Encore Engage External Controller

Customer Product Manual

Document Number 1615897-06
Issued 12/24

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

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

NORDSON CORPORATION • 100 NORDSON DRIVE, AMHERST, OHIO 44001 • USA

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

http://www.nordson.com/en/global-directory

Table of Contents

Change Record

Revision	Date	Change
01	5/19	Initial Release
02	6/22	Added UKCA certification
03	9/22	Administrative change
04	9/22	Administrative change
05	9/22	Added air prep kit
update	04/23	Fixed parts table for Gateway, fixed errors in Section 2 and Section 5
06 Update	12/24	Updated Manufacturer Address and Labels

Section 1

Safety

Introduction

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

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

Qualified Personnel

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

Intended Use

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

Some examples of unintended use of equipment include:

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

Regulations and Approvals

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

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

Personal Safety

To prevent injury follow these instructions.

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

Fire Safety

To avoid a fire or explosion, follow these instructions.

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

Grounding

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

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

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

Action in the Event of a Malfunction

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

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

Disposal

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

Safety Labels

Table 1-1 contains the text of the safety labels on the front of the cabinet. The safety labels are provided to help operate and maintain the console safely. See Figure 1-1 for the location of the safety labels.

Table 1-1 Safety Label Information

Item	Description
1.	**WARNING:** Disconnect power before servicing.

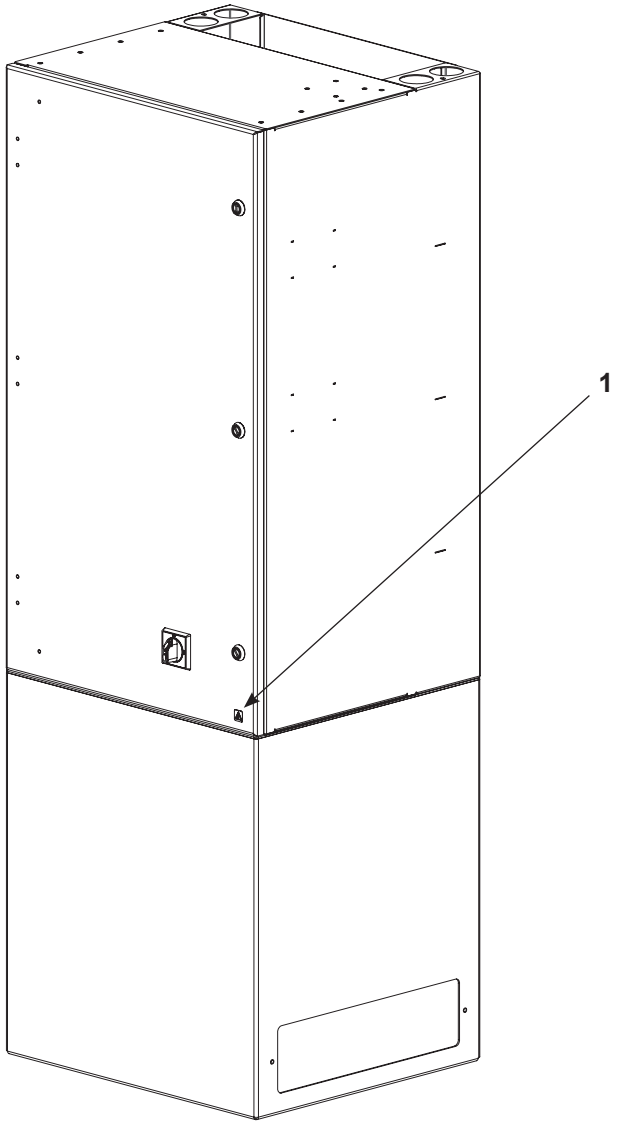


Figure 1-1 Safety Label Location

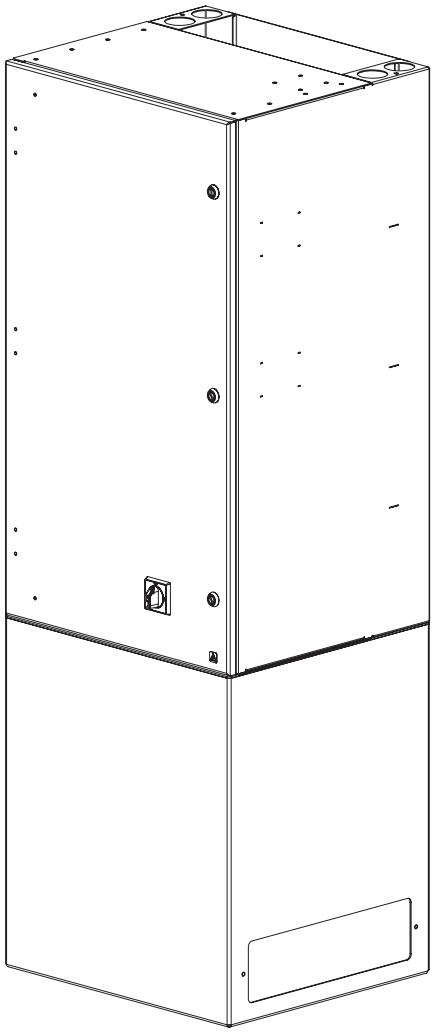
Section 2

Description

The Encore® Engage external controller provides pneumatic support for powder spray gun pumps, and electrostatic support for powder spray guns. The controller uses the Encore Engage Gateway, which provides a network for communication between a main PLC controller and pumps and spray guns. The controller supports either venturi or HD Encore spray guns.

NOTE: Encore Engage Gateway sold separately.

Each controller can support up to 16 automatic spray guns. Up to 4 manual guns can be substituted for automatic spray guns.



10018633

Figure 2-1 Safety Labels

Console and System Hardware and Software

Controller Components

See Figure 2-2. A fully equipped controller controlling 16 spray guns contains the following hardware:

- Backplanes, 8 dual spray gun control cards, and card cage (1 card controls 2 spray guns)
- One 600 watt 24 Vdc power supply
- Up to 8 iFlow modules for HDLV® configurations

Encore Engage Gateway

The Encore Engage Gateway is required to provide a communication network between the system's main PLC controller and the system's spray guns and pumps. The Gateway must be ordered separately, and is available as PROFINET® or EtherNet/IP™ protocols.

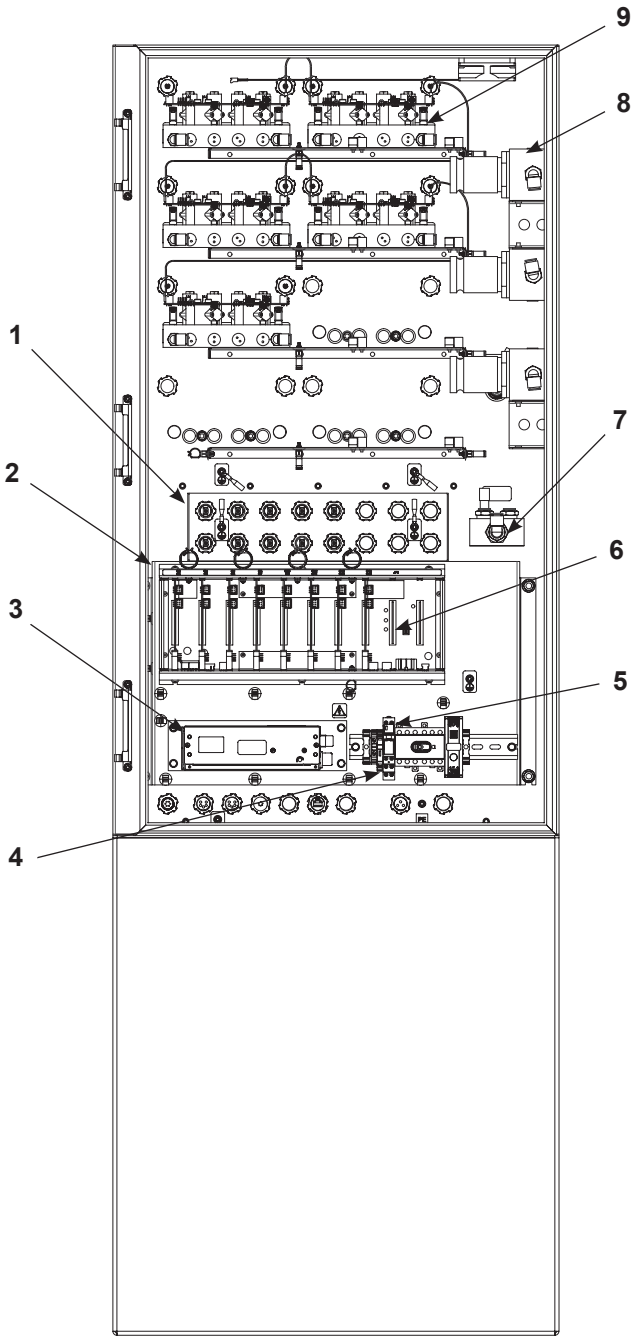


Figure 2-2 Controller Components

1. Spray gun receptacle panel
2. Spray gun cards, card cage, and backplane
3. 24 Vdc power supply
4. Fuse
5. Relay
6. Slot 9 for Gateway
7. Main air
8. Regulator
9. iFlow modules

DC Power Supplies

One 600-watt 24 Vdc provides 24 Vdc power to the spray gun cards and flow nodes

NOTE: The relay board converts 24 Vdc to 12 Vdc for the display.

Dual Spray Gun Cards

Each dual spray gun card in the card cage provides electrostatic controls for two Encore automatic powder spray guns. The cards provide a 0−20 Vac (peak) signal to drive the electrostatic power supplies inside the spray guns. The dual spray gun card also provides process feedback to the operator interface.

Spray Gun Pump Control

The controller controls the powder pumps and the manual spray gun controllers control the powder pumps through the CAN network. In the pump cabinet, one pump control card controls two pumps.

Refer to the pump and pump panel manuals for wiring diagrams, parts lists, and other information.

iFlow Digital Flow Module

The controller controls air flow to the pumps supplying powder to the automatic spray guns. The flow controls consist of precision regulators and iFlow digital flow modules.

One regulator supplies air to two iFlow modules. Each module supplies flow and atomizing air to two powder pumps, plus gun air (electrode wash air) to two spray guns. Flow and atomizing air is turned on and off when the spray guns are triggered on and off.

For HD pumps, the iFlow module also includes HDLV valve drivers to control the HD pumps.

The modules provide closed-loop control of the flow and atomizing air, constantly sensing the output and adjusting it to maintain air flow at the preset settings. The regulators provide air at a constant pressure to the iFlow modules so the closed-loop controls can operate at the calibrated range. The regulators are set 85−86 psi (5.86−5.93 bar) at the factory—do not change their settings.

Maximum output per flow module is 27.18 m^3/hr (16 scfm). Maximum output per channel is 6.80 m3/hr (4 scfm).

Two solenoid valves on the iFlow modules control the flow of gun air to the spray guns. The air flow is regulated by a fixed-orifice restrictor at the output. The solenoids can be set to turn on and off as the guns are triggered or to provide a continuous flow.

Communication between the iFlow modules and the PCA Gateway is through the internal Nordson CAN network.

Specifications

General

See Figure 2-5 for controller dimensions.

Electrical Requirements	
Input (See Note B)	100−250 Vac, 50−60 Hz, 1 Phase, 400VA max.
	Conveyor Interlock, Remote Lockout: 120/230 Vac, 50/60 Hz, 1 Ø, 6 mA
Output (to spray gun)	± 19V, ± 1A (peak)
CAN 1 (manual gun connection)	24 V, ± 10% at 4A Fused
NOTE A: The controller must be interlocked with the fire detection system so that the spray guns are shut off if a fire is detected inside the spray booth.	
NOTE B: Branch circuit breaker 10A Maximum	
D I/O	
Lockout (Open=System Lockout)	24 V 5 mA, Contact Closure
Alarm (Contacts Closed=System Good)	Contact Closure 60 V maximum at 1A
ANSI/ISA S82.02.01	
Pollution Degree	2
Installation (Overvoltage)	Category II
Environmental	
Operating Temperature	+15° C to +40° C
Operating Humidity	5−95%, non-condensing
Weight	
16 Spray Gun Controller	140 kg (309 lb)
NOTE B: Branch circuit breaker 10A Maximum	

Input Air Quality Requirement

Air must be clean and dry. Use a regenerative desiccant or refrigerated air dryer capable of producing a 3.4 oC (38 oF) or lower dew point at 7 bar (100 psi) and a filter system with prefilters and coalescent-type filters capable of removing oil, water, and dirt in the submicron range.

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 HDLV pumps to malfunction; the powder to cake in the reclaim system, or cause clogging in the feed tubing or spray gun powder paths.

