Sure Coat® Rack-Mount Automatic Gun Control Unit

Customer Product Manual
Part 303818E
Issued 6/02

NORDSON CORPORATION • AMHERST, OHIO • USA

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Notice

Trademarks

Table of Contents

Section 1
Safety

Introduction

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

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

Qualified Personnel

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

Intended Use

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

Some examples of unintended use of equipment include

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

Regulations and Approvals

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

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

Personal Safety

To prevent injury follow these instructions.

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

Fire Safety

To avoid a fire or explosion, follow these instructions.

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

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

Grounding

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

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

Sure Coat automatic gun control units are used with automatic powder spray guns. The control units:

- 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 control status information and parameters are adjusted and viewed from the front panel keypad and Liquid Crystal Display (LCD). The LCD displays operation mode, set point values, and spray gun output. The front panel keys allow the operator to choose between the different control modes and to set the electrostatic output levels.

The control unit is available in two-gauge and three-gauge, single and dual configurations. A single control unit services one powder spray gun, a dual control unit services two powder spray guns.

Typically, several control units are mounted in a standard equipment rack and connected to a master control unit, which controls and distributes power and air to the control units in the rack. The control unit can also be used as a standalone unit, without a master control unit.

Front Panel Controls and Indicators

See Figure 2-1.

Controls and indicators are housed in two modules:

- keypad and display module (1)
- regulator module, containing regulators and gauges for the adjustment of flow rate (2) and atomizing (3) air pressures. Flow rate F2 (4) air pressure is available only on three-gauge units.

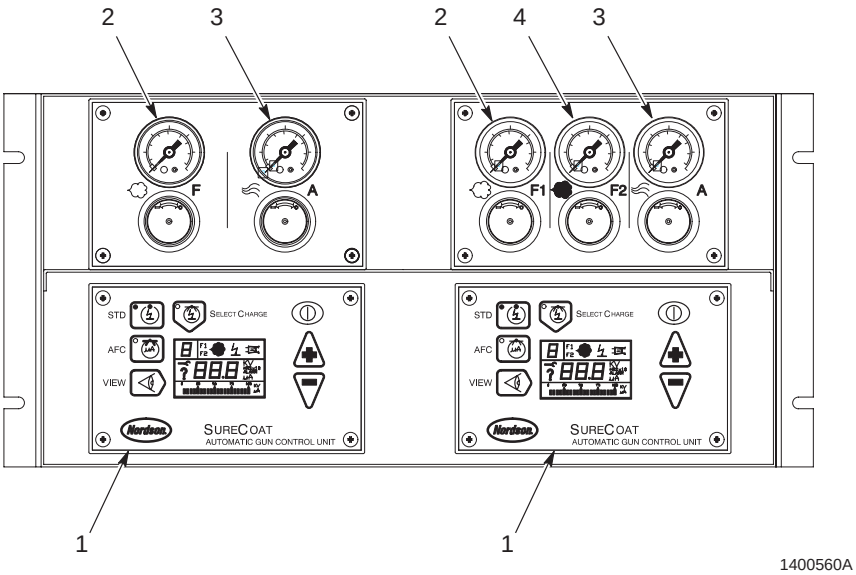

Figure 2-1 Front Panel Controls and Indicators

1. Keypad and display
2. Flow rate air regulator and gauge
3. Atomizing air regulator and gauge
4. Flow rate air F2 (three-gauge configuration only)

Keypad

Refer to Table 2-1 and see Figure 2-2.

Table 2-1 Keypad

Item	Component	Description
1	Nordson logo (diagnostics) key	Puts the control unit into the diagnostics mode. Diagnostics mode cannot be started while the spray gun is triggered. Puts the control unit in configuration mode if pressed during startup.
2	VIEW key	Toggles through gun current (µA) 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 light	Indicates that the AFC function is active.
5	STD key	Selects the Standard mode (STD) (kV control mode).
6	STD light	Indicates that Standard mode is active.
7	Select Charge light	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	Enables/disables triggering by an external device, typically a master control unit.
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 *Display* in this section.

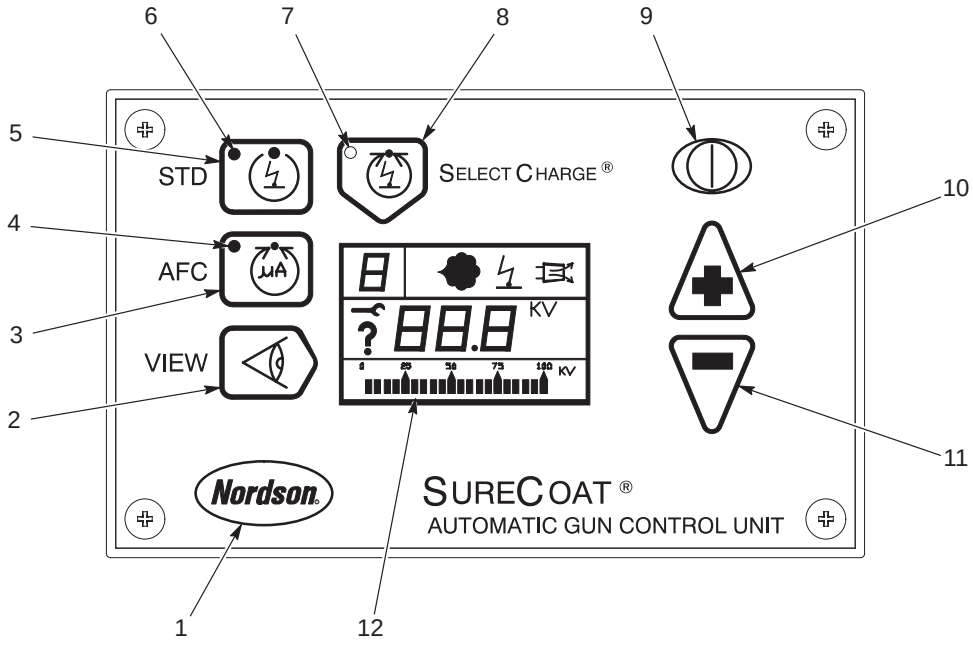

Figure 2-2 Keypad

Display

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

Table 2-2 Display

Item	Component	Description
1	Select Charge mode number	Indicates which Select Charge mode is currently active. Modes are numbered 1 to 4.
2	F1/F2	Indicates the flow rate regulator selected.
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 is detected in the solenoid circuit.
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 µA set point, and the gun µA 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 is detected in the gun drive circuit.
6	Purge icon	This function is not active in this control unit.
7	Unit indicator	Lights to indicate the selection of kV, µA, 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. The bar graph is only active while the spray gun is triggered.
10	Fault icon	Lights when there is an alarm or error condition. Clear a fault by correcting all errors or powering off control unit.
11	Diagnostics icon	Lights when the control unit is in diagnostics mode.

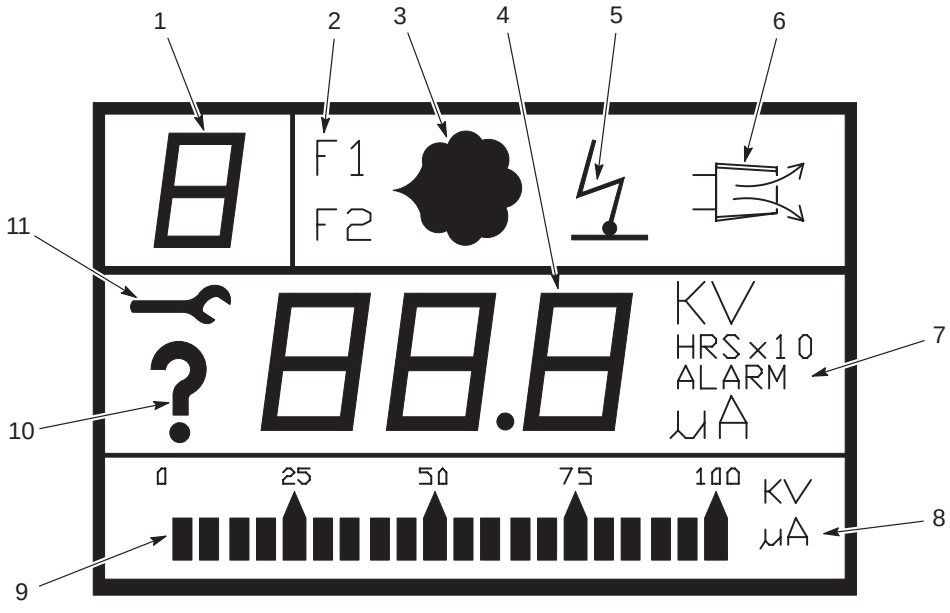

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Figure 2-3 Display

Back Panel Connections

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

Table 2-3 Back Panel Connections

Item	Component	Function
1	Flow rate air connector	8-mm tubing connector for powder pump flow rate air supply.
2	Atomizing air connector	8-mm tubing connector for powder pump atomizing air supply.
3	Gun air connector	6-mm tubing connector for the gun air output. A restrictor is supplied to reduce the air pressure to the spray gun for the electrode air wash function.
4	Supply air connector	10-mm tubing connector for the supply air input. 7 bar (105 psi) max
5	GUN OUTPUT receptacle	Gun output receptacle to the powder spray gun.
6	POWER INPUT receptacle	Power input receptacle from the master control unit back panel.

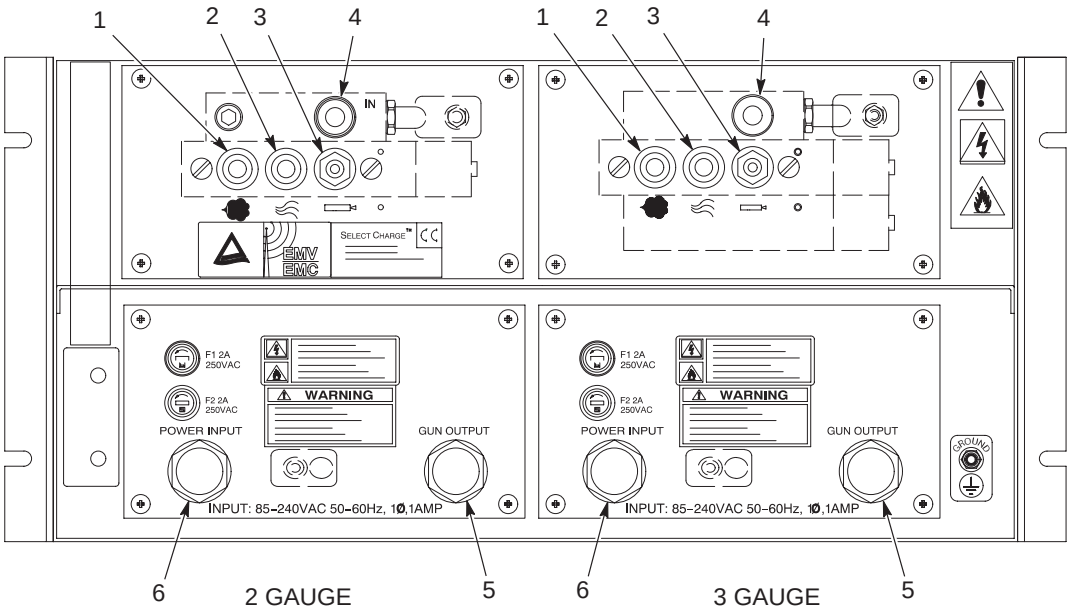

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Figure 2-4 Back Panel Connections

Timers

The timers available are the spray timer, the total spray timer, and the service timer.

Spray Timer (Gun On Hours)

The spray timer (gun on hours) keeps track of 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 Timer (Gun On Total Hours)

The total spray timer (gun on total hours) keeps track of 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 Timer

The service timer (total hours) keeps track of the time the control unit 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

Operating modes are Standard and Select Charge.

Standard Mode

In standard (STD) mode the operator can choose to set kV or maximum current (μA) 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 (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.

To turn on AFC the control unit must be in standard mode (STD LED lit). When AFC is on both the STD and AFC LEDs are lit.

Select Charge Modes

Select Charge modes allow the operator to select different electrostatic charging characteristics for an optimum coating on differently shaped parts.

Mode #1 (Recoat)

This mode is for recoating. It is designed to delay back ionization and to minimize picture framing.

