

Sure Coat[®] Individual Controllers

Customer Product Manual
Part 334455G

Issued 9/03

**For parts and technical support, call the Industrial Coating
Systems Customer Support Center at (800) 433-9319 or
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Contact Us

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Section 1

Safety

Introduction

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

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

Qualified Personnel

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

Intended Use

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

Some examples of unintended use of equipment include

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

Regulations and Approvals

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

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

Personal Safety

To prevent injury follow these instructions.

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

Fire Safety

To avoid a fire or explosion, follow these instructions.

- Do not smoke, weld, grind, or use open flames where flammable materials are being used or stored.
- Provide adequate ventilation to prevent dangerous concentrations of volatile materials or vapors. Refer to local codes or your material MSDS for guidance.
- Do not disconnect live electrical circuits while working with flammable materials. Shut off power at a disconnect switch first to prevent sparking.

- Know where emergency stop buttons, shutoff valves, and fire extinguishers are located. If a fire starts in a spray booth, immediately shut off the spray system and exhaust fans.
- Clean, maintain, test, and repair equipment according to the instructions in your equipment documentation.
- Use only replacement parts that are designed for use with original equipment. Contact your Nordson representative for parts information and advice.

Grounding



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

All work conducted inside the spray booth or within 1 m (3 ft) of booth openings is considered within a Class 2, Division 1 or 2 Hazardous location and must comply with 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

Manual and automatic Sure Coat individual controllers are used to control manual and automatic Sure Coat powder spray guns. The automatic Sure Coat controller can also be used to control a Versa-Spray II automatic powder spray gun.

Sure Coat individual controllers:

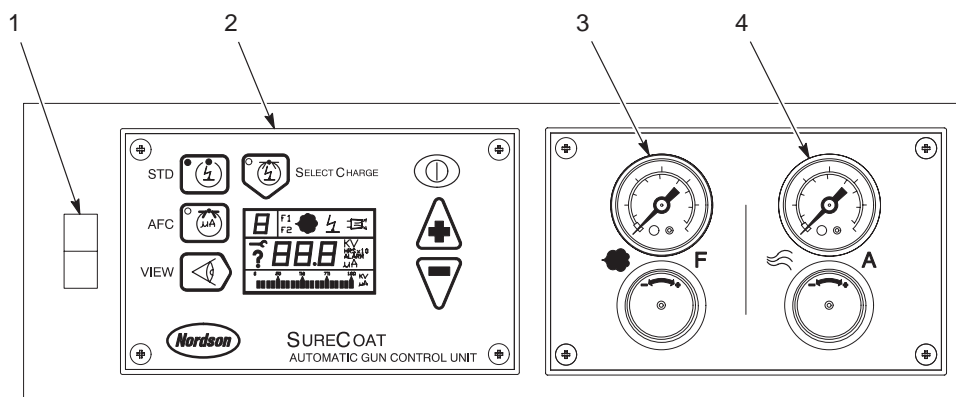
- control air pressure to the spray gun's powder feed pump
- provide dc power to the spray gun's voltage multiplier
- control the spray gun's electrostatic output
- monitor the spray gun's voltage and microamperage output

The individual controllers provide regulated flow rate and atomizing air to the powder feed pump only. Individual controllers can be connected to and controlled by a Sure Coat mini-master control unit, which provides auxiliary pneumatic controls for functions such as hopper fluidizing air. Refer to the *Sure Coat Mini-Master Controller* manual for more information.

Front Panel Controls and Indicators

See Figure 2-1. The controller's front panel is separated into two sections.

- The first contains a keypad and display (2). The main power switch (1) is located to the left of the keypad and display.
- The second contains regulators and gauges for the adjustment of flow rate (3) and atomizing (4) air pressures.



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Figure 2-1 Front Panel Controls and Indicators

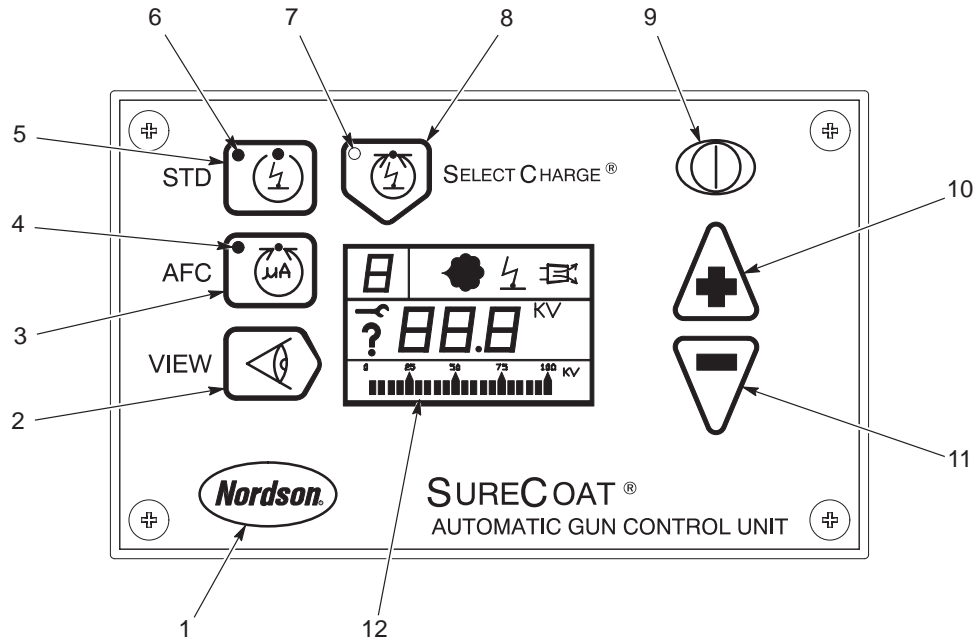
- | | | |
|-----------------------|--------------------------------------|--------------------------------------|
| 1. Main power switch | 3. Flow rate air regulator and gauge | 4. Atomizing air regulator and gauge |
| 2. Keypad and display | | |

Keypad

Refer to Table 2-1 and see [Figure 2-2](#). The keypad controls the electrostatic and diagnostic functions of the Sure Coat individual controller.

Table 2-1 Keypad Components

Item	Component	Description
1	Nordson logo (diagnostics) key	Puts the controller into diagnostics mode. Diagnostics mode cannot be started while the spray gun is triggered. Puts the controller into configuration mode if pressed during startup.
2	VIEW key	Toggles through gun current (μ A) and voltage (kV) when the gun is spraying, and gun on hours when the gun is not spraying.
3	AFC key	Turns on and off the automatic feedback current (AFC) function.
4	AFC indicator	Indicates that the AFC function is active.
5	STD key	Selects the Standard mode (STD) (kV control mode).
6	STD indicator	Indicates that Standard mode is active.
7	Select Charge indicator	Indicates that Select Charge mode is active.
8	Select Charge key	Turns on the Select Charge function and toggles through the four Select Charge modes. The Select Charge mode number is located in the upper left corner of the display.
9	Trigger enable key	Automatic Controllers Only: Enables/disables triggering by an external device, typically through a Sure Coat mini-master controller. NOTE: If the controller is used with a mini-master control unit, it must be configured first. Refer to <i>Configuring for Use with a Mini-Master Control Unit</i> on page 3-6 for instructions.
10	Up arrow key (+)	Increases the displayed set point value. Pressing the key continuously causes the value to increase until the maximum value is reached.
11	Down arrow key (-)	Decreases the displayed set point value. Pressing the key continuously causes the value to decrease until the minimum value is reached. If viewing the gun on hours, clears the hours. If in diagnostic mode, clears the faults.
12	Display	Refer to <i>Display</i> on page 2-4.



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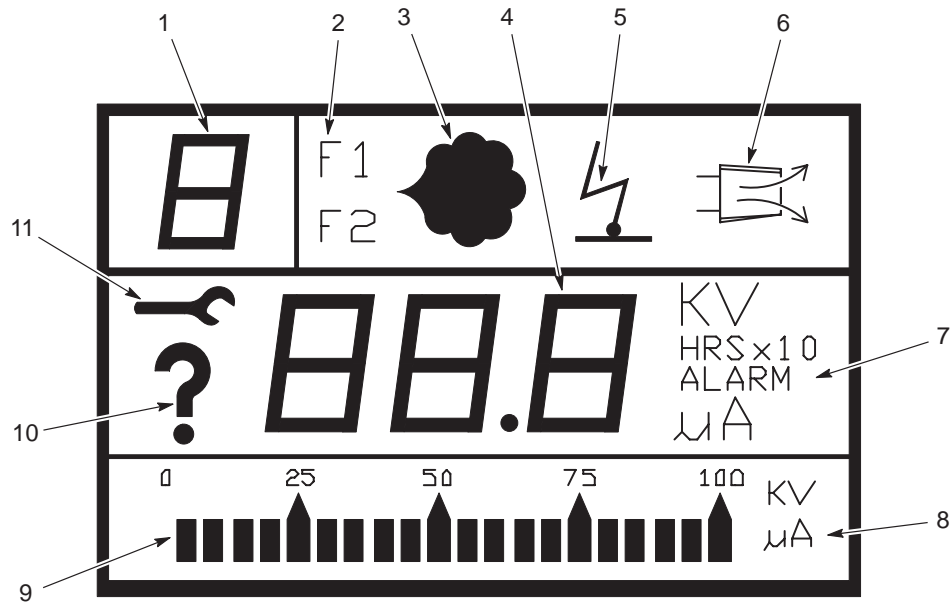
Figure 2-2 Front Panel Keypad (Automatic Controller Keypad Shown)

Display

Refer to Table 2-2 and see Figure 2-3.

Table 2-2 Display Indicators

Item	Component	Description
1	Select Charge value	Indicates which Select Charge value is currently active. Modes are numbered 1 to 4.
2	F1/F2	Not active in this control unit.
3	Powder icon	Indicates that the spray gun is triggered and air is flowing to the powder feed pump. This icon will flash if an error in the solenoid circuit is detected.
4	Digital display	Displays set point and actual parameter information. May also display gun on hours, total hours, error codes, software version, kV set point, gun μ A setpoint, and the gun μ A actual value. The display is blank when no appropriate value can be displayed.
5	Gun kV or electrostatics icon	Lights to indicate that the spray gun is triggered. The icon will flash if an error in the gun drive circuit is detected.
6	Purge icon	Manual Controllers Only: Lights to indicate that the gun's purge button is pressed.
7	Unit indicator	Lights to indicate the selection of kV, μ A, HRS x10, and ALARM.
8	Bar graph units	Shows the units being displayed by the bar graph.
9	Bar graph	Shows the parameter displayed on the digital display as a bar graph. Only active while the spray gun is triggered.
10	Fault icon	Lights when there is an alarm or error condition. Clear the fault by correcting all errors or powering off controller.
11	Diagnostics icon	Lights when the controller is in diagnostics mode.



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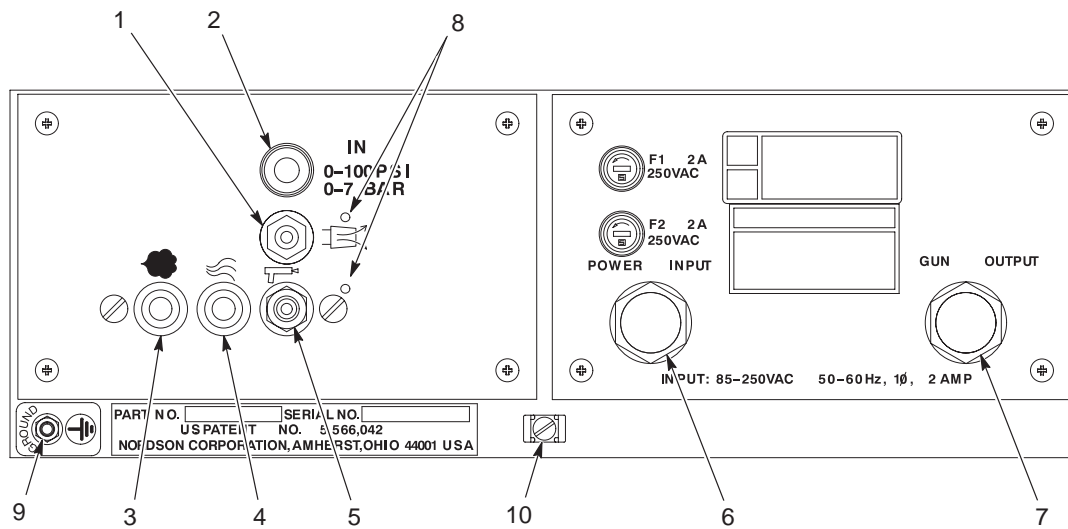
Figure 2-3 Display

Back Panel

Refer to Table 2-3 and see Figure 2-4.

Table 2-3 Back Panel

Item	Component	Function	Manual Tubing Size	Automatic Tubing Size
1	Purge air connector (manual controller only)	Purge air output to manual spray gun. Air pressure is unregulated at full supply pressure.	6 mm	N/A
2	IN air connector	Supply air input.	10 mm	10 mm
3	Flow rate air connector	Flow rate air supply output to powder pump.	8 mm	8 mm
4	Atomizing air connector	Atomizing air supply output to powder pump.	8 mm	8 mm
5	Gun air connector	Gun air output. Restrictor reduces the air pressure for the electrode air wash function.	4 mm	6 mm
6	POWER INPUT receptacle	Power input receptacle.	N/A	N/A
7	GUN OUTPUT receptacle	Gun cable output receptacle.	N/A	N/A
8	Air vents	Solenoid exhaust vents. Vents should not be plugged.	N/A	N/A
9	Enclosure Ground	Grounds enclosure to earth ground. Use for standalone controller.	N/A	N/A
10	Enclosure Ground	Use in multiple controller stack for common grounding.	N/A	N/A



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Figure 2-4 Manual Controller Back Panel

Timers

Timer	Description
Spray (Gun on hours)	Tracks the time the spray gun is on. Time is shown as hours (HRS). View by pressing the VIEW key when the spray gun is off. Reset by pressing the down arrow while viewing. Use this timer to track preventive maintenance procedures.
Total Spray (Gun on total hours)	Tracks the total time the spray gun has been on. Time is shown as HRS x 10. View by pressing the Nordson logo key and going into the diagnostics mode. The numeral 1 appears in the upper left corner of the display when the total spray timer is visible. This timer cannot be reset. Use this timer for diagnostics.
Service (Total hours)	Tracks the time the controller has been in service. Time is shown as HRS x 10. View by pressing the Nordson logo key and going into the diagnostics mode. The numeral 2 appears in the upper left corner of the display when the service timer is visible. This timer cannot be reset. Use this timer for diagnostics.

Operating Modes

The operating modes are Standard and Select Charge.