Special Conditions for Safe Use

- The Encore Engage Auxiliary Unit is only for use in non-explosive atmospheres.
- The Encore Engage Auxiliary Unit shall be used with the manufacturer's applicators that are certified under FM11ATEX0056X, FM13ATEX0006X or FM14ATEX0051X and for manual applicators shall be used with the kit including the manual interface unit certified under FM18ATEX0058X.
- The equipment must be used in accordance with EN 50177 for automatic applicators and EN 50050-2 for manual applicators.

CAUTION: Caution should be taken when cleaning plastic surfaces on the Encore Engage External Controller. There is a potential for static electricity buildup on these components.

Approvals

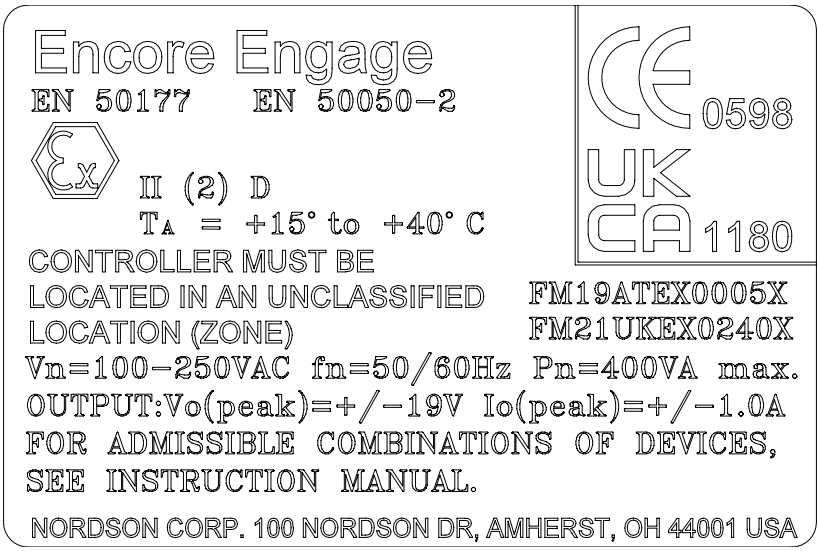


Figure 2-3 Label for CE and UKCA Approval

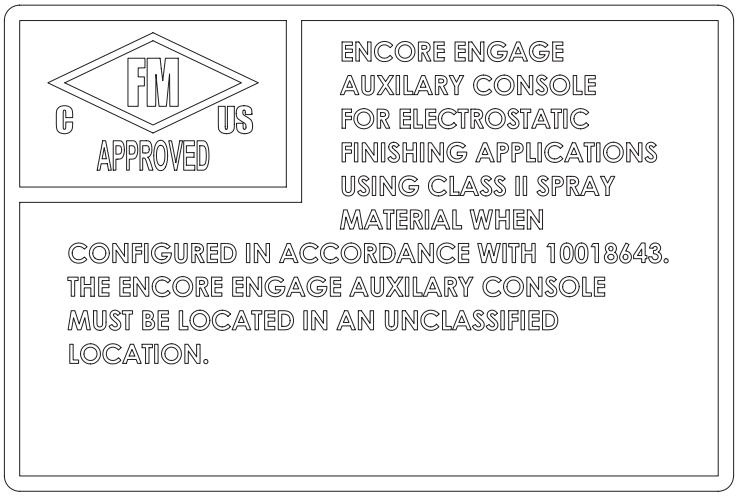


Figure 2-4 Label for FM Approval

Dimensions

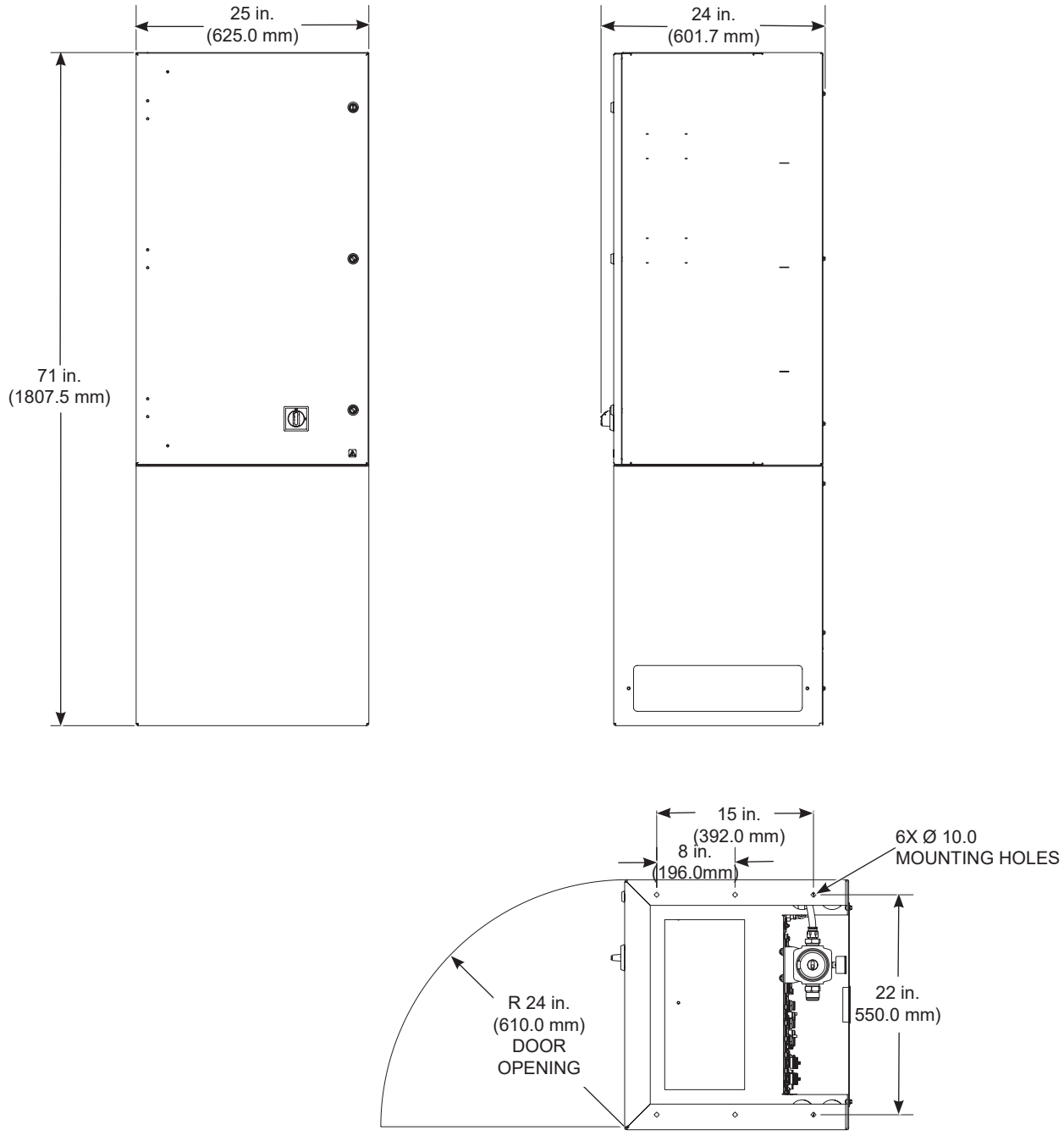


Figure 2-5 Dimensions

Section 3
Installation

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

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

Introduction

Powder spray systems are configured for each customer's application and requirements. The equipment supplied with the system varies depending on the type of installation (new, upgrade, or retrofit) and the equipment furnished by the customer. Therefore, this section provides only basic installation information. Detailed information is contained in the system wiring diagrams, plan views, and other documentation furnished by Nordson application engineering.

The controller must be installed outside the zone.

System Connections

Connection Diagrams

12 Automatic and 4 Manual Spray Gun System

See Figure 3-2.

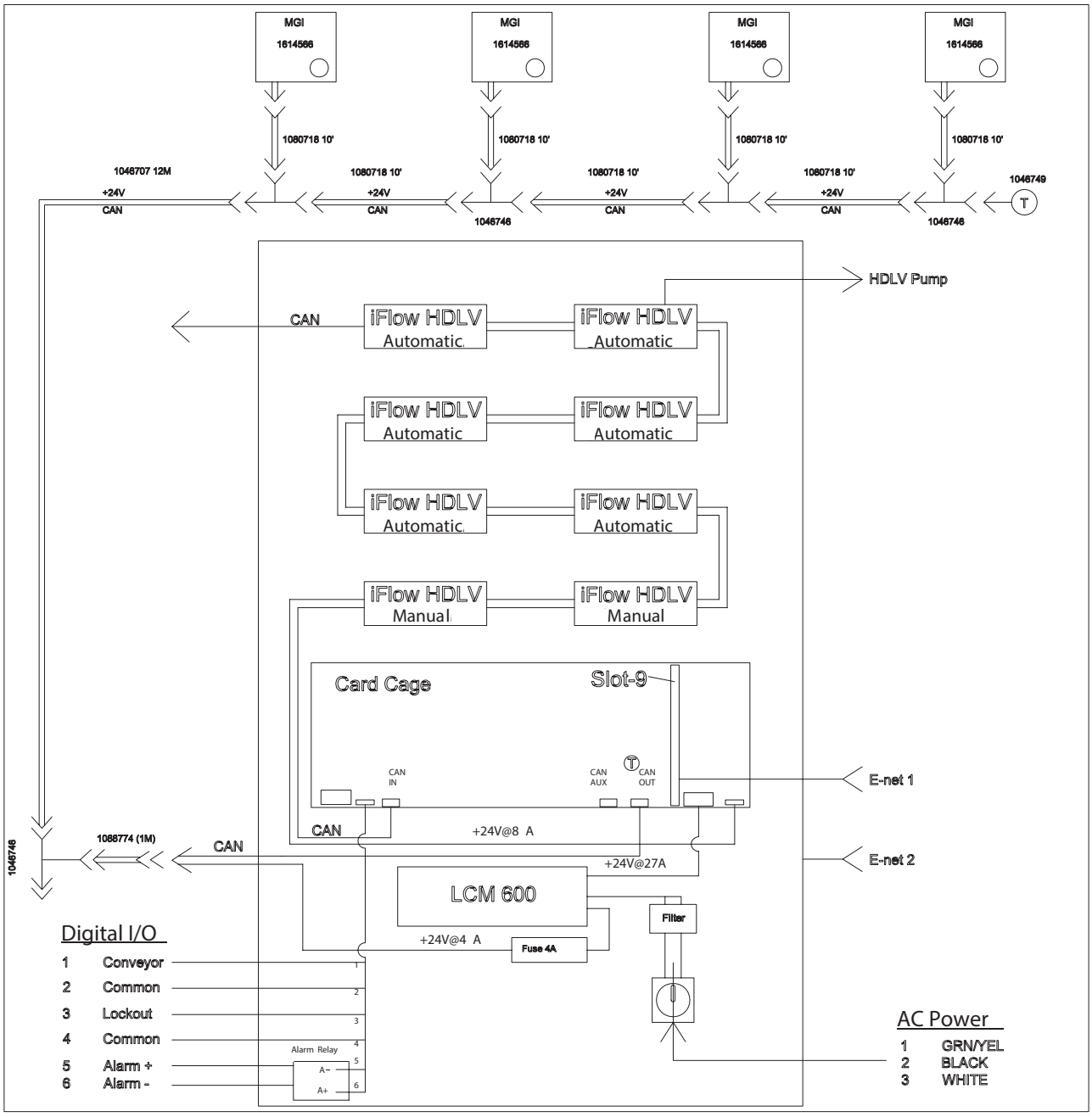


Figure 3-1 12 Automatic and 4 Manual Spray Gun System

Electrical Connections

See Figure 3-2.