Mode #2 (Special)

This mode is referred to as special or reinforcement mode and 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 for deep cavities. It 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 µA for a particular powder or part. The control unit stores the settings in memory and restores them each time mode 4 is selected.

Optional Standalone Configuration

The Sure Coat automatic control unit can be converted to operate as a standalone unit. The standalone unit does not need to be mounted in a rack or connected to a master control unit. Refer to the *Installation* section for conversion information.

Specifications

Specifications are subject to change without notice.

Enclosure Rating	IP54 and Class II, Division II
Electrical	
Input	85–240 Vac, 2 A, 1 phase, 50–60 Hz
Output	6–21 Vdc to spray gun
Short circuit output current	300 mA
Maximum output current	600 mA
Input Air Pressure	
Minimum input pressure	5.6 bar (80 psi)
Maximum input pressure	7.2 bar (105 psi)
Typical Operating Pressures	
Flow rate air	2 bar (30 psi)
Atomizing air	1 bar (15 psi)
Gun air	0.6 bar (10 psi) fixed

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 7 bar (105 psi) and 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.

Symbols

See Figure 2-5. These symbols are used on the control unit.

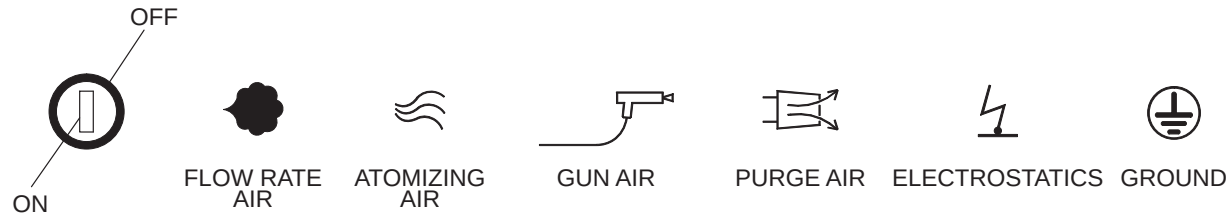

Figure 2-5 Symbols

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 control unit comes ready for installation into a standard 19-inch equipment rack. Mount the control unit as follows:

1. Slide the control unit between the two side brackets.
2. Align the control unit with the four holes on the brackets.
3. Attach the control unit to the brackets with four screws.

Electrical Connections

CAUTION: Equipment damage may occur if the control unit is connected to any line voltage other than that stated on the ID 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.

1. Install a locking disconnect switch or breaker in the service line ahead of the control unit or rack system so power can be shut off during installation or repair.
2. Make sure the input voltage is 85–240 Vac nominal, 1 phase, 50–60 Hz.
3. Wire the unterminated end of the power cord as follows:

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

Electrical Connections *(contd)*

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.

4. Connect the ground strap furnished with the control unit to the ground stud on the cabinet.
5. Secure the clamp to a true earth ground.
6. Connect the gun cable to the GUN OUTPUT receptacle.

Pneumatic Connections

Maximum input air pressure is 7 bar (105 psi). The supply air must be clean and dry. 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.

Use prefilters and coalescent filters with automatic drains and a refrigerated or regenerative desiccant air dryer capable of producing a 3.4 °C (38 °F) or lower dewpoint at 7 bar (105 psi).

See Figure 2-4 for pneumatic connections.

Input Air

1. Install a manually operated, self-relieving shutoff valve in the supply line to the control unit or rack system.
2. Connect 10-mm tubing from the air supply to the connector marked IN (4) on the pneumatic panel. In a rack system, air is typically supplied to the control units through a manifold mounted in the bottom of the rack.

Output Air

1. Connect 8-mm blue tubing to the atomizing air connector (2) on the pneumatic panel. Route this tubing to the connector marked A (atomizing air) on the spray gun's powder pump.
2. Connect 8-mm black tubing to the flow rate air connector (1) on the pneumatic panel. Route this tubing to the connector marked F (flow rate air) on the powder pump.
3. If used, connect 6-mm gun air tubing from the spray gun to the gun air connector (3).

Optional Standalone Configuration

Follow these procedures to convert the standard Sure Coat control unit to a standalone unit.

WARNING: Fire detection and conveyor interlocks must interrupt ac power to all Sure Coat automatic control units 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.

See Figure 3-1.

1. Remove the four mounting screws (2) from the power supply module (1). Carefully slide out the module out of the enclosure.
2. Locate the interface circuit board (4) on the back of the power supply tray. Remove the harness from connector J1 (3).
3. Remove the jumper harness from the tie-down (5).
4. Install the jumper harness in connector J1.

   NOTE: A jumper harness is shipped with the control unit. If you need to order a new one, refer to the *Parts* section of this manual.
5. Carefully install the power supply tray into the enclosure and secure it with the four mounting screws.

NOTE: If you are converting a dual unit, steps 1–4 must be completed for each power supply module. One jumper harness is required for each.

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.

6. Connect the control unit to a true earth ground.
7. After you start up the control unit, perform the *Optional Standalone Configuration* procedure in the *Operation* section.

Optional Standalone Configuration *(contd)*

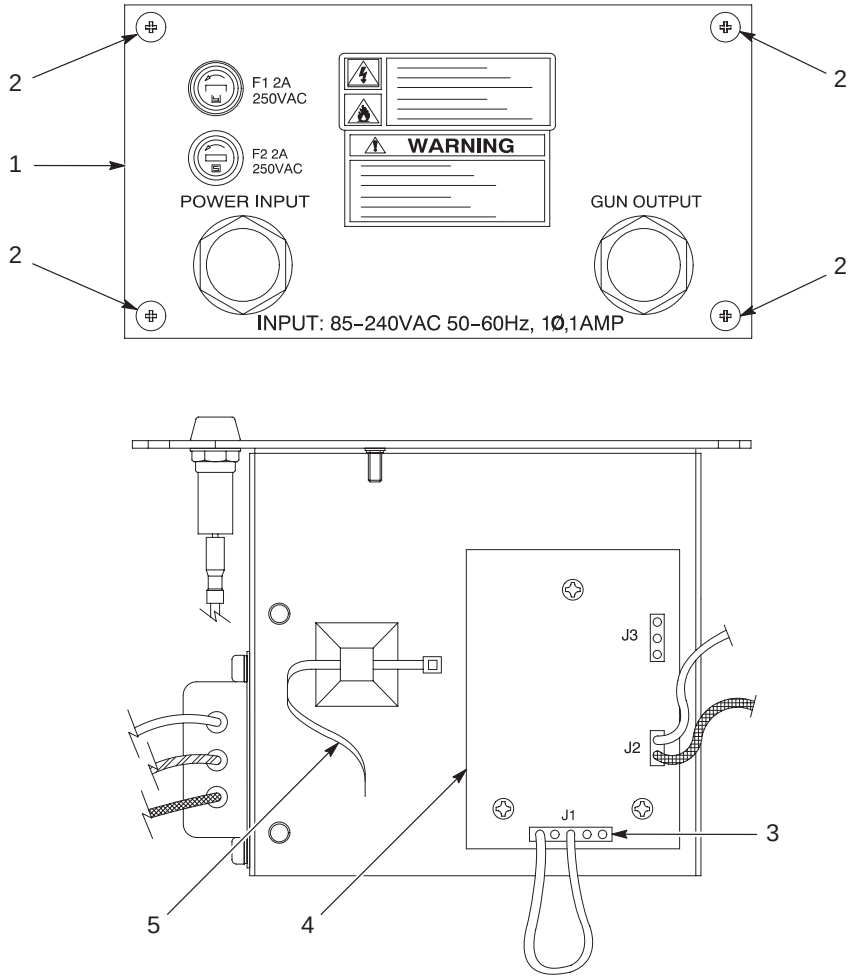

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Figure 3-1 Optional Standalone Configuration

1. Power supply module
2. Mounting screws
3. Connector J1
4. Interface circuit board
5. Tie-down

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.

Introduction

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 automatic control unit. Before operating a Nordson powder spray system, read all system component manuals.

Startup

Perform the following procedure to start up the control unit.

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.

Startup *(contd)*

2. Power on the control unit by turning on the main power on the master control unit front panel. 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.

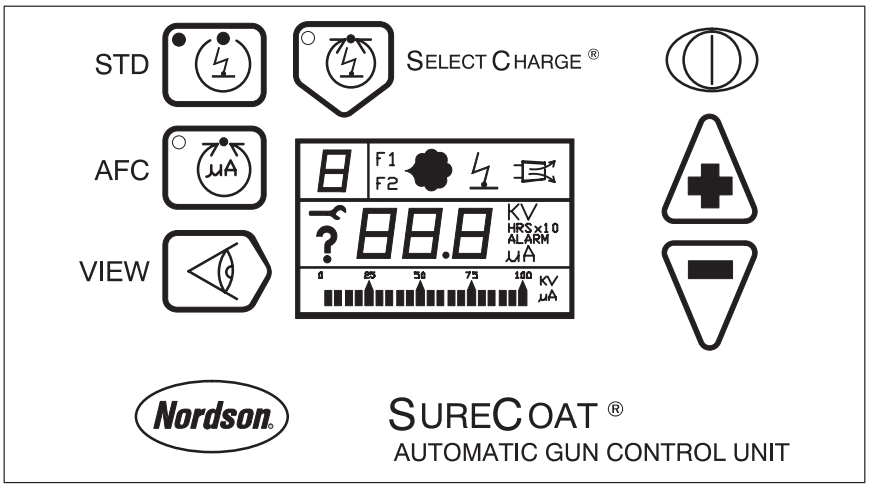

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Figure 4-1 Typical Display when Power is Turned On

3. If you are starting up a spray gun for the first time, perform the *Initial Gun Usage* procedures.
4. Select an operating mode using Tables 4-2, 4-3, 4-4, and 4-5 in *Operating Modes*.

   Table 4-1 lists the values shown on the display.
5. Set flow rate and atomizing air pressures to the following settings:

   Flow rate air 2 bar (30 psi)

   Atomizing air 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* in this section 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* for suggested kV or µA settings, and *Air Pressure Adjustments* 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 1.0, 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 control unit.

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 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: 95kV,
   Versa-Spray guns: 100 kV
3. Press the VIEW key to display μA.
4. On the master control unit, use the trigger switch to select the control unit, move the keyswitch to READY, and press the trigger enable key.
5. Adjust the flow rate and the atomizing air pressure to obtain the desired spray pattern.
6. 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

Standard Operating Mode

Table 4-2 Standard Operating Mode

Mode	AFC	Description		
Standard	Off	See Figure 4-2. Use the up/down arrow keys to turn adjust the kV set point. The control unit stores the kV setting when the mode is changed or when the control unit is powered off.		
		Setting	**Sure Coat Gun**	**Versa-Spray Gun**
		kV Set Point	adjustable	adjustable
		kV Range	0 then 25 to 95 kV	0 then 25 to 100 kV
		Maximum kV Output/Default Setting	95 kV	100 kV
	On	See Figure 4-2. Use the up/down arrow keys to turn adjust the AFC set point. The control unit stores the AFC setting when the mode is changed or when the control unit is powered off. Voltage is automatically set to the maximum, and AFC allows the setting of a feedback current threshold. If the current threshold is reached, the voltage is automatically adjusted to maintain the required coverage. If the AFC set point is changed, the controller remembers the new set point.		
		Setting	**Sure Coat Gun**	**Versa-Spray Gun**
		Initial kV Value	95 kV (not adjustable)	100 kV (not adjustable)
		Set Point Increments	5 µA	5 µA
		kV Range	10 to 100 µA	10 to 120 µA
		Default Set Point	30 µA (Default for version 1.0: 20 µA)	
		Maximum Current	100 µA	120 µA

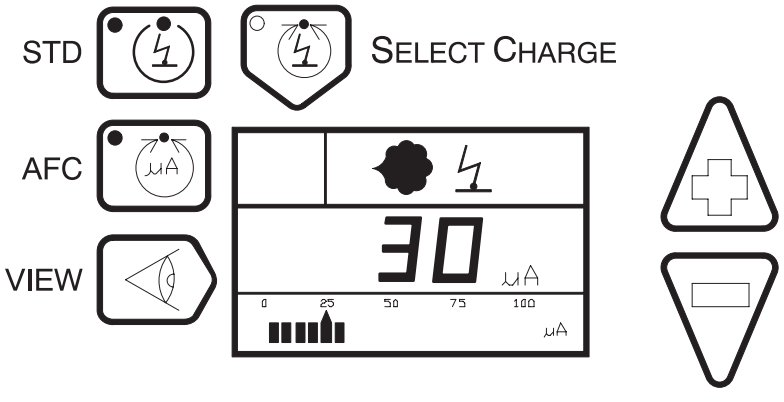

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Figure 4-2 STD Mode with AFC On

Select Charge Modes—Software Version 4.0

Select the desired Select Charge value (based on the application and coating requirements) by pressing the Select Charge key.

