Encore® Enhance Powder Spray Controller

Customer Product Manual

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

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1614575-03

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Change Record

Revision	Date	Change
01	05/19	New release.
02	10/20	Updated wiring diagrams.
03	06/22	Updated approval information.

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 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.

Safety Labels

See Figure 1-1 for location of safety labels and refer to Table for description of each safety labels. The safety labels are provided to help operate and maintain equipment safely.

Item	Label	Description
1.		**WARNING:** Electric hazard.
2.		**WARNING:** Fire hazard.
3.		**WARNING:** Follow all safety instructions in manual for safe use.

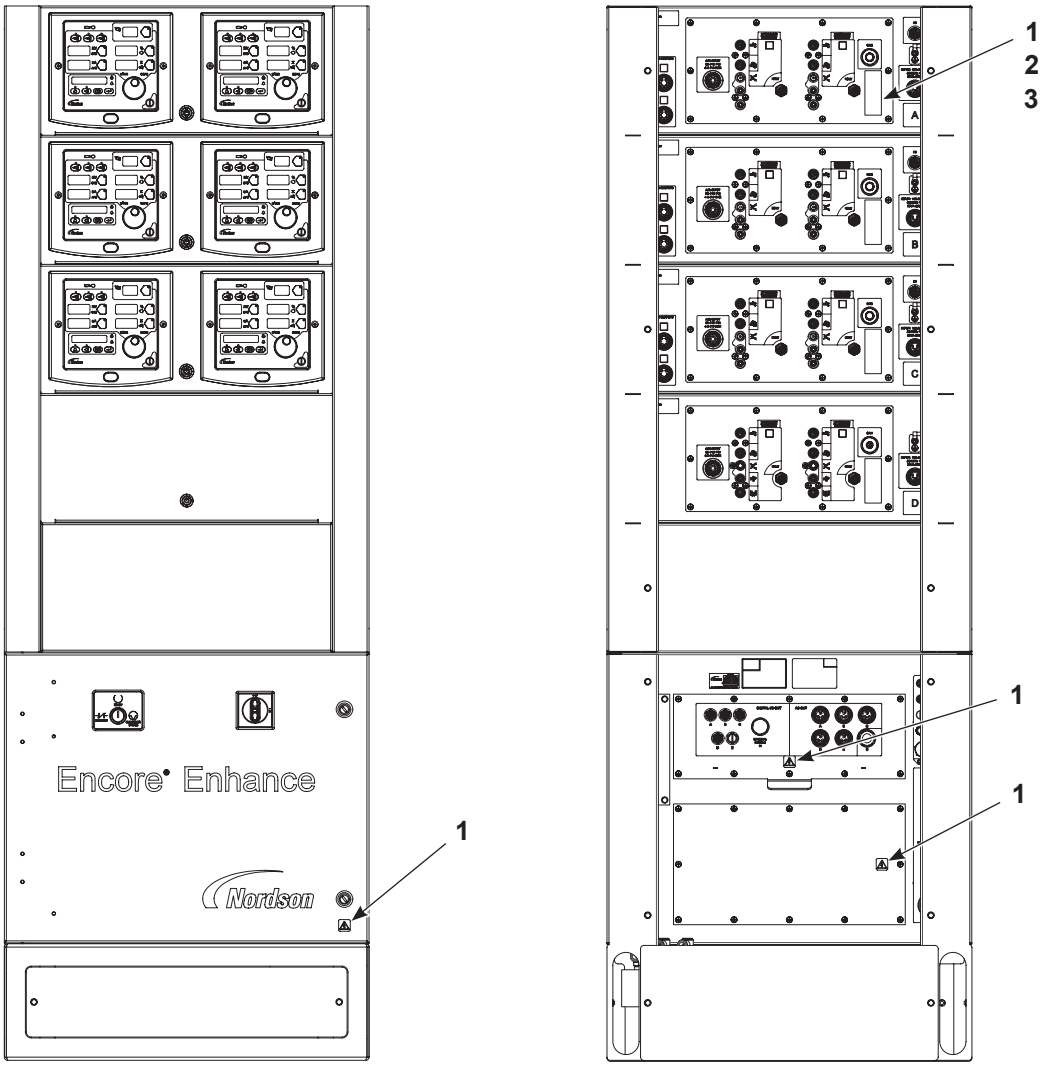


Figure 1-1 Safety Labels

Section 2
Description

Introduction

The Encore® Enhance is an automatic and manual spray gun controller. The controller includes a power distribution module and can include up to five spray gun modules. Each spray gun module controls two spray guns.

The controller can be configured for up to a total of ten spray guns:

- 4 to 10 automatic spray guns
- Up to 4 manual spray guns (includes remote manual gun interface)

The controller can be paired with Encore HD or venturi style pumps.

Controller Components

See Figure 2-1 for typical controller components.

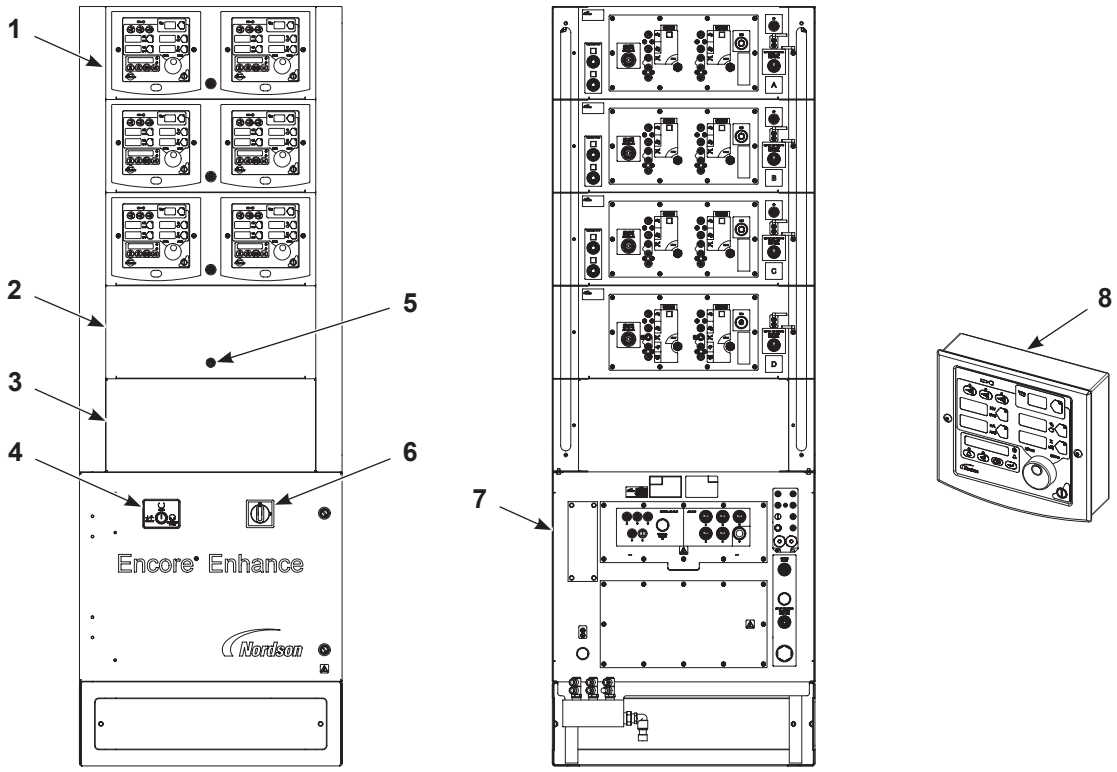


Figure 2-1 Encore Enhance Spray Gun Controller (shown with 3 automatic gun modules and 1 manual gun module)

1. Automatic spray gun module
2. Manual spray gun module
3. Blank panel (for spacing)
4. Conveyor lockout and bypass
5. Spray module On/Off button
6. Main disconnect
7. Power distribution module
8. Remote manual gun interface (MGI)

Section 3

Specifications

System Specifications

Model	Input Rating	Output Rating
Dual Manual Spray Gun Controller	100-250Vac, 50/60Hz, 90VA max	±19VAC, ±1.0A
Dual Automatic Spray Gun Controller	100-250Vac, 50/60Hz, 90VA max	±19VAC, ±1.0A
Configurable Controller Cabinet	100−250Vac, 50/60Hz, 450VA max	±19VAC, ±1.0A

Environment	Factor
Input Air	6.2−7.6 bar (90−110 psi), air supply must be clean dry air
Maximum Relative Humidity	5−95% non−condensing
Ambient Temperature Rating (Encore System)	+15°C to +40°C (+59°F to +104°F)

Air Quality

The air supply must be clean and dry. Use a regenerative desiccant or refrigerated air dryer capable of producing a 3.4 C (38 F) or lower dew point at 7 bar (100 psi) and a filter system with pre−filters and coalescent−type filters capable of removing oil, water, and dirt in the sub−micron range.

Air Quality Factors	
Recommended Air Filter Screen Size	5 micron or smaller
Maximum Oil Vapor in Air Supply	0.1 ppm
Maximum Water Vapor in Air Supply	0.48 grains/ft3

Moist or contaminated air can cause the iFlow® modules to malfunction; the powder to cake in the feed hopper or clog the pump venturi throats, feed hoses, and spray gun powder paths; and cause grounding or arcing inside the spray gun.

EX, European Union, Special Conditions for Safe Use

Modular Controls

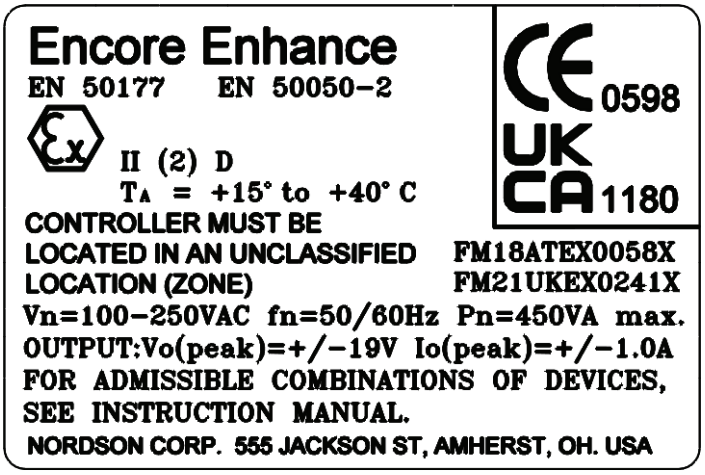
- The Encore Enhance Modular Controls shall be installed in a non−explosive atmosphere.
- The Encore Enhance Modular Controls shall be used with the manufacturer's applicators that are separately certified under FM11ATEX0056X, FM22UKEX0006X, FM13ATEX0006X, FM21UKEX0223X, FM14ATEX00051X, or FM21UKEX0129X.
- The equipment must be used in accordance with EN 50050−2 for manual applicators.

Manual Spray Gun Interface

- The Encore Enhance Manual Spray Gun interface shall be used with the manufacturer's applicators that are separately certified under FM11ATEX0056X, FM22UKEX0006X, FM14ATEX0051X, or FM21UKEX0129X.
- Refer to the manufacturer's instructions for guidance on possible static discharge hazards.
- The equipment must be used in accordance with EN 50050−2.

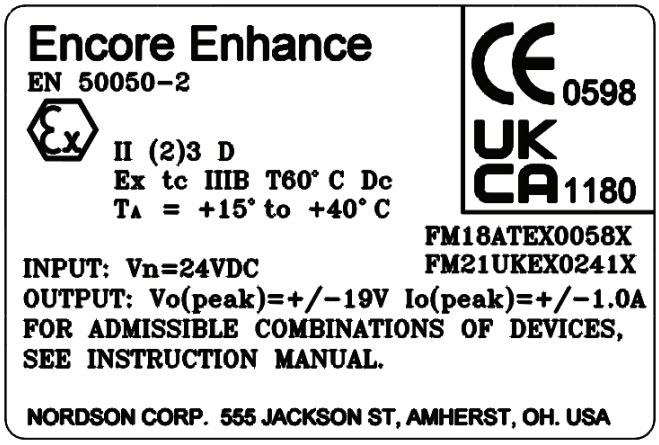
CAUTION: Awareness should be taken where cleaning plastic surfaces of the Encore Enhance Controller. There is a potential for static electricity build up on these components.

Encore Enhance Controller Certification Label



1614221-02

Encore Enhance Manual Gun Interface Label



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Dimensions for Controller Cabinet

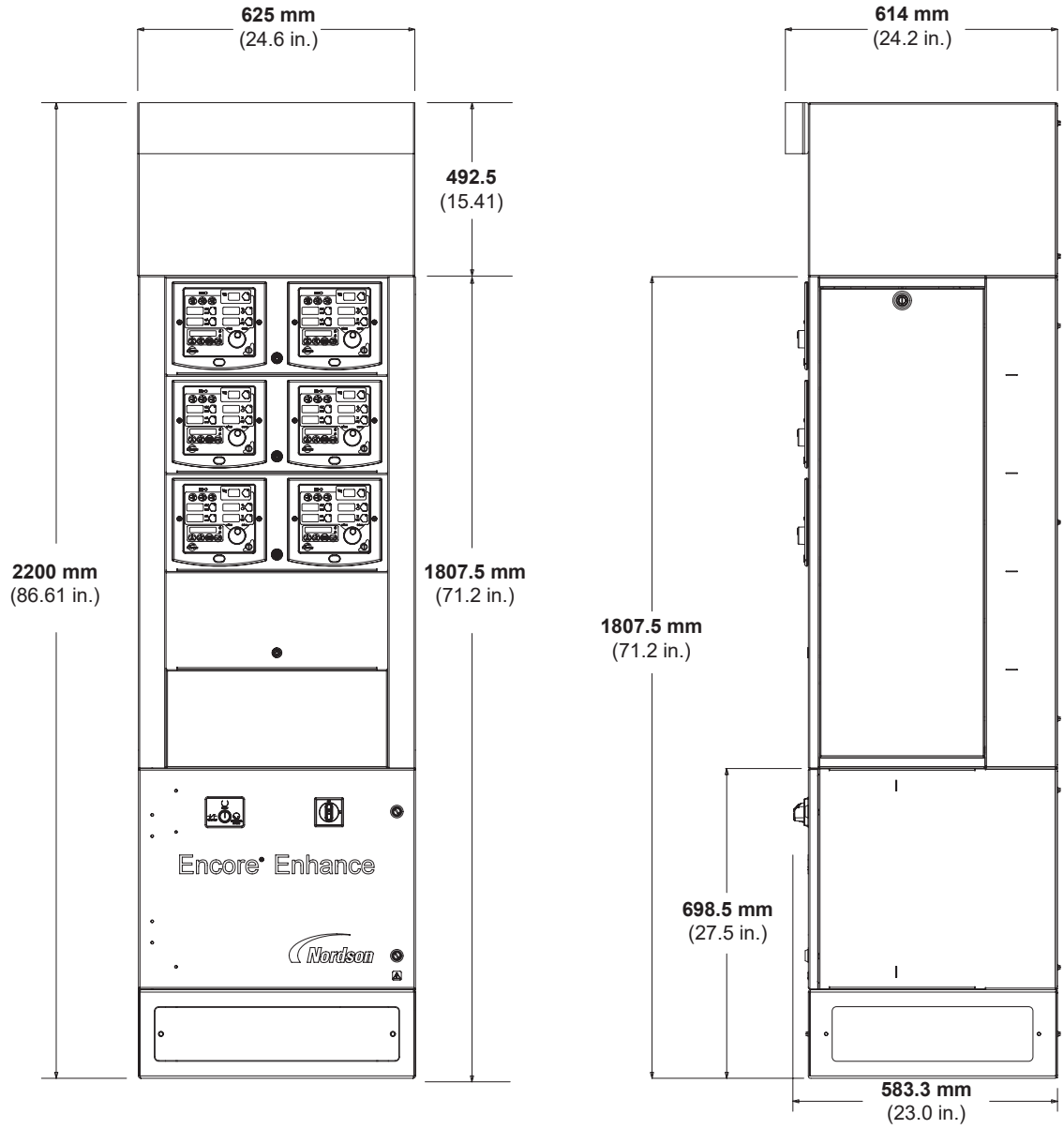


Figure 3-1 Dual Gun Controller Cabinet Dimensions (shown with optional top cover)

Section 4

Setup

WARNING: Make sure to use qualified personnel to set up the equipment to prevent electrical shock or personal injury. Make sure that the last connections made relate to powering up and operation of the equipment.

Encore Enhance System

For Encore Enhance system connections, refer to *Wiring Diagrams* section and the *Encore Enhance* installation guide.

Dual Spray Gun Controller Connections

Use Figure 4-1 as a reference for spray controller connections. Use the *Wiring Diagrams* section and the *Encore Enhance* installation guide for full installation instructions.

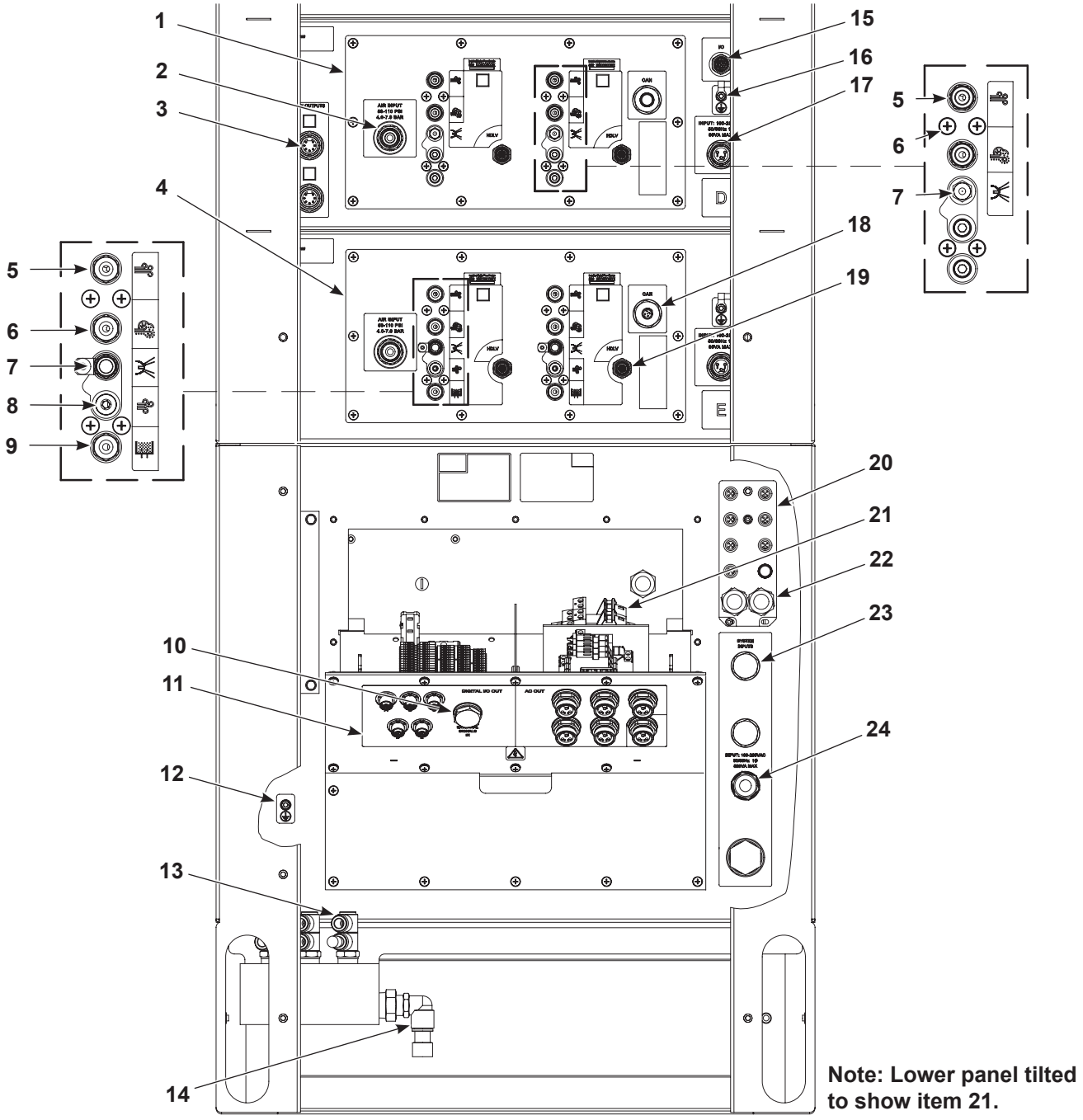


Figure 4-1 System Connections (Auto and Manual Controller Configuration Shown)

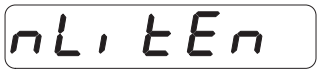
1. Spray controller (automatic)
2. Manifold air in
3. Spray gun connections
4. Spray controller (manual)
5. Flow air
6. Atomizing air
7. Electrode air wash
8. Purge air
9. Fluidizing air
10. External signals in
11. I/O connections from power distribution to controllers
12. Earth ground
13. Air distribution
14. Main air in
15. I/O connections
16. Ground connections
17. AC controller connection
18. CAN connection
19. HD control connection
20. CAN network block
21. Replay terminal block
22. CAN connections for MGI
23. System inputs
24. Main power in connection

Controller Configuration

Initial Startup

Refer to Table 4-1. When power is applied to spray controller, the function/help display screen will quickly scroll through function settings. See *Basic Functions* on page 4-4 to customize the controller.

Table 4-1 Startup Display

Display Codes		Description
	Encore	Controller Type
	Enhance	Controller Type
 OR  OR 	Automatic OR Manual OR Manual with nLighten™	System in Automatic Mode System in Manual Mode System in Manual Mode
	HDLV®	System Type
	Peer-to-Peer	Peer-to-Peer
	Gun - 1, - 2,….	Gun Number, 1−32 Auto Gun Number, 1−4 Manual
	Controller Pairing	Pairing Controller to Flow Node
	Controller Paired	Controller Paired to Flow Node
	GC - X.XX	Gun Controller, Software Version
	Gd - X.XX	MGI Software Version, Manual Only
	FL - X.XX	Flow Module, Software Version

Basic Functions

The following controller functions must be set up for basic operation.

See Figure 4-2 and refer to Table 4-2. Some functions may have been preset if purchased as a system. Refer to page 4-4 for instructions on operating the function menu.

For a list of all function settings, see page 4-7.

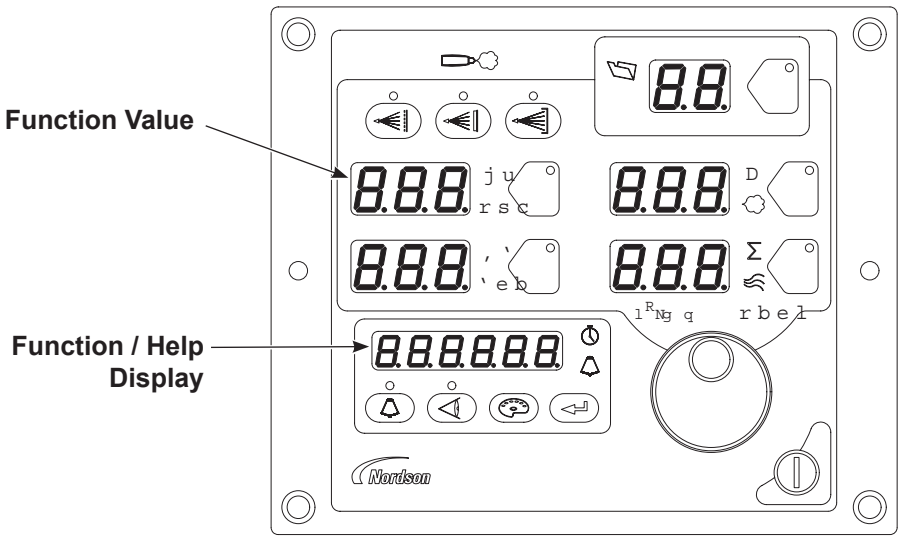


Figure 4-2 System Controls − Mobile System Shown

Table 4-2 Controller Basic Function Settings

Function Number	Function Name	Function Values			
F00	Gun Type	00 = Manual	01 = Auto	02 = Robot	03 = Manual with Light on Gun
F01	Fluidizing	00 = Hopper	01 = Box	02 = Disable	
F18	Pump Type	00 = Venturi	01 = HD		
F19	Control Type	00 = Local	01 = Future Use		02 = Peer-to-Peer
F20	Gun Number	01−32 for Auto 01−04 for Manual			
F39	Auxiliary Inputs	00 = Normal			
	Lockout Disable	01 = Disable			
	Conveyor Disable	02 = Disable			
	Continuous	03 = Continuous (front panel trigger)			
	Color Change	04 = Color change (lockout disabled)			
	Auxiliary Inputs Disabled	05 = Inputs disabled			

Software Versions

 The **View** button allows the user to see the software versions used in the system. Press this button consecutively to toggle between display options Refer to Table 4-3 for list of software.

NOTE: *Assist Air and Fast Flow Setting* shown for reference only. For information on adjusting these settings, see the *Operation* section.