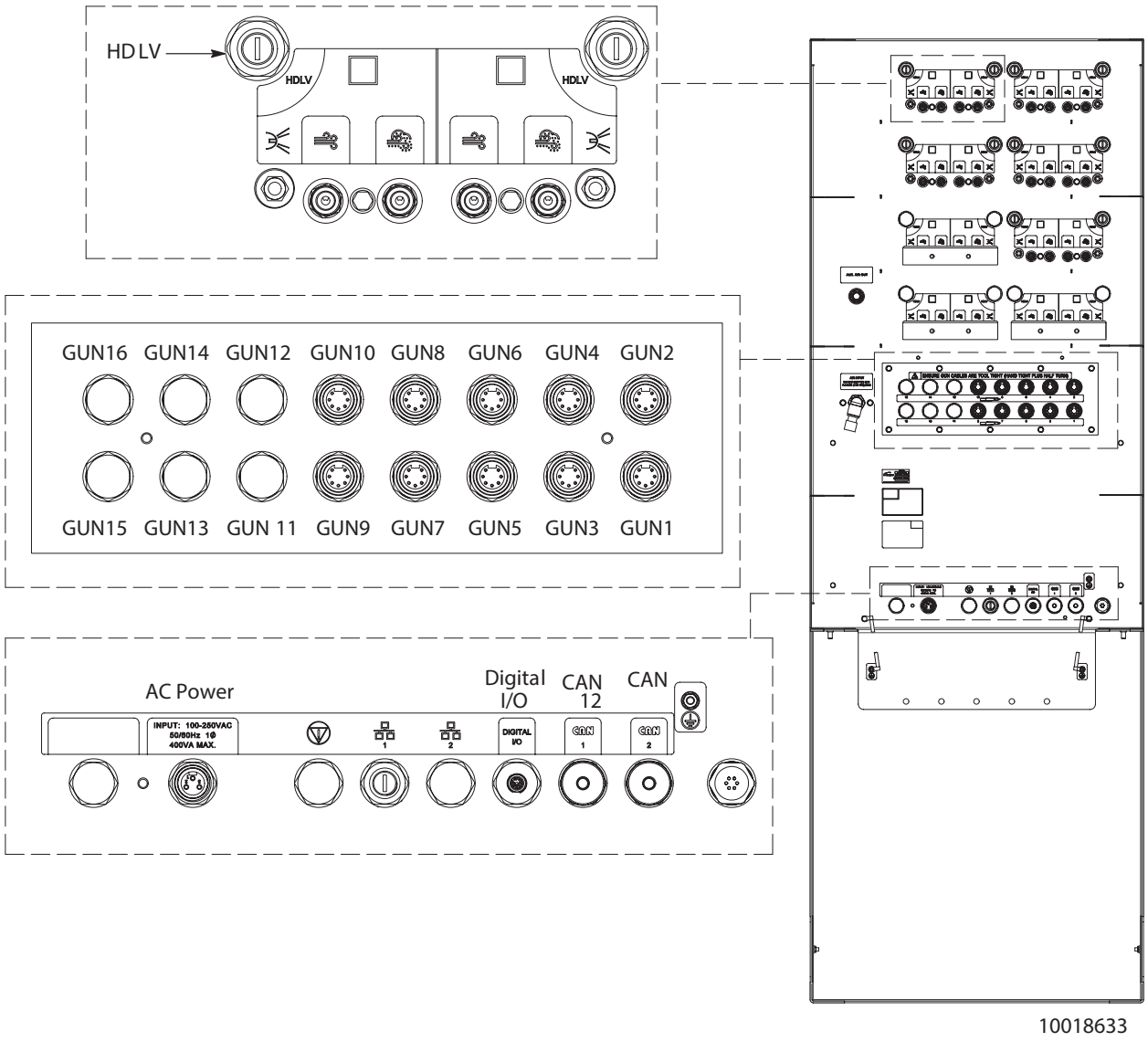


Figure 3-2 Back Electrical Connections (Cover Removed)

Pneumatic Connections

See Figure 3-3.

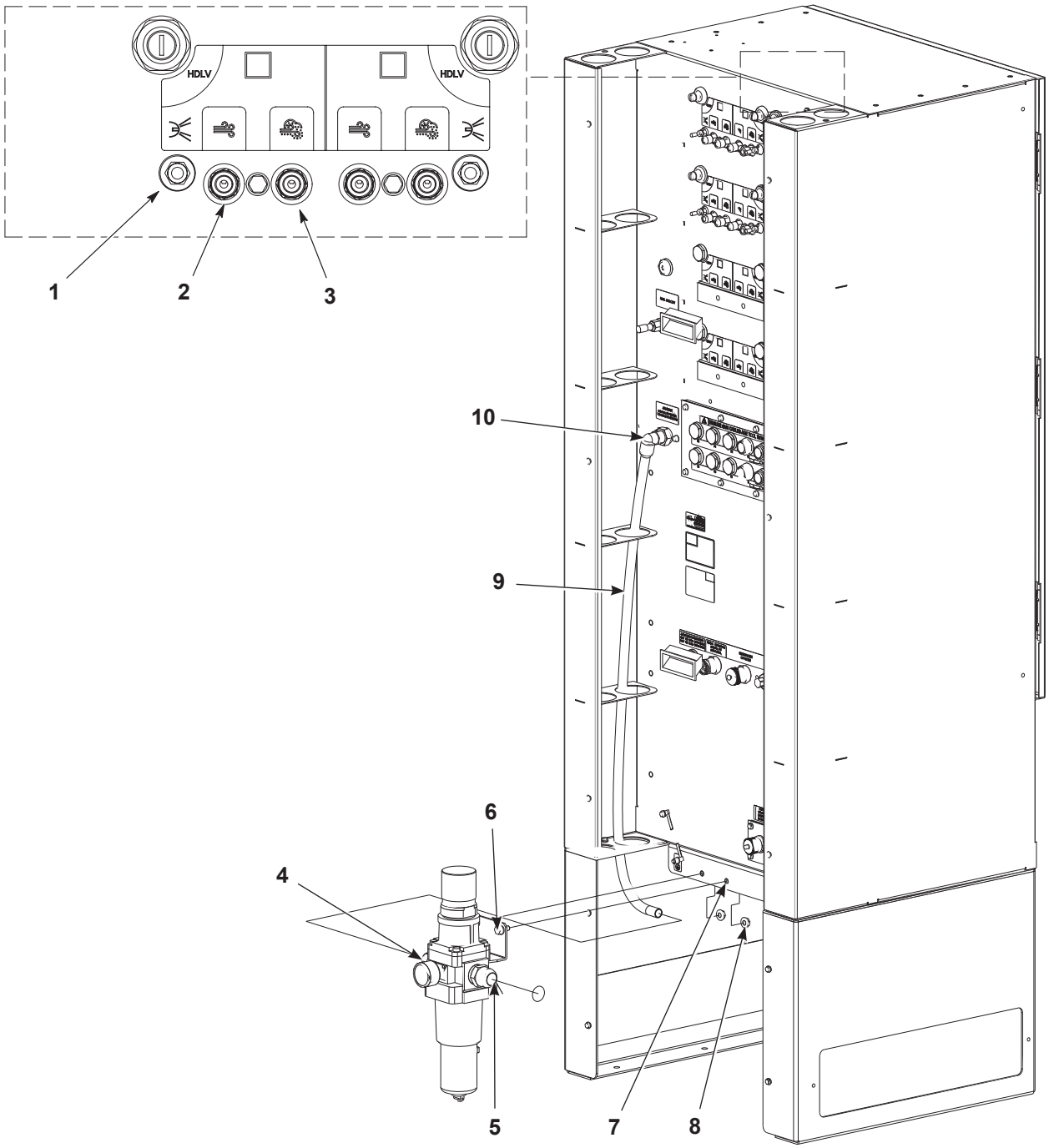


Figure 3-3 Back Pneumatic Connections (Cover Removed)

1. Electrode air wash
2. Flow air
3. Atomizing air
4. Air prep unit outlet fitting
5. Air prep unit inlet fitting
6. M8 serrated hex screw
7. Mounting holes
8. M8 serrated nut
9. 16 mm tubing
10. Controller air inlet fitting

External Air Supply

Attach the external air supply to the air prep unit inlet fitting using the supplied connectors as required.

Grounding

WARNING: Consoles and all conductive equipment in the spray area MUST be connected to a true earth ground. Use the provided gr M8 serrated hex screw

WARNING: Controller air inlet fitting ound cables to ground the consoles. Mount junction boxes and control panels to grounded stands or the booth base. Failure to observe this caution could result in severe shocks to personnel, fire, or explosion.

Proper grounding of all conductive components of a powder coating system provides both shock and electrostatic discharge protection for both operators and sensitive electronic equipment. Many system components (booth, collector, color modules, control consoles, and conveyor) are connected both physically and electrically. It is important that the proper grounding methods and equipment are used when installing and operating the system.

PE (Protective Earth) Grounding

PE grounding is required on all conductive metal electrical enclosures in a system. PE grounding is provided by a ground conductor wire bonded to a true earth ground. PE grounding protects operators from electrical shock by providing a path to ground for electrical current if a conductor contacts an electrical enclosure or other conductive component. The ground conductor wire carries the electrical current directly to ground and short circuits the input voltage until a fuse or circuit breaker interrupts the circuit.

The sole purpose of the green/yellow ground wires bundled with the AC input power cable is to protect personnel from a shock. They must be used for PE grounding only. These ground wires do not protect equipment against electrostatic discharge.

Electrostatic Grounding

Electrostatic grounding protects electronic equipment from damage caused by electrostatic discharges (ESD). Some electronic components are so sensitive to ESD that a person can deliver a damaging static discharge without feeling even a mild shock.

Proper electrostatic grounding is mandatory in an electrostatic powder coating system. Powder spray guns generate electrostatic voltages up to 100,000 V. It does not take long for ungrounded system components to build up an electrical charge strong enough to damage sensitive electronic components when discharged.

Electrostatic discharges occur at very high frequencies, around 100 MHz. An ordinary ground conductor does not conduct such high frequencies well enough to prevent damage to electronic components. Special flat-braided cables are provided with Nordson powder coating equipment to protect against ESD.

Spray Gun Current Path

See Figure 3-4. All electrical circuits need a complete path for current to make its way back to the source. Electrostatic spray guns emit current (ions) and therefore require a complete circuit. Some of the current emitted by the spray gun is attracted to the spray booth, but most is attracted to the grounded parts moving through the booth. The current attracted to the parts flows through the part hangers to the conveyor and to the building ground, back to the controller through a ground braid and back to the spray gun through the spray gun driver board. The current attracted to the booth is returned through the booth ground to the controller and back to the spray gun.

It is very important to provide a complete circuit for the spray gun current. A break in the circuit conductors (conveyor, booth, braided ground cables, controller) can cause voltage to build up on the conductors up to the maximum output of the spray gun voltage multiplier (up to 100 kV). The voltage will eventually discharge in a high frequency arc, which can cause damage to the controller electronics (spray gun driver board and power supply).

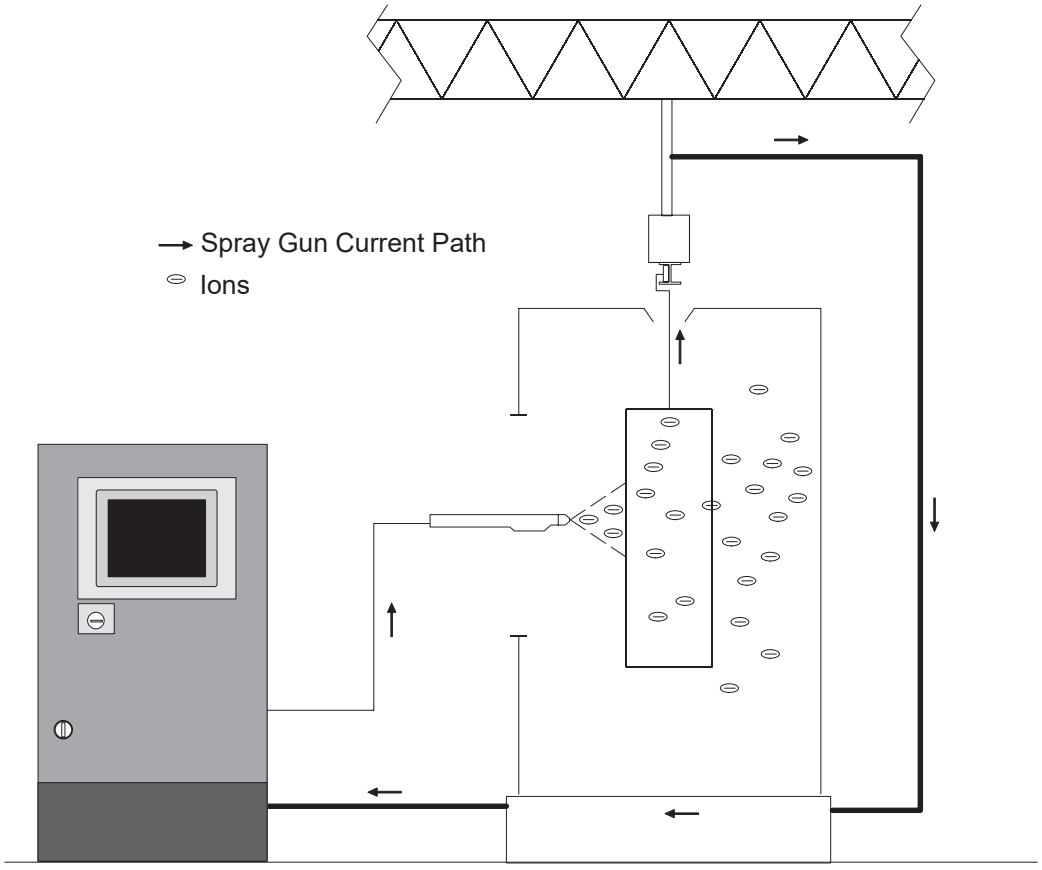


Figure 3-4 Electrostatic Current Path

ESD Ground Procedures and Equipment

The best protection against ESD is to keep the ground braids as short as possible and connect them to a central point on the booth base as shown in the Star diagram. Under normal conditions making Star connections is not a problem, but in some systems, such as roll-on/roll-off booths, the ground braids required for a Star connection are too long to be effective against ESD. In this case, a Daisy Chain ground configuration is acceptable.

