on page 5-13. Check for water and/or oil contamination in the transducer filters by removing the board from the flow manifold. Replace filters with 1604436.

Continued...

H25 (XT)	Flow Air Flow High Fault	Switch to Classic Flow mode. This mode lets you set and view actual flow and atomizing air so you can diagnose the problem. 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 the *Repair* in the pump control unit manual for cleaning instructions. 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 the *Repair* section in the pump control unit manual for cleaning instructions. If the help code re-occurs and the controller interface is showing air flow, then check for leaks around the proportional valves or transducers on the iFlow module. If the help code persists, re-zero the module as described on page 5-13. Refer to the *Repair* section in the *Encore XT Manual Powder Spray Systems* manual for procedures 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.
H26 (HD)	Pattern Air Flow High Fault	Check if input pressure is less than 110 psi (7.6 bar). Check if the internal regulator is set to 85 psi (5.7 bar) with the spray gun triggered ON. Check for contamination in the proportional valve. Check for oil/water contamination. Trigger the spray gun OFF and reset the fault. If the fault returns without triggering the spray gun ON, remove the 6 mm blue tubing and check for air leaks. Make sure the system controller is triggered OFF. Check that no air is leaking from the port of the pump control unit. If air is leaking, remove the proportional valve and clean it. If air is not leaking, plug the 6 mm pattern port and perform the *Re-Zero Procedure* on page 5-13. Perform the *Conveyance Air Flow Verification for HD* procedure on page 5-13. Check for water and/or oil contamination in the transducer filters by removing the board from the flow manifold. Replace filters with 1604436.
H26 (XT)	Atomizing Air Flow High Fault	See H25 (XT)

Continued...

H27	Trigger On during Power Up Fault	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.
H28	EEPROM Data Version Changed	Software version has been changed. This code appears after a software update. Clear the fault. It should not reappear.
H29	System Configuration Mismatch	Main gun control and pump configurations do not match. One is venturi and the other is HDLV/COD. See F18 in the *Controller Configuration* section on page 4-20 and confirm settings.
H30	Calibration Invalid	Pump calibration values for A or C are out of range. Refer to your pump control unit manual for more information.
H31	Boost Valve Fault	Check J6 wiring diagram pump board.
H32	Electrode Airwash Fault	Check J4 wiring diagram pump board.
H33	Fluidizing Air Valve Fault	Check J5 wiring diagram pump board.
H34	Purge Air Valve Fault	Check J10 wiring diagram pump board.
H35	Vibratory Motor Relay Fault	Check J9 wiring diagram pump board.
H36	LIN BUS Communication Fault (Gun Cable)	Perform *Gun Cable Continuity Tests* in the spray gun manual, to check J3 connection. If an open or short is found, replace the cable. If the gun cable is okay, replace the gun display module.
H41	24V Fault	Check the DC power supply located in the pump control unit. If the voltage is less than 22 Vdc replace the power supply in the pump control unit. Turn on the pump control unit for this test.
H42	Main Board Fault (Interface)	Clear the fault and make sure kV is set to maximum 100 kV, then trigger the gun ON. If the code re-appears, 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 the gun ON and check the µA display. If the 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 high voltage 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 high voltage power supply. When the gun is triggered on and kV is set >0, the µA display should always read >0.
H44	Robot Heartbeat Missing	System controller is configured for External Mode, and cannot detect the Prodigy PLC Gateway heartbeat. Check CAN cable. Make sure Gateway is configured properly. Refer to the Prodigy PLC Gateway manual.

Continued...

H45	Pinch Valve 1 Fault	Check J11–1 for loose harness connection. Check Valve 1 for loose connection.
H46	Pinch Valve 2 Fault	Check J11-2 for loose harness connection. Check Valve 2 for loose connection.
H47	Pinch Valve 5 Fault	Check J11-5 for loose harness connection. Check Valve 5 for loose connection.
H48	Pinch Valve 6 Fault	Check J11-6 for loose harness connection. Check Valve 6 for loose connection.
H49	Delivery Tube A Valve 3 Fault	Check J11-3 for loose harness connection. Check Valve 3 for loose connection.
H50	Delivery Tube B Valve 4 Fault	Check J11-4 for loose harness connection. Check Valve 4 for loose connection.
H51	Vacuum Valve 7 Fault	Check J11-7 for loose harness connection. Check Valve 7 for loose connection.
H52	Purge Valve 9 Fault	Check J12-3 for loose harness connection. Check Valve 9 for loose connection.
H53	Purge Pinch Pressure Select Valve 8 Fault	Check J12-2 for loose harness connection. Check Valve 8 for loose connection.

General Troubleshooting Chart

Problem	Possible Cause	Corrective Action
1. Uneven pattern	Blockage in spray gun	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. 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 pattern air flow.
	Damp powder	Check the powder supply, air filters, and dryer. Replace the powder supply if contaminated.
	Low pattern air pressure	Increase the pattern air.
	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 5-13.
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.
3. Low powder flow or powder flow surging	Assist air to high/low	Adjust assist air as needed. Refer to vacuum measurement troubleshooting in the pump control unit manual.
	Fluidizing to high/low	
	Air tubing kinked or plugged (H24 or H25)	Check pattern air tubing for kinks.
	Fluidizing air too high	If fluidizing air is set too high the ratio of powder to air will be be too low.

Continued...

Problem	Possible Cause	Corrective Action
	Fluidizing air too low	If fluidizing air is set too low the pump will not operate at peak efficiency.
	Powder hose plugged	Perform color change
	Powder hose kinked	Checked for a kinked powder hose.
	Gun powder path plugged	Check powder inlet tube, elbow, and electrode support for impact fusion or debris. Clean as necessary with compressed air.
	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 the *Controller Configuration* section on page 4-20.
	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)	Refer to *Proportional Valve Cleaning* in the pump control unit manual.

Continued...

Problem	Possible Cause	Corrective Action
4. Loss of wrap, poor transfer efficiency	**NOTE:** Before checking possible causes, check the help code on the system 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. If the electrode assembly is good, remove the gun power supply and check its resistance. Refer to your spray gun product manual for instructions.
	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.
5. 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 *Gun Cable Continuity Checks* as described in your spray gun manual. If an open or short is found, replace the cable.
	Spray gun power supply shorted	Perform the *Power Supply Resistance Test* as described in the pump control unit manual.
6. Powder build up on the electrode tip	Insufficient electrode air wash flow	Adjust the electrode air wash needle valve on the pump control panel to increase the electrode air wash flow.
7. 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 *Power Supply Resistance Test* as described in your spray gun manual.
	Damaged gun cable	Perform the *Gun Cable Continuity Test* as described in your spray gun manual. If an open or short is found, replace the cable.

Continued...

Problem	Possible Cause	Corrective Action
8. No kV output and no powder output	Malfunctioning trigger switch, display module, or cable	Check the *Gun Triggered ON* icon at the top center of the controller interface. If the icon is not lit, check for a H36 help code. Check the trigger switch connections to the display module, replace the switch if necessary. Perform the *Gun Cable Continuity Test* as described in your spray gun manual. **NOTE:** It may be possible to use the settings trigger as the spray trigger until repairs are made. Set Function F08 to F08−05. Refer to the *Controller Configuration* section on page 4-20 for more information.
9. 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 *Gun Cable Continuity Test* as described in your spray gun manual.
10. Gun display module shows CF	Loose gun display connection	Refer to the system controller manual. 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 *Gun Cable Continuity Test* as described in your spray gun manual. 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). Check F05 (lockout) function settings. Refer to the *Controller Configuration* section on page 4-20 for more information.
	No programmed preset available	Presets with no set values for flow rate and electrostatics are automatically skipped.
	Loose or defective trigger switch	Check for a loose trigger switch connection. The trigger switch is plugged into the gun display module.

Continued...

Problem	Possible Cause	Corrective Action
12. Powder flow cannot be changed from the spray gun	Settings trigger disabled	Check Custom Function F08 and set to enabled (F08−00). Check F05 (lockout) function settings. Refer to the *Controller Configuration* section on page 4-20 for more information.
	Loose or defective trigger switch	Refer to spray gun manual. 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). Refer to the *Controller Configuration* section on page 4-20 for more information. Check for loose cable on pump control unit.
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). Refer to the *Controller Configuration* section on page 4-20 for more information.
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 and follow the procedures	
16. No powder flow when gun is triggered ON, kV OK	Powder flow set to zero	Change powder 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.
	Check for Help Codes and follow the procedures	

Re-Zero Procedure

Perform this procedure if the system controller interface indicates air flow when the spray gun is not triggered on, or if a Flow Air or Pattern 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 pump control panel, disconnect the 6 mm pattern 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 system controller will re-zero the flow and pattern air and reset the function display to F10−00.
6. Remove the plugs from the pattern air output fittings and reconnect the air tubing.

Conveyance Air Flow Verification for HD

NOTE: Perform a color change and verify that all powder is removed from the pump before starting this procedure.

1. Use the flow verification tool (1039881) and connect to the delivery port of the pump with 10 ft of 8 mm tubing.
2. Set the delivery to 100% and set assist air to 00% and trigger the pump ON. The monometer should read 4.0−5.0 psi (0.2−0.3 bar).
3. Increase the assist air to +50% and trigger the pump ON. The monometer should read 7.0−8.0 psi (0.5−0.6 bar).
4. Decrease the assist air to −50% and trigger the pump ON. The monometer should read 1.0−3.0 psi (0.1−0.2 bar).

Controller Interconnect Cable Test

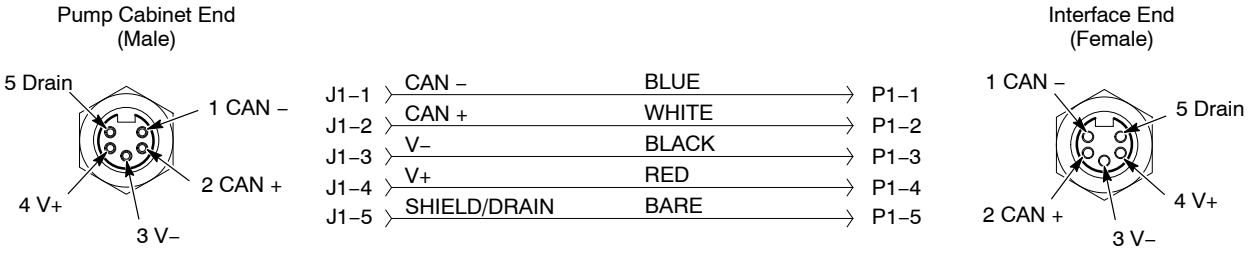


Figure 5-2 Controller Interconnect Cable Wiring

Wiring Diagram

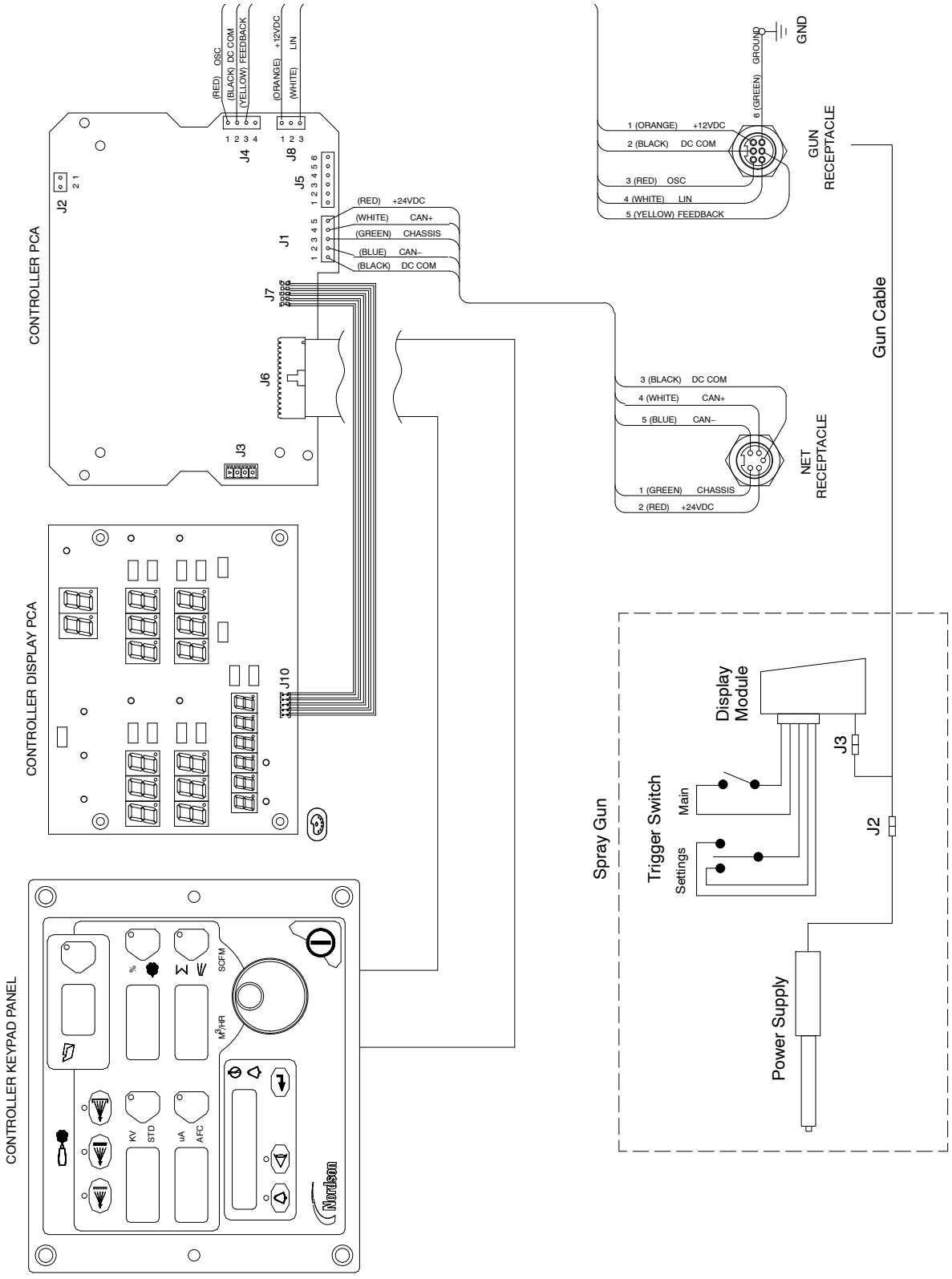


Figure 5-3 Controller Interface Wiring Diagram

Section 6
Repair

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

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.

See Figure 6-1 for a view of the interface module assembly and repair parts.

Refer to *Section 5, Troubleshooting*, for the interface electrical schematic and harness connections. Refer to *Section 7, Parts* for repair kits.

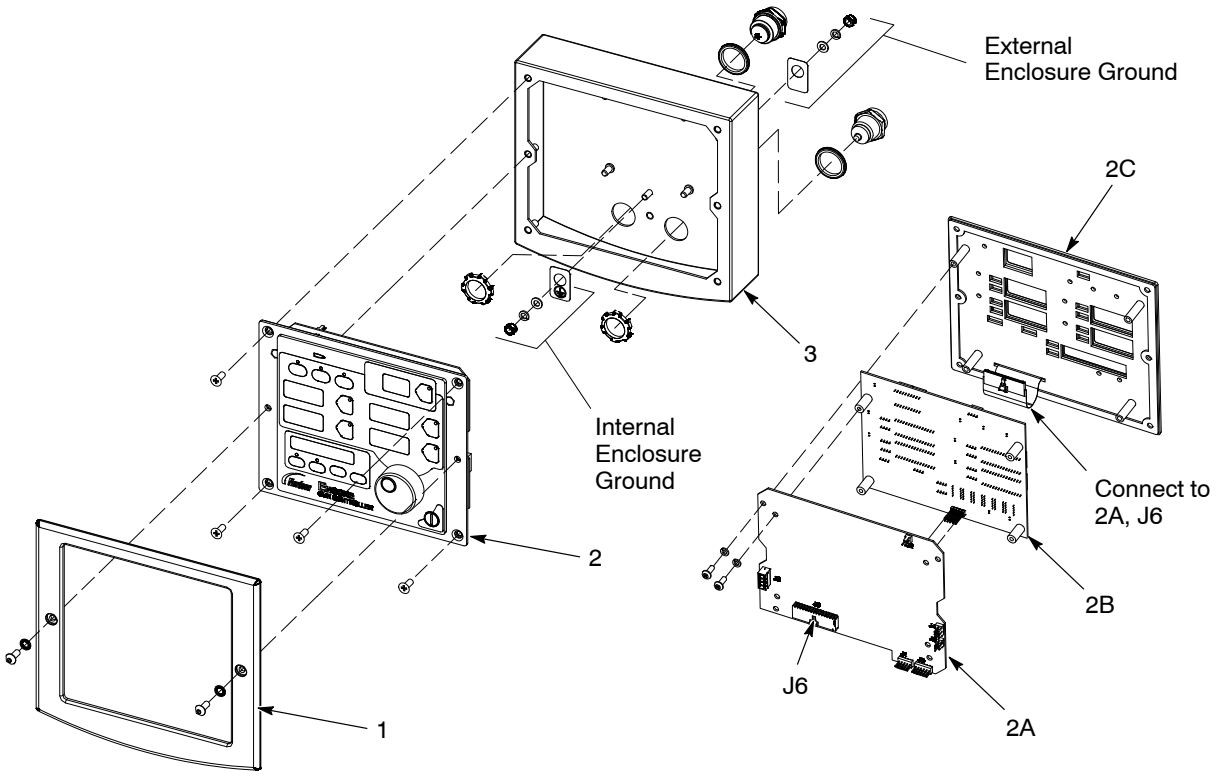


Figure 6-1 Interface Module Assembly

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

Section 7
Parts

Introduction

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

This section covers components, parts and options for the Encore HD and XT system controller.

Refer to the following manuals for additional information and optional equipment.

Encore HD Mobile Powder Spray System: 1605707
Encore HD Manual System Spray Gun: 1604869
Encore HD Pump Control Unit and Power Supply: 1606783
Encore XT Manual Powder Spray Systems: 1603227
ColorMax 2 Powder Coating System w/ Encore Feed Center: 1605397
Prodigy to Encore HD Upgrade Kit Instruction Sheet: 1604780
Encore HD Manual System with Pump Cabinet: 1612632
Encore HD Color–on–Demand System: 1612313
Encore HD Pump: 1605078

Some system manuals are not listed. All manuals can be downloaded from:
http://emanuals.nordson.com/finishing/
(click on Powder–US, then navigate to appropriate system manual)

Controller Parts

Controller Exploded View

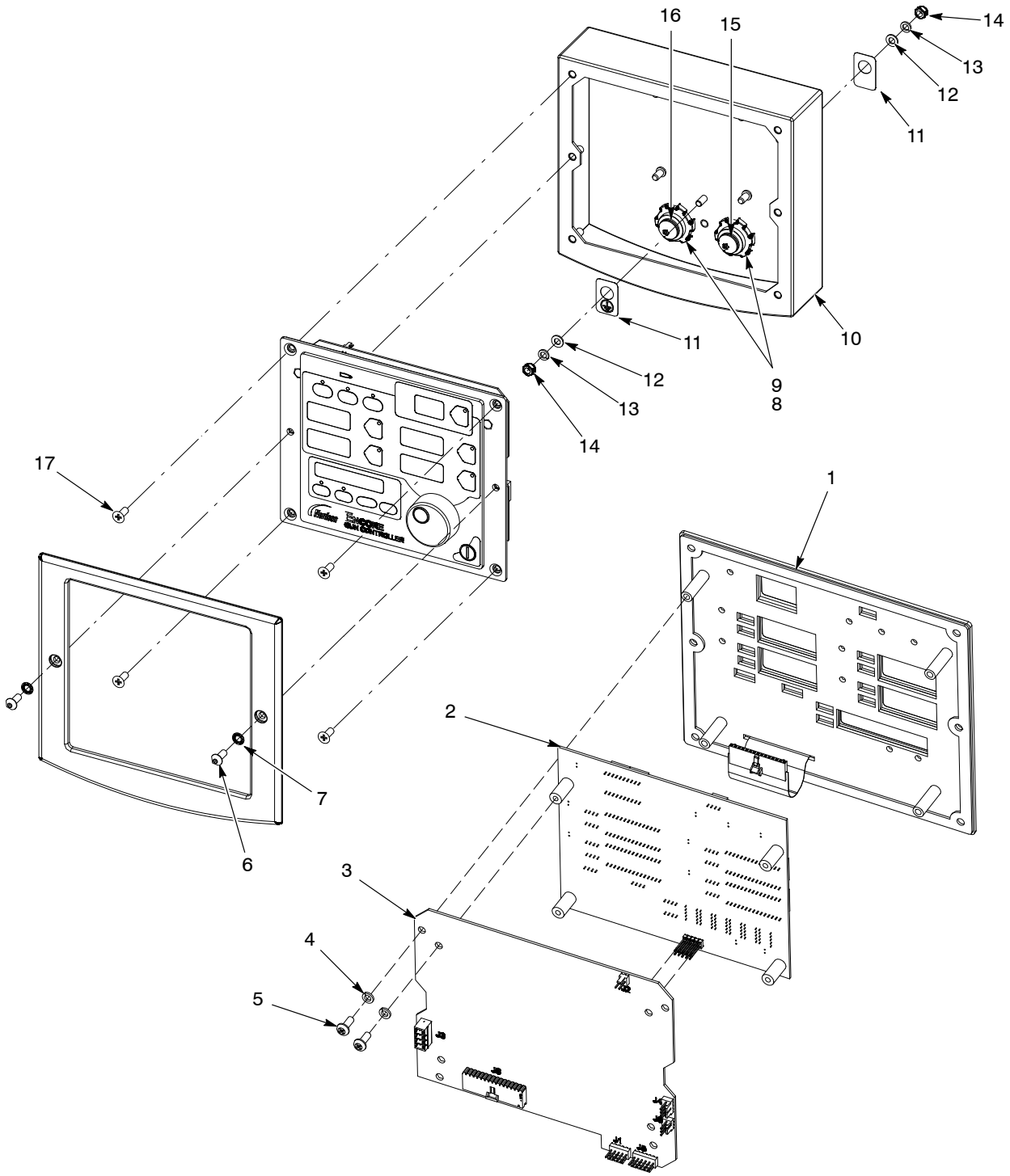


Figure 7-1 Controller Parts

Controller Parts List

Refer to Figure 7-1.

Item	Part	Description	Quantity	Note
–	1604125	CONTROL UNIT, interface, Encore HD/XT	1	
1	1604855	• PANEL, keypad, Encore HD controller	1	
2	1085084	• PCA, main controller display, Encore HD	1	B
3	1601341	• PCA, main control, Encore HD	1	B
4	983403	• WASHER, lock, split, M4, steel, zinc	8	
5	982308	• SCREW, pan head, recessed, M4 x 10, zinc	8	
6	982636	• SCREW, button, socket, M5 x 12, zinc	2	
7	983127	• WASHER, lock, internal, M5, zinc	2	
8	984526	• NUT, lock, $^1/_2$ in. conduit	2	
9	939122	• SEAL, conduit fitting, $^1/_2$ in., blue	2	
10	1082734	• ENCLOSURE, controller interface, Encore HD	1	
11	240674	• TAG, ground	2	
12	983021	• WASHER, flat, 0.203 x 0,406 x 0.040, brass	2	
13	983401	• WASHER, lock, split, M5, steel, zinc	2	
14	984702	• NUT, hex, m5, brass	2	
15	1082759	• RECEPTACLE, net, controller interface, Encore HD	1	A
16	1082709	• RECEPTACLE, gun, Encore HD	1	A
17	982286	• SCREW, flat, slotted, M5 x 10, zinc	4	

NOTE A: Receptacles include harnesses.

B: Items 2 and 3 are sold together as kit 1604025.

Rail Mount Exploded View

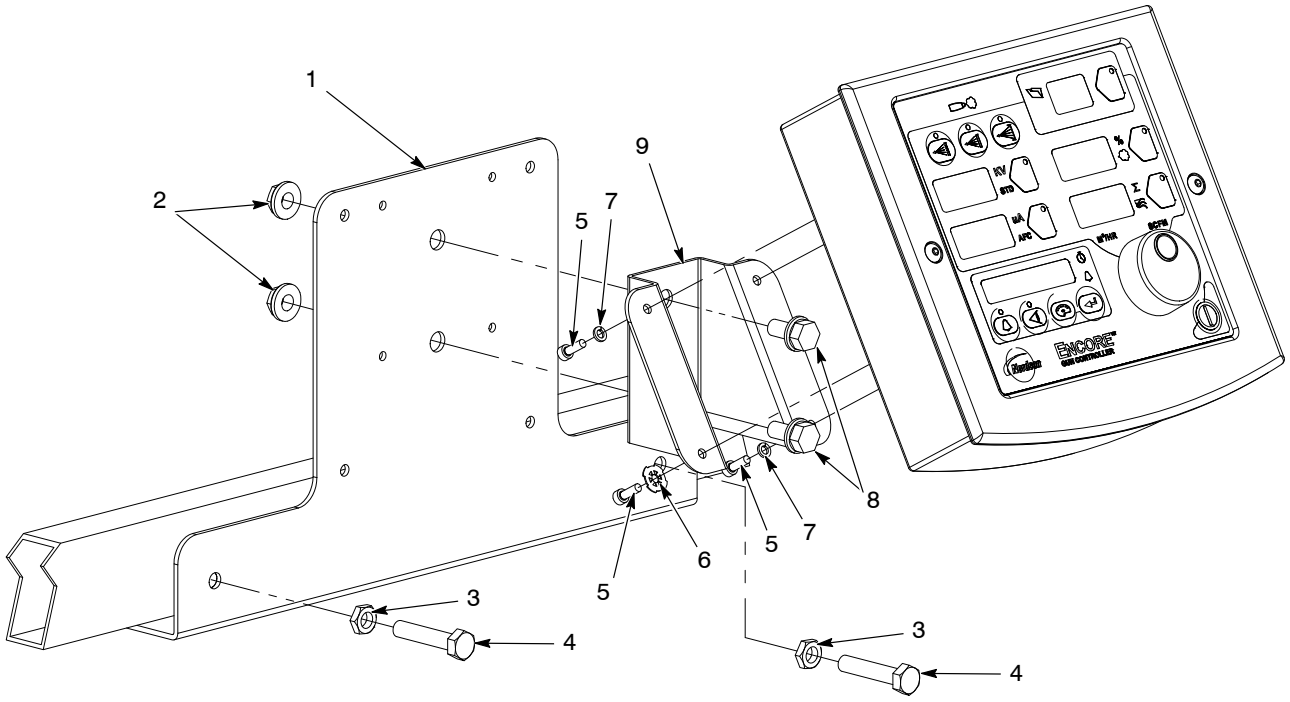


Figure 7-2 Rail Mount System Parts

Rail Mount Parts List

Refer to Figure 7-2.

