Vantage® Modular Gun Control System

Customer Product Manual
Part 1046736–07
Issued 03/20

For parts and technical support, call the Finishing Customer Support Center at (800) 433-9319.

This document is available on the Internet at http://emanuals.nordson.com/finishing

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Change Record

Revision	Date	Change
05	04/15	Removed CE, FM, and DOC from document.
06	03/20	Internal admin change.
07	03/20	Internal admin change.

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 2, Division 1 or 2 Hazardous Locations. Refer to NFPA 33, NFPA 70 (NEC articles 500, 502, and 516), and NFPA 77, latest conditions.

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

Action in the Event of a Malfunction

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

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

Disposal

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

Section 2
Description

Introduction

The Vantage modular gun control system is used to control four to eight automatic spray guns. The controller can be used with Versa-Spray® II, Sure Coat®, or Tribomatic® II automatic spray guns.

The Vantage modular control system:

- controls flow rate and atomizing air pressure to the spray gun powder feed pump
- provides dc power to the spray gun voltage multiplier and controls controls the spray gun electrostatic output
- monitors the spray gun voltage and microamperage output

Master Control Unit

See Figure 2-1 and Table 2-1.

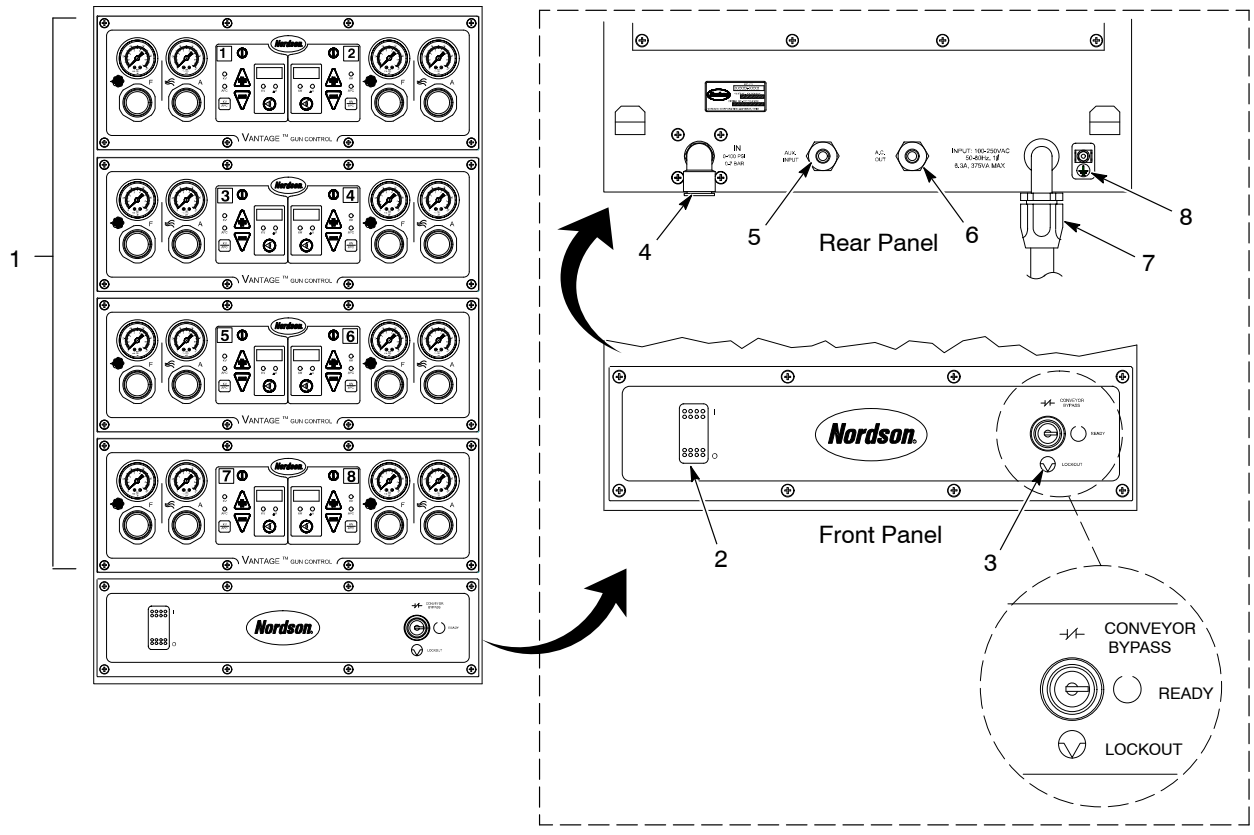


Figure 2-1 Master Control Unit

Master Control Unit *(contd)*

Table 2-1 Master Control Unit Front and Back Panels

Item	Component	Function
1	Spray gun controllers	Each controller contains controls for two spray guns. Refer to *Spray Gun Controls and Indicators* on page 2-2 for more information.
2	Main Power Switch	Turns the master controller on and off
3	Lockout Keyswitch	Use to bypass the conveyor interlock or place the system in lockout mode.
	CONVEYOR BYPASS	Allows user to trigger spray gun with the conveyor off.
	READY	Standard setting for running system. The spray guns stop when the conveyor stops.
	LOCKOUT	Shuts down the spray guns and pumps, preventing the unit from triggering on. Use LOCKOUT mode for safety when cleaning the booth.
4	IN air connector	10 mm supply air input
5	AUX INPUT	Use for external control cable from a PLC or other device
6	AC OUT	Provides power to trigger controller
7	Power input	Power input cable
8	Enclosure Ground	Connects enclosure to earth ground

Spray Gun Controls and Indicators

Front Panel

See Figure 2-2.

- The keypad and display (1) controls electrostatic output and gun triggering.
- The regulators and gauges control flow-rate (2) and atomizing (3) air pressures.

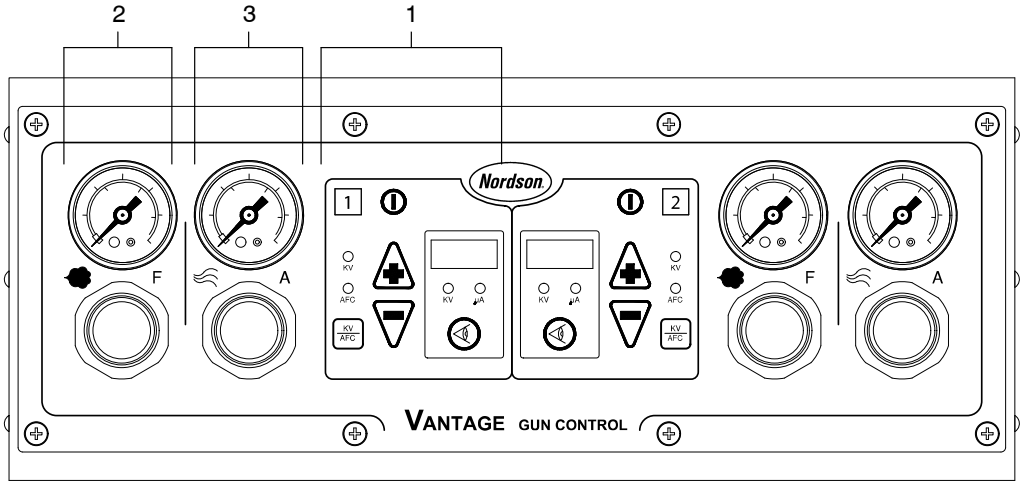


Figure 2-2 Front Panel Controls and Indicators

1. Keypad and display
2. Flow rate air regulator and gauge
3. Atomizing air regulator and gauge

Keypad

Refer to Table 2-1 and Figure 2-3. The keypad controls the electrostatic and diagnostic functions of the Vantage modular gun control system.

Table 2-1 Keypad Components

Item	Component	Description
1	Trigger key	**Automatic gun, external trigger** (gun is triggered by another controller, such as a PLC): When on, external triggering enabled. When off, external triggering disabled. **Automatic gun, no external trigger:** Turns gun on or off.
2	kV/AFC LEDs	Light to identify the electrostatic mode being used.
3	kV/AFC key	Toggles between kV mode and AFC mode. In kV mode: Set kV output of spray gun. In AFC mode: Set current output limit.
4	Up arrow key (+) Down arrow key (–)	Use to set output voltage (kV) or output current (µA). Settings are stored in memory in case of power loss. **NOTE:** If you are using Tribomatic II spray guns no electrostatic adjustments are available.
		In AFC Mode: Range is 10–100 µA in 1 µA increments.
		In kV Mode: • Versa Spray gun: 33–100 kV in 1 kV increments. • Sure Coat gun: 25–95 kV in 1 kV increments.
5	Display	A three-digit, seven-segment display. When the spray guns are triggered it shows kV (voltage) or µA (current). **NOTE:** If you are using Tribomatic II spray guns only the output current (µA) is displayed.
6	kV/µA LEDs	Lights to identify value being displayed: kV (voltage) or µA (current).
7	VIEW key	Toggles display between current (µA) and voltage (kV) when the gun is spraying.

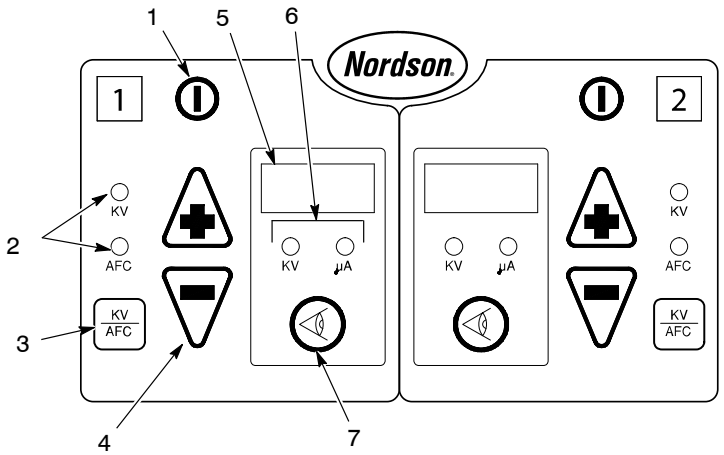
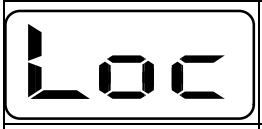


Figure 2-3 Front Panel Keypad

Display

Mode	Description
	Lockout mode used for safety purposes to disable gun when cleaning.
	Conveyor interlock: When the conveyor stops the gun is triggered off.
	Automatic gun, external trigger: Trigger is disabled. Automatic gun, no external trigger: Gun is off.
	Automatic gun, external trigger: Trigger is enabled. This messge only appears for a few seconds when trigger is enabled. Display is blank when no external trigger signal is present.

Back Panel

Refer to Table 2-2 and Figure 2-4.

Table 2-2 Back Panel

Item	Function
1	8-mm tubing connector: Flow rate air to powder pump
2	8-mm tubing connector: Atomizing air to powder pump
3	Gun cable receptacle
4	4-mm tubing connector: Optional gun air (Sure Coat spray guns) (requires orifice fitting)

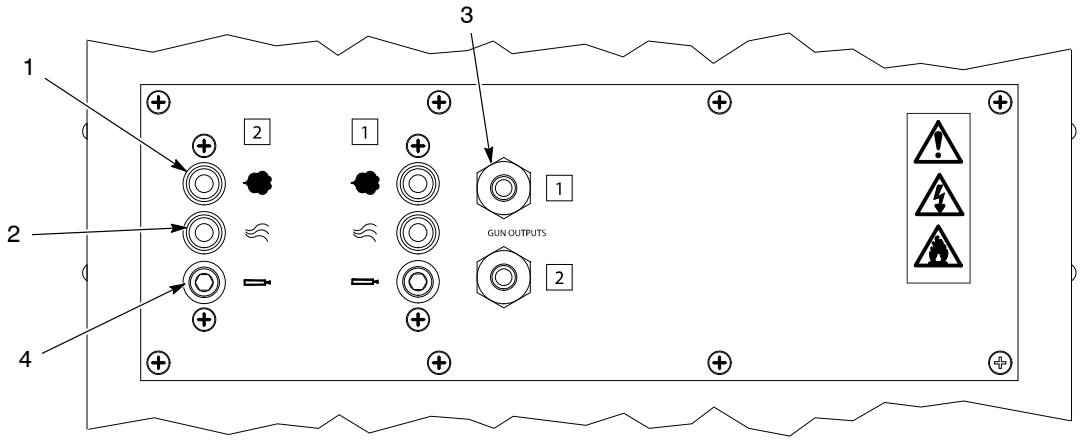


Figure 2-4 Controller Back Panel

Base Assembly

See Figure 2-5. The base assembly is used to route the power distribution cables, trigger distribution cables, and the air tubing from the master control unit to the individual gun control units.

- The power distribution cables are routed up from the main input power. These cables attach to the power supply within each control unit.
- The trigger distribution cables are routed from the din rail in the main controller to the interface display board within each control unit.
- Two 8-mm tubes are routed from the main air input. This tubing is connected to the manifolds in each control unit.

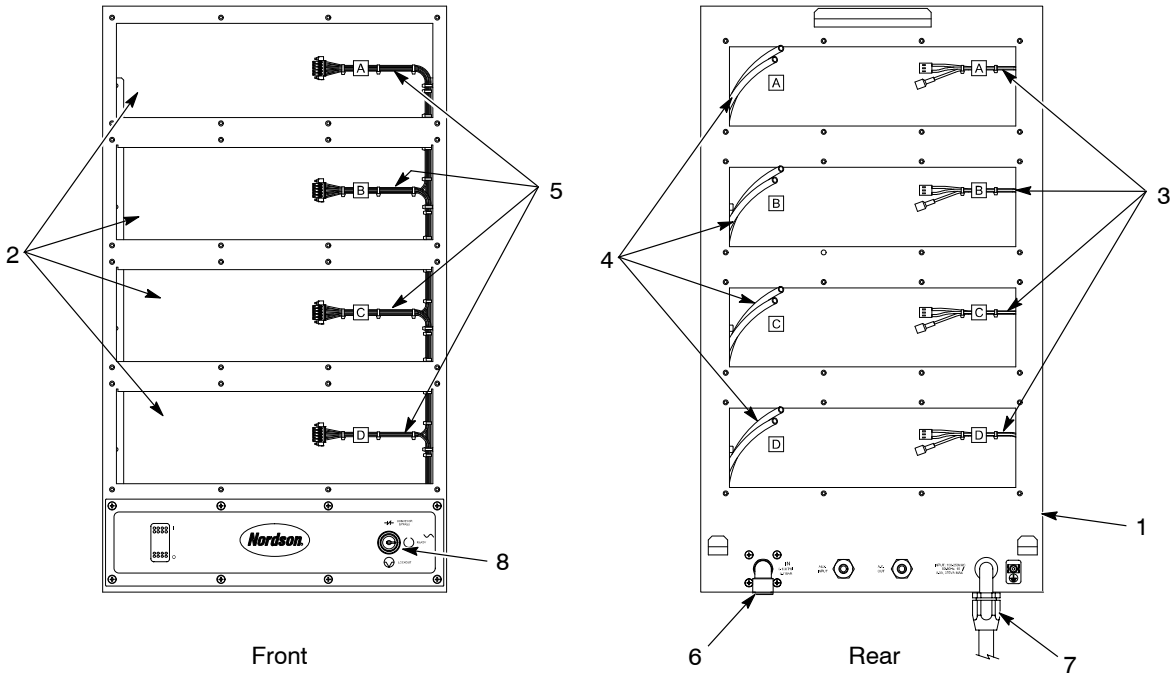


Figure 2-5 Base Assembly

1. Master control unit
2. Individual control units
3. Power distribution cables
4. 8-mm air tubing
5. Trigger distribution cables
6. Main input air
7. Main input power
8. Keyswitch

Operating Modes

Sure Coat and Versa-Spray gun operating modes are kV or AFC. Select the appropriate mode by pressing the kV/AFC button on the front display panel. The kV or AFC LED will light when that mode is selected.