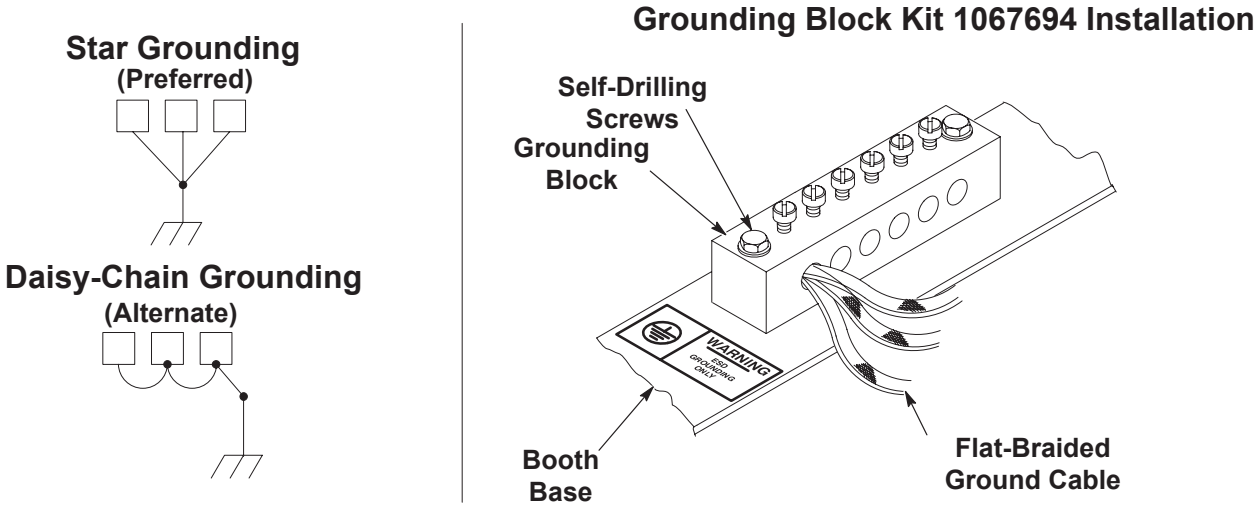


Figure 3-5 ESD Grounding Procedures and Equipment

Always use the special flat-braided copper ESD ground cables furnished with all Nordson spray gun controllers to ground them. The ESD ground cables should always be attached to the booth base, not to a panel, enclosure, or other component bolted to the base. Keep the cables as short as possible. If using a grounding block kit, make sure the block is installed directly to the base with the included self-drilling screws.

An ESD grounding block kit is available for connecting the ground braids to the booth base. The kit contains two 6-position grounding blocks, fasteners, terminals, and 15 meters (50 feet) of braided ground cable. If additional kits are required, order:

1067694 Kit, ground bus bar, ESD, 6-position, with hardware

Spray Gun Cable Connections

See Figure 3-6. Connect the automatic spray gun cables to the receptacles on the rear panel of the controller. Connect spray gun 1 cable to receptacle 1, spray gun 2 cable to receptacle 2, and so on.

Odd Number of Spray Guns

The controller is configured for an even number of spray guns. Each spray gun controller card in the console controls two spray guns. If the system is configured for an odd number of spray guns, the fault LED on the card with only one spray gun connected will light.

NOTE: The unused spray gun must be the highest even-number spray gun. For example, if there is an 8-spray gun system, then number 8 must be the unused spray gun. The spray gun card receptacles are labeled on the circuit boards as A (odd-number spray gun) and B (even-number spray gun).

Included in the bag with the controller keys is a bulkhead seal and jumper. The jumper disables the spray gun not detected fault LED on the spray gun card.

Cap the unused cable receptacle with the bulkhead seal, then open the console door and unplug the receptacle harness from the spray gun card. Install the jumper in the card receptacle.

Refer to the *Parts* section for seal and jumper part numbers.

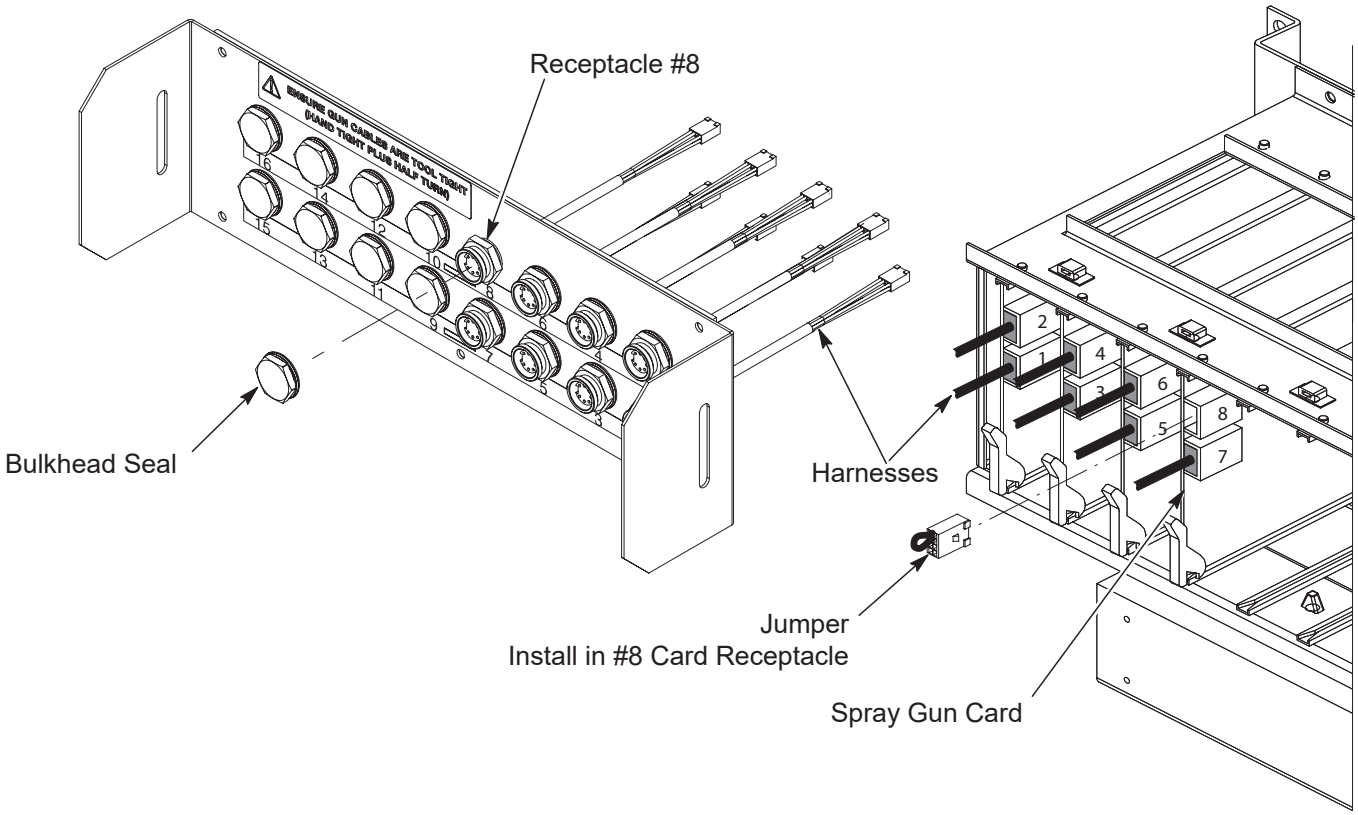


Figure 3-6 Seal and Jumper Installation - Example Showing Eight-Spray Gun System Using Seven Spray Guns

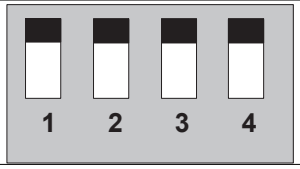
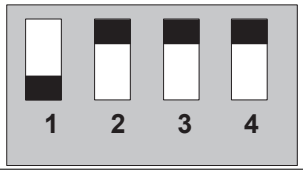
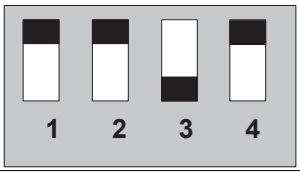
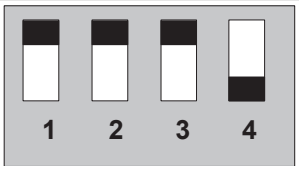
Manual Spray Gun Controller Addresses

The manual spray gun controller addresses are set through software. Each controller must have a unique address. Use SW3 and SW4 on the iFlow control board to set address. Refer to Table 3-2 and Table 3-3, and see Figure 3-7. Up to four manual spray guns can be included in a system.

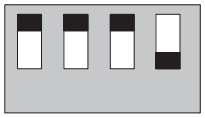
Table 3-2 SW3 Dip Switch Functions

SW3 Dip Switches	Position Definition
1	Up: Cabinet 1 Down: Cabinet 2
2	Not Used
3	Up: HD Down: VT
4	Up: Automatic Down: Manual
NOTE: Default position of all dip switches on replacement iFlow modules is Up.	

Table 3-3 SW3 Dip Switch Functions

Switch Positions	Position Definition
	Main Control, HD, Auto SW4 set to 1−8
	Aux Control, HD, Auto SW4 set to 1−8
	Main Control, VT, Auto SW4 set to 1−8
	HD, Manual Gun SW4 set to 1 for manual spray guns 1 and 2 SW4 set to 2 for manual spray guns 3 and 4
NOTE: Default position of all dip switches on replacement iFlow modules is Up.	

SW3 Configured for Manual Spray Gun



SW4 Configured for Guns 1 and 2

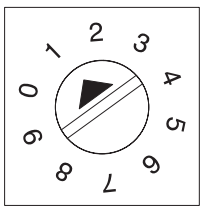


Figure 3-7 iFlow Module Address Set for Manual Spray Guns 1 and 2

Section 4
Troubleshooting

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

NOTE: If the troubleshooting procedures in this section do not solve your problem, contact the Nordson Industrial Coating Systems Customer Support Center at (800) 433−9319 or your local Nordson representative.

Spray Gun Card LEDs

See Figure 4-1. Use the card LEDs to help diagnose problems.

Table 4-1 Spray Gun Card LEDs

LED	Color	Function	Correction
Fault	Red	Lights when a fault is detected (communication, spray gun cable, RAM, or hardware).	If two spray guns are not connected to the card this LED will light. If you have an odd number of spray guns in the system, unplug the unused harness and install the jumper plug shipped with the console. (Refer to Odd Number of Spray Guns below or the Installation section.) Make sure the card is seated in the backplane. Open the Alarm screen and clear all faults. Replace the card if the malfunction cannot be corrected.
Status	Green	Flashing (heartbeat) when communicating properly with system.	If the status LED is not flashing, make sure the card is seated in the backplane. Turn controller power off and on. Replace the card if the other spray gun control cards have heartbeats.
Gun Limit B (even-numbered spray gun	Yellow	Lights if over-current protection circuit triggered due to high current draw from spray gun drive circuit.	Refer to the corrections for Fault Code (E15 in some applications).
Gun Limit A (odd-numbered spray gun)			
Power	Green	Lights when power (5 volts) is applied to the board.	If the card has no power, make sure it is properly seated in the backplane and the locking tab is working correctly. Replace the card if the other spray gun control cards have power.