Table 4-3 View Button Displays

Function Display	Function Name	Description
	Assist Air Setting	See page 5-14
	Fast Flow Setting	See page 5-14
	Gun Controller Software Version	View only
	Back of Gun Display Module Software Version	View only
	Flow Module Software Version	View only
	Hardware Version for Main Control Board	View only

Opening the Function Menu and Setting Preferences

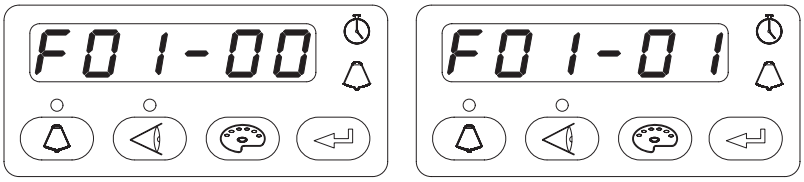
Press and hold the Nordson button for 5 seconds. The Function/Help display lights up to show the function numbers and values. Use the functions to configure the controller.

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

To scroll through the function numbers rotate the knob clockwise or counterclockwise.

To select the displayed function number, press the Enter button.

Once the function is selected the function value blinks to show value can be changed. To change the function value, rotate the knob. Press the Enter button to save the change and exit the value, taking the user back to the Function numbers menu.



Function 01, Value 00 **Function 01, Value 01**

Figure 4-3 Displaying and Changing Configuration Functions

Functions

Refer to Table 4-4 for full list of functions to configure the spray controllers.

Table 4-4 Function Settings

Function Number	Function Values	Function Name	Default Value	Description
F00	00 = Manual 01 = Auto 02 = Robot 03 = Manual with nLighten	Gun Type	00	Customize for type of gun being used. Must be programmed during initial setup.
F01	00 = Hopper 01 = Box 02 = Disable	Fluidizing (Manual Only)	02	Customize for type of fluidizing system used. Must be programmed during initial setup.
F02	00 = SCFM 01 = M3/HR	Display Units	00	Customize for type of fluidizing system used. Must be programmed during initial setup. Choose standard cubic feet per minute or cubic meters per hour.
F03	00 = Custom 01 = Classic	Electrostatic Control	00	Choose custom or classic feedback control mode. See page 5-7 for more information.
F04	00 = Smart 01 = Classic	Powder Flow Control	01	Choose Smart or Classic mode. See page 5-15 for more information.
F05	00 = Unlocked 01 = Preset Only 02 = All Locked 03 = Preset Locked 04 = Reset Password	Keypad Lockout	00	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.
F06	For Future Use			
F07	00 = View Timer 01 = Set Timer (000 = Disable to 999) 02 = Reset (00, 01)	Maintenance Timer Gun	00	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 hours. 02 resets the timer to 00.

Continued...

Function Number	Function Values	Function Name	Default Value	Description
F08	00 = Increase/Decrease 01 = Disable 02 = Flow 03 = Preset 04 = Purge 05 = Trigger	Setting Trigger Function	00	Sets the desired function for the spray gun trigger. Manual only.
F09	00 = Enable 01 = Disable	Help Codes	00	Enable or disable help codes.
F10	00 = Normal 01 = Reset	Zero Reset (Flow)	00	Refer to page 8-13 for the Zero Reset procedure.
F11	00 = Flashing 01 = Disable	Gun Display Errors	00	Enable or disable gun display errors. Display will flash when an error occurs if enabled.
F12	00 = 10 µA 01 = 5 µA	µA Lower Limit	00	See page 5-8 for more information on µA settings.
F13	00 = 50 µA 01 = 100 µA	µA Upper Limit	00	See page 5-8 for more information on µA settings.
F14	00 = Gun Total Hours 01 = Pump Total Hours	Total Hours	00	View total hours the pump and gun have been used. View only.
F15	00 = System Save 01 = System Restore 02 = Factory Reset 03 = Peer-to-Peer Copy Presets 04 = Peer-to-Peer Copy Configurations	Save Restore Reset	00	Save new settings, restore to previously saved settings, or return to factory settings. See page 4-11.
F16	00 = Low 01 = Medium 02 = Maximum	Gun Display Brightness	01	Sets brightness for gun display.
F17	01 to 99 Presets	Number of Presets	20	Choose how many presets are available to operator. See page 4-11.
F18	00 = Venturi 01 = HDLV	Pump Type	01	Customize for the pump type being used. Must be programmed during initial setup.
F19	00 = Local (Only Pair) 01 = Future Use 02 = Peer-to-Peer	Control Type	00	Controlled locally or through advance Peer-to-Peer function.

Function Number	Function Values	Function Name	Default Value	Description
F20	01 to 32 (Auto) 01 to 04 (Manual)	Gun Number	00	Number identification of spray guns being used. Auto − Preset at factory Manual − Must be programmed during initial setup.
F21	00 = View Timer 01 = Set Timer (000 = Disable thru 999) 02 = Reset (00, 01)	Maintenance Timer, Pump	00	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 hours. 02 resets the timer to 00.
F22	00 = Disable 01 = Single Purge 02 = Peer-to-Peer/Dual 03 = Future Use	Purge	01	Sets desired purge functionality. See page 5-20 for more information.
F23	0.25 to 3.75 seconds (0.25 increments)	Pulse ON Siphon	0.50	Pulse ON sets duration of each siphon pulse.
F24	0.25 to 3.75 seconds (0.25 increments)	Pulse OFF Siphon	1.50	Pulse OFF sets time between siphon pulse.
F25	0.00 to 5.00 seconds (0.25 increments)	Atomizing Air Delay	0.00	Sets the number of seconds the atomizing air continues to operate after the gun trigger is released.
F26	1 to 10 seconds (0.25 increments)	Soft Siphon	8.00	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.
F27	1 to 10 seconds (0.25 increments)	Soft Gun	8.00	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.
F28	0.10 to 2.00 seconds (0.05 increments)	Pulse ON delivery	0.50	Pulse ON delivery sets the duration of each spray gun pulse. See F30-31.
F29	0.1 to 0.95 seconds (0.05 increments)	Pulse OFF delivery	1.50	Pulse OFF sets the time between spray gun pulses. See F30-31.

Continued...

Function Number	Function Values	Function Name	Default Value	Description
F30	1 to 99	Siphon Pulses	7	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).
F31	1 to 99	Gun Pulses	13	
F32	For Future Use			
F33	For Future Use			
F34	3.500 to 4.500	Pump 1 Constant A	4.000	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.
F35	−0.500 to +0.500	Pump 1 Constant B	0	
F36	1.500 to 4.500	Pump 2 Constant A	4.000	
F37	−0.500 to +0.500	Pump 2 Constant B	0	
F38	VVYYMNNNNN Line 1: VVYYM Line 2: NNNNN	Flow Serial Number		Sets the serial number flow control module.
F39	00 = Normal 01 = Lockout disable 02 = Conveyor disable 03 = Continuous (Front Panel Trigger) 04 = Color Change (Lockout Disabled) 05 = Auxiliary Inputs Disabled	Trigger Modes	00	Sets the function of how the spray gun and system operates. See page 4-12.
F40	00 = Primary 01 to 32 = Secondary	Primary or Secondary ID	00	Identifies a controller as a primary controller or a secondary controller. F19 must be set for Peer-to-Peer (02).

Saving and Restoring Settings − F15

The F15 function controls the way presets and functions are saved and restored. Refer to Table 4-5 for saving and restoring options and page 4-6 for instructions on operating the function menu.

Table 4-5 Save and Restore Preset Functions

Function Value	Description
F15−00	System settings saved to memory for restore.
F15−01	Restores the user created presets done through the F15−00 function.
F15−02	Restores presets to factory defaults.
F15−03	For Peer-to-Peer: Copies all presets from primary controller to secondary controllers.
F15−04	For Peer-to-Peer: Copies configuration settings from primary controller to secondary controllers for F02, F03, F17, F18, and F22−31.

Number of Presets − F17

The F17 function controls the number of presets available for the operator to choose from. If the function is set to F17−05, then only five presets will be available. If the function is changed to F17−30, then 30 presets are available to the operator.

The factory default is set to 20.

NOTE: Reducing the number of presets available does not delete any of the presets saved in memory.

Refer to the *Operation* section for more information on working with presets.

Triggering − F39

Each automatic spray gun controlled by a spray gun controller can be locally triggered with the Enable/Disable buttons on the spray gun controller keypads, or remotely triggered by a PLC or other switching device. F39 functions override the Interlock Keyswitch.

For more information on the Interlock Keyswitch, refer to the *Operation* section.

Table 4-6 Function Settings

Function Number	Function Name	Function Value	Default Value
F39	Trigger Modes	00 = Normal 01 = Lockout Disable 02 = Conveyor Disable 03 = Continuous (front panel trigger only) 04 = Color Change (lockout disabled) 05 = Auxiliary Inputs Disabled	00

Section 5
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.

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 the operator to start spraying powder after initial setup. To update functions, refer to the Setup section.

Controller Interface

See Figure 5-1 and refer to Table 5-1. Use the controller interface to adjust spray settings and system functions.

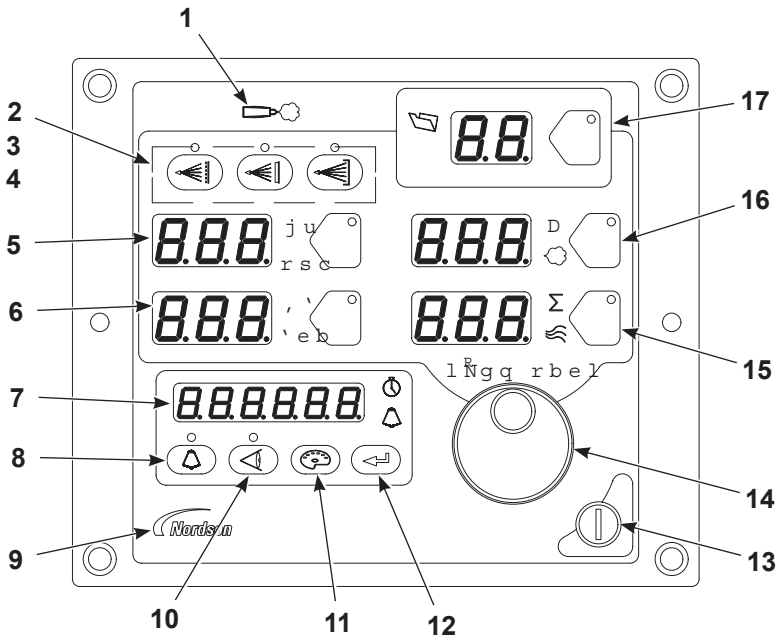
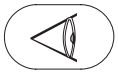
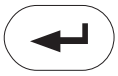


Figure 5-1 Controller Interface

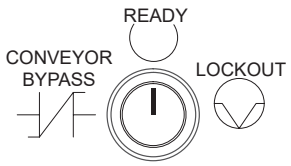
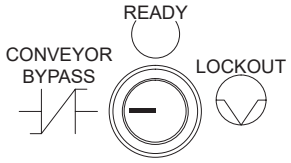
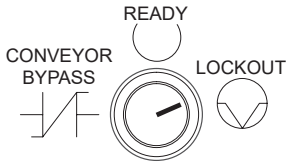
Table 5-1 Controller Interface

Item Number	Controller Icon	Description
1		Indicates when spray gun is triggered
2		Recoat mode
3		Metallics mode
4		Deep recess mode
5		kV settings
6		µA settings
7		Function/Help Display
8		Help function
9		Configuration key
10		View Menu
11		Color change
12		Enter button Selects functions and saves values and settings
13		Standby or Trigger on button
14		Rotary knob, toggles screen displays
15		Total atomizing air OR Atomizing
16		Percentage of flow OR Flow
17		Preset display and button

Interlock Keyswitch

The interlock keyswitch controls allows the user to override normal spray triggering. Refer to Table 5-2 for description of the three interlock keyswitch positions.

Table 5-2 Interlock Keyswitch Positions

Position	Description
	**Ready:** Normal operation. Spray guns can be triggered, as long as the conveyor is running. This prevents powder waste and hazardous operating situations.
	**Bypass:** Allows the operator to trigger the spray guns on and off without running the conveyor. Use the Bypass position to set up and test spray gun settings.
	**Lockout:** Spray guns cannot be triggered. Use this position when working inside the booth.

Presets

See Figure 5-2. 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 for a particular part or application..

Up to 99 presets can be programmed. The system is shipped with presets 1-3 are programmed at the factory for the most common applications. Presets 4 to 99 can be programmed as needed.

See Table 5-3 and Table 5-4 for default presets values for the HD and Venturi systems.

Table 5-3 HD System Factory 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 5-4 VT System Factory Presets

Preset	Electrostatics, Powder Flow	kV	µA		
1	Max kV, 150 g/min (20 lb/hr)	100	30	1.25	1.75
2	Max kV, 300 g/min (40 lb/hr)	100	30	2.25	0.75
3	Select Charge 3 (deep recess), 150 g/min (20 lb/hr)	100*	60*	1.25	1.75
* Select Charge Mode settings are factory set and cannot be changed.					

Creating Presets

01−99 presets can be customized for each spray controller. Use the following procedures to choose and change presets.

To save presets to memory to restore later, use the F15−00 function to save all configured presets for backup copy. Use F15−01 to restore presets saved through F15−00.

Choosing Presets

1. Press the **Preset** button. The button LED lights.
2. Turn the **Rotary Knob** to toggle between available presets.

   NOTE: Preset will restart at 1 after last preset number is reached. Number of available presets can be adjusted through the F17 function.
3. With the desired preset selected, begin production. All preset electrostatic and powder flow values will be used.

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

Figure 5-2 Preset Display and Button

Changing Presets

1. 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.
2. The preset number will begin blinking, indicating a change has been made. **Save immediately** by pressing **Enter**. The preset number will only blink for 5 seconds. If the changes are not saved within this time frame, the change will only be temporary for the current job, and the preset will stay at the original values for future use.

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

Electrostatic Settings

Electrostatic output can be set to Select Charge® mode (predefined), Custom mode, or Classic mode. Refer to the *Functions* section on page 4-7 to program Custom or Classic mode using the F03 function.

Select Charge® Mode

Select Charge mode provides three predefined electrostatic settings for common paint applications. These settings cannot be changed. The LEDs above the Select Charge mode buttons indicate the selected 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.

Refer to Table 5-5 for mode settings.

Table 5-5 Select Charge Mode Settings

Controller Icon	Description	Setting Values
Mode 1	**Re-coat:** Reduces back ionization when re-coating a part that has already been coated and cured.	100 kV, 15 µA
Mode 2	Metallics: Reduces voltage to spray gun to prevent separation of metallic flake from base material.	50 kV, 50 µA
Mode 3	Deep Recesses: Improves coating of inside corners.	100 kV, 60 µA

Custom Mode

Custom Mode is the factory default mode. Custom mode allows the operator to adjust both kV and µA independently. **kV** and **µA** LEDs light to display user is in Custom mode. Refer to F03 in Function Settings on page 4-7.

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 after 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.
5. Once the value is chosen the user can either:
   - wait 3 seconds and the value will save for the current job

   OR

   - press **Enter** to also save the new value to the current preset.

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 F12 and F13 in Function Settings on page 4-7.

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.

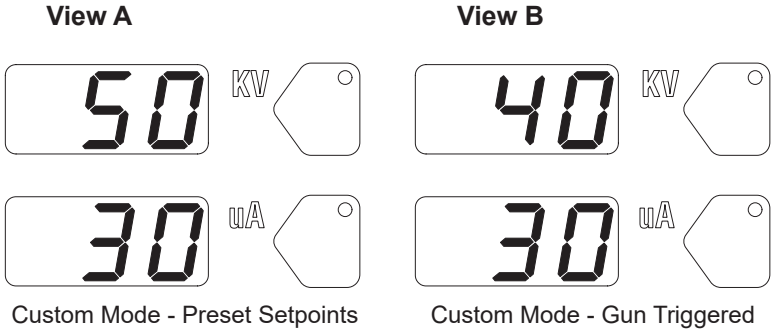


Figure 5-3 Custom Mode − Electrostatic Displays

Encore Nano Feedback Control Mode (NFC)

NFC mode allows the user to make precise adjustments to kV and µA in the lower range.

In Custom mode, the controller automatically adjusts to NFC mode as user approaches the NFC range.

Refer to F03=00 in the *Function Settings* on page 4-7 for configuring controller to Custom mode.

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 the user to control kV (STD) output or µA (AFC) output, but not both at the same time. The STD or AFC LEDs will light to indicate which mode is active.

Refer to F03=01 in the Function Settings on page 4-7 for configuring controller to Custom mode.

Adjust kV: Classic Mode: Standard (STD)

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.
3. Once the value is chosen the user can either:
   - wait 3 seconds and the value will save for the current job

   OR

   - press **Enter** to also save the new value to the current preset.

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.

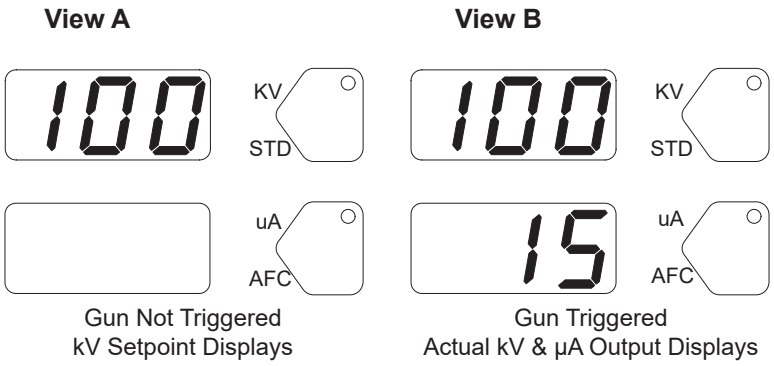


Figure 5-4 Classic Mode (STD) − Electrostatic Displays

Adjust µA: Classic Mode: Standard (AFC)

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.
3. Once the value is chosen the user can either:
   - wait 3 seconds and the value will save for the current job

   OR

   - press **Enter** to also save the new value to the current preset.

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 F12 and F13 in *Function Settings* on page 4-7.

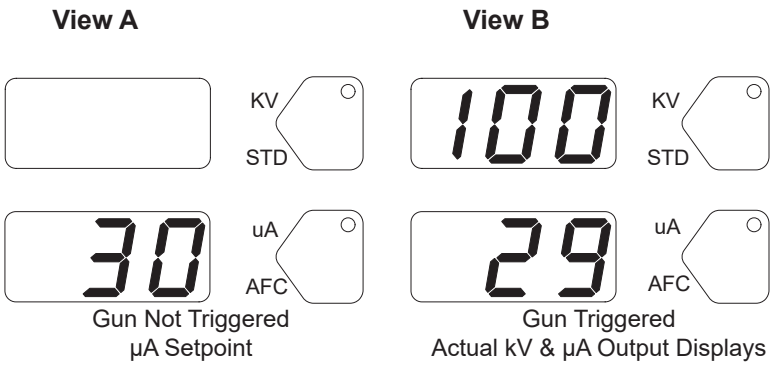


Figure 5-5 Classic Mode (AFC) − Electrostatic Displays

Powder Flow Settings

HD Powder Flow Settings

Powder flow through the system is affected by Flow, Atomizing Air, and Assist Air.

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. Flow is adjusted by the percentage of the pump's total capacity.

Flow can also be adjusted using the **Fast Flow** setting, which increases the timing of the pulses, while reducing the size of the pulses. Refer to page 5-14 for adjusting Fast Flow settings.

Atomizing Air will change the delivery velocity as the powder exits the gun, as well as change the atomization of the powder cloud.

Assist Air works in conjunction with Flow to provide Flow Air from the pump out to the the spray gun. Assist Air is adjusted by changing the percentage that correlates to a specific preset. Refer to page 5-14 for adjusting Assist Air settings.

Ranges for HD flow settings are:

- Powder Flow output from 0−100%
- Atomizing Air from 0.20−4.00 cfm in 0.05 increments
- Assist Air value from −50% to +50%
- Fast Flow − Normal or Fast

Setting Powder Flow and Atomizing Setpoints

To set flow or atomizing air:

1. Press the **Flow** or Atomizing button. The green LED on the selected button lights up.
2. Turn the **Rotary Knob** to increase or decrease the setpoints.
3. Once the value is chosen the user can either:
   - wait 3 seconds and the value will save for the current job

   OR

   - press **Enter** to also save the new value to the current preset.

Flow or Atomizing Setpoint Display:

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

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

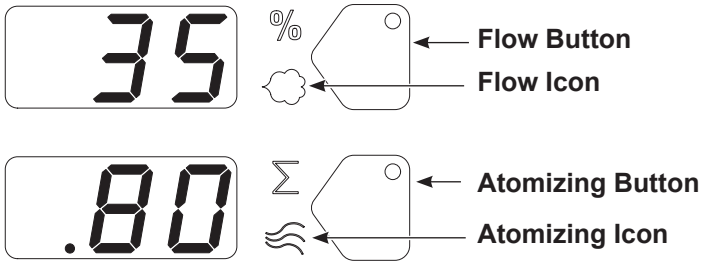


Figure 5-6 Flow or Atomizing Setpoints

Air Assist and Fast Flow

Use the **View** button to adjust assist air and fast flow preset values. Press this button consecutively to toggle between display options. Refer to Table 5-6 for display screens and description of settings.

NOTE: The **View** button also toggles through software versions in a *view only* mode.

Table 5-6 View Menu Settings

Function Display	Function Name	Description
AA 00	Assist Air Setting	Allows user to set value between −50% and +50%
FF 0	Fast Flow Setting	0 = Normal F = Fast

Use the following instructions to adjust assist air and fast flow settings.

NOTE: Adjustments to Assist Air and Fast Flow values only affect the preset the user is currently viewing.

1. Press **View** button until the appropriate code is displayed.
2. Press the **Enter** button to select. The value will blink indicating it is in edit mode.
3. Use the **Rotary Knob** to select the desired setting.
4. Once the value is chosen the user can either:
   - wait 3 seconds and the value will save for the current job

   OR

   - press **Enter** to also save the new value to the current preset.

VT Powder Flow Settings

Powder flow through the system is affected by Flow and Atomizing Air working together to provide the Total Air.

Flow Air creates suction through the line to draw powder into the pump.

Atomizing Air works with the Flow air to deliver the powder out to the spray gun.

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

- **Classic Flow** − This is the standard method of setting powder flow and velocity. The user sets flow and atomizing air separately, and balancing each for optimum results. When the controller is configured for Classic Flow mode, the Flow and Atomizing Air icons are illuminated.

Flow Air **Atomizing Air**

Figure 5-7 Classic Mode Icons

- **Smart Flow** − In this mode, user sets Total Air (powder velocity) and Flow Air % (powder flow) setpoints. The controller automatically adjusts Flow and Atomizing air based on the setpoints. When the controller is configured for Smart Flow mode, the % and ∑ icons are illuminated.

NOTE: Refer to the F04 function in *Function Settings* on page 4-7 for a list for mode configurations.

Flow Air % **Total Air**

Figure 5-8 Smart Mode Icons

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.
3. Once the value is chosen the user can either:
   - wait 3 seconds and the value will save for the current job

   OR

   - press **Enter** to also save the new value to the current preset.

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

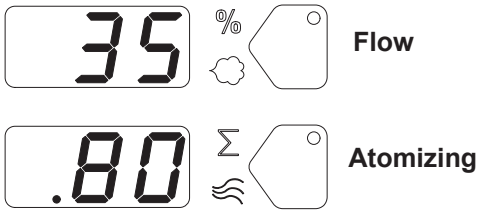


Figure 5-9 Classic Mode − Flow Air or Atomizing Air Flow Setpoints

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 Table 5-7and Table 5-8 for examples of possible Smart Flow settings and their equivalents in Atomizing and Flow Air pressures and flows. Figure 5-10 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.

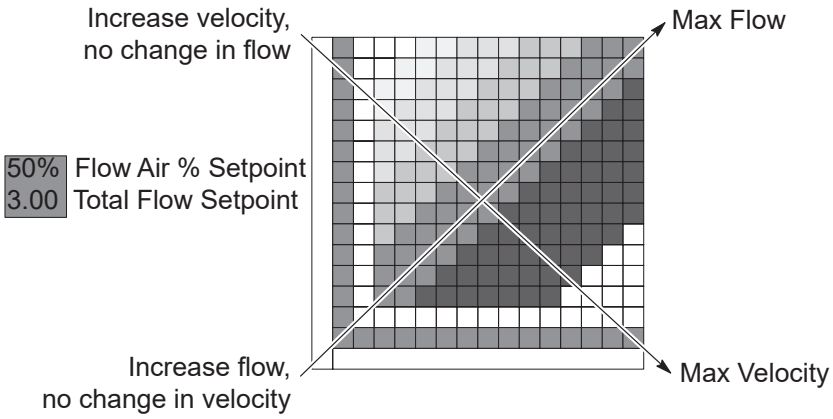


Figure 5-10 Reading the Smart Flow Tables

Setting Smart Flow Setpoints

To set Flow Air % or Total Flow ∑ :

1. Press the % or ∑ button. The LED on the selected button illuminates.
2. Turn the **Rotary Knob** to increase or decrease the setpoint. The setpoint is automatically saved after 3 seconds or when any button is pressed.