Table 4-3 Select Charge Modes—Software Version 4.0

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

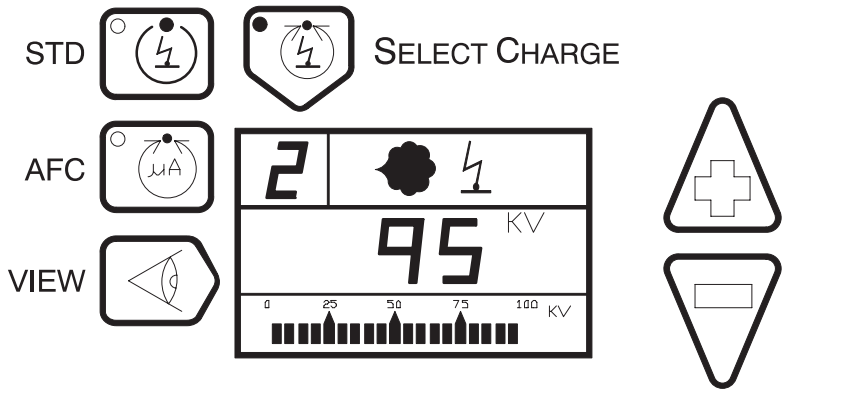


Figure 4-3 Select Charge Mode

Select Charge Modes—Software Versions 3.0 and 2.0

Select the desired Select Charge value (based on the application and coating requirements) by pressing the Select Charge key.

Table 4-4 Select Charge Modes—Software Versions 3.0 and 2.0

Select Charge Mode	Application	kV/AFC Set Point Adjustment	Initial kV Value		Maximum Current
			Sure Coat Gun	Versa-Spray Gun	Sure Coat or Versa-Spray Gun
1	Recoat	not adjustable	95 kV	100 kV	15 µA
2	Special	not adjustable	60 kV	60 kV	30 µA
3	Deep Cavity with Gun Inside	not adjustable	95 kV	100 kV	70 µA

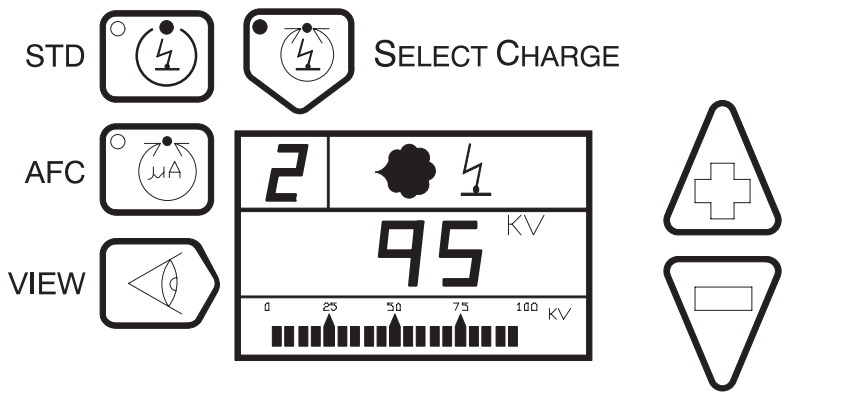


Figure 4-4 Select Charge Mode

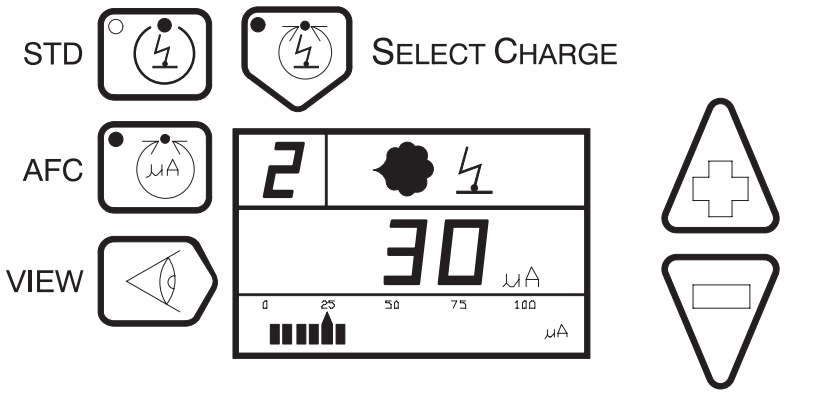
Select Charge Modes—Software Version 1.0

See Figure 4-5. When using Select Charge modes 2 or 3, adjust the desired AFC set point by using the up/down keys. A suggested starting point is 20 µA. If the set point is changed, the control unit remembers the new set point value. The default AFC set point can be different for Select Charge modes 2 or 3. AFC cannot be set in value 1.

Voltage is automatically set to the maximum, and AFC allows the setting of a feedback current threshold. If the current threshold is reached, the voltage is automatically adjusted to maintain the required coverage. The kV is set to that particular mode's initial kV value.

Table 4-5 Select Charge Modes—Software Version 1.0

Mode	AFC	Description			
			Mode #1	**Mode #2**	**Mode #3**
Select Charge	On	Initial kV value	95	95	95
		kV set point	not adjustable	not adjustable	not adjustable
		AFC set point	not adjustable	10 – 50	10 – 100
		Maximum current	15 µA	50 µA	100 µA



1400472A

Figure 4-5 Select Charge Mode with AFC On

Select Charge Mode Examples

Mode	Application
1	When recoating parts that have already been cured but require additional coating and curing, the gun current should be limited and maintained.
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 spray gun is required for painting the recessed sections at a close gun to part distance.
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.
4	**Version 4.0 Only** For special applications, such as metallic powders or unique parts. To use, select mode 4 and set the kV and µA. The control unit stores the settings and recalls them each time mode 4 is selected.

Air Pressure Adjustments

Refer to the feed hopper manual for the recommended fluidizing air pressure and to *Specifications* in the *Description* section for recommended flow rate and atomizing air pressures.

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.

Atomizing Air Pressure *(contd)*

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 to at least 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.

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.

If the question mark (**?**) error icon appears on the display, refer to the *Troubleshooting* section.

Display	Possible Problem
kV icon flashes while the gun is triggered	electrostatics problem exists
powder cloud flashes while the gun is triggered	air solenoid problem exists
kV icon is flashing and the gun is not triggered	kV could be on when it should be off

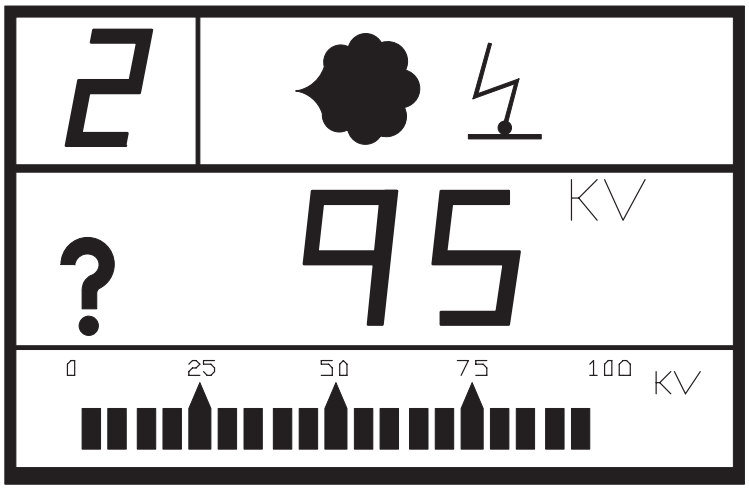


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Figure 4-6 Display of an Error Condition

Shutdown

To shut down the control unit:

1. Turn off power to the control unit:
   - If the control unit is connected to a master control unit, turn the master control unit's power switch to the off position.
   - If the control unit is not connected to a master control unit, turn the control unit's power switch to the off position.
2. Ground the gun electrode to discharge any residual voltage.
3. Turn off main power on the master control unit front panel.
4. Perform the *Daily Maintenance* procedure in this section.

Optional Standalone Configuration

When the control unit is configured as a standalone unit, the external trigger signal is activated continuously.

See Figure 4-7. To trigger the spray gun, use the trigger enable key (2) on the keypad module (1). Press the key to turn on the spray gun, press the key again to turn it off.

Refer to the *Description* section for information on the trigger enable key. Refer to the *Installation* section for information on standalone configuration.

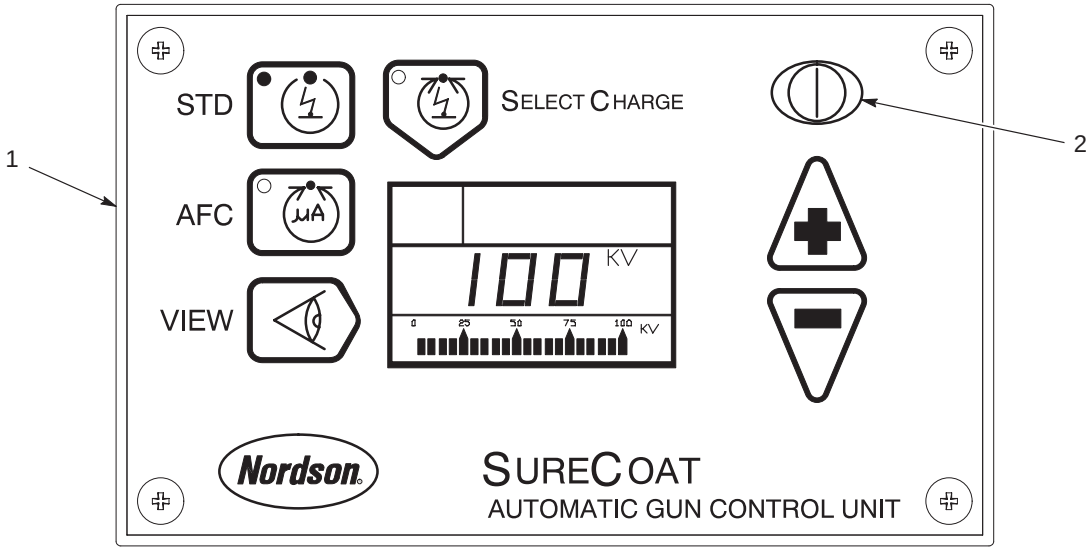

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Figure 4-7 Optional Standalone Configuration

1. Keypad module
2. Trigger enable key

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 in the *Gun Current Baseline* procedure. Significant differences may mean that the spray gun electrode assembly or multiplier is shorted or failed. 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 spray gun cable connections.
4. Make sure that the air being supplied to the control unit is clean and dry.
5. Wipe powder and dust off the control unit cabinet 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.

Introduction

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. A flashing kV icon while the spray gun is not triggered is a warning to the operator that voltage may be present at the spray gun due to faulty hardware. Failure to comply with this warning may result in an electrical shock.

Display	Possible Problem
kV icon flashes while the gun is triggered	electrostatics problem exists
powder cloud flashes while the gun is triggered	air solenoid problem exists
kV icon is flashing and the gun is not triggered	kV could be on when it should be off

Error codes may only be viewed in diagnostic 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.