Mode	Option	Description
Standard		In standard (STD) mode the operator can choose to set either kV or maximum current (μ A) output.
	STD	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.). To set kV, turn STD on and AFC off. Only the STD LED lights.
	AFC	Automatic feedback current (AFC) allows the operator to set the maximum current (μ A) 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. To turn on AFC the controller must be in standard mode (STD LED lit). When AFC is on both the STD and AFC LEDs are lit.
Select Charge		Select Charge allows the operator to select different electrostatic charging characteristics for an optimum coating on differently shaped parts.
	Mode #1 (Recoat)	This mode is designed to delay back ionization and to minimize picture framing.
	Mode #2 (Touch-Up/Special)	For Manual Spray Guns: This mode is referred to as touch-up mode, particularly to facilitate Faraday penetration.
		For Automatic Spray Guns: This mode is referred to as special or reinforcement mode. It has the same capability as touch-up mode for a manual spray gun, but is typically applied to selected spray guns in an automatic gun arrangement. This mode may provide performance benefits in certain automatic coating applications.
	Mode #3 (Deep Cavity)	This mode is designed to provide high transfer efficiency inside deep cavities while minimizing back ionization on cavity edges.
Mode #4 (User Programmable)	This mode allows the operator to set kV and μ A for a particular powder or part. The control unit stores the settings in memory and restores them each time mode 4 is selected.	

Specifications

Contact your Nordson representative for additional information.

Enclosure Rating	IP54 and Class II, Division II	
Installation Requirements (per ANSI/ISA S82.01)		
Pollution degree	2	
Installation category	2	
Electrical		
Input	85-250 Vac, 2 A, 1 phase, 50/60 Hz	
Output	6-21 Vdc to the spray gun	
Short circuit output current	300 mA	
Maximum output current	600 mA	
Input Air Pressures	Manual Controller	Automatic Controller
Minimum	4.1 bar (60 psi)	5.6 bar (80 psi)
Maximum	7 bar (100 psi)	7.2 bar (105 psi)
Typical Operating Air Pressures	Manual Controller	Automatic Controller
Flow rate air	1.0 bar (15 psi)	2.0 bar (30 psi)
Atomizing air	0.3 bar (5 psi)	1 bar (15 psi)
Gun air (fixed)	0.3 bar (5 psi)	0.6 bar (10 psi)

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.

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.

Table Top Mounting

Set a single controller on a clean, flat surface. Use caution if placing other equipment on the surface so that the controller does not get damaged.

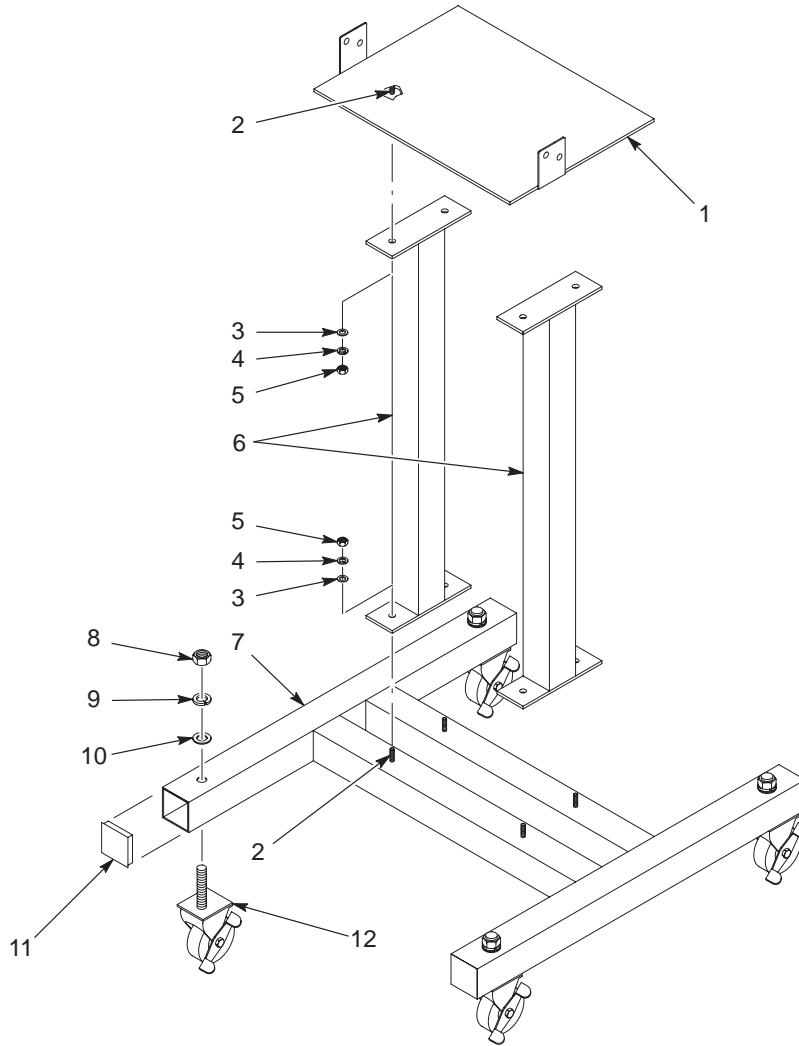
Stand Mounting

Up to six manual or automatic controllers plus one mini-master control unit can be mounted on a stand.

NOTE: The stand mounting kit must be ordered separately. Refer to *Mounting Stand Parts* on page 7-10 for ordering information.

1. See [Figure 3-1](#). Assemble the mounting stand:
 - a. Attach the legs (6) to the base (7) by guiding the threaded studs (2) through the holes in the legs. Secure the legs to the base using the flat washers (3), lock washers (4), and hex nuts (5).
 - b. Attach the tray (1) to the legs by guiding the threaded studs through the holes in the legs. Secure the tray to the legs using the flat washers (3), lock washers (4), and hex nuts (5).
 - c. Attach the casters (12) to the base using the flat washers (10), lock washers (9), and hex nuts (8).
 - d. Insert the end caps (11) into the hollow ends of the base.

Stand Mounting *(contd)*



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Figure 3-1 Assembling the Mounting Stand

- | | | |
|-------------------|-------------|------------------|
| 1. Tray | 5. Hex nuts | 9. Lock washers |
| 2. Threaded studs | 6. Legs | 10. Flat washers |
| 3. Flat washers | 7. Base | 11. End caps |
| 4. Lock washers | 8. Hex nuts | 12. Casters |

2. See [Figure 3-2](#). Set the first individual controller (2) onto the tray (1). Use the provided pan-head screws (4) to secure the controller to the tabs on the tray.

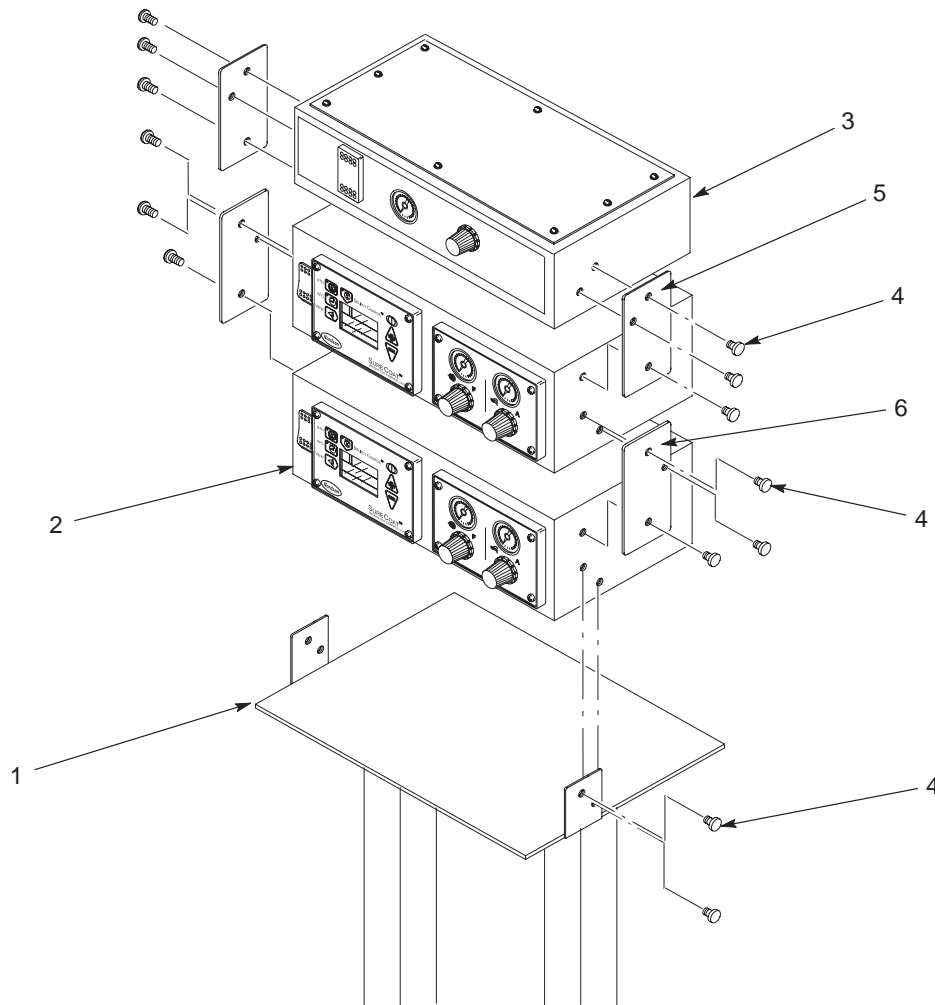


CAUTION: Do not stack more than six individual controllers and the mini-master controller onto the stand. The stand may tip over if more than six individual controllers and the mini-master controller are attached to the stand.

- Stack additional controllers on top of the first. Secure each controller to the one beneath it using the mounting brackets (6) and pan-head screws (4) provided with the individual controllers.

NOTE: If used, the Sure Coat mini-master control unit must be placed on top of the stack of individual controllers. You must be able to remove the mini-master control unit top panel to make connections to the individual controllers and configuration changes.

- If used, stack the Sure Coat mini-master controller (3) on top of the individual controllers. Secure the mini-master controller to the individual controllers using the mounting brackets (5) and pan-head screws (4) provided with the mini-master controller.



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Figure 3-2 Mounting Individual Controllers onto the Mounting Stand

- | | | |
|--------------------------|---------------------------|-----------------------------------|
| 1. Tray | 3. Mini-master controller | 5. Mini-master controller bracket |
| 2. Individual controller | 4. Pan-head screws | 6. Individual controller bracket |

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 the locking disconnect switch or breaker may result in a severe shock during installation or repair.



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.

1. Install a locking disconnect switch or breaker in the service line ahead of the controller. Use the switch to shut off and lock out system power during installation or repair.
2. Make sure that the input voltage is 85-250 Vac nominal, 1 phase, 50/60 Hz.
3. Wire the unterminated end of the power cord to a breaker or disconnect switch as shown in Table 3-1.

NOTE: Refer to *Configuring for Use With a Mini-Master Control Unit* on page 3-6 for information on connecting an individual controller to a mini-master control unit. Refer to Table 3-1 for power cord wiring to the mini-master control unit.

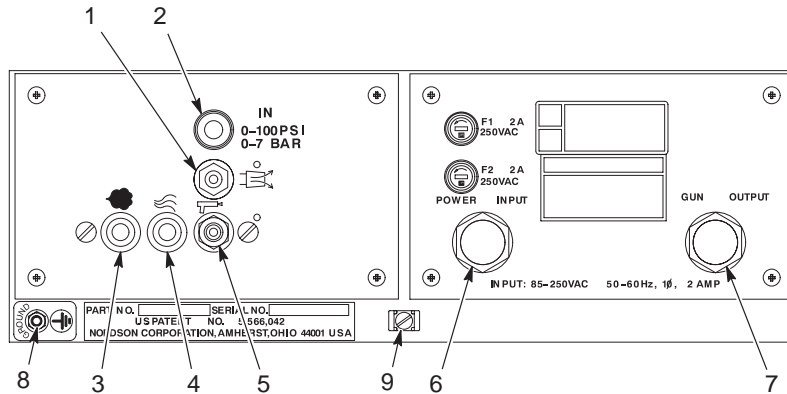
Table 3-1 Power Cord Wiring

Wire	Function
Brown	L1 (hot)
Blue	L2 (neutral)
Green/yellow	Ground

4. See [Figure 3-3](#). Plug the power cord into the POWER INPUT receptacle (6) on the back panel. Secure the cord to the receptacle with the retaining nut.
5. Connect the ground wire furnished with the controller to the ground stud (8) on the enclosure back panel and secure the clamp to a true earth ground.

NOTE: If connecting the controller to a mini-master control unit, daisy-chain the individual controllers together using the center ground stud (9) and the provided ground strap. Connect the mini-master control unit to an earth ground.

6. Plug the gun cable into the GUN OUTPUT receptacle (7). Secure the cable to the receptacle with the retaining nut.



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Figure 3-3 Electrical and Pneumatic Connections—Back Panel

- | | | |
|---|----------------------------|--|
| 1. Purge air connector (manual controller only) | 4. Atomizing air connector | 7. GUN OUTPUT receptacle |
| 2. Supply air (IN) connector | 5. Gun air connector | 8. Ground stud (standalone) |
| 3. Flow rate air connector | 6. POWER INPUT receptacle | 9. Ground stud (for use with mini-master controller) |

Pneumatic Connections

Refer to *Specifications* on page 2-8 for air quality and pressure specifications. See Figure 3-3.

Input and Output Air

Air Type	Tubing size	From	To
Input	10-mm	air supply shut-off valve in the supply line	IN connector (2) on the rear panel
Output Flow rate	8-mm (Black)	 Flow rate connection (3) on back panel	"F" connection on powder pump
Atomizing	8-mm (Blue)	 Atomizing connection (4) on back panel	"A" connection on powder pump
NOTE: Install a manually operated shut-off valve in the supply line to the controller.			

Gun Air

Controller	Tubing size	From	To
Manual			
Gun Air	4-mm	Gun air connector (5) on back panel.	Gun air connector on the spray gun
Purge Air	6-mm (Black)	Purge air connector (1) on back panel.	Purge air connector on the spray gun
Automatic	6-mm	Gun air connector (5) on the back panel	Gun air connector on the spray gun

Configuring for Use with a Mini-Master Control Unit

Individual controllers are shipped configured for use as standalone units. Use the following procedure to configure an individual controller for use with a Sure Coat mini-master control unit.