Item	Part	Description	Quantity	Note
1	1604881	BRACKET, controller rail mount	1	
2	336281	NUT, hex, serrated, 0.5/16 – 18	2	
3	1091006	NUT, hex, flanged, serrated, M8	2	
4	1103115	SCREW, hex, serrated, M8 x 16mm, zinc	2	
5	982448	SCREW, skt, cap, M4 x 12mm	4	
6	1084121	WASHER, lock, dished #8	1	
7	983403	WASHER, lock, M4	3	
8	981346	SCREW, hex, 0.5/16 – 8 x 2.500	2	
9	1082732	BRACKET, universal mount	1	

Encore® HD
Manual Powder Spray Gun

Customer Product Manual
Part 1604869-13
Issued 07/18

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

This document is subject to change without notice.
Check http://emanuals.nordson.com/finishing for the latest version
and available local languages.

NORDSON CORPORATION • AMHERST, OHIO • USA

Contact Us

Nordson Corporation welcomes requests for information, comments, and inquiries about its products. General information about Nordson can be found on the Internet using the following address: http://www.nordson.com.

Address all correspondence to:

Nordson Corporation
Attn: Customer Service
555 Jackson Street
Amherst, OH 44001

Notice

Trademarks

Part 1604869-13

Change Record

Revision	Date	Change
01	01/2014	New release
02	04/2014	New flat spray electrode holder and assembly, new conical nozzle kit and conical electrode assembly
03	05/2014	Page 7–3, new trigger axle P/N 1605713 Page 7–5, new nozzle P/N's
04	07/2014	New flat and conical electrode holders
05	09/2014	Re-zero procedure revised
06	12/2014	New powder inlet tube; 3mm and 4mm nozzles to ship with gun
07	10/2015	Revised equipment labels and parts
08	03/16	Added cleaning procedure
09	09/16	Nozzle part number change and positive power supply added
10	03/18	Added 1083205, Deflector to parts list and some callout and nomenclature changes
11	04/18	Updated system setup images, updated certification label
12	03/18	Changed description for gun labels
13	07/18	Added nLighten LED inspection kit, added XD electrode support, new reference document links and updated description for part number 1600819. Added power supply resistance test nomenclature changes

Table of Contents

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 Safety Data Sheets (SDS) for all materials used. Follow the manufacturer's instructions for safe handling and use of materials, and use recommended personal protection devices.
- 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 SDS 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.

Section 2
Description

Introduction

See Figure 2-1. This manual covers the Encore® HD manual powder spray gun with 6 meter power cable and tubing.

The Encore HD manual powder spray gun should be used with the Encore HD manual controller, which provides electrostatic voltage control, electrode air-wash air, and powder pump air. It is compatible with the following systems:

- Encore HD Mobile Systems
- Encore HD Manual Wall or Rail Mount Systems
- Encore Single and Dual Stand Alone
- Encore Color-on-Demand® Systems
- ColorMax® Powder Coating Systems
- Prodigy® Dual Pump HDLV® Systems

Figure 2-1 Encore HD Manual Powder Spray Gun

Flat spray nozzles with 3-mm and 4-mm slots are shipped with the gun, as well as a conical nozzle kit that contains a conical nozzle, a 26-mm deflector and a conical electrode holder. Use the conical nozzle kit to convert from flat spray to conical spray applications.

Optional equipment is available for the Encore HD manual spray gun including the following:

- Additional flat, conical and cross-cut nozzles options
- 6-meter cable extension
- 150 and 300-mm lance extensions
- Pattern adjuster for use with lance extensions
- Ion collector

See *Options* section beginning on page 7-4 for information on additional options.

Specifications

Model: Encore Applicator	
Input Rating:	+/– 19 VAC, 1 A
Output Rating:	100 KV, 100 μA
Input Air:	6.0–7.6 bar (87–110 psi), <5μ particulates, dew point <10 °C (50 °F)
Max Relative Humidity:	95% non-Condensing
Ambient Temperature Rating:	+15 to +40 °C (59–104 °F)
Hazardous Location Rating for Applicator:	Zone 21 or Class II, Division 1
Dust Ingress Protection:	IP6X

Equipment Labels

Applicator Certification Label

1603105–02

Section 3
Setup

System Connections

WARNING: This diagram does not show system grounds. All conductive equipment in the spray area must be connected to a true earth ground.

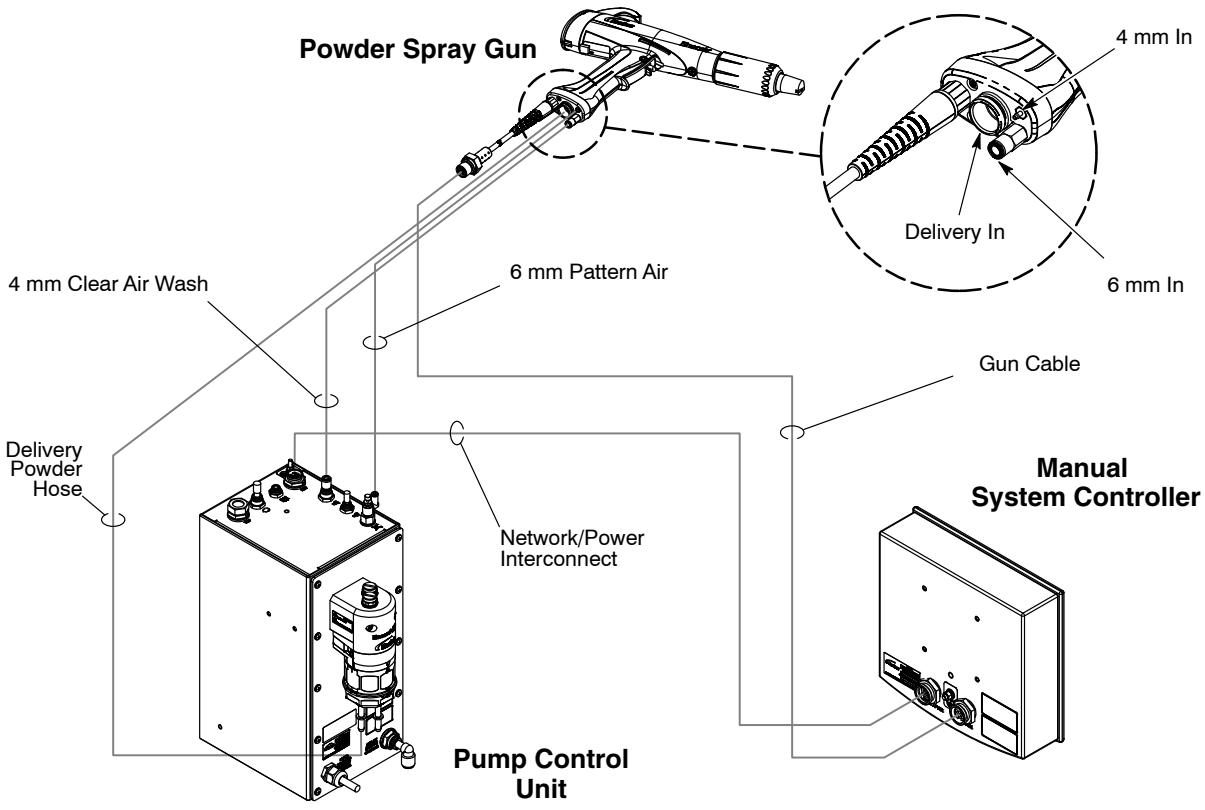


Figure 3-1 System Diagram (Common System Equipment Shown)

Spray Gun Installation

See Figures 3-1 and 3-2 for gun connection illustrations.

1. Connect the 6-mm pattern air tubing to the quick-disconnect fitting (1) in the bottom of the gun handle. Connect the other end to the pattern air tubing on the fitting located on the pump control unit.
2. Connect the 4-mm clear electrode air wash tubing to the barbed fitting (2) in the bottom of the gun handle. Connect the other end to the electrode air wash tubing on the 90° flow control fitting on top of the pump control unit.
3. Seat the O-rings (4) onto the barbed hose adapter (3). Push the barbed end of the hose adapter into the end of the powder hose, then plug the adapter into the powder inlet tube (5) in the bottom of the spray gun handle.
4. Connect the gun cable (6) to the gun connection on the back of the Encore HD manual system controller.
5. Use the sections of black spiral wrap supplied with the system to bundle together the spray gun cable, all air tubing, and powder hose. Take care not to smash, squish, kink, bind, or deform the powder tubing.

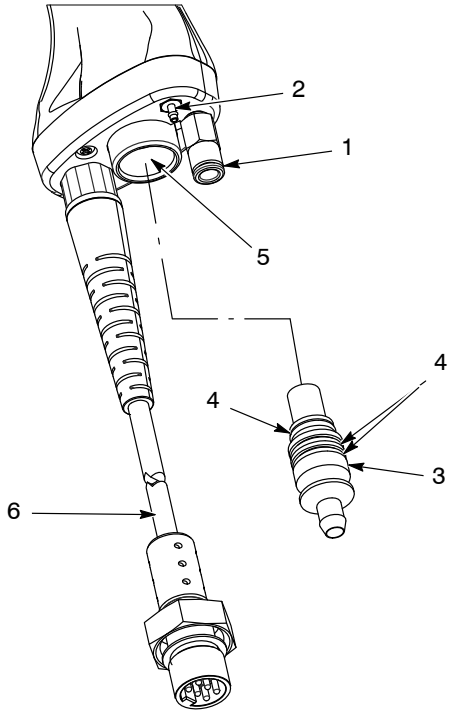


Figure 3-2 Spray Gun Connections

1. Quick disconnect
2. Barbed fitting
3. Barbed hose adapter
4. O-rings
5. Powder inlet tube
6. Gun cable

Section 4
Operation

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

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 HD manual applicator shall only be used with the associated Encore XT/HD interface control unit and Encore HD controller power unit, over the ambient temperature range of +15 °C to +40 °C.
2. Equipment may only be used in areas of low impact risk.
3. Caution should be taken when cleaning plastic surfaces of the Encore controller and interface. There is a potential for static electricity build up on these components.

System Operation

This manual includes information on the Encore HD Manual Powder Spray Gun. Refer to appropriate system, controller and control panel manuals for information on system components.

Spray Gun Operation

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

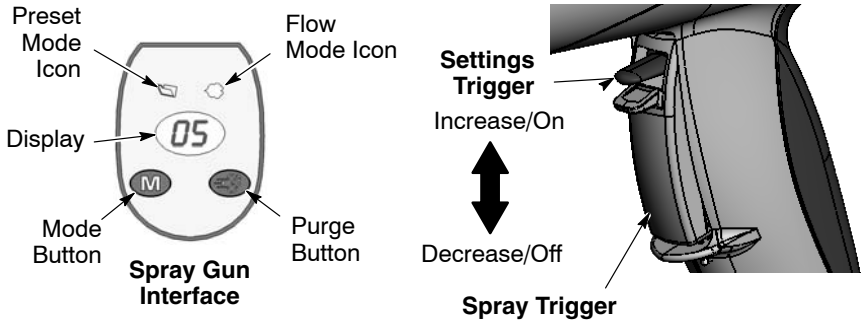


Figure 4-3 Gun Controls

Changing Presets with the Settings Trigger

1. See Figure 4-3. Release the spray trigger. Presets cannot be changed while the gun is triggered on.
2. Press and hold 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. Refer to your controller manual for preset programming instructions.
4. Press the spray trigger. The system sprays with the new preset.

See controller configuration F08 for more settings.

Changing Powder Flow with the Settings Trigger

1. See Figure 4-3. Press and hold 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 spray trigger.

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

Purging the Spray Gun

1. See Figure 4-3. Point the gun into the booth and release the spray trigger.
2. Press and hold the **Purge** button. The purge will continue as long as you hold the **Purge** button.

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* in your controller manual for setting trigger configuration.

For optimal performance, purge the gun periodically to keep the powder path inside the spray gun clean. The purge length and frequency required will depend on the application.

NOTE: The purge air only cleans the spray gun powder path. Refer to the system controller manual for additional HDLV purge information.

Electrode Air Wash Operation

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

Refer to the pump control unit manual for instructions on adjusting electrode air wash flow.

Daily Operation

WARNING: All conductive equipment in the spray area must be connected to a true earth ground. Failure to observe this warning may result in a severe shock.

Initial Startup

With the fluidizing and powder flow set to zero, and no parts in front of the gun, trigger the gun and record the μA output. Monitor the μA output daily, under the same conditions. A significant increase in μA output indicates a probable short in the gun resistor. A significant decrease indicates a resistor or voltage multiplier requiring service.

Startup

1. Turn on the spray booth exhaust fan.
2. Turn on the system air supply.
3. Make sure the spray gun is not triggered, then turn on controller power. The displays and icons on the controller interface and gun interface should light.

Standby Button

Use the **Standby** button on the Encore HD controller 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 turn off controller power, shut system power off at power unit or control panel.

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.

NOTE: The tapered electrode holder of the electrode assembly has been designed for optimized cleaning during color changes on systems using flat spray nozzles. This tapered electrode holder will not accept conical deflectors.

1. Purge the spray gun and turn off the interface in order to prevent accidentally triggering the gun on.
2. See Figure 4-4. 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. See Figure 4-5. Install a new nozzle on the electrode assembly. The nozzle is keyed to the electrode assembly. Do not bend the antenna wire.
5. Screw the nozzle nut onto the gun body clockwise until finger-tight.

NOTE: To clean nozzles, use the *Recommended Cleaning Procedure for Powder Contact Parts* on page 4-9.

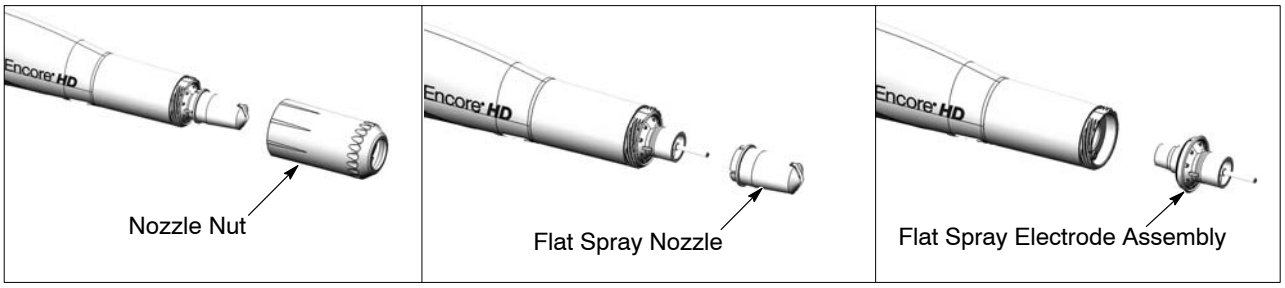


Figure 4-4 Changing a Flat Spray Nozzle

Figure 4-5 Correct Nozzle Orientation

Converting from Flat Spray Nozzles to 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.

NOTE: The tapered flat spray electrode holder shipped with the gun will need to be changed in order to accept the conical nozzles and deflectors. The conical nozzle kit shipped with the gun is required for this conversion.

1. Purge the spray gun and turn off the interface in order to prevent accidentally triggering the gun on.
2. Convert the electrode holder and the nozzle. See Figure 4-6.
   A. Unscrew the nozzle nut counterclockwise and remove it. Pull the flat spray nozzle off the electrode assembly.
   B. Remove the tapered flat spray electrode holder. Do not bend the antenna wire.
   C. Install the non-tapered conical spray electrode holder over the electrode.
   D. Install the conical spray nozzle on the electrode assembly. The nozzle is keyed to the electrode assembly. Screw the nozzle nut onto the gun body clockwise until finger-tight. Install a deflector on the electrode assembly. Do not bend the electrode wire.

NOTE: To clean nozzles, use the *Recommended Cleaning Procedure for Powder Contact Parts* on page 4-9.

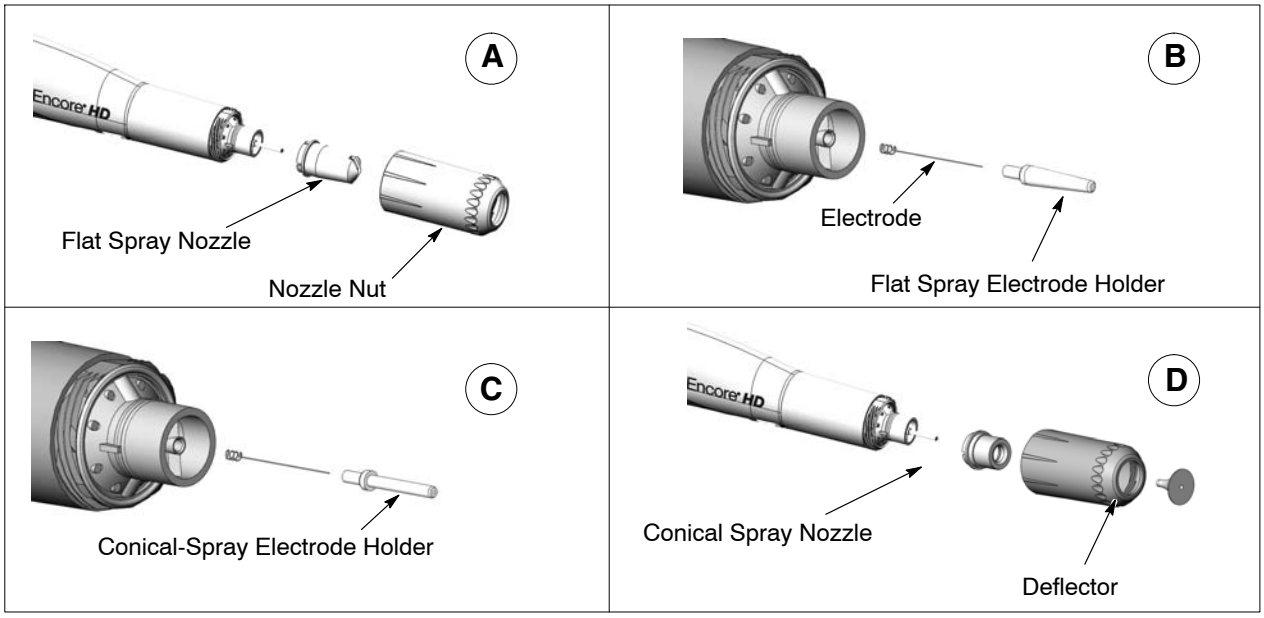


Figure 4-6 Converting from a Flat Spray Nozzle to a Conical Spray Nozzle

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.

NOTE: The tapered flat spray electrode holder shipped with the gun will need to be changed in order to accept the conical nozzles and deflectors. The conical nozzle kit shipped with the gun is required for this conversion. See page 4-6 for conversion instructions.

1. Purge the spray gun and turn off the interface to prevent accidentally triggering the gun on.
2. Gently pull the deflector off the electrode holder. If only changing the deflector, install the new one on the electrode holder, 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.

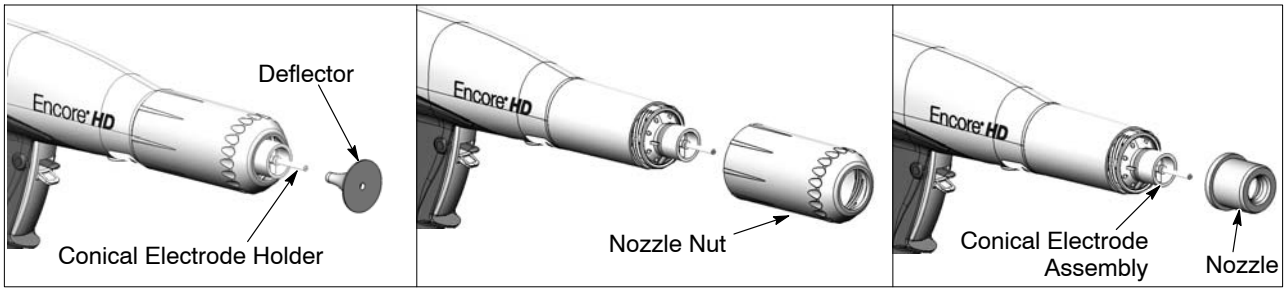


Figure 4-7 Changing a Conical Nozzle

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.

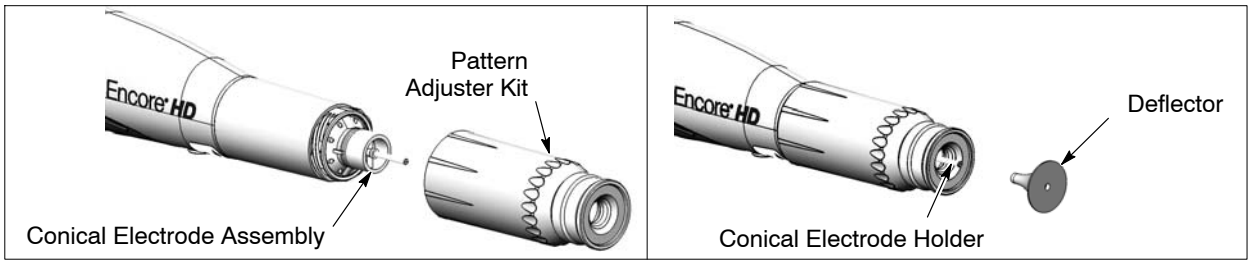


Figure 4-8 Pattern Adjuster Kit Installation

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, shut off the system power.

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.

Recommended Cleaning Procedure for Powder Contact Parts

Nordson Corporation recommends using an ultrasonic cleaning machine and Oakite® BetaSolv emulsion cleaner to clean spray gun nozzles and powder path parts.

NOTE: Do not immerse the electrode assembly in solvent. It cannot be disassembled; cleaning solution and rinse water will remain inside the assembly.

1. Fill an ultrasonic cleaner with BetaSolv or an equivalent emulsion cleaning solution at room temperature. Do not heat the cleaning solution.
2. Remove the parts to be cleaned from the gun. Remove the O-rings. Blow off the parts with low-pressure compressed air.

NOTE: Do not allow the O-rings to come in contact with the cleaning solution.

3. Place the parts in the ultrasonic cleaner and run the cleaner until all parts are clean and free of impact fusion.
4. Rinse all parts in clean water and dry before re-assembling the spray gun. Inspect the O-rings and replace any that are damaged.

NOTE: Do not use sharp or hard tools that will scratch or gouge the smooth surfaces of powder contact parts. Scratches will cause impact fusion.

Maintenance Procedures

Component	Procedure
Spray Gun (Daily)	1. Point the spray gun into the booth. Remove the suction line from the hopper or box feeder and point them in the booth, as well. Push the *Color Change* button on the system controller and purge the powder delivery system. 2. Remove the nozzle and electrode assembly and clean them with low pressure compressed air and clean cloths. Check them for wear, and replace them if necessary. 3. Clean the gun face surface (where the electrode assembly attaches) with low pressure compressed air and a clean cloth. 4. Blow off the gun and wipe it down with a clean cloth.
System Grounds	Daily: Make sure the system is securely connected to a true earth ground before spraying powder. Periodically: Check all system ground connections.

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

Item numbers in this section match the item numbers in the parts lists.

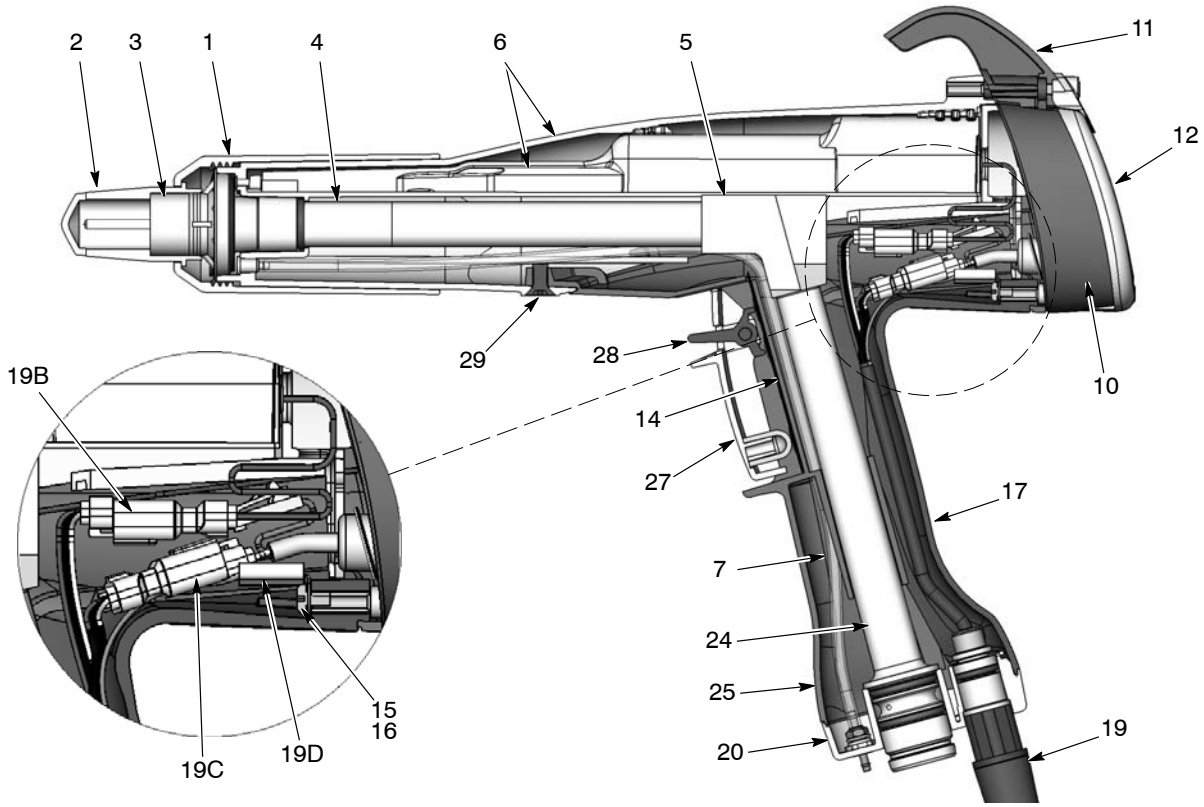


Figure 5-1 Section View of Spray Gun (item numbers in this section match item numbers in parts list)

1. Nozzle nut
2. Nozzle, flat spray
3. Electrode assembly, flat spray
4. Outlet tube kit
5. Elbow
6. Power supply/body kit
7. Filter assembly
10. Display module
11. Hook
12. Bezel
14. Trigger switch
15. Lock washer
16. Ground screw
17. Ground pad
19. Cable assembly

19B. Power supply connector (J2)
19C. Display connector (J3)
19D. Ground terminal (J1)

20. Handle base
24. Inlet tube/hose adapter kit
25. Handle
27. Spray trigger
28. Settings/purge trigger
29. Screw (handle to gun body)

Note: Ground terminal (19D) must always be connected to the ground screw (16).