NOTE: If Total Flow is set to zero, then 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.

Flow Air %

Total Flow Air in M³/HR or SCFM

Figure 5-11 Smart Flow Mode − Flow Air % or Total Flow ∑

Smart Flow Settings − Metric Units

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

Table 5-7 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) ∑		**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 5-8 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							

Color Change Purge (HD Only)

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 F22 in *Function Settings* on page 4-7 to configure the following purge choices.

- **Single** − Only the gun connected to this controller is purged when the Color Change key is pressed.
- **Peer-to-Peer/Dual** −
  - Automatic Spray Guns (Peer-to-Peer) − Secondary spray controllers purge when their assigned Primary spray controller are purged.
  - Manual Spray Guns (Dual) − Both guns on CAN network are purged.
- **Disabled** − Color Change key is disabled.

HD 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.

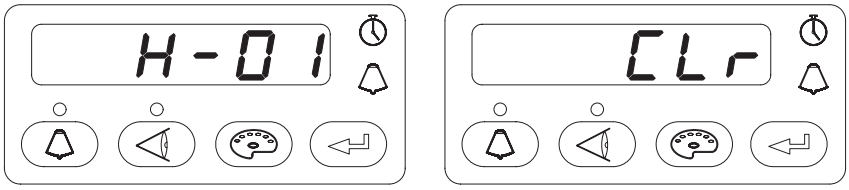
HD Purge Settings

NOTE: Refer to functions F22 through F31 in *Function Settings* on page 4-7 for more information.

Function	Description	Default	Setting
F23	PULSE ON SIPHON	**0.50**	0.25 to 3.75 seconds (0.25 increments)
F24	PULSE OFF SIPHON	**1.50**	0.25 to 3.75 seconds (0.25 increments)
F25	ATOMIZING AIR DELAY	**0.00**	0.00 to 5.00 seconds (0.25 increments)
F26	SOFT SIPHON	**8**	1.00 to 10.00 seconds (0.25 increments)
F27	SOFT GUN	**8**	1.00 to 10.00 seconds (0.25 increments)
F28	PULSE ON DELIVERY	**0.50**	0.10 to 1.00 seconds (0.05 increments)
F29	PULSE OFF DELIVERY	**1.50**	0.1-2.00 seconds (0.05 increments)
F30	SIPHON PULSES	**7**	1-99 pulses
F31	GUN PULSES	**13**	1-99 pulses

Help Codes

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



Display Codes **Clear Codes**

Figure 5-12 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 the *Troubleshooting* section for help code troubleshooting, general system troubleshooting, and controller wiring diagram.

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 manual 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 9-1.

VT System Shutdown

For VT 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 9-1.

Section 6

Advanced Features

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

Peer-to-Peer (P2P)

Peer-to-Peer (P2P) communication allows the Encore Enhance controllers to communicate to each other over the Nordson CAN communications network (CAN) for automatic spray guns.

The user can set up a controller as a primary; then any controller configured as a secondary will follow the same settings as its assigned primary. When the primary is triggered, all the secondary controllers assigned to it will also spray.

The following features are are available using P2P:

- Group triggering
- Group presets
- Group purging (configured through F22=02)
- Copy presets (configured through F15=03)
- Copy configurations for F02, F03, F17, F18, F22−F31 (configured through F15=04)

Setup for P2P

Use the following steps to configure applicable spray controllers using the P2P function. Refer to the *Function Settings* table on page 4-7 for full list of function options.

1. Update all applicable controllers to F19 = 02.
2. Set the controller to be a primary or a secondary.
    - Primary: F40 = 00
    - Secondary: F40 = Gun number of primary it will follow (01 to 32)

See Figure 6-1 for an example of a system configured for two primary controllers and six secondary controllers.

- Guns 1 and 2 are configured as primary controllers
- Guns 3, 5, and 7 are configured as secondary controllers following Gun 1
- Guns 4, 6, and 8 are configured as secondary controllers following Gun 2

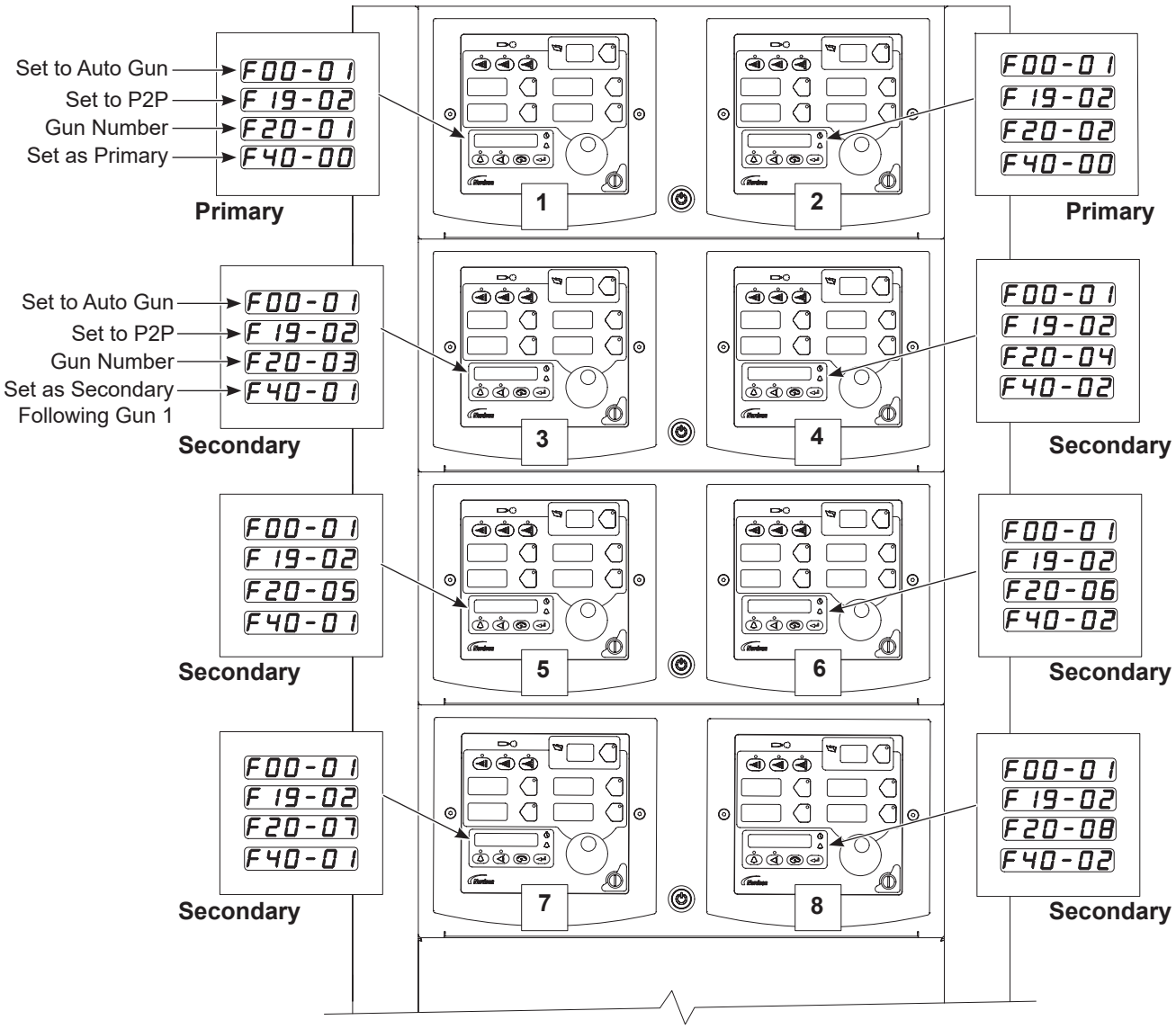


Figure 6-1 Example of Eight Gun P2P Setup − Two Primary Controllers and Six Secondary Controllers

Pairing Interface with iFlow Module

Each iFlow module has a unique serial number that is paired with its respective spray controller interface. The pairing communicates the serial number from the iFlow module to the interface, and also allows the interface to communicate the spray gun number to the iFlow module.

See Figure 6-2. A matching serial number label is placed on the back of the spray controller module for easy reference.

Pairing is done at the factory. The user only needs to complete the pairing procedure when a replacement iFlow module is installed into the spray controller. Use the steps below to pair the iFlow module to the spray controller interface.

Refer to *iFlow Module* on page 7-3 of the *Repair* section for replacing iFlow module into the spray controller.

Pairing New iFlow Module

1. See Figure 6-2. Reference the serial number of the new iFlow module. The serial number label of the new iFlow module should have been removed from the new iFlow module and placed on the back of its respective spray controller.
2. Use the F38 function to program the new 10 digit serial number (VVYYMNNNNN) to the spray controller interface.

Refer to Table 6-1 and Table 6-2 for digit descriptions and segment alphabet symbols used to represent the numbers and letters of the serial number.

NOTE: The Function screen will only show 5 digits at a time. The screen will advance to allow the next set of 5 digits to be entered.

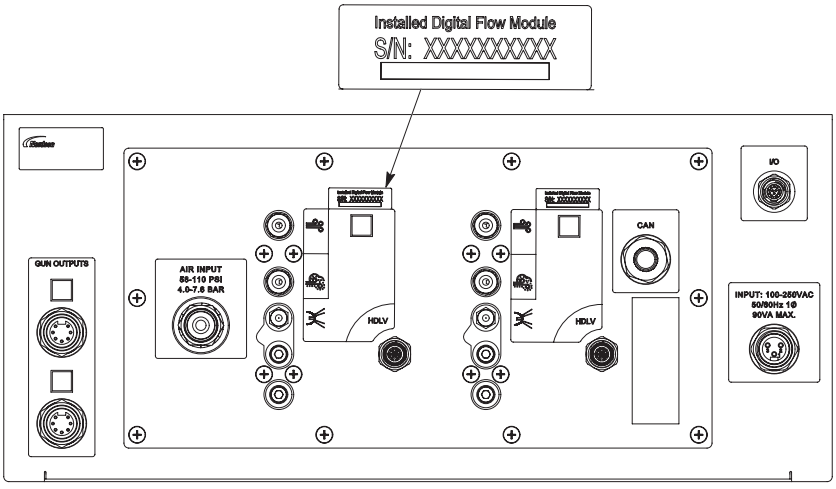


Figure 6-2 Spray Controller Module (Rear View)

Table 6-1 Serial Number Values

Code	Definition
VV	Vendor code
YY	Year
M	Month
NNNNN	Unique five digit number

Table 6-2 Segment Symbols

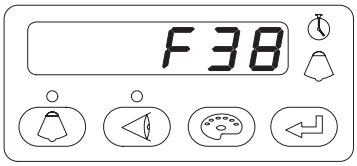
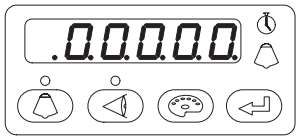
Heading	Description	Letter	Description	Letter	Description
	Letter A Month: January		Letter B Month: February		Letter C Month: March
	Letter D Month: April		Letter E Month: May		Letter F Month: June
	Letter G Month: July		Letter H Month: August		Letter J Month: September
	Letter K Month: October		Letter L Month: November		Letter M Month: December
	Letter N		Letter O		Letter P
	Letter Q		Letter R		Letter S
	Letter T		Letter U		Letter V
	Letter W		Letter X		Letter Y
	Letter Z				

Manual iFlow Pairing

Manual iFlow pairing is only done if the original programmed serial number becomes corrupt, which will display as Help code H54. Use the following procedure to manually pair the iFlow module to its respective spray gun module.

NOTE: H54 may also be a result of a serial number improperly entered or a CAN network cable issue. Verify the serial number and check cable before proceeding with the manual pairing procedure.

1. The serial number for F38 must be set to the following so the pairing process will be skipped.

Function Display	Serial Number Line Display
	
	Line 1, set to 00_
	
	Line 2, set to _00000

2. Remove power from the system and refer to *iFlow Module* on page 7-3 of the *Repair* section for disassembly instructions.
3. See Figure 6-3. Locate the SW1 and SW2 switches on the iFlow module board. Refer to Table 6-3 for definition of each SW1 position.
4. Place SW1-3 in the *Down* position to activate override mode.
5. Use the SW1 and SW2 to set the applicable gun number address.
   - Manual Spray Guns − Adjust SW2 dial to gun number.
   - Automatic Spray Guns − Configure SW1-1 and SW1-2 for the appropriate gun range listed in Table 6-4 and adjust SW2 dial to applicable gun number.

NOTE: When advancing to the next range of numbers, SW2-1 represents the first number in that range. See Figure 6-4 for example of configured address of iFlow module.

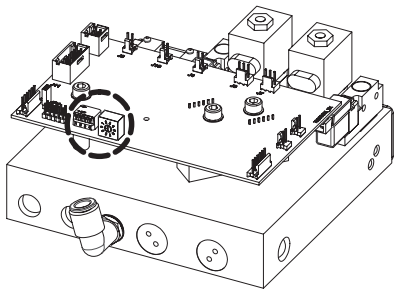
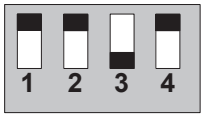
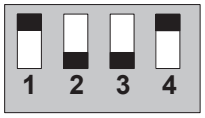
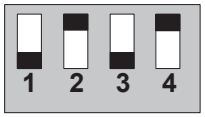
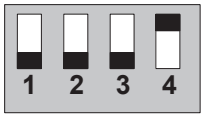
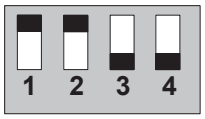


Figure 6-3 Location of Switches

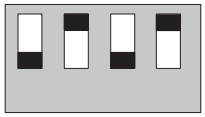
Table 6-3 SW1 Dip Switch Functions

SW1 Dip Switches	Function	Position
1	Determines automatic gun range when switch 3 is in *Down* position.	Refer to Table 6-4
2	Determines automtic gun range when switch 3 is in Down position.	Refer to Table 6-4
3	Address Override − allows iFlow module to be manually configured to a gun number when in the *Down* position.	Up: Override inactive Down: Override active
4	Configures iFlow module for auto or manual spray gun	Up: Automatic Down: Manual
NOTE: Default position of all dip switches on replacement iFlow modules is *Up*.		

Table 6-4 SW2 Configuration for Spray Guns

SW1 Positions	SW2 Configuration and Description
	SW2 sets automatic gun range 1−8 SW2-1 = Gun 1
	SW2 sets automatic gun range 9−16 SW2-1 = Gun 9
	SW2 sets automatic gun range 17−24 SW2-1 = Gun 17
	SW2 sets automatic gun 25−32 SW2-1 = Gun 25
	SW2 sets manual gun range 1−4 SW2-1 = Gun 1

SW1 Configured for Gun Range 17−24



SW2 Configured for Gun 17

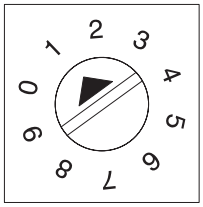


Figure 6-4 iFlow Module Address Set for Gun 17

Section 7

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.

Disassembly

See Figure 7-1 for view of disassembling interface module for repair.

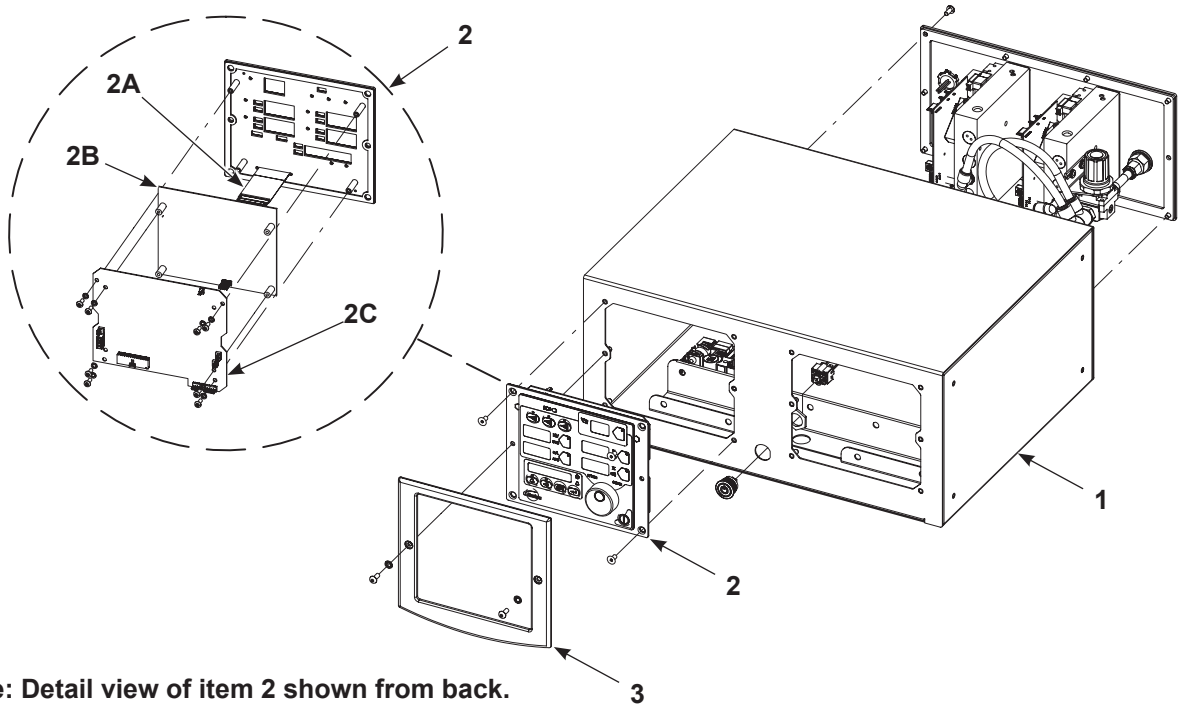


Figure 7-1 Interface Module Assembly

1. Enclosure
2. Keypad

2A. Keypad ribbon conntector
2B. Main controller display

2C. Main control board
3. Bezel

iFlow Module

Refer to Disassembly on page 7-2 for access to the iFlow module.

Removal

See Figure 7-2.

1. Remove air connection (4) from back of iFlow module (3).
2. Remove the four screws (1) securing the iFlow module (3) to the plate.

NOTE: If replacing the iFlow module, remove the serial number label loosely attached to the new iFlow module and place on the along the dedicated location (2) on the back of the respective spray controller module. Refer to *Pairing Interface with iFlow Module* on page 6-4 of the *Advanced Features* section for pairing the new iFlow module to the spray controller.

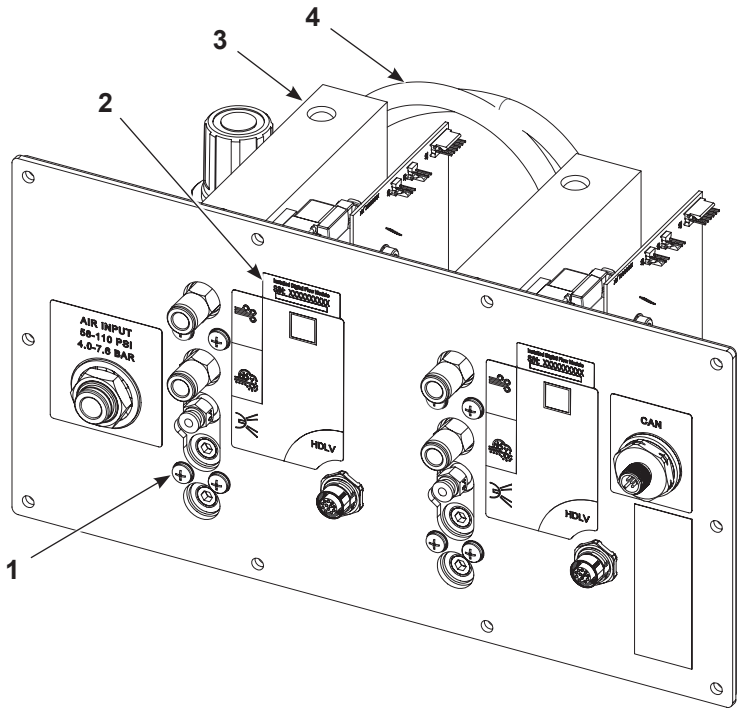


Figure 7-2 Removing iFlow Module

Proportional Valve Cleaning

See Figure 7-3. A dirty air supply can cause the proportional valve (10) to malfunction. Follow these instructions to disassemble and clean the valve.

1. Disconnect the coil (2) wiring from the circuit board (6). Remove the nut (1) and coil from the proportional valve (10).
2. Remove the two long screws (4) and two short screws (3) to remove the proportional valve from the manifold.

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

3. Remove the valve stem (11) from the valve body (14).
4. Remove the valve cartridge (13) and spring (12) from the stem.
5. Clean the cartridge seat and seals, and the orifice (15) in the valve body. Use low-pressure compressed air. Do not use sharp metal tools to clean the cartridge or valve body.
6. Install the spring and then the cartridge in the stem with the plastic seat on the end of the cartridge facing out.
7. Make sure the O-rings furnished with the valve are in place on the bottom of the valve body.
8. Secure the valve body to the manifold with the long screws, making sure the arrow (5) on the side of the body points toward the outlet fittings.
9. Install the coil over the valve stem, with the coil wiring pointing toward the circuit board. Secure the coil with the nut and connect the coil wiring to the circuit board.

Proportional Valve Replacement

See Figure 7-3. If cleaning the proportional valve does not correct the flow problem then replace the valve. Before installing a new valve, remove the protective cover from the bottom of the valve body. Be careful to not lose the O-rings under the cover.

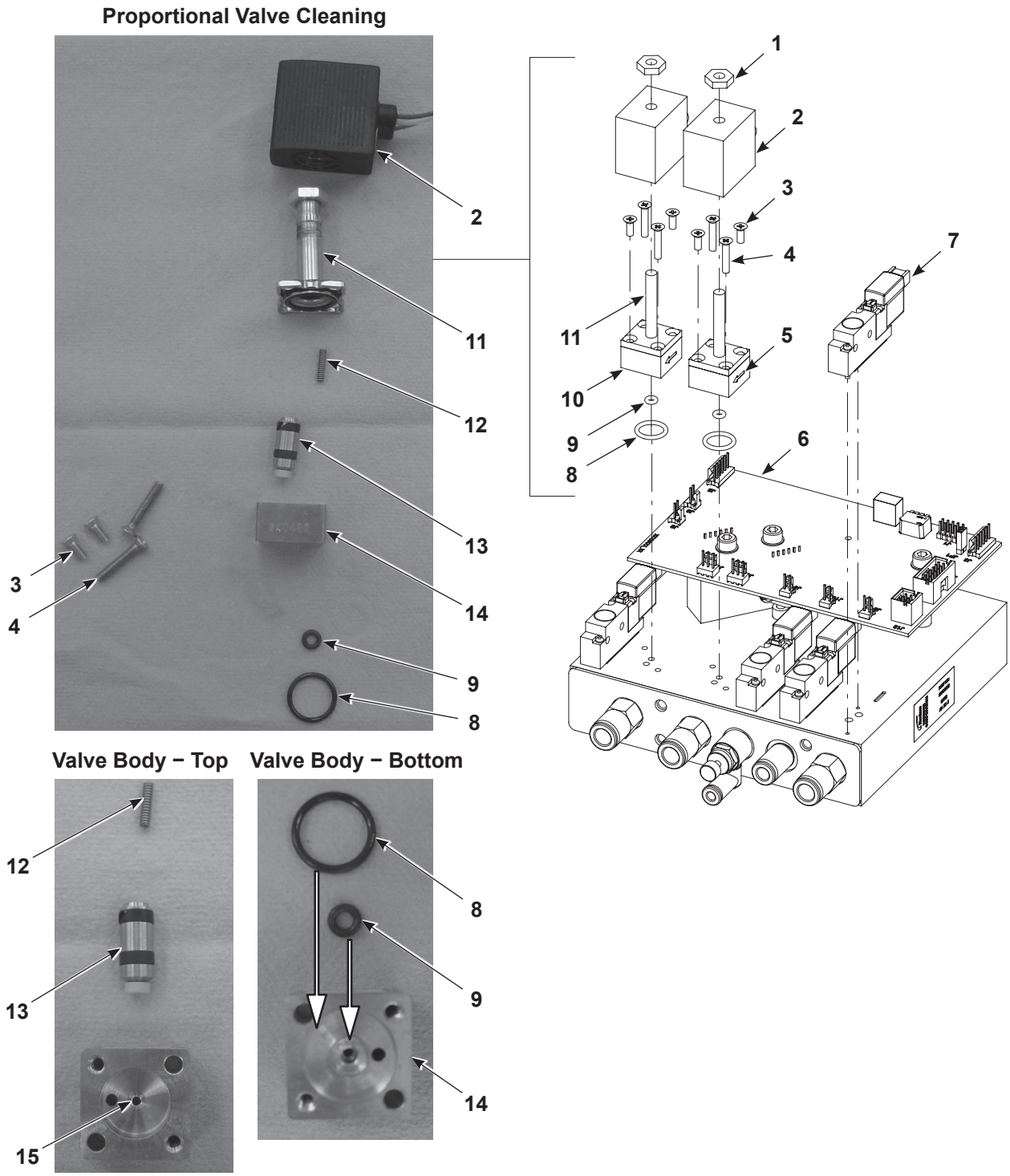


Figure 7-3 iFlow Module Cleaning and Repair

1. Nut
2. Coil
3. Short screws (two per valve)
4. Long screws (two per valve)
5. Direction of flow arrow
6. Circuit board
7. Solenoid valve
8. Large O-ring
9. Small O-ring
10. Proportional valve
11. Valve stem
12. Spring
13. Cartridge
14. Valve body
15. Orifice

Filter Replacement

See Figure 7-4.