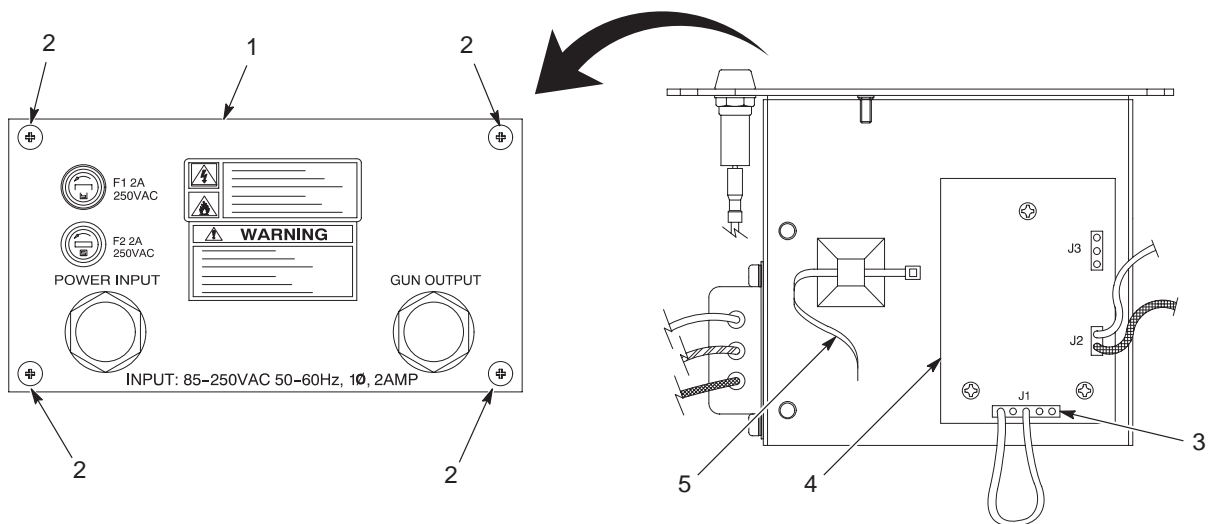


WARNING: Fire detection and conveyor interlocks must interrupt ac power to all automatic individual controllers to prevent serious damage or fire.



WARNING: Shut down and lock out the main power supply before removing any enclosure panels. Failure to observe this warning may result in a severe shock.

1. See Figure 3-4. Remove the four screws (2) from the power supply module panel (1). Carefully slide the power supply module out of the enclosure.
2. Locate the interface circuit board (4) on the underside of the power supply tray. Unplug the jumper from terminal J1 (3).
3. Locate the wire harness terminated with a plug and tied down with the cable tie (5).
4. Plug the harness into terminal J1.
5. Carefully slide the power supply into the enclosure and secure it with the four screws.
6. Repeat this procedure for each individual controller.
7. Refer to [Table 3-1](#). Connect each individual controller's power cord to the mini-master control unit as described in the *Sure Coat Mini-Master Controller* manual.



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Figure 3-4 Configuring for Use with a Mini-Master Control Unit

- | | | |
|------------------------------|----------------------------|---------------------------|
| 1. Power supply module panel | 3. Terminal J1 and jumper | 5. Cable tie and mounting |
| 2. Screws | 4. Interface circuit board | |

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.



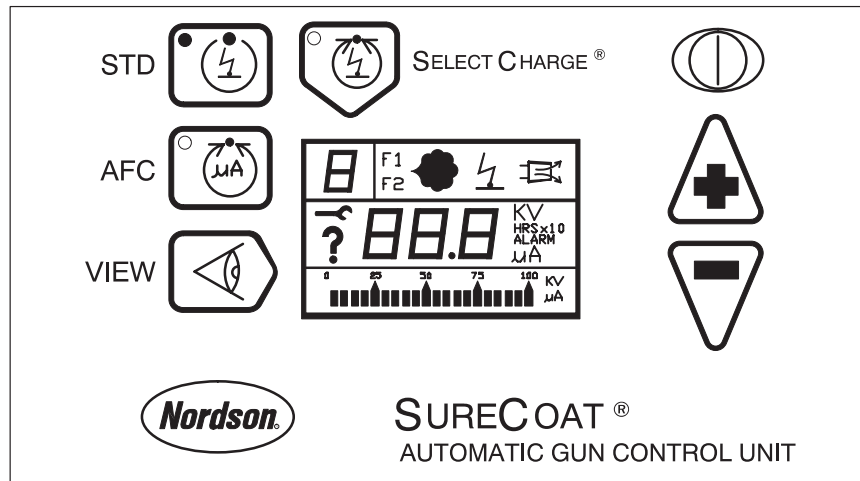
WARNING: All electrically conductive equipment in the spray area must be grounded. Ungrounded or poorly grounded equipment can store an electrostatic charge which can give personnel a severe shock or arc and cause a fire or explosion.

This section explains basic operation procedures for the Sure Coat individual controller. 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 unit. 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 control unit.
2. Power on the control unit by turning the mini-master control unit's power switch to the on position. This causes all the icons on the LCD panel to light up. The controller switches to the factory default mode or to the last selected mode. The LCD displays the kV or μA setting.

Startup *(contd)*



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Figure 4-1 Typical Display when Power is Turned On

3. If you are starting up a spray gun for the first time, perform the *Initial Gun Usage* procedures on page 4-4.
4. Select an operating mode using Tables 4-2 through 4-5 in the appropriate *Operating Modes* section starting on page 4-5.
Table 4-1 lists the values shown on the display.
5. Set flow rate and atomizing air pressures to the following settings:

Air Type	Manual Controller	Automatic Controller
Flow rate air	1 bar (15 psi)	2 bar (30 psi)
Atomizing air	0.33 bar (5 psi)	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 4-9 for guidelines for adjusting the pressures to obtain the desired results.

6. Trigger the spray gun to test the spray pattern.
7. Adjust the flow rate and atomizing air pressures to obtain the desired spray pattern.
8. Adjust flow rate and atomizing air pressures; operating modes and kV or μA settings; and spray gun nozzle to obtain the desired spray pattern and desired powder coverage and coating thickness.

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 *Operating Modes* starting on page 4-5 for suggested kV or μA settings, and *Air Pressure Adjustments* on page 4-9 for guidelines on flow rate and atomizing air pressure settings.

Table 4-1 Displays

Function	Display when gun triggered ⁽¹⁾	Display when gun not triggered
STD Mode & Viewing kV	Version 2.0 and 4.0: kV set point Version 3.0: Actual kV	kV setting
AFC On & Viewing kV	Actual kV	Initial kV setting (factory kV)
AFC On & Viewing μA	Actual μA ⁽²⁾	AFC set point ⁽³⁾
AFC Off & Viewing kV	kV set point	kV set point
AFC Off & Viewing μA	Actual μA	Blank
⁽¹⁾ Use the VIEW key to toggle the display between kV and μA values. The units are shown on the display and the bar graph. ⁽²⁾ Pressing the AFC key shows the AFC set point then the actual μA current feedback from the spray gun on the display and the bar graph. ⁽³⁾ Pressing the up or down key switches the display to AFC set point. All subsequent key presses change the AFC set point.		

Initial Gun Usage

When a spray gun is first put into service, perform the *Configuring Gun Type* and *Gun Current Baseline* procedures. You do not need to perform these procedures again unless you connect a new spray gun to the controller.

Configuring Gun Type—Only for Software Versions 3.0 and 4.0

The default spray gun type is the Sure Coat powder spray gun. Perform the following procedure to switch between Sure Coat and Versa-Spray powder spray guns.

1. Depress and hold the Nordson logo key and turn on the control unit.
2. Hold the Nordson logo key until CFG appears on the display. CHOOSE GUN scrolls across the display.
3. Either press the VIEW key or wait until SC appears on the display.
4. Use the arrow keys to select either Sure Coat (SC) or Versa-Spray (VS).
5. Press the Nordson logo key to exit the CONFIG mode.

Gun Current Baseline

1. Turn on the mini-master control unit, or if the control unit is a standalone unit turn on electrical power to the unit.
2. Make sure the control unit is in STD mode, AFC off, with the maximum kV set point displayed.
Sure Coat guns: 95 kV,
Versa-Spray guns: 100 kV
3. Press the VIEW key to display μA .
4. Trigger the spray gun, and adjust the flow rate and the atomizing air pressure to obtain the desired spray pattern.
5. Record the μA output with no parts in front of the spray gun.

Monitor the μA output daily, under the same conditions. A significant increase in μA output indicates a probable short in the gun resistor. A significant decrease indicates a failing resistor or voltage multiplier.

Operating Modes—Automatic Controller

Use this section to set the operating mode and kV or μA set points on an automatic controller.

Standard Operating Mode—Automatic Controller

Table 4-2 Standard Operating Mode—Automatic Controller

Mode	AFC	Description		
Standard	On	Press the STD button to put the controller in Standard mode. Use the up/down arrow keys to adjust the setpoint or turn the kV on or off. The controller stores the kV setting when powered off or the mode is changed.		
		kV Setting	Sure Coat Gun	Versa-Spray Gun
		KV set point	95 kV (adjustable)	100 kV (adjustable)
		Range	0, then 25-95 kV	0, then 30-100 kV
		Maximum output default setting	95 kV	100 kV
	Off	Press the STD button to put the controller in Standard mode. Press the AFC button to turn on the AFC function. Use the up/down arrow keys to adjust the desired AFC set point. The factory setting is 30 μA . If the setpoint is changed, the controller stores the new set point. Voltage is automatically set to maximum. If current feedback reaches the μA setpoint, voltage is automatically adjusted to maintain the required coverage. Voltage is not adjustable in AFC mode.		
		AFC Setting	Sure Coat Gun	Versa-Spray Gun
		KV initial value	95 kV (not adjustable)	100 kV (not adjustable)
		Set point increments	5 μA	5 μA
		Range	10-100 μA	10-120 μA
		Factory setting	30 μA	30 μA
		Maximum current	100 μA	120 μA

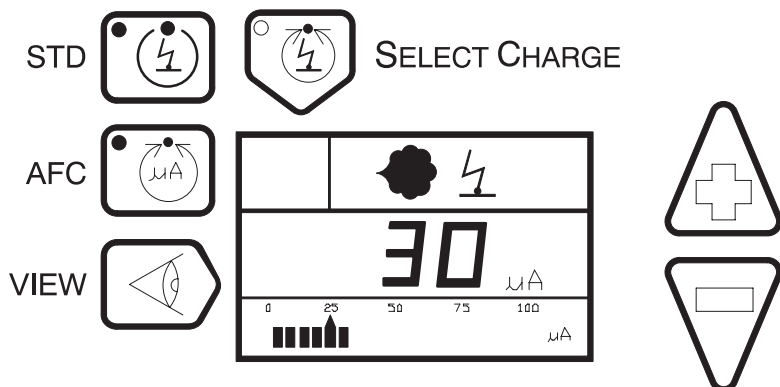


Figure 4-2 Standard Operating Mode with AFC On

Select Charge Operating Modes—Automatic Controller

See Figure 4-3. Press the Select Charge key to select the desired Select Charge value, based on your application and coating requirements. In modes 1-3 the kV and AFC set points are not user-adjustable and are set for optimum output for the mode.

Table 4-3 Select Charge Operating Modes—Automatic Controller

Mode	Application	kV/AFC Set Point Adjustment	Initial kV Value		Maximum Current	
			Sure Coat Gun	Versa-Spray Gun	Sure Coat Gun	Versa-Spray Gun
1	Recoat	not adjustable	95 kV	100 kV	15 μ A	15 μ A
2	Special	not adjustable	60 kV	60 kV	30 μ A	30 μ A
3	Deep Cavity with Gun Inside	not adjustable	95 kV	100 kV	70 μ A	70 μ A
4	User Programmable	adjustable	60 kV	60 kV	100 μ A	120 μ A

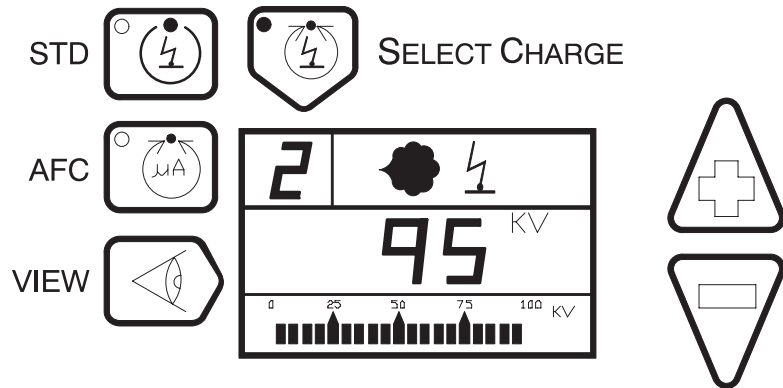
Select Charge Mode Examples

Mode 1: When recoating parts that have already been cured but require additional coating and curing, the gun current should be limited and maintained.

Mode 2: When coating large parts with a mix of large, flat sections and recessed or angled sections, high kV is required for painting the flat sections at a far gun to part distance, but low voltage from the gun is required for painting the recessed sections at a close gun to part distance.

Mode 3: When coating parts with deep cavities, low kV and low current are required to coat the corners, but high kV and high current are required to coat the flat sections inside.

Mode 4: For special applications, such as metallic powders or unique parts. To use, select mode 4 and set the kV and μ A. The controller stores the settings and recalls them each time mode 4 is selected.



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Figure 4-3 Select Charge Mode

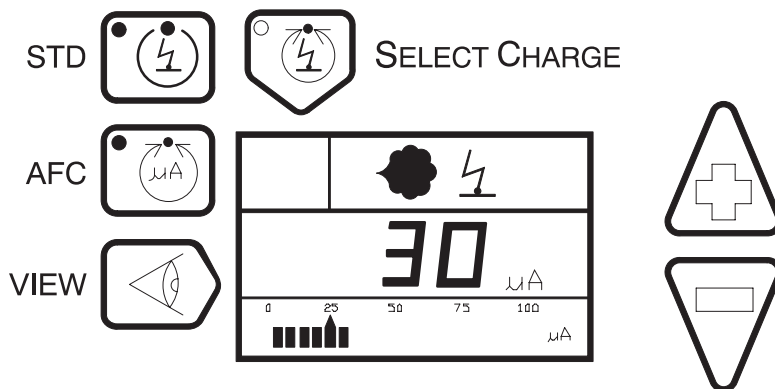
Operating Modes—Manual Controller

Use this section to set the operating mode and kV or μA set points on a manual controller.