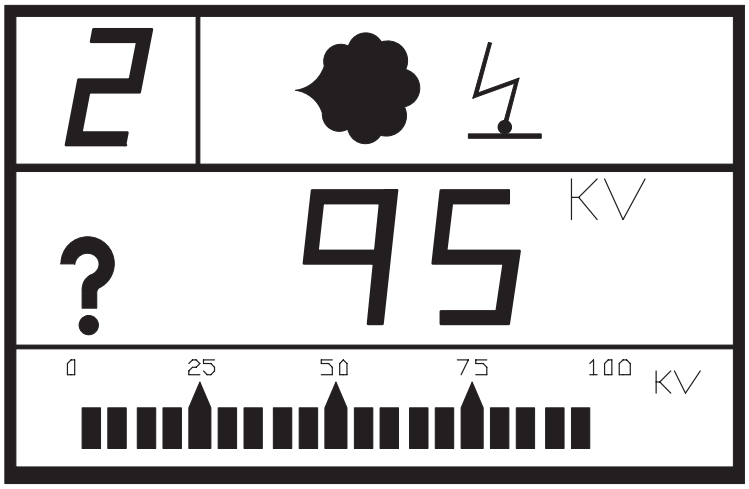

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Figure 5-1 Display of an Error Condition

Entering Diagnostics Mode

The diagnostic 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 diagnostic 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 diagnostic sequence. Refer to *Error Codes* in this section to identify the error code and correct the problem.

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Figure 5-2 Diagnostic Mode Display

Diagnostic 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 diagnostic 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 controller board.
2	RAM test failed	Turn off control unit power to reset the microprocessor. If the problem persists, replace the controller board.
3	µA Feedback fault	Trigger the spray gun with no parts in front of the spray gun. If the gun current is greater than 105 µA, 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. • 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	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	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. If the multiplier reading is acceptable, check for a defective cable as described in the spray gun manual.
8	Gun cable or multiplier short circuit	Unplug the gun cable from the back of the spray gun and trigger the spray gun. • If the error code changes to E7, check for a defective multiplier as described in the 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.

Continued...

Error Code	Problem	Corrective Action
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	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.
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	Unplug the gun cable from the back of the spray gun and trigger the spray gun. • If the error code changes to E7, check for a defective multiplier as described in the 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.

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 master 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 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, check the ac and dc electrical circuits.

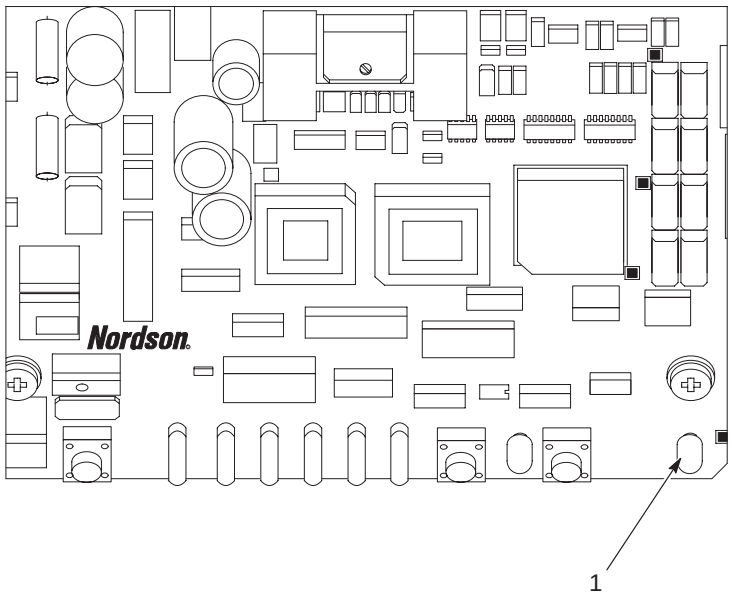

Figure 5-4 Controller Board dc Power LED Location

1. dc Power LED

Checking Electrical Circuits

WARNING: Risk of electrical shock. Shut off power at the master 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 Figures 5-5 and 5-6.

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

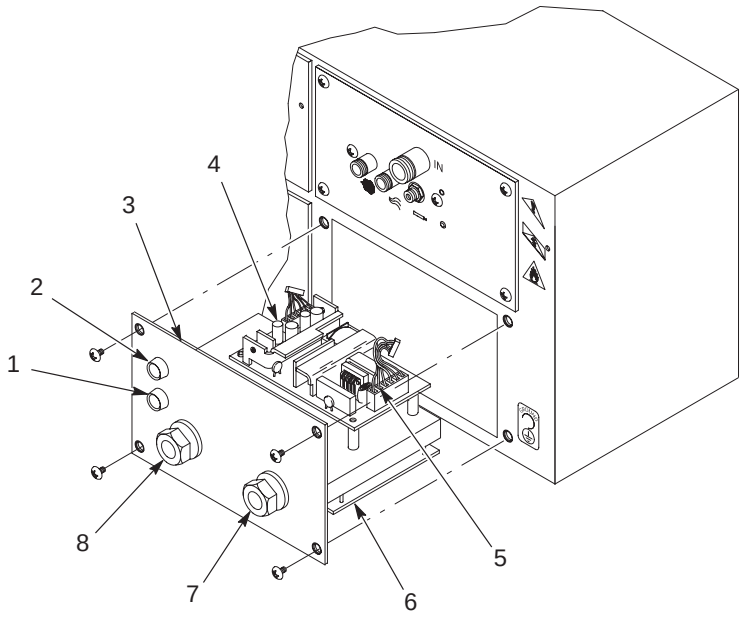

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Figure 5-5 Checking Electrical Circuits

1. Fuse 1
2. Fuse 2
3. Back panel
4. Power supply
5. dc Output
6. Interface board
7. Gun cable input
8. ac Power input

Wiring Diagram

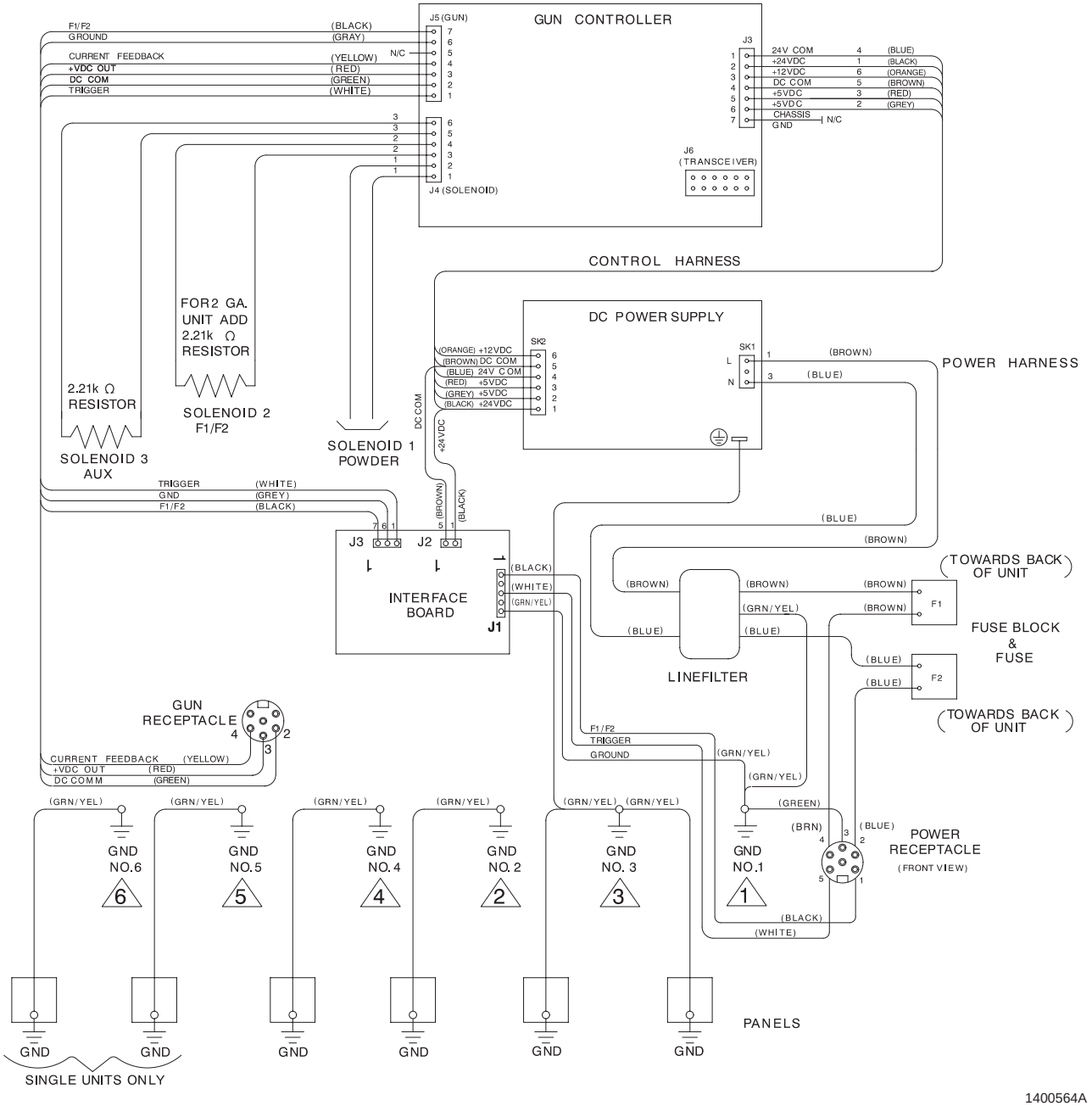

Figure 5-6 Wiring Diagram

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) consists of the LCD module, the keypad, and the controller board, plugged into each other and secured by standoffs.

CAUTION: Printed circuit boards are sensitive to electrostatic discharge. Wear a grounded wrist band when working on the keypad module.

1. Remove the four corner screws (1) and washers (2).
2. Tilt the top of the keypad module (3) forward and disconnect all three connectors (4).
3. Lift the keypad module out of the enclosure.

NOTE: The LCD module, keypad, and controller board can all be replaced individually. Refer to the *Parts* section for more information.

4. Place the new keypad module on the bottom edge of the enclosure opening and connect all three connectors.
5. Tilt the keypad module in, insert the screws and washers and tighten the screws.

Keypad Module Replacement *(contd)*

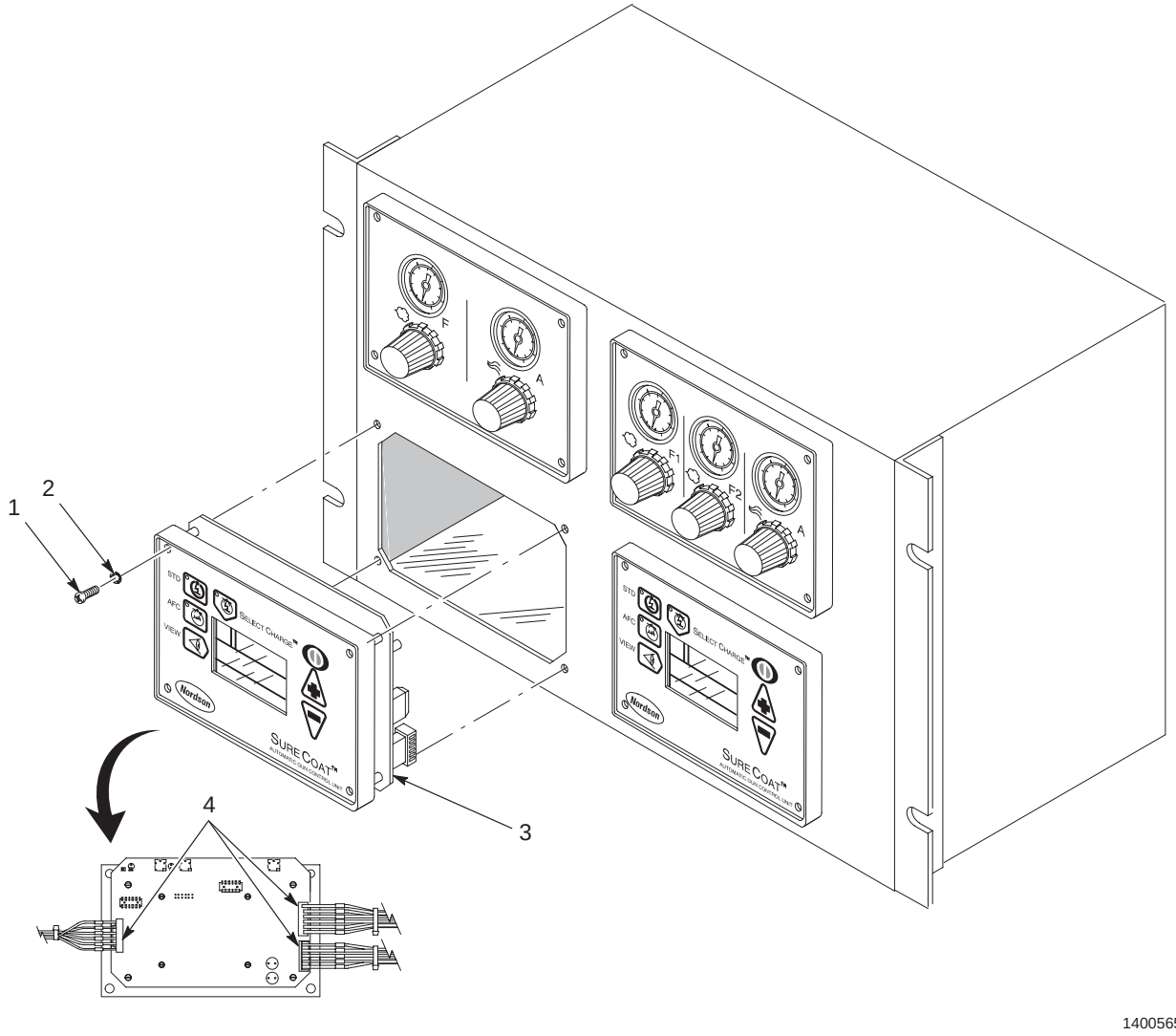

Figure 6-1 Keypad Module Replacement

1. Screw
2. Washer
3. Keypad module
4. Connectors

dc Power Supply Board Replacement

See Figure 6-2.