1. Remove the screws (1) and washers (2) securing the circuit board (3) to the manifold (4), then remove the circuit board from the manifold.

NOTE: If the seals (7) remain in the manifold port (5), remove them.

2. Check for filter contamination. If filters (6) are discolored, replace filters using service kit 1604436. Replacement instructions are included with kit.

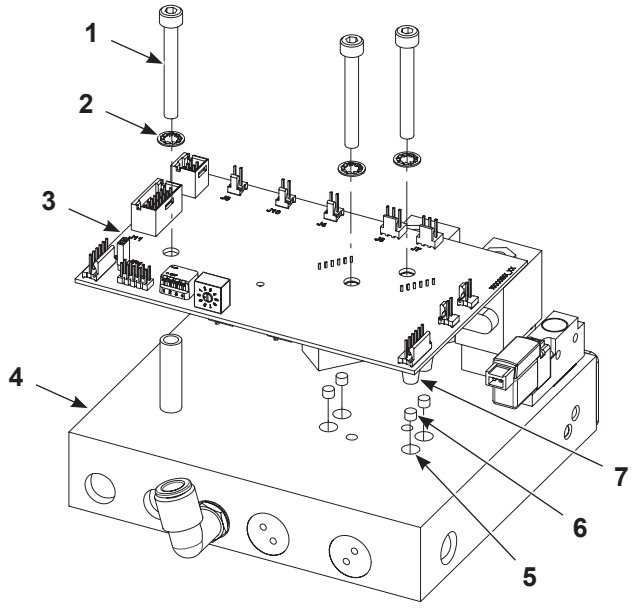


Figure 7-4 iFlow Module Filters

Section 8
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.

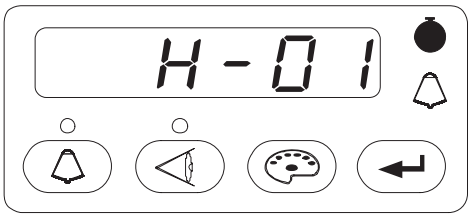


Figure 8-1 Displaying and Clearing Help Codes

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 1−32 for auto or 1−4 for manual spray guns. Refer to the F20 function in *Function Settings* on page 4-7.
H01	EEPROM Read Failed	Reset the fault (press the Nordson key to open the Help 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. Refer to the F20 function in *Function Settings* on page 4-9. If in manual override mode, 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. Check the connections from the cable receptacle to the J1 terminal block on the main control board. Check all CAN network connections (internal and external). Check for proper network terminations and network layout. 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. Set the maximum gun current F13=00. 50 µA. 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 the spray gun manual.

Code	Message	Correction
H19	Gun Maintenance Timer Expired	The Maintenance Timer has exceeded its setting. Perform the scheduled maintenance, then reset the maintenance timer. See F07 in *Function Settings* on page 4-7 for reset instructions (F07-02).
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 *Function Settings* on page 4-9 for reset instructions (F21-02).
H21	Atomizing Air Valve Fault	Refer to the *System Connections* section. 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	Flow Air Valve Fault	Refer to the *System Connections* section. 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)	Flow Air Flow Low Fault Flow is lower than setpoint. System cannot reach setpoint.	Check if input pressure is greater than 90 psi (6.2 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 90 psi (6.2 bar) with gun triggered ON. Check for blockage in proportional valve. Check for oil/water contamination. Perform the *Flow Air Flow Verification for HD* procedure on page 8-13. Check for water and/or oil contamination in the transducer filters by removing the board from the flow manifold. Replace filters with 1604436.

Continued...

Code	Message	Correction
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 the user set and view actual flow-rate and atomizing air flow so problem can be diagnosed. 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 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.
H24 (HD)	Atomizing 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 atomizing 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)	Flow 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 spray controller. 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 8-13. Perform the *Flow Air Flow Verification for HD* procedure on page 8-13. Check for water and/or oil contamination in the transducer filters by removing the board from the flow manifold. Replace filters with 1604436.

Code	Message	Correction
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* section 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 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 8-13. Refer to 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.
H26 (HD)	Atomizing 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 8 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 spray controller. If air is leaking, remove the proportional valve and clean it. If air is not leaking, plug the 8 mm atomizing port and perform the *Re-Zero Procedure* on page 8-13. Perform the *Flow Air Flow Verification for HD* procedure on page 8-13. 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)
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.

Continued...

Code	Message	Correction
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. See F18 in *Function Settings* on page 4-8 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	For future use	
H36	LIN BUS Communication Fault (Gun Cable) (Manual spray guns only)	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	Contact Nordson service representative.
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 µ display should always read >0.
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.

Code	Message	Correction
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 Pinch Pressure Select Valve 9 Fault	Check J12-3 for loose harness connection. Check Valve 9 for loose connection.
H53	Purge Valve 8 Fault	Check J12-2 for loose harness connection. Check Valve 8 for loose connection.
H54	Node not paired	Check CAN network cable connection. Confirm serial number displayed matches label on back of spray controller. Perform *Manual iFlow Pairing* procedure on page 6-6 to manually set iFlow address.

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 atomizing air flow.
	Damp powder	Check the powder supply, air filters, and dryer. Replace the powder supply if contaminated.
	Low atomizing air pressure	Increase the atomizing 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 8-13.
2. Voids in powder pattern (VT)	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.

Problem	Possible Cause	Corrective Action
3. Low powder flow or powder flow surging	Assist air to high/low	Adjust assist air as needed.
	Fluidizing to high/low	Refer to the *Encore HD Pump Module* manual.
	Air tubing kinked or plugged (H24 or H25)	Check atomizing 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.
	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 *Function Settings* on page 4-7.
	Low supply air pressure	Input air must be greater than 6.2 bar (90 psi).
	Air pressure regulator set too low	Adjust the input regulator so that the pressure is greater than 6.2 bar (90 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* on page 7-4.

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 the 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 spray gun 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 the spray gun manual.
	Damaged gun cable	Perform the Gun Cable Continuity Test as described in the spray gun manual. If an open or short is found, replace the cable.

Problem	Possible Cause	Corrective Action
8. No kV output a d 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 the 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 *Function Settings* on page 4-8 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 the spray gun manual.
10. Gun display module shows CF	Loose gun display connection	Refer to the *System Connections* section 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 the 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 *Function Settings* on page 4-7.
	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 *Function Settings* on page 4-7.
	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. 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 *Function Settings* on page 4-7.
14. 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	
15. 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 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 6.2 bar (90 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 spray controller, disconnect the 8 mm atomizing air tubing and install 8 mm plugs in the output fittings.
2. Press the **Nordson** button for 5 seconds to display the controller functions. F00−00 is displayed.
3. Rotate the knob until F10−00 is displayed.
4. Press the **Enter** button, then rotate the knob to display F10−01.
5. Press the **Enter** button. The system controller will re-zero the flow and atomizing air and reset the function display to F10−00.
6. Remove the plugs from the atomizing air output fittings and reconnect the air tubing.

Flow 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).

Section 9
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 10

Options

Adding an Additional Dual Spray Controller

WARNING: Before adding a spray controller to the system, power down the complete system to avoid an electrical shock or prevent personal injury when performing the below procedures.

1. See Figure 10-1. Remove the side panels (4) from stack frame.
2. Remove the screws (3) and back panel (2) from the stack frame.
3. Remove the screws (5) and blank panels (1). Retain the screws for installing the spray controller.
4. Slide the new spray controller module into the stack frame and secure in place with the retained screws (5). Use the slots (6) on the stack frame for any adjustments needed for fit.

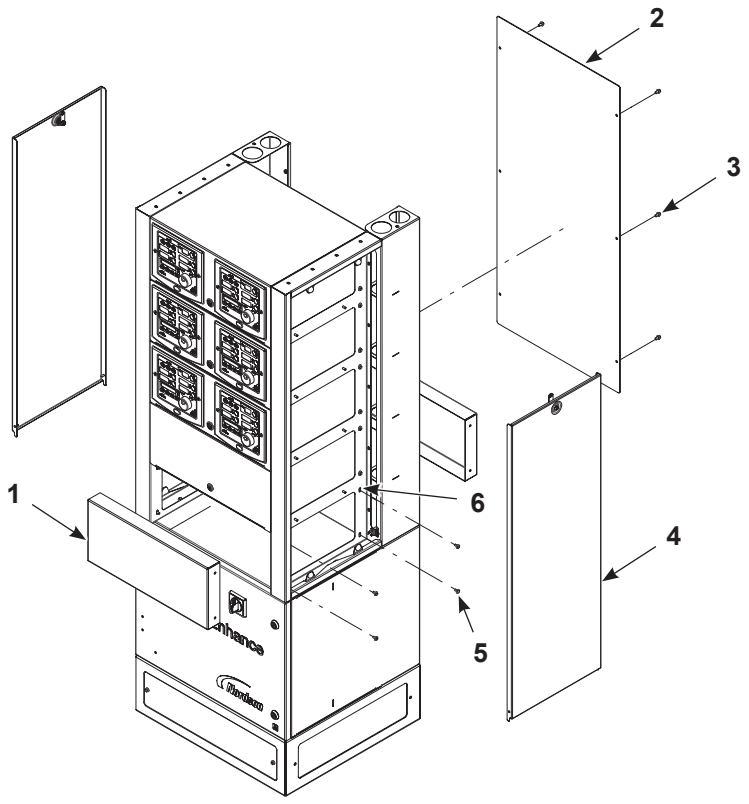


Figure 10-1 Removing Blank Panels

5. See Figure 10-2. Connect the spray controller ground connection to the stack.
6. Remove the power distribution back panel and make the CAN, I/O, and AC connections from the spray controller to the power distribution module.

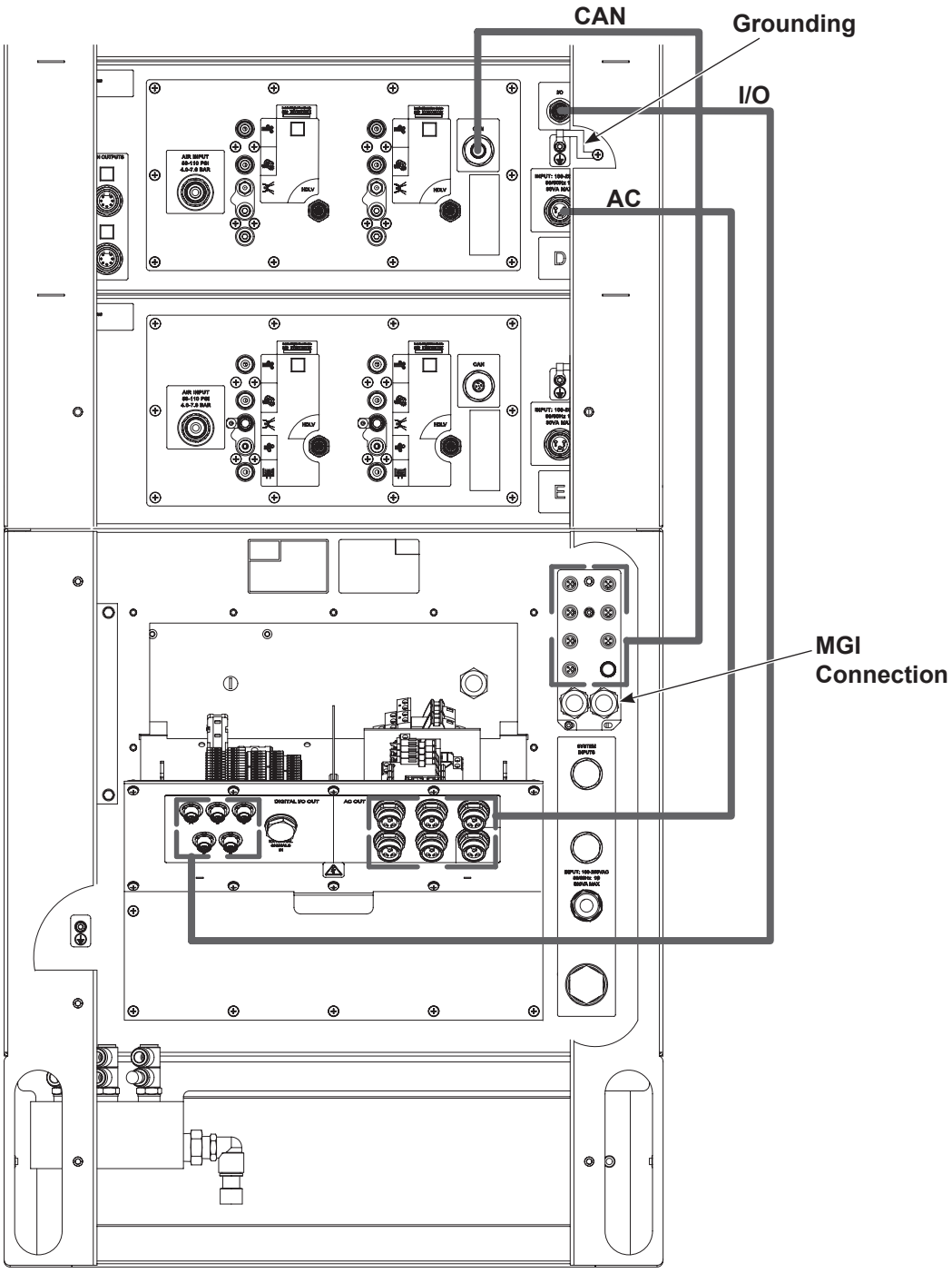


Figure 10-2 Power Distribution Connections

7. **Manual spray guns only** − See Figure 10-3. Connect the MGI to the power distribution module.
8. For all other connections, refer to the System Connections section and the Encore Enhance Installation Guide.

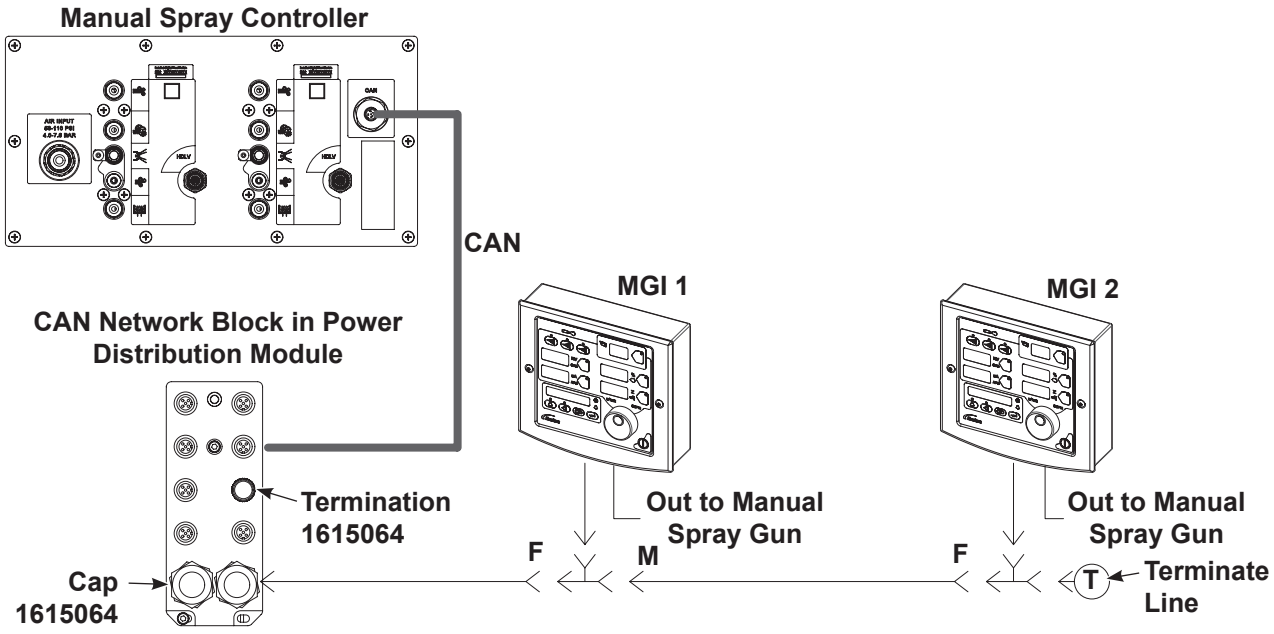


Figure 10-3 MGI Connections for Manual Spray Gun Modules

Adding the Top Extension Panel

See Figure 10-4.

1. Remove the side panels (4).
2. Use the screws (1) and nuts (3) to attach the extension (3) on top of the frame.

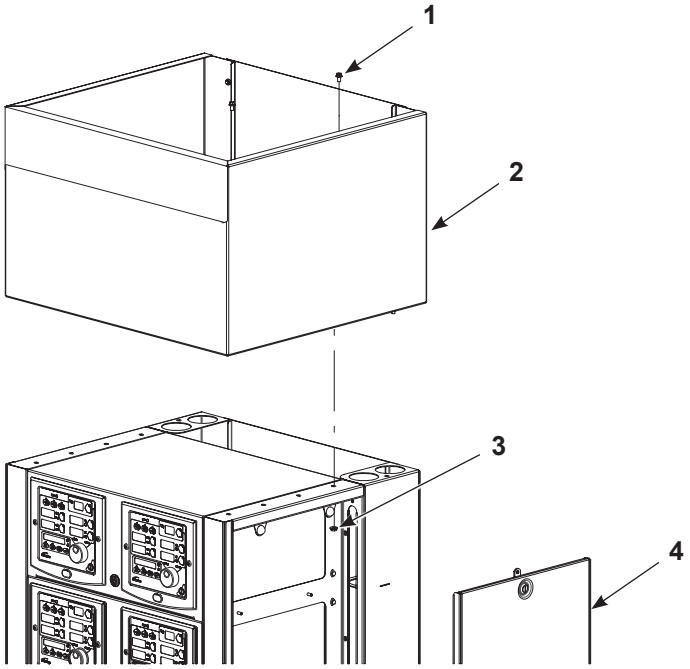


Figure 10-4 Assemble the Extension to the Stack Frame

Item	Part	Description	Quantity	Note
1	1613918	KIT, extension panel assembly, tall	1	
2	------	• SCREW, hex, serrated, M6 x 10 mm, zn	10	
3	------	• NUT, hex, flanged, serrated, M6	10	

Section 11
Parts

Parts

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	Part	Part	Description	Quantity	Note
—	- - - - - -	—	—		—	
1	- - - - - -					
2						

Continued...

NOTE: A.

B.

NS: Not Shown

AR: As Required

Spray Controller Configurations

See Figure 11-1 and refer to the parts list below for standard configurations.

Part Number	Number of Automatic Spray Guns	Number of Manual Spray Guns
1613993	4	0
1613994	6	0
1613995	8	0
1613996	10	0
1614000	4	2
1614002	6	2
1614004	8	2

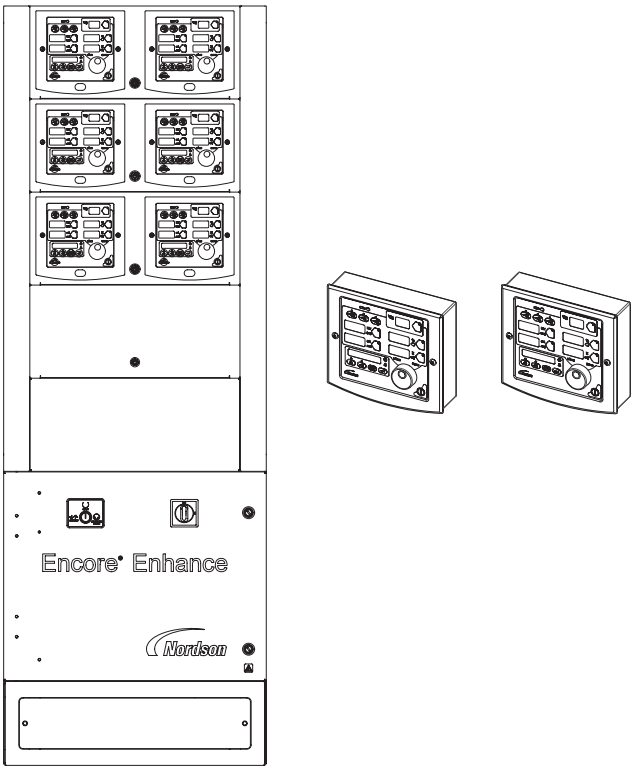


Figure 11-1 Spray Controller Configuration (Shown for 6 Automatic Spray Guns and 2 Manual Spray Guns)

Common Components for Spare Parts

Automatic Spray Controller Module

See Figure 11-2 and refer to the following parts list for common spare parts for the automatic spray controller module.

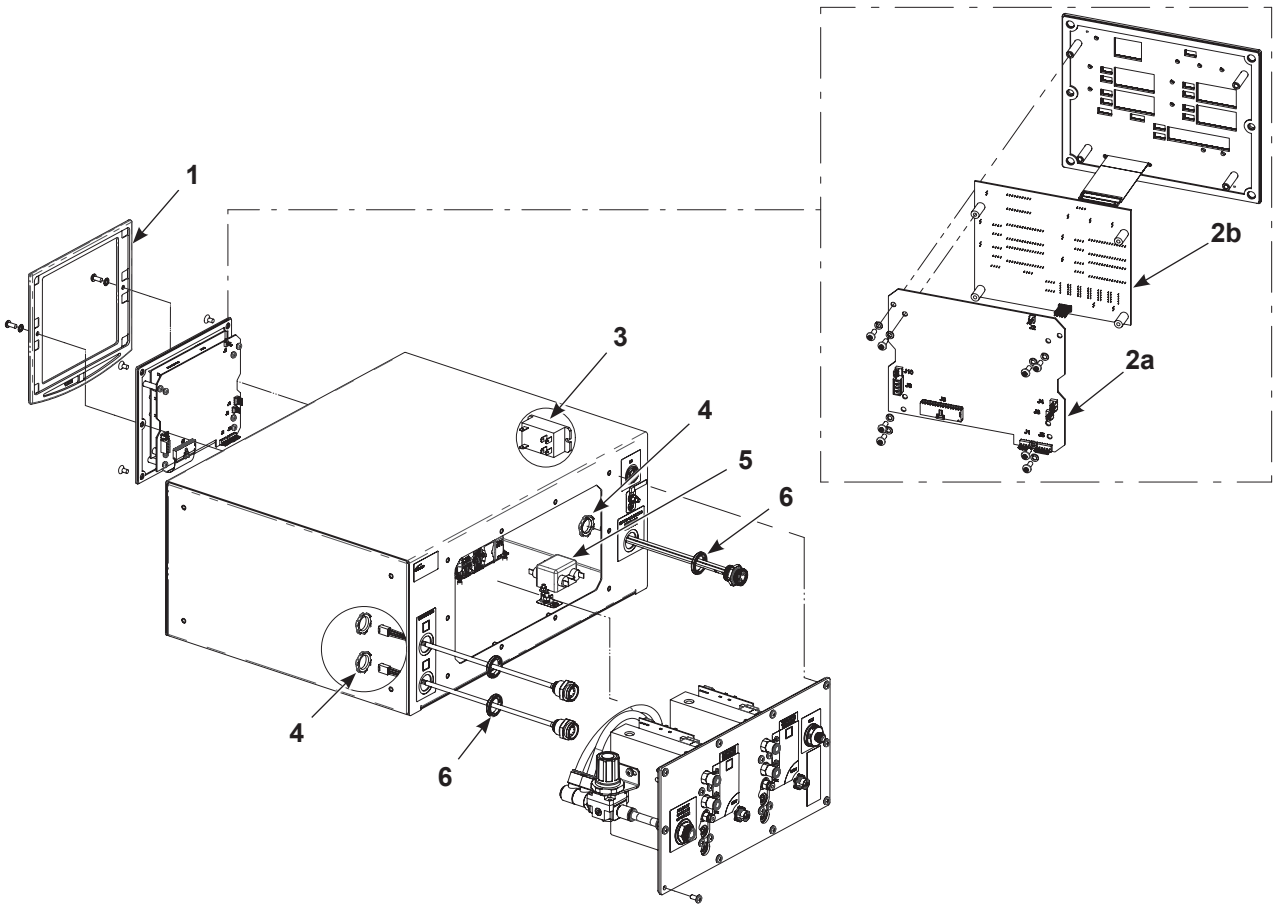


Figure 11-2 Automatic Spray Controller Module

Item	Part	Description	Quantity	Note
—	1613446	CONTROLLER, 2 gun automatic, Enhance, with cables, packaged	1	A
1	1082081	• BEZEL, interface, controller	2	
2a	1614563	• KIT, PCA, main control, Encore Enhance, packaged	2	
2b	1614564	• KIT, PCA, control, interface, Encore Enhance	2	
3	1068173	• RELAY, two pole, 30 A, PCB/panel mount	1	
4	984526	• NUT, lock, ½ conduit	3	
5	334805	• FILTER, line, RFI, power, 10 A	1	
6	939122	• SEAL, conduit fitting, ½, blue	3	
NOTE: A. Includes cables for power, DeviceNet, and I/O.				