Standard Operating Mode—Manual Controller

Table 4-4 Standard Operating Mode—Manual Controller

Mode	AFC	Description		
Standard	Off	Press the STD button to put the controller in Standard mode. Use the up/down arrow keys to adjust the setpoint or turn the kV on or off. The controller stores the kV setting when powered off or the mode is changed.		
		kV Setting	Sure Coat Gun	Versa-Spray Gun
		KV set point	95 kV (adjustable)	80 kV (adjustable)
		Range	0, then 25-95 kV	0, then 25-80 kV
		Maximum output default setting	95 kV	80 kV
	On	Press the STD button to put the controller in Standard mode. Press the AFC button to turn on the AFC function. Use the up/down arrow keys to adjust the desired AFC set point. The factory setting is 30 μA . If the setpoint is changed, the controller stores the new set point. Voltage is automatically set to maximum. If current feedback reaches the μA setpoint, voltage is automatically adjusted to maintain the required coverage. Voltage is not adjustable in AFC mode.		
		AFC Setting	Sure Coat Gun	Versa-Spray Gun
		KV initial value	95 kV (not adjustable)	80 kV (not adjustable)
		Set point increments	5 μA	5 μA
		Range	10-100 μA	10-120 μA
		Factory setting	30 μA	30 μA
		Maximum current	100 μA	120 μA



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Figure 4-4 STD Mode with AFC On

Select Charge Operating Modes—Manual Controller

See Figure 4-5. Press the Select Charge key to select the desired Select Charge value, based on your application and coating requirements. In modes 1-3 the kV and AFC set points are not user-adjustable and are set for optimum output for the mode.

Table 4-5 Select Charge Operating Modes—Manual Controller

Mode	Application	kV/AFC Set Point Adjustment	Initial kV Value		Maximum Current	
			Sure Coat Gun	Versa-Spray Gun	Sure Coat Gun	Versa-Spray Gun
1	Recoat	not adjustable	95 kV	80 kV	15 μ A	15 μ A
2	Touch Up	not adjustable	95 kV	80 kV	50 μ A	50 μ A
3	Deep Cavity with Gun Inside	not adjustable	95 kV	80 kV	70 μ A	70 μ A
4	User Programmable	adjustable	60 kV	60 kV	100 μ A	120 μ A

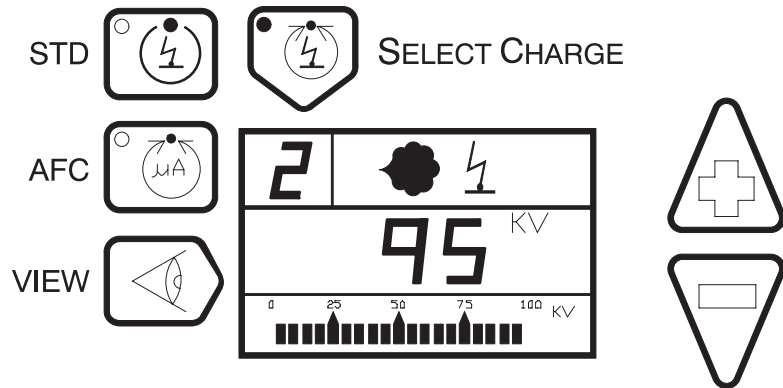
Select Charge Mode Examples

Mode 1: When recoating parts that have already been cured but require additional coating and curing, the gun current should be limited and maintained.

Mode 2: When coating large parts with a mix of large, flat sections and recessed or angled sections, high kV is required for painting the flat sections at a far gun to part distance, but low voltage from the gun is required for painting the recessed sections at a close gun to part distance.

Mode 3: When coating parts with deep cavities, low kV and low current are required to coat the corners, but high kV and high current are required to coat the flat sections inside.

Mode 4: For special applications, such as metallic powders or unique parts. To use, select mode 4 and set the kV and μ A. The controller stores the settings and recalls them each time mode 4 is selected.



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Figure 4-5 Select Charge Mode

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

NOTE: Auxiliary air connections for fluidizing air are not available on the controllers. Connect the controller to the Sure Coat mini-master control unit if your application requires an auxiliary air connection.





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.

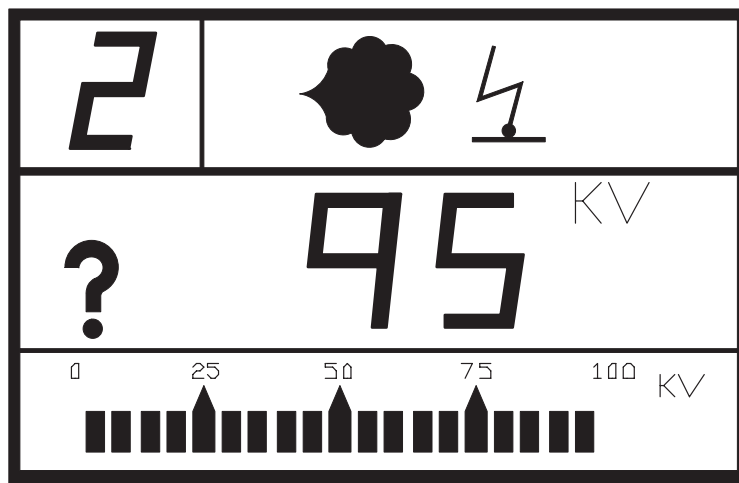
If the fluidizing pressure is set too low, a heavy inconsistent powder may flow. If the fluidizing pressure is too high, the powder boils violently, and the flow is uneven with possible air pockets in the powder stream.

Error Conditions

The Sure Coat control unit continuously monitors the operation of vital system components. The question mark (?) error icon alerts the operator about potential faults to prevent rejects and to reduce downtime. The automatic self diagnostics pinpoint a faulty component to facilitate troubleshooting and also reduces downtime.

See Figure 4-6.

Icon	Icon Status	Gun Status	Problem
	Flashing	Triggered	Electrostatics
	Flashing	Not triggered	kV is on when it should be off
	Flashing	Triggered	Solenoid
	On continuously	Triggered	Press the Nordson key to view error code



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Figure 4-6 Error Condition Display

Shutdown

1. Turn off power to the controller:
 - If the controllers are connected to a mini-master control unit, turn the main power switch on the mini-master control unit to the off position.
 - If the controller is not connected to a mini-master control unit, turn the individual controller's power switch to the off position.
2. Ground the gun electrode 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 *Gun Current Baseline* 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.

This section contains troubleshooting procedures. 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.



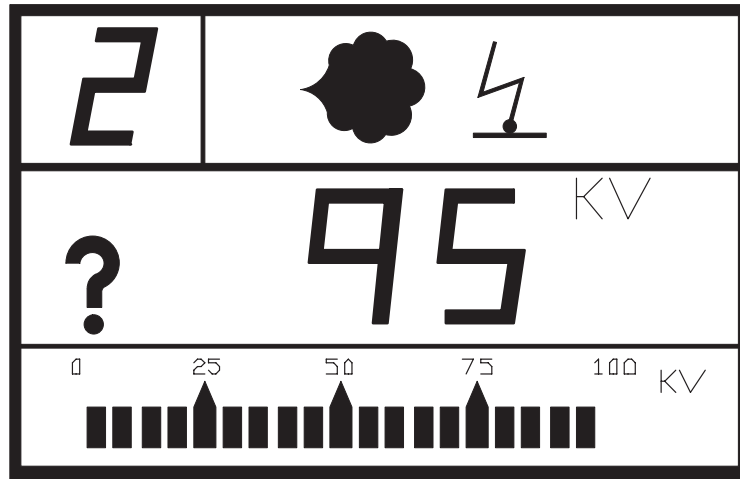
WARNING: Do not touch the spray gun if the kV icon is flashing. If the kV icon is flashing while the spray gun is not spraying, voltage may be present at the spray gun due to faulty hardware. Failure to comply with this warning may result in an electrical shock.

Icon	Icon Status	Gun Status	Problem
	Flashing	Triggered	Electrostatics
	Flashing	Not triggered	kV is on when it should be off
	Flashing	Triggered	Solenoid
	On continuously	Triggered	Press the Nordson key to view error code

Error codes may only be viewed in diagnostics mode. Errors are not cleared by viewing the codes. To clear error codes, you must first fix the problem, then press the down arrow or turn off the control unit.

Diagnostics Mode

See Figure 5-1. If the spray gun is triggered while an error condition is present, a question mark is displayed on the digital display and the powder and kV symbols flash on and off. The diagnostics mode must be entered to correct the errors.



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Figure 5-1 Display of an Error Condition

Entering Diagnostics Mode

The diagnostics function is available at all times. The spray gun may still be triggered while the display shows the diagnostics information.

NOTE: In software version 1.0, the diagnostics function is only available when the system is not triggered. Triggering the spray gun or pressing the Nordson key at any time while in diagnostics results in an automatic exit from the diagnostics mode and a return to the previous operating mode.

NOTE: Do not power off the control unit unless instructed to do so. Error codes are erased when the control unit is powered off.

See [Figure 5-2](#). Press and hold the Nordson logo key to enter the diagnostics mode.

In diagnostics mode, a wrench symbol is shown on the digital display.

When diagnostics mode is entered, the system performs internal checks and automatically cycles through the following diagnostics sequence. Each set of information is displayed for several seconds.

NOTE: Record the error codes displayed during the diagnostics sequence. Refer to *Error Codes* on page 5-4 to identify the error code and correct the problem.



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Figure 5-2 Diagnostics Mode Display

Diagnostics Sequence

1. Error codes are shown on the digital display if any error occurs.
2. Dashes are displayed to indicate the end of the error code.
3. The total spray timer value is displayed, and the number 1 is displayed in the Select Change digit along with the HRS x10.
4. The service timer value is displayed and the number 2 is displayed in the upper left corner along with the HRS x10.
5. All segments and icons light up on the LCD display.
6. The controller type is displayed.
7. The software version is displayed. The letter S is displayed in the upper left hand corner, along with the version number.

NOTE: After the entire diagnostics sequence is completed, the controller automatically exits diagnostics and reverts to the previous operating mode.

Error Codes

Table 5-1 Error Codes

Error Code	Problem	Corrective Action
1	Problem writing to Neuron EPROM	Turn off control unit power to reset the microprocessor. If the problem persists, replace the control board.
2	RAM test failed	Turn off control unit power to reset the microprocessor. If the problem persists, replace the control board.
3	μ A Feedback fault	Trigger the spray gun with no parts in front of the spray gun. If the gun current is greater than 105 μ A, check for a short circuit of the current feedback wire in the gun cable: Unplug the connector to the multiplier at the back of the spray gun. Trigger the spray gun and check the display. <ul style="list-style-type: none"> • If the error stays E3, replace the cable. • If the error changes to E7, replace the multiplier.
4	Trigger valve solenoid #1 has a short or open	Turn off control unit power and check the solenoid valve coil. If the problem persists, replace the solenoid.
5	Purge valve solenoid #2 has a short or open	Turn off control unit power and check the solenoid valve coil. If the problem persists, replace the solenoid.
6	Not used in this system	Contact your Nordson representative for assistance.
7	Gun cable or multiplier open circuit	<p>Automatic Controllers:</p> <p>If the current display is 1 μA or less, check the multiplier cable and electrode assembly for loose connections. If the connections are secure, check the multiplier with a kV meter as described in the spray gun manual.</p> <p>If the multiplier reading is acceptable, check for a defective cable as described in the spray gun manual.</p> <p>Manual Controllers:</p> <p>Check if the LED on the back of the spray gun illuminates when the trigger is depressed.</p> <ul style="list-style-type: none"> • If the LED is not on, check for a faulty gun cable. • If the LED is on, trigger the spray gun close to a grounded part. <p>If the current display is 1 μA or less, check the multiplier cable and electrode assembly for loose connections. If the connections are secure, check the multiplier with a kV meter. If the kV meter shows output voltage, check for a defective feedback wire in the cable. If the feedback wire is good, check for a defective multiplier.</p>

Continued...

Error Code	Problem	Corrective Action
8	Gun cable or multiplier short circuit	<p>Automatic Controllers: Unplug the gun cable from the back of the gun and trigger the spray gun.</p> <ul style="list-style-type: none"> • If the error code changes to E7, check for a defective multiplier as described in the spray gun manual. • If the error code stays E8, unplug the cable from the back of the control unit. If the error code changes to E7, replace the cable. <p>Manual Controllers: Check if the LED on the back of the spray gun illuminates when the trigger is depressed. If the LED is not on, turn off the control unit. Unplug the connector to the multiplier at the back of the spray gun. Trigger the spray gun and check the LED. If the LED stays off and the error code stays E8, the cable is shorted and must be replaced. If the LED is on and the error code changes to E7, the gun cable is good. Check for a defective multiplier.</p>
9	Not used in this system	Contact your Nordson representative for assistance.
10	Not used in this system	Contact your Nordson representative for assistance.
11	Controller board hardware	<p>Turn off control unit power. Unplug the multiplier connection at the back of the spray gun. Power up the controller and then trigger the spray gun. If the problem changes to an open circuit, then the board is working correctly. Check the multiplier. If the problem persists, replace the controller board.</p>
12	Not used in this system	Contact your Nordson representative for assistance.
13	Not used in this system	Contact your Nordson representative for assistance.
14	Not used in this system	Contact your Nordson representative for assistance.
15	Foldback fault	<p>Automatic Controllers: Unplug the gun cable from the back of the gun and trigger the spray gun.</p> <ul style="list-style-type: none"> • If the error code changes to E7, check for a defective multiplier as described in the spray gun manual. • If the error code stays E15, unplug the cable from the back of the control unit. If the error code changes to E7, replace the cable. <p>Manual Controllers: Check if the LED on the back of the spray gun illuminates when the trigger is depressed. If the LED is not on, turn off the control unit. Unplug the connector to the multiplier at the back of the spray gun. Trigger the spray gun and check the LED. If the LED stays off and the error code stays E8, the cable is shorted and must be replaced. If the LED is on and the error code changes to E7, the gun cable is good. Check for a defective multiplier.</p>

Determining Software Version

See Figure 5-3.

The software version of your system is displayed during the diagnostics mode. The letter S (software) appears in the upper left corner, the software version is displayed next to the wrench symbol.



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Figure 5-3 Determining Software Version

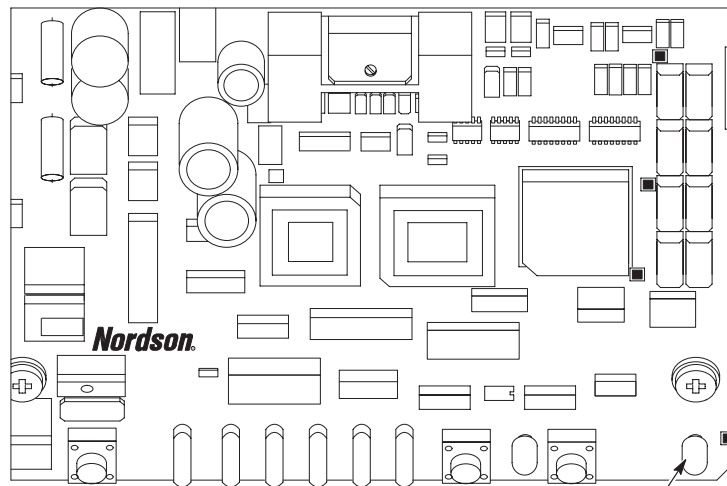
No Display when Powered Up



WARNING: Risk of electrical shock. Shut off power at the control unit or at a breaker or disconnect switch. Lock and tag the switch. Failure to observe may result in equipment damage, personal injury, or death.