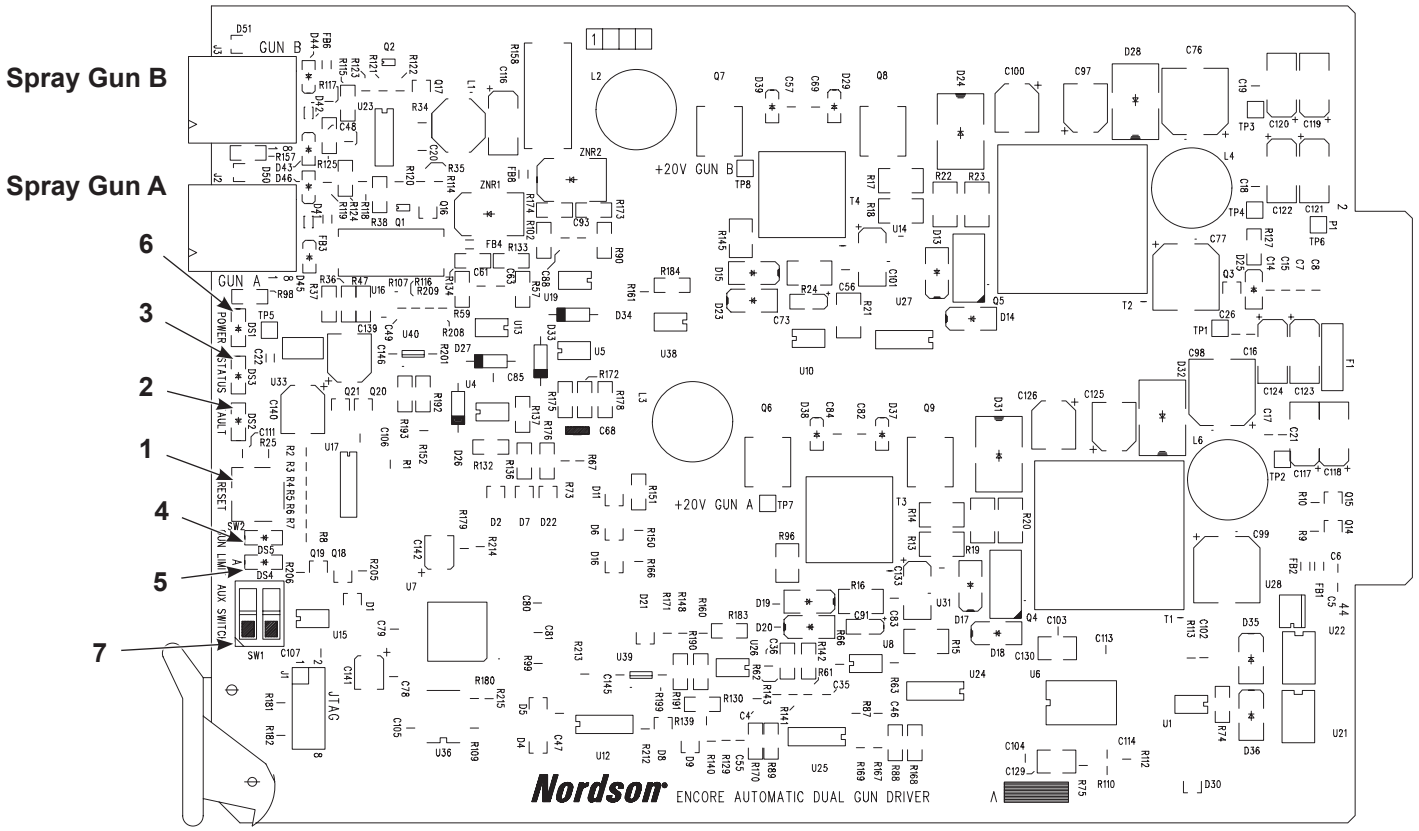


Figure 4-1 Spray Gun Control Card LEDs and Switches

1. Reset switch (reboots the on-board processor)
2. Fault LED (red)
3. Status LED (green)
4. Spray Gun Limit B LED (yellow)
5. Spray Gun Limit A LED (yellow)
6. Power LED (green)
7. SW1 (2 position DIP switch for future use)

iFlow Module

Perform this procedure if the customer PLC is indicating atomizing air flow when a spray gun is off and no air is actually flowing. This procedure re-zeros the pump control cards to eliminate false air flow indications.

Air Flow Re-Zero Procedure

Before performing a re-zero procedure:

- Make sure the air pressure being supplied to the pump cabinet is higher than the minimum 6.2 bar (90 psi).
- If the regulator supplying the module being tested is new, make sure it has been calibrated for the correct pressure output. Use an iFlow air flow verification kit (1039881) and follow the instructions in the kit instruction sheet.
- Each pump circuit board in the pump cabinet controls two pumps and the atomizing air for two spray guns. Make sure no air is flowing through the pumps, around the pump control manifold gaskets, or from around any of the solenoid valves on the manifold. Re-zeroing boards when leaks are present in the control manifolds will result in additional errors.
- 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.

Re-Zero Procedure

See Figure 4-1. For each pump board that is being re-zeroed:

1. Disconnect the atomizing and flow air tubing from all four of the 8-mm output ports and plug the ports with tube plugs.
2. Note the setting of address switch SW3, then set it to zero.
3. Press pushbutton switch SW1 to reset the module. The red LED should be off.
4. Press and hold pushbutton switch SW2 for about two seconds, until the red LED turns on. Release the button. The LED will turn off again in about seven seconds. The module is now re-zeroed.
5. Move address switch SW3 back to its original position.
6. Press pushbutton switch SW1 again. The red LED should shut off.
7. Remove the tube plugs from the output ports.
8. Check the gun control panel. With the spray gun off, the customer display should show no air flow.

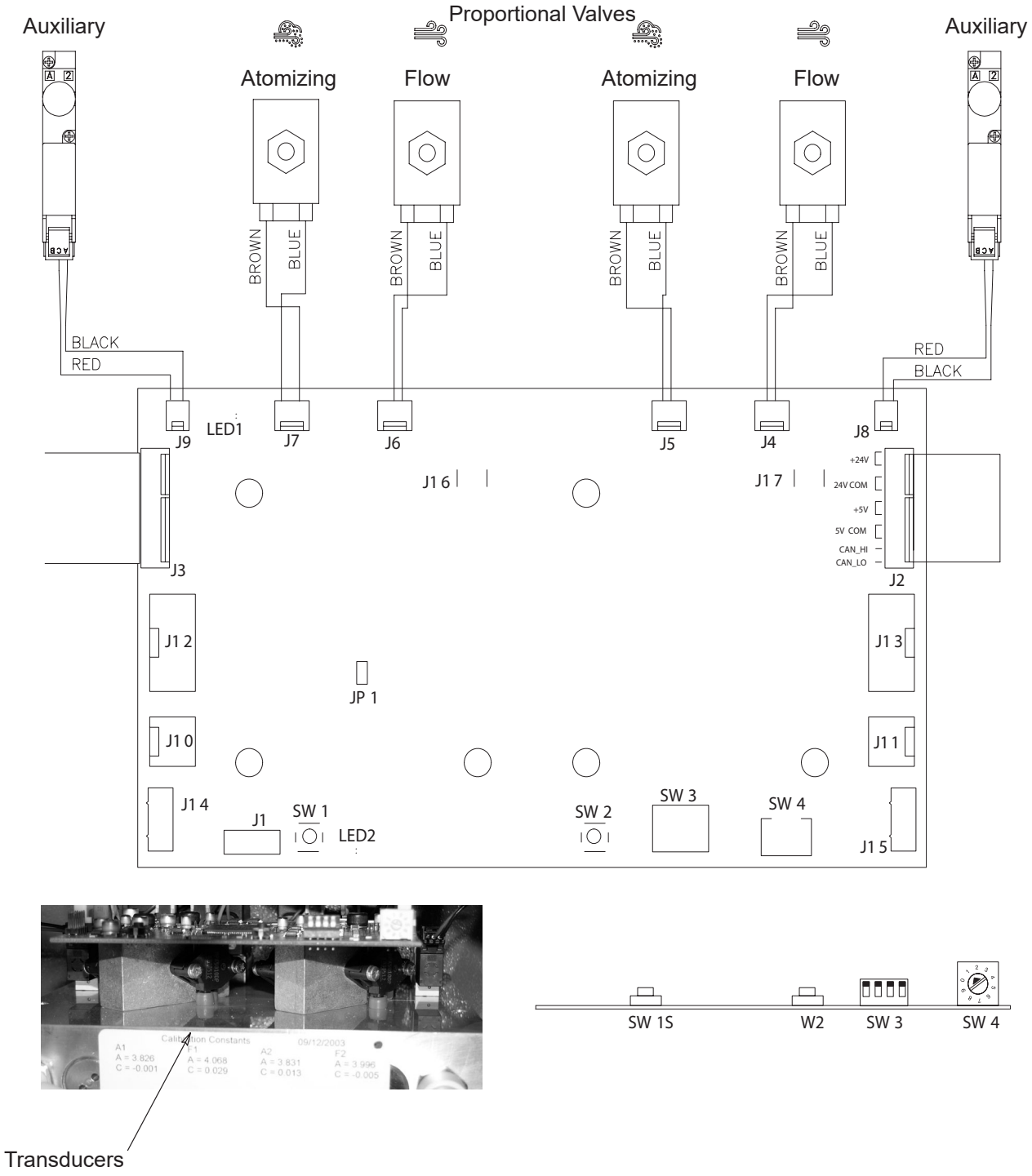


Figure 4-2 Dual Pump Control Board

Section 5

Repair

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

WARNING: Hazardous voltages exist within the controller. Unless power must be on to test circuits, always shut off and lock out power before opening the console to make repairs. All repairs should be made by a qualified electrician. Failure to observe this warning could result in personal injury or death.

WARNING: Whenever replacing a component that interfaces with the exterior of the enclosures, such as an iFlow digital flow module, make sure that the dust-tight integrity of the enclosures are intact by installing the correct gaskets and seals. Failure to maintain the dust-tight integrity of the enclosures could invalidate agency approvals and create a hazardous condition.

Spray Gun Control Card Removal/Installation

Replacing a Spray Gun Control Card

WARNING: Do not remove spray gun control cards from the card cage while they are powered. Either shut off controller power or shut off the booth exhaust fan so that the interlock will remove power from the spray gun control cards. Failure to observe this warning could result in damage to the cards.

CAUTION: Do not remove spray gun control cards from the card cage while they are powered. Either shut off controller power or shut off the booth exhaust fan so that the interlock will remove power from the spray gun control cards. Failure to observe this warning could result in damage to the cards.

See Figure 5-1. Spray gun control cards (2) are installed in the card cage from left to right. Each card controls two spray guns: the bottom receptacle is the odd spray gun number; the top receptacle is the even spray gun number.

To remove a card, disconnect the spray gun harness connectors (3 and 4), pull down the locking tab (5), then pull the card out of the card cage.

To install a new card, slide the card into the slots in the card cage and seat the card's finger board firmly into the connector slot on the backplane (6). Push the locking tab up to lock the card into the card cage. Connect the spray gun harness to the two receptacles on the card.

Adding Spray Guns

If the controller has an odd number of spray guns, it is possible to add another spray gun without adding another spray gun control card. If the controller has an even number of spray guns less than 16, add more spray guns by installing a new spray gun control card in an unused slot.

NOTE: Cards are installed in the card cage from left to right. Spray guns are numbered from left to right and bottom to top.

Spray Gun Connector Configuration on Card

17 19 21 23 25 27 29 31

18 20 22 24 26 28 30 32

---

2 4 6 8 10 12 14 16

1 3 5 7 9 11 13 15

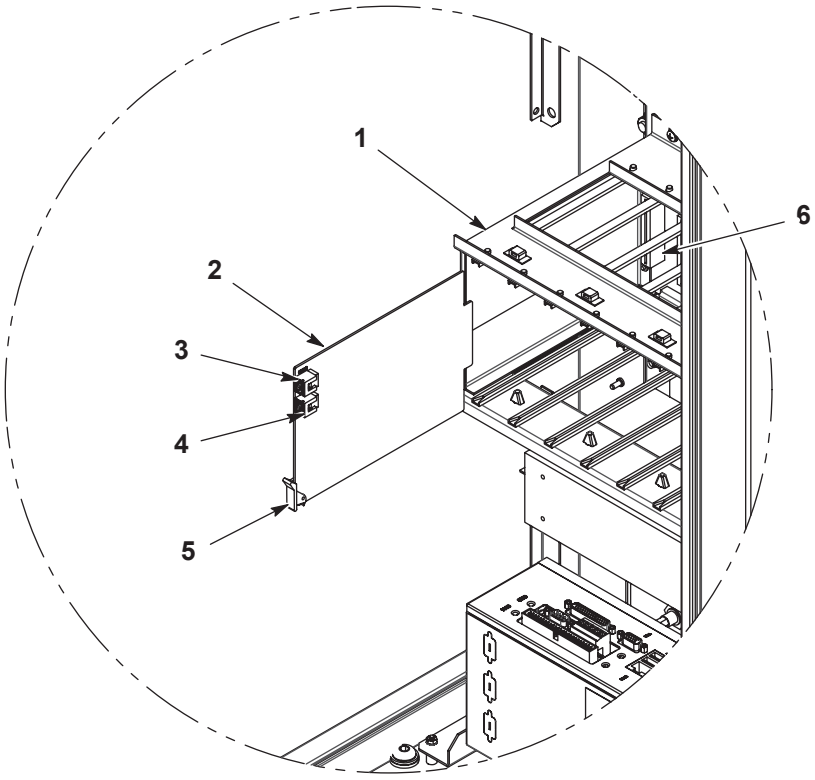


Figure 5-1 Spray Gun Control Card Replacement

1. Card cage (slot 1)
2. Gun control card
3. Spray gun 2 connector
4. Spray gun 1 connector
5. Locking tab
6. Backplane

iFlow Module Repair

Repair of the iFlow module is limited to:

- cleaning or replacing the proportional valve
- replacing the gun air solenoid valve

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

CAUTION: The module circuit cards are electrostatic sensitive devices (ESD). To prevent damage to the cards when handling them, wear a grounding wrist strap connected to the controller enclosure or other ground. Handle the cards only by their edges.