NOTE: If you are using Tribomatic II spray guns only output current (μA) is displayed. No electrostatic adjustments are available.

Mode	Description
kV (voltage)	Setting kV output provides maximum transfer efficiency when coating large objects with a gun-to-part distance of 0.2–0.3 m (8–12 in.). The setting is adjustable in 1 kV increments. • For Versa-Spray guns the range is 33–100 kV • For Sure Coat guns the range is 25–95 kV
AFC (current – μA)	Automatic feedback current (AFC) allows the operator to set the maximum current (μA) output from the spray gun to prevent excess charging of the sprayed powder. This provides an optimum combination of kV and electrostatic field strength for coating parts with interior corners and deep recesses at close range. The setting range is 10–100 μA in increments of 1 μA.

Specifications

Hazardous Location Rating	North America: Class II Division 2
	European Union: Ordinary non–hazardous location
Installation Requirements (per ANSI/ISA S82.02.01)	
Pollution degree	2
Installation category	2
Electrical	
Input	100–250 Vac, 1 phase, 50–60 Hz, 375 VA maximum
Output	6–21 Vdc to the spray gun
Short circuit output current	50 mA
Maximum output current	600 mA
Maximum Input Air Pressure	7.2 bar (105 psi)
Typical Operating Air Pressures	
Flow-rate air	2.0 bar (30 psi)
Atomizing air	1 bar (15 psi)
Operating Temperature	Ambient; 45 °C maximum
Air Supply Quality	Air 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 the controller's maximum input pressure. Use a filter system with prefilters and coalescent-type filters capable of removing oil, water, and dirt in the submicron range. Moist or contaminated air can cause powder to cake in the feed hopper; stick to the feed hose walls; clog the pump venturi throats and spray gun passages; and cause grounding or arcing inside the spray gun.
Weight	61 kg (135 lb)

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.

Mounting

The Vantage modular gun control system can be ordered with a base cabinet to place the controls at optimum height.

The controller can also be mounted in a customer supplied 19-in. cabinet.

Electrical Connections

CAUTION: Equipment damage may occur if the controller is connected to any line voltage other than that stated on the identification plate.

WARNING: Do not skip step 1. Failure to install a locking disconnect switch or breaker may result in a severe shock during installation or repair.

WARNING: Lock out and shut off system power during installation. Failure to observe this warning may result in severe shock.

WARNING: Properly ground the control system or equipment damage will result.

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.

Electrical Connections *(contd)*

See Figure 3-2.

1. Connect the ground cable to the ground stud (4) and connect the ground clamp to a true earth ground.
2. Install a locking disconnect switch or breaker (15 amp maximum) in the service line ahead of the controller. Use the disconnect switch to shut off and lock out system power during installation or repair.
3. Make sure that the input voltage is 100–250 Vac nominal, 1 phase, 50–60 Hz.
4. Wire the power cord (3) as shown in Table 3-1.

NOTE: The conveyor interlock circuit must supply 120 or 240 Vac to the red and orange conductors while the conveyor is running. When the conveyor stops, the circuit must de-energize. The conveyor interlock shuts off the spray guns when the conveyor stops.

Table 3-1 Power Cord Wiring

Wire	Function
Brown	L1 (hot)
Blue	L2 (neutral)
Green/yellow	Ground
Red	Conveyor Interlock
Orange	Conveyor Interlock
NOTE: See Figure 3-1. The conveyor interlock is wired for 240 Vac at the factory. To configure the interlock for 120 Vac, re-wire the connection inside the master controller as shown below.	

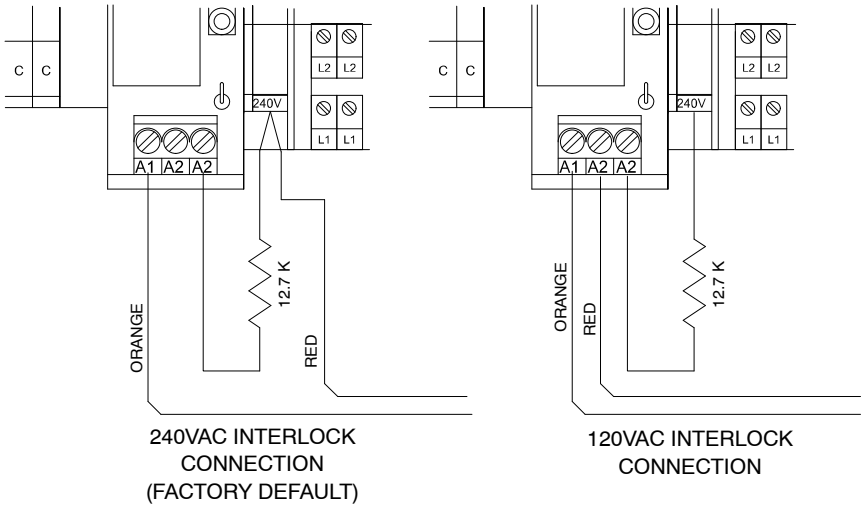


Figure 3-1 Conveyor Interlock Connections

Spray Gun Cable/Adapter Installation

NOTE: The spray gun cables are shipped loose and must be connected to the controller gun driver cards.

1. See Figure 3-2. Remove the eight screws (1) and rear panel (2) from the spray gun controllers.
2. Install the Sure Coat or the Versa Spray II spray gun cables or the Tribomatic II adapters using the procedures on the following pages.

Sure Coat or Versa-Spray II Automatic Spray Gun Cables

See Figure 3-2.

1. Loosen the retaining nuts (5) on the gun cable strain reliefs.
2. Remove and discard the tube plugs from the strain reliefs.
3. Feed the 8-pin connector (7) end of the spray gun cables (6) through the strain reliefs.
4. Pull approximately 350 mm (14 in.) of gun cable through the strain relief to reache the gun board (8).
5. Connect the eight-pin connectors to the circuit boards. The top spray gun cable should connect to the right-hand (odd) connector (J3), the bottom spray gun cable should connect to the left-hand (even) connector (J4).
6. Tighten the strain relief retaining nuts to secure the cables.
7. Secure the gun cables to the tab on the assembly tray with a tie wrap.
8. Install the rear panel (2) with the eight screws (1).
9. Connect the other ends of the cables to the appropriate spray guns.
10. Repeat this procedure for the other gun controllers in your system.

Spray Gun Cable/Adapter Installation *(contd)*

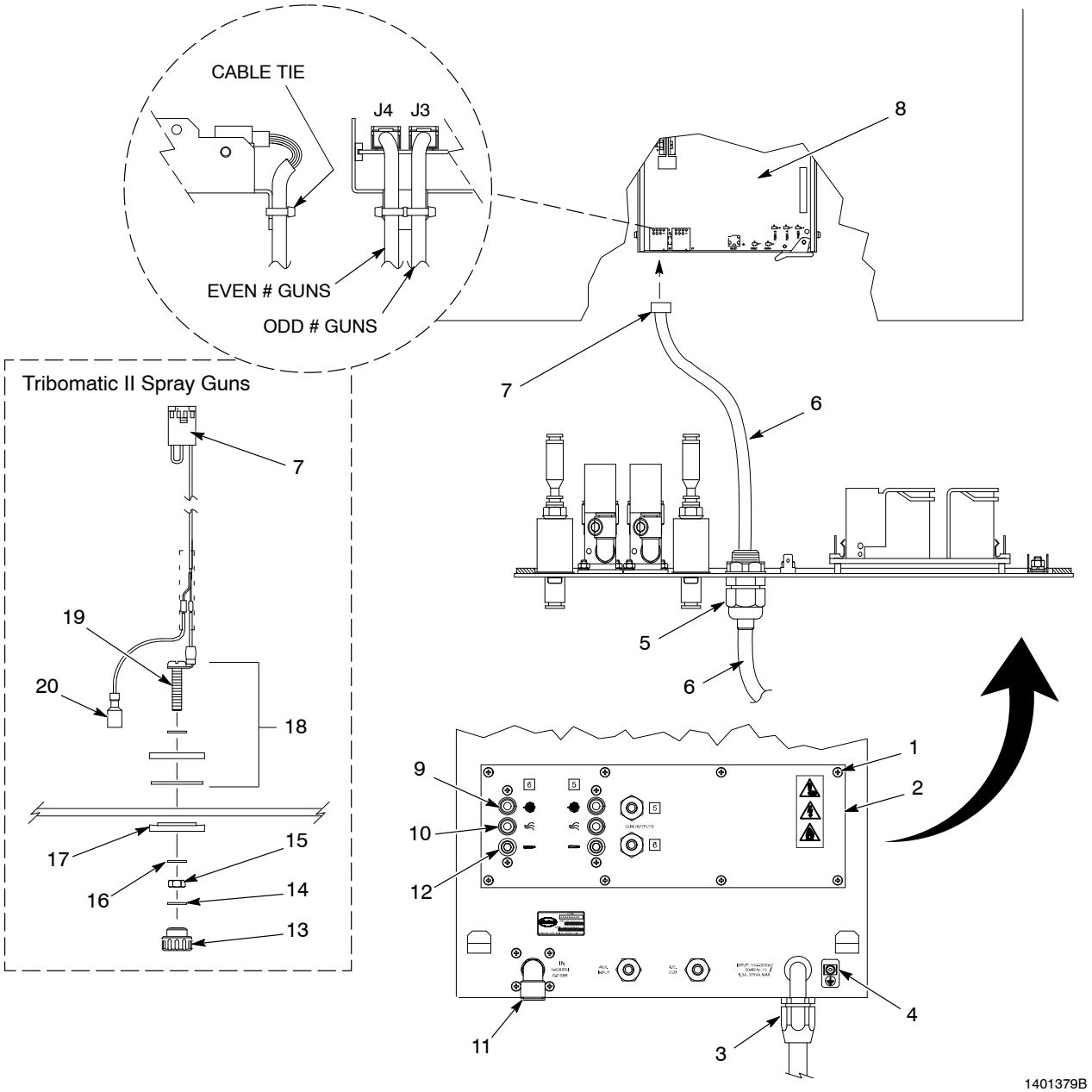


Figure 3-2 Electrical and Pneumatic Connections—Back Panel

1. Screws
2. Rear panel
3. Power cord
4. Ground stud
5. Retaining nut
6. Spray gun cable
7. Eight−pin connector
8. Gun board
9. Flow-rate connection
10. Atomizing air connection
11. Supply air (IN) connection
12. Gun air connection (Sure Coat spray guns)
13. Knob
14. Washer
15. Hex nut
16. Lock washer
17. Shoulder washer
18. Plastic washer and rubber gasket assembly
19. Slotted screw
20. Push on terminal

Tribomatic II Automatic Spray Gun Cable Adapters

See Figure 3-2.

NOTE: You must connect the ground wire furnished with the controller to the ground stud (4) on the enclosure back panel and secure the clamp to a true earth ground.

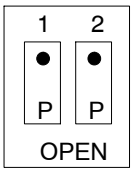
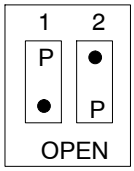
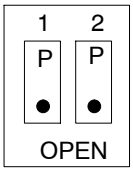
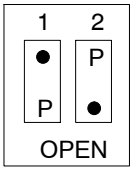
1. Remove the gun cable strain reliefs.
2. The Tribomatic II adapter is shipped completely assembled. To install the adapter remove the knob (13), washer (14), hex nut (15), lock washer (16), and shoulder washer (17) from the assembly and set them aside.
3. Attach the 8-pin connector (7) end of the adapter to the circuit board. Gun 1 should connect in the right-hand connector, gun 2 should connect in the left-hand connector.
4. Mate the adapter's plastic gasket and rubber seal assembly (18) to the openings in the rear panel where the strain reliefs were and secure the assembly with the parts removed in Step 2.
5. Secure the adapter to the tab on the assembly tray with a tie wrap.
6. Connect the pushon terminal (20) to the ground terminal on the rear panel.
7. Repeat steps 2 through 8 for the second spray gun.
8. Install the rear panel (2) with the eight screws (1).
9. Remove the adapter knobs, connect the Tribomatic II spray gun cable terminals to the adapter studs, then install and tighten the knobs.

Trigger Configuration

NOTE: If the controllers are going to be connected to an external PLC or other controlling device refer to *External Triggering* on page 3-7.

Set switch SW-2 on the interface display board for the desired trigger configuration for each controller. Refer to Table 3-2.

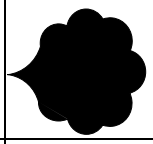
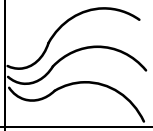
Table 3-2 Trigger Configuration Switch Settings

Configuration (See Notes)	SW2 Switch Position (P=Pushed In)	Notes
Trigger Key Disabled		Not Used
Automatic Gun No External Trigger (Factory Setting)		The spray gun is turned on/off with the trigger key on front panel.
Automatic Gun External Trigger		The trigger key on the front panel enables (ON) or disables (OFF) the trigger. Set to OFF to prevent the gun from being turned on remotely. If the display is blank then the external trigger is enabled but no trigger signal is present (the gun is off).
Trigger Key Disabled		Not Used

NOTE: On power up, the display shows the software versions for both printed circuit boards in the controller, gun driver board first, then display board. If the version numbers do not display, open the enclosure and check the green LED on the display board. If it is blinking, make sure the gun board is fully plugged into the display board. The gun board may come loose during cable installation.

Pneumatic Connections

Refer to *Specifications* on page 2-6 for air quality and pressure specifications. See Figure 3-2 for the back panel illustration.

Air Type	Tubing size	From Rear Panel Connector	To
Input	16-mm	IN (11)	air supply shut-off valve in the supply line
Output Flow rate	8-mm (Black)	 Flow rate (9)	“F” connection on powder pump
Atomizing	8-mm (Blue)	 Atomizing (10)	“A” connection on powder pump
Gun	4 mm	 Gun air (12)	Spray gun (Sure Coat spray guns)
NOTE: Install a manually operated shut-off valve in the supply line to the controller.			

External Trigger Connections

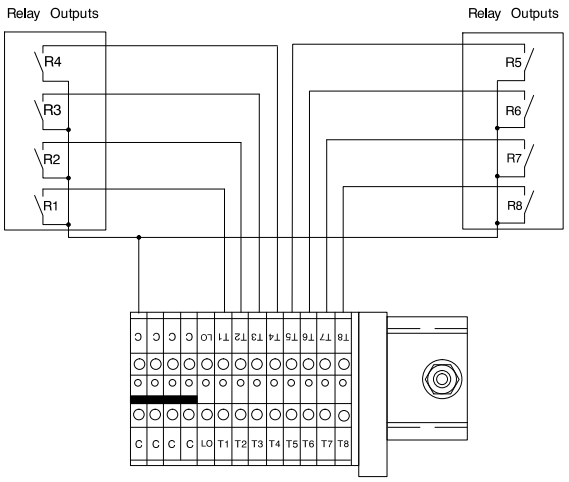
See Figure 3-3. Use the following procedure to connect the Vantage master controller to a PLC or other external control device.

1. Loosen the eight screws (1) to lower the front panel (2).
2. Loosen the retaining nut on the AUX. INPUT strain relief (3) on the rear panel.
3. Remove and discard the tube plug from the strain relief.
4. Feed the auxiliary control cord (customer-supplied) through the retaining nut and strain relief, pulling enough cable through to reach the front panel.
5. Make the appropriate connections at T1–T8 to establish triggering signals to the terminal block and common.