See Figure 5-4.

1. Check the fuses on the back panel. Replace any open fuses.
2. Remove the four screws securing the keypad module to the front of the enclosure and tilt the top of the module down.
3. Find the green dc power LED (1) on the controller board. See the keypad module parts illustration in the *Parts* section for the controller board location.
 - If the LED is on, replace the LCD module.
 - If the LED is off, perform the *Checking Electrical Circuits* procedure on page 5-8.



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Figure 5-4 Controller Board dc Power LED Location

1. Green dc power LED

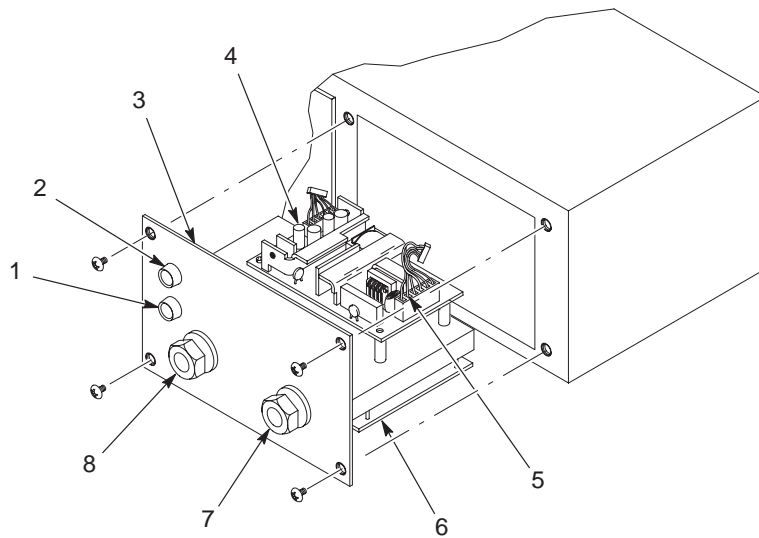
Checking Electrical Circuits



WARNING: Risk of electrical shock. Shut off power at the control unit or at a breaker or disconnect switch. Lock and tag the switch. Failure to observe may result in equipment damage, personal injury, or death.

See Figure 5-5.

1. Check the fuses (1 and 2) on the back panel (3). Replace any blown fuses.
2. Check the power cord connections. Tighten any loose connections.
3. Remove the power supply module. Check the dc outputs (5) at the dc power supply (4). Tighten any loose wires.
4. Tighten the connections at the dc power supply and the interface board (6). Tighten any loose wires.
5. Check the connections at the ac power input (8) and the gun cable input (7) on the back panel. Tighten any loose connections.



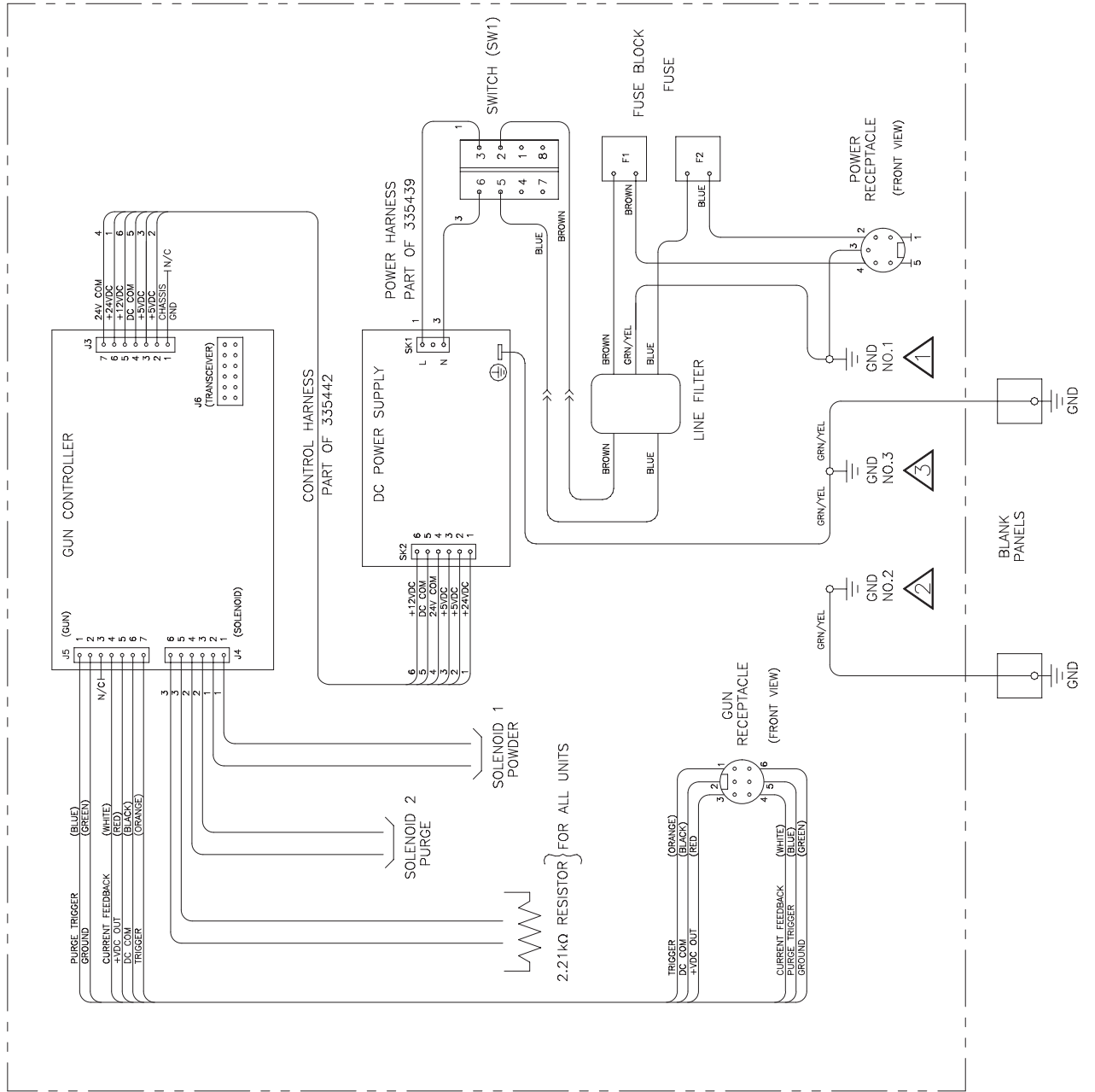
1400391A

Figure 5-5 Checking Electrical Circuits

- | | |
|-----------------|--------------------|
| 1. Fuse 1 | 5. Dc output |
| 2. Fuse 2 | 6. Interface board |
| 3. Back panel | 7. Gun cable input |
| 4. Power supply | 8. Ac power input |

Wiring Diagrams

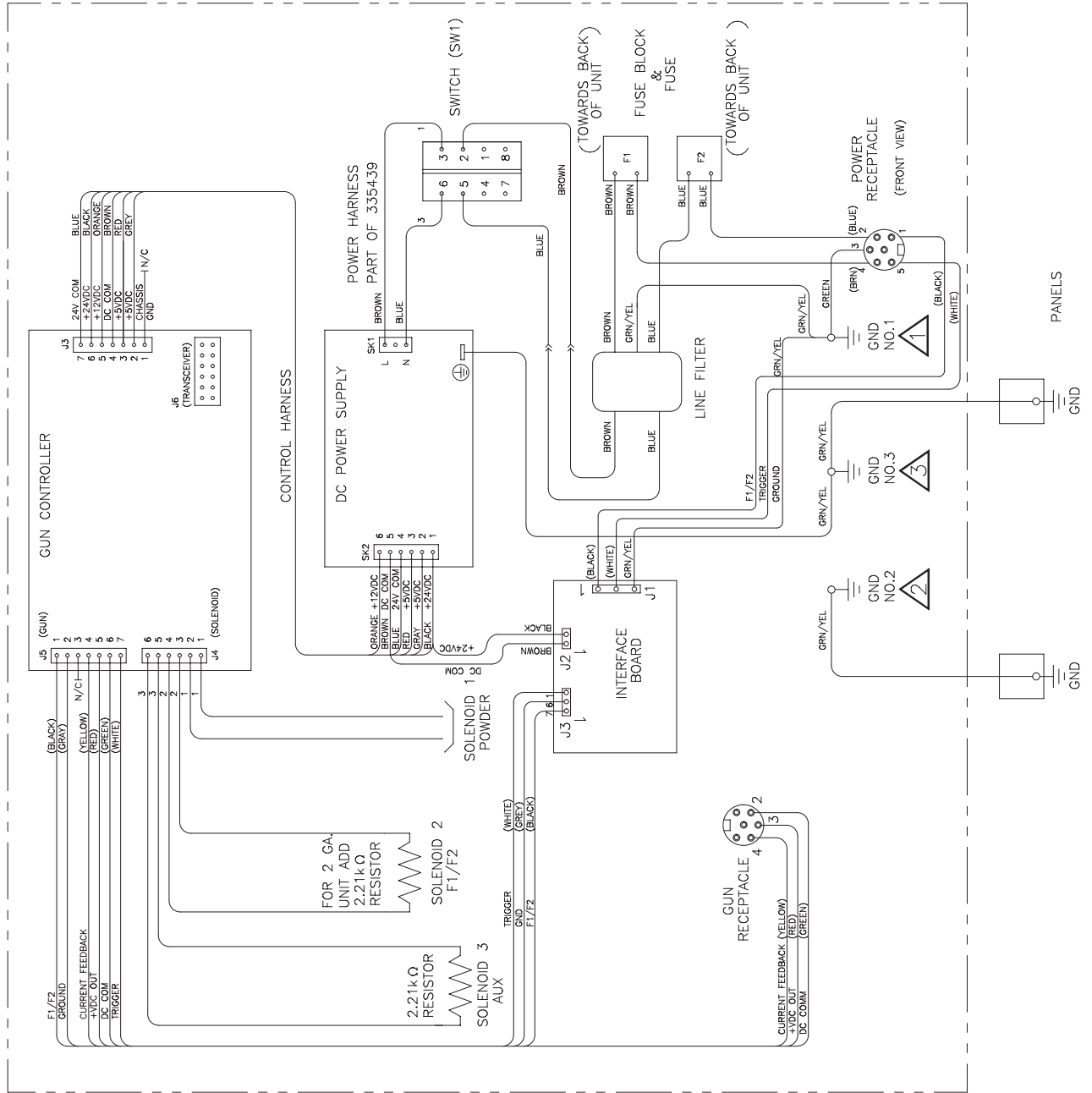
Manual Controller Wiring Diagram



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Figure 5-6 Manual Controller Wiring Diagram

Automatic Controller Wiring Diagram



1400393A

Figure 5-7 Automatic 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.

Keypad Module Replacement

See [Figure 6-1](#). The keypad module (3) can be replaced from the front of the controller. The module consists of the LCD module, the keypad, and controller board (5), connected to each other by standoffs.

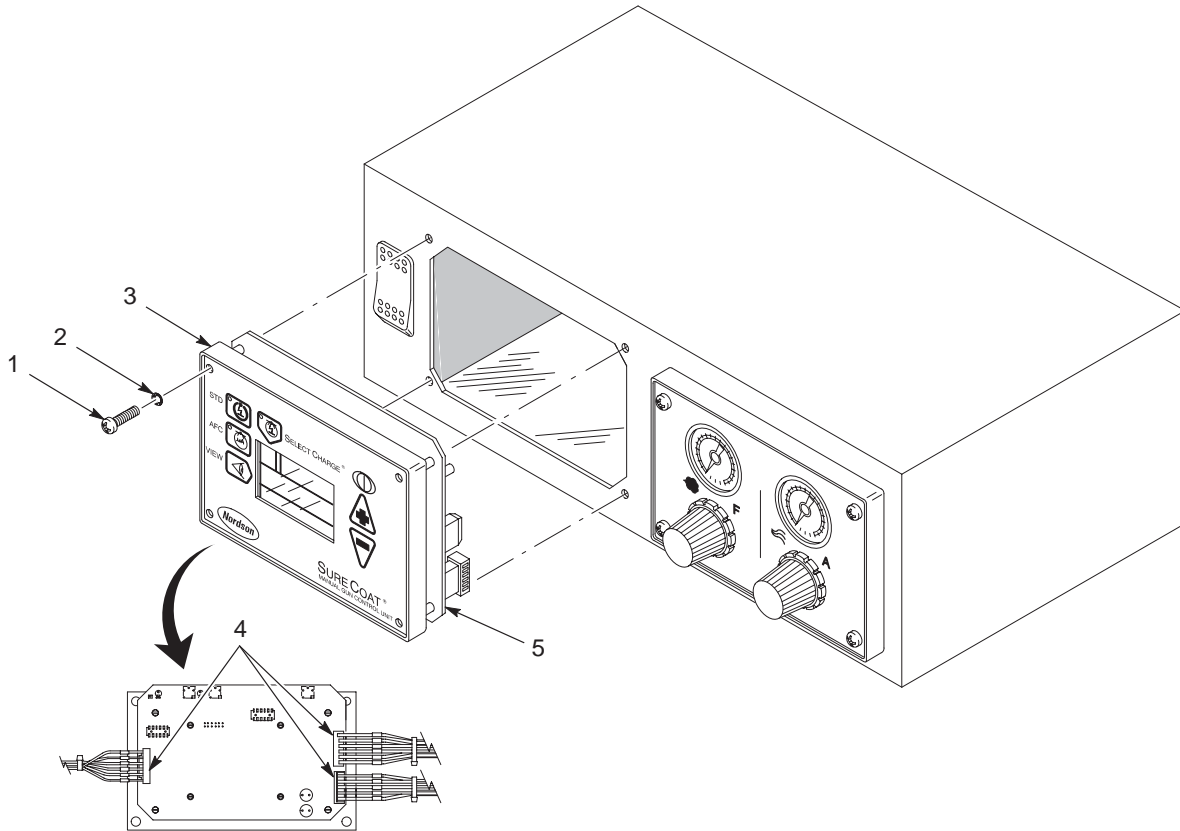
NOTE: The LCD module, keypad, and controller board can be replaced separately. Refer to *Keypad Module* on page 7-5 for ordering information.



CAUTION: Printed circuit boards are sensitive to electrostatic discharge. Wear a grounded wrist strap when working on the controller.

1. Remove the four screws (1) and washers (2) securing the keypad module to the enclosure.
2. Tilt the top of the keypad module (3) forward and disconnect all three connectors (4) from the controller board.
3. Lift the keypad module out of the enclosure.
4. Place the new keypad module on the bottom edge of the opening and connect all three connectors.
5. Tilt the keypad module into the enclosure, insert the screws and washers and tighten the screws.