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

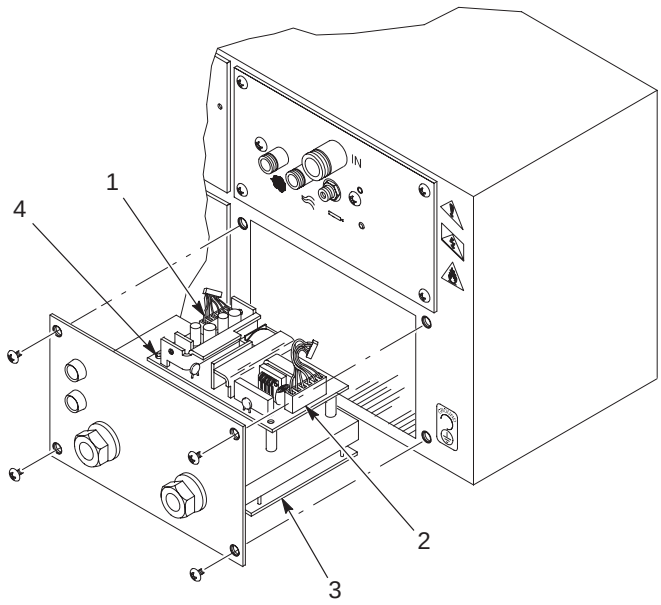

Figure 6-2 dc Power Supply Board Replacement

1. ac Input connector
2. dc Output connector
3. Interface board
4. dc Power supply board

Manifold Assembly Replacement

The manifold assembly is mounted on the pneumatic module. The entire module can be replaced, or individual parts can be replaced. The solenoid valves can be rebuilt. Refer to the *Parts* section for more information.

See Figure 6-3.

1. Remove the four screws and pull the pneumatic module out of the enclosure to access the manifold (5).
2. Disconnect the air tubing from the solenoid valves (1).
3. Remove the knurled nuts (4) and washers (3) and pull the solenoid coils (2) off the solenoid valves.
4. Remove the screws that secure the manifold to the module.
5. Remove the manifold assembly from the module.
6. Install the new manifold assembly on the module.
7. Install the solenoid coils on the solenoid valves with the knurled nuts and washers.
8. Reconnect the air tubing to the solenoid valves as shown in Figure 6-4.

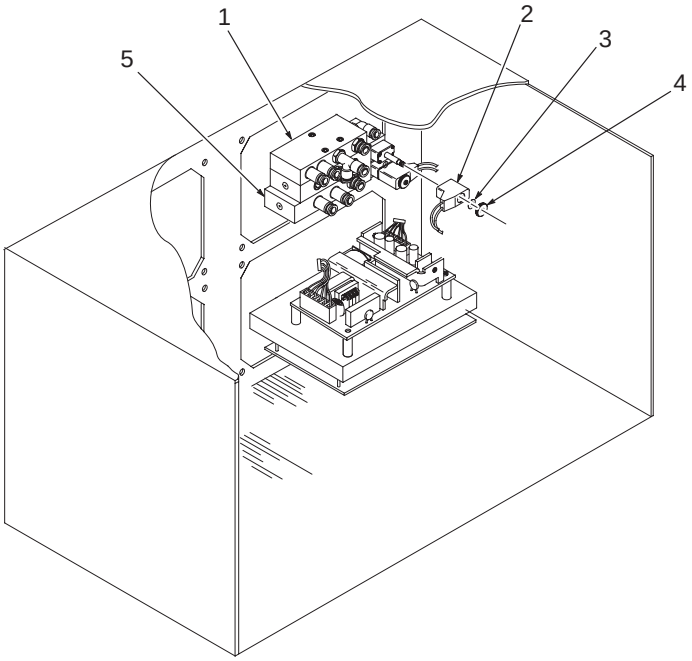

Figure 6-3 Manifold Assembly Replacement

1. Solenoid valve
2. Solenoid coil
3. Washer
4. Knurled nut
5. Manifold

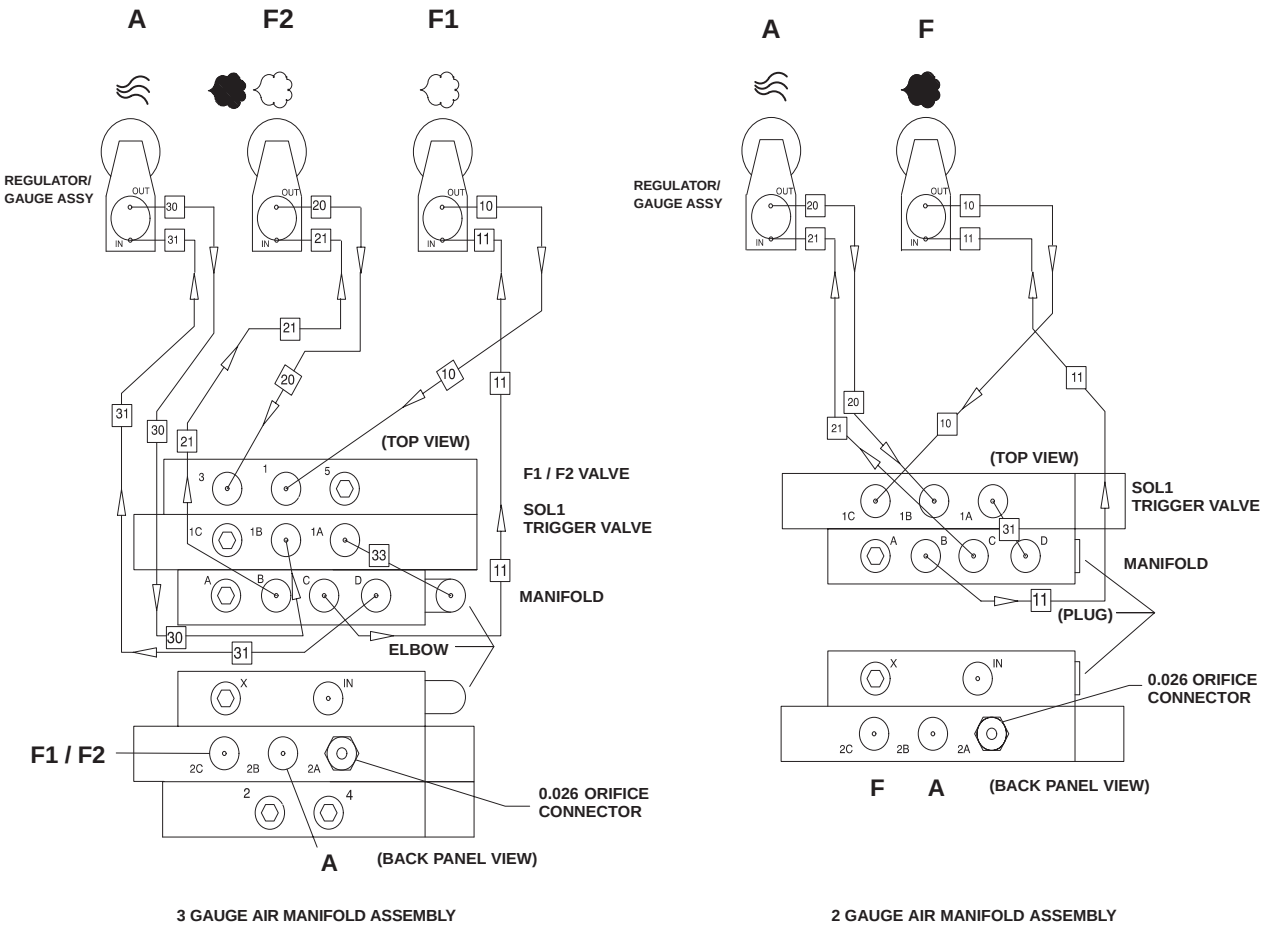

Figure 6-4 Pneumatic Diagram

Solenoid Valve Rebuild

See Figure 6-5. This procedure uses the valve seal, trigger valve, or F1/F2 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 F1/F2 valve, you will only use six tee seals.

1. Remove the manifold. Refer to *Manifold Assembly Replacement* 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 F1/F2 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).

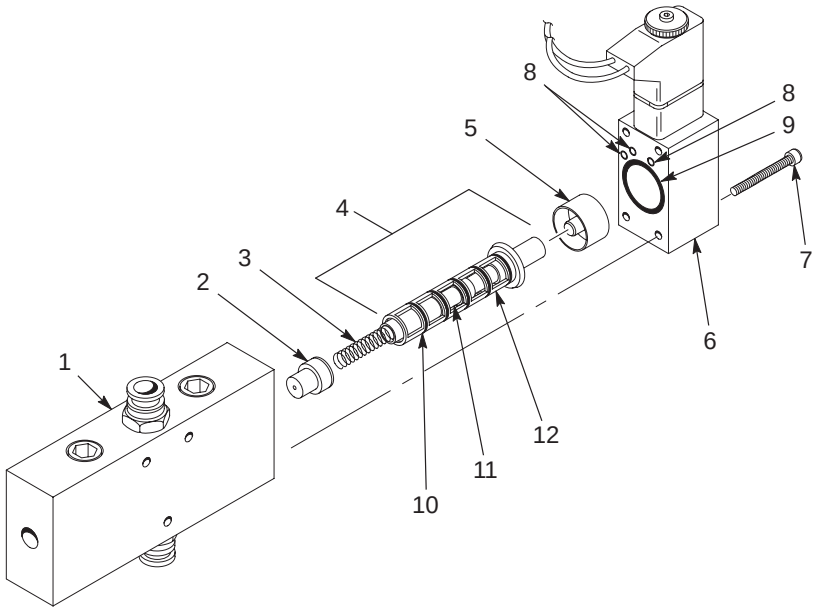

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Figure 6-5 Solenoid Valve Rebuild

1. Solenoid valve body
2. Spring pad
3. Spring
4. Spool assembly
5. Piston and bushing
6. End cap
7. Screws
8. O-rings
9. Gasket
10. Tee seals
11. Spool
12. Spacers

Regulator/Gauge 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.

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

- 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.