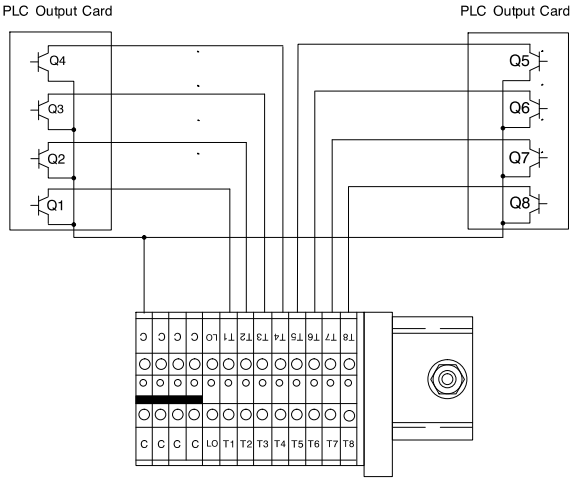
   To trigger a spray gun on short using a switch, relay, or open collector output, connect the terminal to common as shown in Figure 3-3.

   NOTE: The open collector PLC card should be +24 V current sinking only.
6. Tigthen the strain relief retaining nut to secure the cable and seal the enclosure.
7. Secure the front panel with the eight screws.

External Trigger Connections *(contd)*



RELAY OUTPUTS



CURRENT SINKING OUTPUTS

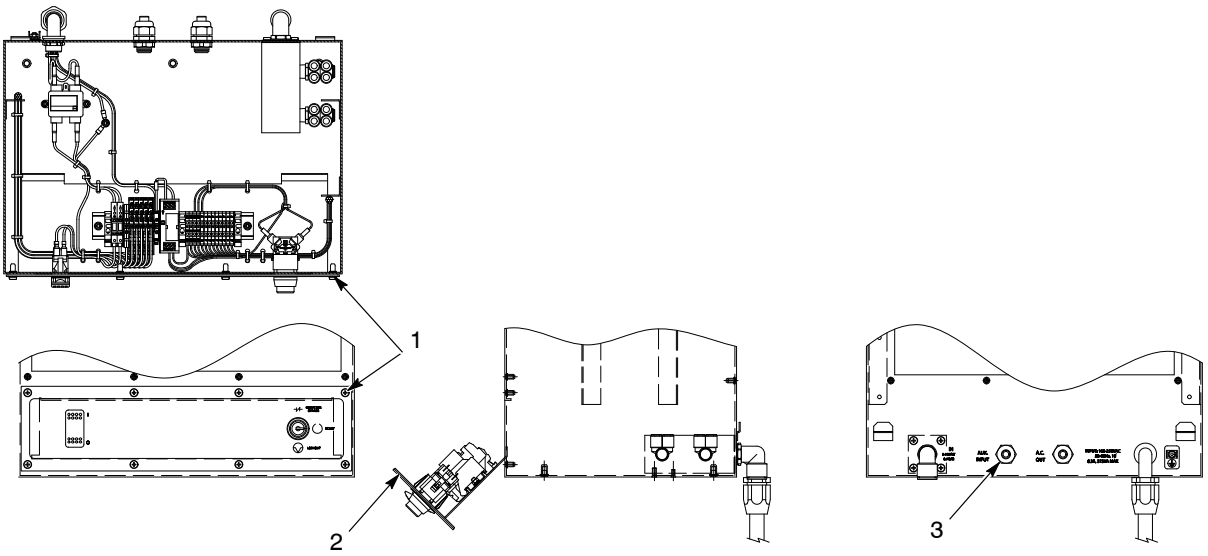


Figure 3-3 External Triggering

1. Screws
2. Front panel
3. AUX. INPUT port

Section 4
Operation

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

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

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

This section explains basic operation procedures for the Vantage modular gun control system. Before operating a powder spray system, read all system component manuals.

Startup

1. Make sure that the following conditions are met before starting up the control system. Refer to the system component manuals for startup instructions.
   - The booth exhaust fans are turned on.
   - The powder recovery system is operating.
   - The powder in the feed hopper is thoroughly fluidized.
   - The gun cable, powder feed hose, and air tubing are correctly connected to the spray gun, powder pump, and power supply.
2. Power on the master control unit with the rocker switch on the bottom front of the unit. The gun controllers will power up and their front panel LEDs will light.

   NOTE: On power up, the display shows the software versions for the two printed circuit boards in the controllers. If the version numbers do not display, open the enclosure and check the green LED on the display board. If it is blinking, make sure the gun board is plugged into the display board. The gun board may come loose during cable installation.
3. If you are starting up a spray gun for the first time, perform the *Initial Gun Usage* procedure on page 4-4.
4. See Figure 4-1. Select an operating mode by pressing the kV/AFC button (6) on each controller. The selected mode LED (1) will light.
5. Set flow rate (8) and atomizing air pressures (7) to the following settings:

Air	Pressure
Flow-rate	2 bar (30 psi)
Atomizing	1 bar (15 psi)
NOTE: These pressures are average starting points. Pressures vary according to required film build, line speed, and part configuration. Refer to *Air Pressure Adjustments* on page 4-5 for guidelines for adjusting the pressures to obtain the desired results.	

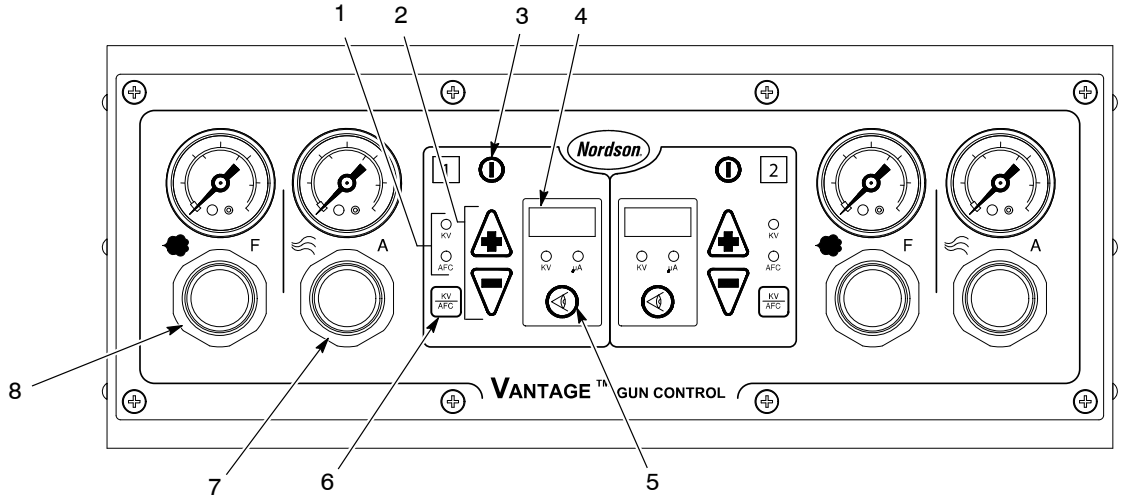


Figure 4-1 Front Panel Controls and Indicators

1. kV/AFC indicators
2. Up/Down arrow keys
3. Trigger key
4. Display
5. VIEW key
6. kV/AFC key
7. Atomizing air control
8. Flow rate air control

6. Trigger the spray gun to test the spray pattern.
   - Press the trigger key or trigger the guns remotely.
7. Adjust the flow-rate (8) and atomizing air (7) pressures to obtain the desired spray pattern.
8. Adjust the following to obtain the desired spray pattern and desired powder coverage and coating thickness:

   NOTE: If you are using Tribomatic II spray guns only the output current (µA) will display. No adjustment functions are available.

   - flow rate and atomizing air pressures
   - spray gun nozzle
   - kV or µA settings

Spray Gun	kV		AFC	
	Minimum	Maximum	Minimum	Maximum
Versa Spray	33	100	10	100
Sure Coat	25	95	10	100

Startup *(contd)*

Obtaining a high-quality finish and maximum transfer efficiency (percentage of powder sprayed that adheres to the part) requires experimentation and experience. Settings for electrostatic voltage and air pressure affect overall coating performance. In most applications, the settings should produce a soft spray pattern that directs as much of the powder as possible onto the part with a minimum of overspray. These settings allow the maximum amount of charged powder to be attracted to the grounded part.

Lowering the voltage is a common method for trying to improve coverage of deep recesses and interior corners of parts. However, lowering the voltage may also reduce the overall transfer efficiency. Powder velocity, direction, and pattern shape can be just as important as electrostatic voltage in coating these areas.

Refer to *Air Pressure Adjustments* on page 4-5 for guidelines on flow rate and atomizing air pressure settings.

Initial Gun Usage

Perform these procedures only when you connect a new spray gun to the controller.

1. Turn on the controller.
2. Make sure the control unit is in kV mode, AFC off, with kV set to maximum.

   NOTE: Versa-Spray gun: 100 kV maximum; Sure Coat gun: 95 kV maximum

   NOTE: If you are using Tribomatic II spray guns only the output current (μA) will display. No electrostatic adjustments are available.
3. See Figure 4-1. Press the VIEW key (5) to display μA.
4. Trigger the spray gun, and adjust the flow-rate and the atomizing air pressure to obtain the desired spray pattern.

   NOTE: Make sure the correct trigger configuration is set. Refer to *Trigger Configuration* on page 3-6 for more information.
5. Record the μA output with no parts in front of the spray gun.

   Monitor the μA output daily, under the same conditions. For Versa-Spray and Sure Coat guns, a significant increase in μA output indicates a probable short in the gun resistor. A significant decrease indicates a failing resistor or voltage multiplier. For Tribomatic guns, a significant decrease in μA output indicates a worn charge module.

Air Pressure Adjustments

Refer to the feed hopper manual for the recommended fluidizing air pressure.

Flow-Rate Air Pressure

Flow-rate air transports a powder and air mixture from the feed hopper to the spray gun. Increasing the flow-rate air pressure increases the amount of powder sprayed from the spray gun and may increase the thickness of the powder deposited on the part.

If the flow-rate air pressure is set too low, an inadequate film build or uneven powder output may result. If the flow-rate air pressure is too high, too much powder could be output at too high a velocity. This could cause excessive film build or overspray, which reduces transfer efficiency and wastes powder. Excessive flow-rate air pressure may also accelerate the build-up of impact fused powder (impact fusion) in the spray gun or pump or cause premature wear of the spray gun and pump parts in contact with the powder.

Keeping the amount of overspray to a minimum reduces the amount of powder to be recovered and recycled. This minimizes wear and tear on the system components such as pumps, spray guns, and filters. Maintenance costs are also kept down.

Atomizing Air Pressure

Atomizing air is added to the powder and air stream to increase the powder velocity in the feed hose and break up clumps of powder. Higher atomizing air pressures are needed at lower powder flow rates to keep the powder particles suspended in the air stream. Higher powder velocities may cause the spray pattern to change.

If the atomizing air pressure is set too low, the result may be uneven powder output or puffing and surging from the spray gun. If set too high, atomizing air pressure can increase the powder velocity and cause excessive overspray, impact fusion, and premature wear of the pump and spray gun parts.

NOTE: Set the atomizing air at least to 0.3 bar (5 psi). If the air pressure is too low, powder may flow back from the powder pump and get inside the control unit, damaging the air valves and regulators.

Fluidizing Air Pressure

When properly fluidized, small air bubbles should rise gently and uniformly to the surface of the powder, making it look like it is boiling. In this state, the powder feels and acts similar to a liquid, enabling easy transport by the powder pump from the hopper to the spray gun.

If the fluidizing pressure is set too low, a heavy inconsistent powder may flow. If the fluidizing pressure is too high, the powder boils violently, and the flow is uneven with possible air pockets in the powder stream.

Shutdown

1. Turn off power to the modular gun control system.
2. Ground the spray gun electrodes to discharge any residual voltage.
3. Perform the *Daily Maintenance* procedure.

Daily Maintenance

WARNING: Turn off the electrostatic voltage and ground the gun electrode before performing the following tasks. Failure to observe this warning could result in a severe shock.

1. Compare the spray gun's μA output in kV mode with no parts in front of the spray gun with the output and kV setting recorded during the *Initial Gun Usage* procedure on page 4-4. Significant differences may mean that the gun electrode assembly or multiplier is shorted or failing. Refer to the *Troubleshooting* section for more information.

WARNING: Check all ground connections thoroughly. Ungrounded equipment and parts may accumulate a charge that could arc and cause a fire or explosion. Failure to observe this warning could cause serious injury or equipment and property damage.

2. Check all ground connections, including part grounds. Ungrounded or poorly grounded parts affect transfer efficiency, electrostatic wrap, and the quality of the finish.
3. Check power and gun cable connections.
4. Make sure that the air being supplied is clean and dry.
5. Wipe powder and dust off the controller enclosure with a clean, dry cloth.
6. Disassemble the spray guns and powder pumps and clean them. Refer to the spray gun and pump manuals for instructions.

Section 5
Troubleshooting

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

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

Problem	Possible Cause	Corrective Action
1. Uneven spray pattern; unsteady or inadequate powder flow	Blockage in spray gun, feed hose, or pump	Disconnect the feed hose from the pump and blow out the feed hose. Disassemble and clean the pump and spray gun. Replace the feed hose if it is clogged with fused powder.
	Poor fluidization of powder in hopper	Increase the fluidizing air pressure. Remove the powder from the hopper. Clean or replace the fluidizing plate if it is contaminated.
	Moisture in powder	Check the powder supply, air filters, and dryer. Replace the powder supply if it is contaminated.
	Worn nozzle	Remove, clean, and inspect the nozzle. Replace the nozzle if necessary. If excessive wear or impact fusion is present, reduce the flow rate and atomizing air pressures.
	Low atomizing or flow rate air pressure	Increase the atomizing and/or flow rate air pressures.

Continued...

Problem	Possible Cause	Corrective Action
2. Loss of wrap; poor transfer efficiency	Low electrostatic voltage	Increase the electrostatic voltage.
	Poor electrode connection	Check the resistance of the gun electrode assembly. Refer to your spray gun manual for instructions.
	Poorly grounded parts	Check the part hangers for powder buildup. The resistance between the parts and the ground must be 1 megohm or less. For best results, the resistance should be 500 ohms or less.
3. No kV output from the spray gun	Damaged spray gun cable	Test the continuity of the spray gun cable. If an open or short circuit is found, replace the cable. Refer to your spray gun manual for instructions.
	Malfunctioning voltage multiplier	Check the resistance of the spray gun's voltage multiplier. Refer to your spray gun manual for instructions.
	Poor electrode connection	Check the resistance of the spray gun's electrode assembly as described in your spray gun manual.
	Malfunctioning power supply	Unplug the gun end of the cable from the voltage multiplier. Refer to to your spray gun manual and with the trigger switch actuated, check for 21 Vdc between pins 2 and 3 of the gun end of the gun cable. If the reading is not 21 Vdc, contact your Nordson representative.
4. No kV output and no powder output	No trigger signal	Make sure the system is triggered on.
	Defective power supply	Check for +24 volts at connector. Replace the power supply if necessary.
	Shorted solenoid valve	Replace the solenoid valve.

Continued...

Problem	Possible Cause	Corrective Action
5. No kV output, no powder output, and no display	Controller not turned on	Power on the controller with the rocker switch on the back panel.
	Blown fuse	Check fuses on rear panel and replace if necessary. Check fuse on power supply and replace if necessary.
	Defective switch	Replace the switch.
	Defective power supply	Replace the power supply.
6. kV output and no powder output	Malfunctioning solenoid valve	Replace the solenoid valve.
	Air to controller turned off	Check air gauges. Adjust air pressure as necessary.
	Air tubing disconnected or kinked to the pump	Check the air tubing to and from the controller.