Display Module Replacement

Display Module Removal

1. See Figures 5-1 and 5-2. Unscrew the top and bottom screws (13) holding the bezel (12), hook (11) and display module (10) 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 (10), 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 5-2.
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.
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 ground wire 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 (11) onto the display module, then install the bezel (12).
8. Install and tighten the screws (13).

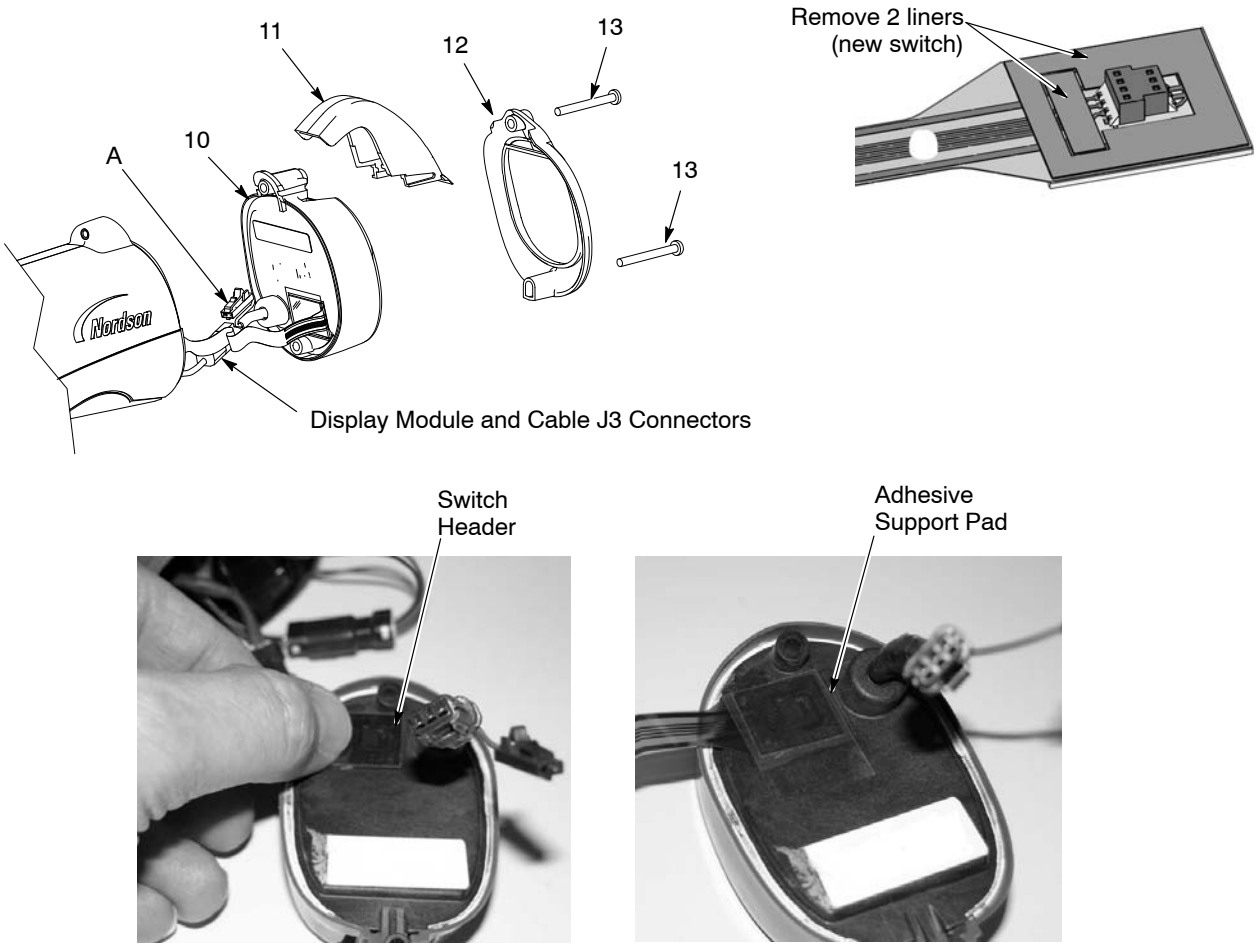


Figure 5-2 Display Module Replacement

10. Display module
11. Hook
12. Bezel
13. M3 x 35 screws

A. Ground wire connector

Power Supply and Powder Path Replacement

Gun Disassembly

1. Remove the display module from the spray gun as described in *Display Module Replacement* on page 5-2.
2. See Figure 5-1. Unscrew the nozzle nut and remove the nozzle and electrode assembly from the spray gun.
3. Insert a small screwdriver into the recess in the J2 gun cable/power supply connectors to release the catch and disconnect them.
4. See Figure 5-3. Remove the black nylon screw (29) from the gun body.
5. Grasp the handle in one hand and the gun body in the other. Press the thumbs of each hand together while pulling carefully in opposite directions to separate the gun body from the handle. The air wash tubing will prevent a complete separation; leave it connected unless it must be replaced.

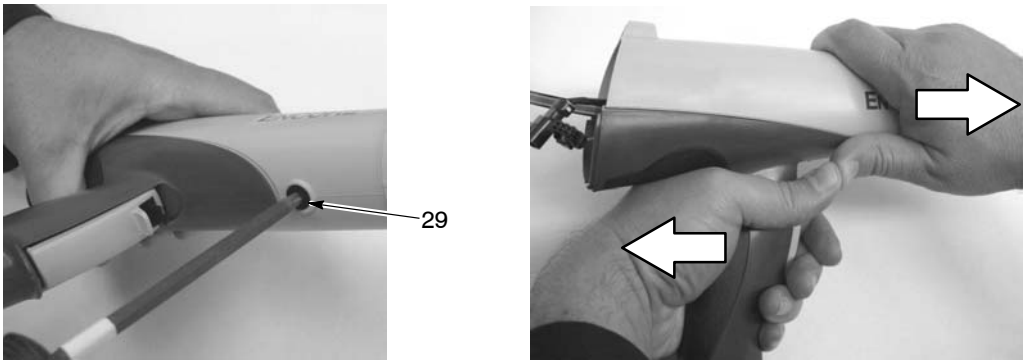


Figure 5-3 Removing the Gun Body from the Handle

Power Supply Replacement

NOTE: If replacing the powder path, skip this procedure.

1. See Figure 5-4. Slide the power supply (6A) out of the gun body (6B).
2. Check the gasket (8) on the back of the bulkhead (9). Replace it if it is damaged. The gasket is stuck to the bulkhead with pressure-sensitive adhesive.

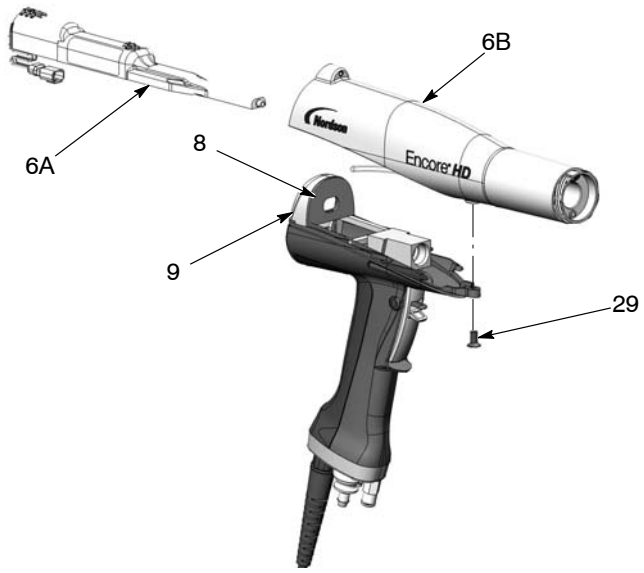


Figure 5-4 Removing the Power Supply from the Gun Body

3. Slide the new power supply into the upper cavity of the gun body, guiding the gun body ribs between the raised grooves on the top of the power supply.
4. Press on the end of the power supply to ensure that the power supply contact tip is firmly seated against the brass contact inside the gun body.
5. Route the power supply harness connector through the top hole in the bulkhead.

Powder Path Removal

NOTE: Skip these steps if not replacing the powder path. Go to page 5-8 to reassemble the spray gun.

1. Perform the *Gun Disassembly* procedure on page 5-4.
2. See Figure 5-5. Remove the elbow (5) from the inlet tube (24).
3. Remove the two M3 x 20 screws (21) from the handle base (20).
4. Pull the base away from the handle, then swing the bottom of the ground pad (17) up and away from the handle, then remove it. Leave the ground wire connected to the ground pad.
5. Push the inlet tube (24) up and out of the base, then move the base out of the way and pull the inlet tube out of the handle.
6. Push the outlet tube (4) out of the front of the gun body (6B).
7. Blow off the inlet tube, outlet tube, and elbow, and replace them if the interiors are worn or coated with impact-fused powder. If re-using the tubes, make sure the O-rings are undamaged.

Powder Path Installation

1. See Figure 5-5. Install the outlet tube (4) into the gun body (6B), with the end of the tube flush with the end of the gun body.
2. Install the inlet tube (24) into the handle (25), then install the end of the tube into the handle base (20).
3. Push the handle base close to the handle, then hook the top end of the ground pad (17) into the body and rotate it onto the handle. Make sure the cable wires are not pinched or trapped during re-assembly.
4. Install the handle base onto the handle and ground pad and secure it with the two M3 x 20 screws (21).
5. Install the elbow (5) onto the inlet tube, with the end oriented toward the front of the gun as shown.

NOTE: To verify proper installation, place a flashlight inside the bottom of the inlet adapter and verify the internal connections by looking through the outlet tube from the front of the powder spray gun.

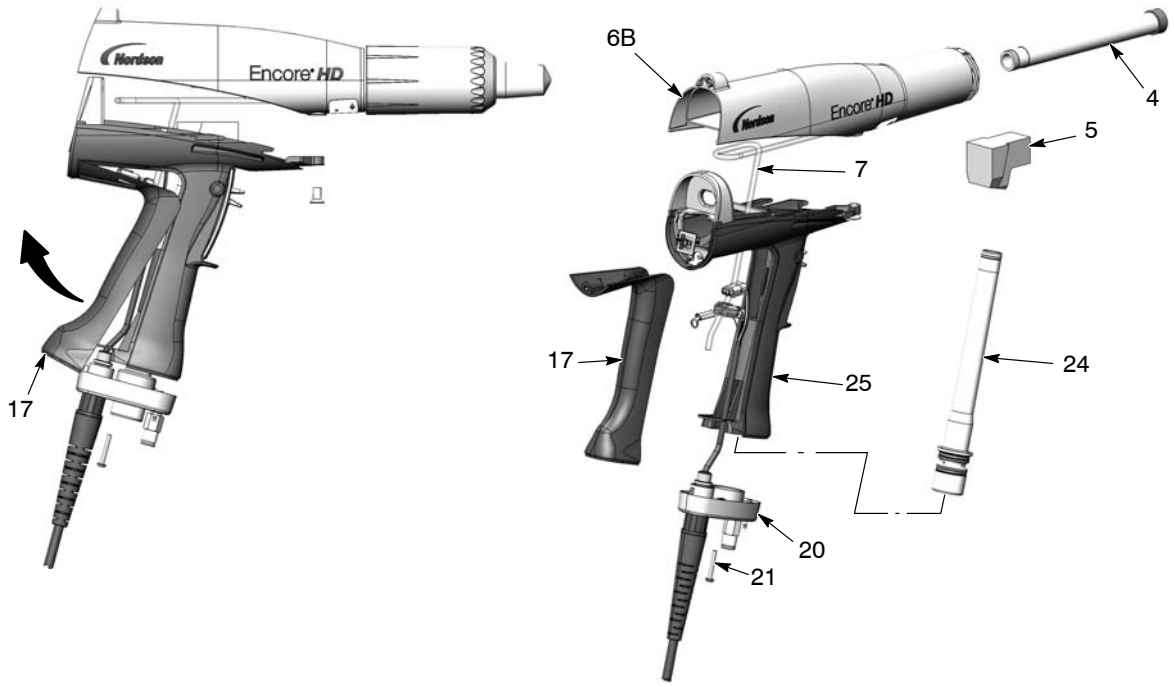


Figure 5-5 Powder Path Replacement

4. Outlet tube kit
5. Elbow
6B. Gun body
7. Filter assembly
17. Ground pad
20. Handle base
21. M3 x 20 screws
24. Inlet tube/hose adapter kit
25. Handle

Gun Re-Assembly

1. See Figure 5-6. Align the gun body with the handle and slide them together, engaging the internal ribs of the gun body with the handle tabs.

NOTE: Make sure that the power supply harness is not pinched between the bulkhead and the power supply.

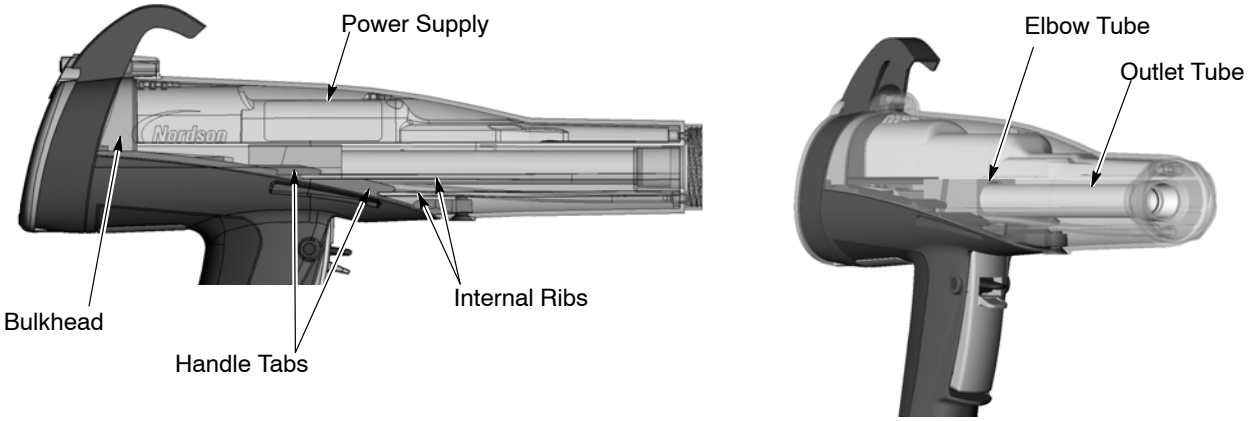


Figure 5-6 Gun Re-assembly

2. Insert your finger into the outlet tube at the front of the gun and align the inside end of the tube with the elbow, then push on the tube to seat it in the elbow.
3. Connect the power supply harness to the gun cable, then tuck both through the bottom hole in the bulkhead, into the gun body.
4. See Figure 5-2. Install the display module as described in *Display Module Installation* on page 5-2.
5. Install the electrode assembly (3) into the the end of the outlet tube at the front of the gun body. Make sure the wire electrode is not bent or broken.

   NOTE: The flat spray and conical nozzles each have their own respective electrode holders.
6. Install the nozzle (2) on the electrode assembly, making sure the keys in the electrode assembly slide into the slots on the nozzle.
7. Install the nozzle nut (1) over the nozzle and rotate clockwise to secure.

Cable Replacement

Cable Removal

1. Disconnect the gun cable from the controller.
2. See Figure 5-7, View A. Remove the two M3 x 20 screws (21) securing the handle base (20) to the handle.
3. Remove the lower M3 x 35 screw (13) from the display module.
4. Pull the base away from the handle enough to free the bottom edge of the ground pad (17) from the base.
5. Pull the bottom edge of the ground pad out and away from the handle.
6. See Figure 5-7, View B. Remove the M3 x 8 screw, lock washer (16, 15), and ground terminal from the ground pad.
7. Remove the retaining ring (18) from the cable.
8. See Figure 5-7, View C. Pull the cable connectors out of the handle. Insert a small flat-bladed screw driver in the slots of the power supply and display connectors to release the catch and disconnect them.
9. Pull the cable out of the handle base, feeding the connectors through the base one at a time.

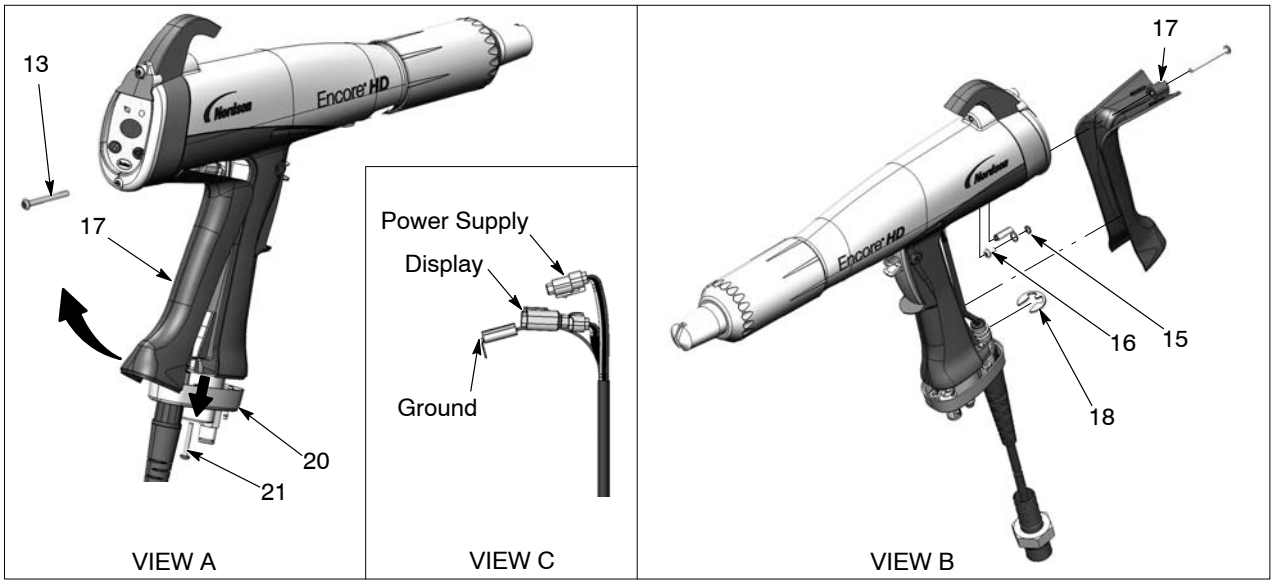


Figure 5-7 Cable Replacement

13. M3 x 35 screw
15. Lock washer
16. M3 x 6 screw
17. Ground pad
18. Retaining ring
20. Handle base
21. M3 x 20 screws

Cable Installation

1. See Figure 5-7. Feed a new cable through the handle base, then install the retaining ring (18) on the cable to hold it in place.
2. Connect the cable to the display module and power supply connectors.
3. Connect the cable terminal to the ground pad (17) with the M3 x 6 screw and lock washer (16, 15).
4. Tuck the cable connectors and ground wire into the gun, below the multiplier.
5. Hook the top of the ground pad into the gun body, then rotate it into position on the handle.
6. Push the handle base (20) up against the handle and ground pad, and tighten securely the two M3 x 20 screws (21) in the base.
7. Re-install the M3 x 35 screw (13) in the bottom of the display module.

Trigger Switch Replacement

Switch Removal

1. Remove the display module and disconnect the trigger switch ribbon cable from the module as described in Display Module Removal on page 5-2.
2. Remove the gun body from the handle as described in *Gun Disassembly* on page 5-4.
3. See Figure 6-8. Pull out the elbow (5) off the inlet tube.
4. Push the small diameter end of the axle (30) out of the handle with a small, flat-ended punch or other tool.
5. Remove the spray trigger (27), actuator (26), and purge trigger (28) from the handle.
6. Use a tool to pry and pull the trigger switch (14) off the handle, then pull it up and out of the handle.

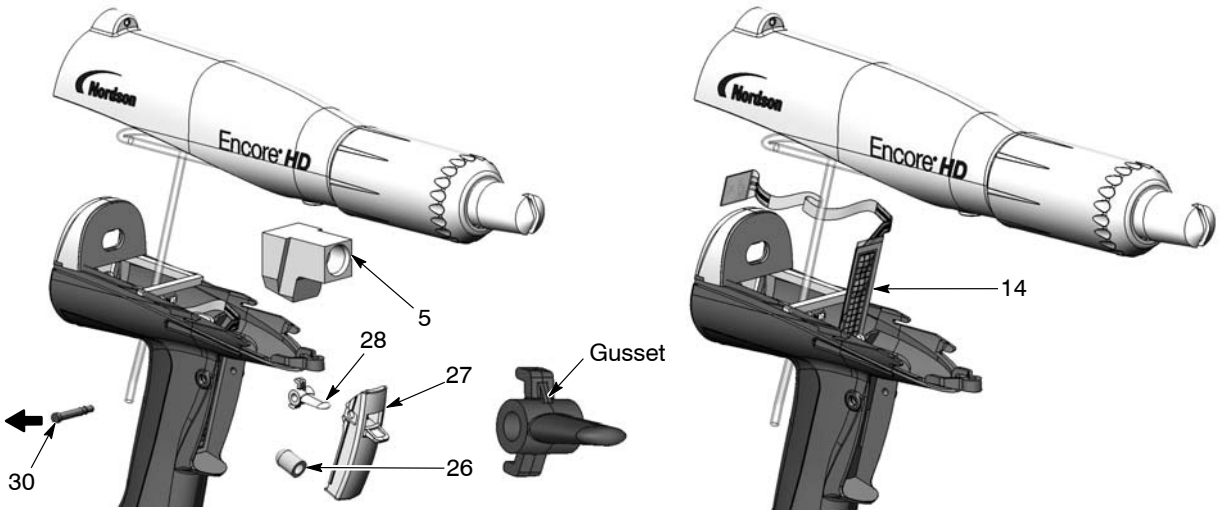


Figure 5-8 Trigger Switch Replacement

Switch Installation

1. See Figure 5-8. Orient the new switch (14) with the grid facing the front of the gun, then carefully feed the square, bottom end of the switch through the slot in the handle.
2. Peel the adhesive release liner from the back of the switch.
3. Carefully install the switch against the bottom and left edges of the trigger recess, pressing the switch against the back of the recess. Run your finger up and down on the switch to ensure it is securely adhered to the handle.
4. Install the purge trigger (28) into the spray trigger (27) with the gusset oriented upward as shown. **Do not install the purge trigger upside down.**
5. Position the triggers in the handle and hold them in place while pressing the axle (31) through the handle and triggers until the head of the axle is flush with the handle. The axle will snap into place when properly installed.
6. Feed the trigger switch ribbon cable through the bottom of the bulkhead and connect the ribbon cable connector to the display module as described in *Display Module Installation* on page 5-2.
7. Re-assemble the gun as described in *Gun Re-assembly* on page 5-8.

Section 6
Troubleshooting

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

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 Nordson technical support at (800) 433−9319 or your local Nordson representative for help.

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 225−335 megohms. If the reading is infinite, switch the meter probes. If the resistance falls outside this range, replace the power supply.

NOTE: There are multiple variables that can affect the Meg−Ohm readings of your meter (temperature and measurement voltage). If the Meg−Ohm meter output voltage differs from the 500 VDC setting, it will have a direct impact on the measurement accuracy. Measurements should also be taken at room temperature 22°C or 72°F. Allow time for the multiplier to cool to room temperature for repeatable results.

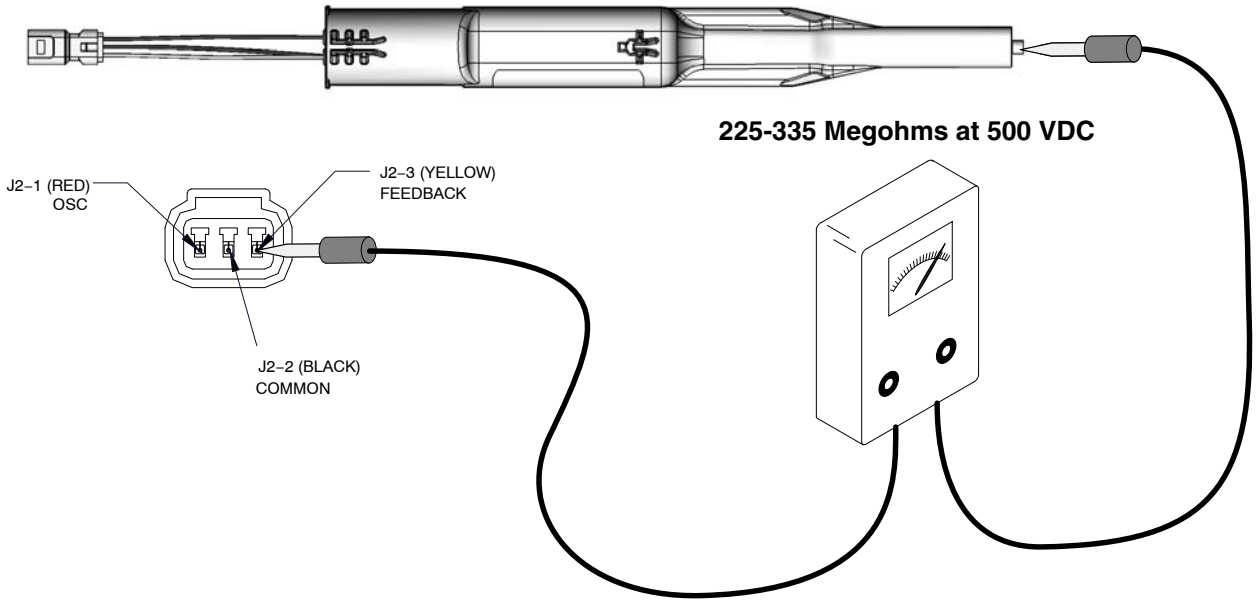


Figure 6-9 Power Supply Resistance Test

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.

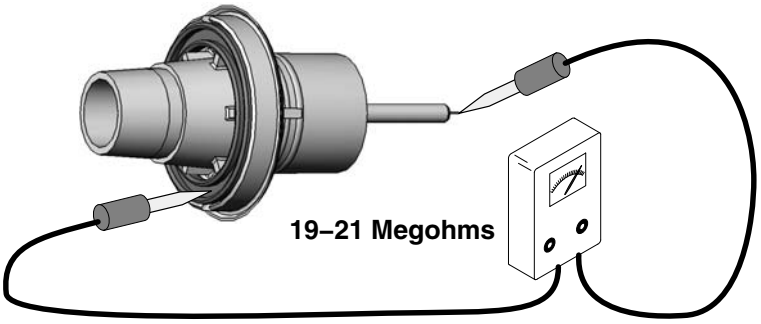


Figure 6-10 Electrode Assembly Resistance Test

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.