Proportional Valve Cleaning

See Figure 5-2. A dirty air supply can cause the proportional valve (8) to malfunction. Follow these instructions to disassemble and clean the valve.

1. Disconnect the coil (11) wiring from the circuit board (3). Remove the nut (12) and coil from the proportional valve (8).
2. Remove the two long screws (9) 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 two short screws (10), then remove the valve stem (13) from the valve body (16).
4. Remove the valve cartridge (15) and spring (14) from the stem.
5. Clean the cartridge seat and seals, and the orifice in the valve body. Use low-pressure compressed air. Do not use sharp metal tools to clean the cartridge or valve body.
6. Install the spring and then the cartridge in the stem, with the plastic seat on the end of the cartridge facing out.
7. Make sure the O-rings furnished with the valve are in place on the bottom of the valve body.
8. Secure the valve body to the manifold with the long screws, making sure the arrow on the side of the body points toward the outlet fittings.
9. Install the coil over the valve stem, with the coil wiring pointing toward the circuit board. Secure the coil with the nut.
10. Connect the coil wiring to the circuit board.

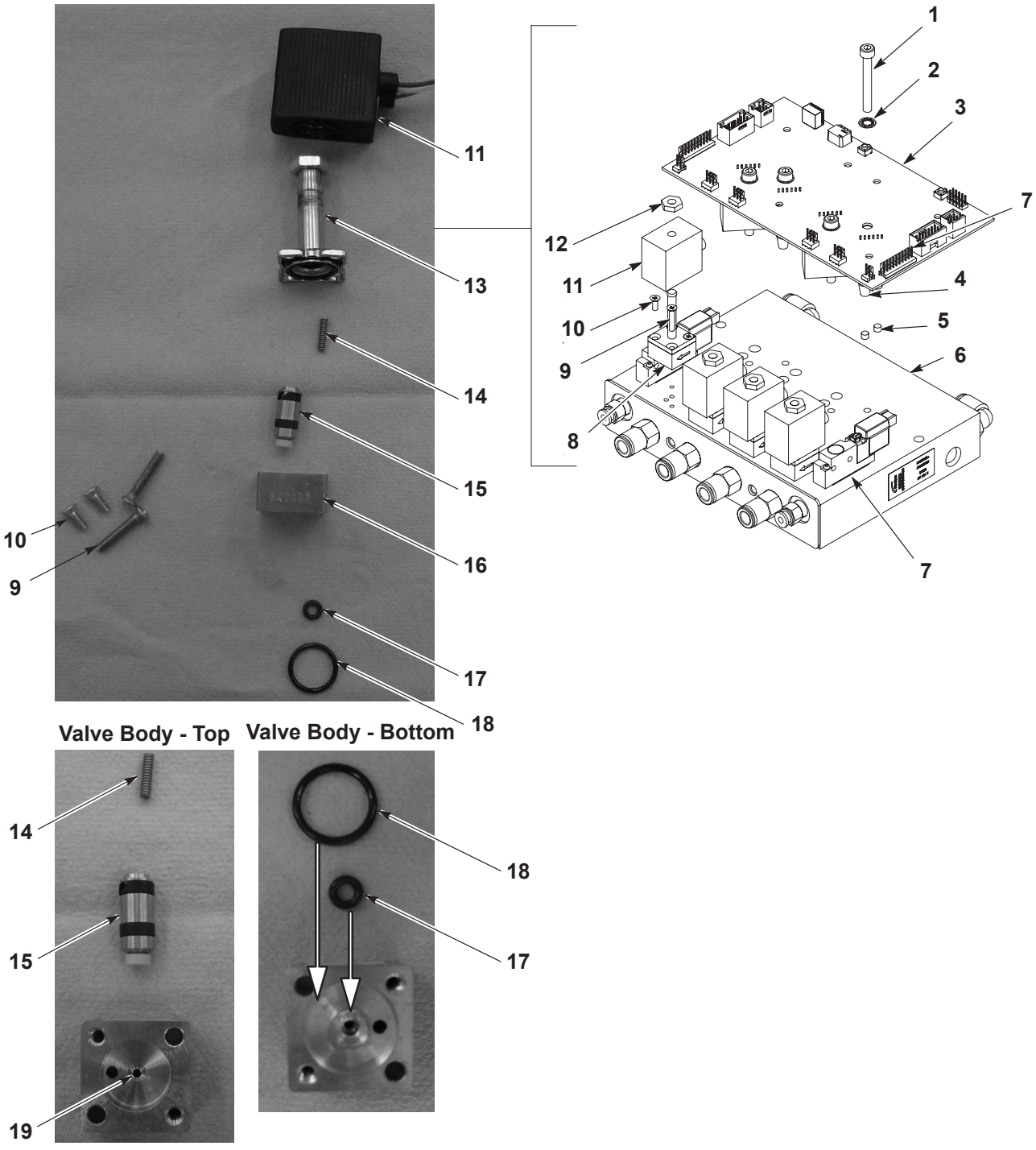


Figure 5-2 iFlow Module Cleaning and Repair

Proportional Valve Replacement

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

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

Gun Air Solenoid Valve Replacement

See Figure 5-2. To remove the gun air solenoid valves (7), remove the two screws in the valve body and lift the valve off the manifold.

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

Filter Replacement

See Figure 5-2.

1. Remove the screws (1) and washers (2) securing the circuit board (3) to the manifold (6), then remove the circuit board from the manifold.

NOTE: If the seals (4) remain in the manifold port, remove them.

2. Check for filter contamination. If filters (5) are discolored, replace filters using service kit found in Figure 6-4. Replacement instructions are included with kit.

Section 6
Parts

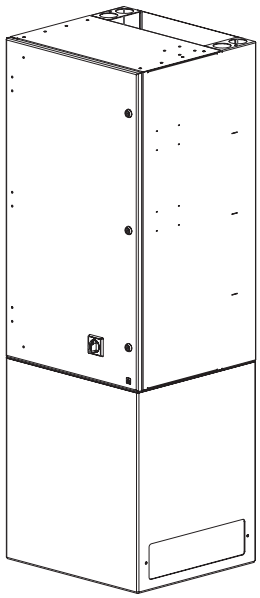
Introduction

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

Controller Configurations

See Figure 6-1 and refer to the parts list below for standard configurations.

Part	Description	Note
1615950	CONTROLLER, external, 4 gun, Encore Engage	
1615951	CONTROLLER, external, 6 gun, Encore Engage	
1615952	CONTROLLER, external, 8 gun, Encore Engage	
1615953	CONTROLLER, external, 10 gun, Encore Engage	
1615954	CONTROLLER, external, 12 gun, Encore Engage	
1615955	CONTROLLER, external, 14 gun, Encore Engage	
1615956	CONTROLLER, external, 16 gun, Encore Engage	



10018633

Figure 6-1 Encore Engage External Controller

Common Components

See Figure 6-2 and refer to the following parts list for common spare parts for the external controller cabinet.

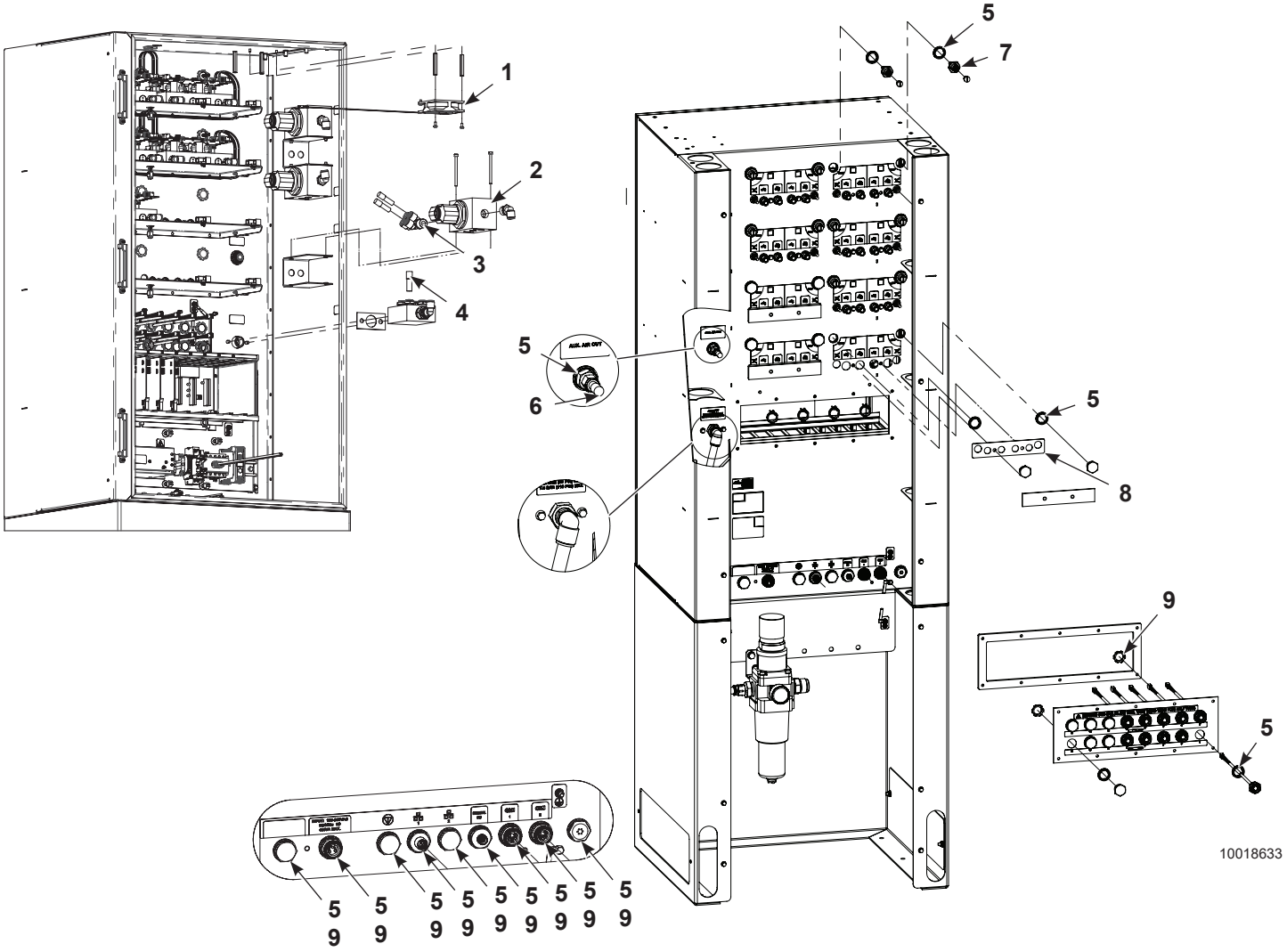


Figure 6-2 Common Components (Door and Back Panel Removed for Clarity)

Item	Part	Description	Quantity	Note
1	1615492	FAN ASSEMBLY, Engage	1	
2	1033878	REGULATOR, rolling diaphragm, 0−120, ½ NPT	AR	
3	1034000	FITTING, ½ RPT x (4) 10 mm tube	AR	
4	183418	PLUG,12 mm, tube	AR	
5	939122	SEAL, conduit fitting, 1/2, blue	AR	
6	148256	PLUG, 10 mm, tubing	AR	
7	1615491	RECEPTACLE ASSEMBLY, HDLV, 12 position, F, ENGAGE	AR	
8	1027256	GASKET, module, digital airflow control	AR	
9	984526	NUT, lock, 1/2 conduit	AR	
AR: As Required add the number for the filter regulator and also there is a replacable element in it where you can replace the filter				