Keypad Module Replacement *(contd)*



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Figure 6-1 Keypad Module Replacement

- 1. Screw
- 2. Washer
- 3. Keypad module
- 4. Connectors
- 5. Controller board

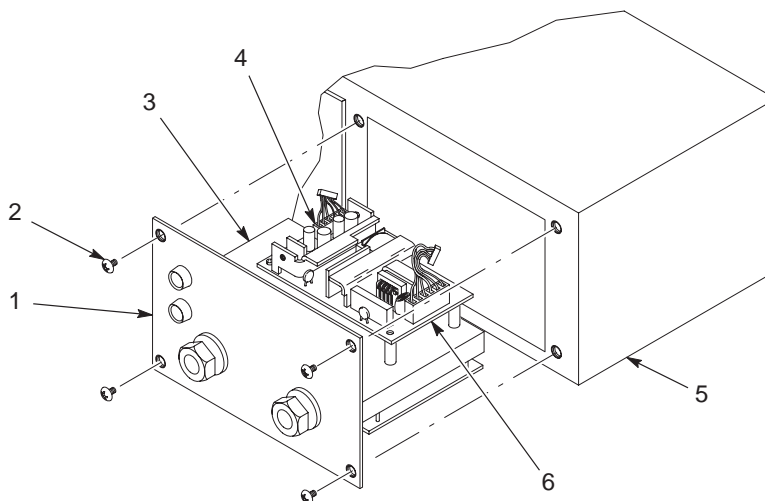
DC Power Supply Board Replacement

The dc power supply board is mounted on the power supply module, which is the right panel at the rear of the enclosure.

NOTE: The power supply module components can be replaced separately. Refer to *Power Supply Module* on page 7-8 for ordering information.

See Figure 6-2.

1. Remove the screws (2) securing the power supply module (1) to the enclosure (5).
2. Unplug the ac input (4) and dc output (6) connectors from the dc power supply board.
3. Remove the four screws that secure the dc power supply board (3) to the power supply module. Remove the dc power supply board.
4. Snap the new dc power supply board into the front and rear standoffs on the power supply module.
5. Secure the dc power supply board to the power supply module with the four screws and attach the ac input and dc output connectors.
6. Secure the power supply module to the enclosure with the screws.



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Figure 6-2 DC Power Supply Board Replacement

- | | |
|--------------------------|------------------------|
| 1. Power supply module | 4. ac Input connector |
| 2. Screws | 5. Enclosure |
| 3. dc Power supply board | 6. dc Output connector |

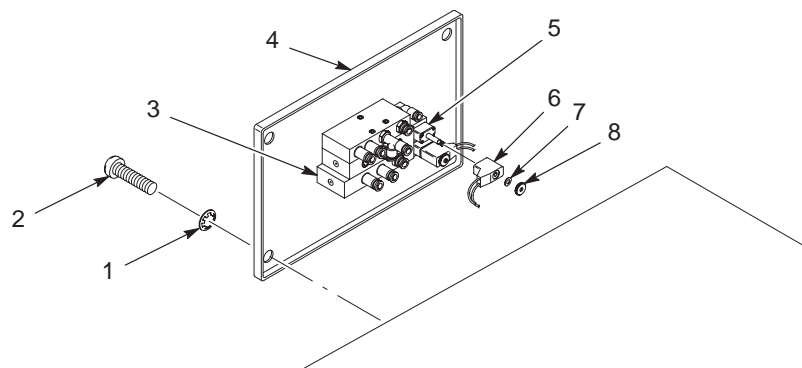
Manifold Assembly Replacement

The manifold assembly is mounted on the pneumatic module, which is the left panel at the rear of the enclosure. Manual controllers have two solenoid valves in the assembly, automatic controllers have one.

NOTE: The pneumatic module components can be replaced separately, and the solenoid valves can be rebuilt. Refer to *Solenoid Valve Rebuild* on page 6-6 and *Pneumatic Module* on page 7-6 and *Solenoid Valve Kits* on page 7-11.

See Figure 6-3.

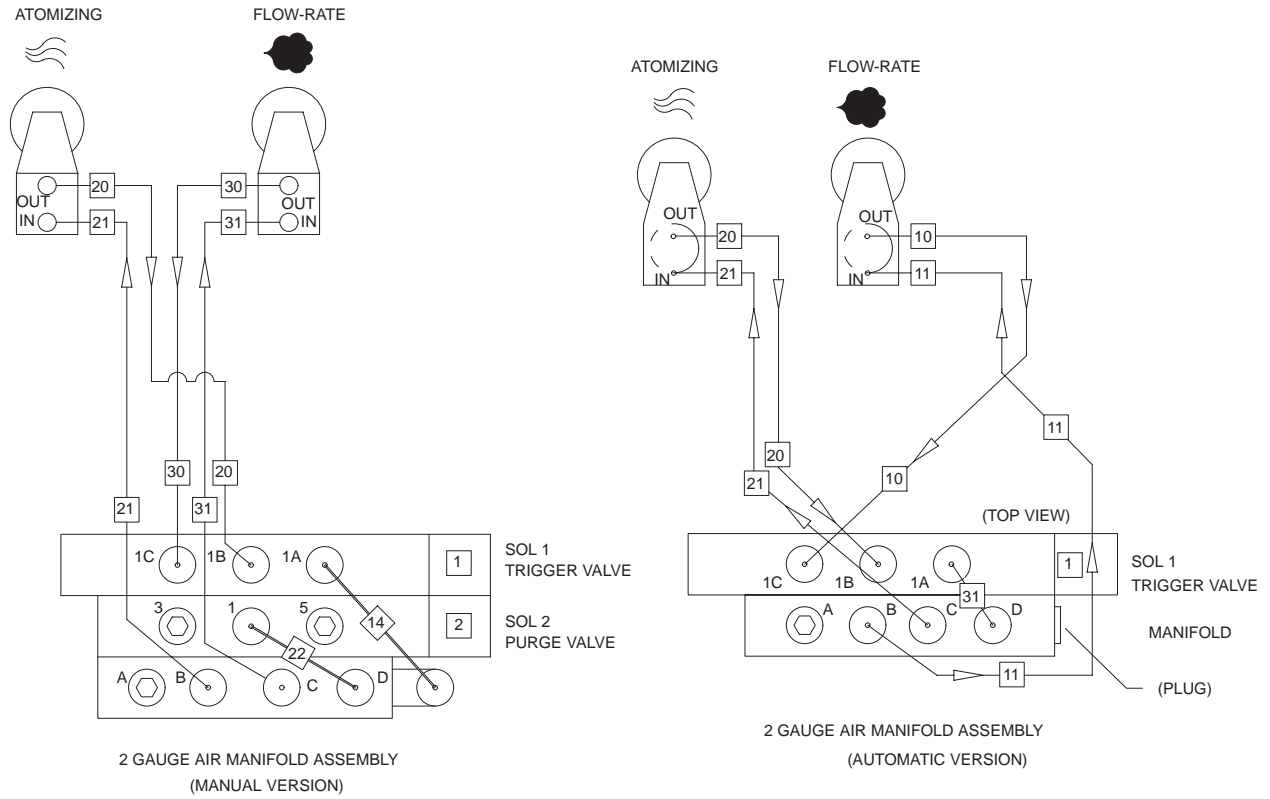
1. Remove the four screws (2) and washers (1) to remove the pneumatic module (4) from the enclosure.
2. Disconnect the air tubing from the manifold assembly (3).
3. Remove the knurled nut (8) and washer (7) securing the solenoid coil (6) to the solenoid valve (5). Pull the solenoid coil off the solenoid.
4. Remove the screws that secure the manifold assembly to the pneumatic module. Lift the entire manifold from the pneumatic module.
5. Install the new manifold assembly on the pneumatic module with the screws.
6. Secure the solenoid coil to the solenoid valve with the washer and knurled nut.
7. Reconnect the air tubing to the manifold as shown in [Figure 6-4](#).
8. Secure the pneumatic module to the enclosure with the four screws and washers.



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Figure 6-3 Manifold Assembly Replacement

- | | |
|----------------------|----------------------|
| 1. Washers | 5. Solenoid valve(s) |
| 2. Screws | 6. Solenoid coil |
| 3. Manifold assembly | 7. Washer |
| 4. Pneumatic module | 8. Knurled nut |



TUBING CUT LENGTHS

MANUAL		
TUBE NO.	LENGTH (INCHES)	TUBE SIZE
14	7.00	6mm
20	14.00	6mm
21	14.00	6mm
22	7.00	6mm
30	14.00	6mm
31	14.00	6mm

AUTOMATIC		
TUBE NO.	LENGTH (INCHES)	TUBE SIZE
10	14.00	6mm
11	14.00	6mm
20	14.00	6mm
21	14.00	6mm
31	8.00	6mm

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Figure 6-4 Pneumatic Diagram

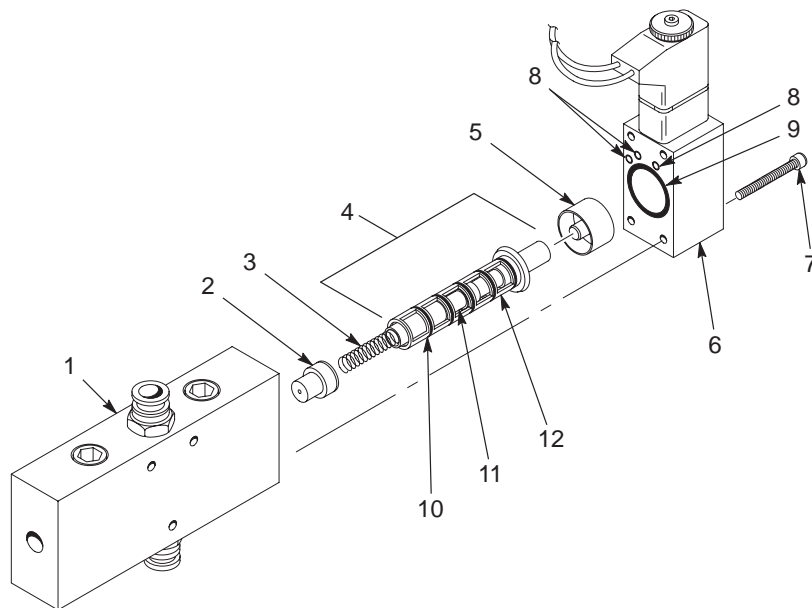
Solenoid Valve Rebuild

See [Figure 6-5](#).

This procedure uses the valve seal, trigger valve, or purge valve service kits to rebuild the solenoid valves. Refer to the *Parts* section for more information.

NOTE: Seven tee seals are included in the seal kit. If you rebuild the trigger valve, use all seven tee seals. If you rebuild the purge valve, you will only use six tee seals.

1. Remove the manifold. Refer to *Manifold Assembly Replacement* on page 6-4 for instructions.
 2. Remove the screws (7) and pull the end cap (6) off the solenoid valve body (1). Make sure the three small O-rings (8) and flat round gasket (9) remain in the end cap.
 3. Remove the piston and bushing (5) from the valve body.
 4. Push on the spring pad (2) to force the spool assembly (4) out of the valve body.
 5. Disassemble the spool assembly and clean and replace parts as necessary.
 6. Assemble the solenoid valve. Lightly lubricate the following items with the lubricant included in the service kit before installing it them:
 - piston (5) O-ring
 - O-rings (8)
 - gasket (9)
 - tee seals (10)
 - spool (11)
- NOTE:** The spacers (12) and tee seals (10) are identical and may be installed in any location along the spool (11). Use only six of the seven tee seals provided in the seal kit when rebuilding the purge valve.
7. Install the spool assembly into the valve body.
 8. Install the piston and bushing into the valve body.
 9. Make sure that the small O-rings are aligned with the holes in the valve body, and install the endcap using the four screws. Torque the screws to 1 N•m (9 in.-lb).



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Figure 6-5 Solenoid Valve Rebuild

- | | | |
|-------------------|-----------------------|--------------|
| 1. Valve body | 5. Piston and bushing | 9. Gasket |
| 2. Spring pad | 6. End cap | 10. Tee seal |
| 3. Spring | 7. Screw | 11. Spool |
| 4. Spool assembly | 8. O-ring | 12. Spacer |

Regulator Module Replacement

1. Remove the regulator module from the enclosure.
2. Tag and disconnect the air tubing from the regulators and gauges.

NOTE: See [Figure 6-4](#) for tube labeling and routing.

3. Remove the regulator cap and the front panel mounting ring.
4. Remove the regulators and gauges from the panel.
5. Install the new regulators and gauges from the rear.
6. Install the regulator cap and mounting ring on the front panel.
7. Connect all tubing as shown in [Figure 6-4](#).
8. Install the module into the enclosure.

Section 7

Parts

Introduction

To order parts, call the Nordson Customer Service Center or your local Nordson representative. Use this five-column parts list, and the accompanying illustration, to describe and locate 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	

Manual and Automatic Controllers

See Figure 7-1.

Item	Part	Part	Description	Quantity	Note
—	335418		MANUAL CONTROLLER, Sure Coat, 2 gauge, packaged	1	
—		335417	AUTOMATIC CONTROLLER, Sure Coat, 2 gauge, packaged	1	
1	982825	982825	• SCREW, pan, recessed, M4 x 12, internal lock washer	16	
2	307372	307372	• GASKET, front panel	2	
3	288814	288814	• BEZEL, control	2	
4	335451	307407	• REGULATOR MODULE kit, 2 gauge	1	A
5	327744	307410	• KEYPAD MODULE kit	1	B
6	322404	322404	• SWITCH, rocker, DPST, dust tight	1	
7	-----	-----	• ENCLOSURE, Sure Coat, single	1	
8	335450	307409	• PNEUMATIC MODULE kit	1	C
9	335449	335448	• POWER SUPPLY MODULE kit	1	D
10	100775	100775	• MOUNT, cable tie, screw down	1	
11	982327	982327	• SCREW, chee head, slotted, M4 x 12, zinc	1	
12	983021	983021	• WASHER, flat, e, 0.203 x 0.406 x 0.040 in., brass	3	
13	983401	983401	• WASHER, lock, m, split, M5, steel, zinc	3	
14	984702	984702	• NUT, hex, M5, brass	3	
15	302189	302189	• GROUND WIRE, assembly, 10.5 in.	2	
NS	900742	900742	• TUBING, polyurethane, 6 x 4 mm, blue	AR	
NS		332776	• HARNESS, jumper	1	
NS	982094	982094	• SCREW, pan, slotted, M5 x 6	6, 4	E
NS	335456	335456	• PLATE, mounting, long	2	
NS	933260	933260	• CONNECTOR, conduit, 1/2-in. NPT x 0.56 in., grip	1	
NS	939122	939122	• SEAL, conduit, fitting, 1/2 in.	1	
NS	130629	130629	• CABLE, power, 5-wire, 6.5 ft	1	
NS	163449	163449	• JUMPER, ground, cable, 15 ft	1	
NS	240976	240976	• CLAMP, ground, with wire	1	

NOTE A: Refer to *Regulator Module* on page 7-4 for an exploded parts list.