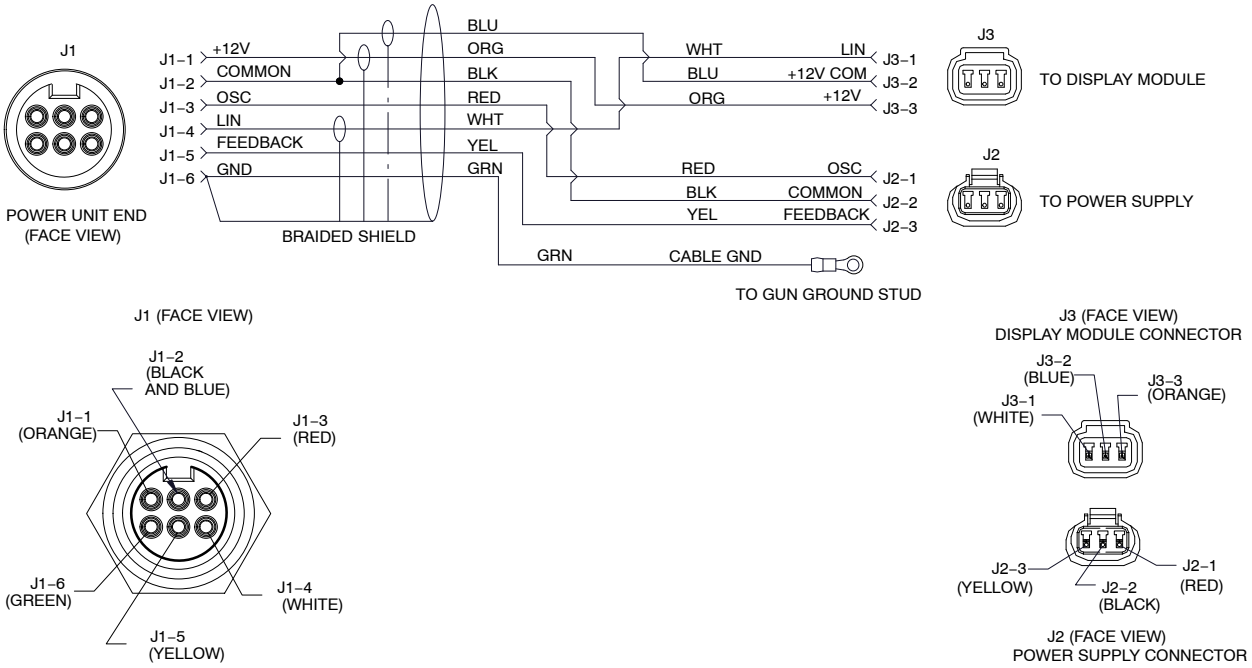


Figure 6-11 Gun Cable Wiring

Section 7
Parts

Introduction

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

This section covers parts and options for the Encore HD manual powder spray gun.

Reference Documentation

For additional information related to other components in the system, reference the following documentation:

Document Title	Document Part Number
Encore HD/XT System Controller Manual	1604870
Encore Cup Gun Kit	1102764
Encore HD Powder Spray Gun Lance Extensions	1604971
Pattern Adjuster Kit for Lance Extensions	1100013
Pattern Adjuster Kit for Encore Manual Spray Guns	1098440

Spray Gun Parts

See Figure 7-1 and the parts list on the following pages.

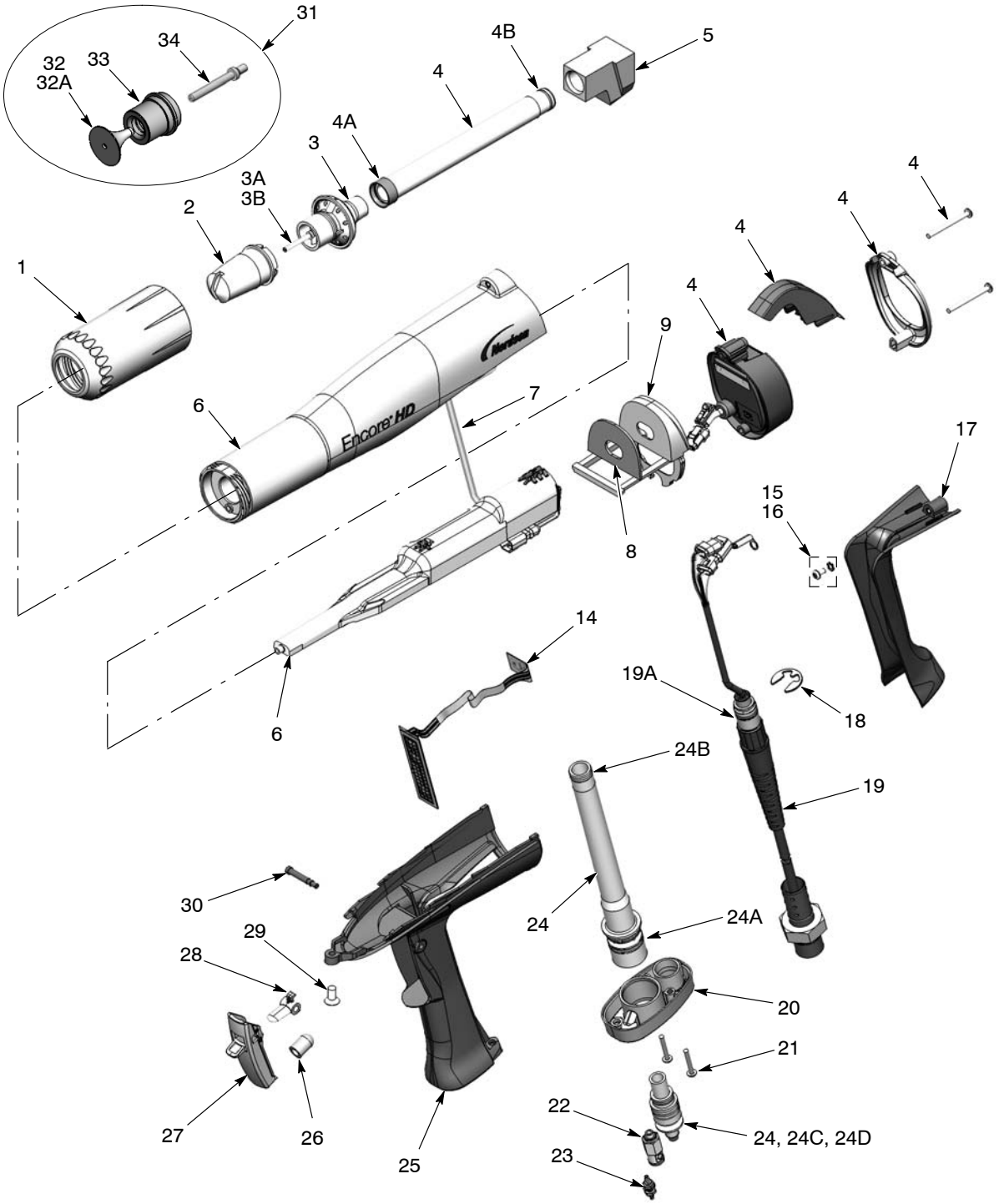


Figure 7-1 Encore HD Manual Spray Gun and Accessories Parts

Spray Gun Parts List

See Figure 7-1.

Item	Part	Description	Quantity	Note
–	1603160	GUN ASSEMBLY, manual, Encore HD	1	
1	1081638	• NUT, nozzle, handgun	1	
2	1081657	• NOZZLE, flat spray, 3 mm	1	A
3	1604824	• ELECTRODE ASSEMBLY, Encore, flat spray	1	F
3A	1106078	• • ELECTRODE, spring contact	1	
3B	1605863	• • HOLDER, electrode, M3, flat spray, Encore	1	F
4	1606082	• KIT, powder outlet tube, Encore HD	1	D
4A	1097527	• • SEAL, tube, powder	1	
4B	1081785	• • O-RING, silicone, 0.468 x 0.568 x 0.05 in.	1	
5	1096695	• ELBOW, powder tube, handgun	1	D
6	1608280	• KIT, neg power supply/manual body, Encore	1	H
7	1088558	• • FILTER ASSEMBLY, handgun		
8	1088502	• GASKET, multiplier cover, handgun	1	
9	1106872	• BULKHEAD, multiplier, handgun, Encore HD	1	
10	1100986	• KIT, handgun display module, Encore	1	
NS	1085631	• • SUPPORT, adhesive, handgun, Encore	1	
11	1087760	• HOOK, handgun	1	
12	1102648	• BEZEL, shield, plated	1	
13	345071	• SCREW, pan head, recessed, M3 x 35, BZN	2	
14	1101872	• KIT, trigger switch, Encore HD	1	
NS	1085631	• • SUPPORT, adhesive, handgun, Encore	1	
15	983520	• WASHER, lock, internal, M3, zinc	1	
16	982427	• MACHINE SCREW, pan head, recessed, M3 x 6, zinc	1	
17	1106871	• HANDLE, ground pad, handgun, Encore HD	1	
18	1081777	• RETAINING RING, external, 10 mm	1	
19	1600745	• CABLE ASSY, handgun, 6 meter, Encore HD	1	E
19A	940129	• • O-RING, silicone, conductive, 0.375 x 0.50in.	1	
20	1087762	• BASE, handle, handgun	1	
21	760580	• SCREW, Philips head, M3 x 20, zinc	2	
22	1081617	• CHECK VALVE, male, M5 x 6 mm	1	
23	1081616	• FITTING, bulkhead, barb, dual, 10–32 x 4 mm	1	
24	1608282	• KIT, inlet tube and hose adapter, Encore HD, Gen 2	1	
24A	1084773	• • O-RING, silicone, 18 mm ID x 2 mm wide	2	
24B	1081785	• • O-RING, silicone, 0.468 x 0.568 x 0.05 in.	1	
24C	1606709	• • O-RING, PUR, 0.551 x 0.07 x 0.7	2	
24D	940137	• • O-RING, silicone, 0.437 x 0.562 x 0.063	1	
25	1600819	• HANDLE, handgun, Encore HD/XT	1	
26	1106892	• ACTUATOR, switch, trigger, Encore HD	1	
27	1606999	• KIT, service, Encore trigger axle/trigger	1	
28	1081540	• TRIGGER, setting, handgun	1	
29	1088601	• SCREW, flat head, recess, M5x 10, nylon	1	

Continued...

Item	Part	Description	Quantity	Note
30	1606998	• AXLE, trigger, spray gun, Encore	1	G
31	1604828	• KIT, conical nozzle, Encore	1	
32	1083205	• DEFLECTOR assembly, conical, 19 mm	1	A
32A	1098306	• • O−RING, Viton, 3 mm x 1.1 mm wide	1	B
32	1083206	• DEFLECTOR assembly, conical, 26 mm	1	A
32A	1098306	• • O-RING, Viton, 3 mm x 1.1 mm wide	1	B
33	1082060	• NOZZLE, conical	1	A
34	1605861	• HOLDER, electrode, M3, conical, Encore	1	
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	1081658	• NOZZLE, flat spray, 4 mm	1	A

NOTE A: 3- and 4-mm flat spray nozzles, conical nozzles, and deflectors are shipped with the 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: Also available in wear resistant material. Refer to *Spray Gun Options*.

E: Optional 6 meter extension available; refer to *Spray Gun Options*.

F: For flat spray nozzle use only. Use kit item 32 to convert for conical nozzle and deflector use.

G: Included with trigger switch kit 1101872.

H: Application Specific: Order part number 1609053 if a positive power supply is needed. The positive power supply is sold separately from the gun body.

Spray Gun Options

Miscellaneous Spray Gun Options

See Figure 7-1.

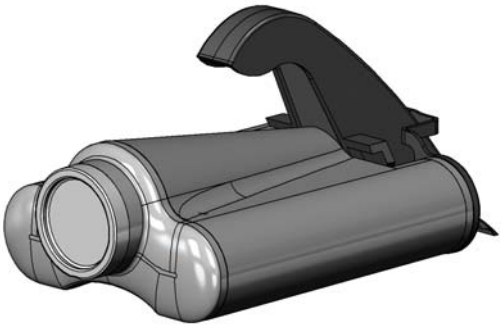
Item	Part	Description	Quantity	Note
4	1096698	KIT, powder outlet tube, wear resistant	1	
4A	1081785	• O-RING, silicone, 0.468 x 0.568 x 0.05 in.	1	
4B	941113	• O-RING, silicone, 0.438 x 0.625 x 0.094 in.	1	
5	1096696	ELBOW, powder tube, Encore, impact resistant	1	
NS	1085168	CABLE, 6-wire, shielded, handgun, 6 meter extension	1	

NS: Not Shown

Spray Gun Options (contd)

nLighten ™

nLighten is an LED inspection kit that helps powder coaters improve quality by effectively illuminating hard to see surface areas. Any imperfection or missed area is quickly identified and corrected. Find out more at: nordsoncoating.com/nLighten.



1611977
nLighten

Figure 7-2 LED Inspection Kit

Flat Spray Nozzles

3- and 4-mm flat spray nozzles are shipped with the spray gun. All other flat spray nozzles are optional.

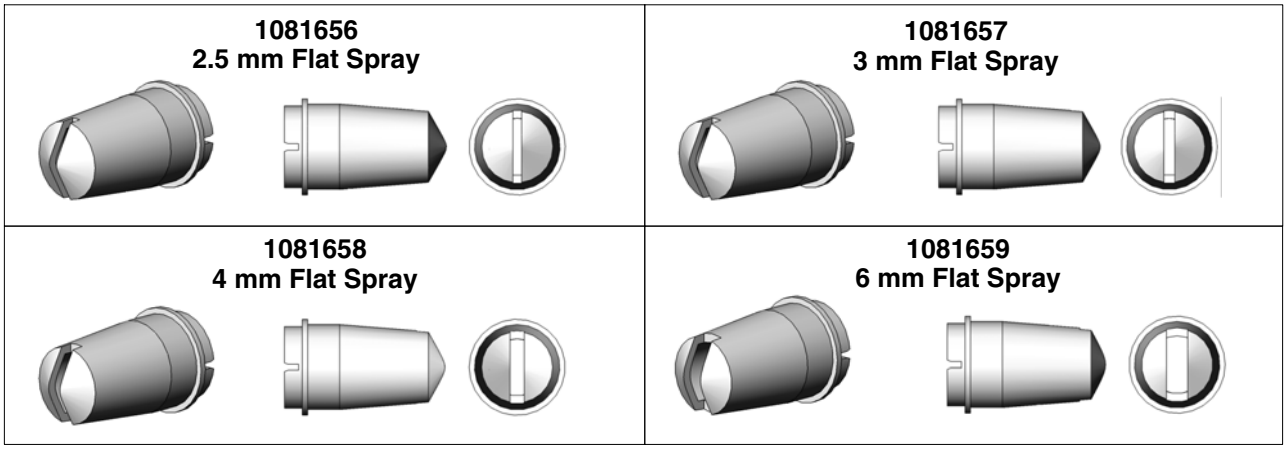


Figure 7-3 Flat Spray Nozzles

Cross Cut Nozzles

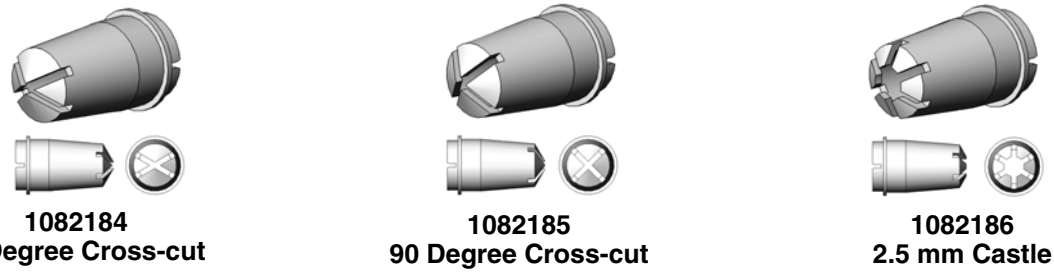


Figure 7-4 Cross-cut Nozzles

45-Degree Corner-Spray Nozzle

See Figure 7-5.

Spray Pattern	Wide fan pattern perpendicular to the spray gun axis
Slot Type	Angled, cross slot
Application	Flanges and recesses

Part	Description	Note
1102872	NOZZLE, corner spray, Encore	

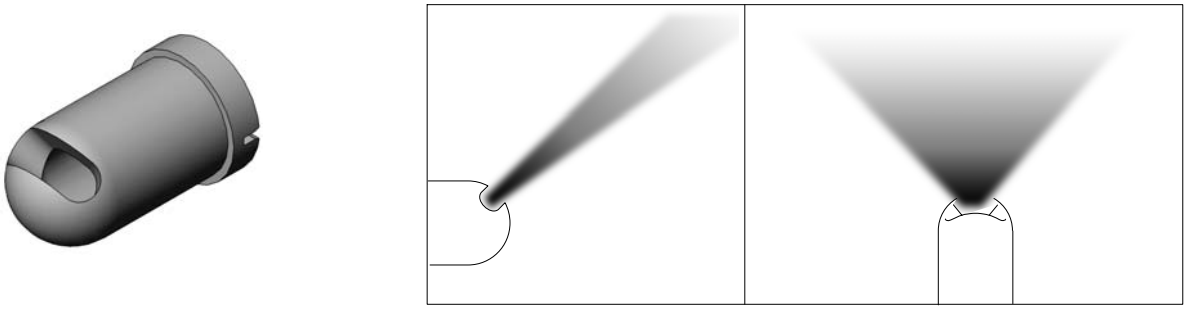


Figure 7-5 45-Degree Corner Spray Nozzle

45-Degree In-Line Flat-Spray Nozzle

See Figure 7-6.

Spray Pattern	Narrow fan pattern in-line with spray gun axis
Slot Type	Three angled slots in-line with spray gun axis
Application	Top and bottom coating; typically no in/out part positioning

Part	Description	Note
1102871	NOZZLE, 45 degree, flat spray, Encore	

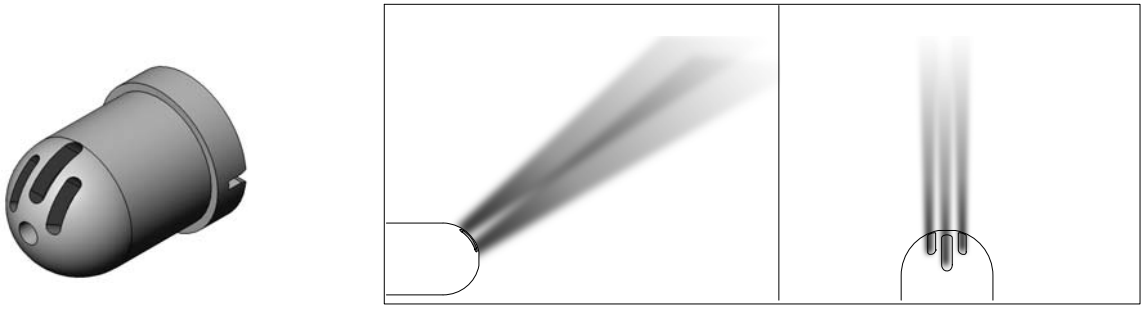


Figure 7-6 45-Degree Flat Spray Nozzle

Conical Nozzle, Deflectors and Electrode Assembly Parts

See Figures 7-7, 7-8, and 7-9. The conical nozzle and deflectors must be used with the conical electrode holder. One conical nozzle kit (1604828) and one 19 mm deflector (1083205) are shipped with the gun. Other parts shown here are optional and must be ordered separately.

Conical Nozzle and Deflectors

1082060 Conical Nozzle | **1083201 16-mm Deflector** | **1083205 19-mm Deflector** | **1083206 26-mm Deflector** | **1083207 38-mm Deflector**

All deflectors include a 1098306 O-ring, Viton, 3 mm x 1.1 mm wide

Figure 7-7 Conical Nozzle and Deflectors

Conical Nozzle Kit (shipped with gun)

26-mm Deflector | **Conical Nozzle** | **Conical Electrode Holder**

Figure 7-8 Conical Nozzle Conversion Kit

Part	Description	Quantity	Note
1604828	KIT, conical nozzle, Encore	1	
1083206	• DEFLECTOR, 26 mm	1	
1082060	• NOZZLE, conical	1	
1605861	• ELECTRODE HOLDER, conical	1	A
NOTE A: The conical nozzle requires a different style electrode holder than what is used in the flat spray nozzle electrode assembly.			

Conical Nozzle, Deflectors and Electrode Assembly Parts (contd)

Conical Electrode Assembly

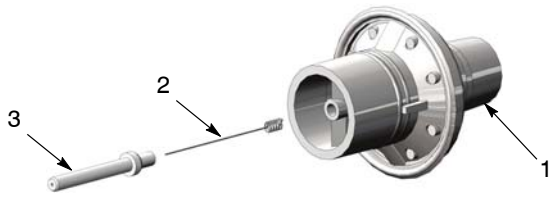
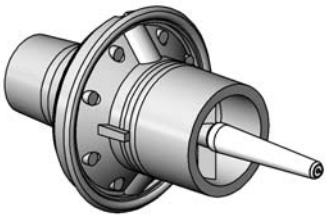


Figure 7-9 Conical Electrode Assembly

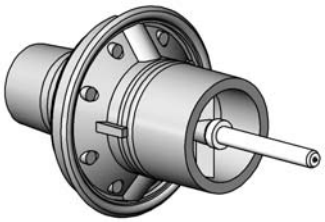
Item	Part	Description	Quantity	Note
—	1106076	ELECTRODE ASSEMBLY, conical, Encore	1	
1	------	• ELECTRODE SUPPORT	1	
2	1106078	• ELECTRODE	1	
3	1605861	• ELECTRODE HOLDER, Conical	1	A
NOTE A: The conical nozzle requires a different style electrode holder than what is used in the flat spray nozzle electrode assembly.				

XD Electrode Support

The XD (extended duty) Electrode Support provides 2 to 3 times longer wear life than that of the standard duty electrode support.



1613834
XD Flat Spray Electrode Support

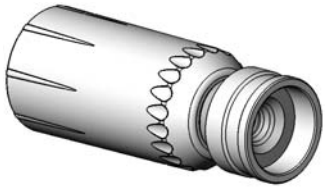


1613835
XD Conical Spray Electrode Support

Figure 7-10 Conical Spray and Flat Spray Electrode Supports

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 and must be ordered separately.



1098417
Encore HD Manual Gun Pattern Adjuster Kit

Figure 7-11 Pattern Adjuster Kit

Lance Extensions

The nozzles listed on the preceding pages install directly on the lance extensions. Refer to the instruction sheet shipped with the lance extensions for installation instructions and repair parts.

NOTE: A conical electrode holder is required for use with conical deflectors and lance extensions. See page 7-8.

Part	Description	Note
1604965	EXTENSION, lance, 150 mm, Encore HD	A
1604970	EXTENSION, lance, 300 mm, Encore HD	A
NOTE A: If a longer lance extension is required, contact your Nordson representative.		

Ion Collector Kit

This kit installs on the standard length gun. Refer to the instruction sheet shipped with the spray gun for installation instructions and repair parts.

Part	Description	Note
1603854	KIT, ion collector assembly, manual, Encore (std length gun)	

Ion Collector Components for Lance Extensions

To use the ion collector kit listed above with 150-mm or 300-mm Lance Extensions, order one of the rods and the bracket listed below. Refer to the instruction sheet shipped with the kit for installation instructions.

Item	Part	Description	Quantity	Note
—	189483	ROD, ion collector, 15 in.	1	A
—	189484	ROD, ion collector, 21 in.	1	B

NOTE A: Use for 150-mm lance extension.
B: Use for 300-mm lance extension.

Powder Hose and Air Tubing

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

Part	Description	Note
1081783	Powder hose, 6 mm ID x 8 mm OD, polyolefin (by 100 ft)	B, E
1080388	Powder hose, 6 mm ID x 8 mm OD, polyolefin (by 500 ft)	C, E
1606690	Clear powder hose, 6 mm ID x 8 mm OD, polyurethane (by 100 ft)	A, F
1606695	Clear powder hose, 6 mm ID x 8 mm OD, polyurethane (by 500 ft)	C, F
900617	Air tubing, polyurethane, 4 mm, clear, electrode air wash	A
900742	Air tubing, polyurethane, 6 mm, blue, pattern air	A
1096789	Air tubing, antistatic, 6/4 mm, black (conductive air tubing), VBF pickup tube to controller	D
900741	Air tubing, polyurethane, 6 mm, black	
900618	Air tubing, polyurethane, 8 mm, blue	A
900619	Air tubing, polyurethane, 8 mm, black	A
900740	Air tubing, polyurethane, 10 mm, blue, main air IN	A
900517	Tubing, poly, spiral cut, 0.62 in. ID, dress out	
301841	Strap, Velcro, w/buckle, 25 x 3 cm, dress out	

NOTE A: Minimum order quantity is 50 ft.
B: Minimum order quantity is 100 ft.
C: Minimum order quantity is 500 ft.
D: This tubing is used on VBF systems to provide fluidizing air from the bulkhead union to the pickup tube. It is conductive and grounds the pickup tube to the cart body. Do not replace with non-conductive tubing.
E: Standard powder hose delivered with system.
F: Optional powder hose to use in place of the standard polyolefin.

This page intentionally left blank.

Encore® HD Pump

Customer Product Manual
Document Number 1605708-09
Issued 10/23

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

This document is subject to change without notice.
Check http://emanuals.nordson.com for the latest version.

NORDSON CORPORATION • AMHERST, OHIO • USA

Table of Contents

Contact Us
Nordson Corporation welcomes requests for information, comments, and inquiries about its products. General information about Nordson can be found on the Internet using the following address:
http://www.nordson.com.
Address all correspondence to:
Nordson Corporation
Attn: Customer Service
555 Jackson Street
Amherst, OH 44001

1605708-09

Change Record

Revision	Date	Change
01	11/17	Initial Release
02	03/18	Added CE mark and new DOC14045-01.
02_update	12/18	1093557 was 1903557.
03	06/19	Added repair and parts information on gaskets 1608603 and 1613013. Updated parts lists with 940175, 940137, 983401, 1616440.
04	09/19	Removed washer from assembly and corrected part number for fluidizing tube kit and check valve kit. Updated torque for pump screw.
05	09/20	Replacing screw.
06	03/21	Added anti-static tubing kit (1620023)
07	05/21	Updated specifications and gasket.
08	06/22	Updated approval information.
09	10/23	Removed P/N 1620004 & P/N 768181, Added P/N 7035356 per tubing consolidation

Safety

Introduction

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

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

Qualified Personnel

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

Intended Use

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

Some examples of unintended use of equipment include:

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

Regulations and Approvals

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

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 (SDS) 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.