Air Prep Unit Kit

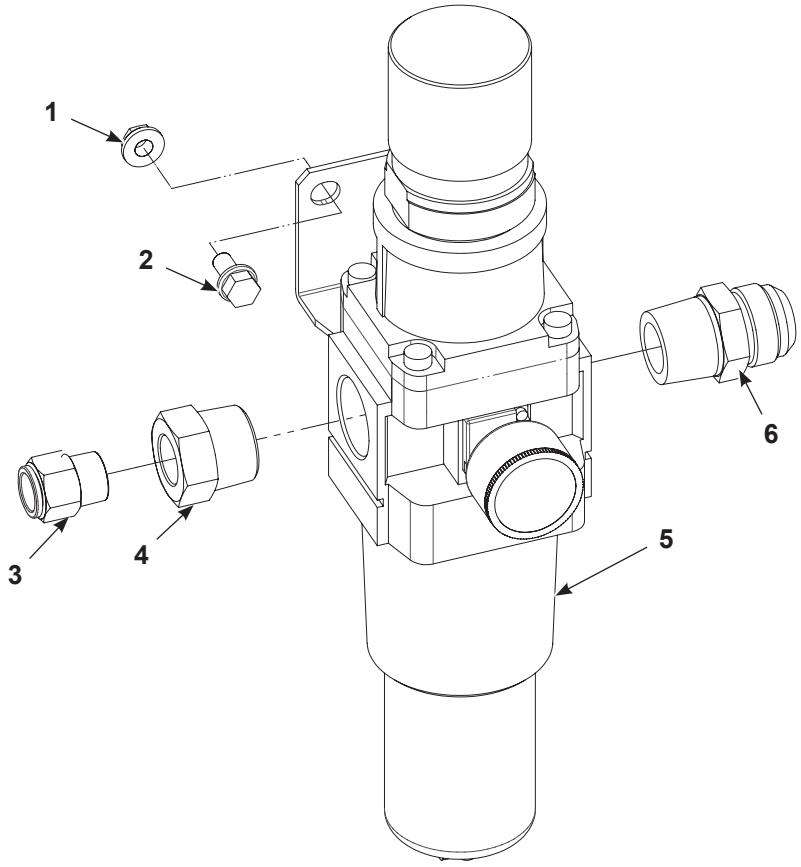


Figure 6-3 Air Prep Unit for Engage Controllers

Item	Part	Description	Quantity	Note
	1619554	KIT, air prep unit, Encore Engage	1	
1	- - - - - -	• NUT, hex, flanged, serrated, M8	2	
2	- - - - - -	• SCREW, hex, serrated, M8 x 18, steel, zinc	2	
3	- - - - - -	• CONNECTOR, male, 16 mm T x 1/2 RPT, with seal	1	
4	- - - - - -	• BUSHING, reducing, 1 NPT x 1/2 NPT	1	
5	1615771	• FILTER, REGULATOR, gage, 5 micron, 100 cfm, 1 NPT	1	
NS	1614705	• • FILTER ELEMENT, 5 micron	1	
6	- - - - - -	• CONNECTOR, male	1	
NS	1091201	• 16mm TUBING, 3 ft	1	
NS: Not Shown				

iFlow Module

See Figure 6-4 and refer to the following parts list for common spare parts for the iFlow module.

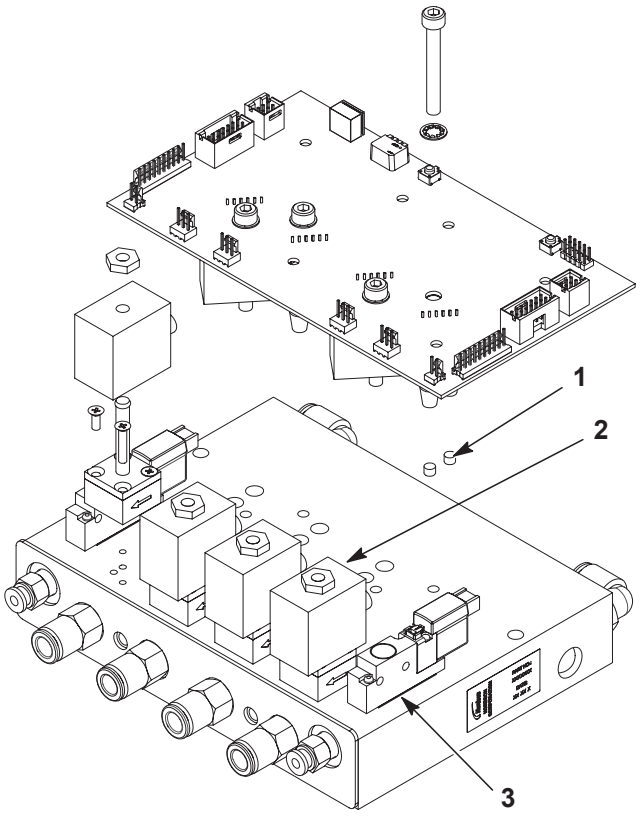


Figure 6-4 iFlow Module

Item	Part	Description	Quantity	Note
–	1615880	KIT, service, iFlow module, Engage	1	
1	1604437	• KIT FILTER, 20 micron, 0.168 D X 0.125 LG	1	A
2	1027547	• VALVE, proportional, solenoid, sub-base	4	
3	1099288	• VALVE, solenoid, 3-way, 24 V, 0.35 W, with connector	2	
NS	1039881	KIT, tester, iFlow	1	

NOTE: A. Contains 6 filters.

AR: As Required

Upgrade Kits

Use the following kits to add spray guns to system. Each kit supports two spray guns.

Part	Description	Note
1616439	KIT, upgrade, dual gun driver, PCA, receptacle, Engage	
1616438	• KIT, upgrade, iFlow module and receptacle, Engage	

Encore Engage Gateway

The Encore Engage Gateway must be ordered separately. It can be configured with either the EtherNet IP or the PROFINET kit.

Part	Description	Note
1616013	KIT, Gateway, Engage, EtherNet IP	
1616015	KIT, Gateway, Engage, PROFINET	

Section 7
Wiring Diagrams and Schematics

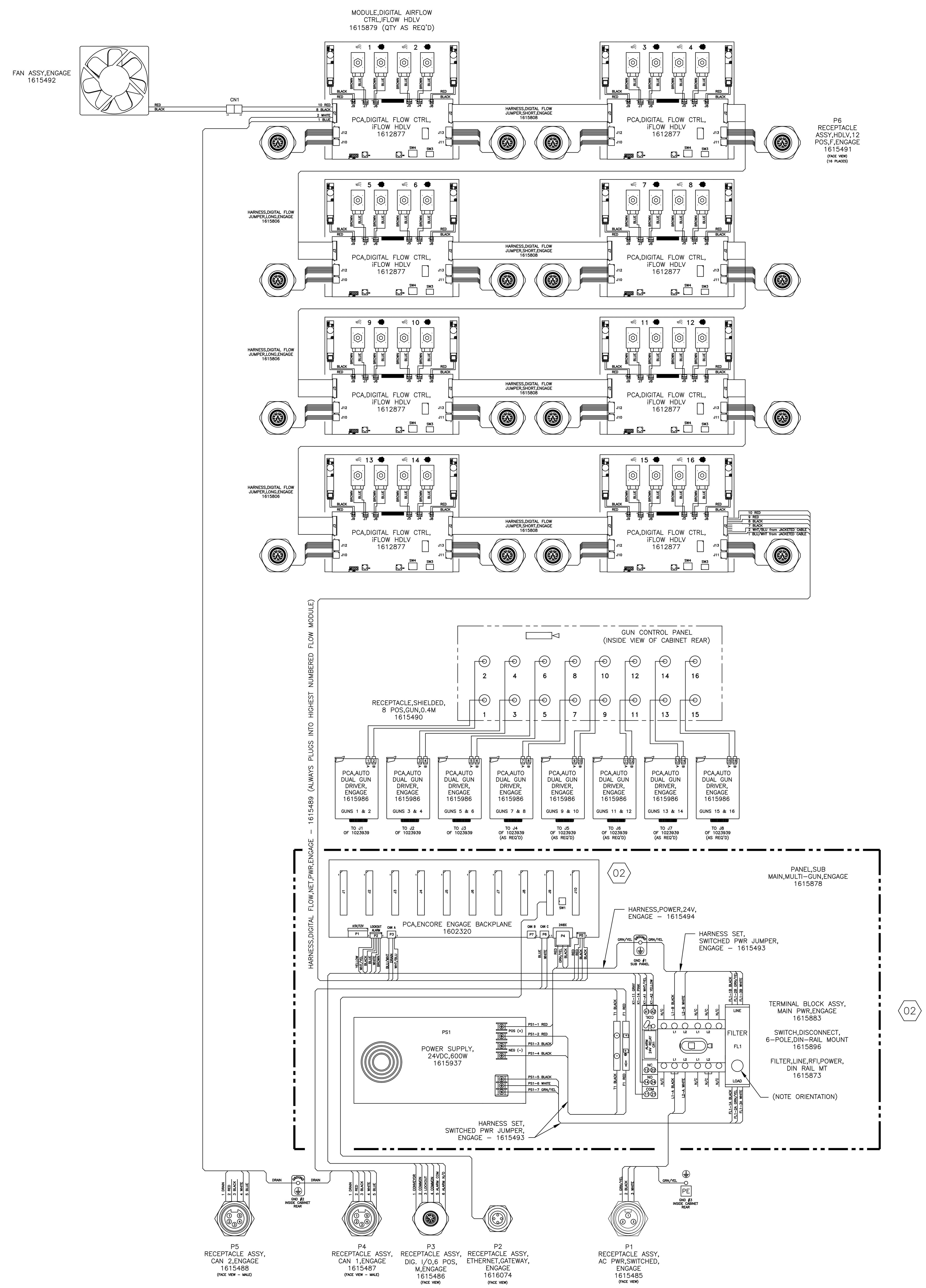
Refer to the following foldout wiring diagrams and schematics for the controller.

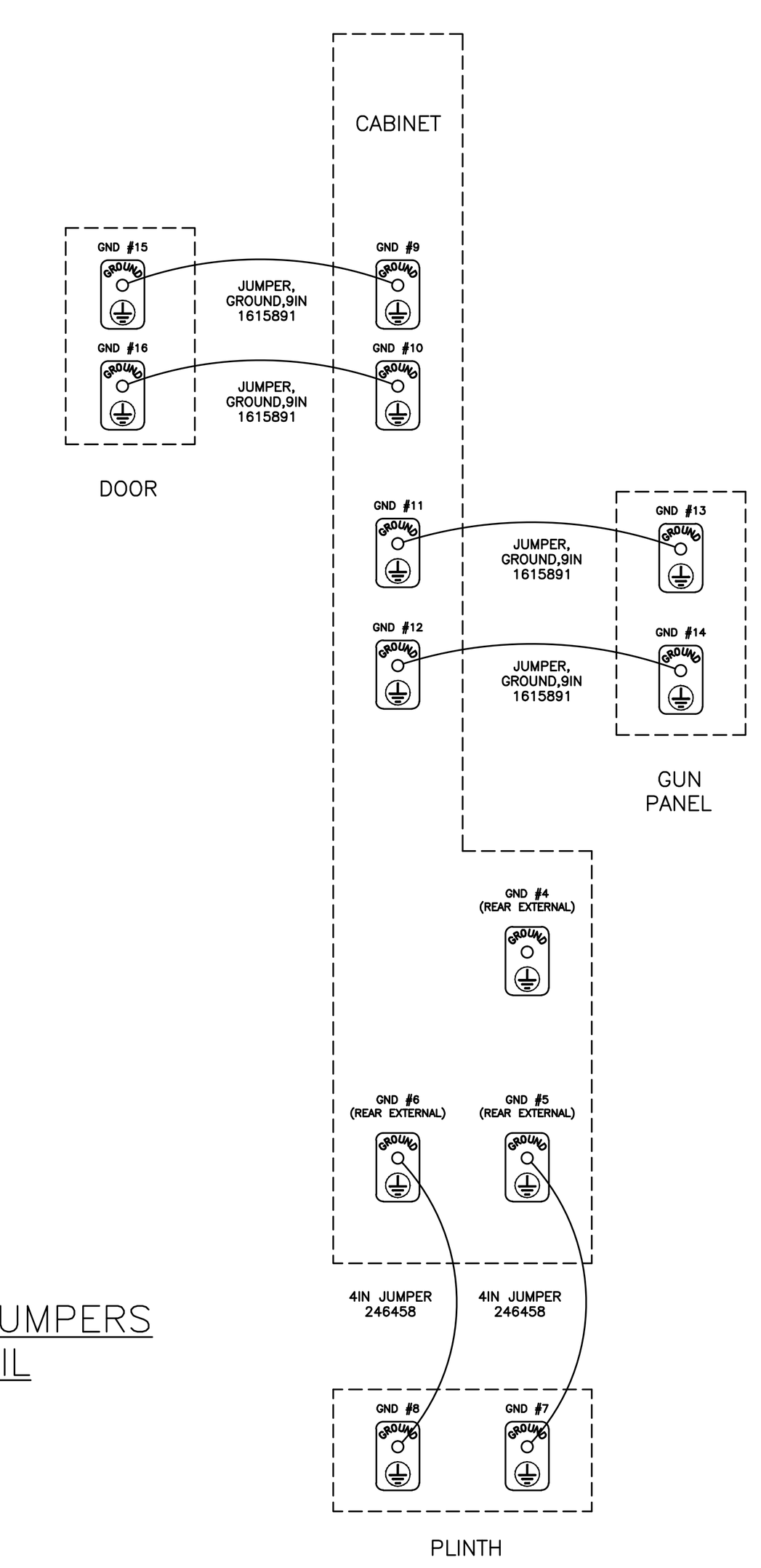
NOTE: Visit Nordson eManuals http://emanuals.nordson.com for a high-resolution view of the wiring diagrams and schematics.