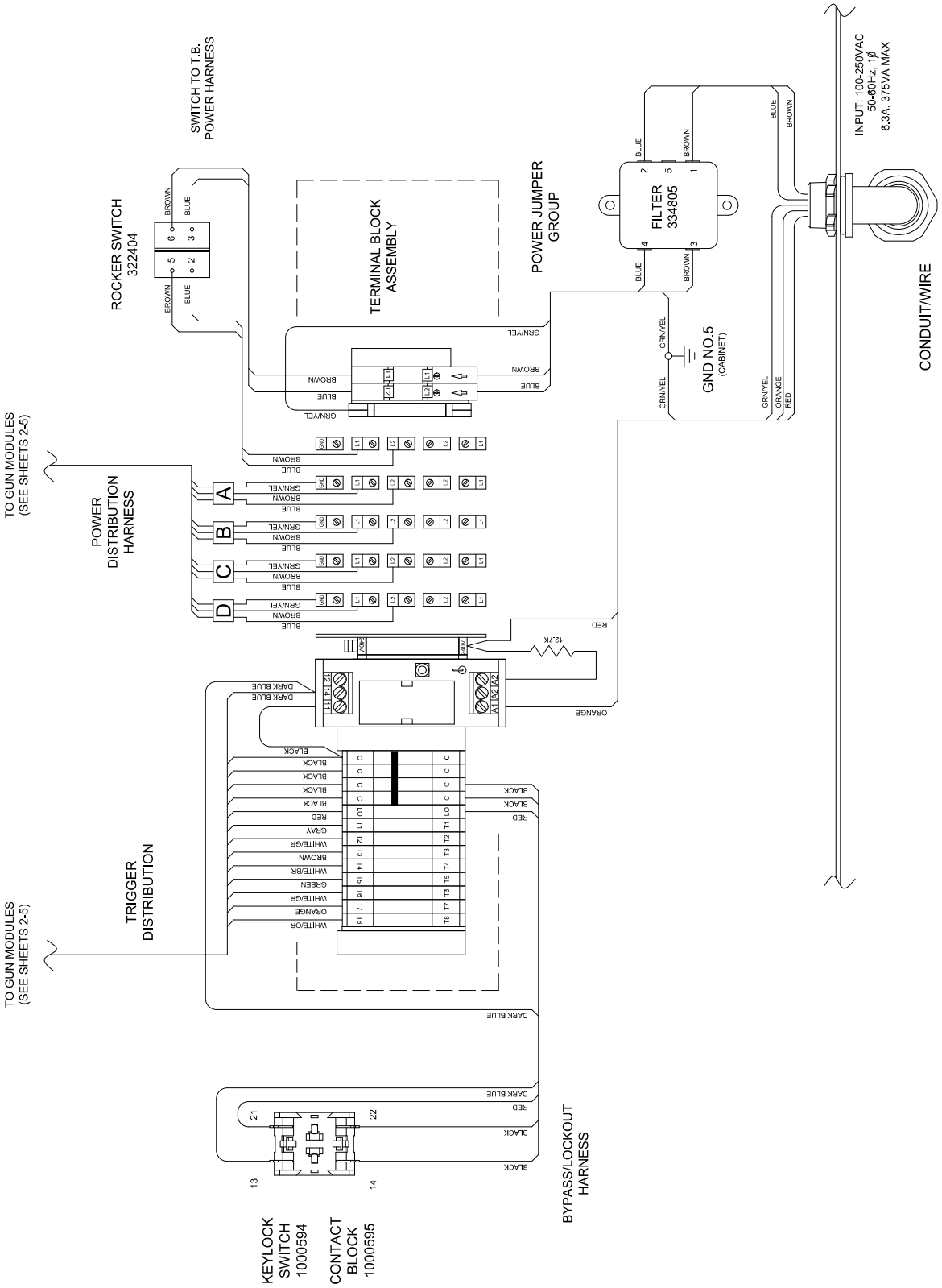


Figure 5-1 Master Controller Wiring Diagram

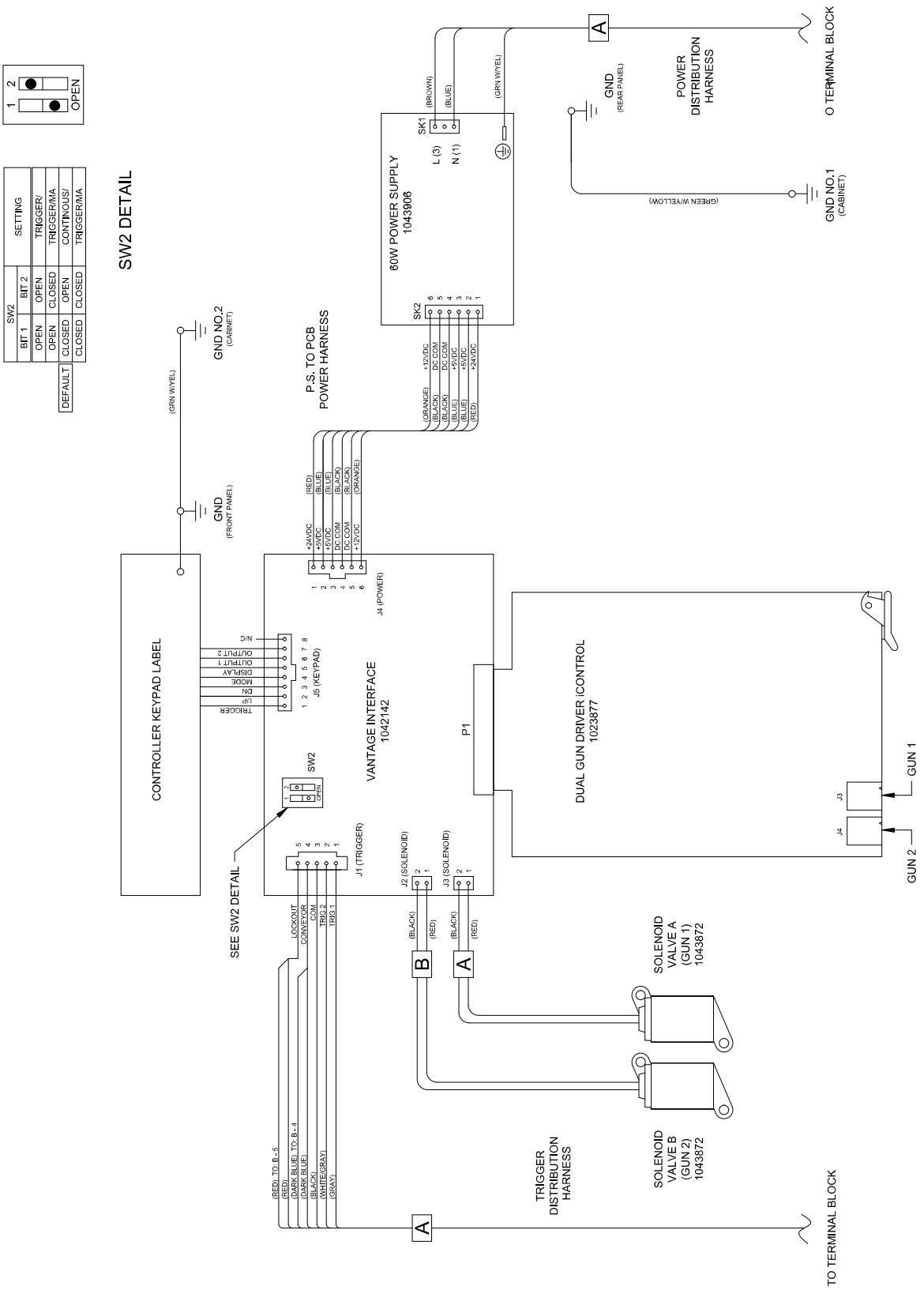


Figure 5-2 Individual Controller Wiring Diagram

Section 6
Repair

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

WARNING: Disconnect and lock out electrical power before performing the following tasks. Failure to observe this warning could result in personal injury or death.

Spray Gun Cable/Adapter Replacement

WARNING: Properly ground the controller or equipment damage will result.

Sure Coat or Versa Spray II Automatic Spray Gun Cables

See Figure 6-1.

1. Disconnect the cable from the spray gun.
2. Remove the eight screws (1) to remove the rear panel (2) from the controller and pull the panel back from the cabinet.
3. Clip the tie wrap and disconnect the correct eight-pin cable connector (7) from the gun board (8).
4. Loosen the retaining nut (5) on the gun cable strain relief.
5. Pull the gun cable out through strain relief.
6. Feed a new cable through the strain relief and pull approximately 350-mm (14-in.) of cable through to reach the gun board.
7. Connect the eight-pin connector to the gun board. The top spray gun cable should connect in the right-hand (odd) connector (J3), the bottom spray gun cable should connect in the left-hand (even) connector (J4).
8. Secure the gun cables to the tab on the assembly tray with a tie wrap.
9. Tighten the strain relief retaining nut to secure the cable and seal the enclosure.
10. Replace the rear panel with the eight screws.
11. Connect the other end of the cable to the appropriate spray gun.
12. Repeat this procedure for another cable if necessary.

Spray Gun Cable/Adapter Replacement *(contd)*

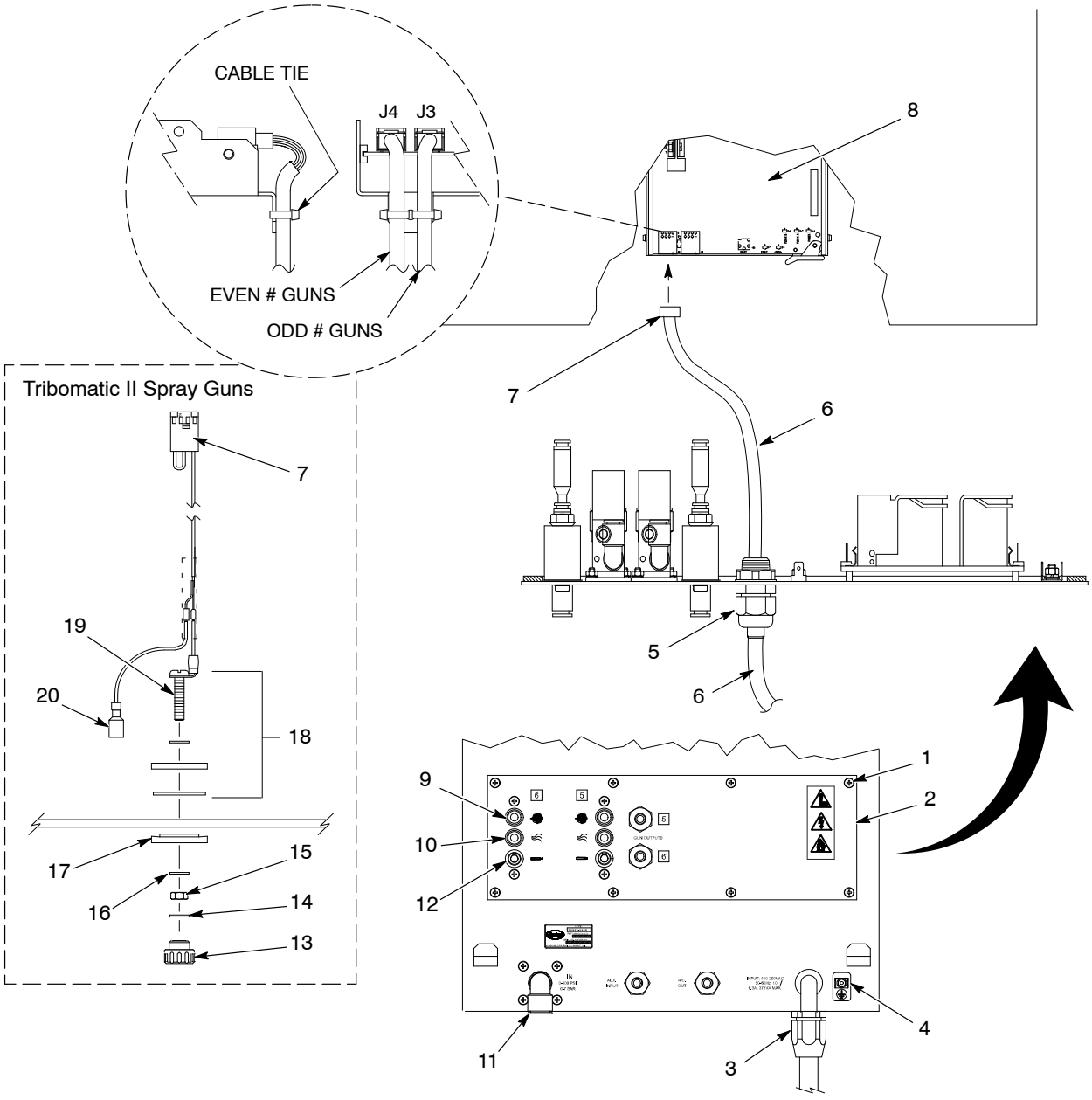


Figure 6-1 Electrical and Pneumatic Connections—Back Panel

1. Screws
2. Rear panel
3. Power cord
4. Ground stud
5. Retaining nut
6. Spray gun cable
7. Eight−pin connector
8. Gun board
9. Flow rate connection
10. Atomizing air connection
11. Supply air (IN) connection
12. Gun air connection (Sure Coat spray guns)
13. Knob
14. Washer
15. Hex nut
16. Lock washer
17. Shoulder washer
18. Plastic washer and rubber gasket assembly
19. Slotted screw
20. Push on terminal

Tribomatic II Automatic Spray Gun Adapters

See Figure 6-1.

1. Disconnect the Tribomatic II spray gun from the adapter screw (19).
2. Remove the eight screws (1) to remove the rear panel (2) from the controller and pull the panel back from the cabinet.
3. Clip the tie wrap and disconnect the correct eight-pin cable connector (7) from the gun board (8).
4. Remove the knob (13), washer (14), hex nut (15), lock washer (16), and shoulder washer (17) from the rear panel and pull the adapter assembly from the controller.
5. The Tribomatic II adapter is shipped completely assembled. To install the new adapter remove the knob (13), washer (14), hex nut (15), lock washer (16), and shoulder washer (17) from the assembly and set aside.
6. Attach the 8-pin connector (7) end of the new adapter to the gun board. The top spray gun cable should connect in the right-hand (odd) connector (J3), the bottom spray gun cable should connect in the left-hand (even) connector (J4).
7. Secure the adapter to the tab on the assembly tray with a tie wrap.
8. Mate the plastic gasket and rubber seal assembly (18) to the rear panel opening and secure the assembly with the parts removed in step 5.
9. Connect the pushon terminal (20) to the ground terminal on the rear panel.
10. Repeat this procedure for the other spray gun if necessary.
11. Install the rear panel (2) with the eight screws (1).
12. Connect the Tribomatic II spray gun cable to the adapter screw (19) and tighten the knob.

Check Valve Replacement

See Figure 6-2.

1. Remove the eight screws (1) securing the rear panel (2) to the cabinet.
2. Lay the rear panel flat. The two manifolds (3) and six check valves (4) are located on the left-hand side of the rear panel.
3. Disconnect and mark the air tubing (5) from the check valve you are replacing.
4. Remove the check valve from the manifold fitting.
5. Push the new check valve into the manifold fitting.
6. Reconnect the air tubing to the check valve.
7. Repeat this procedure for any other check valves that need to be replaced.
8. Install the rear panel with the eight screws.