B: Refer to *Keypad Module* on page 7-5 for an exploded parts list.

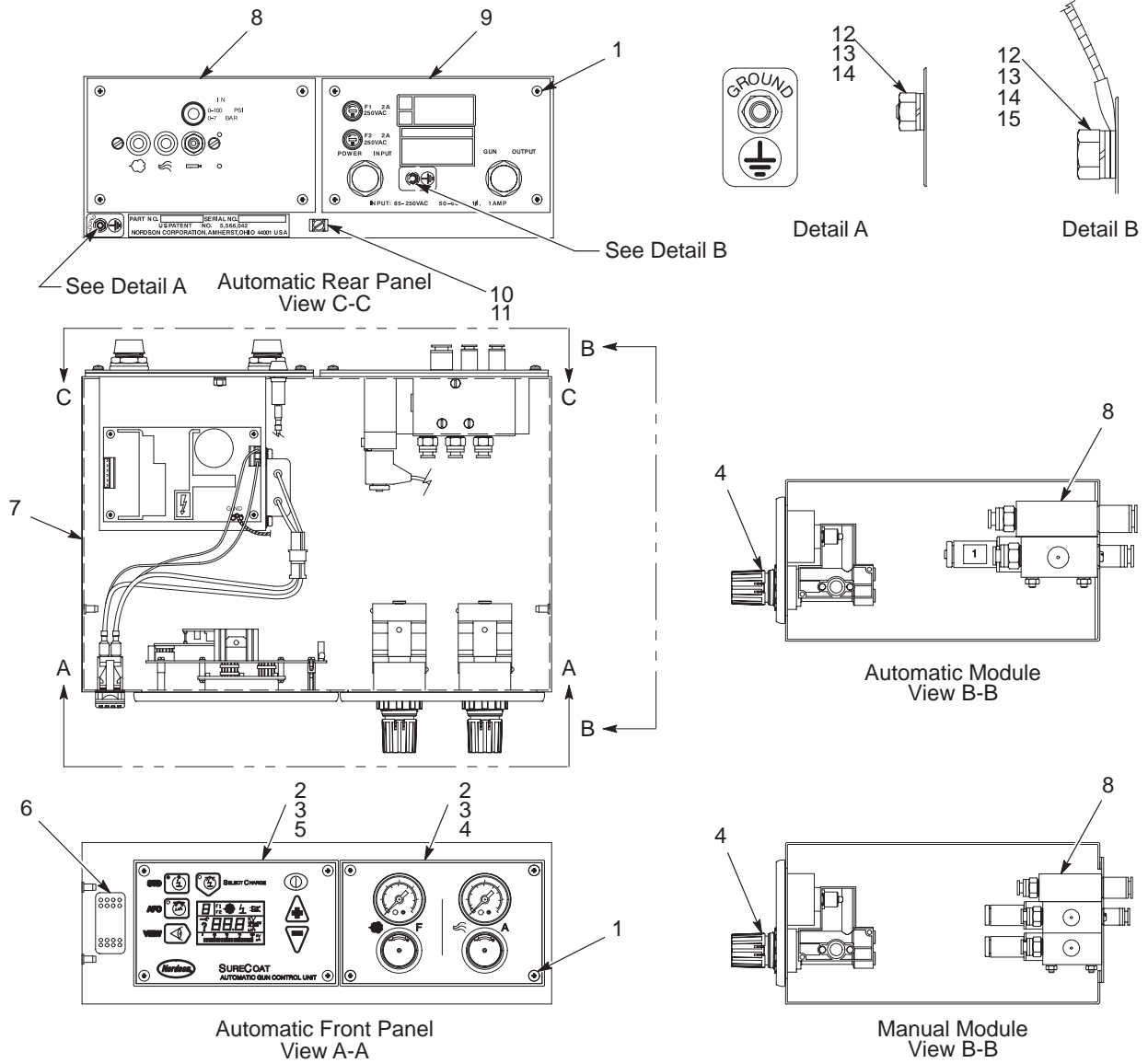
C: Refer to *Pneumatic Module* on page 7-6 for an exploded parts list.

D: Refer to *Power Supply Module* on page 7-8f or an exploded parts list.

E: Use four screws to mount the first controller to the stand. Use six screws to mount additional individual controllers (or a mini-master controller) using the supplied mounting plates.

NS: Not Shown

AR: As Required



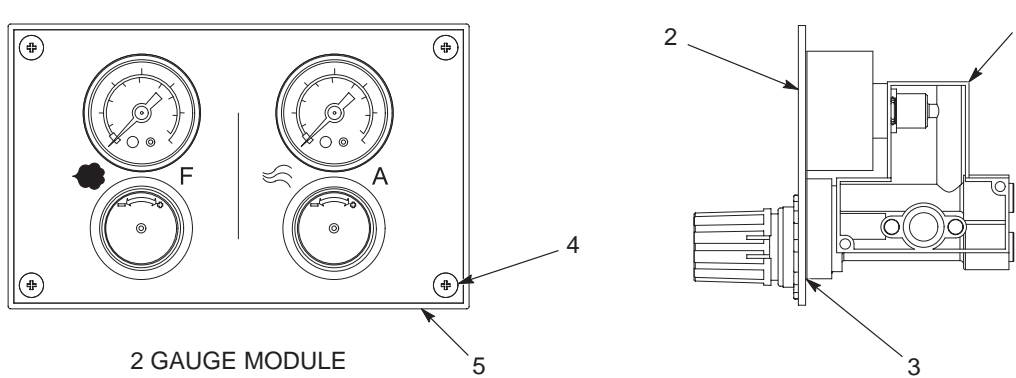
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Figure 7-1 Manual and Automatic Controllers

Regulator Module

See Figure 7-2.

Item	Part	Part	Description	Quantity	Note
—	335451		REGULATOR MODULE kit, 2 gauge, manual controller	1	
—		307407	REGULATOR MODULE kit, 2 gauge, automatic controller	1	
1	288821	288821	<ul style="list-style-type: none"> REGULATOR, assembly, 0-60 psi, 0-4 bar 	2	
2	288816	307389	<ul style="list-style-type: none"> PANEL, controller, 2 gauge 	1	
3	141603	141603	<ul style="list-style-type: none"> SEAL, panel, regulator 	2	
4	982825	982825	<ul style="list-style-type: none"> SCREW, pan, recessed, M4 x 12, with integral lock washer 	4	
5	288814	288814	<ul style="list-style-type: none"> BEZEL, control, Sure Coat 	1	



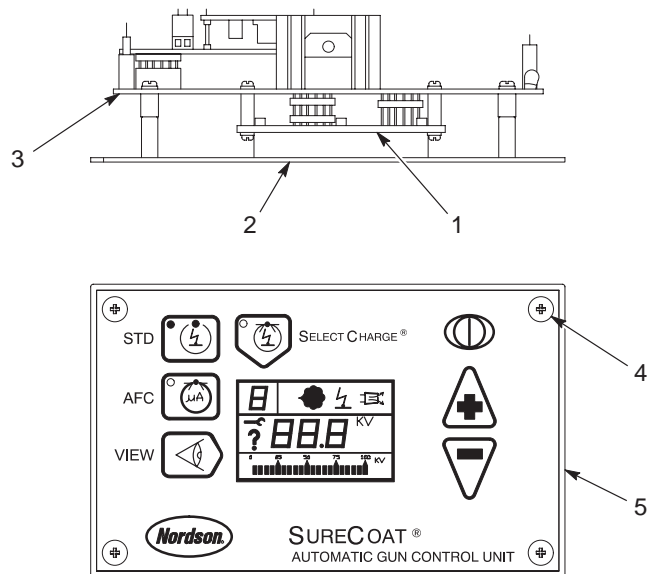
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Figure 7-2 Regulator Module

Keypad Module

See Figure 7-3.

Item	Part	Part	Description	Quantity	Note
—	327744		KEYPAD MODULE kit, Sure Coat manual controller	1	
—		307410	KEYPAD MODULE kit, Sure Coat automatic controller	1	
1	288836	288836	• MODULE, LCD, Sure Coat	1	
2	288839	302186	• PANEL, keypad, Sure Coat	1	
3	227186	227300	• PCA, gun controller	1	
4	982825	982825	• SCREW, pan head, recessed, M4 x 12, with integral lock washer	4	
5	288814	288814	• BEZEL, control, Sure Coat	1	



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Figure 7-3 Keypad Module (Automatic Keypad Shown)

Pneumatic Module

See Figure 7-4.

Item	Part	Part	Description	Quantity	Note
—	335450		PNEUMATIC MODULE kit, manual controller, 2 gauge	1	
—		307409	PNEUMATIC MODULE kit, automatic controller, 2 gauge	1	
1	933751	933751	• CONNECTOR, mc plug, 6 position	1	
2	288825	302169	• MANIFOLD, assembly, 2 gauge	1	
3	-----	-----	• • SOLENOID VALVE, trigger, 3-2 way, NC, 24 Vdc	1	A
4	-----		• • SOLENOID VALVE, purge, 4 way, 24 Vdc	1	A
5	971100		• • CONNECTOR, male, 6-mm tube x 1/4-in. universal	8	
5		971100	• • CONNECTOR, male, 6-mm tube x 1/4-in. universal	6	
NS	972142		• • ELBOW, male, 6-mm tube x 1/4 in.	1	
6	972283	972283	• • CONNECTOR, round, male, 10-mm tube x 1/4-in. universal	1	
7	288822		• • CONNECTOR, orifice, 4 mm x 1/4-in. universal, diameter 0.012 in.	1	
7		302158	• • CONNECTOR, orifice, 6 mm x 1/4 in., 0.026 in.	1	
8		972282	• • CONNECTOR, round, male, 8-mm tube x 1/4 in.	2	
8	327748		• • VALVE, check, male, 8-mm tube x 1/4 in., manual, input	2	
9	982309	982309	• SCREW, pan, recessed, M5 x 10, black	2	
10	983401	983401	• WASHER, lock, m, split, M5, steel, zinc	3	
11	-----	302172	• PANEL, valve	1	
12	335443	302199	• GASKET, rear pneumatic panel	1	
13	271221	271221	• LUG, 45, double, 0.250 in., 0.438 in.	1	
14	983021	983021	• WASHER, flat, e, 0.203 x 0.406 x 0.040 in., brass	1	
15	984702	984702	• NUT, hex, M5, brass	1	
NS	982825	982825	• SCREW, pan head, recessed, M4 x 12, with internal lock washer	4	

NOTE A: Refer to *Solenoid Valve Kits* on page 7-11 for solenoid valve service kits.
NS: Not Shown