Number	Description
10018372	Encore External Controller Wiring Diagram

NOTICE THIS DRAWING IS NORDSON PROPERTY,CONTAINS PROPRIETARY INFORMATION AND MUST BE RETURNED UPON REQUEST. DO NOT CIRCULATE, REPRODUCE OR DIVULGE TO OTHER PARTIES WITHOUT WRITTEN CONSENT OF NORDSON.

ZONE	REV	DESCRIPTION	BY	CHK	RELEASE NO.	DATE
	00	PRELIMINARY.	DRJ			04FEB19
	01	RELEASED FOR PRODUCTION.	DRJ	JAP	PE-101260	12FEB19
	02	1615883 WAS 1615937; CORRECTED PIN 1 ON P5	DRJ	JAP	PE-101711	20MAY19





GROUND JUMPERS DETAIL

CRITICAL
No revisions permitted without approval of the proper agency

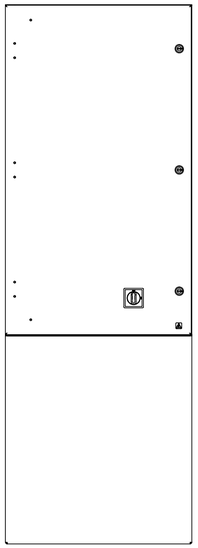
ALL DIMENSIONS IN MM EXCEPT AS NOTED	NORDSON CORPORATION WESTLAKE, OHIO 44145		
X±0.8 / X.X±0.25 / X.XX±0.13; MACHINED SURFACES 1.6	DESCRIPTION: WIRING DIAGRAM,MULTI-GUN,ENGAGE EXT		
BREAK INSIDE/OUTSIDE CORNERS 0.1/0.8	DRAWN BY: DRJ	DATE: 04FEB19	RELEASE NO.: PE-100260
THREAD LENGTH DIMENSIONS ARE FULL THREAD; INTERPRET DRAWINGS PER ASME Y14.5M-2009	CHECKED BY: JAP	APPROVED BY: JAP	
PERFECT FORM AT MMC REQUIRED FOR INTERRELATED FEATURES	SIZE: E; FILE NAME: 10018372	MATERIAL NO.: 10018372	REVISION: 02
THIRD ANGLE PROJECTION	SCALE: NONE	CADD GENERATED DWG.	SHEET 1 OF 1

MATERIAL NO. 10018372 REVISION 02

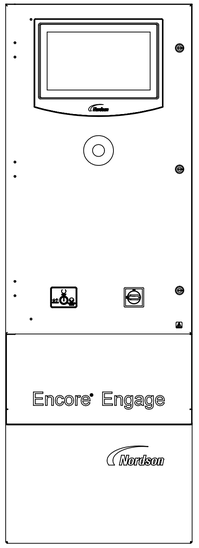
MATERIAL NO. 10018643 | REVISION 05

REVISIONS

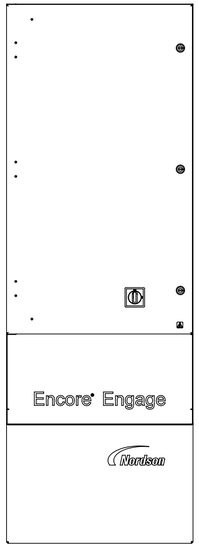
ZONE	REV.	DESCRIPTION	BY	CHK	ECO NO.	DATE
	00	ISSUED	BDM			25JAN19
	01	RELEASED TO PRODUCTION	BDM	RF	PE-101281	22FEB19
	02	ADDED SHEET 2	DRJ		PE-102174	22OCT19
	03	ADDED ENCORE HD PUMP MODULES & ENGAGE AIR CONDITIONED CONFIGURATIONS	TAL	BF	PE-102543	23JUN20
	04	REMOVED OBSOLETE CONTROLLERS & APPLICATORS, UPDATED PICTORIALLY.	FM	DS	PE-105877	27MAR23
	05	ADDED GEN3 APPLICATOR & OPTIONAL KITS	TAL	CG	PE-107163	18MAR24



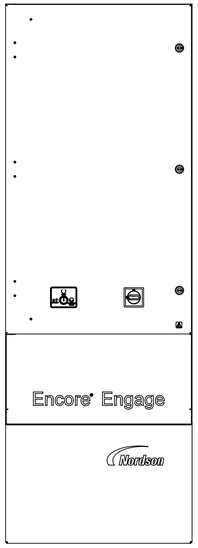
ENCORE ENGAGE EXTERNAL CONTROL CONSOLE



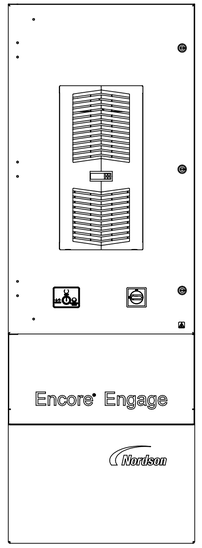
ENCORE ENGAGE LOCAL DISPLAY CONTROL CONSOLE



ENCORE ENGAGE AUXILIARY CONTROL CONSOLE

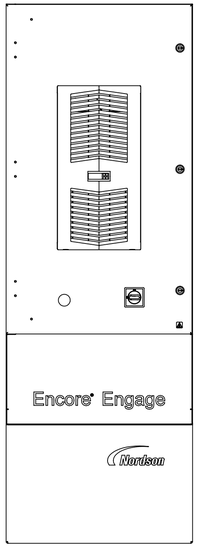


ENCORE ENGAGE REMOTE DISPLAY CONTROL CONSOLE



ENCORE ENGAGE REMOTE DISPLAY CONTROL CONSOLE W/ AIR CONDITIONER

〈03〉



ENCORE ENGAGE AUXILIARY CONTROL CONSOLE W/AIR CONDITIONER

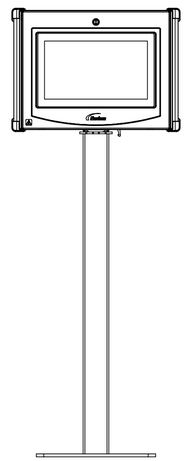
〈03〉

〈04〉

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
〈05〉 1624523	APPLICATOR,AUTO,ENCORE,GEN3
OPTIONS:	
1604084	EXTENSION,SPRAY,90 DEGREE,ENCORE
1605614	EXTENSION,SPRAY,60 DEGREE,ENCORE
1605703	EXTENSION,SPRAY,45 DEGREE,ENCORE
1609048	POS MULTIPLIER
1625279	DIFFUSER,ENCORE HD AUTO,GEN3,PKG
1625160	KIT,BAR MOUNT,APPL,AUTO,ENCORE,GEN3
〈05〉 1625161	KIT,COLLECTOR,ION,AUTO,ENCORE,GEN3
1625163	KIT,TUBE MOUNT,5FT,APPL,AUTO,ENCORE,GEN3
1625164	KIT,TUBE MOUNT,6FT,APPL,AUTO,ENCORE,GEN3
1625165	KIT,TUBE MOUNT,8FT,APPL,AUTO,ENCORE,GEN3
CABLES:	
1097537	CABLE,AUTO,ENCORE,8M
1097539	CABLE,AUTO,ENCORE,12M
1097540	CABLE,AUTO,ENCORE,16M
1600745	CABLE ASSY,ENCORE XT/HD,6M
1601344	CABLE,EXTENSION,ENCORE AUTO,4M
1085168	CABLE EXTENSION,6-CONDUCTOR,SHIELDED,6M

〈04〉

THE FOLLOWING CONTROLLERS ARE FOR USE IN UNCLASSIFIED LOCATIONS AND NON-EXPLOSIVE ATMOSPHERES:	
1617974	CONTR,MAIN,8 GUN,ENCORE ENGAGE
1617976	CONTR,MAIN,12 GUN,ENCORE ENGAGE
1617978	CONTR,MAIN,16 GUN,ENCORE ENGAGE
1617979	CONTR,AUX,4 GUN,ENCORE ENGAGE
1617981	CONTR,AUX,8 GUN,ENCORE ENGAGE
1617983	CONTR,AUX,12 GUN,ENCORE ENGAGE
1617985	CONTR,AUX,16 GUN,ENCORE ENGAGE
1617988	CONTR,MAIN,REM,8 GUN,ENCORE ENGAGE
1617990	CONTR,MAIN,REM,12 GUN,ENCORE ENGAGE
1617992	CONTR,MAIN,REM,16 GUN,ENCORE ENGAGE
1617995	CONTR,MAIN,REM,AC,8 GUN,ENCORE ENGAGE
1617999	CONTR,MAIN,REM,AC,16 GUN,ENCORE ENGAGE
1618002	CONTR,AUX,AC,8 GUN,ENCORE ENGAGE
1618006	CONTR,AUX,AC,16 GUN,ENCORE ENGAGE
1623643	SYSTEM ASSY,REMOTE DISPLAY,W/PED
1615952	CONTR,EXT,8 GUN,ENCORE ENGAGE
1615954	CONTR,EXT,12 GUN,ENCORE ENGAGE



REMOTE DISPLAY WITH PEDESTAL

〈04〉

CRITICAL
No revisions permitted without approval of the proper agency.

ALL DIMENSIONS IN MM EXCEPT AS NOTED X±0.8 X.X±0.25 X.XX±0.13 MACHINED SURFACES √6 BREAK INSIDE/OUTSIDE CORNERS 0.1/0.8 THREAD LENGTH DIMENSIONS ARE FULL THREAD INTERPRET DRAWINGS PER ASME Y14.5-2009 PERFECT FORM AT MMC REQUIRED FOR INTERRELATED FEATURES THIRD ANGLE PROJECTION	NORDSON CORPORATION WESTLAKE, OH, U.S.A. 44145		
	DESCRIPTION: REF DWG,APPROVED EQUIPMENT,ENGAGE		
	DRAWN BY: BDM	DATE: 25JAN19	RELEASE NO.: PE-101281
	CHECKED BY: RF	APPROVED BY: RF	
	SIZE: D	FILE NAME: 10018643	MATERIAL NO.: 10018643 — REVISION: 05
	SCALE: 1:10	CADD GENERATED DWG.	SHEET 1 OF 1

EU DECLARATION of Conformity

Product: Encore Engage Powder Spray Systems

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

Models: Encore Main Controller with Display, Encore Main Controller with Remote Display, Encore Engage Auxiliary Units

Description: This is an electrostatic, powder spray system, including Manual and Auto applicators, control cables and associated controllers.

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

Standards Used for Compliance:
EN/ISO12100 (2010) EN61000-6-3 (2007) EN50050-2 (2013)
EN61000-6-2 (2005) EN55011 (2009) EN50177 (2012)

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 = (Engage Controllers and Remote Display) – Located in Unclassified Location (Zone)
- Ex II 2 D / 2mJ = (Encore Auto Applicator)

Certificates:
- FM14ATEX0051X = Encore XT and HD Manual Applicators (Dublin, Ireland)
- FM18ATEX0058X = Encore Enhance Manual Interface (Dublin, Ireland)
- FM11ATEX0056X = Encore Automatic Applicator (Dublin, Ireland)
- FM19ATEX0005X = Encore Engage Controller (Dublin, Ireland)

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

Date: 12Dec24

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-StraBe 42-44
D-40699 Erkrath

UK DECLARATION of Conformity

Product: Encore Engage Powder Spray Systems

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

Models: Encore Main Controller with Display, Encore Main Controller with Remote Display, Encore Engage Auxiliary Units

Description: This is an electrostatic, powder spray system, including Manual and Auto applicators, control cables and associated controllers.

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)	EN61000-6-3 (2007)	EN50050-2 (2013)	
	EN61000-6-2 (2005)	EN55011 (2009)	EN50177 (2012)

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 = (Engage Controllers and Remote Display) – Located in Unclassified Location (Zone)
- Ex II 2 D / 2mJ = (Encore Auto Applicator)

Certificates:
- FM21UKEX0129X = Encore XT and HD Manual Applicators (Maidenhead, Berkshire, UK)
- FM21UKEX0241X = Encore Enhance Manual Interface (Maidenhead, Berkshire, UK)
- FM22UKEX0006X = Encore Automatic Applicator (Maidenhead, Berkshire, UK)
- FM21UKEX0240X = Encore Engage Controller (Maidenhead, Berkshire, UK)

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

Date: 12Dec24

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