- Ground all conductive equipment. Use only grounded air and fluid hoses. Check equipment and workpiece grounding devices regularly. Resistance to ground must not exceed one megohm.
- Shut down all equipment immediately if you notice static sparking or arcing. Do not restart the equipment until the cause has been identified and corrected.
- Do not smoke, weld, grind, or use open flames where flammable materials are being used or stored. Do not heat materials to temperatures above those recommended by the manufacturer. Make sure heat monitoring and limiting devices are working properly.
- Provide adequate ventilation to prevent dangerous concentrations of volatile particles or vapors. Refer to local codes or your material SDS for guidance.
- Do not disconnect live electrical circuits when working with flammable materials. Shut off power at a disconnect switch first to prevent sparking.
- Know where emergency stop buttons, shutoff valves, and fire extinguishers are located. If a fire starts in a spray booth, immediately shut off the spray system and exhaust fans.
- Shut off electrostatic power and ground the charging system before adjusting, cleaning, or repairing electrostatic equipment.
- Clean, maintain, test, and repair equipment according to the instructions in your equipment documentation.
- Use only replacement parts that are designed for use with original equipment. Contact your Nordson representative for parts information and advice.

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

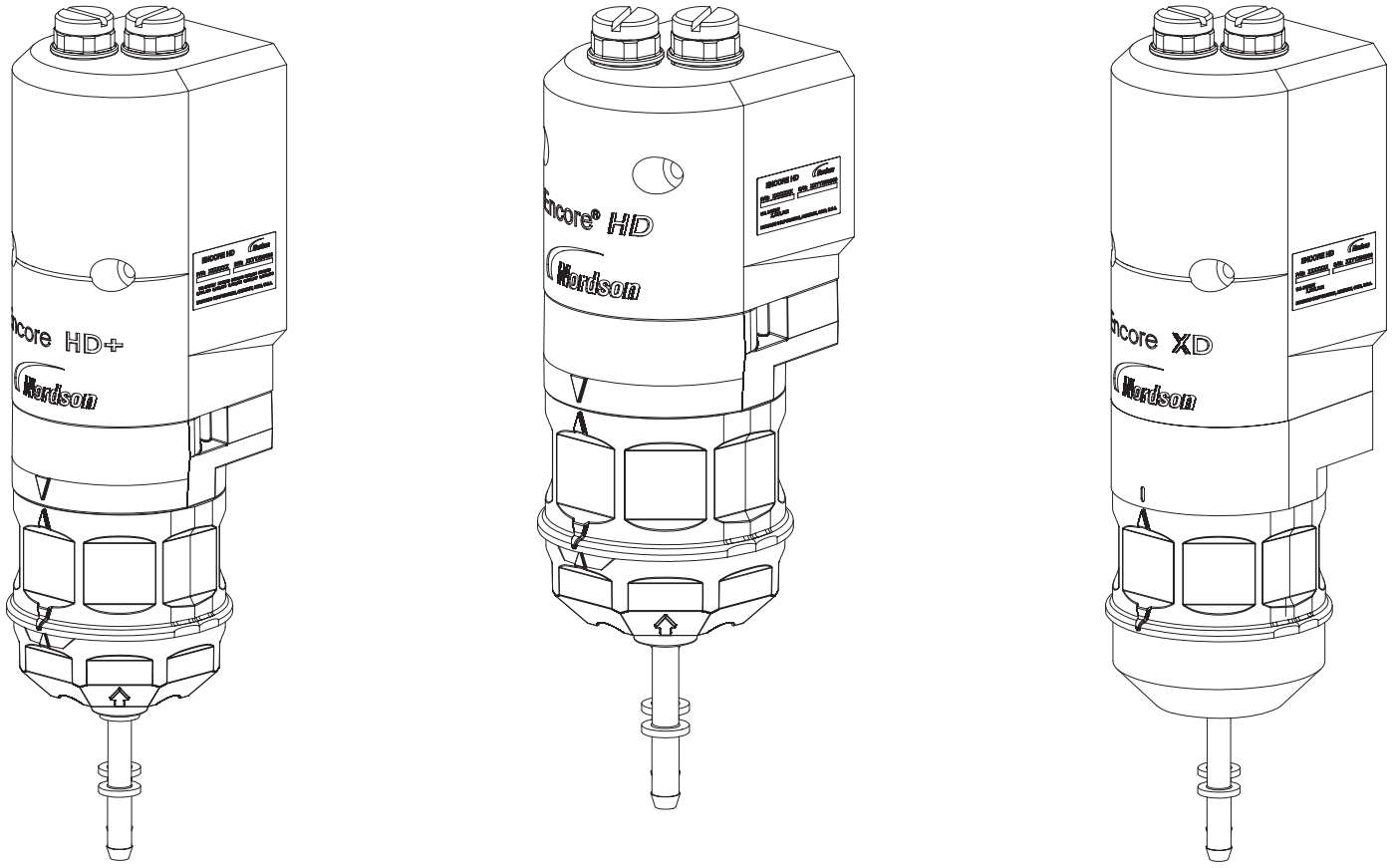
Disposal

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

Description

Pump

See Figure 1. The Encore HD, HD+, and XD powder feed pump transports precise amounts of powder from a feed source to a powder spray gun.



Encore HD+ **Encore HD** **Encore XD**

Figure 1 Encore HD Pump Dispenser

Features and Benefits

- Standard pump (HD) has blue pinch valves, molded Y blocks and standard porous tubes.
- High flow pump (HD+) is the same as a standard pump except for high flow spacing block and high flow porous tubes.
- Extreme duty pump (XD) is the same as a high flow pump except for machine tivar Y blocks and high temperature pinch valves.
- Higher powder output.
- Improved uniformity of powder output.
- Maintains high reliability of pinch valves.
- One screw maintenance design.
- Easier filter replacement.
- Improved gasket design.
- Centralized wear parts.
- Over torque protection.

Pump Components

See Figure 2.

Item	Description	Function
1	Purge Air Fittings and Check Valves	Route high pressure purge air through the pump. Check valves prevent powder contamination of the purge valves.
2	Fluidizing Tubes	Porous cylinders that draw powder into the pump when a vacuum is applied, and force powder out of the pump when air pressure is applied.
3	Purge Manifold	Contains the fluidizing tubes, check valves, and air passages.
4	Upper Y Block	Interface between the pinch valves and the porous tubes; consists of two Y-shaped passages that join the inlet and outlet branches of either half of the pump.
5	Pinch Valves	Open and close to allow powder to be drawn in or dispensed out of the fluidizing tubes.
6	Pinch Valve Body	Houses the pinch valves. Made from clear plastic allowing for visual inspection of the pinch valves.
7	Lower Y Block	Connect the inlet and outlet fittings to the pinch valves on either half of the pump.
8	Inlet Fitting	Connects to the tubing leading from the power source
9	Outlet Fitting	Connects to the tubing leading to the powder spray gun

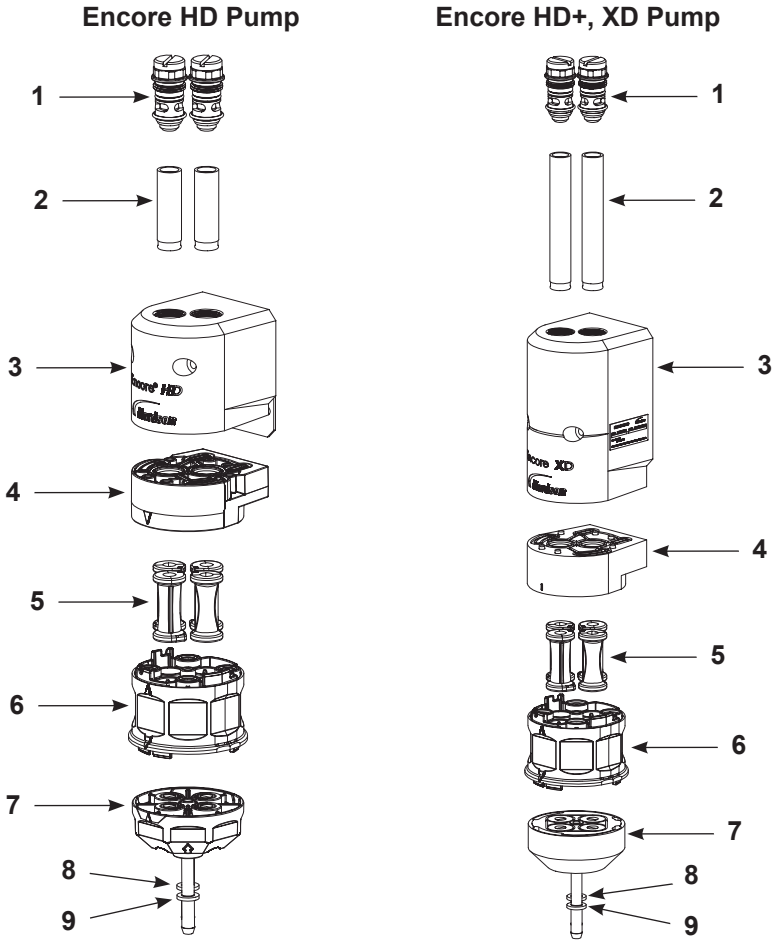


Figure 2 Encore Pump Components

Theory of Operation

Pumping

The Encore HD pump consists of two halves that function identically. The halves alternately draw powder in and dispense powder out of the pump; while one half is drawing powder in, the other half is dispensing powder out.

Left Half Drawing Powder In

See Figure 3.

The left suction pinch valve is open, while the left delivery pinch valve is closed. Negative air pressure is applied to the left porous fluidizing tube, which draws powder in the inlet fitting, up the left side of the inlet manifold wear block, through the left suction pinch valve, and into the left fluidizing tube.

After the negative air pressure has been on for the specified time, the fluidizing tube's negative air pressure shuts off and the left suction pinch valve closes.

Right Half Dispensing Powder Out

See Figure 4.

The right suction pinch valve is closed, while the right delivery pinch valve is open. Positive air pressure is applied to the right porous fluidizing tube, which dispenses the powder out of the fluidizing tube, down the right delivery pinch valve, down the right side of the outlet manifold wear block, out the delivery fitting, and out to the tubing that leads to the powder spray gun.

As the sides complete these processes, they alternate. In the example explained above, the left half would now dispense powder out while the right half would draw powder in.

As each half dispenses powder out, the powder in the tubing blends together, resulting in a consistent flow of powder from the spray gun.

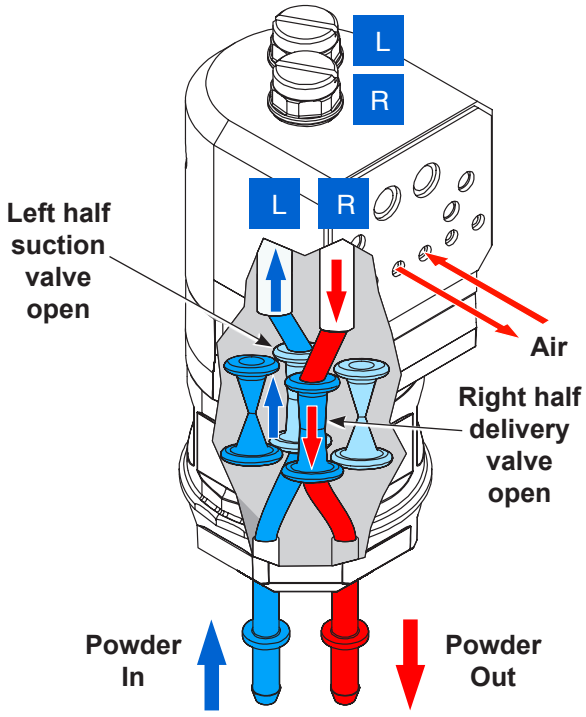


Figure 3 Left Side Drawing In, Right Side Dispensing

NOTE: Illustration is viewed from the right, rear of the pump.

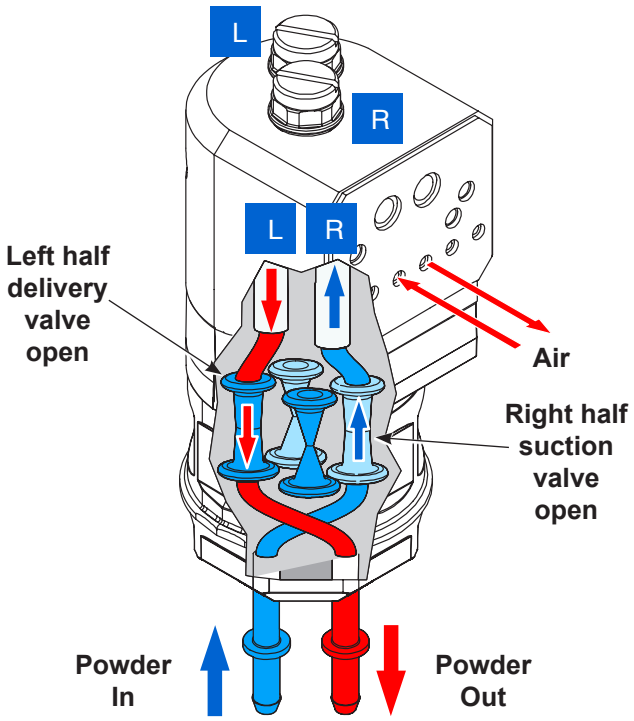


Figure 4 Left Side Dispensing, Right Side Drawing In

Purging

See Figure 5. When the operator initiates a color change, the pump goes through a three-stage purge process.

Stage 1: Soft Purge to Spray Gun

The suction pinch valves close, while the delivery pinch valves remain open. Pump assist air pressure turns on, starting at a low pressure and building up to maximum pump assist pressure. The air dispenses powder out of both fluidizing tubes, through the powder delivery tubing and spray gun and out into the booth.

Stage 2: Soft Purge to Feed Source

The suction pinch valves are open, while the delivery pinch valves close. Pump assist air pressure turns on, starting at a low pressure and building up to maximum pump assist pressure. The air dispenses powder out of both fluidizing tubes, through the powder suction tubing, and back into the powder feed source.

Stages 3 and 4: Hard Purge to Spray Gun and Feed Source

The delivery pinch valves open. Pump assist air pressure turns on at maximum pressure, while pulses of line air pressure are sent down the purge air fittings at the tops of the fluidizing tubes. The pulses of air remove any powder that remains in the pump, spray gun, and suction and delivery tubing.

After the delivery side is purged, the delivery pinch valves close and the suction pinch valves open. The suction side is purged in the same way as the delivery side.

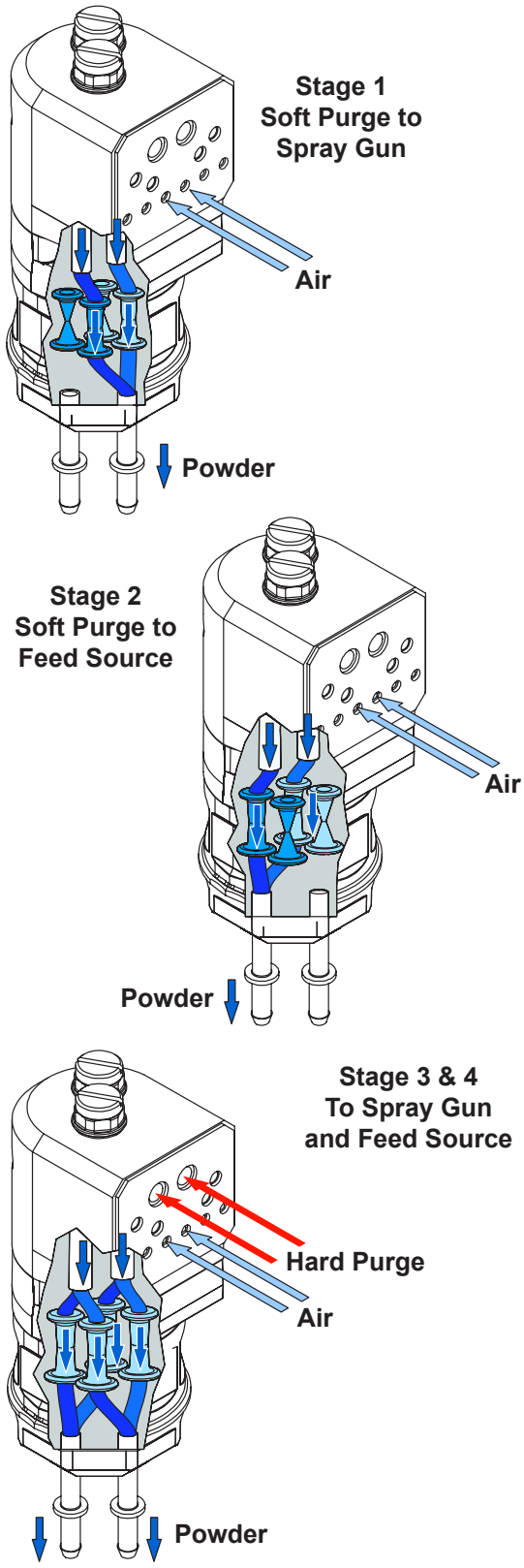


Figure 5 Purging Operation

Pump Port Functions

Figure 6 identifies the functions of the ports on the rear face of the pump.

Position	Function
1	Right Side Suction Pinch Valve
2	Right Side Delivery Pinch Valve
3	Right Side Fluidizing Tube
4	Left Side Fluidizing Tube
5	Left Side Delivery Pinch Valve
6	Left Side Suction Pinch Valve

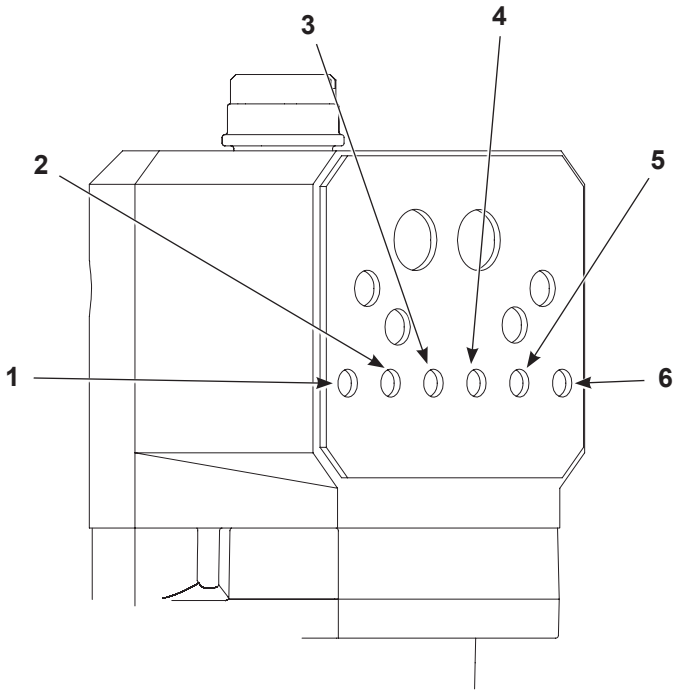


Figure 6 Pump Port Functions

Operation

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

CAUTION: Do not adjust the regulators inside the pump cabinet. The regulators are factory set and should not be adjusted without guidance from your Nordson representative.

Pump operation is controlled through the spray gun controller. Refer to the *Operation* section of the *Encore Manual Spray Gun Controller* manual for specific instructions.

Pump operation is controlled by specifying a set point from 0-100 (which translates to a percent of flow) at the spray gun controller. At the pump, each set point results in a predefined cycle rate. Increasing the cycle rate increases the powder delivery rate. Decreasing the cycle rate decreases the powder delivery rate.

The manifold also has a spray gun pattern air flow control valve. spray gun pattern air is controlled by setting the flow rate (in either scfm or m3/hr) at the spray gun control unit.

NOTE: When the fluidizing tubes become clogged with powder, the powder delivery rate decreases The spray gun controller will generate a fault to indicate this condition and notify you that it is time to replace the fluidizing tubes. Correct vacuum reading is (9-14 in. Hg).

Specifications

See Figure 7.

Standard Pump Output (Maximum)	
HD: 80 lb/hour (600 g/min) HD+, XD: 100 lb/hour (750 g/min)	
Air Consumption	
Conveying Air	12.5-31 l/min (0.438-1.1 scfm)
Gun Pattern Air	6-57 l/min (0.2-2.0 scfm)
Total Consumption	85-170 l/min (3-6 scfm)
Operating Air Pressure	
Pinch Valves	37 psi (2.6 bar)
Flow Control (to pattern air/ pump assist)	85 psi (5.9 bar)
Vacuum Generator	80 psi (5.5 bar)
Powder Tubing	
Size	8 mm OD x 6 mm ID
Length	Output: 18.3 m (60 ft) Input: 3.5-12 ft (1-3 m)

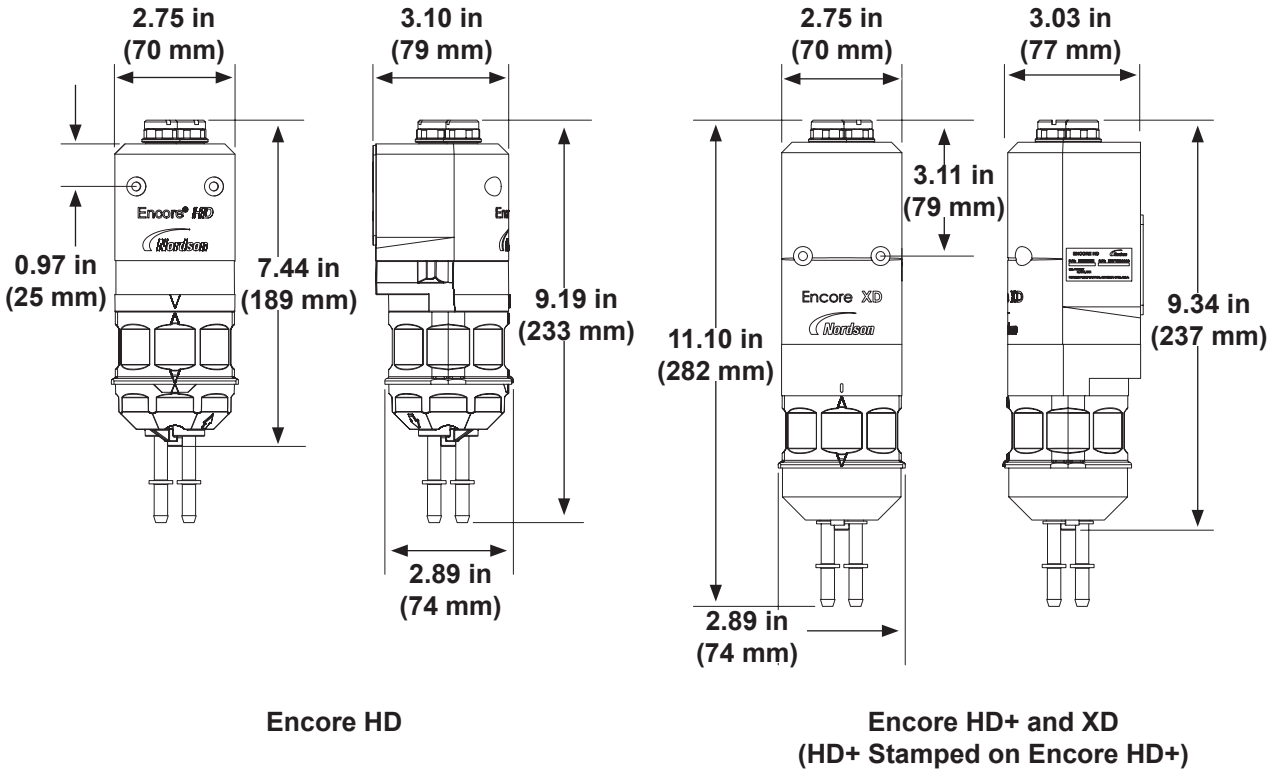


Figure 7 Encore Pump Dimensions

Installation

Pump Tubing Installation

See Figure 8.

Standard 8 mm OD Poly Tubing

NOTE: Cut the poly tubing with a tubing cutter. Powder cross-contamination may result if the powder tubing is cut unevenly.

Install the poly tubing (3) into the lower Y block (1) and push to internal connector fitting (not shown).

Flexible 8 mm OD Tubing

NOTE: The barbed adapters used to connect flexible tubing to the pump are shipped with the pump.

1. Install the end of the adapter (2) into the lower Y block (1). Push to internal connect fitting.
2. Push the flexible powder tubing (4) over the barbed ending of the adapter (2).

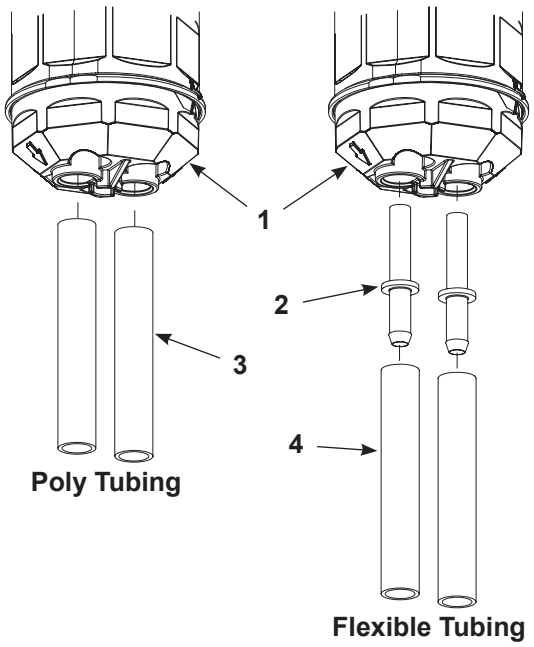


Figure 8 Powder Tubing Installation

Antistatic 8.2 mm OD/5.6 mm ID Tubing

Refer to the *Encore HD Antistatic Tubing Grounding Kit* instruction sheet (1620023). Only used with Encore HD Antistatic Tubing Grounding Kit.

Installing the Pump Gasket

See Figure 9.

NOTE: Pump gasket depicted here is not applicable to pumps used with Encore HD pump module.

NOTE: If replacing a damaged gasket with a new gasket, refer to the *Replacing Pump Gasket* on page 23.

Remove the sticker backing from gasket (1) and place on the pump (2), aligning the holes of the gasket (1) with the port holes on the pump (2).

CAUTION: Ensure gasket is not covering any of the port holes on pump. A second gasket is provided with pumps as an additional spare.