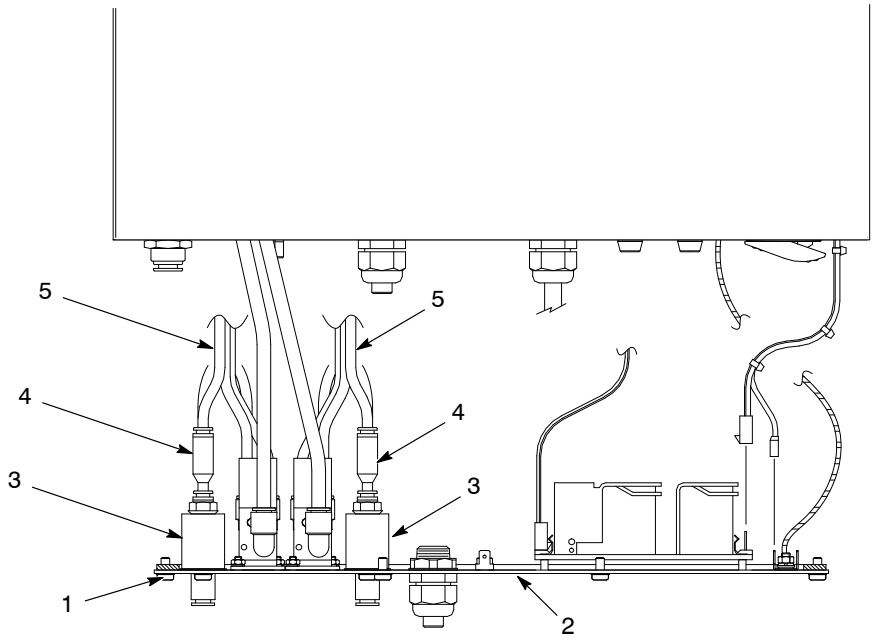


Figure 6-2 Check Valve Replacement

1. Screws
2. Rear panel
3. Manifolds
4. Check valves
5. Air tubing

Solenoid Replacement

1. See Figure 6-3. Remove the eight screws (1) securing the rear panel (2) to the cabinet.
2. Lay the rear panel flat. The two solenoids (3) are located between the manifolds (4) on the left-hand side of the rear panel.
3. Remove the air tubing connecting to the elbow (10).
4. Remove the tubing (5) connecting the gun air line to the solenoid.
5. Follow the solenoid wire (6) back into the controller cabinet and snip the ties (7) that hold the two wires together.
6. Disconnect the appropriate wire from the interface board (8) mounted on the front panel.
7. Remove the two nuts and two washers (9) securing the solenoid to the rear panel.
8. Remove the elbow and the connector (11) from the old solenoid and install them on the new solenoid.
9. Install the new solenoid on the rear panel with the nuts and washers.
10. Connect the solenoid wire to the interface board mounted to the front panel.
11. Install the air tubing to the elbow.
12. Connect the air tubing from the gun air line to the solenoid.
13. Repeat this procedure for the second solenoid if necessary.
14. Install two ties around the solenoid wires in the cabinet.
15. Install the rear panel with the eight screws.

Solenoid Replacement *(contd)*

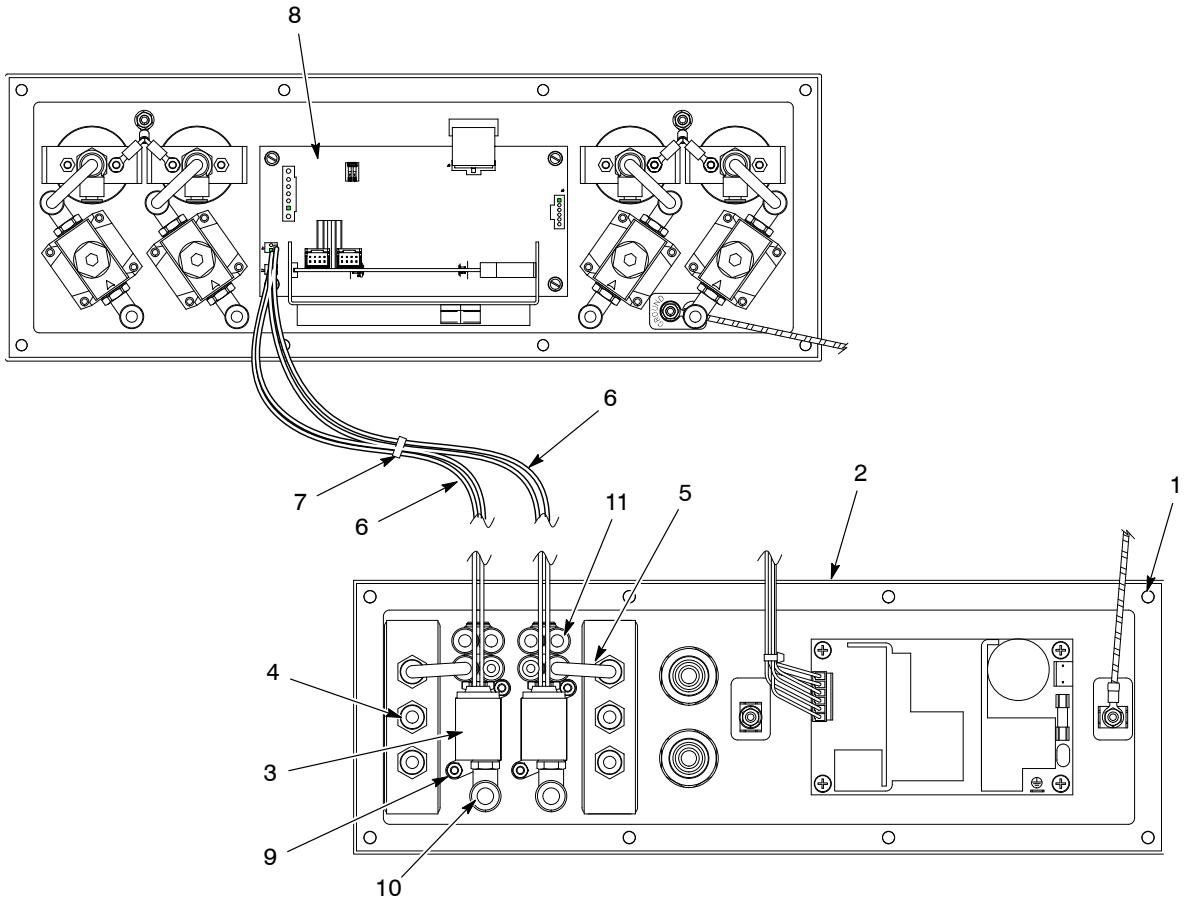


Figure 6-3 Solenoid Replacement

1. Screws
2. Rear panel
3. Solenoids
4. Manifolds
5. Air tubing
6. Solenoid wire
7. Tie
8. Interface board
9. Nuts and washers
10. Elbows
11. Connectors

Gun Board Replacement

NOTE: When you are replacing the gun board, the new gun board must be revision D or higher.

1. See Figure 6-4. Remove the eight screws (1) securing the rear panel (2) to the cabinet. Lay the rear panel flat.
2. Disconnect the one or two gun cables or adapters (3) from the end of the gun board (4).
3. Open the latch (5) on the right hand corner and pull the gun board from the cabinet.
4. Install the new gun board into the cabinet and lock it in place by closing the latch.
5. Connect the eight-pin connectors (6) on the gun cables to the new gun board. The top spray gun cable should connect in the right-hand (odd) connector (J3), the bottom spray gun cable should connect in the left-hand (even) connector (J4).
6. Install the rear panel with the eight screws.

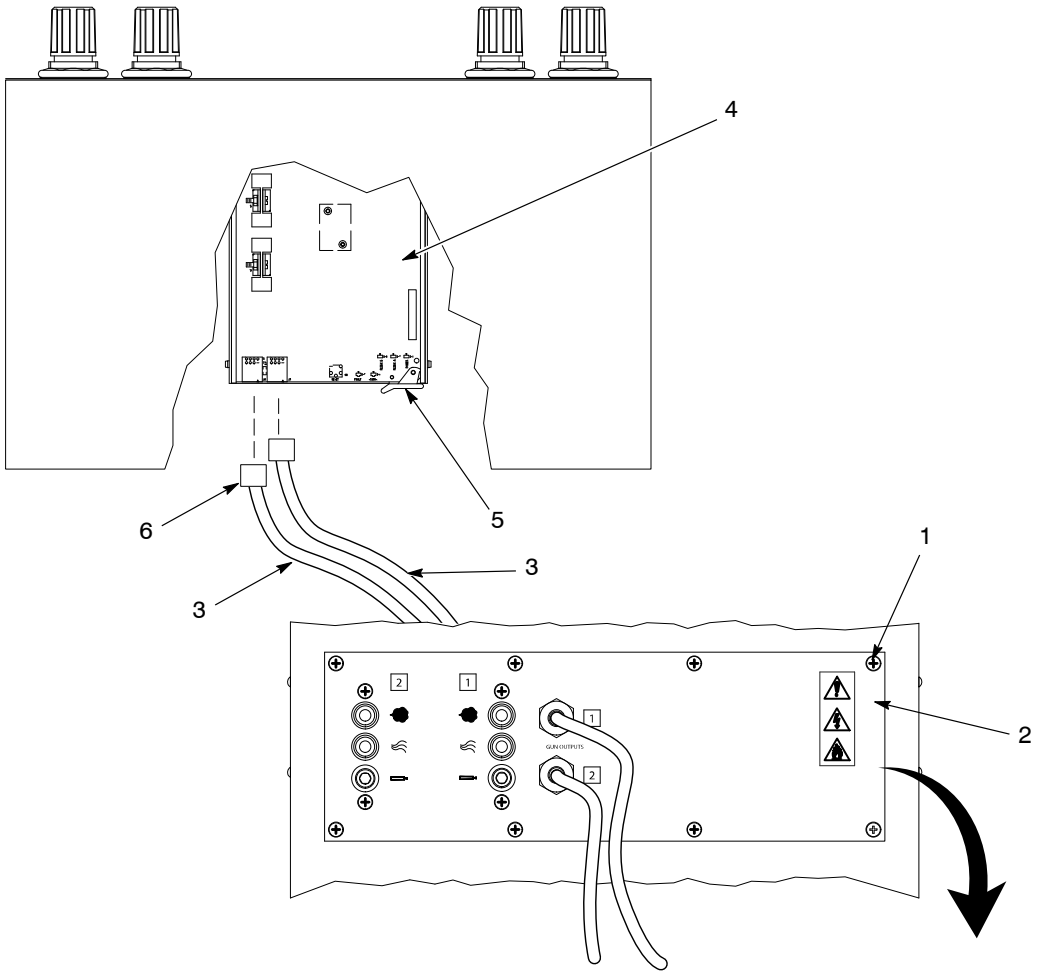


Figure 6-4 Gun Board Replacement

1. Screws
2. Rear panel
3. Spray gun cables/adapters
4. Gun board
5. Gun board latch
6. Eight-pin connector

Interface Display Board Replacement

1. See Figure 6-5. Remove the eight screws (1) securing the front panel (2) to the cabinet. Carefully pull the front panel from the cabinet so you do not disconnect any cables or tubing or damage the front display.
2. Remove the gun board (6) as described in *Gun Board Replacement* on page 6-7.

   NOTE: Skip step 1 in *Gun Board Replacement*. You do not need to remove the rear panel.
3. Disconnect the keypad ribbon connector (3) from connector J5 on the interface board (4).
4. Remove the J1 connector (7) and install it on the new interface display board.
5. Remove the solenoid connectors (J2 and J3) (8) and install them on the new interface display board.
6. Remove the four screws (5) securing the board to the front panel.
7. Remove the board from the front panel.
8. Install the new board on the front panel with the fours screws.
9. Connect the keypad ribbon connector to connector J5.
10. Install the gun board.
11. Check the trigger configuration setting (SW2). Refer to *Trigger Configuration* on page 3-6 for more information.

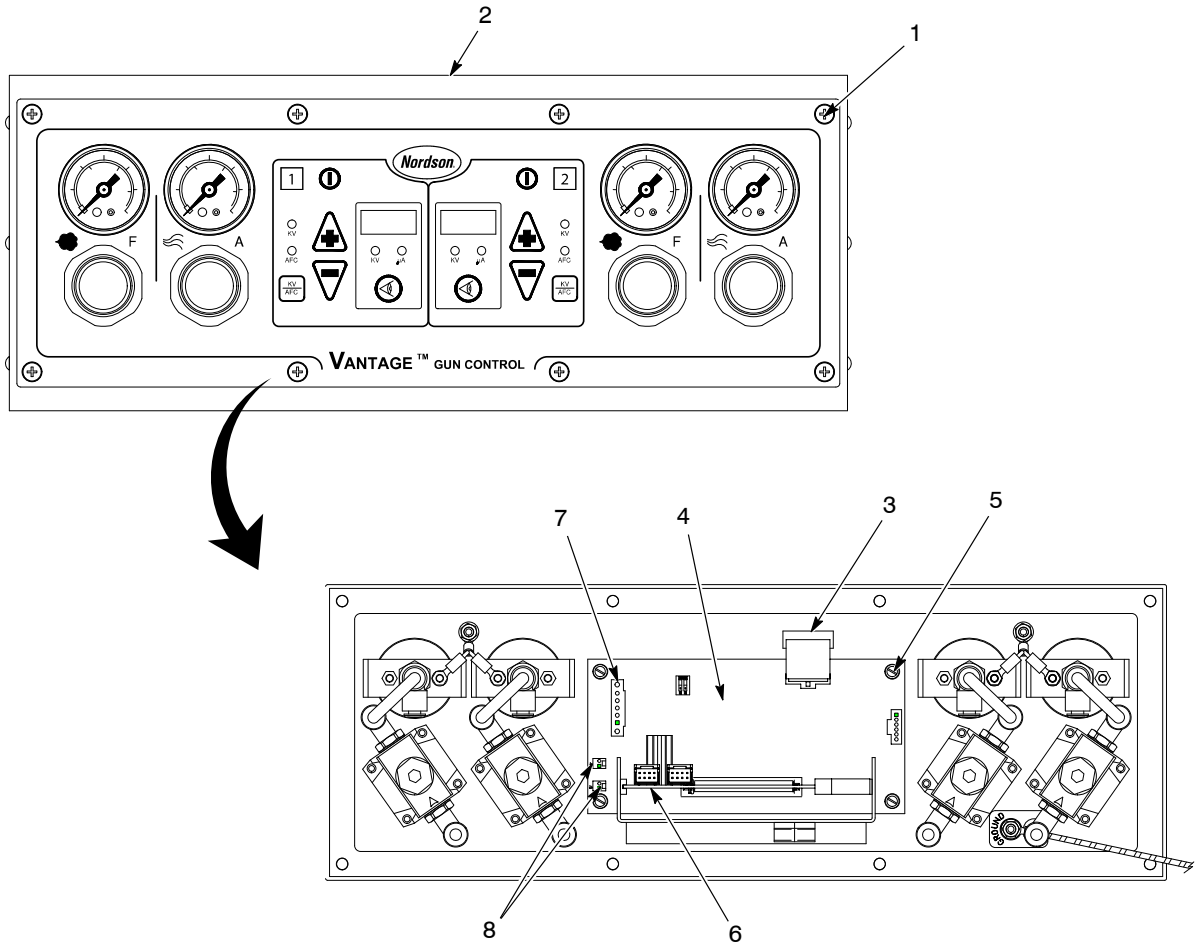


Figure 6-5 Interface Display Board Replacement

1. Screws
2. Front panel
3. Keypad ribbon connector
4. Interface board
5. Screws
6. Gun board
7. J1 connector
8. Solenoid connectors (J2 and J3)

Regulator and Gauge Replacement

1. See Figure 6-6. Remove the eight screws (1) securing the front panel (2) to the cabinet. Carefully pull the front panel from the cabinet so you do not disconnect any cables or tubing or damage the front display.
2. Tag and disconnect the air tubing (3) from the regulators (4) and gauges (5).

NOTE: See Figure 6-9 for tube labeling and routing.