Manual Spray Controller Module

See Figure 11-3 and refer to the following parts list for common spare parts for the automatic spray controller module.

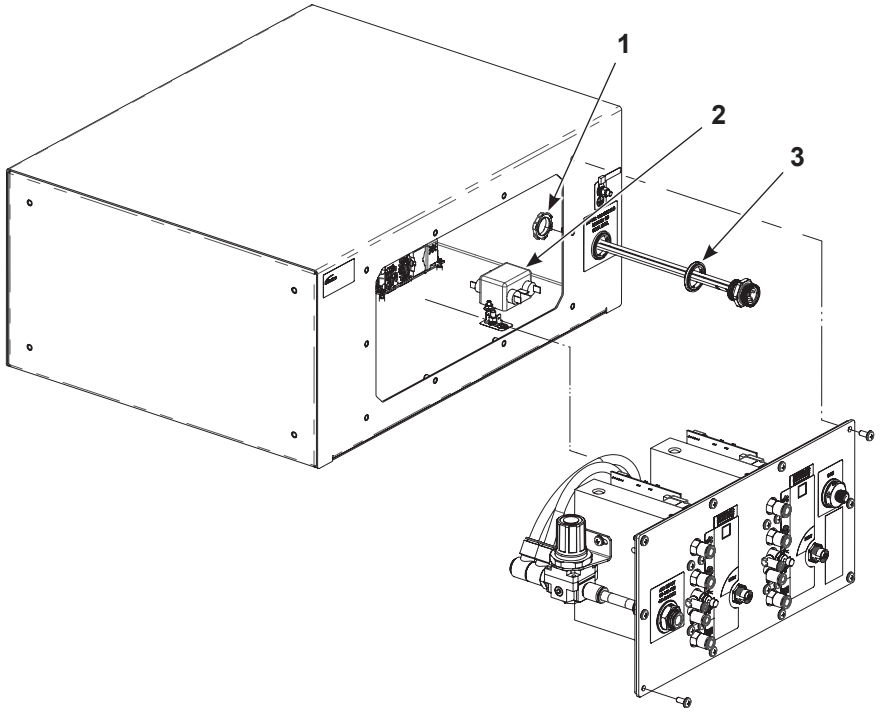


Figure 11-3 Manual Spray Controller Module

Item	Part	Description	Quantity	Note
—	1613451	CONTROLLER, 2 gun manual, Enhance, with cables, packaged	1	A
1	984526	• NUT, lock, ½ conduit	1	
2	334805	• FILTER, line, RFI, power, 10 A	1	
3	939122	• SEAL, conduit fitting, ½, blue	1	
NOTE: A. Manual controller also includes the MGI (1614566), power cable, DeviceNet cable, tees, and resistors required for installation.				

Manual Gun Interface (MGI)

See Figure 11-4 and refer to the following parts list for common spare parts for the MGI.

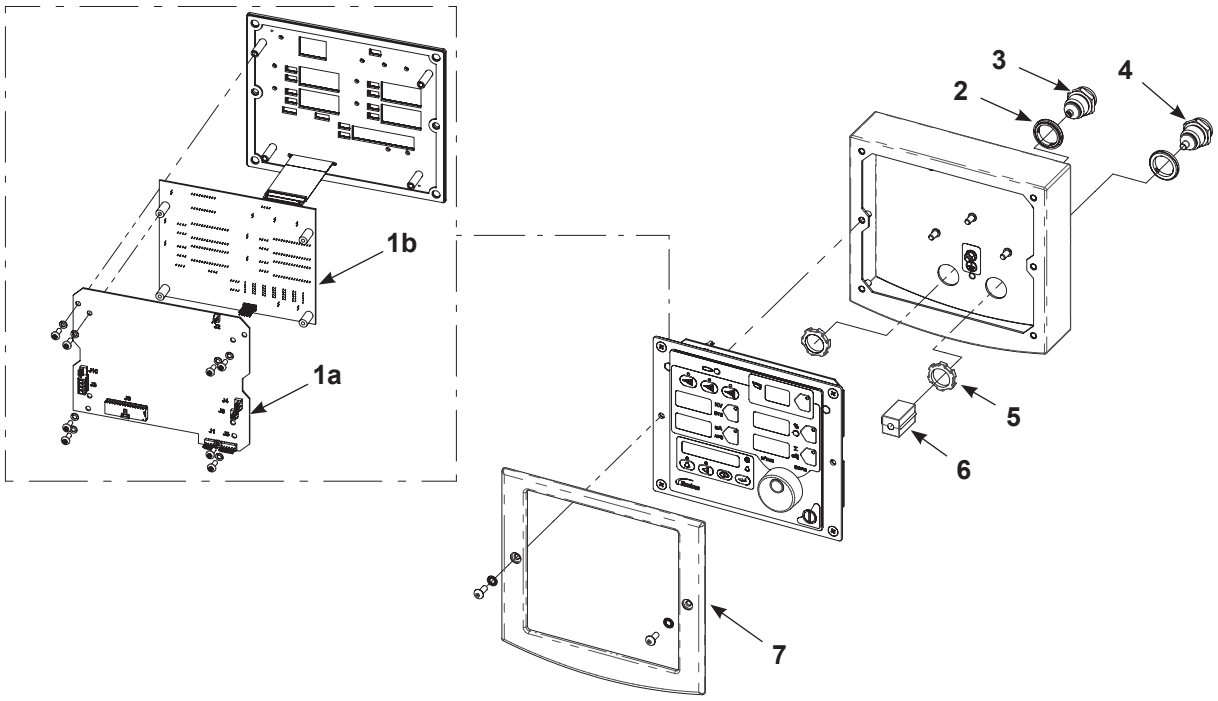


Figure 11-4 Manual Gun Interface (MGI)

Item	Part	Description	Quantity	Note
—	1614566	CONTROL UNIT, interface, Encore Enhance, packaged	1	
1a	1614563	• KIT, PCA, main control, Encore Enhance, packaged	1	
1b	1614564	• KIT, PCA, control, interface, Encore Enhance	1	
2	939122	• SEAL,conduit fitting, 1/2, blue	2	
3	1082709	• RECEPTACLE, gun, Encore	1	
4	1082759	• RECEPTACLE, network, controller interface, Encore	1	
5	984526	• NUT, lock, 1/2 conduit	2	
6	185067	• SUPPRESSOR, ferrite, 7 mm D	1	
7	1082081	• BEZEL, interface, controller	1	

iFlow Module

See Figure 11-5 and refer to the following parts list for common spare parts for the iFlow module.

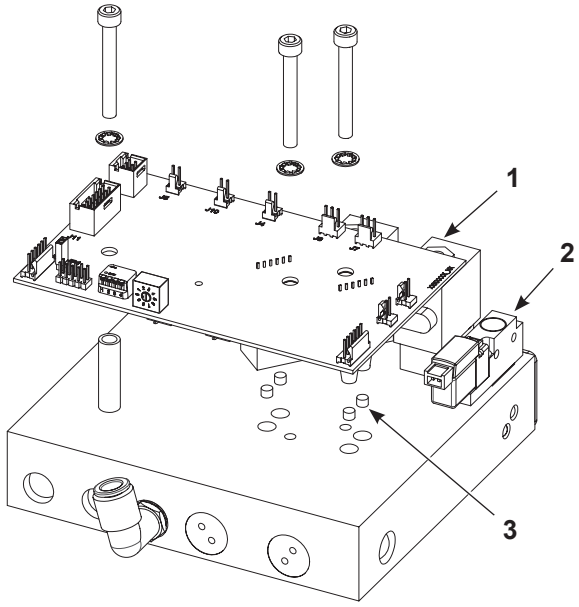


Figure 11-5 iFlow Module

Item	Part	Description	Quantity	Note
—	1613547	MODULE, digital airflow control, automatic, Enhance, packaged	1	
—	1614525	MODULE, digital airflow control, manual, Enhance	1	
1	1027547	• VALVE, proportional, solenoid, sub-base	2	
2	1099288	• VALVE, solenoid, 3-way, 24 V, 0.35 W, with connector	AR	A
3	1604437	• KIT FILTER, 20 micron, 0.168 D x 0.125 LG	1	B
NS	1039881	KIT, tester, iFlow	1	

NOTE: A. Quantity 2 for automatic guns and quantity 4 for manual guns.

B. Contains 6 filters.

AR: As Required

NS: Not Shown

Power Distribution Module

See Figure 11-6 and refer to the following parts list for common spare parts for the power distribution module.

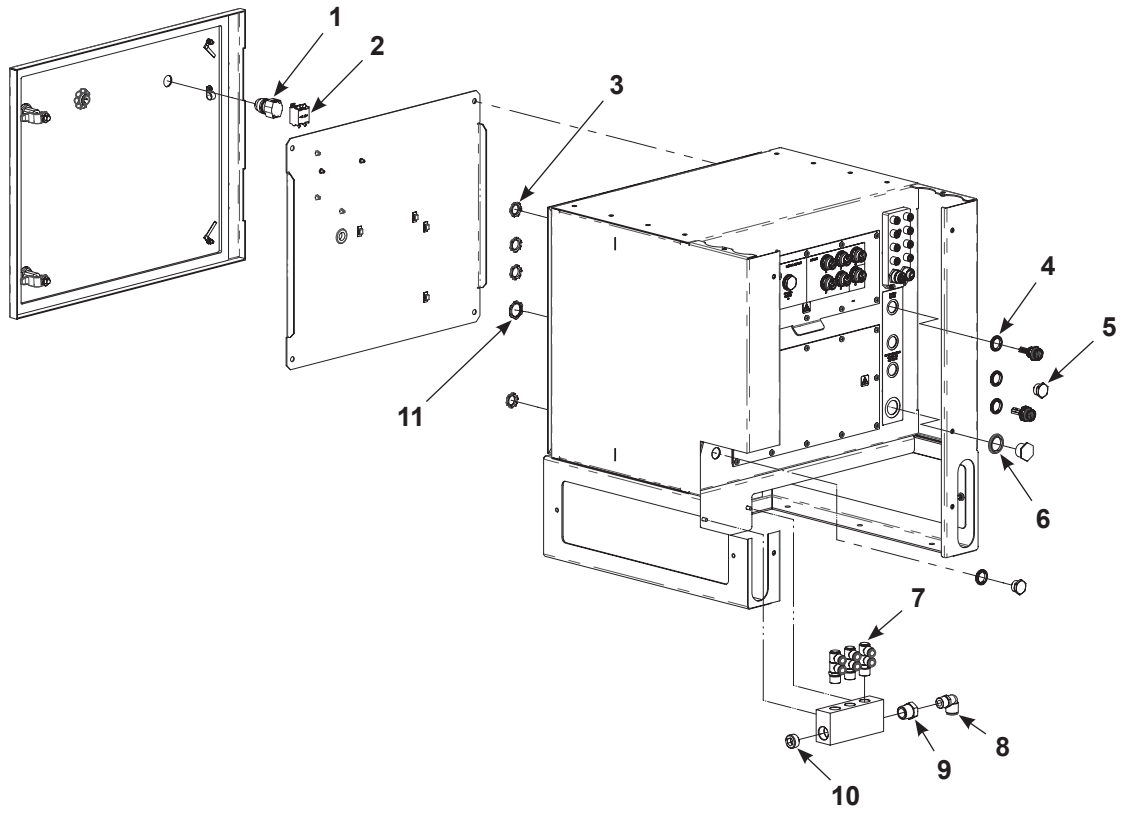


Figure 11-6 Power Distribution Module

Item	Part	Description	Quantity	Note
1	1000594	SWITCH, keylock, 3-position	1	
2	1000595	CONTACT BLOCK,1−N.O. and 1−N.C. contact	1	
3	984526	NUT, lock,1/2 conduit	4	
4	939122	SEAL, conduit fitting,1/2, blue	4	
5	334800	PLUG, 1/2 pipe, 1 in. hex	2	
6	272058	SEAL, conduit fitting, 3/4	1	
7	1608398	ELBOW, swivel, pushin, 2x10T x 0.5R	3	
8	1100040	CONNECTOR, male, elbow, 16 mm x ½ RPT, with seal	1	
9	973399	BUSHING, pipe, hydraulic, ¾ x ½ , steel, zinc	1	
10	973442	PLUG, pipe, socket, flush, ¾ , zinc	1	
11	939613	LOCKNUT, conduit, ¾ NPS	1	

Terminal Block Assembly

See Figure 11-7 and refer to the following parts list for common spare parts for the terminal block in the power distribution module.

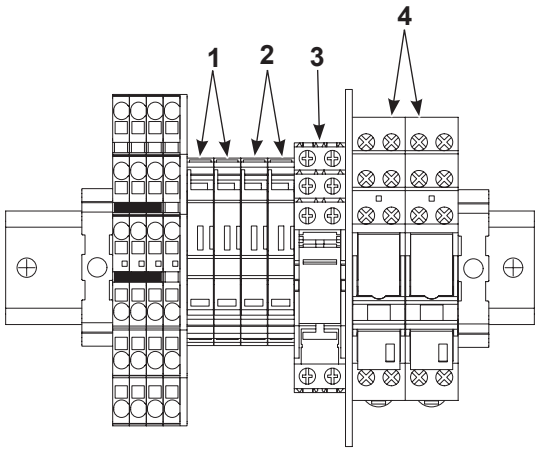


Figure 11-7 Terminal Block Assembly

Item	Part	Description	Quantity	Note
1	939267	FUSE, fast-acting, glass tube, 250 V, 2 A	2	
2	7790155	FUSE, 8 A, ceramic, time-delayed	2	
3	1615100	RELAY, plug-in, 230 V	1	A
4	1615158	RELAY, modular, 230 Vac	2	B

NOTE: A. 230 V relay (1615100) is factory installed. For 115/120 Vac requirements, replace with 115 V relay (1615099) shipped with system.

B. 230 Vac modular relays (1615158) are factory installed. For 115/120 Vac requirements, replace with 120 Vac modular relays (1615159) shipped with system.

AR: As Required

NS: Not Shown

Blank Panel

See Figure 11-8 and refer to the following parts list for a blank panel.

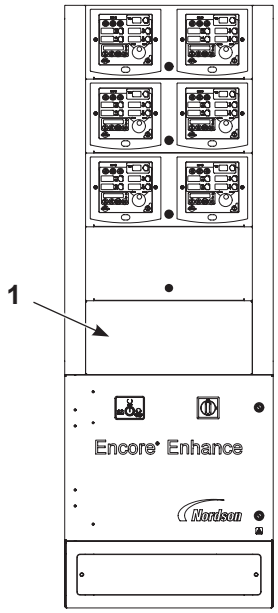


Figure 11-8 Blank Panel

Item	Part	Description	Quantity	Note
1	1612883	PANEL, dual controller, blank	1	A
NOTE: A. Use 2 panels in place of a spray controller.				

Top Extension Panel

See Figure 11-9 and refer to the following parts list for common spare parts for optional top extension panel.

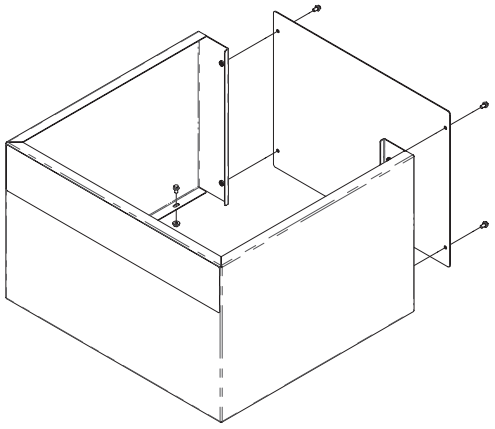


Figure 11-9 Top Extension Panel

Part	Description	Note
1613918	KIT, extension panel, tall	

Section 12
Drawings

Introduction

For instructions on connecting system modules together, see the *Encore Enhance Powder Spray Controller and HD Pump Cabinet Installation Guide* that came with this manual.

WARNING: Allow only qualified personnel to perform connecting modules and systems together. Follow any safety instructions included in the instruction sheet.

WARNING: Before connecting any systems together, make sure to remove debris and make sure no power or air is connected to prevent injury to the installer.

See *Setup and Operation* sections in this manual for detailed information on setting controls and operating these components.

[redacted]

2 MODCTRLS CONTROLLER KEYPAD PANEL 1613326

2 ENCORE CONTROLLER DISPLAY PCA 1079994

2 ENCORE ENHANCE MAIN CONTROL PCA 1614271

2 HDLV RECEPTACLE 1614098

2 MODCTRLS DIGITAL AIRFLOW CONTROL MODULE 1613443

REMOVE JUMPER FROM JP1 (04)

SEE DETAIL A

1 CHANNEL ENCORE HD FLOW NODE PCA 1602319

NOZZLE

ATOMIZING

FLOW

BOOST

2 GUN RECEPTACLE 1613982

FROM POWER SUPPLY & MAIN CTRL PCA 1 J1

DESCRETE I/O RECEPTACLE 1614097

RELAY 1068173

CAN RECEPTACLE 1614100

REAR PANEL GND NO. 2

(04) DETAIL A
SW1
(CONFIGURED FOR AUTO CONTROLLER)

1 MODCTRLS CONTROLLER KEYPAD PANEL 1613326

1 ENCORE CONTROLLER DISPLAY PCA 1079994

1 ENCORE ENHANCE MAIN CONTROL PCA 1614271

1 HDLV RECEPTACLE 1614098

1 MODCTRLS DIGITAL AIRFLOW CONTROL MODULE 1613443

1 GUN RECEPTACLE 1613982

TO MAIN CTRL PCA 2 J1

AC PWR RECEPTACLE ASSY 1602706 (03)

(02) WIRE,GROUND ASSY,350MM 1046757

REAR PANEL GND NO. 2

CABINET GND NO. 1

LINE FILTER 1107696

A.C. POWER HARNESS 1614101

SWITCH 1613980

150W DC POWER SUPPLY 1613981

SWITCH HARNESS 1614153

CRITICAL
No revisions permitted without approval of the proper agency

KEY PRODUCT CHARACTERISTIC

A KEY CHARACTERISTIC IS A FEATURE, DIMENSION, OR NOTE THAT MAY DIRECTLY AFFECT THE COMPONENT'S FORM, FIT, FUNCTION, PRODUCIBILITY OR INSPECTIABILITY.

SHOULD THIS CHARACTER NOT BE HELD WITHIN THE SPECIFIED RANGE, LOSS OF FUNCTION, PRODUCIBILITY, OR DURABILITY MAY RESULT IN INTERNAL AND/OR EXTERNAL CUSTOMER DISSATISFACTION.

CHARACTERISTICS OF THIS TYPE REQUIRE ADDITIONAL ATTENTION FROM THE MANUFACTURER AND SHALL BE DOCUMENTED IN A CONTROL PLAN SUBMITTED WITH THE PPAP DOCUMENTATION.

ALL DIMENSIONS IN MM EXCEPT AS NOTED
X±0.8 | X.X±0.25 | X.XX±0.13
MACHINED SURFACES
BREAK INSIDE/OUTSIDE CORNERS 0.1/0.8
THREAD LENGTH DIMENSIONS ARE FULL THREAD
INTERPRET DRAWINGS PER ASME Y14.5M-2009
PERFECT FORM AT MMC REQUIRED FOR INTERPOLATED FEATURES
THIRD ANGLE PROJECTION

NORDSON CORPORATION
WESTLAKE, OHIO 44145

DESCRIPTION: WIRING DIAGRAM,2 GUN AUTO CTRLR,MODCTRLS

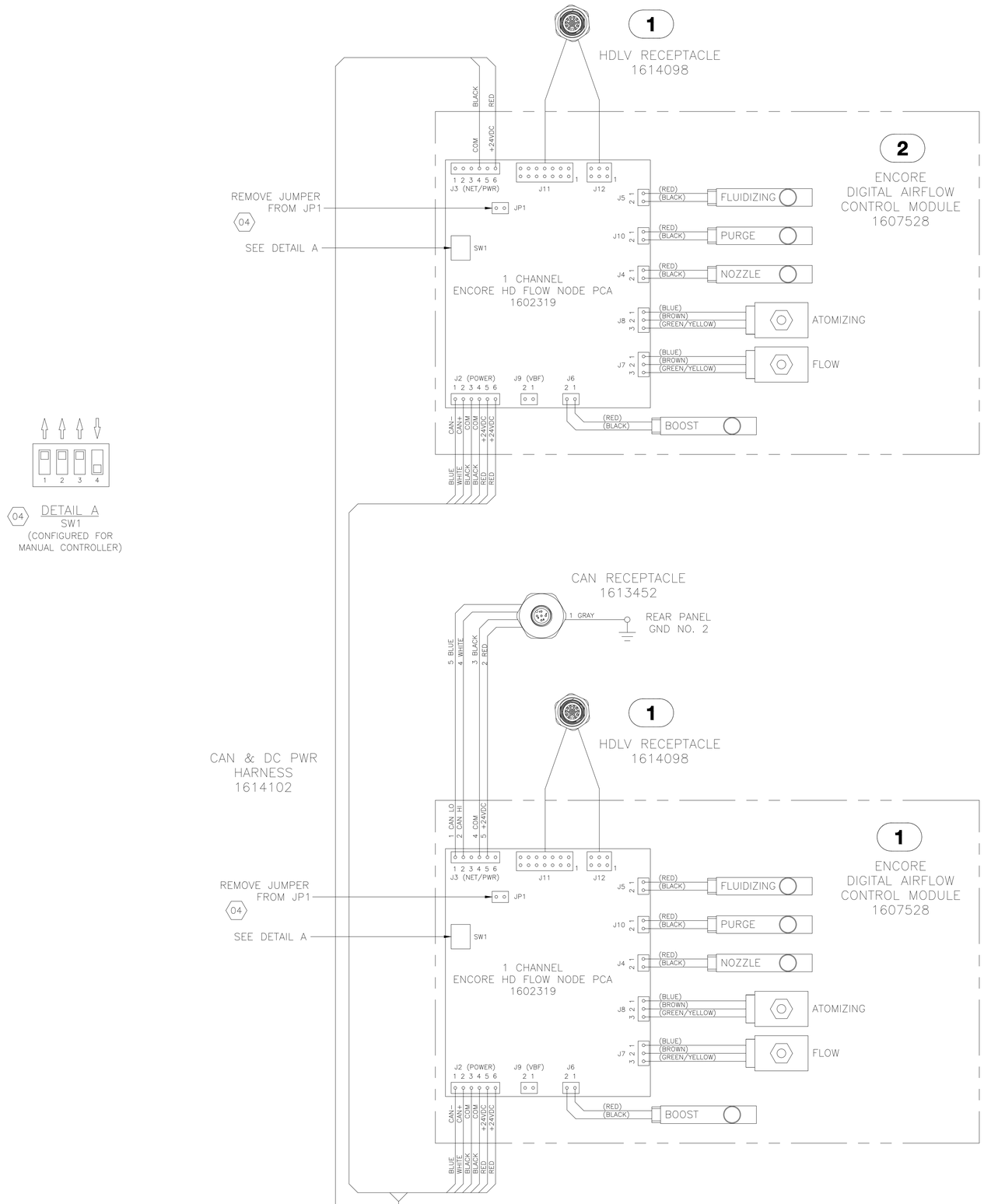
DRAWN BY	DATE	RELEASE NO.
DRJ	01MAY18	PE-100203
CHECKED BY	APPROVED BY	
JAP	JK	

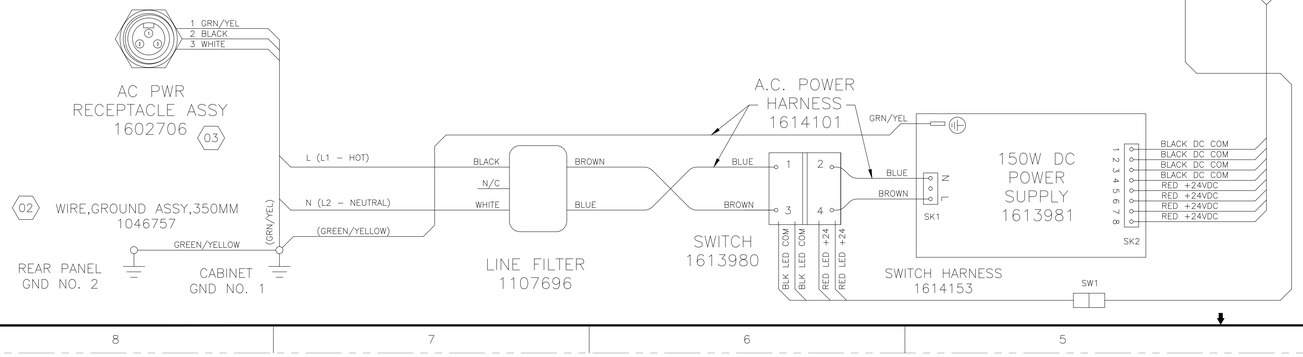
SIZE	FILE NAME	MATERIAL NO.	REVISION
E	10017602	10017602	04