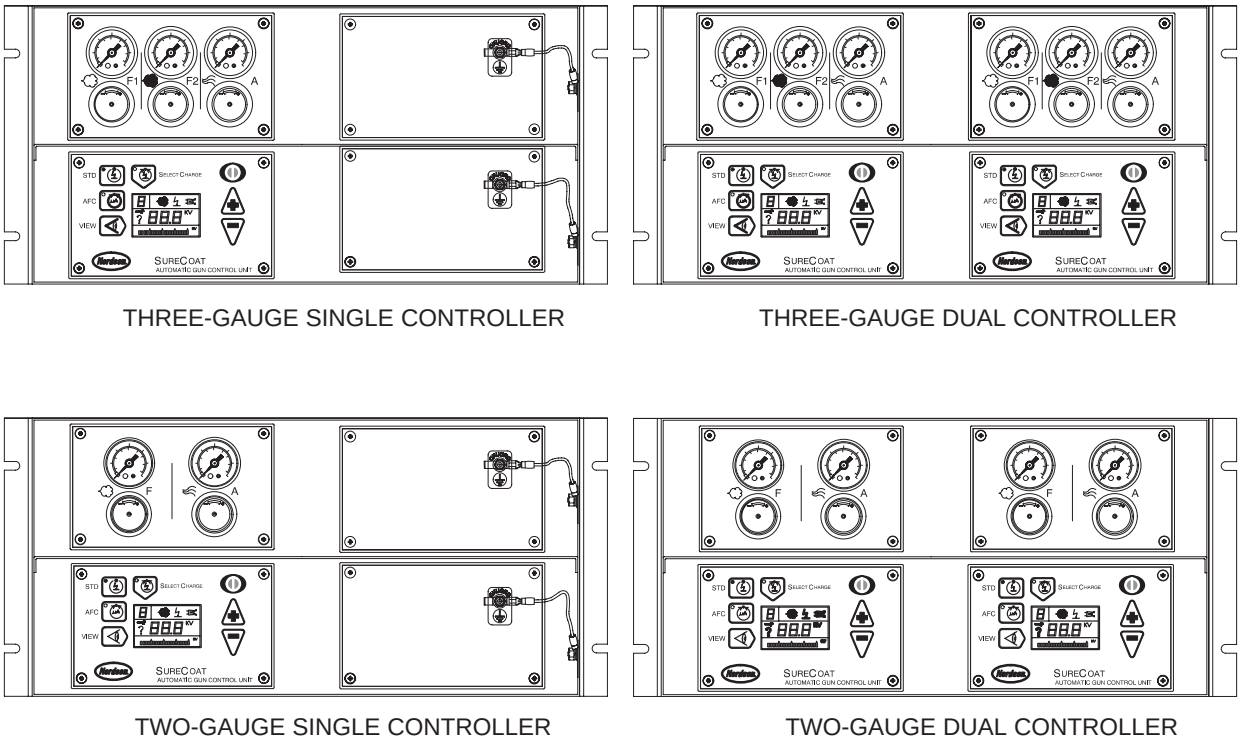
The number in the Quantity column is the quantity required per unit, assembly, or subassembly. The code AR (As Required) is used if the part number is a bulk item ordered in quantities or if the quantity per assembly depends on the product version or model.

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.

Control Unit Illustrations

These illustrations identify the versions and parts of the Sure Coat rack-mount automatic control units. Refer to the parts lists on the following pages for replacement part numbers.

FRONT VIEW SHOWING CONTROLLER VARIATIONS



THREE-GAUGE SINGLE CONTROLLER

THREE-GAUGE DUAL CONTROLLER

TWO-GAUGE SINGLE CONTROLLER

TWO-GAUGE DUAL CONTROLLER

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Figure 7-1 Control Unit Variations

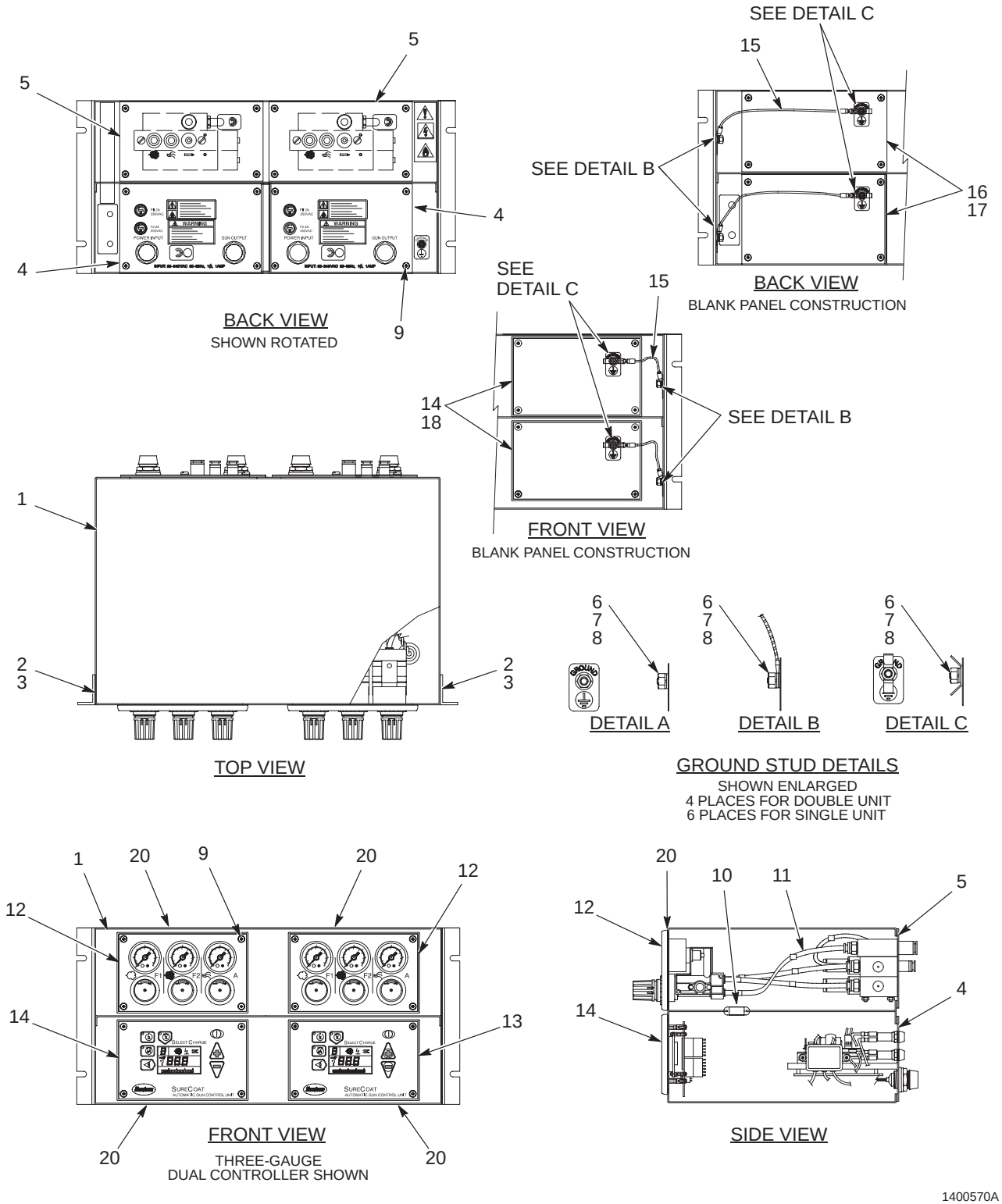


Figure 7-2 Two- and Three-Gauge Control Unit Parts

Two-Gauge Control Units

Single Two-Gauge Control Units

See Figures 7-1 and 7-2.

Item	Part	Description	Quantity	Note
—	307398	CONTROL UNIT, automatic, 2-gauge, single, Sure Coat	1	
1	302198	• ENCLOSURE, box, Sure Coat, automatic	1	
2	302193	• BRACKET, mount, Sure Coat, automatic	2	
3	982286	• SCREW, flat head, slotted, M5 x 10, zinc	8	
4	307411	• POWER SUPPLY MODULE kit, Sure Coat, automatic	1	A
5	307409	• PNEUMATIC VALVE MODULE kit, 2 gauge, Sure Coat, automatic	1	B
6	983021	• WASHER, flat, e, 0.203 x 0.406 x 0.040 in., brass	11	
7	983401	• WASHER, lock, m, split, M5, steel, zinc	11	
8	984702	• NUT, hex, M5, brass	11	
9	982825	• SCREW, pan head, recessed, M4 x 12, with integral lock washer, bezel	32	
10	900732	• GROMMET, rubber, 1.00 x 0.44 in.	2	
11	900742	• TUBING, polyurethane, 6/4 mm, blue	5 ft	
12	307407	• REGULATOR MODULE kit, 2-gauge, Sure Coat, automatic	1	C
13	307410	• KEYPAD MODULE kit, Sure Coat automatic	1	D
14	288814	• BEZEL, manual controller, Sure Coat	4	
15	302189	• WIRE, ground assembly, 10.5 in.	6	
16	302171	• PANEL, blank, back, Sure Coat, automatic	2	
17	302195	• GASKET, back panel, electric, Sure Coat, automatic	4	
18	302161	• PANEL, blank, front, Sure Coat, automatic	2	
19	271221	• LUG, 45°,double, 0.250, 0.438 in.	6	
20	307372	• GASKET, front panel	4	
NS	130629	• CABLE, power, 5-wire, 6.5 ft, female	1	
NS	335049	• STRAIN RELIEF, cable, 12 mm	1	

NOTE A: Refer to *Power Supply Module* for a parts breakdown.
B: Refer to *Pneumatic Modules* for a parts breakdown.
C: Refer to *Regulator Modules* for a parts breakdown.
D: Refer to *Keypad Module* for a parts breakdown.

NS: Not Shown

Dual Two-Gauge Control Units

See Figures 7-1 and 7-2.

Item	Part	Description	Quantity	Note
—	307397	CONTROL UNIT, automatic, 2-gauge, double, Sure Coat	1	
1	302198	• ENCLOSURE, box, Sure Coat, automatic	1	
2	302193	• BRACKET, mount, Sure Coat, automatic	2	
3	982286	• SCREW, flat head, slotted, M5 x 10, zinc	8	
4	307411	• POWER SUPPLY MODULE kit, Sure Coat, automatic	2	A
5	307409	• PNEUMATIC VALVE MODULE kit, 2 gauge, Sure Coat, automatic	2	B
6	983021	• WASHER, flat, e, 0.203 x 0.406 x 0.040 in., brass	7	
7	983401	• WASHER, lock, m, split, M5, steel, zinc	7	
8	984702	• NUT, hex, M5, brass	7	
9	982825	• SCREW, pan head, recessed, M4 x 12, with integral lock washer, bezel	32	
10	900732	• GROMMET, rubber, 1.00 x 0.44 in.	2	
11	900742	• TUBING, polyurethane, 6/4 mm, blue	9.5 ft	
12	307407	• REGULATOR MODULE kit, 2-gauge, Sure Coat, automatic	2	C
13	307410	• KEYPAD MODULE kit, Sure Coat automatic	2	D
14	288814	• BEZEL, manual controller, Sure Coat	4	
15	302189	• WIRE, ground assembly, 10.5 in.	4	
19	271221	• LUG, 45°, double, 0.250, 0.438 in.	4	
20	307372	• GASKET, front panel	4	
NS	130629	• CABLE, power, 5-wire, 6.5 ft, female	2	
NS	335049	• STRAIN RELIEF, cable, 12 mm	2	

NOTE A: Refer to *Power Supply Module* for a parts breakdown.
B: Refer to *Pneumatic Modules* for a parts breakdown.
C: Refer to *Regulator Modules* for a parts breakdown.
D: Refer to *Keypad Module* for a parts breakdown.
NS: Not Shown

Three-Gauge Control Units

Single Three-Gauge Control Units

See Figures 7-1 and 7-2.