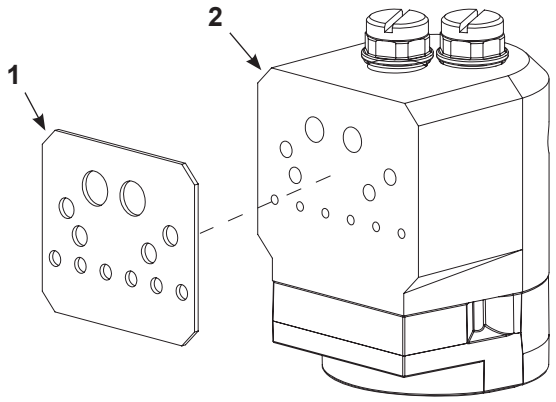


Figure 9 Replacing the Pump Gasket

Pump to Cabinet, Panel, or Housing

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

Follow the below instructions to install the pump to an existing pump panel.

See Figure 10.

1. Make sure that the gaskets on the pump (1), are not damaged, replace them if necessary.
2. Line the pump to the appropriate mounting location on the cabinet wall or housing (3). See *Pump Port Functions* on page 7 for port locations.
3. Secure the pump hand tight to the cabinet wall with the pump mounting hardware (2).
4. Tighten all hardware securely.

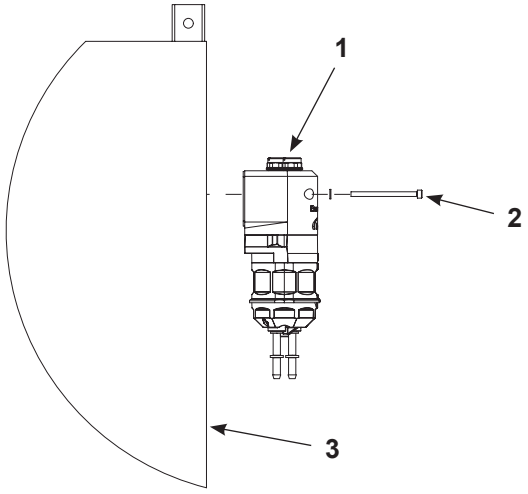


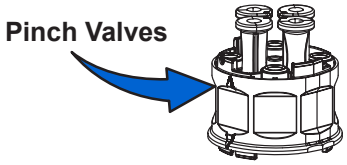
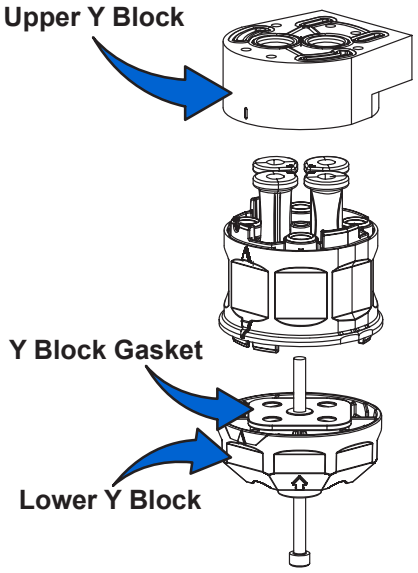
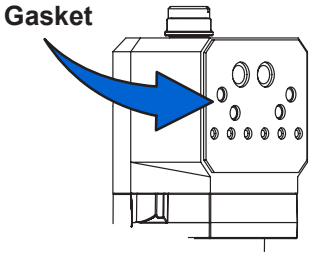
Figure 10 Pump Mounting to Cabinet

Maintenance

Perform these maintenance procedures to keep your pump operating at peak efficiency.

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

NOTE: You may have to perform these procedures more or less frequently, depending on factors such as operator experience and type of powder used.

Frequency	Part	Procedure
Daily Visual Inspection		Inspect the pinch valve body for signs of powder leakage. If powder is seen in the pinch valve body or there are stress cracks in the pinch valves, replace the pinch valves and filter discs.
Every Six Months **or** **Each Time the Pump Is Disassembled**		**NOTE:** To reduce downtime, keep a spare upper manifold and set of lower wear blocks in stock to install while the other set is being cleaned. Disassemble the pump and inspect the lower Y block and upper Y-block for signs of wear or impact fusion. Clean these parts in an ultrasonic cleaner if necessary. Replace the Y block gasket. **NOTE:** Y block gasket must be replaced any time the pump is disassembled. **NOTE:** Torque screw to 25-30 in.-lb (2.8-3.4 N●m) for assembly.
		Inspect the gasket for damage. Replace if necessary.

Troubleshooting

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

These troubleshooting procedures cover only the most common problems that you may encounter. If you cannot solve the problem with the information given here, call the Nordson Finishing Customer Support Center at (800) 433-9319 or contact your local Nordson representative for help.

Problem	Possible Cause	Corrective Action
1. Reduced powder output (pinch valves are opening and closing)	Blockage in the powder tubing to the spray spray spray gun.	Check the tubing for blockages. Purge the pump and spray gun.
	Defective pump air flow control valve.	Clean the pump air flow control valve. If the problem persists, replace the pump air flow control valve.
	Defective pump check valve.	Replace the check valves.
2. Reduced powder output (pinch valves are not opening and closing)	Defective pinch valve.	Replace the pinch valves and filter discs.
	Defective solenoid valve.	Replace the solenoid valve. Refer to the *Encore HD Pump Control Unit and Power Supply* or *Encore HD Pump Module* manual (per application) to determine which solenoid valve controls the affected pinch valve.
	Defective pump check valve.	Replace the check valves.
3. Reduced powder input (loss of suction from feed source)	Blockage in the powder tubing from the feed source.	Check the tubing for blockages. Purge the pump and spray gun.
	Loss of vacuum at the vacuum generator.	Check the vacuum generator for contamination. Check the pump panel exhaust muffler. If the exhaust muffler appears to be plugged, replace it.
	Defective pump air flow control valve.	Clean the pump air flow control valve. If the problem persists, replace the pump air flow control valve.
4. Spray gun fan pattern changes	Defective pattern air flow control valve	Clean the pattern air flow control valve. If the problem persists, replace the pattern air flow control valve.

Continued...

Problem	Possible Cause	Corrective Action
5. Powder inside spray gun inlet adapter	Internal nozzle O-ring worn.	Replace the internal nozzle O-ring.
	Powder delivery hose not seated properly in tubing adapter.	Loosen the retaining nut to remove the nozzle and retaining nut assembly. Pull the tubing adapter from the end of the flexible powder tube. Loosen the lock knob and gently pull the flexible powder tubing out of the spray gun adapter. Clean the surfaces. If the end of the feed tubing is damaged, cut the damaged end off with a tube cutter. Remove the set screw and inlet adapter from the spray gun. Blow the adapter and powder tube clean. Install the inlet adapter. Feed the flexible powder tubing through the inlet adapter. Tighten the lock knob. Install the tubing adapter on the tube then gently pull the tube back until the adapter stops against the flange. Install the nozzle and retaining ring.
6. Air leaking around end cap	Multiplier gasket worn.	Replace the multiplier gasket.
7. Powder tubing too stiff	Spiral wrap too close to the spray gun.	Remove any spiral wrap that is within 24 in. of the spray gun handle.
8. Streams of powder disrupting uniform spray pattern	Pattern air setting too low.	Increase the pattern air setpoint.
	Nozzle plugged.	Remove the nozzle, disassemble, and clean.
	Input air pressure too low.	Increase the input air pressure.
	Calibration constants incorrect.	Verify that the calibration constants on the manifold match what is entered in the manual spray gun controller.
9. Powder delivery problems: Surging, fading, intermittent flow, low flow	Assist air compensation incorrect.	Increase or decrease the assist air compensation setting for the current preset.
		Set the controller to a positive number if the spray gun is surging.
		Set the controller to a negative number if the spray gun is fading.
	Fluidizing air pressure incorrect	Increase or decrease the fluidizing air pressure. The powder should be gently boiling.
	Powder damp or contaminated	Check the air driers and filter/separators. Check the powder in the feed hoppers and make sure it flows easily.

Continued...

Problem	Possible Cause	Corrective Action
9. (cont.) Powder delivery problems: Surging, fading, intermittent flow, low flow.	Suction tubing too long.	Move the hoppers closer to the pump and shorten the suction tube length. The tube length must be less than 12 ft. from the powder feed.
	Suction or delivery tubing blocked or kinked.	Check the tubing. Blow out the tubing or replace it as necessary.
	Pump panel regulator pressure incorrect.	Adjust the regulators in the pump panel to the proper pressures. Refer to *Delivery Check* on page 18 for the proper pressure settings.
	Pump adapter 8-mm tube fitting loose.	Tighten the 8-mm tube fitting.
	Pump mount O-rings worn.	Replace the pump mount O-rings. Refer to your pickup tube instruction sheet or hopper manual for part numbers.
	Pickup tube not tightly threaded into pump mount.	Tighten the pickup tube into the pump mount.
	Air leaking around lock knob.	Replace the lock knob O-ring.
	Pump inlet tube retaining nut or O-ring loose.	Check the O-ring and tighten the retaining nut. Check the barbed tubing adapter for wear. Check for air leaks between the manifold and cabinet and between the manifold and pump.
	Improper delivery tubing arrangement.	The delivery tubing must be arranged in a 3-ft. coil and be parallel to the ground.
	Delivery tubing length is not to specification.	The delivery tubing must be 60 ft from the pump to the spray gun.
	Problem with pump or pump control manifold.	Perform *Vacuum Check* procedure on page 16. (Requires 0-30 in. Hg vacuum gauge.)
10. Pump is bad, requires repair (Suction Check)	Fluidizing tube blinded or plugged.	Replace the fluidizing tubes. Verify O-rings are in place. If missing, powder buildup could occur in the muffler. **NOTE:** The filter discs must be installed flush with the aluminum body. If the discs are even slightly raised, the gasket will leak, causing the pump to malfunction.
	Pinch valve leaking.	Replace the pinch valves and filter disks.
	Lower Y-block plugged.	Remove and clean the lower Y-blocks.

Continued...

Problem	Possible Cause	Corrective Action
11. Control manifold is bad, requires repairs (Suction Check)	Pump manifold valves 2 and 5 are contaminated with powder.	Remove and inspect the valves. If they are contaminated, blow out the manifold and replace the valves. **NOTE:** If using an old harness with three positions, use the supplied adapter. If using a new harness with two positions, the supplied adapter can be discarded.
	Vacuum generator is blocked.	Remove and inspect the vacuum generator venturi nozzle. If it is blocked, blow it out or replace the vacuum generator. 1. Remove the vacuum generator at the manifold. Check for vacuum with your finger. 2. Remove the vacuum generator vent hose at the bottom of the cabinet (inside). Trigger the spray gun on. Check for exhaust and increase the powder flow. 3. Check for proper direction of the check valve.

Vacuum Check

NOTE: Procedure requires a 0-30 in. Hg vacuum gauge. See Figure 12 for reading examples.

1. Purge the pump and spray gun. Do not load a new color.
2. Set the kV output to 0. Set the powder flow to 35%.
3. Disconnect the powder tubing from the pump. Connect a vacuum gauge to the suction fitting or place your finger over the fitting as shown in Figure 11.
4. Trigger the spray gun and watch the vacuum gauge or feel for the vacuum.

- For correct vacuum readings (9-14 in. Hg) on both sides of pump (or you feel less vacuum on one side of pump than the other), proceed to Delivery Check procedure.
- For low vacuum readings (less than 8 in. Hg) on one side of pump (or you feel less vacuum on one side of pump than the other), proceed to Suction Check procedure.
- For low vacuum readings (less than 8 in. Hg) on both sides of pump (or you feel weak or no vacuum on both sides of pump cycle), proceed to Suction Check procedure.

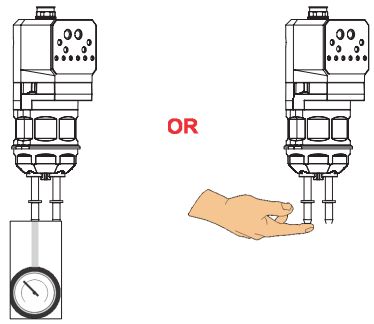


Figure 11 Vacuum Check Options

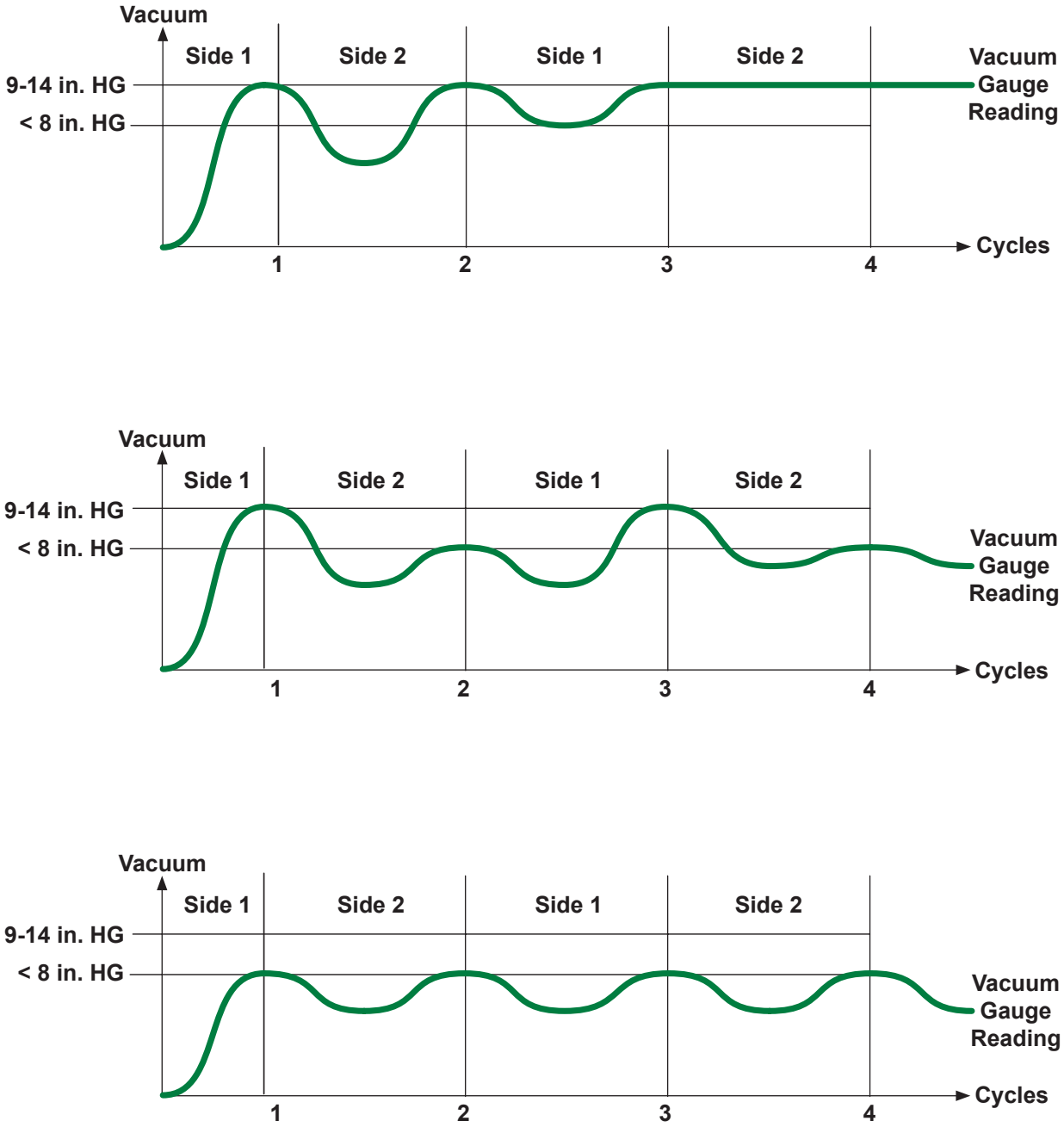


Figure 12 Vacuum Readings

Delivery Check

The problem is not in the pump or the control manifold. Check for problems in delivery tubing or suction tubing.

1. Reconnect the delivery tubing to the pump.
2. Trigger the spray gun and observe the vacuum gauge. The correct vacuum reading ranges from 9-14 in. Hg.

If the problem is in the delivery tubing or spray gun:

1. Clean or replace the delivery tubing.
2. Check the spray gun lock nut O-ring and replace it if it is missing or damaged.
3. Remove the nozzle and powder tubing adapter from the spray gun and clean or replace it.

If the problem is in the suction tubing, fittings, pickup tube, or powder:

1. Connect the suction tubing as shown in Figure 13.
2. Trigger the gun and observe the powder flow.

Suction Check

Low vacuum reading: less than 8 in. Hg in one or both sides of the pump

The problem is not in the pump or control manifold.

1. Remove the pump and replace it with a functioning pump.
2. Connect the vacuum gauge to the pump suction fitting.
3. Trigger the spray gun and observe the vacuum gauge.

- If the problem disappears, then check the suction tubing fittings and adapter O-rings. Clean the pickup tube. For Color-on-Demand® systems, proceed to procedure on page 19.
- If the problem persists, the suction tubing is blocked. Replace the suction tubing.
- If the problem disappears, the original pump was bad. See *Pump is bad, requires repair* in the *Troubleshooting* table on page 15.
- If the problem remains, the pump control manifold is bad. See *Pump is bad, requires repair* in the *Troubleshooting* table on page 15.

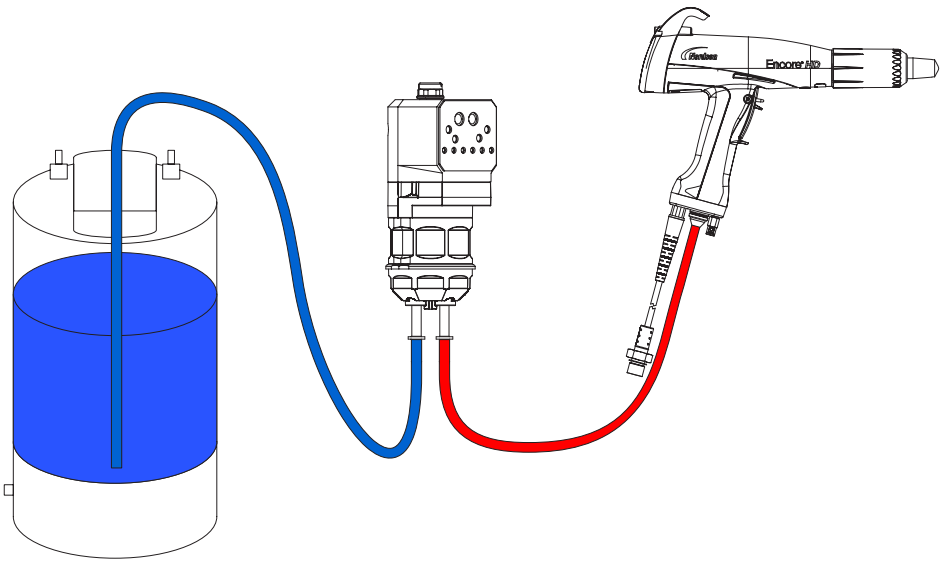


Figure 13 Tubing Connections

Repair

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

NOTE: Pump is shown with the standard pump gasket. For Encore HD pump module applications the standard gasket is not used and replaced with a ringed gasket placed on the pump module manifold. Refer to the Encore HD Pump Module manual for more information on ringed gasket.

Fluidizing Tube Replacement

WARNING: Shut off and relieve system air pressure before performing the following tasks. Failure to relieve air pressure may result in personal injury.

1. See Figure 14. Perform a color change to remove old powder from the pump, then relieve the system air pressure and disconnect the purge air tubing.

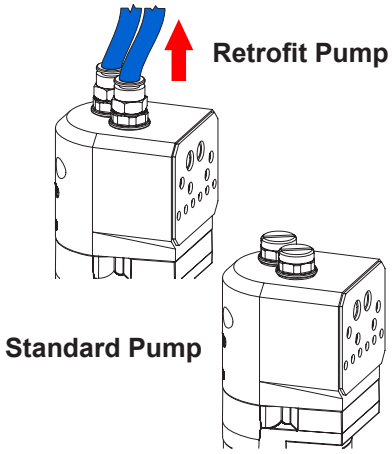


Figure 14 Removing the Purge Air Tubing

2. See Figure 15. Loosen the fluidizing tube access plug and pull the fluidizing tube straight out of the pump body.

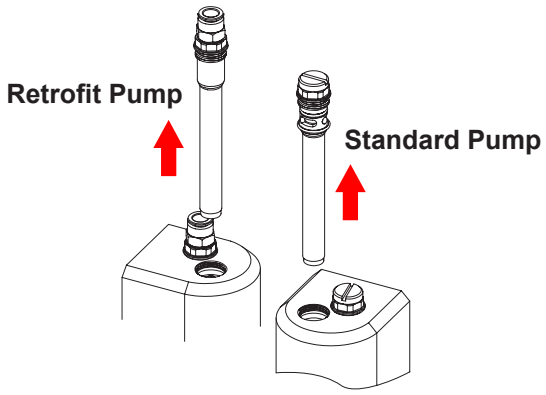


Figure 15 Loosening the Fluidizing Tubes

3. See Figure 16. Pull the old fluidizing tube off the access plug, then seat the new fluidizing tube against the red O-ring.

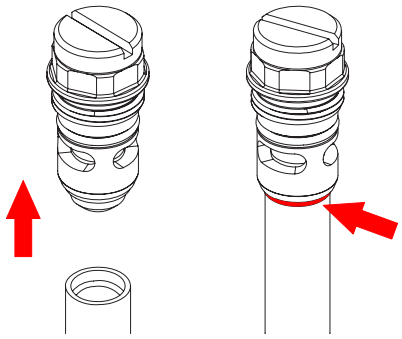


Figure 16 Removing the Tube from the Access Plugs

4. See Figure 17. Install the fluidizing tube assemblies into the pump body. Tighten the access plugs, then reconnect the purge air tubing.

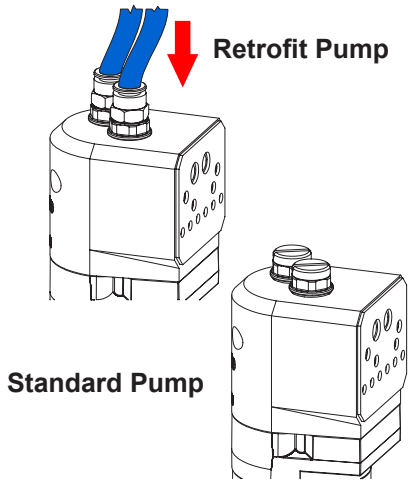


Figure 17 Reinstalling the Purge Air Tubing

Pump Disassembly

To reduce downtime, keep a spare pump in stock to replace a pump that is being repaired.

NOTE: Any time the pump is disassembled, the Y block gasket (item 19 in Figure 20) must be replaced.

WARNING: Shut off and relieve system air pressure before performing the following tasks. Failure to relieve air pressure may result in personal injury.

NOTE: Tag all air and powder tubing before disconnecting from the pump.

1. See Figure 18. Disconnect the purge air lines from the top of the retrofit pump (1) where applicable.
2. See Figure 19. Disconnect the inlet (2) and outlet powder tubing (3) from the bottom of the pump.
3. Remove the cabinet mounting hardware securing the pump to the pump panel (4) and move the pump to a clean work surface.
4. See Figure 20. Starting with the fluidizing tubes, disassemble the pump as shown. Gaskets that are glued on do not need to be removed unless they are damaged. Refer to *Replacing Pump Gasket* on page 23 if replacement is needed.

NOTE: Refer to the *Pinch Valve Replacement* instructions on page 24 to remove pinch valves from pinch valve chamber.