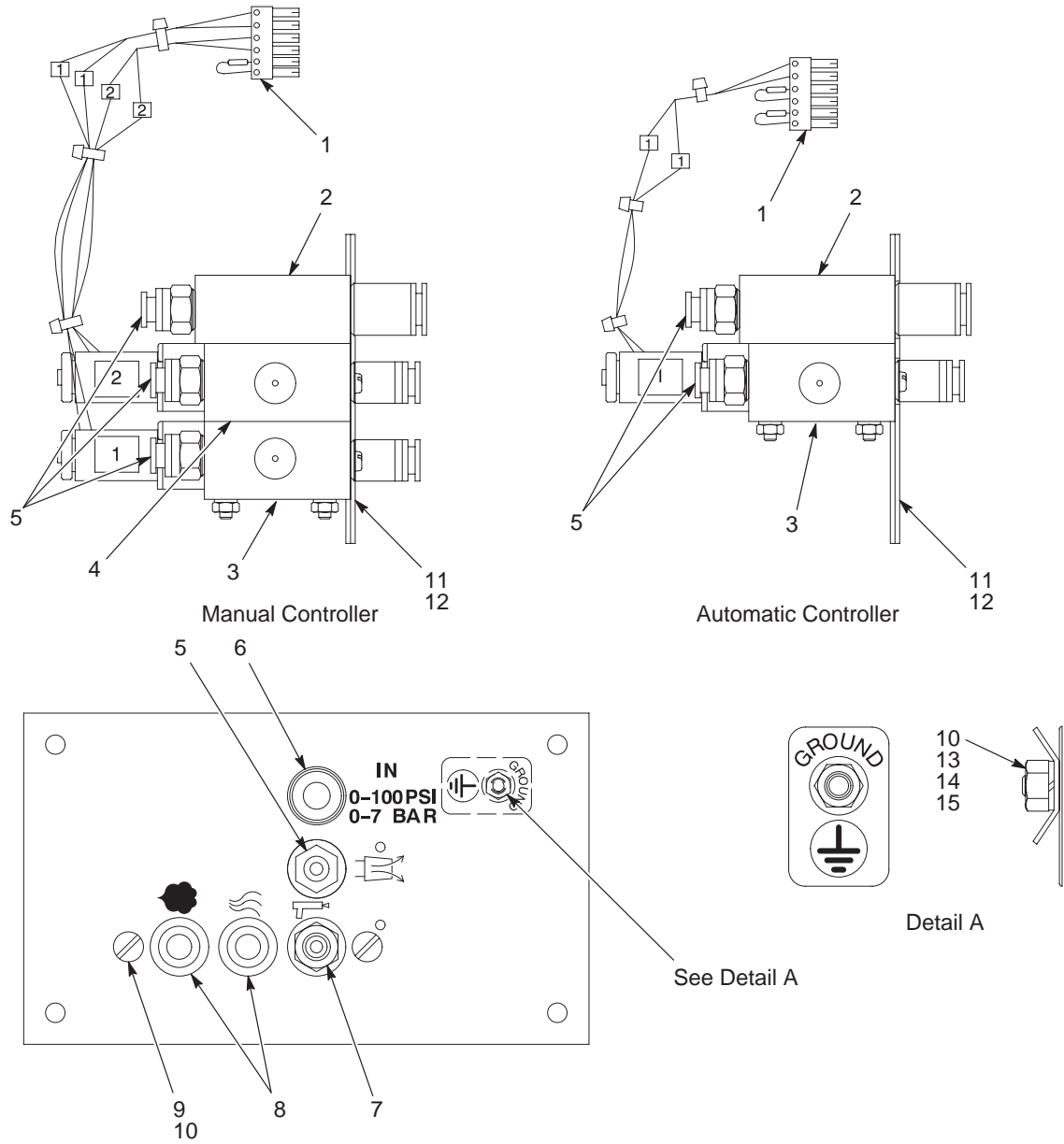


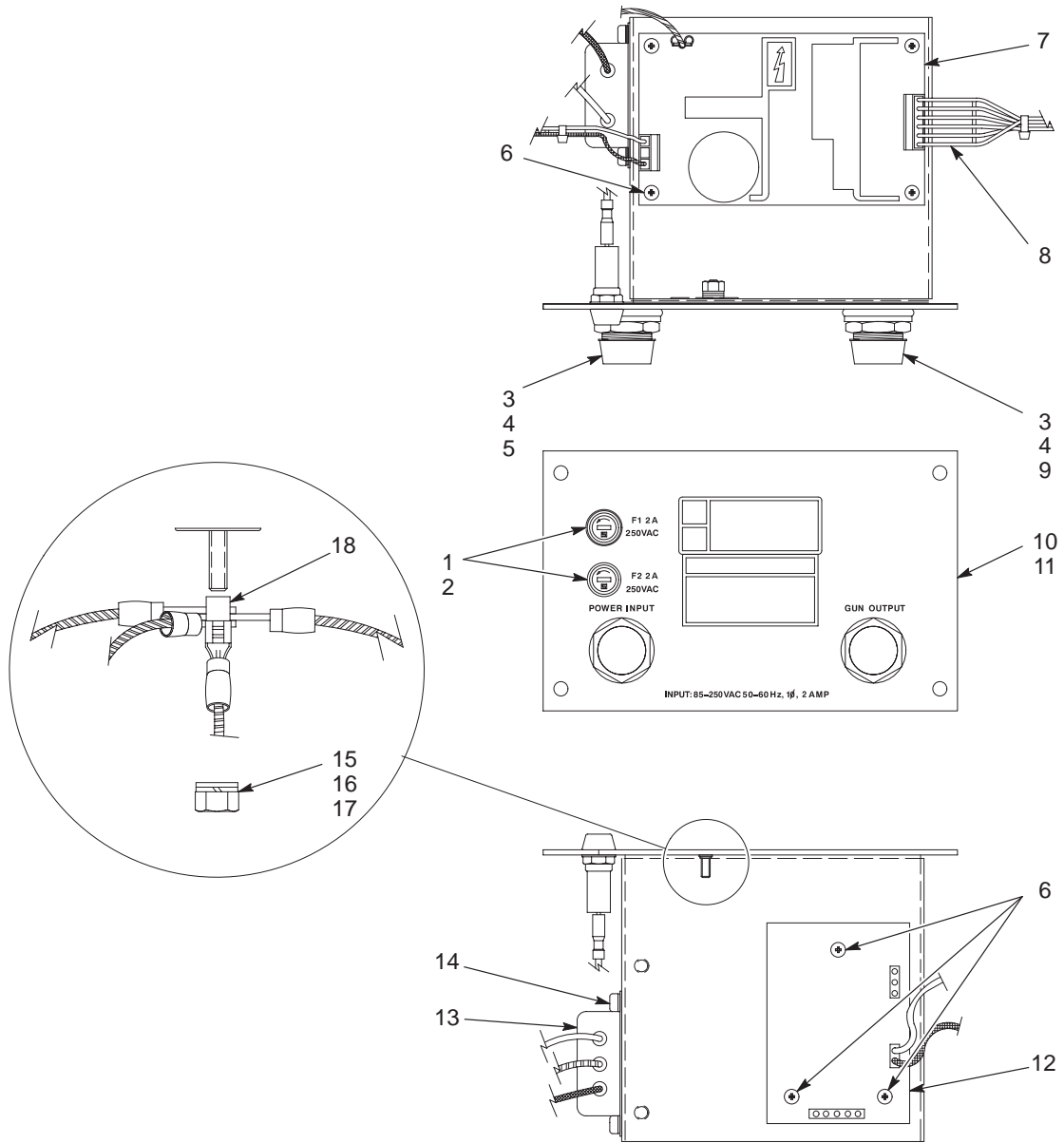
Figure 7-4 Pneumatic Module

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Power Supply Module

See [Figure 7-5](#).

Item	Part	Part	Description	Quantity	Note
—	335449		POWER SUPPLY MODULE kit, Sure Coat manual controller	1	
—		335448	POWER SUPPLY MODULE kit, Sure Coat automatic controller	1	
1	131477	131477	• FUSE, 2.00, fast acting, 250 V, 5 x 20	2	
2	288804	288804	• FUSE HOLDER, panel mount, 5 x 20	2	
3	939122	939122	• SEAL, conduit, fitting, 1/2 in.	2	
4	984526	984526	• NUT, lock, 1/2-in. conduit	2	
5	288842	302162	• RECEPTACLE, power, Sure Coat	1	
6	982824	982824	• SCREW, pan, recessed, M3 x 8, with integral lock washer bezel	4, 7	
7	288803	288803	• POWER SUPPLY, 24, 5, 12 Vdc, 40 W	1	
8	335442	302159	• HARNESS, power	1	
9	288841		• RECEPTACLE, input, T wire, female	1	
9		302163	• RECEPTACLE, gun, automatic, Sure Coat	1	
10	302194	302194	• PANEL, power supply tray	1	
11	302195	302195	• GASKET, back panel, electrostatic, Sure Coat	1	
12		-----	• PCA, interface module, AGC	1	
NS		939991	• • FUSE, 50 mA, quickact, micro, 250 V	2	
13	335441	335441	• FILTER, line, with connector	1	
14	982825	982825	• SCREW, pan head, recessed, M4 x 12, with integral lock washer bezel	2	
15	983401	983401	• WASHER, lock, m, split, M5, stainless steel, zinc	1	
16	983021	983021	• WASHER, flat, e, 0.203 x 0.406 x 0.040 in., brass	1	
17	984702	984702	• NUT, hex, M5, brass	1	
18	271221	271221	• LUG, 45, double, 0.250 in., 0.438 in.	1	
NS: Not Shown					



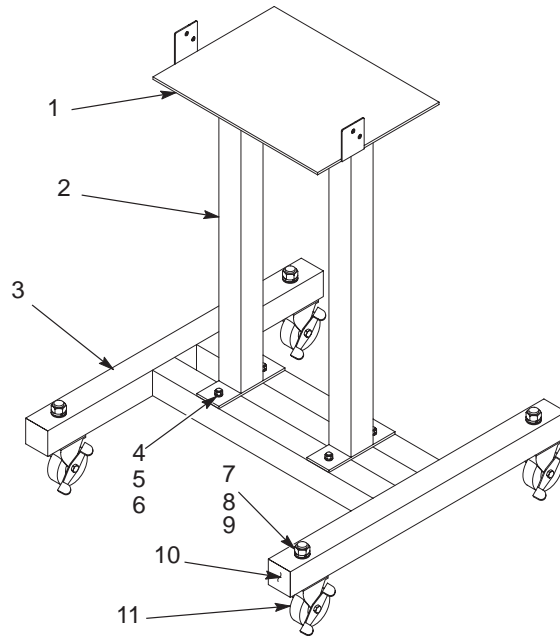
1400403B

Figure 7-5 Power Supply Module

Mounting Stand Parts

See Figure 7-6.

Item	Part	Description	Quantity	Note
—	335457	STAND, mini stack, Sure Coat	1	
1	-----	• TRAY, stand, mini stack	1	
2	-----	• LEG, stand, mini stack	2	
3	-----	• BASE, stand, mini stack	1	
—	335459	KIT, mounting hardware, mini-stack stand	1	
4	984703	• NUT, hex, M6, steel, zinc	8	
5	983409	• WASHER, lock, m, split, M6, steel, zinc	8	
6	983410	• WASHER, flat, m, narrow, M6, steel, zinc	8	
7	984170	• NUT, hex, regular, 1/2-13 in., steel, zinc	4	
8	983180	• WASHER, lock, e, split, 1/2 in., steel, nickel	4	
9	983007	• WASHER, flat, e, 0.531 x 1.000 x 0.063 in., zinc	4	
10	335453	• CAP/PLUG, 2 x 2 x 14 gauge	4	
11	335458	• CASTER, swivel, 4 x 1.25 in. with brake	4	



1400404A

Figure 7-6 Mounting Stand

Adapter Cables for Versa-Spray Guns

Part	Description	Quantity
339783	ADAPTER CABLE, Versa-Spray/Sure Coat, manual	AR
334783	ADAPTER CABLE, Versa-Spray/Sure Coat, automatic	AR
AR: As Required		

Service Kits

Use the following lists to order common replacement parts for the Sure Coat individual controllers. Keep one of each applicable kit on hand to reduce downtime.

Manual Controllers

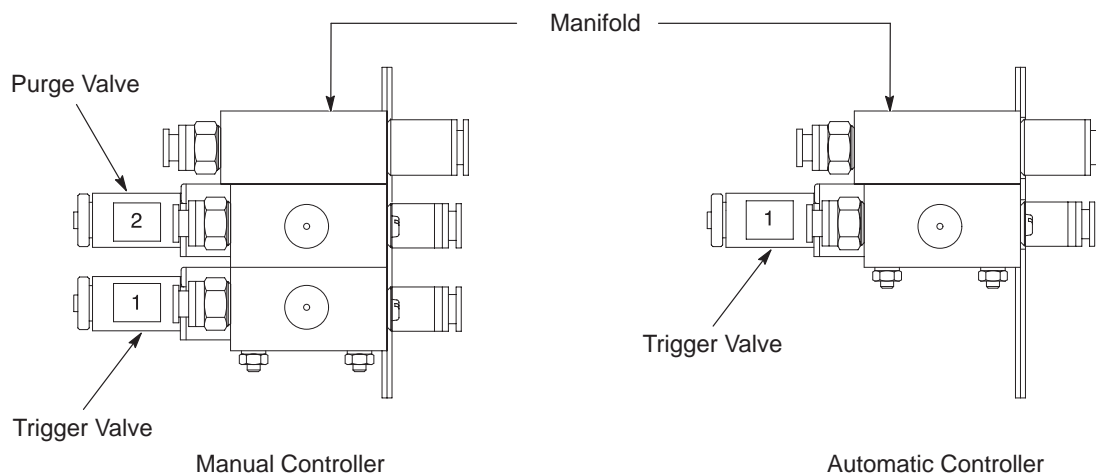
Part	Description	Quantity
335449	POWER SUPPLY MODULE KIT, Sure Coat manual controller	1
335451	REGULATOR MODULE KIT, 2 gauge, Sure Coat manual controller	1
335450	PNEUMATIC MODULE KIT, Sure Coat manual controller	1
327744	KEYPAD MODULE KIT, Sure Coat manual controller	1

Automatic Controllers

Part	Description	Quantity
335448	POWER SUPPLY MODULE KIT, Sure Coat automatic controller	1
307407	REGULATOR MODULE KIT, 2 gauge, Sure Coat automatic controller	1
307409	PNEUMATIC MODULE KIT, 2 gauge, Sure Coat automatic controller	1
307410	KEYPAD MODULE KIT, Sure Coat automatic controller	1

Solenoid Valve Kits

See Figure 7-7 to identify the two solenoid valves.



1400405A

Figure 7-7 Manifold Valves

Trigger Valve

See Figure 7-8.

NOTE: See [Figure 7-7](#) for the location of the trigger valve.

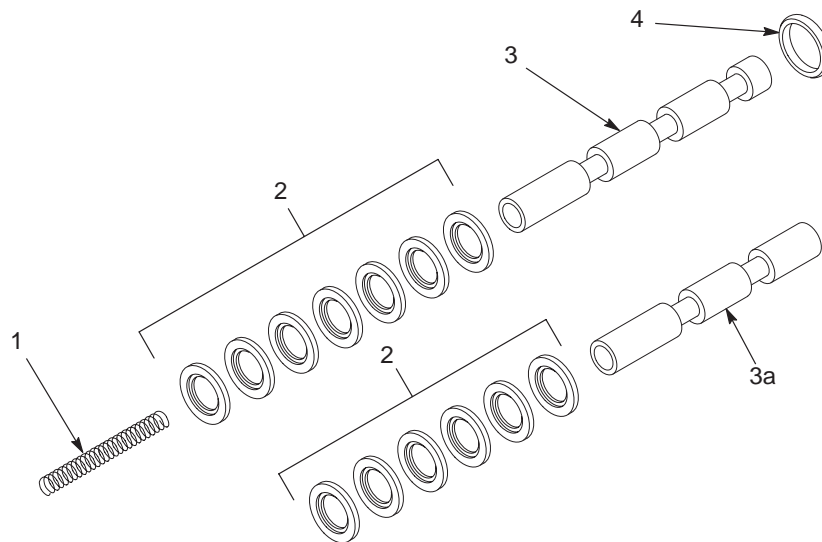
Item	Part	Description	Quantity	Note
—	333677	SERVICE KIT, trigger valve	1	
1	-----	• SPRING	1	
2	1027108	• SEAL KIT, spool, valve	1	
NS	-----	•• SEAL, tee	7	
NS	-----	•• LUBRICANT	1	
3	-----	• SPOOL, molded 3/2/2	1	
4	-----	• O-RING, piston	1	
NS: Not Shown				

Purge Valve

See Figure 7-8.

NOTE: See [Figure 7-7](#) for the location of the purge valve.

Item	Part	Description	Quantity	Note
—	333678	SERVICE KIT, purge valve	1	
1	-----	• SPRING	1	
2	1027108	• SEAL KIT, spool, valve	1	A
NS	-----	•• SEAL, tee	7	A
NS	-----	•• LUBRICANT	1	
3a	-----	• SPOOL, molded 5/2	1	
4	-----	• O-RING, piston	1	
NOTE A: The valve seal service kit, part 1027108, includes seven tee seals. Only six tee seals are needed to rebuild the purge valve. Discard the spare tee seal.				
NS: Not Shown				



1400574A

Figure 7-8 Solenoid Valve Kits

DECLARATION of CONFORMITY

PRODUCT:

Versa-Spray II or SureCoat IPS Electrostatic Powder Spray Applicators,
with SureCoat Automatic or Manual Mini Stackable Controls.

APPLICABLE DIRECTIVES:

89/37/EEC (Machinery)
73/23/EEC (Low Voltage Directive)
89/336/EEC (Electromagnetic Compatibility Directive)
94/9/EC (Equipment for use in potentially Explosive Atmospheres Directive)

STANDARDS USED TO VERIFY COMPLIANCE:

EN292	EN50081	EN50177
EN50014	EN50082	IEC417L
EN50020	EN55011	FM7260
EN50050	EN60204	

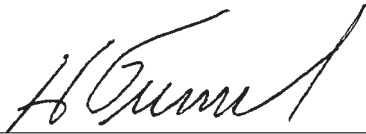
PRINCIPLES:

This product has been manufactured according to good engineering practice.

The product specified conforms to the directive and standards described above.

Certifications:

ISO 9001 - DNV No. QSC3277
EMC - TUV Rheinland V9771906/V9879157
EECS (Notified Body No. 600) - EECS ATEX 0771
SIRA (EU Notified Body) - 98ATEX9216
Canadian Standards Association - 24501-59
Factory Mutual - 3004545



Date: 06 October 00

Herb Turner
Vice President, Powder Systems Group



Nordson Corporation • Westlake, Ohio

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