Item	Part	Description	Quantity	Note
—	307396	CONTROL UNIT, automatic, 3-gauge, single, Sure Coat	1	
1	302198	• ENCLOSURE, box, Sure Coat, automatic	1	
2	302193	• BRACKET, mount, Sure Coat, automatic	2	
3	982286	• SCREW, flat head, slotted, M5 x 10, zinc	8	
4	307411	• POWER SUPPLY MODULE kit, Sure Coat, automatic	1	A
5	307408	• PNEUMATIC VALVE MODULE kit, 3-gauge, Sure Coat, automatic	1	B
6	983021	• WASHER, flat, e, 0.203 x 0.406 x 0.040 in., brass	11	
7	983401	• WASHER, lock, m, split, M5, steel, zinc	11	
8	984702	• NUT, hex, M5, brass	11	
9	982825	• SCREW, pan head, recessed, M4 x 12, with integral lock washer, bezel	32	
10	900732	• GROMMET, rubber, 1.00 x 0.44 in.	2	
11	900742	• TUBING, polyurethane, 6/4 mm, blue	7 ft	
12	307406	• REGULATOR MODULE kit, 3-gauge, Sure Coat, automatic	1	C
13	307410	• KEYPAD MODULE kit, Sure Coat, automatic	1	D
14	288814	• BEZEL, manual controller, Sure Coat	4	
15	302189	• WIRE, ground assembly, 10.5 in.	6	
16	302171	• PANEL, blank, back, Sure Coat, automatic	2	
17	302195	• GASKET, back panel, electric, Sure Coat, automatic	4	
18	302161	• PANEL, blank, front, Sure Coat, automatic	2	
19	271221	• LUG, 45°, double, 0.250, 0.438 in.	6	
20	307372	• GASKET, front panel	4	
NS	130629	• CABLE, power, 5-wire, 6.5 ft, female	1	
NS	335049	• STRAIN RELIEF, cable, 12 mm	1	

NOTE A: Refer to *Power Supply Module* for a parts breakdown.
B: Refer to *Pneumatic Modules* for a parts breakdown.
C: Refer to *Regulator Modules* for a parts breakdown.
D: Refer to *Keypad Module* for a parts breakdown.

NS: Not Shown

Dual Three-Gauge Control Units

See Figures 7-1 and 7-2.

Item	Part	Description	Quantity	Note
—	307395	CONTROL UNIT, automatic, 3-gauge, double, Sure Coat	1	
1	302198	• ENCLOSURE, box, Sure Coat, automatic	1	
2	302193	• BRACKET, mount, Sure Coat, automatic	2	
3	982286	• SCREW, flat head, slotted, M5 x 10, zinc	8	
4	307411	• POWER SUPPLY MODULE kit, Sure Coat, automatic	2	A
5	307408	• PNEUMATIC VALVE MODULE kit, 3-gauge, Sure Coat, automatic	2	B
6	983021	• WASHER, flat, e, 0.203 x 0.406 x 0.040 in., brass	7	
7	983401	• WASHER, lock, m, split, M5, steel, zinc	7	
8	984702	• NUT, hex, M5, brass	7	
9	982825	• SCREW, pan head, recessed, M4 x 12, with integral lock washer, bezel	32	
10	900732	• GROMMET, rubber, 1.00 x 0.44 in.	2	
11	900742	• TUBING, polyurethane, 6/4 mm, blue	13.5 ft	
12	307406	• REGULATOR MODULE kit, 3-gauge, Sure Coat, automatic	2	C
13	307410	• KEYPAD MODULE kit, Sure Coat, automatic	2	D
14	288814	• BEZEL, manual controller, Sure Coat	4	
15	302189	• WIRE, ground assembly, 10.5 in.	4	
19	271221	• LUG, 45°, double, 0.250, 0.438 in.	4	
20	307372	• GASKET, front panel	4	
NS	130629	• CABLE, power, 5-wire, 6.5 ft, female	2	
NS	335049	• STRAIN RELIEF, cable, 12 mm	2	

NOTE A: Refer to *Power Supply Module* for a parts breakdown.
B: Refer to *Pneumatic Modules* for a parts breakdown.
C: Refer to *Regulator Modules* for a parts breakdown.
D: Refer to *Keypad Module* for a parts breakdown.
NS: Not Shown

Regulator Modules

Two-Gauge Regulator Module

See Figure 7-3.

Item	Part	Description	Quantity	Note
—	307407	REGULATOR MODULE kit, 2-gauge, Sure Coat, automatic	1	
1	288821	• REGULATOR, assembly, 0–60 psi	2	
2	307389	• PANEL, automatic, controller, Sure Coat	1	
3	141603	• SEAL, panel, regulator	2	

Three-Gauge Regulator Module

See Figure 7-3.

Item	Part	Description	Quantity	Note
—	307406	REGULATOR MODULE kit, 3-gauge, Sure Coat, automatic	1	
1	288821	• REGULATOR, assembly, 0–60 psi	3	
2	302181	• PANEL, automatic, controller, Sure Coat	1	
3	141603	• SEAL, panel, regulator	3	

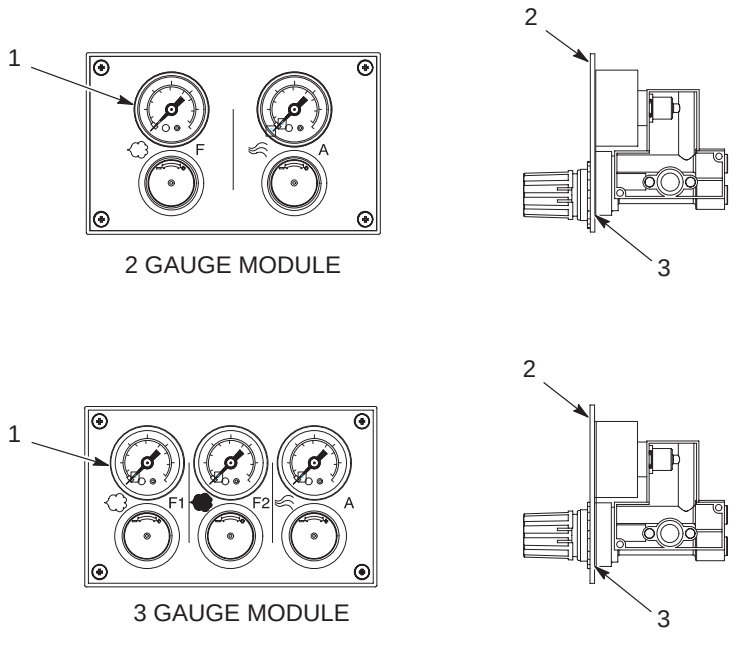


Figure 7-3 Regulator Modules

Pneumatic Modules

Two-Gauge Pneumatic Module

See Figure 7-4.

Item	Part	Description	Quantity	Note
—	307409	PNEUMATIC VALVE MODULE kit, 2-gauge, Sure Coat, automatic	1	
1	302172	• PANEL, valve, automatic, Sure Coat	1	
2	302199	• GASKET, pneumatic, rear panel, Sure Coat automatic	1	
3	302169	• MANIFOLD ASSEMBLY, automatic, Sure Coat	1	
4	- - - - - -	• • SOLENOID VALVE, 3-2 way, normally closed, 24 Vdc, trigger	1	A
7	971100	• • CONNECTOR, male, 6-mm tube x $^1/_4$-in. uni-thread	6	
8	972283	• • CONNECTOR, round, male, 10-mm tube x $^1/_4$-in. uni-thread	1	
9	302158	• • CONNECTOR, orifice, 6 mm x $^1/_4$, 0.026 in.	1	
10	972282	• • CONNECTOR, round, male, 8-mm tube x $^1/_4$-in. uni-thread	2	
11	982309	• SCREW, pan, recessed, M5 x 10, black	2	
12	983401	• WASHER, lock, m, split, M5, stainless steel	3	
13	983021	• WASHER, flat, e, 0.203 x 0.4065 x 0.040 in., brass	1	
14	984702	• NUT, hex, M5, brass	1	
15	271221	• LUG, 45, double, 0.250 in., 0.438 in.	1	
16	933751	• CONNECTOR, mc plug, 6 position	1	

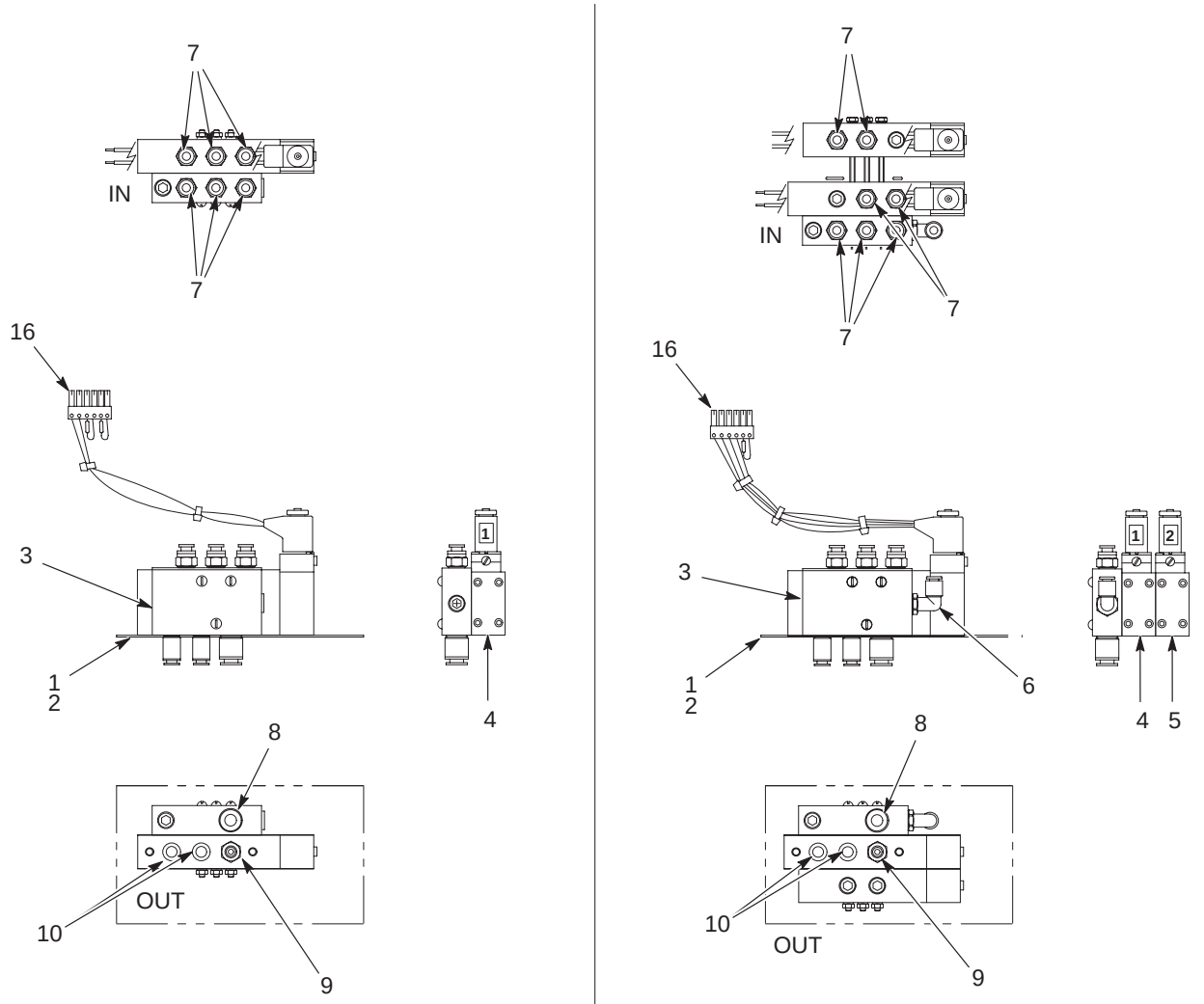
NOTE A: Refer to *Trigger Solenoid Valve* in *Service Kits* for parts.

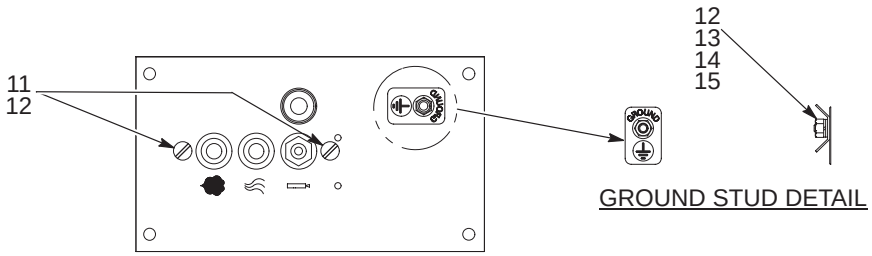
Three-Gauge Pneumatic Module

See Figure 7-4.