SCALE: NONE | CADD GENERATED DWG. | SHEET 1 OF 1

MATERIAL NO 10017602 REVISION 04

[redacted]





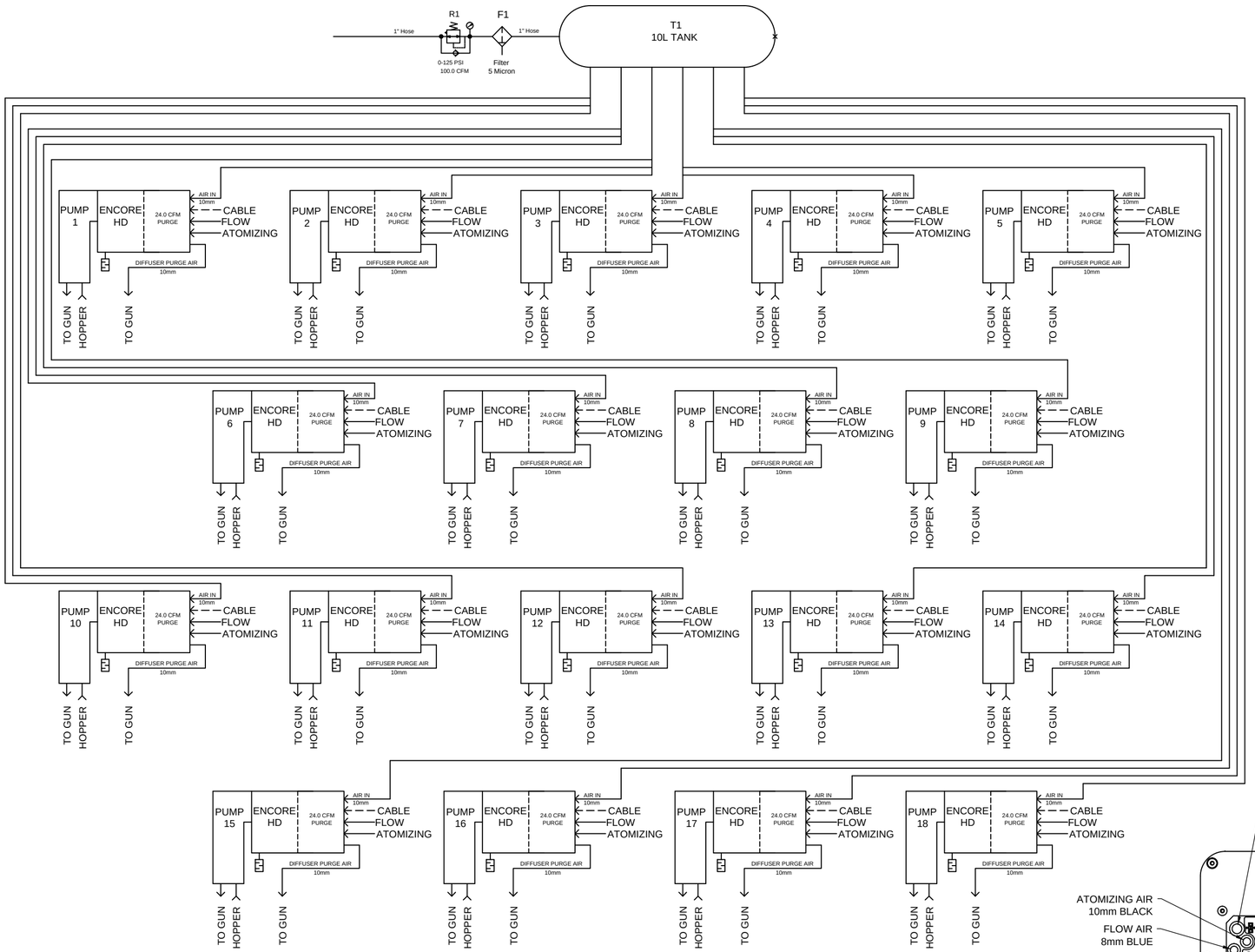
CRITICAL
No revisions permitted without approval of the proper agency

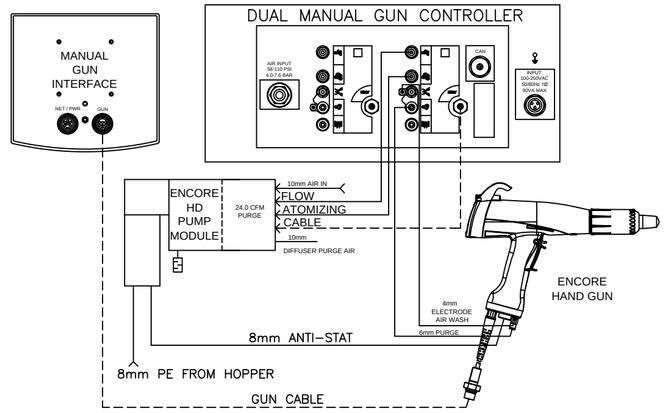
KEY PRODUCT CHARACTERISTIC ◆ A KEY CHARACTERISTIC IS A FEATURE, DIMENSION, OR NOTE THAT MAY DIRECTLY AFFECT THE COMPONENT'S FORM, FIT, FUNCTION, PRODUCIBILITY OR INSPECTABILITY. SHOULD THIS CHARACTER NOT BE HELD WITHIN THE SPECIFIED RANGE, LOSS OF FUNCTION, PRODUCIBILITY, OR DURABILITY MAY RESULT IN INTERNAL AND/OR EXTERNAL CUSTOMER DISSATISFACTION. CHARACTERISTICS OF THIS TYPE REQUIRE ADDITIONAL ATTENTION FROM THE MANUFACTURER AND SHALL BE DOCUMENTED IN A CONTROL PLAN SUBMITTED WITH THE PPAP DOCUMENTATION.	ALL DIMENSIONS IN MM EXCEPT AS NOTED X±0.8 X.X±0.25 X.XX±0.13 MACHINED SURFACES 1.6 BREAK INSIDE/OUTSIDE CORNERS 0.1/0.8 THREAD LENGTH DIMENSIONS ARE FULL THREAD INTERPRET DRAWINGS PER ASME Y14.5M–2009 PERFECT FORM AT MMC REQUIRED FOR INTERRELATED FEATURES THIRD ANGLE PROJECTION	NORDSON CORPORATION WESTLAKE, OHIO 44145 DESCRIPTION: WIRING DIAGRAM,2 GUN MAN CTRLR,MODCTRLS DRAWN BY: DRJ — DATE: 11JUL18 — RELEASE NO.: PE–100203 CHECKED BY: JAP — APPROVED BY: JAP SIZE: E — FILE NAME: 10017605 — MATERIAL NO.: 10017605 — REVISION: 04 SCALE: NONE — CADD GENERATED DWG. — SHEET 1 OF 1	

10017605 04 REVISION

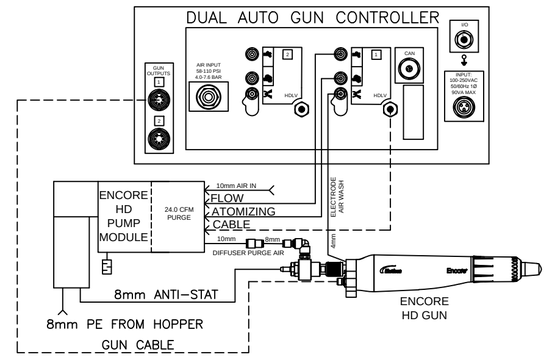
MATERIAL NO. 10018178 REVISION 02

[redacted]

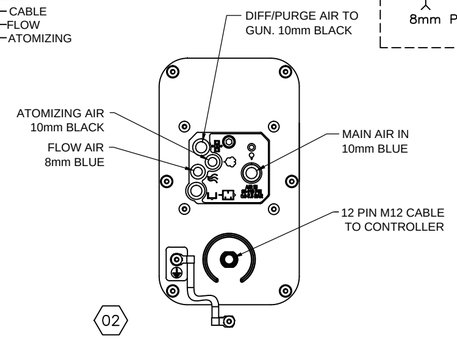




DUAL MANUAL GUN CONTROLLER
DEVICE INTERCONNECT DIAGRAM



DUAL AUTO GUN CONTROLLER
DEVICE INTERCONNECT DIAGRAM



02

ENCORE HD PUMP MODULE DETAIL
REAR VIEW SHOWN FOR CONNECTIONS

ALL DIMENSIONS IN INCHES EXCEPT AS NOTED	NORDSON CORPORATION, WESTLAKE, OH, U.S.A. 44145
X.XX±.03 X.XXX±.010	DESCRIPTION: SCHEMATIC,PNEU,PUMP RACK,ENCORE HD
MACHINED SURFACES 125	DRAWN BY: TAL — DATE: 02OCT18 — RELEASE NO.: PE-100429
BREAK INSIDE/OUTSIDE CORNERS .005/.030	CHECKED BY: NHY — APPROVED BY: NHY
THREAD LENGTH DIMENSIONS ARE FULL THREAD	SIZE: D — FILE NAME: 10018178 — MATERIAL NO.: 10018178 — REVISION: 02
INTERPRET DRAWINGS PER ASME Y14.5-2009	
PERFECT FORM AT MMC REQUIRED FOR INTERRELATED FEATURES	
THIRD ANGLE PROJECTION	SCALE: FULL — CADD GENERATED DWG. — SHEET 1 OF 1

EU DECLARATION of Conformity

This Declaration is issued under the sole responsibility of the manufacture.

Product: Encore Enhance Powder Spray Systems

Models: Encore Enhance Dual Manual Unit, Encore Enhance Dual Auto Unit, Encore Enhance Manual Interface, Encore Enhance Stack.

Description: This is an electrostatic, powder spray system, including Manual and Auto applicators, control cables and associated controllers. The Manual & Automatic Controllers are available in different configurations mounted on a power distribution enclosure.

Applicable Directives:
2006/42/EC - Machinery Directive 2014/30/EU - EMC Directive 2014/34/EU - ATEX Directive

Standards Used for Compliance:

EN/ISO12100 (2010)	EN60079-0 (2014)	EN61000-6-3 (2007)	FM 7260 (2018)	EN50050-2 (2013)
	EN60079-31 (2014)	EN61000-6-2 (2005)	EN55011 (2016)	

Principles:
This product has been designed & manufactured according to the Directives & standards / norms described above.

Type of Protection:
- Ambient Temperature: +15ºC to +40ºC
- Ex tb IIIB T60ºC / Ex II 2 D / 2mJ = (Encore XT and HD Manual Applicators)
- Ex tc IIIB T60ºC Dc / Ex II (2) 3 D = (Enhance Manual Interface Controller)
- Ex II (2) D = (Enhance Stack Controller) – Located in Unclassified Location (Zone)
- Ex II 2 D / 2mJ = (Encore Auto Applicator)

Certificates:
- FM14ATEX0051X = Encore XT and HD Manual Applicators (Dublin, Ireland)
- FM18ATEX0058X = Controls (Dublin, Ireland)
- FM11ATEX0056X = Encore Automatic Applicator (Dublin, Ireland)

ATEX Surveillance
- 0598 SGS Fimko Oy (Helsinki, Finland)

Date: **06Jan22**

Jeremy Krone
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-Straße 42-44
D-40699 Erkrath

UK DECLARATION of Conformity

This Declaration is issued under the sole responsibility of the manufacture.

Product: Encore Enhance Powder Spray Systems

Models: Encore Enhance Dual Manual Unit, Encore Enhance Dual Auto Unit, Encore Enhance Manual Interface, Encore Enhance Stack. Applicators for use with these controls are Encore Auto, Encore HD Auto, Encore Select HD Auto Robot and Encore XT/HD Manual.

Description: This is an electrostatic, powder spray system, including Manual and Auto applicators, control cables and associated controllers. The Manual & Automatic Controllers are available in different configurations mounted on a power distribution enclosure.

Applicable UK Regulations:
Supply Machinery Safety 2008
Electromagnetic Compatibility Regulation 2016
Equipment & Protective Systems Intended for use in Potentially Explosive Atmosphere Reg 2016

Standards Used for Compliance:

EN/ISO12100 (2010)	EN60079-0 (2014)	EN61000-6-3 (2007)	FM 7260 (2018)	EN50050-2 (2013)
	EN60079-31 (2014)	EN61000-6-2 (2005)	EN55011 (2016)	

Principles:
This product has been designed & manufactured according to the Directives & standards / norms described above.

Type of Protection:
- Ambient Temperature: +15ºC to +40ºC
- Ex tb IIIB T60ºC / Ex II 2 D / 2mJ = (Encore XT and HD Manual Applicators)
- Ex tc IIIB T60ºC Dc / Ex II (2) 3 D = (Enhance Manual Interface Controller)
- Ex II (2) D = (Enhance Stack Controller) – Located in Unclassified Location (Zone)
- Ex II 2 D / 2mJ = (Encore Auto Applicator, Encore HD Auto Applicator and Encore Select HD Robot Appl)

Certificates:
- FM21UKEX0129X = Encore XT and HD Manual Applicators (Maidenhead, Berkshire, UK)
- FM21UKEX0241X = Controls (Maidenhead, Berkshire, UK)
- FM22UKEX0006X = Encore Automatic Applicator (Maidenhead, Berkshire, UK)
- FM21UKEX0223X = Encore HD Automatic Applicator (Maidenhead, Berkshire, UK)

EX Quality System Certificate
- SGS Baseefa NB 1180 (Buxton, Derbyshire, UK)

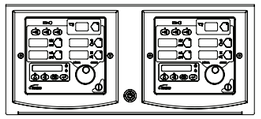
Date: **06Jan22**

Jeremy Krone
Engineering Manager
Industrial Coating Systems
Amherst, Ohio, USA

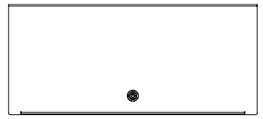
Nordson Authorized Representative in the UK
Contact: Technical Support Engineer
Nordson UK Ltd.; Unit 10 Longstone Road
Heald Green; Manchester, M22 5LB.
England

MATERIAL NO. 10017758 REVISION 03

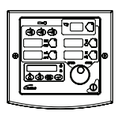
REVISIONS						
ZONE	REV.	DESCRIPTION	BY	CHK	ECO NO.	DATE
	00	ISSUED	JG			17APR18
	01	RELEASED TO PRODUCTION	BDM	RF	PE-100886	09OCT18
	02	ADDED ENCORE HD PUMP MODULES	TAL		PE-102543	23JUL20
	03	ADDED ENCORE ROBOT GUN AND CABLES	BDM	RF	PE-103650	16OCT20



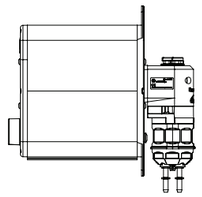
ENCORE ENHANCE
2-GUN AUTO
CONTROLLER ASSY
(1613446)



ENCORE ENHANCE
2-GUN MANUAL
CONTROLLER ASSY
(1613451)



ENCORE ENHANCE
INTERFACE
CONTROLLER UNIT
(1614566)

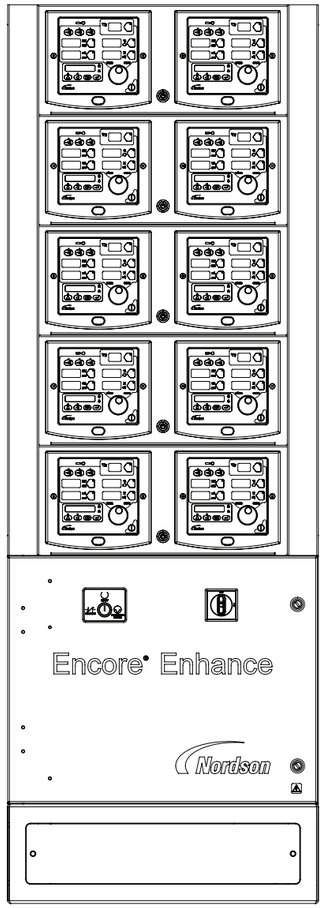


ENCORE ENHANCE HD
PUMP MODULE
(1613916)
(1613943)
(1613944)
(1615910)
02

THE FOLLOWING EQUIPMENT IS FOR USE IN CLASS II, DIV 2 HAZARDOUS (CLASSIFIED) LOCATIONS OR <Ex> II (2)3D EXPLOSIVE ATMOSPHERES:	
1614566	CONTR UNIT,INTERFACE,ENCORE ENHANCE
02 1613916	ENCORE HD PUMP MODULE WITH HD PUMP
02 1613943	ENCORE HD PUMP MODULE WITH HD+ PUMP
02 1613944	ENCORE HD PUMP MODULE WITH XD PUMP
02 1615910	ENCORE HD PUMP MODULE WITH NO PUMP (SERVICE)

THE FOLLOWING CONTROLLERS ARE FOR USE IN UNCLASSIFIED LOCATIONS AND NON-EXPLOSIVE ATMOSPHERES:	
1613446	CONTR ASSY,2 GUN AUTO,ENCORE ENHANCE
1613451	CONTR ASSY,2 GUN MANUAL,ENCORE ENHANCE
1613993	CONTR,TALL,4 AUTO,0 MANL,ENCORE ENHANCE
1613994	CONTR,TALL,6 AUTO,0 MANL,ENCORE ENHANCE
1613995	CONTR,TALL,8 AUTO,0 MANL,ENCORE ENHANCE
1613996	CONTR,TALL,10 AUTO,0 MANL,ENCORE ENHANCE
1614000	CONTR,TALL,4 AUTO,2 MANL,ENCORE ENHANCE
1614002	CONTR,TALL,6 AUTO,2 MANL,ENCORE ENHANCE
1614004	CONTR,TALL,8 AUTO,2 MANL,ENCORE ENHANCE

THE APPLICATORS AND CABLES ARE SUITABLE FOR CLASS II, DIV 1, GROUP F & G HAZARDOUS (CLASSIFIED) LOCATIONS, OR <Ex> II 2 D EXPLOSIVE ATMOSPHERES:	
GUNS:	
1097489	APPLICATOR,BAR MT,AUTO,ENCORE
1099824	APPLICATOR,TUBE MT,AUTO,ENCORE,5FT
1097500	APPLICATOR,TUBE MT,AUTO,ENCORE,6FT
1606986	APPLICATOR,TUBE MT,AUTO,ENCORE,5FT PVC
1606969	APPLICATOR,BAR MT,ENCORE HD AUTO
1606970	APPLICATOR,TUBE MT,AUTO,5FT ENCORE HD
1606985	APPLICATOR,TUBE MT,AUTO,5FT PVC ENCORE HD
1606971	APPLICATOR,TUBE MT,AUTO,6FT ENCORE HD
1600818	APPLICATOR ASSY,MANUAL,ENCORE XT
1603160	APPLICATOR ASSY,MANUAL,ENCORE HD
03 1620076	APPLICATOR ASSY,AUTO,ROBOT,ENCORE SELECT HD
OPTIONS:	
1604084	EXTENSION,SPRAY,90 DEGREE,ENCORE
1605614	EXTENSION,SPRAY,60 DEGREE,ENCORE
1605703	EXTENSION,SPRAY,45 DEGREE,ENCORE
1609048	POS MULTIPLIER
CABLES:	
1097537	CABLE,AUTO,ENCORE,8M
1097539	CABLE,AUTO,ENCORE,12M
1097540	CABLE,AUTO,ENCORE,16M
1601344	CABLE,EXTENSION,ENCORE AUTO,4M
1600745	CABLE ASSY,ENCORE XT/HD,6M
1085168	CABLE EXTENSION,6-CONDUCTOR,SHIELDED,6M
03 1605436	CABLE,SPRAY GUN,ROBOT,AUTO,ENCORE,8M
03 1620523	CABLE,SPRAY GUN,ROBOT,AUTO,ENCORE,20M
03 1620466	CABLE EXTENSION,ROBOT,SHIELDED,4-PIN,M12,10M



ENCORE ENHANCE
4, 6, 8 OR 10-GUN
CONTROLLER
(10 AUTO, 0 MANUAL SHOWN)

CRITICAL
No revisions permitted without approval of the proper agency.

ALL DIMENSIONS IN MM EXCEPT AS NOTED	NORDSON CORPORATION WESTLAKE, OH, U.S.A. 44145		
X±0.8 X.X±0.25 X.XX±0.13	DESCRIPTION: REF DWG,APPROVED EQUIPMENT,ENHANCE		
MACHINED SURFACES 1.6			
BREAK INSIDE/OUTSIDE CORNERS 0.1/0.8	DRAWN BY: JG	DATE: 07JUN18	RELEASE NO.: PE-100886
THREAD LENGTH DIMENSIONS ARE FULL THREAD	CHECKED BY: RF	APPROVED BY: RF	
INTERPRET DRAWINGS PER ASME Y14.5-2009	SIZE: D	FILE NAME: 10017758	MATERIAL NO.: 10017758 REVISION: 03
PERFECT FORM AT MMC REQUIRED FOR INTERRELATED FEATURES			
THIRD ANGLE PROJECTION	SCALE: 1:6	CADD GENERATED DWG.	SHEET 1 OF 1

Encore® Enhance Powder Spray System

Installation Guide Part Number 1614576-01

Issued: 04/2019

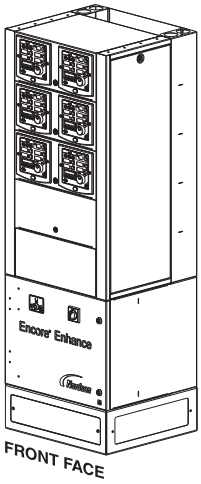
WARNING: Allow only qualified personnel to perform the following tasks. Follow any safety instructions shown in this document and all other document associated with this guide.

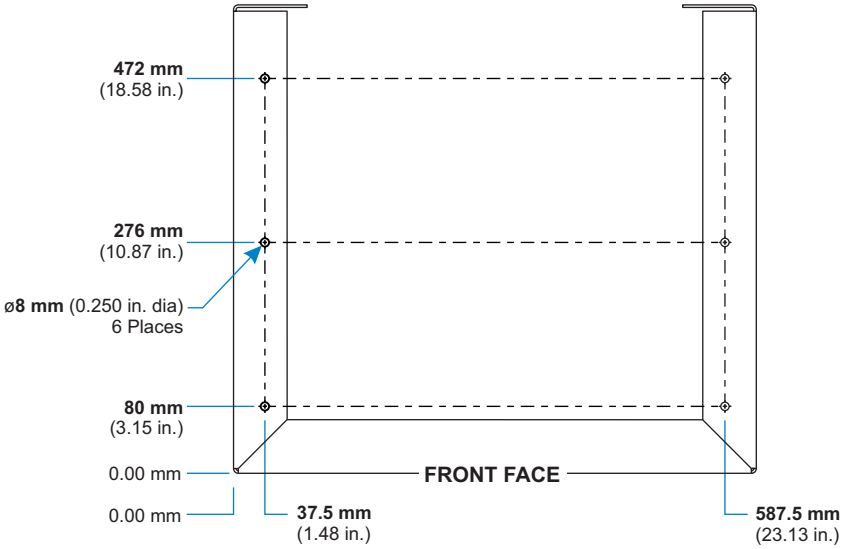
WARNING: Before the system installs to the floor, remove any debris, and make sure power or air is not running until the system starts up to prevent injury to the installer.

ANCHORING THE SYSTEMS IN PLACE

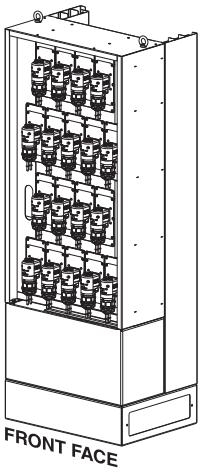
The Encore® Enhance spray controller and pump cabinet must be permanently anchored to the area where the systems are going to be installed. See the bolt pattern below and use any hardware necessary to anchor the cabinets to the surface. Refer to all local codes and standards for permanent anchoring.