3. Remove the regulators and gauges from the panel.

   Regulators (4)

   a. Holding onto the regulator, loosen and remove the nut (6) on the front side of the panel.

   b. Pull the regulator and gasket (7) out of the front panel.

   c. Remove the two elbows (13) from the regulator and install them on the new regulator.

   Gauges (5)

   a. Remove the connector (8) and coupling (9) from the gauge. Install the connector and coupling on the new gauge.

   b. Hold onto the gauge and remove the two nuts (11) securing the gauge bracket (10) to the panel and gauge.

   NOTE: A ground harness (12) is attached to one of the nuts.

   c. Pull the gauge and gasket from the front of the panel.

4. Install the new regulators and gauges onto the front panel by reversing the above steps.
5. Connect all tubing as shown in Figure 6-9.
6. Install the front panel with the eight screws.

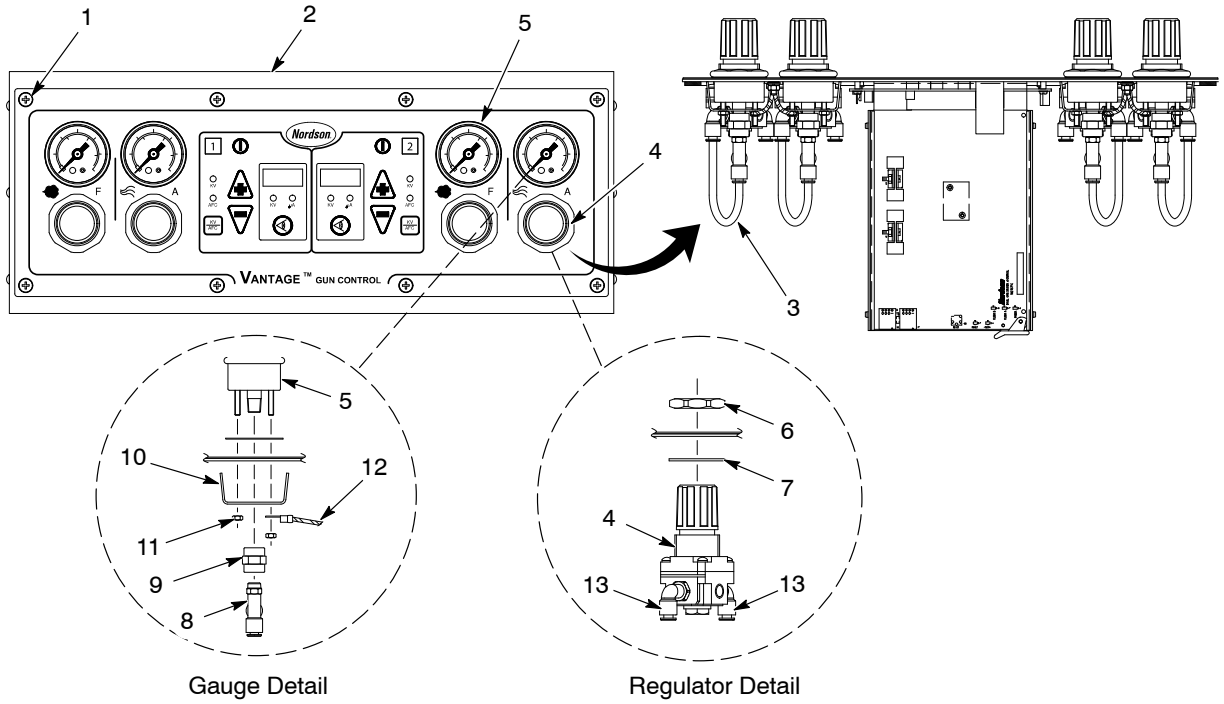


Figure 6-6 Regulator and Gauge Replacement

1. Screws
2. Front panel
3. Air tubing
4. Regulators
5. Gauges
6. Nut
7. Gasket
8. Connector
9. Coupling
10. Bracket
11. Nuts
12. Ground harness
13. Elbows

Fuses

WARNING: Disconnect and lock out electrical power before performing the following tasks. Failure to observe this warning could result in personal injury or death.

See Figure 6-7.

There are three fuses located in the controller, two on the master controller terminal block (front panel) and one on each of the individual controller power supply modules.

Master Control Fuses

1. Remove the eight screws (1) on the master control front panel. Slide the panel out and and lay it flat.
2. Lift the fuse block latch and remove the fuses (2).
3. Install the new fuses in the terminal block.
4. Secure the master control front panel with the eight screws.

Power Supply Fuse

1. Remove the eight screws (3) securing the rear panel to the cabinet.
2. Lay the rear panel flat. The power supply (4) is located on the right hand side.
3. Remove the fuse (5) from the power supply and replace it with a new one.
4. Install the rear panel with the eight screws.

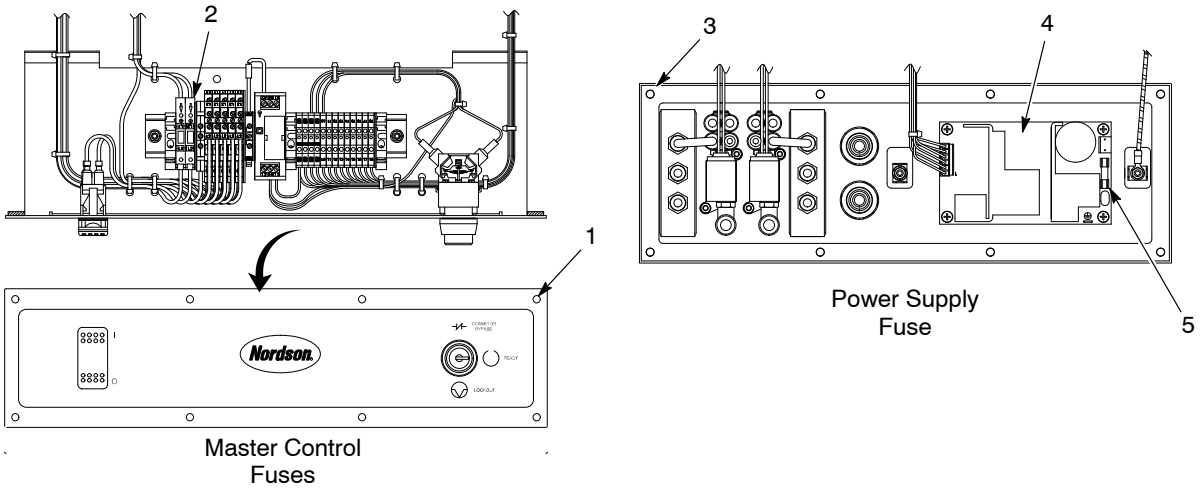


Figure 6-7 Fuse Replacement

1. Screws
2. Master control front panel fuses
3. Rear panel screws
4. Power supply
5. Fuse

Power Supply Replacement

See Figure 6-8.

1. Remove the eight screws (1) securing the rear panel (2) to the cabinet.
2. Lay the rear panel flat. The power supply (3) is located on the right hand side.
3. Unplug the three-pin connector (ac input) (4) and the six-pin dc output connector (5) from the power supply.
4. Remove the four screws (6) that secure the power supply to the rear panel. Remove the power supply.
5. Place the new power supply onto the rear panel and secure it in place with the four screws.
6. Connect the dc output and ac input connectors to the power supply.
7. Replace the rear panel with the eight screws.

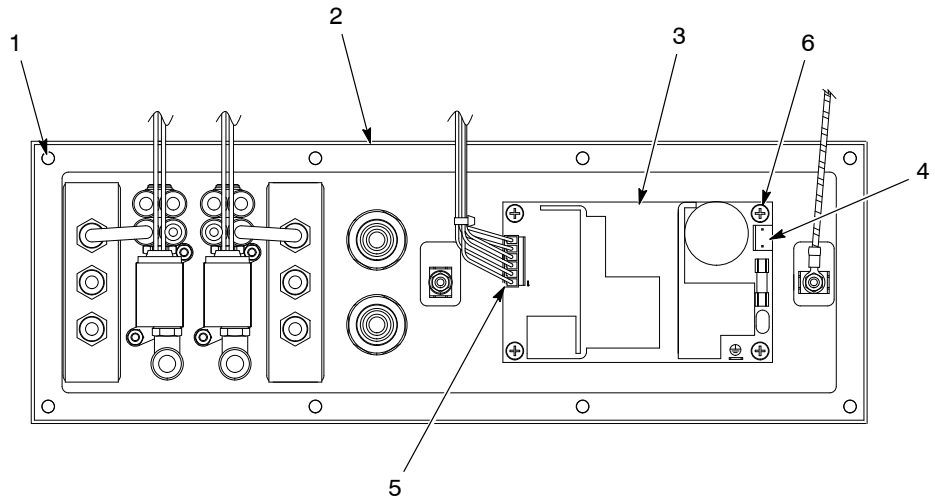


Figure 6-8 Power Supply Replacement

1. Screws
2. Rear panel
3. Power supply
4. Three-pin ac input connector
5. Six-pin dc output connector
6. Screws

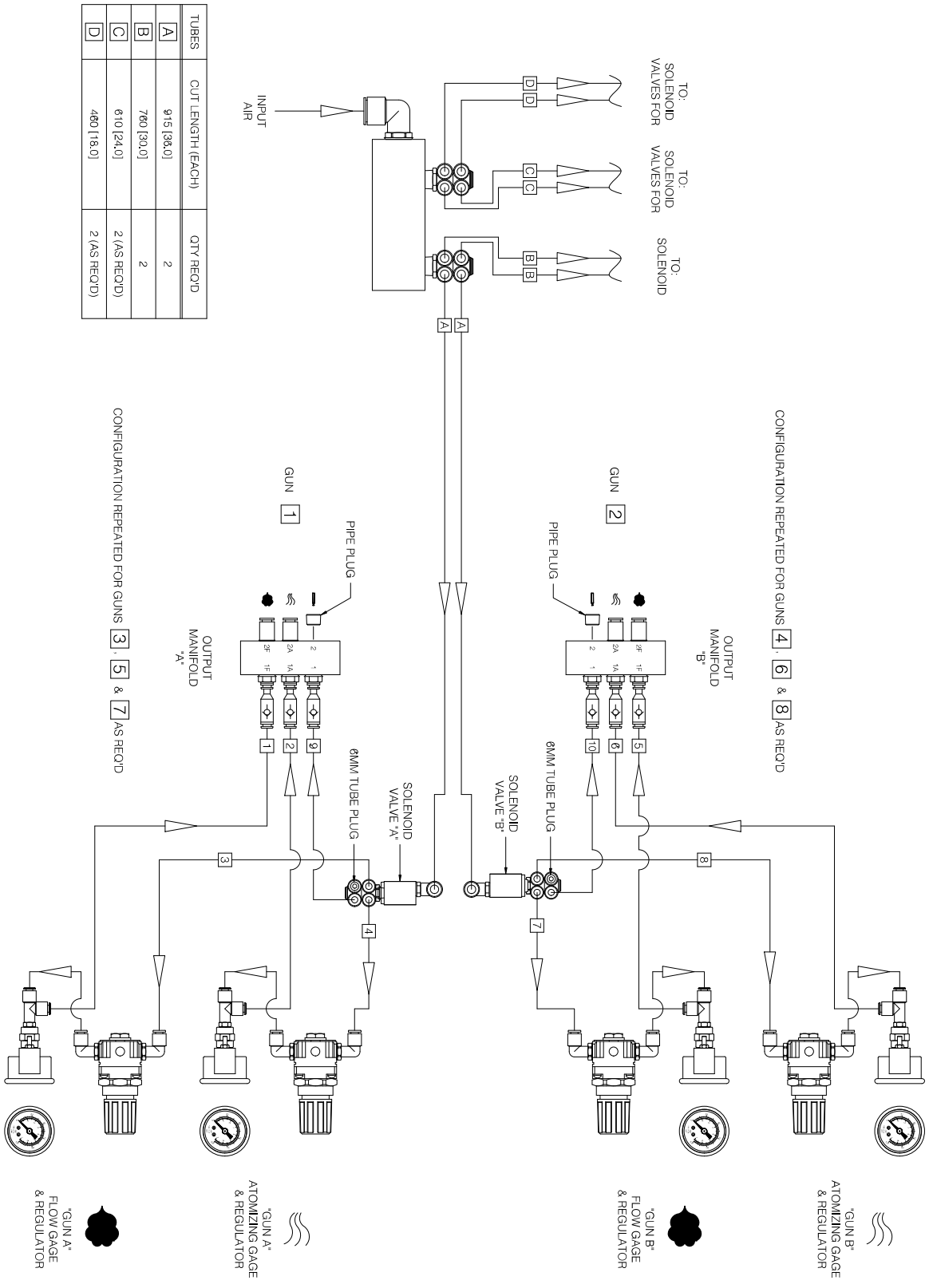


Figure 6-9 Pneumatic Diagram

Section 7

Upgrading the Modular Control System

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

WARNING: Disconnect and lock out electrical power before performing the following tasks. Failure to observe this warning could result in personal injury or death.

Introduction

Additional control units may be added to the base assembly to increase the spray gun controls from 4 to 6 or 6 to 8. An upgrade kit is available with the components necessary to add a new control unit. Refer to *Controller Upgrade Kit* on page 8-4 for ordering information.

Controller Prepartion

See Figure 7-1.

1. Turn off the air supply and relieve the air pressure by triggering the guns.
2. Turn off the electrical power.
3. Lift off the rear dress-out cover.
4. Remove the eight screws (1) to remove the blank rear panel. Disconnect the ground wire (2) from the blank rear panel to the control cabinet.
5. Remove the eight screws to remove the blank front panel (3). Disconnect the ground wire (4) from the blank front panel to the control cabinet.

NOTE: If you are upgrading from a six-gun control unit to an eight-gun control unit, skip step 6.

6. Remove the lowest rear panel on the unit to access to the main air manifold.

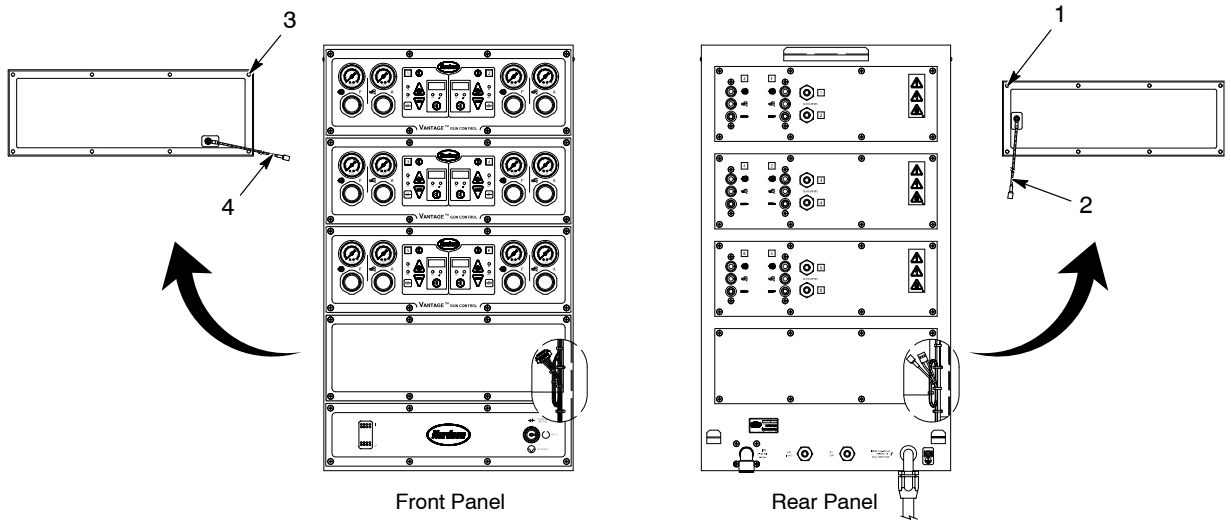


Figure 7-1 Prepare the Controller

1. Rear panel screws
2. Rear panel ground wire
3. Front panel screws
4. Front panel ground wire.

Air Tubing Installation

See Figure 7-2.