Item	Part	Description	Quantity	Note
—	307408	PNEUMATIC VALVE MODULE kit, 3-gauge Sure Coat, automatic	1	
1	302172	• PANEL, valve, automatic, Sure Coat	1	
2	302199	• GASKET, pneumatic, rear panel, Sure Coat automatic	1	
3	302170	• MANIFOLD ASSEMBLY, automatic, Sure Coat	1	
4	- - - - - -	• • SOLENOID VALVE, 3-2 way, normally closed, 24 Vdc, trigger	1	A
5	- - - - - -	• • SOLENOID VALVE, 4 way, 24 Vdc, F1/F2	1	B
6	972142	• • ELBOW, male, 6-mm tube x $^1/_4$-in. uni-thread	1	
7	971100	• • CONNECTOR, male, 6-mm tube x $^1/_4$-in. uni-thread	7	
8	972283	• • CONNECTOR, round, male, 10-mm tube x $^1/_4$-in. uni-thread	1	
9	302158	• • CONNECTOR, orifice, 6 mm x $^1/_4$ in., 0.026	1	
10	972282	• • CONNECTOR, round, male, 8-mm tube x $^1/_4$-in. uni-thread	2	
11	982309	• SCREW, pan, recessed, M5 x 10, black	2	
12	983401	• WASHER, lock, m, split, M5, stainless steel	3	
13	983021	• WASHER, flat, e, 0.203 x 0.4065 x 0.040 in., brass	1	
14	984702	• NUT, hex, M5, brass	1	
15	271221	• LUG, 45, double, 0.250 in., 0.438 in.	1	
16	933751	• CONNECTOR, mc plug, 6 position	1	

NOTE A: Refer to *Trigger Valve* in *Service Kits* for repair parts.
B: Refer to *F1/F2 Valve* in *Service Kits* for repair parts.





PNEUMATIC BACK PANEL

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Figure 7-4 Pneumatic Modules

Power Supply Module

See Figure 7-5.

Item	Part	Description	Quantity	Note
—	307411	POWER SUPPLY MODULE kit, Sure Coat, automatic	1	
1	307394	• FILTER, line, with connector, Sure Coat, automatic	1	
2	288803	• POWER SUPPLY, 24, 5, 12 Vdc, 40 w	1	
3	302159	• HARNESS GROUP, power , Sure Coat	1	
4	984702	• NUT, hex, M5 brass	1	
5	983021	• WASHER, flat, e, 0.203 x 0.406 x 0.040 in., brass	1	
6	983401	• WASHER, lock, m, split, M5, stainless steel, zinc	1	
7	302163	• RECEPTACLE, gun, automatic, Sure Coat	1	
8	939122	• SEAL, conduit, fitting, $^1/_2$ in.	2	
9	984526	• NUT, lock, $^1/_2$-in. conduit	2	
10	271221	• LUG, 45, double, 0.250 in., 0.438 in.	1	
11	302162	• RECEPTACLE, power, automatic, Sure Coat	1	
12	288804	• FUSE HOLDER, panel mount, 5 x 20	2	
13	131477	• FUSE, 2.00, fast-acting, 250 V, 5 x 20	2	
14	302195	• GASKET, back panel, electric, Sure Coat	1	
15	982825	• SCREW, pan, recessed, M4 x 12, with integral lock washer, bezel	2	
16	982824	• SCREW, pan, recessed, M3 x 8, with integral lock washer, bezel	7	
17	- - - - - -	• PCA, interface module, AGC	1	
18	939991	• • FUSE, 50 mA, quick acting, micro, 250 V	2	

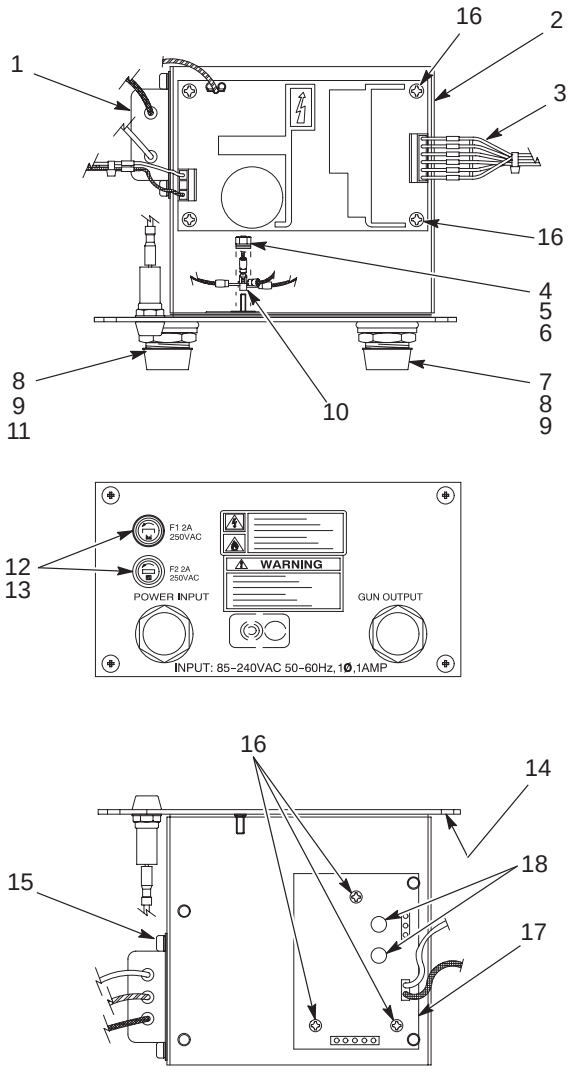

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Figure 7-5 Power Supply Module

Keypad Module

See Figure 7-6.

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

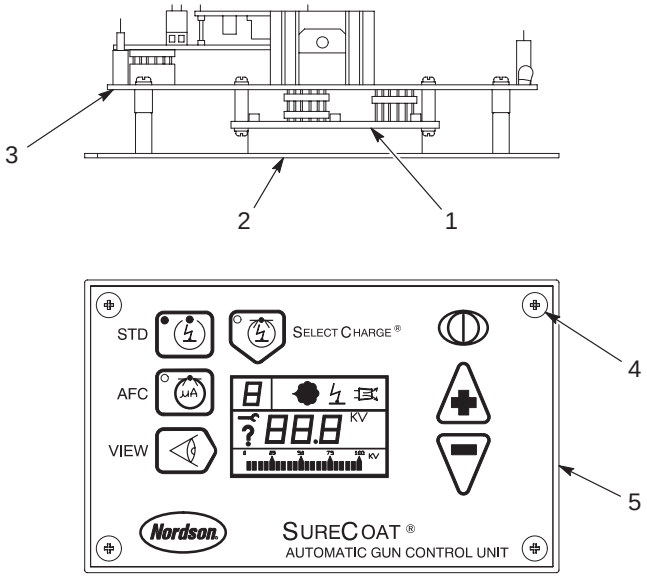

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Figure 7-6 Keypad Module

Solenoid Valve Kits

Use these lists to order service kits for the trigger and auxiliary solenoid valves.

Trigger Valve

See Figure 7-7.

Item	Part	Description	Quantity	Note
—	333677	SERVICE KIT, trigger valve	1	A
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	

NOTE A: See Figure 7-4, item 4 for the location of the trigger valve.

NS: Not Shown

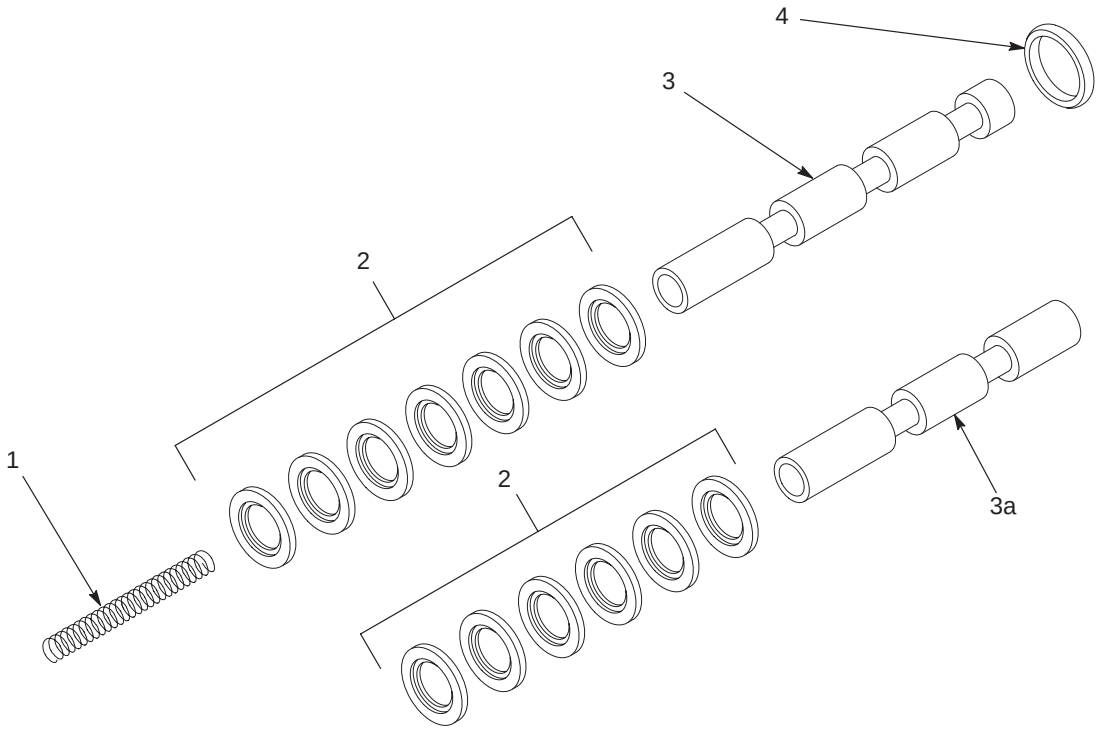

Figure 7-7 Solenoid Valve Kits

F1/F2 Valve

See Figure 7-7.

Item	Part	Description	Quantity	Note
—	333678	SERVICE KIT, F1/F2 valve	1	A
1	- - - - - -	• SPRING	1	
2	1027108	• SEAL KIT, spool, valve	1	B
NS	- - - - - -	• • SEAL, tee	7	B
NS	- - - - - -	• • LUBRICANT	1	
3a	- - - - - -	• SPOOL, molded 5/2	1	
4	- - - - - -	• O-RING, piston	1	

NOTE A: See Figure 7-4, item 5 for the location of the F1/F2 valve.

B: The valve seal service kit, part 1027108, includes seven tee seals. Only six tee seals are needed to rebuild the auxiliary F1/F2 valve. Discard the spare tee seal.

NS: Not Shown

Jumper Harness

See Figure 7-8.

Part	Description	Note
332776	HARNESS, jumper	

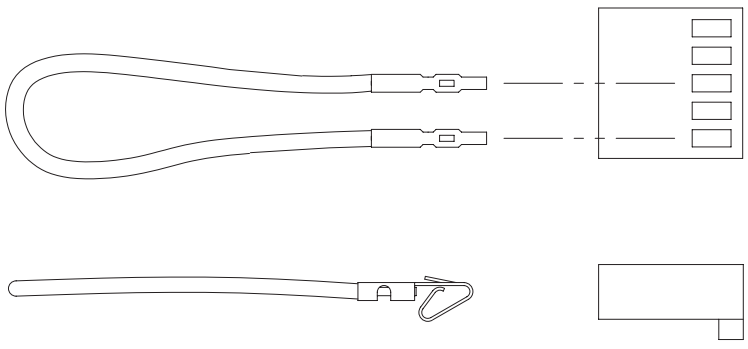

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Figure 7-8 Jumper Harness

DECLARATION of CONFORMITY

PRODUCT:

Versa-Spray® II, IPS Automatic Powder Spray Applicators,
with Sure Coat® Automatic Rack Mount 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	

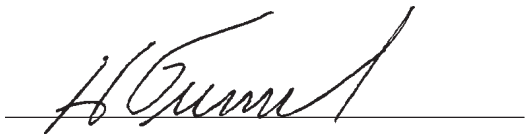
PRINCIPLES:

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 V9879157
EECS (Notified Body No. 600)—EECS ATEX 0771
Factory Mutual—3000677
Canadian Standards Association—24501-57



Date: 15 May 00

Herb Turner
Vice President, Powder Systems Group

Nordson

Nordson Corporation • Westlake, Ohio