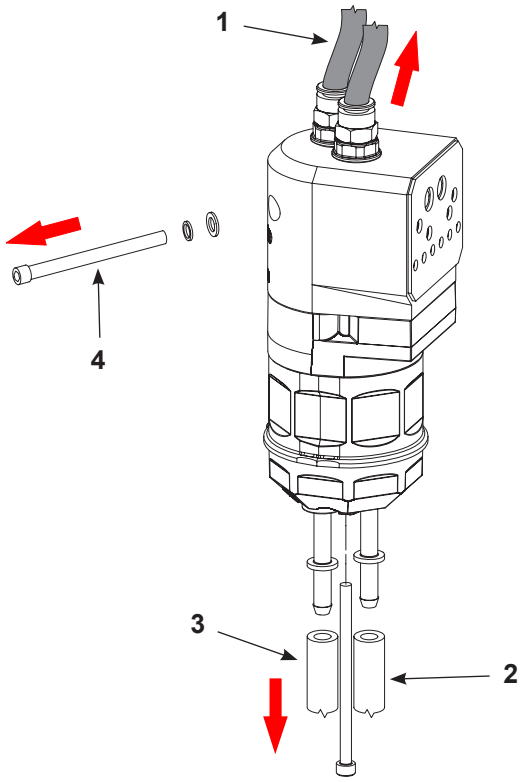


Figure 18 Retrofit Pump Disassemble Preparation

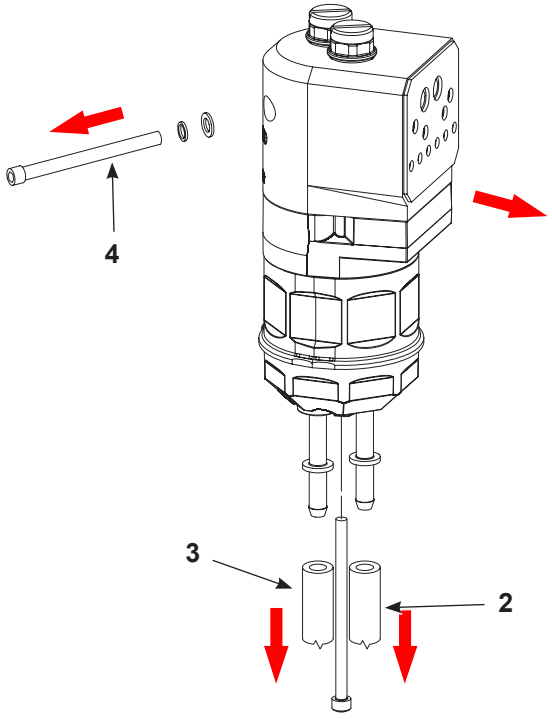


Figure 19 Standard Pump Disassemble Preparation

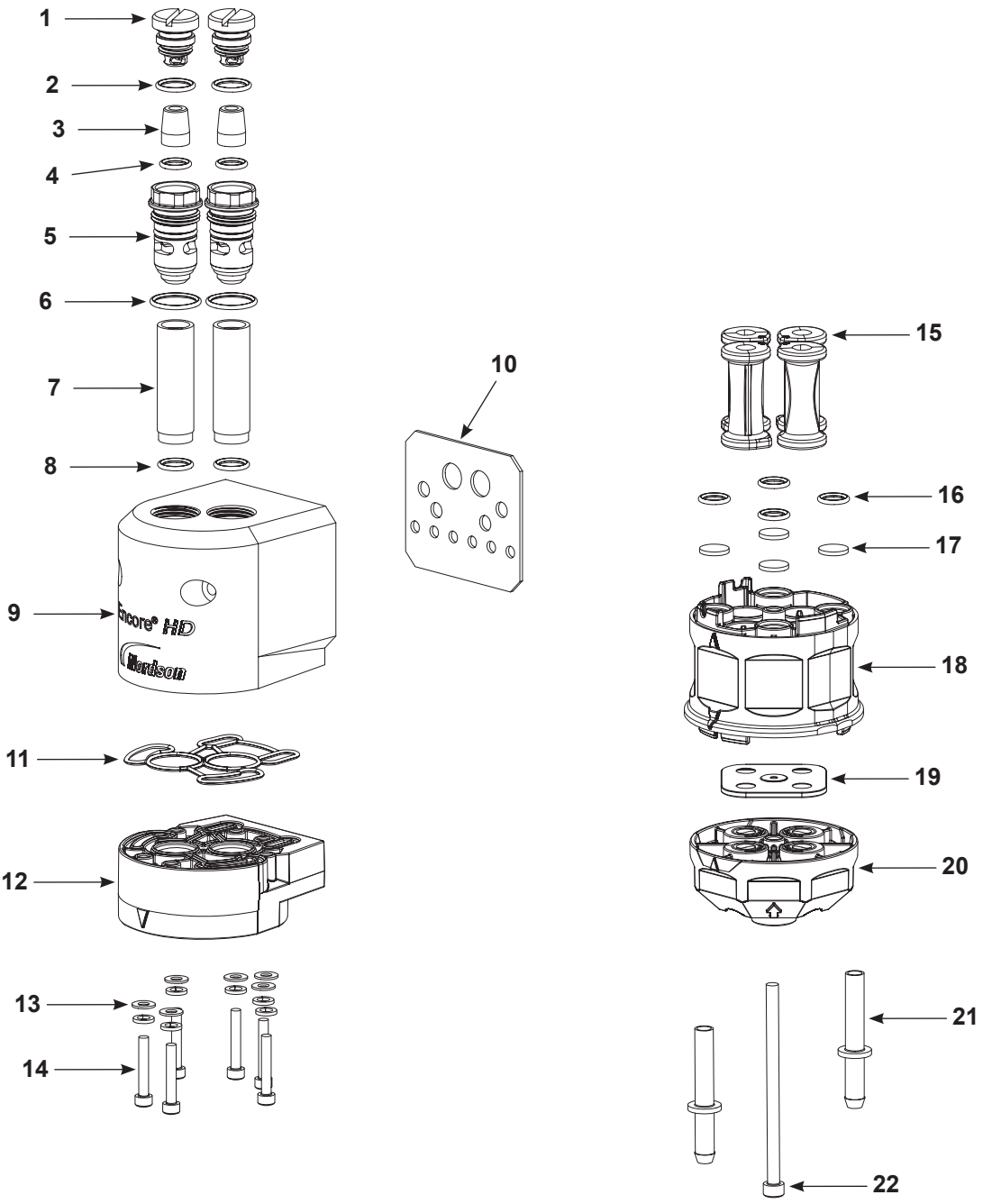


Figure 20 Pump Disassembly (Encore HD Shown)

1. Fitting Caps (2)
2. O-Rings (2)
3. Check Valves (2)
4. O-rings (2)
5. Access Plugs (2)
6. O-rings (2)
7. Fluidizing Tubes (2)
8. O-rings (2)
9. Purge Manifold (1)
10. Manifold Gasket (1)
11. Block Seal (1)
12. Upper Y Block (1)
13. Lock Washers (12)
14. Screws, M4 x 25 (6)
15. Pinch Valves (4)
16. O-rings (2)
17. Filter Discs (4)
18. Pinch Valve Block (1)
19. Y Block Gasket (1)
20. Lower Y Block (1)
21. Hose Barbs (2)
22. Screw, M5 x 85 (1)

Pump Assembly

CAUTION: Follow the assembly order and specifications shown. Pump damage may occur if you do not carefully follow the assembly instructions.

NOTE: Any time the pump is disassembled, the Y block gasket (item 10 in Figure 23) must be replaced.

Procedure

1. See Figure 21. Place the customized O-ring (1) into the upper Y block (2) as shown, then fasten the upper Y block to the purge manifold housing (3) with the provided hardware (4).

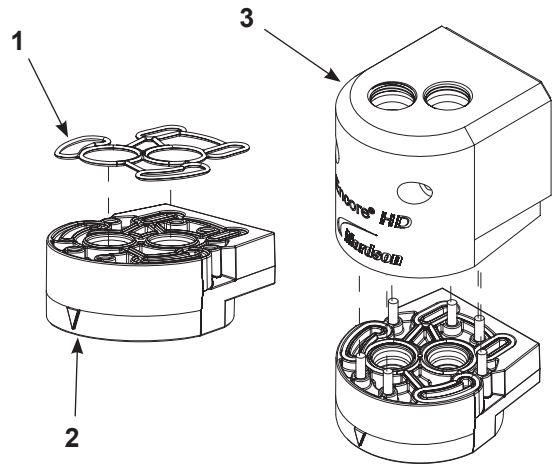


Figure 21 Assemble the Lower Y Block to Purge Manifold

2. See Figure 22. Assemble pinch valves (5), filter discs (6), and O-rings (7) into pinch valve housing (8). Refer to *Pinch Valve Replacement* on page 24 for assembly procedure.

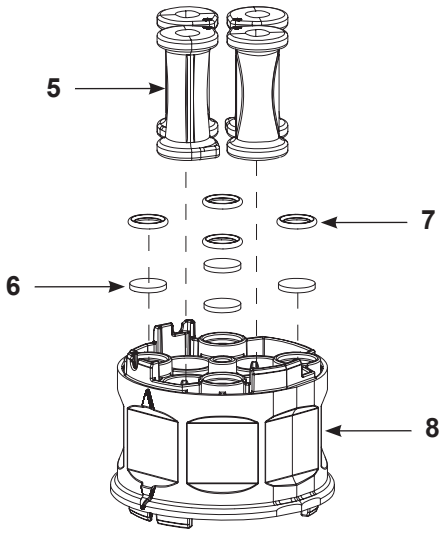


Figure 22 Assemble the Pinch Valve Housing

3. See Figure 23. Assemble gasket (10) over lower Y block (11), then thread long screw (12) through the lower y block and into the pinch valve housing, upper Y block and purge manifold. Torque screw to 25-30 in.-lb (2.8-3.4 N●m).

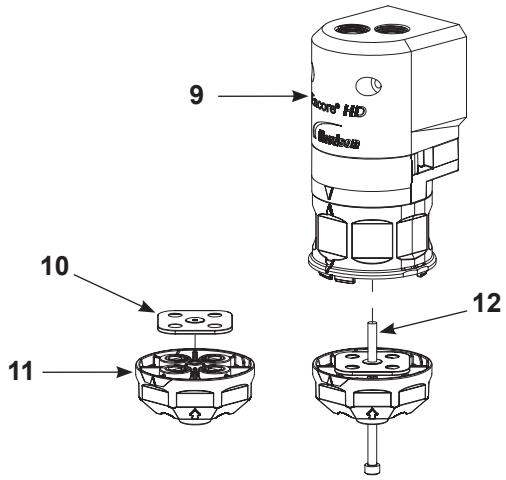


Figure 23 Assemble Gasket and Lower Y Block

4. See Figure 24. Assemble the check valves (13) O-rings (12) access plugs (14), and fitting caps (10) together before replacing the fluidizing tubes (16). Then, once that is complete, assemble the complete access plugs (17) and additional O-rings onto the fluidizing tubes (18).

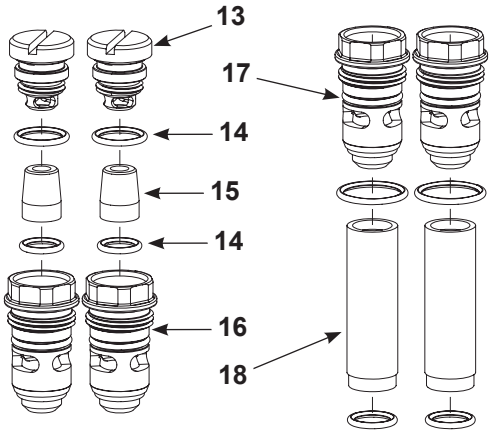


Figure 24 Assemble Fittings to Fluidizing Tubes

5. See Figure 25. Insert the assembled fluidizing tube (19) into the top of the purge manifold (20). Snug fit tubes to manifold.

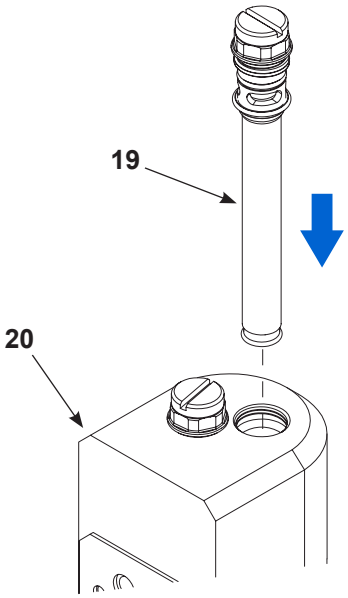


Figure 25 Fasten Fluidizing Tubes into Manifold

6. See . After the pump is assembled, completely tighten the long screw to fit all components together completely.
7. Mount the pump to the cabinet before assembling the feed tubing to the ports in the bottom of the pump. Refer to *Installation* on page 10 for more information.

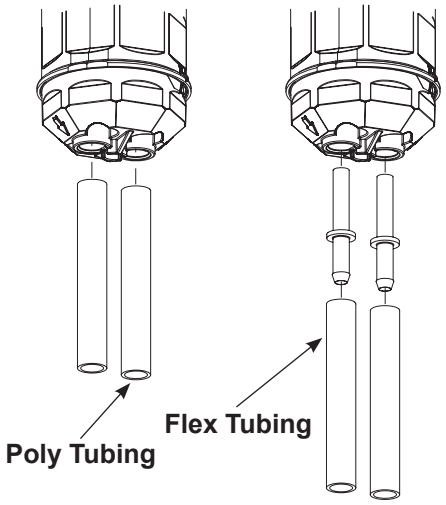


Figure 26 Assemble Tubing into Lower Y Block

Replacing Pump Gasket

NOTE: The pump gasket depicted here is not used on Encore HD pump module applications. For information on the ringed gasket used in place of gasket depicted here, refer to the *Encore HD Pump Module* manual.

1. See Figure 27. Remove pump gasket from the pump.
2. Using an industrial citrus based adhesive remover and plastic scraper, remove any residual adhesive left from old gasket from the pump. Clean any debris from port holes.
3. Remove the sticker backing from the new gasket and place on the pump, aligning the holes of the gasket with the port holes on the pump.

CAUTION: Ensure gasket is not covering any of the port holes on pump. A second gasket is provided with pumps as an additional spare.

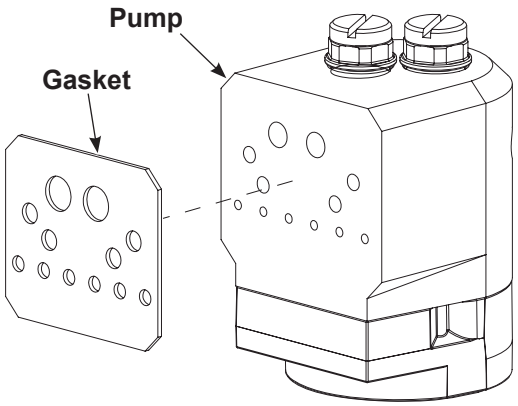


Figure 27 Replacing Pump Gasket

Pinch Valve Replacement

CAUTION: Before placing the pinch valve body in a vise, pad the jaws. Tighten the vise only enough to hold the valve body firmly. Failure to observe may result in damage to the pinch valve body.

Figure 28 shows the top of a pinch valve body.

- The top of the pinch valve body has the word “UP” molded on surface.
- The top side of the valve body has four air passages sealed with filter discs and o-rings.

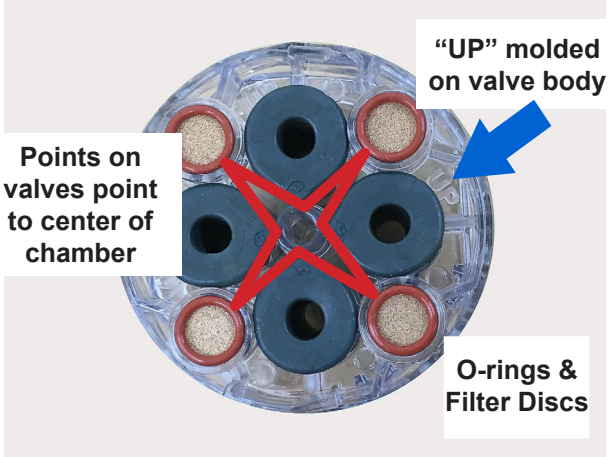


Figure 28 Top of Pinch Valve Body

NOTE: Replace the filter discs (included in the pinch valve kit) when you replace the pinch valves. Refer to Step 2. of the *Pump Assembly* procedure.

Pinch Valve Removal

See Figure 29.

1. Place the pinch valve body in a padded vise.
2. Grasp the bottom flange of a pinch valve with one hand and pull it away from the pinch valve body.
3. Cut the flange off with scissors, then pull the rest of the pinch valve out of the top of the pinch valve body.

Figure 29 Pinch Valve Removal

Pinch Valve Installation

NOTE: All pinch valves intended for repeated contact with food must be thoroughly cleansed prior to their first use.

See inset on Figure 30 to properly align the pinch valve.

1. Insert the insertion tool through one of the valve chambers, then insert the pinch valve into the open end of the insertion tool. Align the pinch valve point to the center of the pinch valve housing.

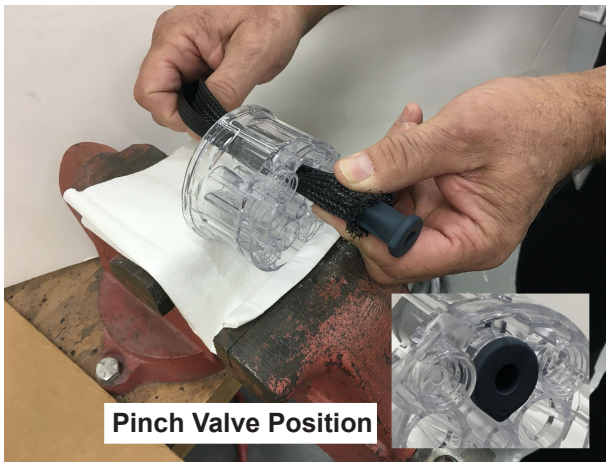


Figure 30 Inserting Pinch Valve into Insertion Tool

2. See Figure 31. Drag the valve through the chamber and check the alignment of the pinch valve in the housing.

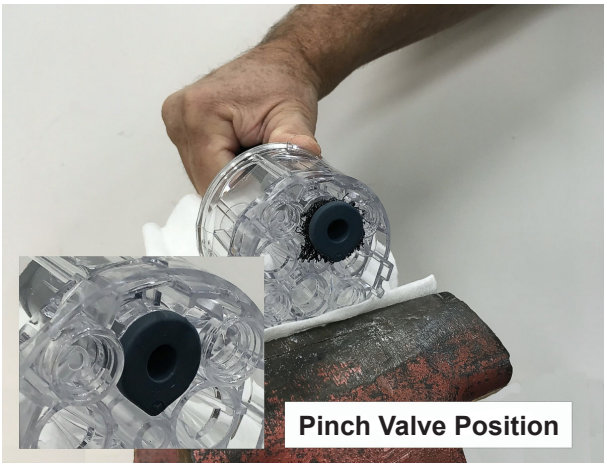


Figure 31 Pull Insertion Tube Through Chamber

3. See Figure 32. Pull on the insertion tool until the end of the pinch valve is inside the valve body. Continue pulling on the insertion tool until the pinch valve pops through the valve body and the tool comes loose.

Figure 32 Pulling Pinch Valve into Valve Body

4. See Figure 33. Pull the pinch valve bottom flange away to check the alignment of the valve ribs with the square grooves in the valve body. Pull and twist the pinch valve to align the ribs with the grooves as necessary.

Figure 33 Checking Rib and Groove Alignment

Parts

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

Pump

See Figure 34 and the following parts list.

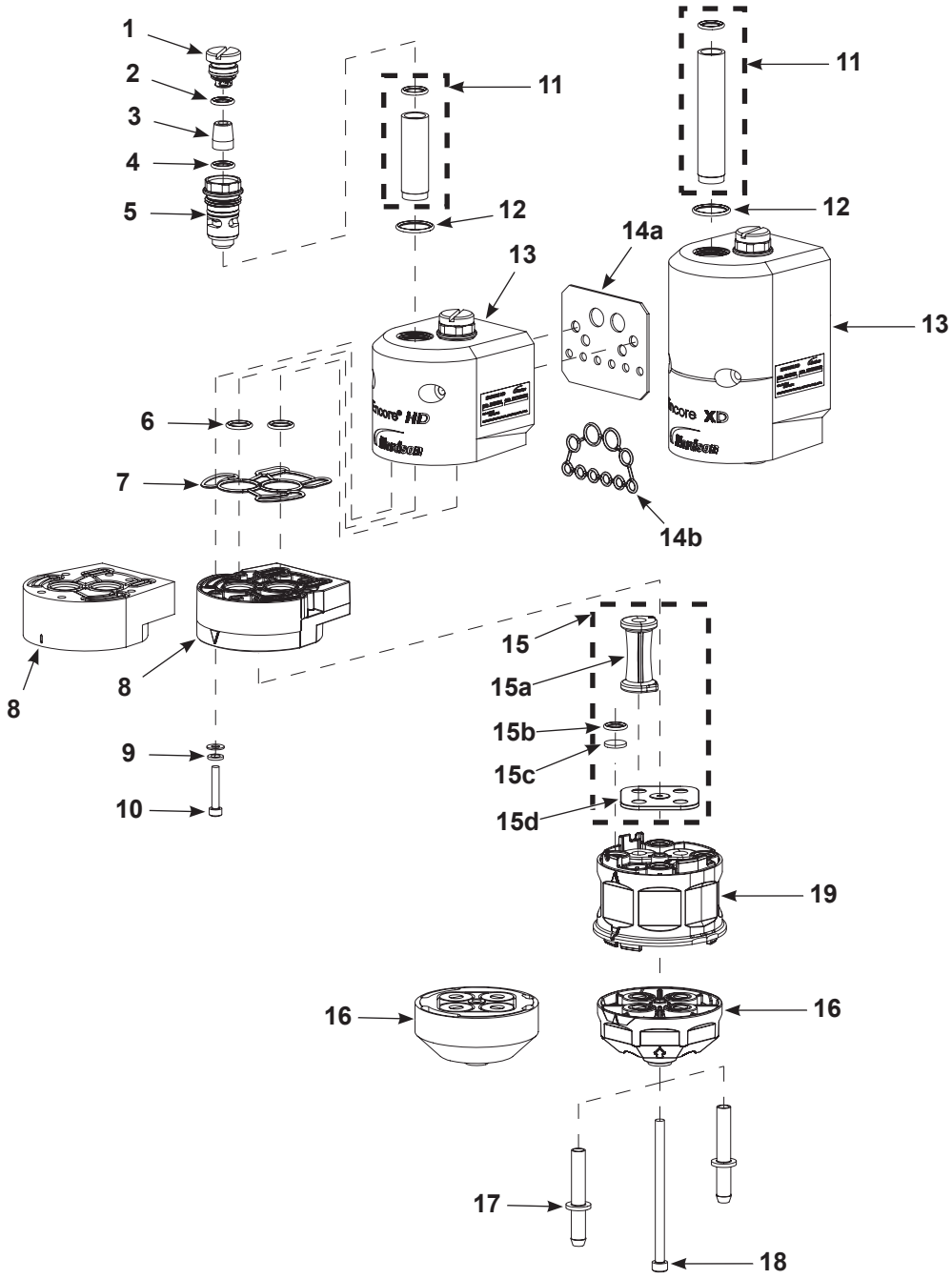


Figure 34 Encore HD, HD+, and XD Standard Parts

Item	Part	Part	Part	Description	Quantity	Note
—	1605940	—	—	PUMP ASSEMBLY, Encore HD	1	
—	—	1610978	—	PUMP ASSEMBLY, Encore HD+	1	
—	—	—	1611247	PUMP ASSEMBLY, Encore XD	1	
1	- - - - - -	- - - - - -	- - - - - -	• PLUG, fluid	–	
2	940142	940142	940142	• O-RING, silicone, 0.500 x 0.652 x 0.063	1	
3	1605570	1605570	1605570	• KIT, check valve	1	A, B
4	940126	940126	940126	• O-RING, silicone, 0.375 x 0.500 x 0.063	1	
5	- - - - - -	- - - - - -	- - - - - -	• PLUG, fluid access	–	
6	940137	940137	940137	• O-RING, silicone, 0.437 x 0.562 x 0.063	6	
7	1604072	1604072	1604072	• CUSTOM O-RING, upper Y block	1	
8	1604059	1604059	1612223	• BLOCK, upper Y	1	
9	983403	983403	983403	• WASHER, lock, split M4	6	
10	1040003	1040003	1040003	• SCREW, socket M4 x 25	6	
11	1057258	1093557	1093557	• KIT, fluidizing tube	1	A
12	940175	940175	940175	• O-RING, silicone, 0.688 x 0.813 x 0.062	2	
13	1620651	1620653	1620774	• MANIFOLD, internal purge	1	
14a	1620646	1620646	1620646	• GASKET, manifold	2	
14b	1613013	1613013	1613013	• GASKET, manifold, pump	1	D
15	1612217	1612217	1612218	• KIT, pinch valve	1	A
15a	- - - - - -	- - - - - -	- - - - - -	• • VALVE, pinch, rib	8	
15b	- - - - - -	- - - - - -	- - - - - -	• • O-RING, silicone, 0.375 x 0.500 x 0.063	8	
15c	- - - - - -	- - - - - -	- - - - - -	• • DISC, filter, pump	10	
15d	1608603	1608603	1608603	• • GASKET, lower Y block	2	C
16	1605568	1605568	1611092	• BLOCK, lower Y	1	
17	1078006	1078006	1078006	• TUBE, adapter, barb	2	
18	1604057	1604057	1604057	• SCREW, socket M5 x 85	1	
19	1604060	1604060	1604060	• BLOCK, pinch valve chamber	1	

NOTE: A. These parts are available in service kits listed on page 28.

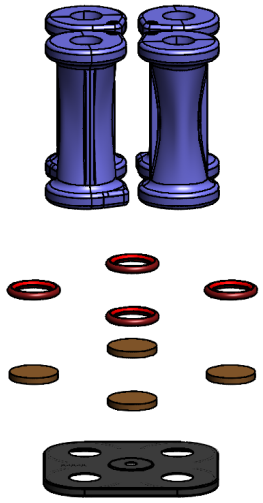
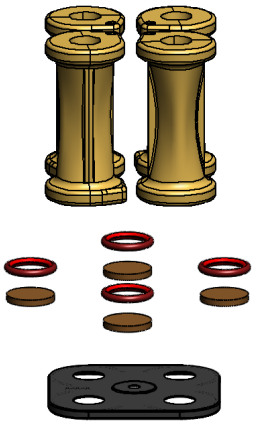
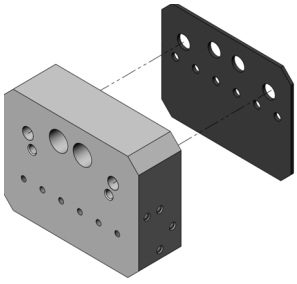
B. If your purge lines enter the top of the pump, then use Check Valve Kit p/n 1078161 (Includes 2 check valves).

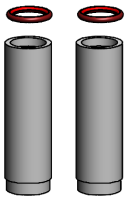
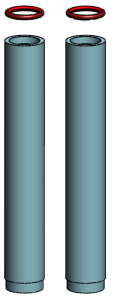
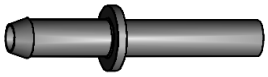
C. Must be replaced any time pump is disassembled.

D. Use gasket 1613013 instead of gasket 1612795 when using pump with Encore HD pump module.

Spare Parts

NOTE: Keep one of each of these assemblies in stock for each pump in your system.

	Blue Pinch Valve Kit Standard Pump **1612217** Includes the following: 8 - Pinch Valves 8 - O-rings 10 - Filter Discs 2 - Gastkets
	Amber Pinch Valve Kit Extreme Duty Pump **1612218** Includes the following: 8 - Pinch Valves 8 - O-rings 10 - Filter Discs 2 - Gastkets
	Retrofit to Prodigy Cabinet Manifold Kit **1616440** Includes Retrofit Manifold Gasket **1613039**

	Check Valve Service Kit (Retrofit) **1078161**
	Check Valve Service Kit **1605570**
	Fluidizing Tube Kit HD Pump **1057258** Includes the following: 4 - Porous Tubes 8 - O-rings
	Fluidizing Tube Kit HD+, XD Pump **1093557** Includes the following: 4 - Porous Tubes 8 - O-rings
	Barbed Tubing Adapter for Flexible Tubing **1078006**

Air and Powder Tubing Part Numbers

See Figure 35 and the following parts list..

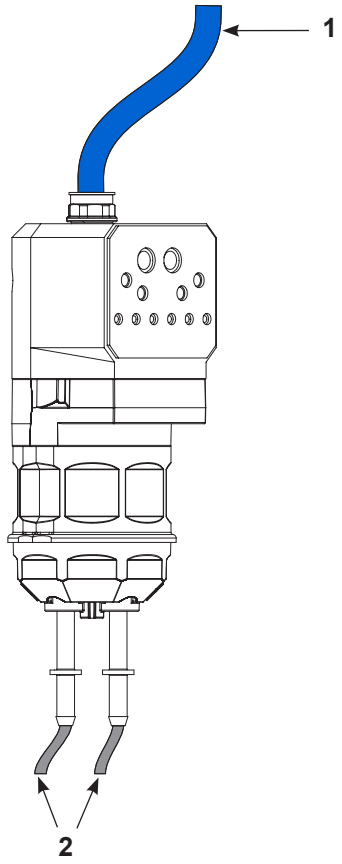


Figure 35 Air and Powder Tubing Part Numbers

Item	Part	Description	Note
1	900740	6.5 mm x 10 mm OD, blue polyurethane	A
2	1613849	6 mm ID x 8 mm OD, polyolefin, 40 m	A
2	1613850	6 mm ID x 8 mm OD, polyolefin, 160 m	A
2	1615026	6 mm ID x 8 mm OD, polyurethane 60 ft	A, B
2	1606695	6 mm ID x 8 mm OD, polyurethane 500 ft	A, B
2	173101	6 mm ID x 8 mm OD, natural, polyethylene	A, B
2	1620002	TUBING, powder, antistatic, 5.6 x 8.2 mm 160 m roll	C
2	7035356	TUBING, powder, antistatic, 5.6 x 8.2 mm 23 m roll	C

NOTE: A. Barbed fitting only required with polyolefin tubing.