1. Remove the appropriate the 8-mm tube plugs (1) (C and/or D) from the main air manifold (2).
2. Use the following information to cut the new 8-mm air tube to the correct length.

Air Tubes	Cut Length, mm (in.)	Quantity
A	915 (36)	2
B	760 (30)	2
C	610 (24)	2
D	460 (18)	2
NOTE: The cut tubes should be long enough to extend out the opening where the new rear panel will be installed.		

3. Insert the air tubing into the appropriate ports in the main air manifold and secure them to the side rails of the controller with tie-wraps.

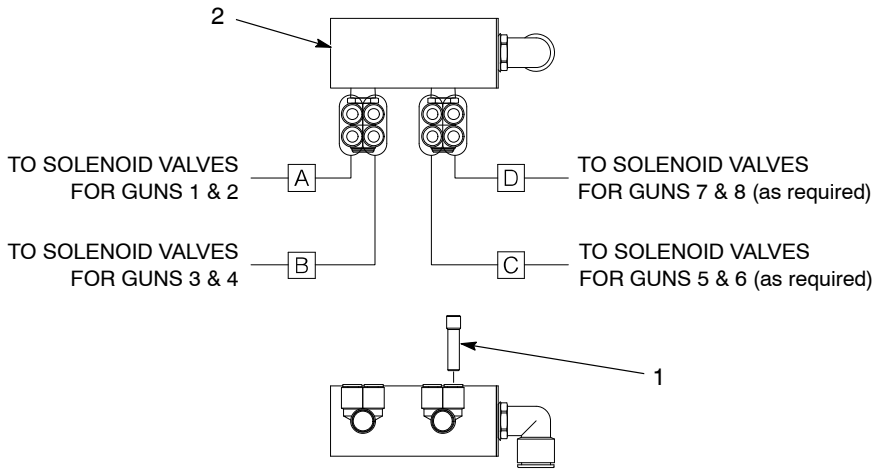


Figure 7-2 Air Tubing Installation

1. Plugs
2. Main air manifold

Power Cable Preparation

See Figure 7-3.

1. Cut the tie-wraps (1) holding the new controller ac power harness and triggering harness (2) to the side rails of the controller.
2. Pull the new controller's ac power harness through the rear panel opening.
3. Pull the new controller's triggering harness through the front panel opening.

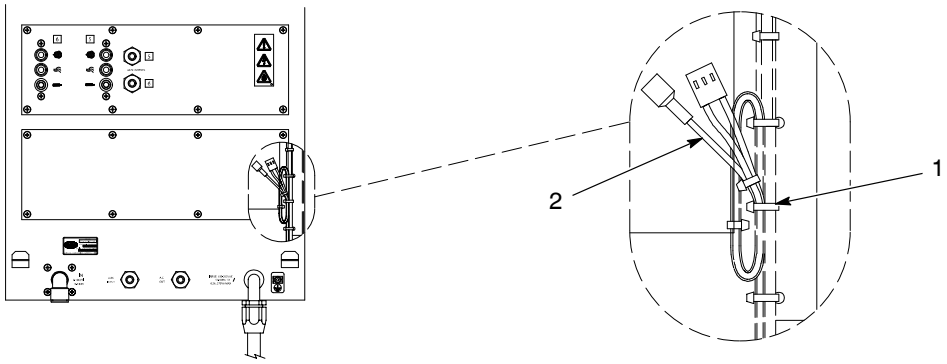


Figure 7-3 Prepare the Power Cables

1. Tie-wraps
2. Power and triggering harness

Rear Panel Connection

See Figure 7-4.

1. Connect the three pin connector and ground wire on the ac power harness (1) to the connector on the power supply.
2. Connect the two 8-mm air tubes (2) to the two solenoids.
3. Connect the ground wire (3) to the main control cabinet.
4. Loosen the retaining nut (4) on one of the gun cable strain reliefs.
5. Remove and discard the tube plug from the strain relief.
6. Connect spray gun cables or adapters.

   Sure Coat and Versa Spray II Automatic Spray Guns

   a. Feed the end of the spray gun cable (5) with the eight-pin connector (6) through the strain relief.

   b. Pull approximately 350 mm (14 in.) of gun cable into the control unit.

   c. Tighten the strain relief retaining nut to secure the cable and seal the enclosure.

Tribomatic II Automatic Spray Guns

a. The Tribomatic II adapter is shipped completely assembled. To install the adapter remove the knob (8), washer (9), hex nut (10), lock washer (11), and shoulder washer (12) from the assembly and set aside.
b. Remove the gun cable strain reliefs and mate the adapter's plastic gasket and rubber seal assembly (13) to the opening and secure it with the parts removed in the last step.
c. Connect the pushon terminal (15) to the rear panel ground teminal.

7. Repeat steps 4 through 6 for the second spray gun.
8. Secure the cables or adapters to the tab on the assembly tray with a tie wrap.
9. Install the new rear panel assembly into the cabinet making sure to pull through the 6-mm air tubing, solenoid harness, dc power cable, and spray gun cables to the front panel opening.
10. Secure the rear panel to the control unit with the eight screws (7).

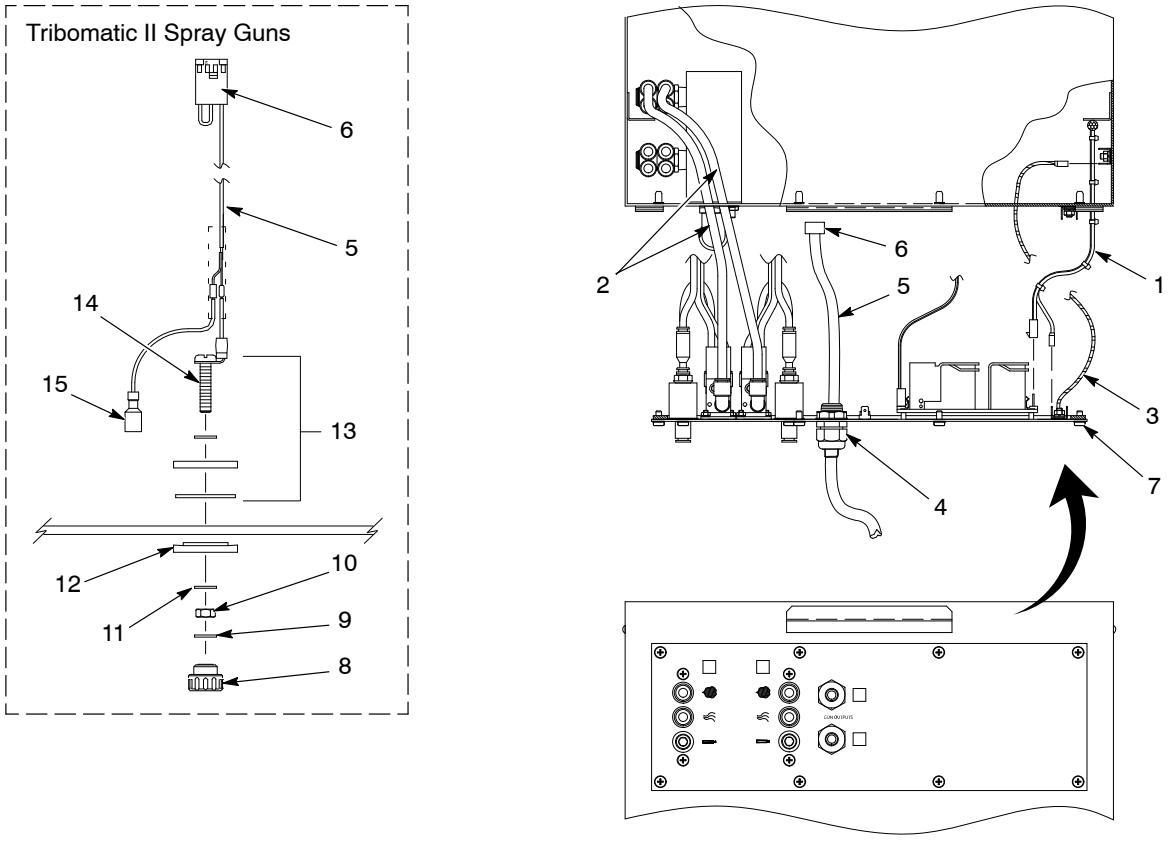


Figure 7-4 Connect the Rear Panel

1. ac Power harness with ground wire
2. 8-mm air tubes
3. Ground wire
4. Nut
5. Spray gun cable/adapter
6. Eight-pin connector
7. Screws
8. Knob
9. Washer
10. Hex nut
11. Lock washer
12. Shoulder washer
13. Gasket and rubber seal assembly
14. Screw
15. Pushon terminal

Front Panel Connections

1. See Figure 7-5. Route the 6-mm air tubes tagged 1, 2, 3, 4 from the manifold on the rear panel through the tubing holder on the bottom of the front panel assembly tray. Connect them to the odd-numbered air regulator and gauge.
2. Connect the 6-mm air tubes tagged 5, 6, 7, 8 from the manifold on the rear panel to the even-numbered air regulator and gauge.

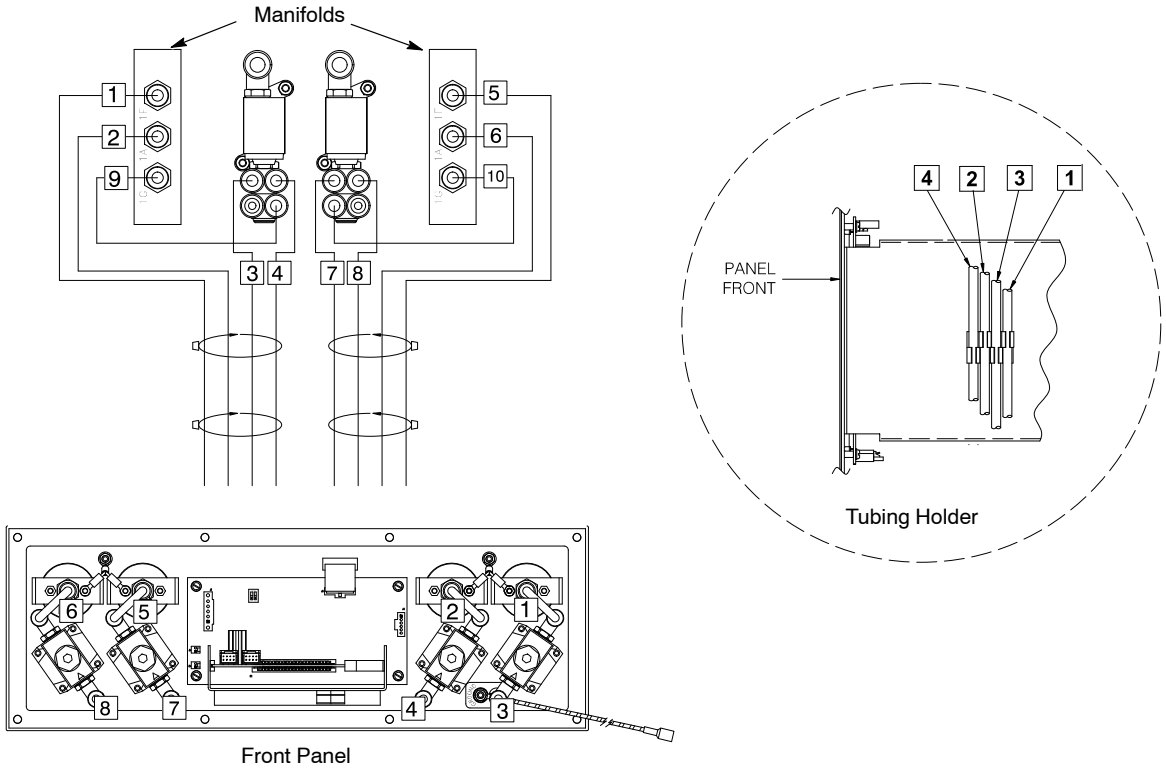
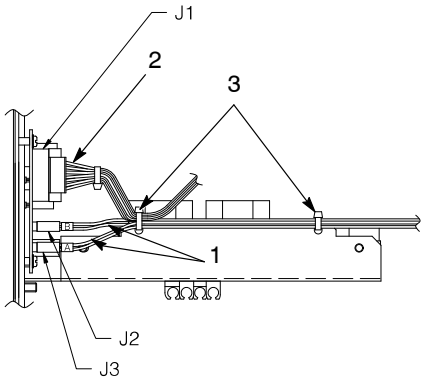


Figure 7-5 Routing the Air Tubing

3. See Figure 7-6. Connect the two solenoid wires (1) from the rear panel to the J2 and J3 connectors on the interface board.
4. Connect the five-pin connector of the triggering distribution harness (2) to the J1 connector on the interface board.
5. Secure the solenoid wires and the triggering harness to the front panel assembly tray with tie-wraps (3).



Right Side View

Figure 7-6 Connecting the Solenoid Wires and Triggering Distribution Harness

1. Solenoid wires
2. Triggering distribution harness
3. Tie-wraps

6. See Figure 7-7. Connect the dc power harness (1) from the rear panel to the interface board and secure the harness to the front panel assembly tray with tie-wraps (2).
7. Connect ground wire (3) from the front panel to inside of main control cabinet.
8. Connect the eight-pin connector (4) of the spray gun cables or adapters to the gun board (5). The top spray gun cable should connect in the right-hand (odd) connector (J3), the bottom spray gun cable should connect in the left-hand (even) connector (J4).
9. Install the new front panel into the cabinet and secure with the eight screws (6).
10. Place the label numbers on the new controller as follows:

Part	Odd Numbers	Even Numbers
Front Panel	Left-hand side	Right-hand side
Rear Panel	Right-hand side	Left-hand side
Gun Cables	Top cable	Bottom cable

Front Panel Connections *(contd)*

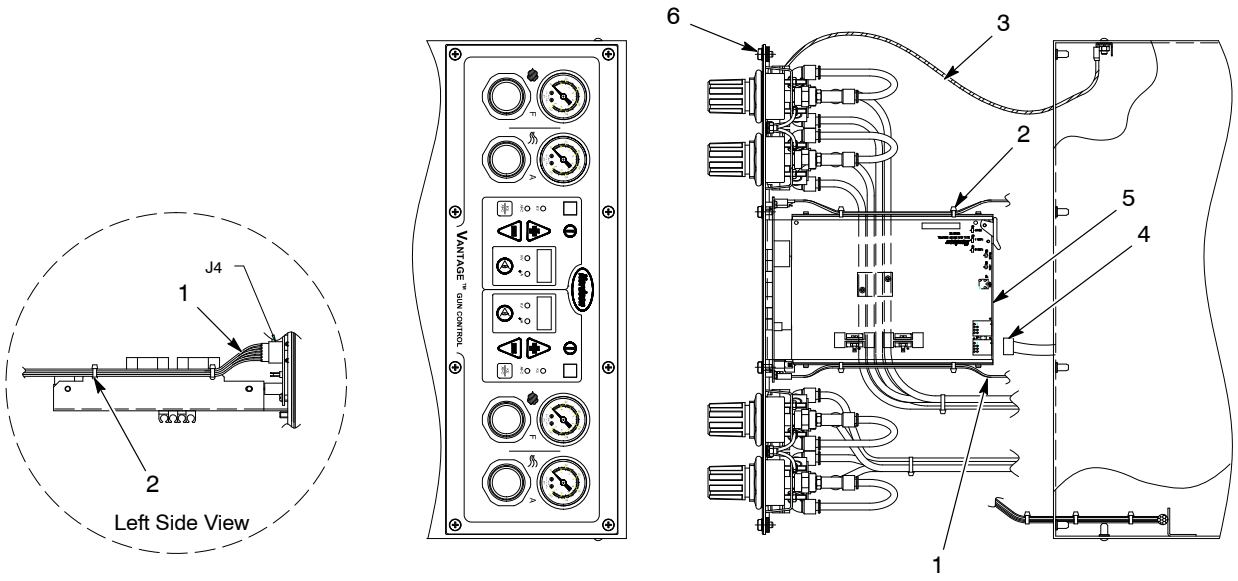


Figure 7-7 Connecting the Front Panel

1. dc Power harness
2. Tie-wraps
3. Ground wire
4. Eight-pin connector
5. Gun board
6. Screws

Section 8
Parts

Introduction

To order parts, call the Nordson Finishing Customer Support Center at (800) 433-9319 or your local Nordson representative. Use the illustrations and parts list to locate and describe parts correctly.