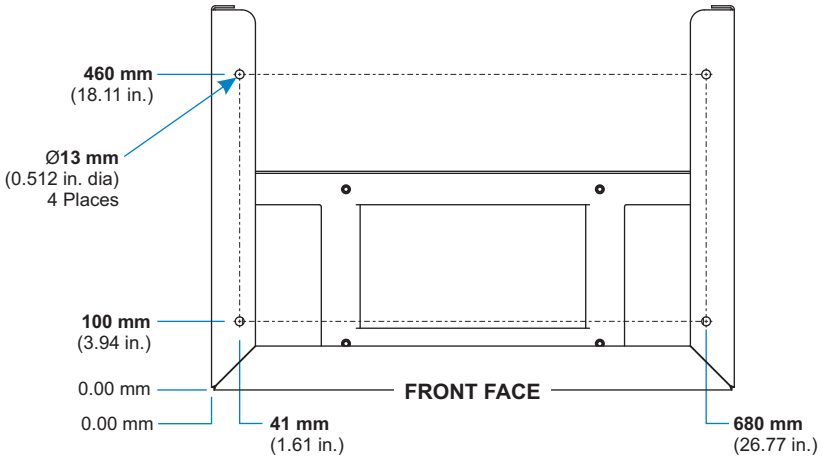
Spray Gun Controller





HD Pump Cabinet



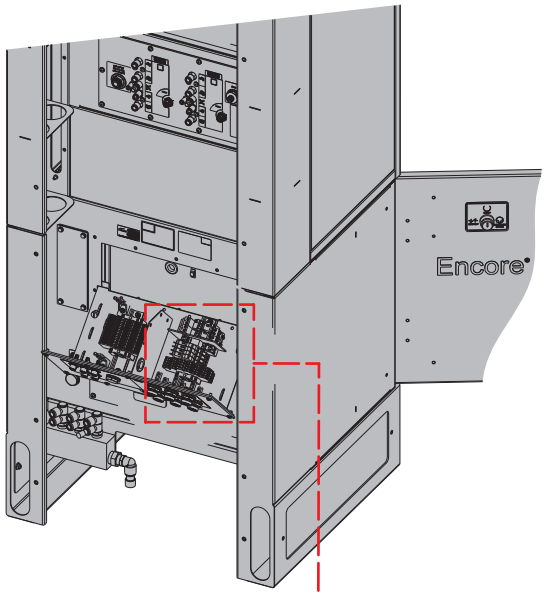


Follow the safety, operation, and maintenance instructions in the product manual.
Refer to the Encore Enhance manual 1614575 for additional information.

CHANGING RELAYS FROM 230 VAC TO 115/120 VAC

WARNING: Before replacing any part or parts on the power distribution module, make sure it is performed by qualified personnel to prevent electrical shock or personal injuries.

Relay Terminal Block in Power Distribution Module



Relay Terminal Block Location

The power distribution module is where interface relays reside and are pre-installed with 230 Vac relays. If the required voltage is 115/120 Vac, the relay must be replaced with the applicable relay included with the Encore Enhance system.

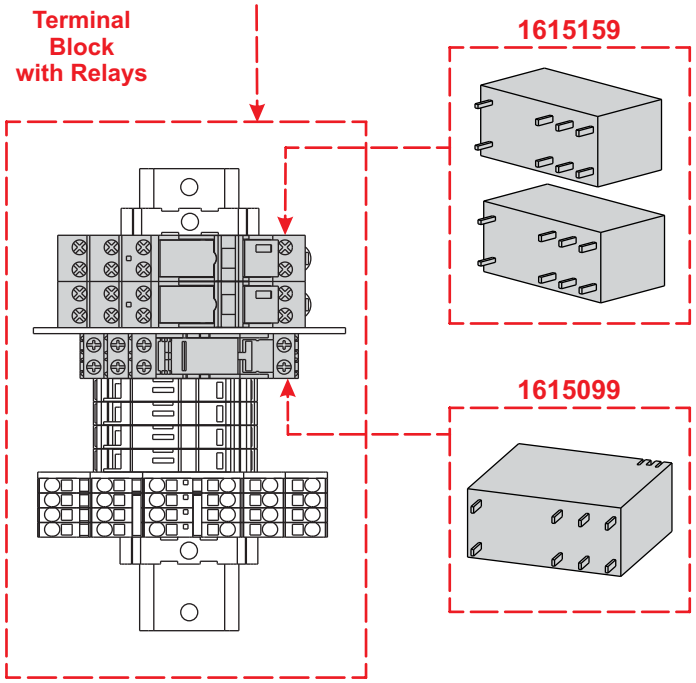
The replacement kit contains the following:

- **1615099:**
  Relay, plug-in, 115 Vac, replaces one 115 Vac relay.
- **1615159:**
  Relay, modular, 120 Vac, replaces two 120 Vac relays.

Replacing Relays

WARNING: Allow only qualified personnel to perform the following tasks. Failure to do so may result in electrical shock or personal injuries.

NOTE: Be sure to replace both types of relays.

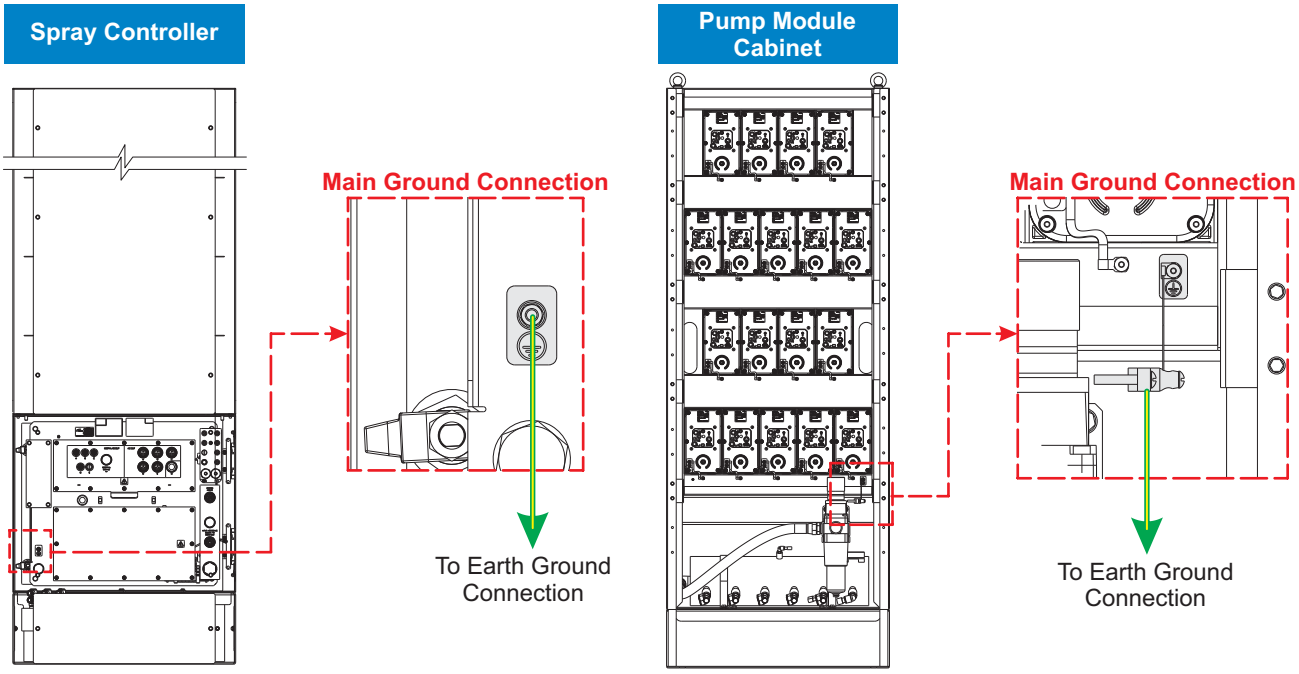


1. Turn the circuit power OFF.
2. Press the relay tab to remove the installed relay.
3. Replace with the appropriate relay.

INITIAL CONNECTIONS

1 Grounding the Spray Controller and Pump Cabinet

- The Spray Controller and Pump Cabinet must be earth grounded before connected to any electrical connection.

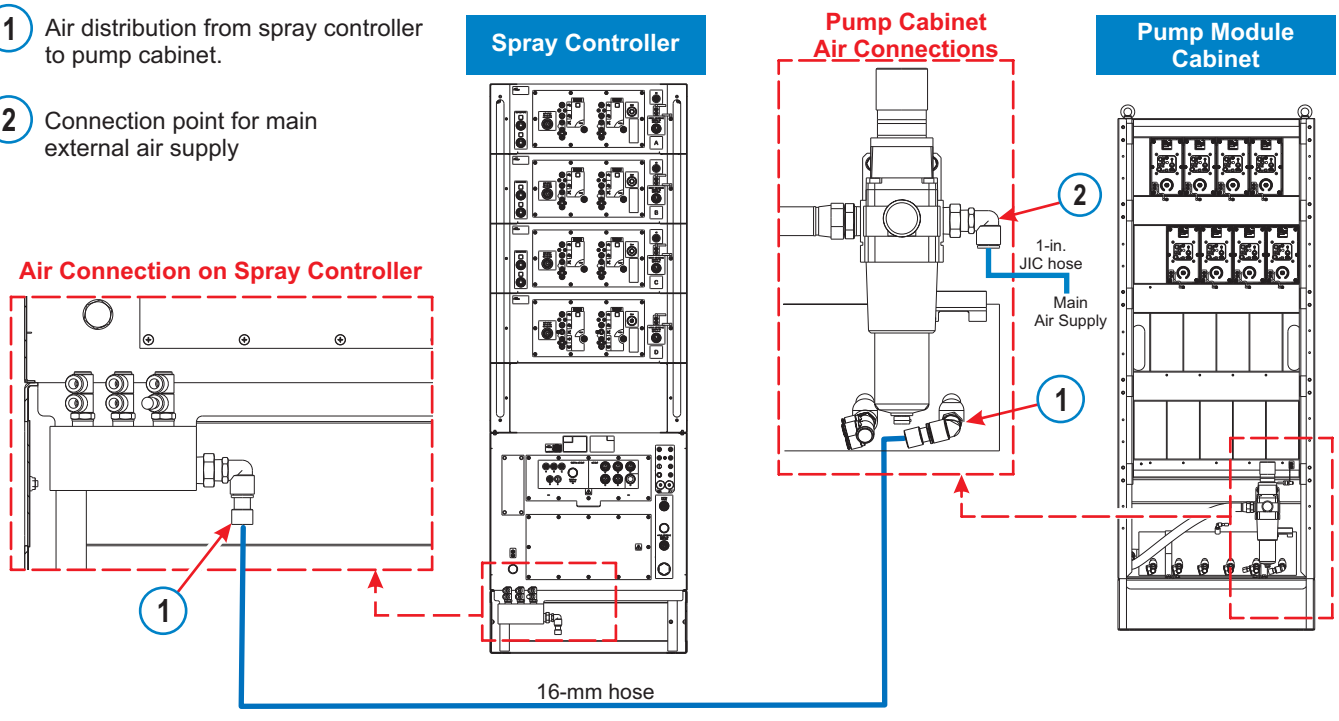


2 Connect Air Line on Spray Controller to Pump Cabinet

NOTE: Colors for connections are for illustrative purposes only, and do not represent colors in the field.

- Connect the air distribution hose from the spray controller to the pump cabinet.
- Connect main air hose supply line to pump cabinet. Air requirement for external air supply is 6.2-7.6 bar (90-110 psi).

1. Air distribution from spray controller to pump cabinet.
2. Connection point for main external air supply

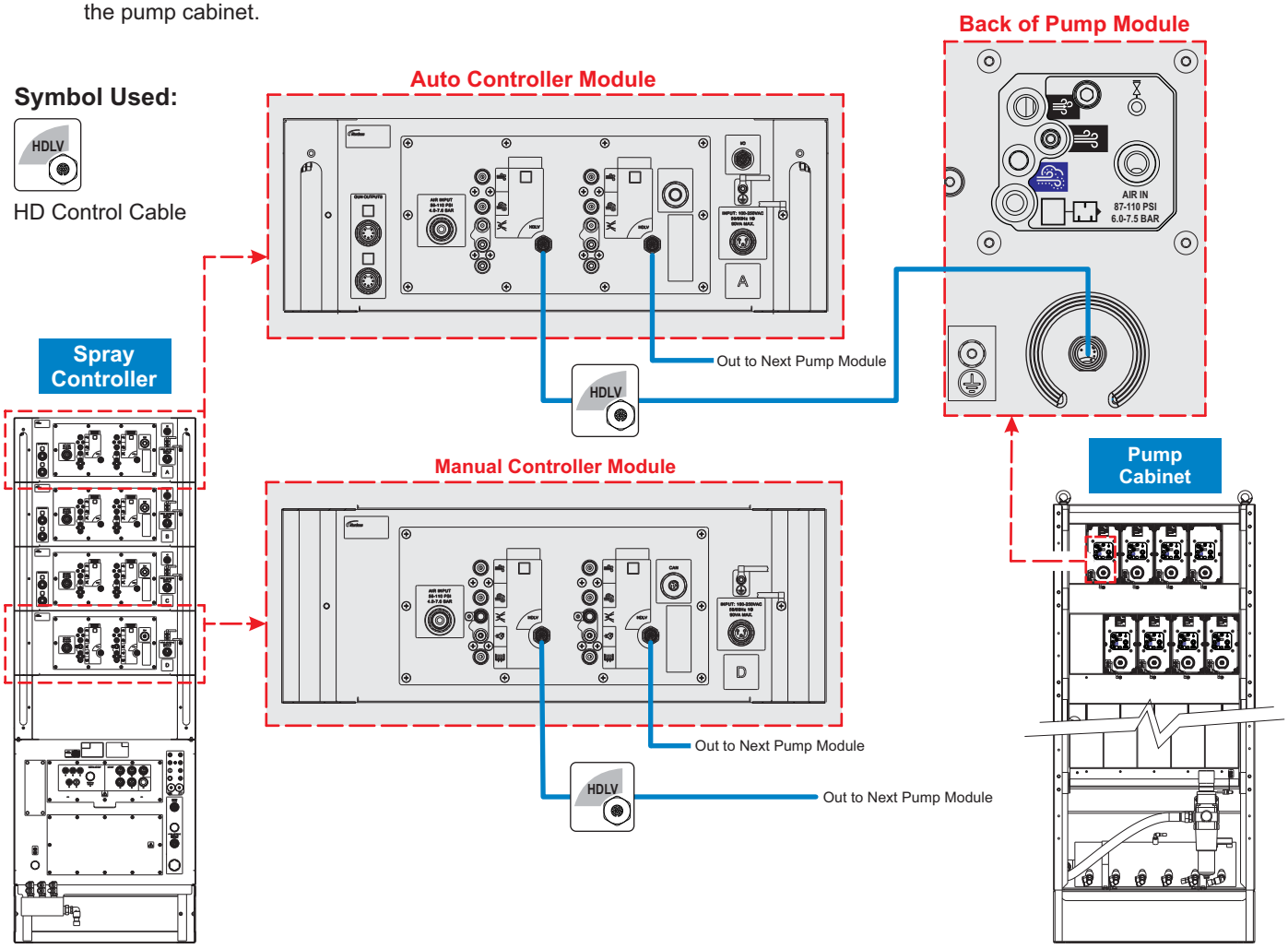


CONNECTION DIAGRAMS - HD PUMPS

3 Connect HDLV® Cable on Spray Controller to Pump Cabinet

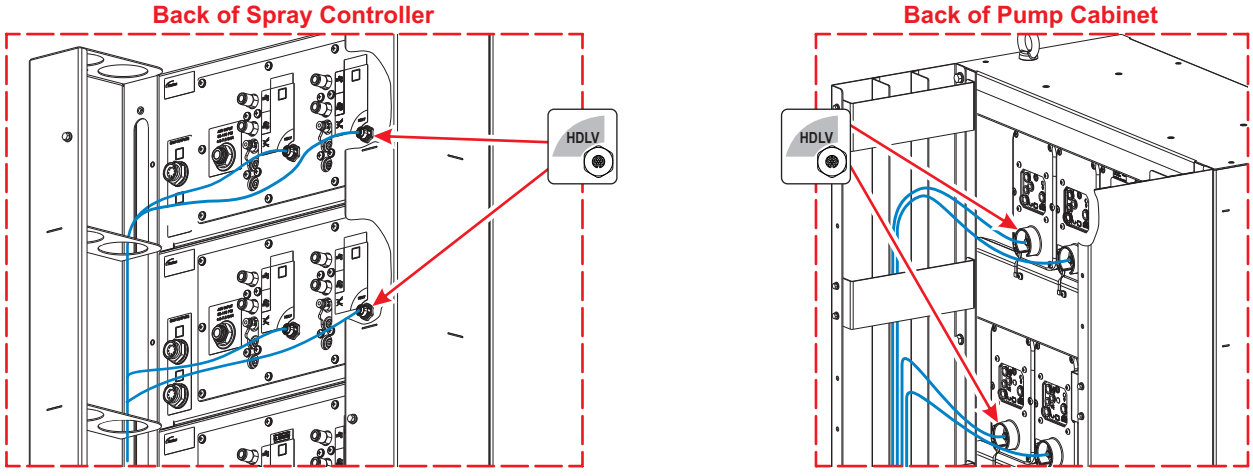
NOTE: As the following connections are made, use the Tube and Cable Routing instructions for proper routing. Colors for connections are for illustrative purposes only, and do not represent colors in the field.

- Connect HDLV control cable from each HDLV port on the spray controller to the HDLV port on each pump module in the pump cabinet.



Tube and Cable Routing

After the connections are made, thread the loose cables down the side channel and through openings in brackets.



CONNECTION DIAGRAMS - HD PUMPS

4 Connect Flow and Atomizing Tubing from Spray Controller to Pump Cabinet

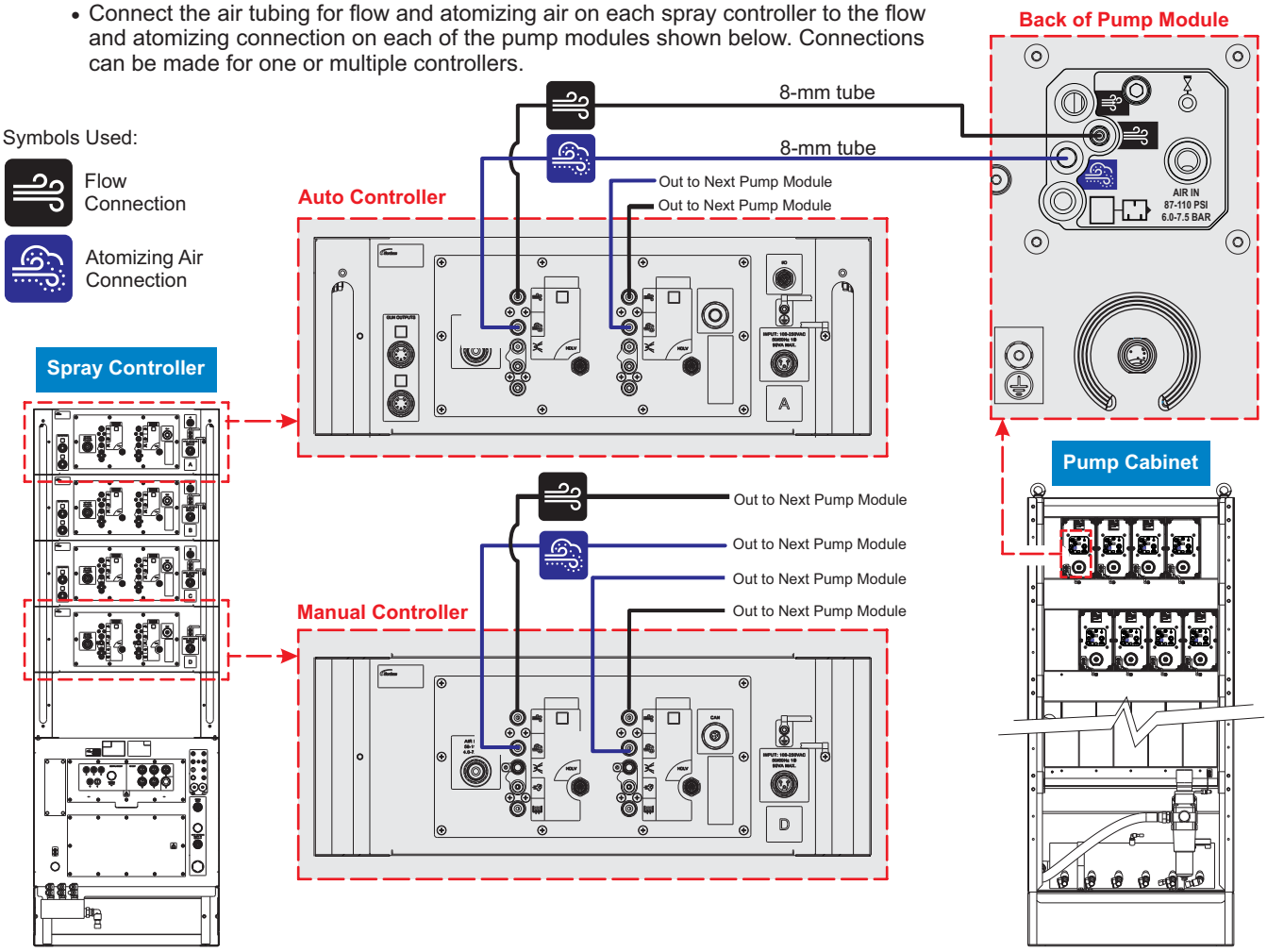
NOTE: As the following connections are made, use the Tube and Cable Routing instructions for proper routing. Colors for connections are for illustrative purposes only, and do not represent colors in the field.

- Connect the air tubing for flow and atomizing air on each spray controller to the flow and atomizing connection on each of the pump modules shown below. Connections can be made for one or multiple controllers.

Symbols Used:

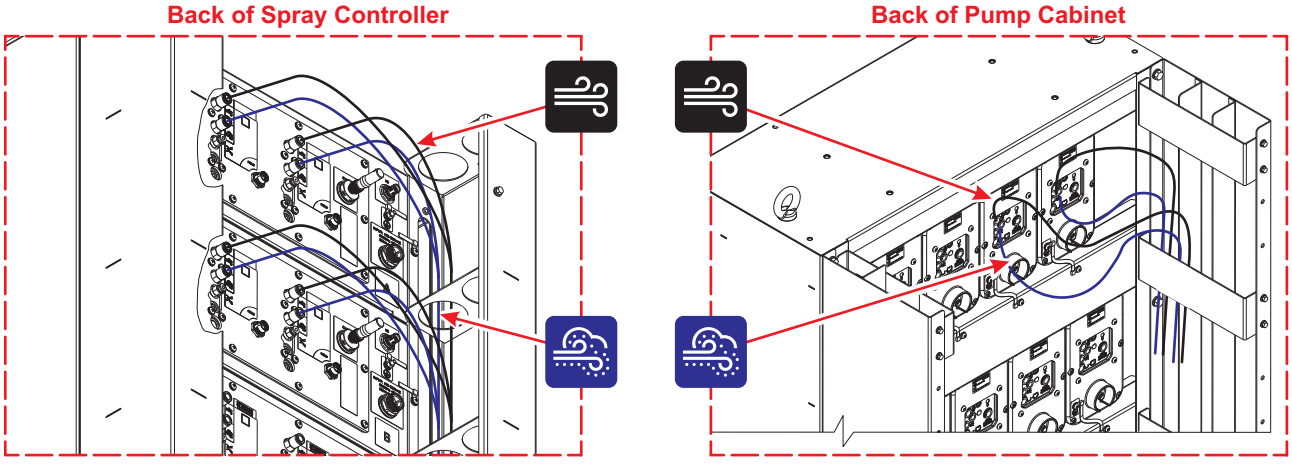
Flow Connection

Atomizing Air Connection



Tube and Cable Routing

- Route tubing through brackets and side channels and bundle to group lines together.



CONNECTION DIAGRAMS - HD PUMP

5 Connect Encore HD Spray Guns to Spray Controller and Pump Cabinet

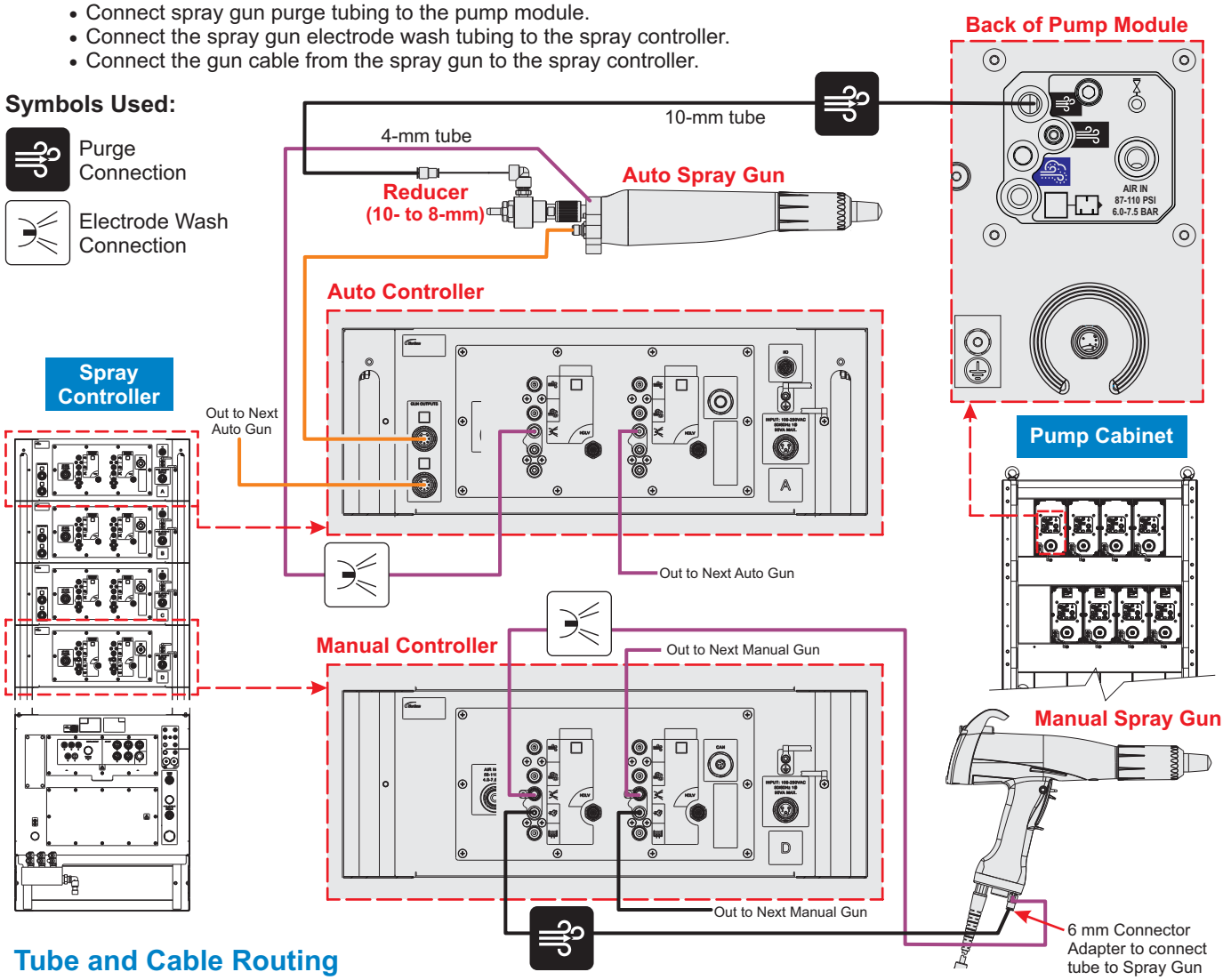
NOTE: As the following connections are made, use the Tube and Cable Routing instructions for proper routing. Colors for connections are for illustrative purposes only, and do not represent colors in the field.