B. Optional powder hose to use in place of the standard polyolefin.

C. Optional antistatic tubing to impact fusion and turbo-charging in the feed tubing. Can only be used with the Encore pump grounding kit (1620013).

This page is intentionally left blank.

Nordson Corporation

OPERATOR'S CARD

P/N 1605548-01

Encore® HD Powder Spray System with Prodigy® Color-on-Demand®

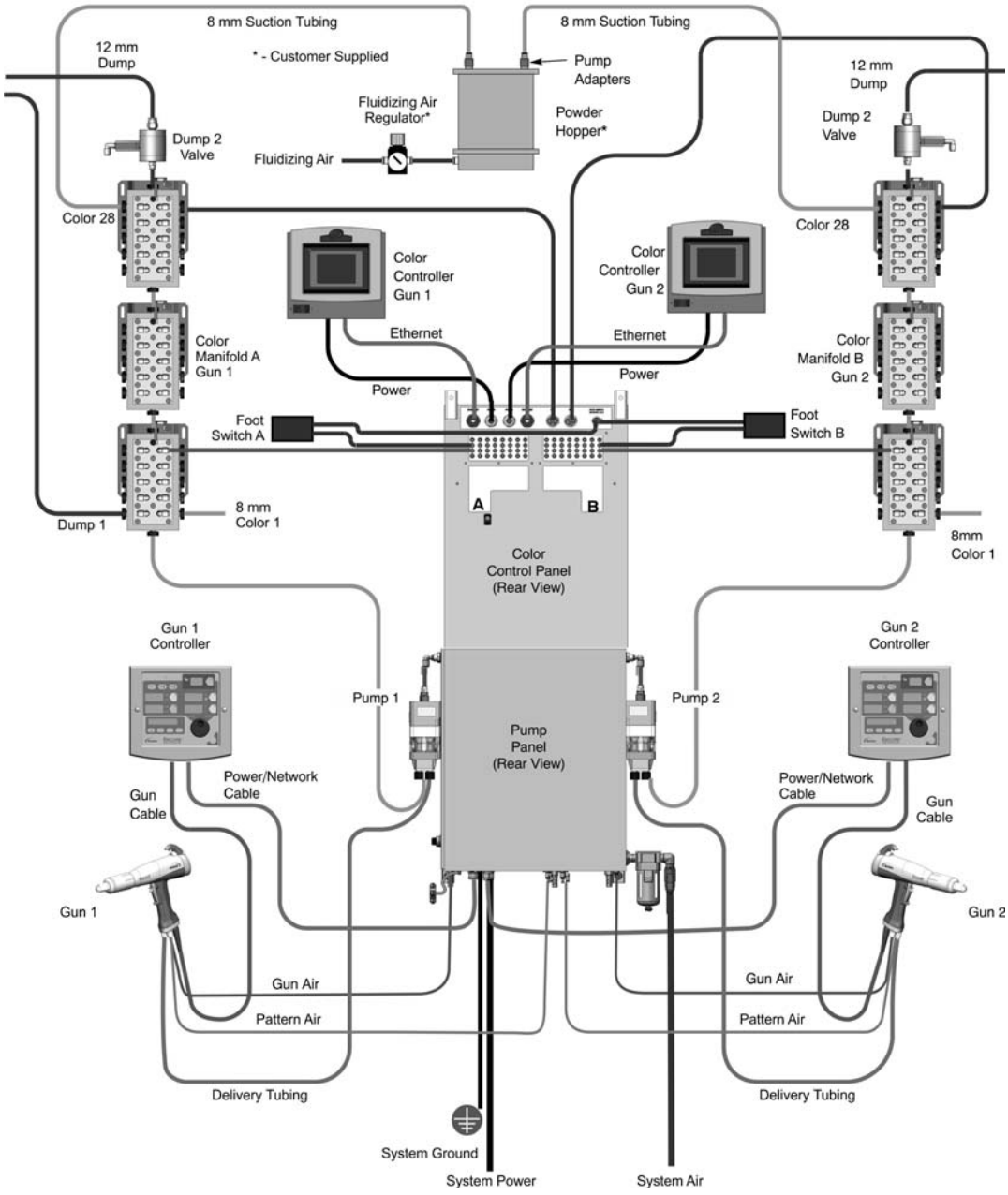


Figure 1 System Diagram (Two-Gun System Shown)

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

Refer to component operator manuals for more information on safety, setup, operation, troubleshooting, repair and parts.

Quick Start

1. Turn on the system air supply.
2. Turn on fluidizing air to the feed hoppers and allow the powder to fluidize.
3. Turn on system power and the controllers.

Select a Color

1. On the Color Controller Main screen, select **Small Buttons** or **Big Buttons** as desired.

   Small buttons display all 28 color buttons on one screen. Big buttons display 14 color buttons per screen.

Figure 2 Color Controller Main Screen

2. If starting with an empty system, or if the system is filled with the wrong color, select a color and **START** a color change.

Changing Colors

Color Change with Screen Only

Point the gun into the booth, or hang it so it is pointing into the booth.

Select a new color and touch the **START** button, or touch the **START** button first then select the new color.

Color Change with the Foot Pedal

Point the gun into the booth, or hang it so it is pointing into the booth.

Press the foot pedal to start the color change, then move to the screen and select a new color.

The factory default purge setting allows 11 seconds after pressing the foot pedal to select the new color, or the system loads the current color instead. The default setting can be adjusted using the Function settings. See your controller manual for details.

Figure 3 Color Controller Color Selection Screen

For color button label instructions, refer to the following pages.

System Warnings

Pressure Warning: If the system pressure falls below 70 psi, the message SYSTEM PRESSURE ALARM appears in red on the screen. You will not be able to start a color change.

Maintenance Warning: When the valve counter exceeds the setpoint, the message WARNING BLADDER MAINTENANCE appears in yellow on the screen. Change the manifold bladders and reset the alarm from the Valve Counter screen.

System Cleaning

Point the gun into the booth, or hang it so it is pointing into the booth. Go to the Main screen, then press **PURGE**, then **CLEAN**, then **START**.

NOTE: If for some reason your system loses air pressure during production, cross-contamination may occur. When air pressure is again available, perform a purge before beginning production.

Figure 4 Color Controller Purge Screen

Color Button Labeling

From the Main screen, touch **SETUP**. Use the Button Label screens to enter labels for each color button and for the system.

Figure 5 Color Controller Setup Screen

The first screen has label buttons for colors C1 to C14, plus the label button for the system name. The system name appears in yellow at the bottom left of the Color Buttons screens. Touch the **More** button to go to the button label screen for colors C15–28.

To create a label for a color or the system name, touch the label button. A keyboard screen appears. Enter a 6-character label for the color, or a 12-character label for the system. The labels are retained in memory when the controller is turned off.

Figure 6 Color Controller Button Label Screen

Touch **Main** to return to the Main screen.

Color Change with Suction Line Purge

NOTE: To perform this procedure the Hopper Purge function must be enabled. Refer to your COD system manual for instructions.

Remove the suction line to be purged from the feed hopper and place the suction line in a waste hopper.

From the Color Selection Controller screen, select the desired color button, then touch **Start w/Suction LN**. The default number of suction line pulses is 12. The pulse range is 1 to 50.

The next screen will ask you to confirm that the correct suction line has been removed from the feed hopper.

Touch the **START** button to begin the suction line purge. The words IN PROCESS will flash on the screen while the system is purging the suction line.

When the purge is complete, the Main screen appears with the word COMPLETE displayed at the bottom.

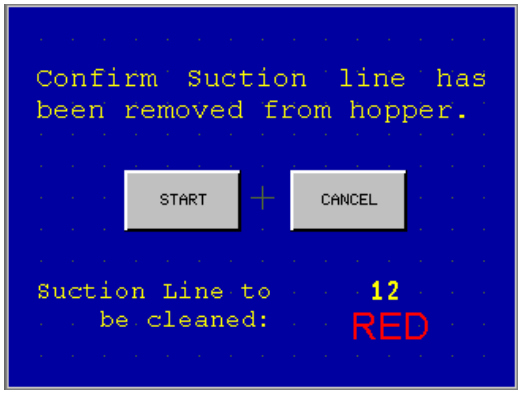


Figure 7 Color Controller Start w/ Suction LN Screen

Gun Controller Functions and Settings

When power is activated at the pump cabinet, the controller is turned on. To shut off controller power, use the power switch on the pump cabinet.

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

Use the **STANDBY** button shown in Figure 8 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.

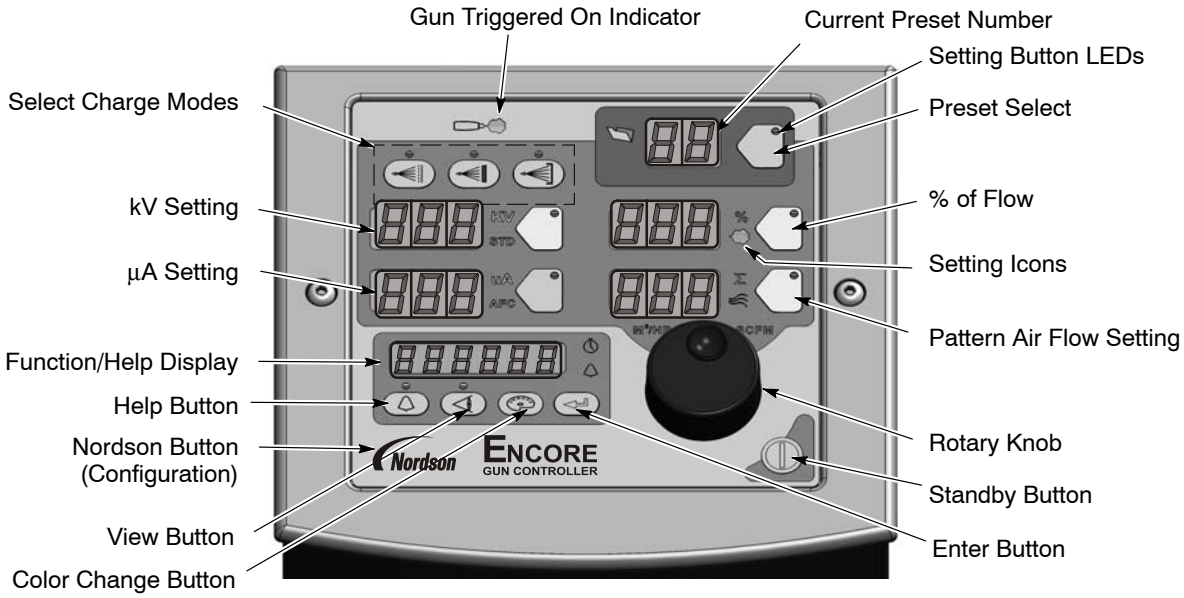


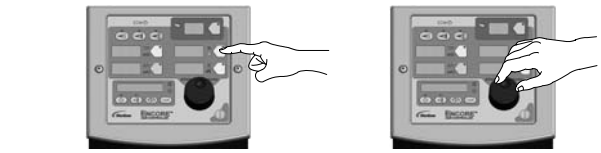
Figure 8 Controller Interface

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

Setpoints include **Select Charge, kV, µA, % of Flow** and **Pattern 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 Setpoint

Figure 9 Selecting and Changing Setpoints

Help Codes

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

 To display the Help codes, press the **Help** button. 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.

Assist Air Setting, Fast Flow Setting, and Software Versions

 The **View** button allows the user access to adjust Assist Air and Fast Flow preset values, and to view software versions.

Press the **View** button consecutively to display, in order, the following functions: Assist Air Setting (AA), Fast Flow Setting (FF), Gun Controller Software Version (GC), Gun Display Module Software Version (Gd), Flow Module Software Version (FL), and Hardware Version for Main Control Board (Hd).

Assist Air Setting

Assist air is the air flow that pushes the powder out of the pump to the gun. This screen allows you to increase or decrease the assist air flow by a percentage of the total flow for each preset, to optimize pump and spray performance.

Assist air can be adjusted from +50% to –50% in 1% increments.

To set the assist air rate:

1. Press the **View** button until **AA** is displayed.
2. Turn the rotary knob to increase or decrease the value.
3. Press **Enter** to save.

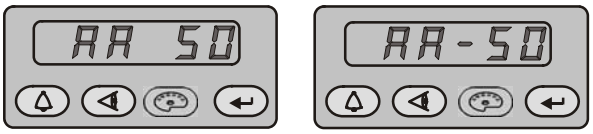


Figure 10 Assist Air Settings

Fast Flow Setting

The Fast Flow setting allows you to specify Fast Flow or Normal Flow for each preset. Normal is the default, and is the setting used for most powders. Use a Fast Flow setting when using powders that are hard to fluidize and that may tend to clump.

When set to Normal, the pump cycle rate varies with the powder flow setting. When Fast Flow is enabled, the pump cycles at a continuous fast cycle rate.

NOTE: Fast Flow should be used only when working with difficult powders, as it will decrease the life of the pump pinch valves.

To set the Fast Flow setting:

1. Press the **View** button until **FF** is displayed.
2. Turn the rotary knob to toggle between **0** for Normal and **F** for Fast Flow.
3. Press **Enter** to save.

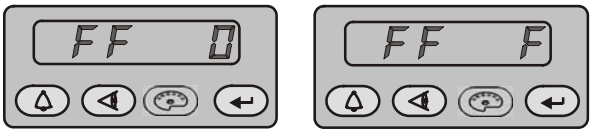
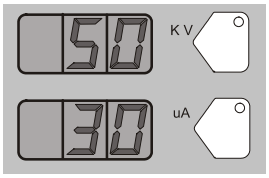


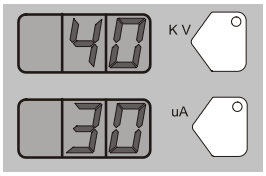
Figure 11 Fast Flow Settings

Spray Settings

For the following spray settings, when the gun is not triggered the setpoints are displayed. When the gun is triggered the actual outputs are displayed.



Custom Mode – Preset Setpoints



Custom Mode – Gun Triggered

Figure 12 Custom Mode Displays

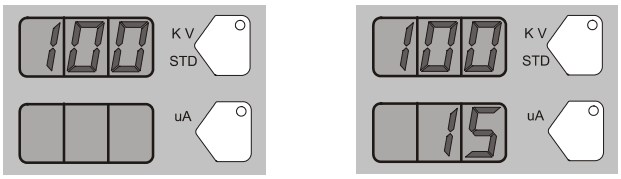
Classic Mode

To use Classic mode, the controller must be configured for it. In Classic mode you can choose to control kV (STD) output or µA (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 µA.

1. To set 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.



STD Mode – kV Setpoint

STD Mode – Gun Triggered

Figure 13 STD Mode 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 µA, press the **µA** button. The button LED lights to show that µA is selected.

Presets

Presets are programmed electrostatic and powder flow setpoints that allow the operator to 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 and can be adjusted as needed. Presets 4–17 can be programmed as needed.

Selecting or Changing a Preset

1. Press the **Preset** button. The button LED lights.
2. Turn the rotary knob. The preset number increases from 1 to 20 then resets to 1.
3. With the desired preset selected, begin production. All preset electrostatic and powder flow values will be used.
4. To change a preset's values, first choose the desired preset by using the rotary knob. Once the preset is selected, change the electrostatic and powder flow settings to the desired values.
5. The preset number will begin blinking, indicating a change has been made. To save the new settings, press the **Enter** button. The preset number will stop blinking, indicating the values have been saved.
6. To begin production without saving the new settings, do not press **Enter**. The new values will be used for the current job, but the preset will keep the original values for future use.

The setpoints for the selected preset are displayed when the gun is not triggered.

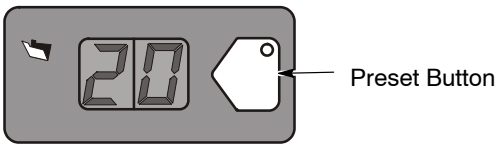


Figure 14 Preset Select

Electrostatic Settings

Electrostatic output can be 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 factory settings are:

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

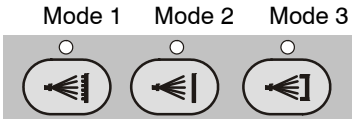


Figure 15 Select Charge Mode

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

Custom Mode

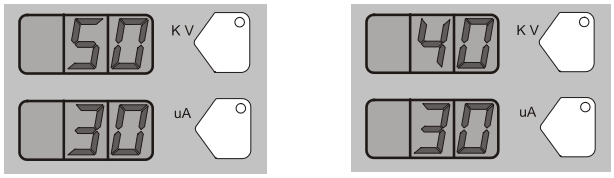
Custom mode is the factory default mode. In Custom mode, both kV and µA can be adjusted independently. In Custom mode the STD and AFC icons are not displayed.

1. To set or change kV, 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 µA setpoint, press the **µA** button. The button LED lights to indicate that µA is selected.
4. 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.

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



Custom Mode – Preset Setpoints

Custom Mode – Gun Triggered

Figure 16 Custom Mode Displays

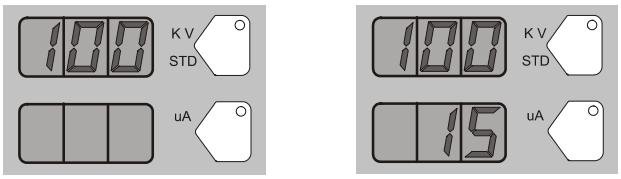
Classic Mode

To use Classic mode, the controller must be configured for it. In Classic mode you can choose to control kV (STD) output or µA (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 µA.

1. To set 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.



STD Mode – kV Setpoint

STD Mode – Gun Triggered

Figure 17 STD Mode Displays

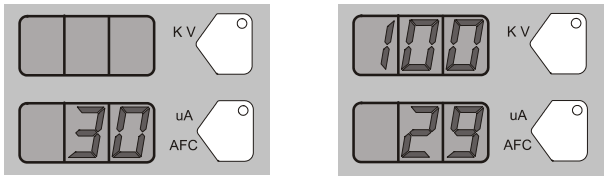
Classic AFC Mode

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 µA, 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.

The default µA range is 10–50 µA. The limits of the range can be adjusted.

For example, the user can set the µA settings from 5, 4, 3.0, 2.9, 2.8, ... through 0.1.



AFC Mode – µA Setpoint

AFC Mode – Gun Triggered

Figure 18 AFC Mode Displays

Powder Flow Setting

Powder flow rate and pattern air ranges are:

Powder flow rate from 0–100%
Pattern air from 0–3.50 in 0.05 increments

To set flow rate or pattern air:

1. Press the **Flow** or **Pattern** button. The green LED on the selected button lights.

2. Turn the knob to increase or decrease the setpoints. The setpoint is automatically saved if it does not change for 3 seconds or when any button is pressed.

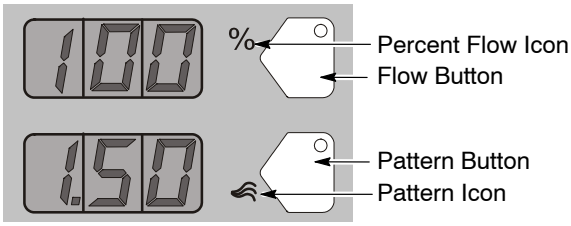


Figure 19 Flow Rate and Pattern Setpoints

Purge Operation

HDLV System Purge

Press the **Color Change** button on the controller and then press **Enter** ↲.

The Purge Cycle operates as follows:

1. **Soft Purge** – Assist air is directed through the pump and siphon tubing back to the powder supply (Soft Siphon), then through the pump and delivery tubing to the spray gun (Soft Gun). This clears the pump, tubing, and gun of powder.
2. **Pulse Purge** – Purge air is directed in pulses from the pump to the powder supply (Siphon Pulses), then from the pump to the spray gun (Gun Pulses). Pulse On sets the duration of each pulse, Pulse Off sets the time between pulses.

NOTE: Make sure the guns are aimed into the booth before starting a purge.

See functions F26 through F31 for settings.

Color-on-Demand (COD) System Purge

Press the **Color Change** button on the controller and then press **Enter** ↲.

The COD Purge Cycle operates as follows:

1. **Manifold Purge** – The dump valve opens. The pump speeds up to 100% of flow to pump the remaining powder out of the manifolds.
2. **Soft Purge** – Assist air is directed through the pump and siphon tubing back to the powder supply (Soft Siphon), then through the pump and delivery tubing to the spray gun (Soft Gun). This clears the pump, powder tubing, and gun of powder.
3. **Pulse Purge** – Purge air is directed in pulses from the pump to the powder supply (Siphon Pulses), then from the pump to the spray gun (Gun Pulses). Pulse On sets the duration of each pulse, Pulse Off sets the time between pulses.
4. **Powder Pre-Load** – The new color powder is pumped to the spray gun for the set time at 100% of flow to load the system for production.

The Color Change cycle is started by the operator or by a remote signal to the Color-On-Demand controller. The operator starts the color change by selecting a new color and touching the **Start** button on the touch screen, or by pressing a foot pedal, then selecting a new color before the powder pre-load begins.

Powder type, humidity, tubing length and other variables can change the effectiveness of these settings. You may have to adjust these settings to avoid color cross-contamination and maintain performance.

See functions F26 through F33 for settings.

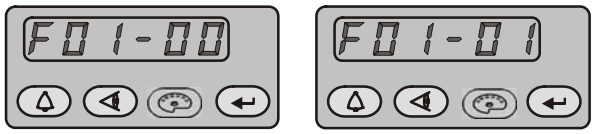
Configuration

Opening the Function Menu and Selecting Settings

Nordson 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.

Use the rotary knob to scroll through the function numbers. To select the displayed function number, press the **Enter** button. The function numbers are in the form F00–00 (function number–value).

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 again.



Function 01, Value 00 Function 01, Value 01

Figure 20 Displaying and Changing Functions

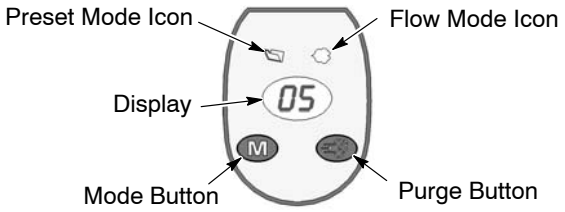
Table -1 Function Settings

Function Number	Function Name
F00	Gun Type
F01	Fluidizing
F02	Display Units
F03	Electrostatic Control
F04	Powder Flow Control
F05	Keypad Lockout
F06	Vibratory Box Delay Off
F07	Maintenance Timer, Gun
F08	Setting Trigger Function
F09	Help Codes
F10	Zero Reset (Flow)
F11	Gun Display Errors
F12	µA Lower Limit
F13	µA Upper Limit
F14	Total Hours
F15	Save/Restore/Reset
F16	Gun Display Brightness
F17	Number of Presets

Function Number	Function Name
F18	Control Type
F19	Pump Type
F20	Gun Number
F21	Maintenance Timer, Pump
F22	Purge
F25	Pattern Air Delay
F26	Soft Siphon
F27	Soft Gun
F28	Pulse ON
F29	Pulse OFF
F30	Siphon Pulses
F31	Gun Pulses
F32	Powder Pre-Load
F33	Manifold Purge
F34	Conveyance Air Constant A
F35	Conveyance Air Constant C
F36	Pattern Air Constant A
F37	Pattern Air Constant C

Spray Gun Operation

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



Spray Gun Interface

Figure 21 Gun Interface Controls

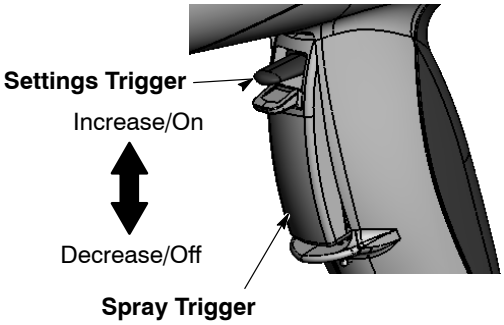


Figure 22 Gun Trigger Controls

Changing Presets with the Settings Trigger

1. See Figures 21 and 22. Release the spray 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. Refer to your controller manual for preset programming instructions.

4. Press the spray trigger. The system sprays with the new preset.

See controller configuration F08 for more settings.

Changing Powder Flow with the Settings Trigger

1. See Figures 21 and 22. 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 spray trigger.

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

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 your controller manual for more information.

Purging the Spray Gun

1. See Figures 21 and 22. Point the gun into the booth and release the spray trigger.
2. Press the **Purge** button. The purge will continue as long as you press the **Purge** button.

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* in your controller manual for setting trigger configuration.

Purge the gun periodically to keep the powder path inside the spray gun clean. The purge length and frequency required will 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.

Electrode Air Wash Operation

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

Refer to your controller manual for instructions on adjusting electrode air wash flow.

Daily Operation

Initial Startup

With the fluidizing and flow air set to zero, and no parts in front of the gun, trigger the gun and record the µA output. Monitor the µA output daily, under the same conditions. A significant increase in µA output indicates a probable short in the gun resistor. A significant decrease indicates a resistor or voltage multiplier requiring service.

Startup

1. Turn on the spray booth exhaust fan.
2. Turn on the system air supply.
3. Make sure the spray gun is not triggered, then turn on controller power. The displays and icons on the controller interface and gun interface should light.

Standby

Use the **Standby** button on the Encore HD controller 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 turn off controller power, shut system power off at power unit or control panel.

Shutdown

For HDLV system shutdown, complete the following steps:

1. Press the **Color Change** button to start cleaning the system of residual powder.
2. Purge the spray gun by pressing the **Purge** button on the back of the spray gun until no more powder is blown from the gun.
3. Press the **Standby** button to turn off the spray gun and interface.
4. Turn off the system air supply and relieve the system air pressure at the pump cabinet.
5. If shutting down for the night, or for a longer period of time, shut off the system power.
6. Perform the daily maintenance procedures.

Maintenance

Clean the spray gun nozzle, gun powder path, pump nozzle and pump throat in an ultrasonic cleaning machine using Oakite® BetaSolv or an equivalent emulsion cleaning solution. Rinse with clean water and dry before re-installing.

Do not immerse the spray gun electrode assembly in the cleaning solution or the rinse water. Remove all O-rings before cleaning. Do not allow the O-rings to come in contact with the cleaning solution.

Issued 03/14