Using the Illustrated Parts List

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

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

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

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

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

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

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

Vantage Modular Gun Control System

The controllers are available in four-gun, six-gun, and eight-gun configurations and with or without a base.

Refer to *Controller Assemblies* for the top level part numbers for each version.

Refer to *Controller Replacement Parts* for the parts breakdowns of each assembly.

Controller Assemblies

Modular Gun Control System WITH a Base		Modular Gun Control System WITHOUT a Base	
Part	**Description**	**Part**	**Description**
1043877	4 Gun, w/base cabinet, Vantage auto	1043876	4 Gun, Vantage auto
1043879	6 Gun, w/base cabinet, Vantage auto	1043878	6 Gun, Vantage auto
1043901	8 Gun, w/base cabinet, Vantage auto	1043900	8 Gun, Vantage auto

Controller Replacement Parts

See Figures 8-1 and 8-2.

Item	Part	Description	Quantity	Note
1	- - - - - -	ENCLOSURE, controller, Vantage, auto	1	
2	- - - - - -	CABINET , base, Vantage, automatic controller	1	A
3	- - - - - -	CAP, tapped, hole, 5 mm, nylon	1	
4	983128	LOCK WASHER, M integral, M6, steel	1	
5	982128	SCREW, hex, machine, M6 x 10, zinc	1	
6	983401	WASHER, lock, m, split, M5, steel, zinc	1	
7	984702	NUT, hex, M5, brass	1	
8	983021	WASHER, flat, e, 0.203 x 0.406 x 0.040 in., brass	1	
9	- - - - - -	PANEL, front controller, master controller, Vantage auto	1	
10	- - - - - -	HARNESS, power distribution, Vantage auto	1	
11	- - - - - -	HARNESS, power, switch to terminal breaker, Vantage, auto	1	
12	- - - - - -	HARNESS, power jumper group, Vantage, auto	1	
13	1050185	CONTROL RELAY, 120 Vac, open, fixed, spot	1	
NS	939683	• FUSE, 6.3 amps	2	
14	- - - - - -	HARNESS, trigger distribution, Vantage auto	1	
15	- - - - - -	HARNESS, bypass/lockout, Vantage, auto	1	
16	- - - - - -	GASKET, master front panel, Vantage, auto	1	
17	322404	SWITCH, rocker, DPST, dust-tight	1	
18	1000594	SWITCH, keylock, 3–position	1	
NOTE A: Used with controller assembly, parts 1043879, 1043877, and 1043901.				

Continued...

Item	Part	Description	Quantity	Note
19	1000595	CONTACT BLOCK, 1-N.O. 7 1-N.C. contact	1	
20	984715	NUT, hex, M4, steel, zinc	1	
21	983403	LOCK WASHER, M split, M4, steel, zinc	1	
22	334805	FILTER, line, RFI, power, 10 A	1	
23	972930	PLUG, pushin, 8mm T, plastic	1	
24	972808	CONNECTORS, strain relief, $^1/_2$-in. NPT	1	
25	984192	NUT lock, $^1/_2$-in NPT, nylon	1	
26	1045837	SCREW, pan, recess, M5x12, with integral lock washer	1	
27	972143	CONNECTOR, male, elbow, 16-mm tube x $^1/_2$-universal	1	
28	- - - - - -	GASKET, manifold pneumatic, input	1	
29	900619	TUBE, polyurethane, 8-mm OD, black	per ft	
30	- - - - - -	PANEL, front, controller, assembly, Vantage, auto	1	
31	1023877	• PCA, dual gun driver, iControl	1	
32	1043857	• AIR GAGE, 0–100 psi, 0–7 bar, kpa, 1 $^1/_2$ in.	1	
33	1045838	• GASKET, gage, diameter 0.41 mm, EDPM	1	
34	973572	• COUPLING, pipe, hydraulic, $^1/_8$ in. steel	1	
35	972840	• CONNECTOR, male, run tee, 6-mm tube x $^1/_8$-in. universal	1	
36	1100310	• REGULATOR, $^1/_4$ in. NPT, 7–125 psi	1	
37	141603	• SEAL, panel, regulator	1	
38	972142	• CONNECTOR, male, elbow, 6-mm tube x $^1/_4$-in. universal	1	
39	1042142	• PCA, Vantage, interface	1	
40	- - - - - -	PANEL, rear, controller assembly, Vantage auto	1	
41	1045839	• VALVE, check, adapter, 6-mm tube x 6-mm tube	1	
42	971100	• CONNECTOR, male, 6-mm tube x $^1/_4$-in. universal	1	
43	- - - - - -	• MANIFOLD, pneumatic	1	
44	972282	• CONNECTOR, male with internal hex, 8-mm tube x $^1/_4$-in universal	1	
45	900742	• TUBING, polyurethane, 6/4 mm, blue	1	
46	1043906	• POWER SUPPLY, 24, 5, 12 Vdc, 60 Watt	1	
47	1043872	• VALVE, 3 port, direct acting, 24 V, ^{1}/8-in. RPT, with connector	1	
48	334818	LABELS, numbers, repeat, 1–16	1	
49	1047751	KIT, keypad with front panel, Vantage	1	

Spray Gun Cables

Part	Description	Note
1043723	VERSA-SPRAY CABLE, 100kV, 12M, Vantage, automatic	
1054175	VERSA-SPRAY CABLE, 100 kV, 16M, Vantage, automatic	
1048653	SURE COAT CABLE, 12M, Vantage, automatic	
1054176	SURE COAT CABLE, 16M, Vantage, automatic	
1054613	ADAPTER, Tribomatic, Vantage, automatic	
1054615	CONNECTOR, Versa-Spray adapter, Vantage, automatic	A

NOTE A: Use this connector with older style Versa-Spray II cables.

Controller Upgrade Kit

See Figure 8-2. Order this kit to upgrade your controller assemble from 4–6 or 6–8 control units.

Item	Part	Description	Quantity	Note
—	1043902	CONTROLLER UPGRADE KIT, 2 gun Vantage, automatic	1	
29	900619	• TUBE, polyurethane, 8-mm OD, black	4 ft	
30	- - - - - -	• PANEL, front, controller, assembly, Vantage, auto	1	
40	- - - - - -	• PANEL, rear, controller assembly, Vantage auto	1	
48	334818	• LABELS, numbers, repeat, 1–16	1	

Accessories

Item	Part	Description	Quantity	Note
NS	900600	TUBING nylon, soft, 16-mm OD, black	1 ft	A
NS	1051108	CONNECTOR, male, 16-mm tube x $^1/_2$-in. universal	1	
NS	288822	CONNECTOR, orifice, 4-mm x $^1/_2$-in. universal, diameter 0.012 in.	1	B

NOTE A: Main air supply tubing. 20 feet of tubing used in each system.

B: Connecter used with Sure Coat spray guns.

NS: Not Shown

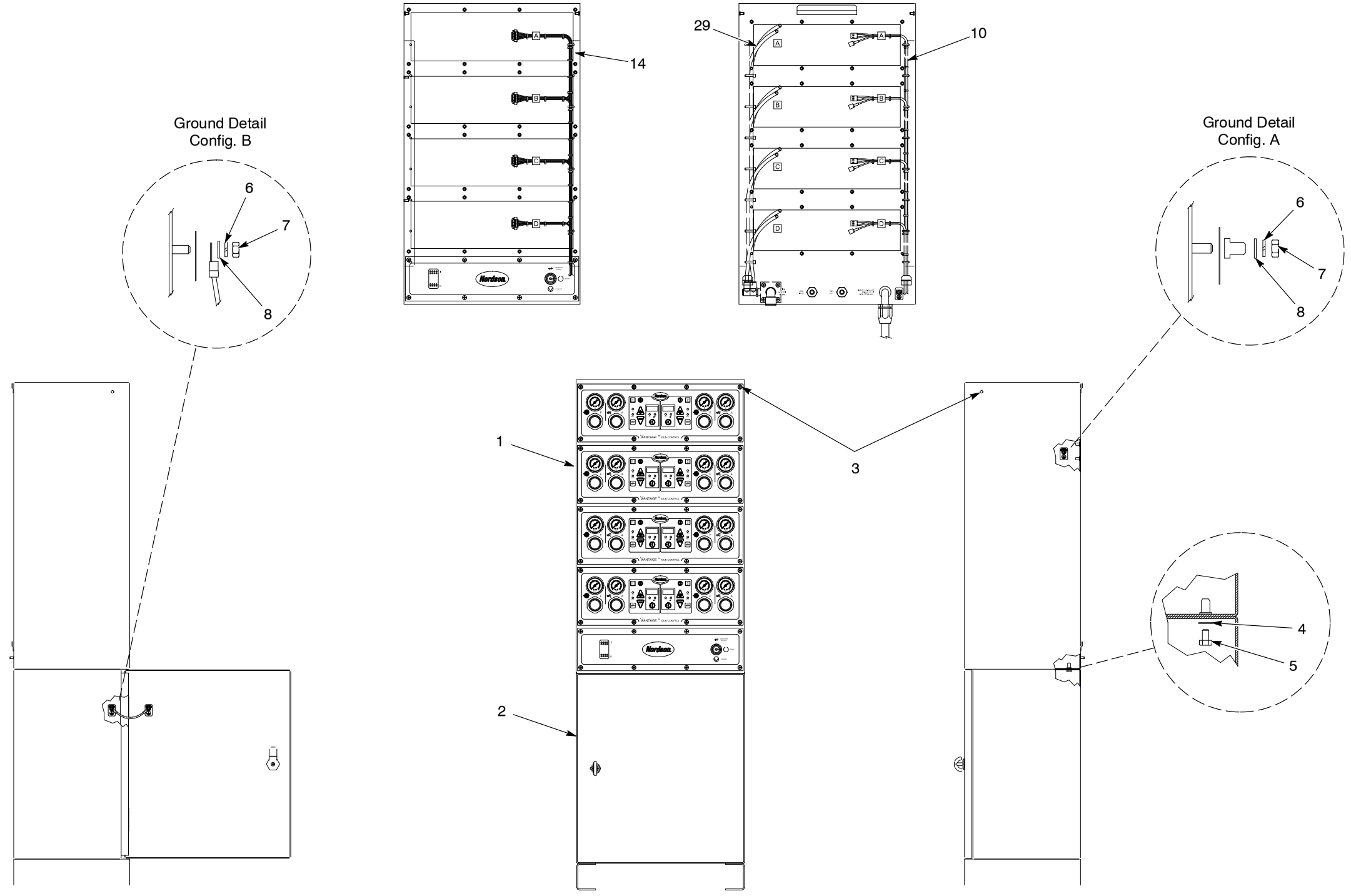


Figure 8-1 Vantage Modular Gun Control System (1 of 2)

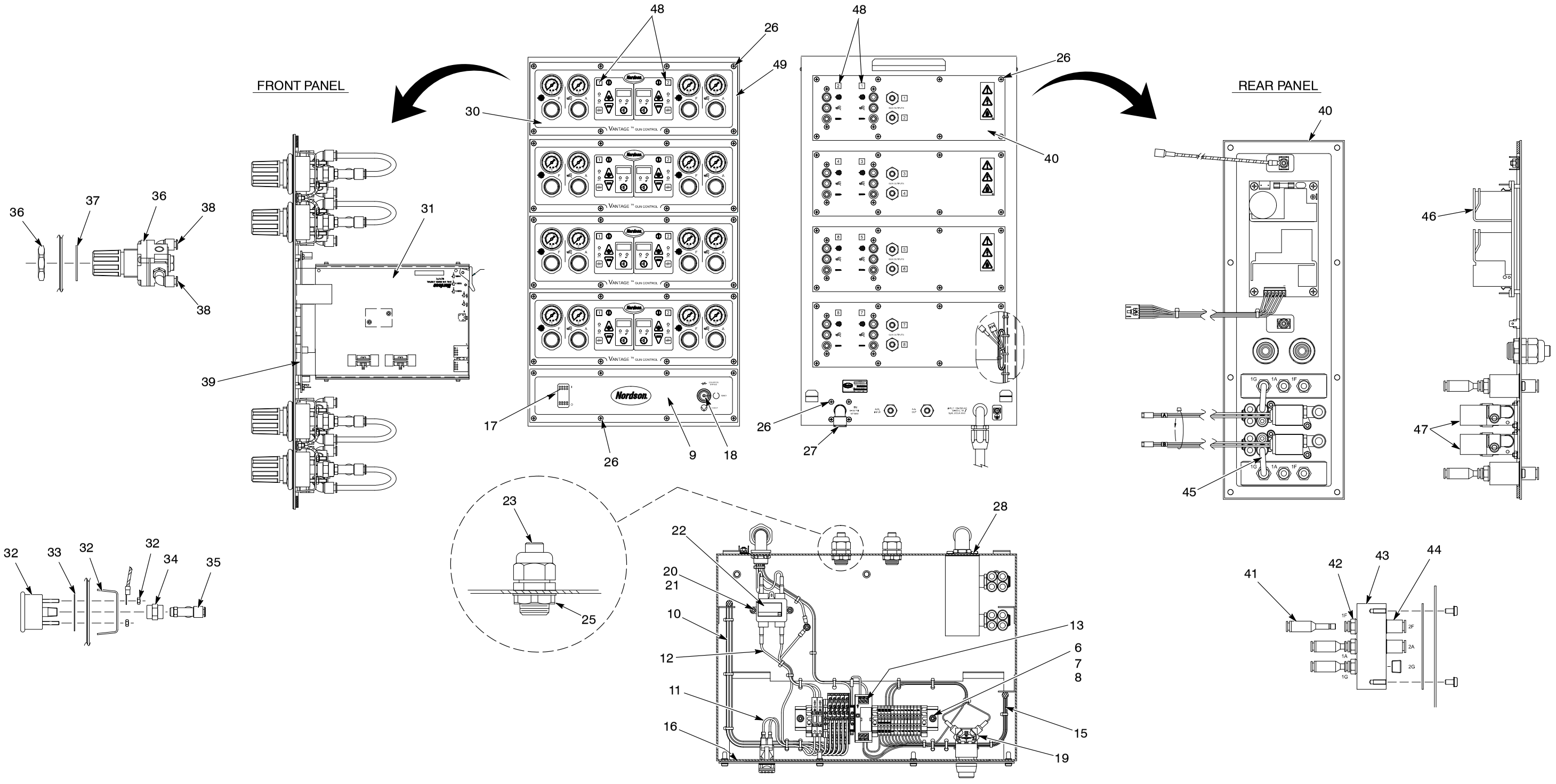


Figure 8-2 Vantage Modular Gun Control System (2 of 2)