- Connect spray gun purge tubing to the pump module.
- Connect the spray gun electrode wash tubing to the spray controller.
- Connect the gun cable from the spray gun to the spray controller.

Symbols Used:

Purge Connection

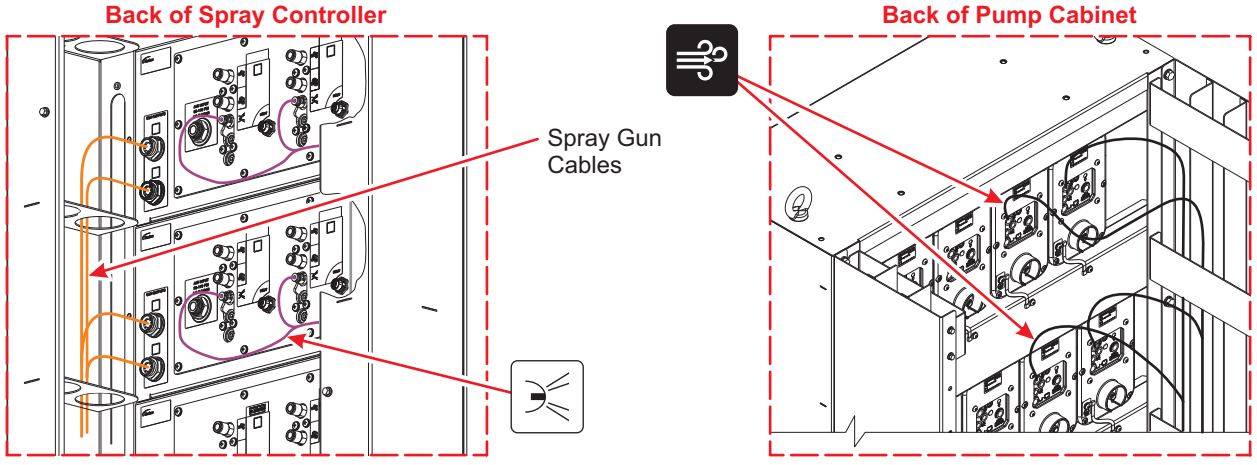
Electrode Wash Connection



Tube and Cable Routing

NOTE: Dedicate a single channel for just the spray gun cables.

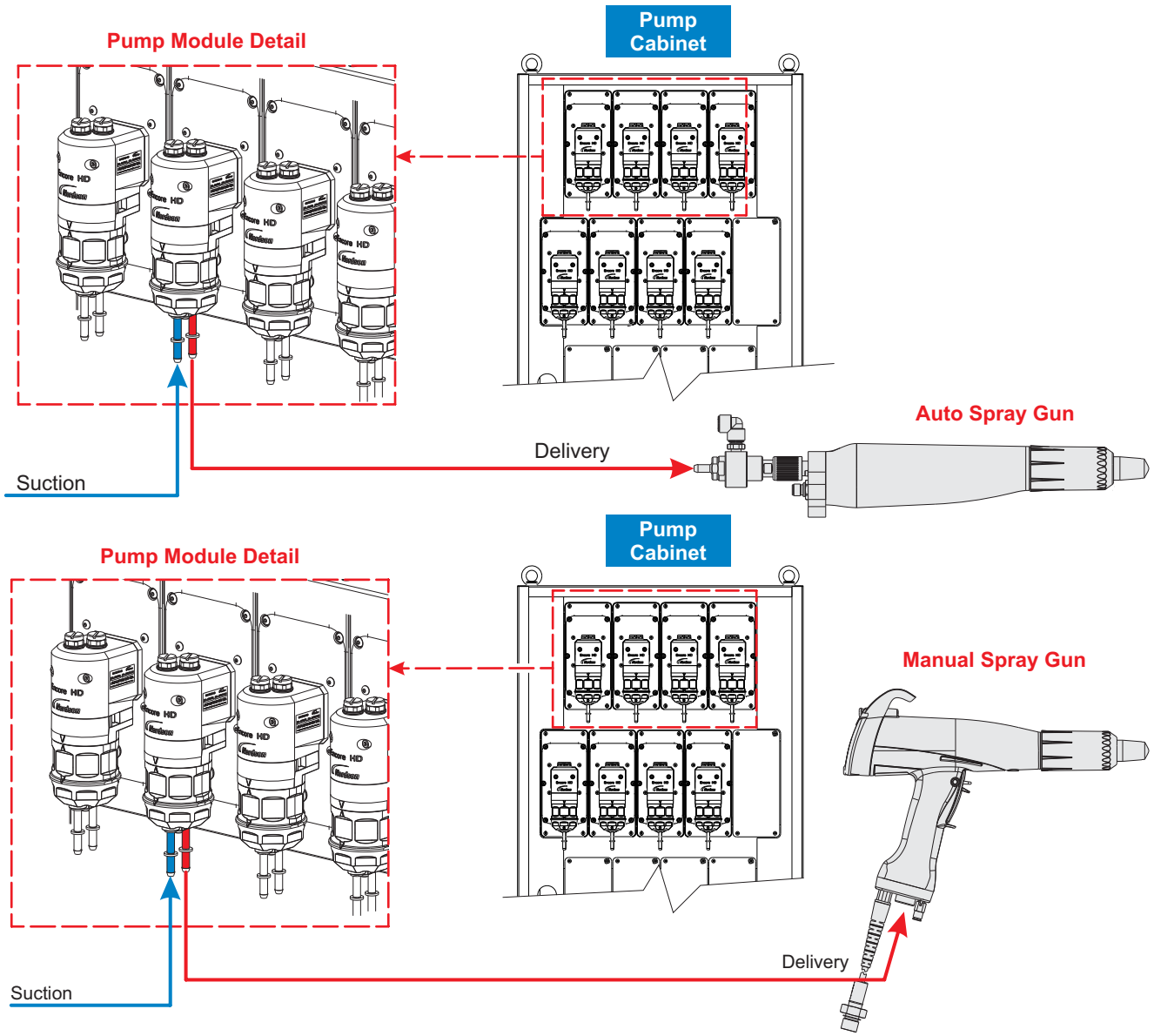
- Route cables and tubes through brackets and side channels and bundle group lines together.



CONNECTION DIAGRAMS - HD PUMP

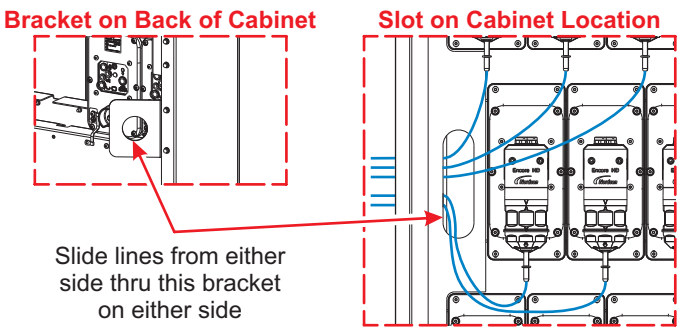
6 Connect Pumps to Encore HD Spray Guns

- Connect the HD pumps on the front of the pump module cabinet to the automatic and manual spray guns as shown.
- Once the delivery tubing is connected, route it to spray controller using side channels as shown in previous steps. See tube and cable routing illustration below to thread tubing from front to back.



Tube and Cable Routing

- Take the tubing and thread them through the slot shown to the back of the cabinet and out to optional bracket on the back of the cabinet.
- Bundle tubing together using Nordson Velcro® straps or cable ties (order separately).



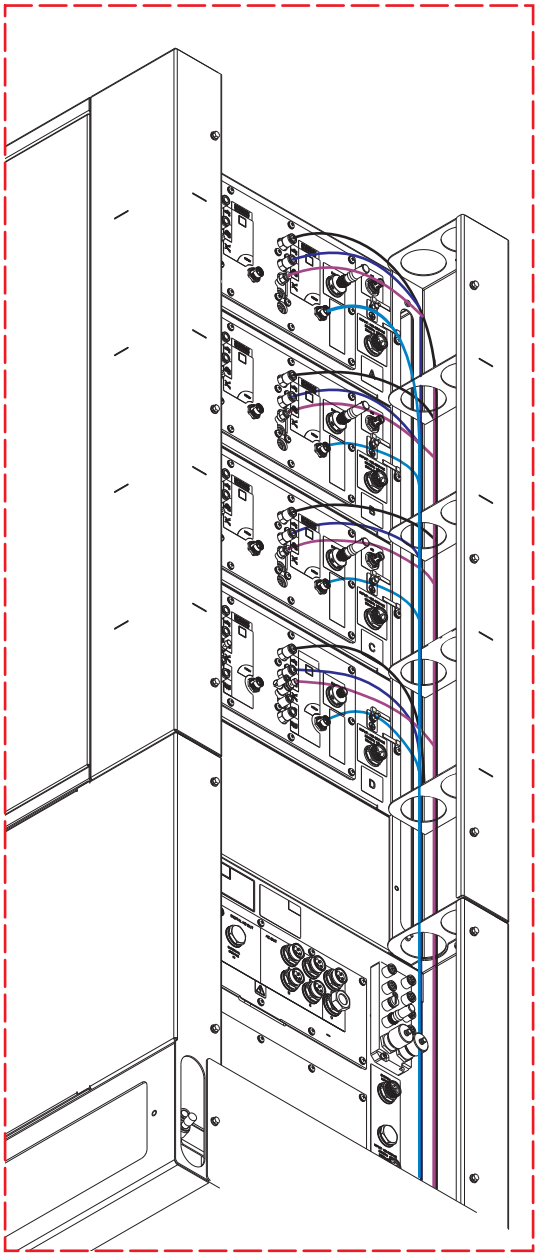
FULL CONNECTION ROUTING

8 Full Connection Routing - Spray Controller

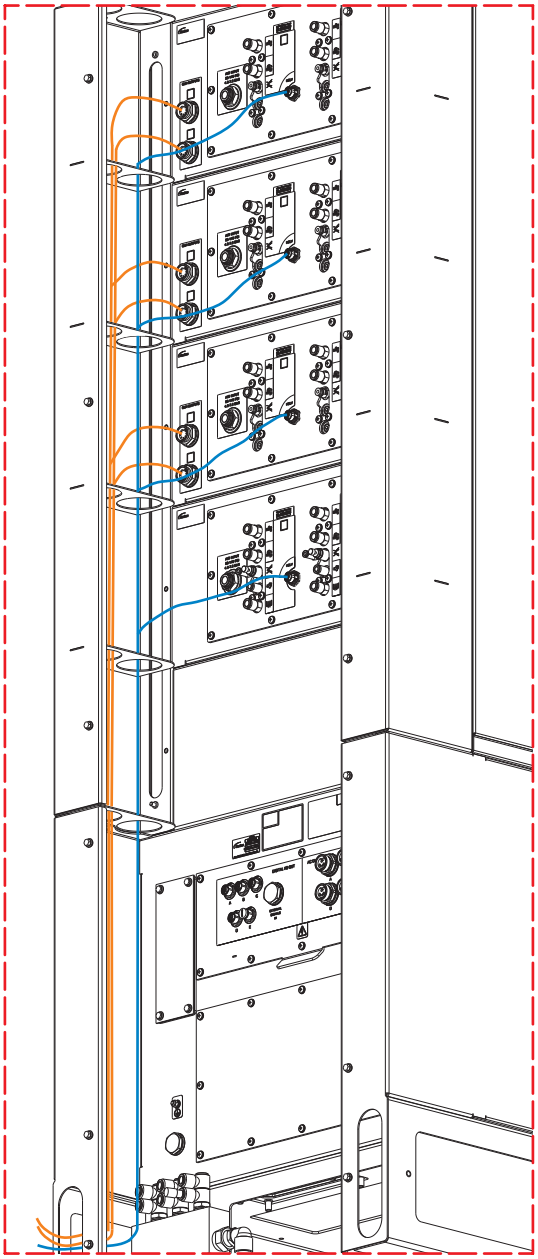
- Use the illustrations below as a reference for all the connections and routings made by the user in previous steps.
- The colors shown below are for illustrative purposes only and do not represent the colors in the field.

NOTE: Dedicate a single channel for just the spray gun cables.

Spray Controller Left Channel



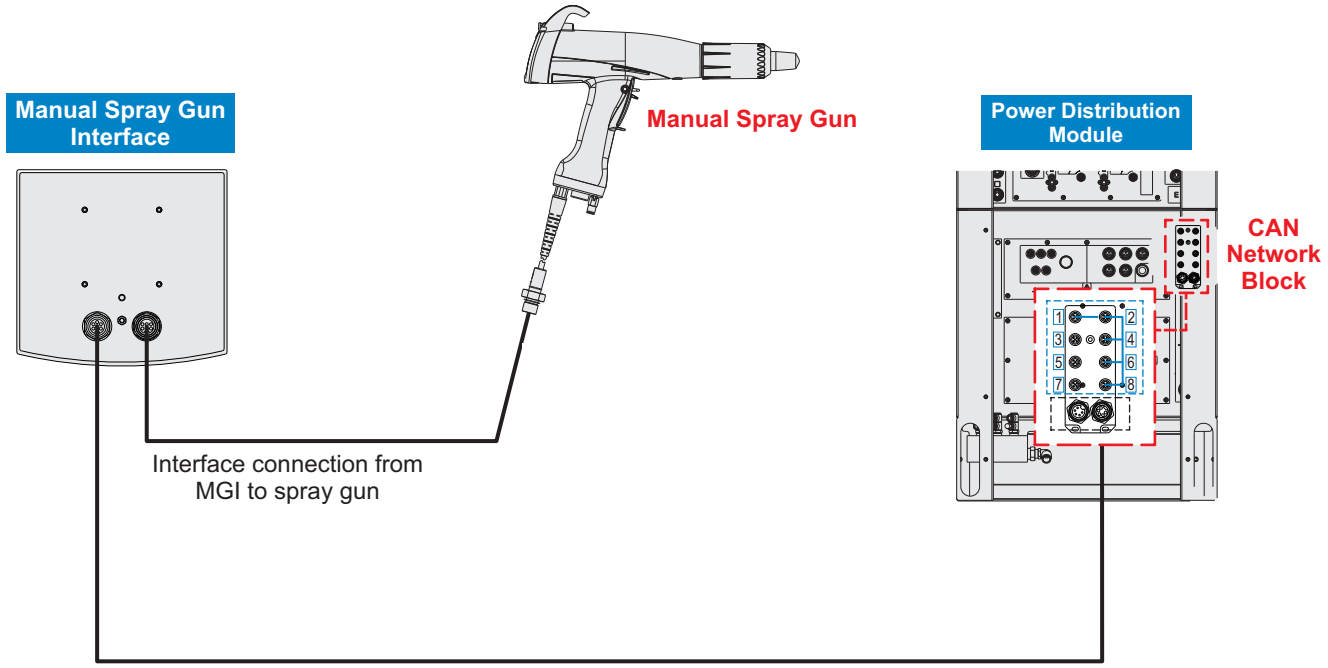
Spray Controller Right Channel



CONNECTION DIAGRAMS - HD PUMP

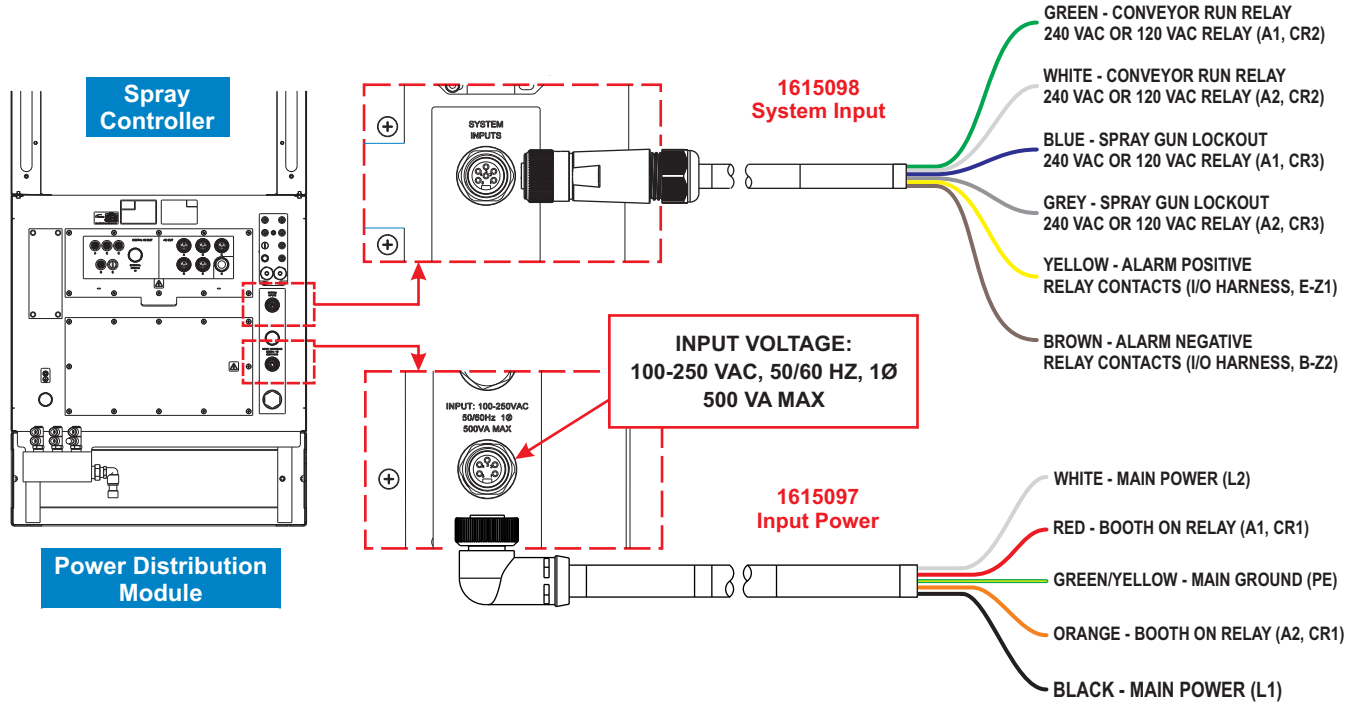
9 Connect Manual Spray Gun Interface to Spray Guns and Power Distribution Module

- Connect the manual spray gun interface to the spray gun controller stack power distribution module.
- Connect manual spray gun interface to the manual spray gun.



10 Connect Power Distribution Module, External Power and System Components

- Connect the external power to the power distribution module.
- Connect system inputs to the power distribution module.



CONTROLLER STARTUP

Startup

When power is applied to the spray controller the function display will scroll through function settings.

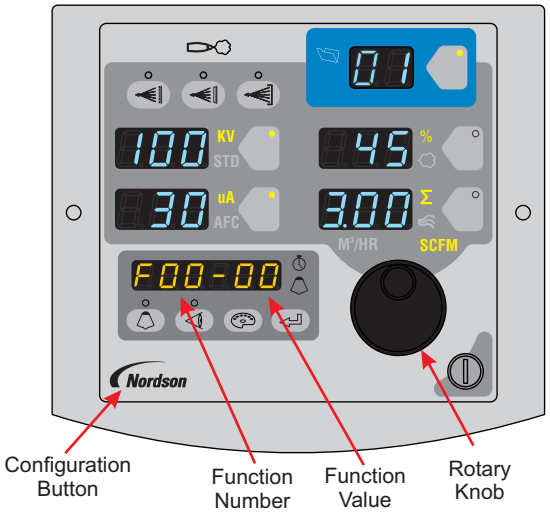
- All displays and LED lights will light for less than one second.
- All function displays below will cycle through for a few seconds.

Controller Startup Display

Display Screen Function Codes		Description
EncorE	Encore	Controller Type
EnhncE	Enhance	Controller Type
Auto	Automatic	System in Automatic Mode
OR		
hAnd	Manual	System in Manual Mode
OR		
nLitEn	Manual	System in Manual Mode with nLighten™
HdLV	HDLV or	System Type
P2P	Peer to Peer	Peer to Peer Functionality
Gun-05	Gun Number	Guns 1 to 4 Guns 1 to 32 (Auto)
PA irn9	Pairing	Controller Setting Pairing Function
PA irEd	Paired	Controllers Paired
GC-E.51	GC - X.XX	Gun Controller Software Version
Gd-0.00	Gd - X.XX	Gun Display Software Version (Manual Only)
FL-0.21	FL - X.XX	Flow Module Software Version

Startup (cont)

When the display runs through the initial cycle it should look as follows:



The following controller functions must be set up before operation:

Function Values

Function Number	Function Name	Function Values	Default Function
F00	Gun Type	00 = Manual 01 = Auto 02 = Robot 03 = Manual with nLighten	00
F01	Fluidizing	00 = Hopper 01 = Box 02 = Disable	02
F18	Pump Type	00=Venturi 01=HDLV	00
F19	Control Type	00 = Local 02 = Peer to Peer	00
F20	Gun Number	1 to 32 (Auto) 1 to 4 (Manual)	Auto - Factory Set Manual - User to Set

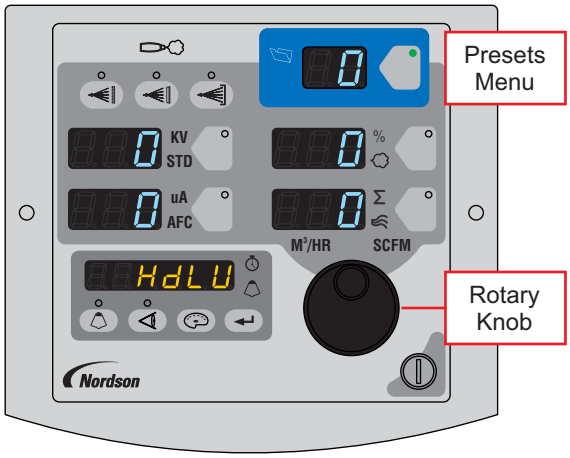
Function Number	Function Name	Function Values
F39	Auxiliary Inputs Lockout Disable Conveyor Disable Continuous Color Change Aux Inputs Disable	00 = Enable 01 = Disable 02 = Disable 03 = Continuous 04 = Color change 05 = Inputs disabled

Additional Setting

For additional configuration and settings options such as Peer to Peer, refer to the Encore Enhance Spray Controller manual.

CONFIGURE THE CONTROLLER

For HD Operation



Presets

Preset	Electrostatic, 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

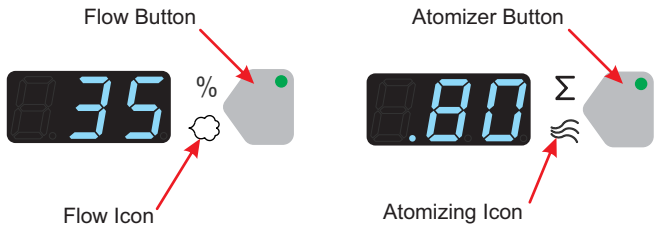
*Select Charge Mode settings are factory set and cannot be changed.

Refer to manual *Operation* section to set and change values.

HD Powder Flow Settings:

To set flow or pattern air:

- Press the Flow or Pattern button. The green LED on the selected button lights up.



- Turn the rotary knob to increase or decrease the setpoints. The setpoint is automatically saved if it does not change for three (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.
- NOTE: Increasing pattern air will not increase powder flow output.

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