Nordson Corporation

OPERATOR'S CARD

P/N 1102109A

Prodigy® HDLV® Generation III Manual System

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

System Diagram

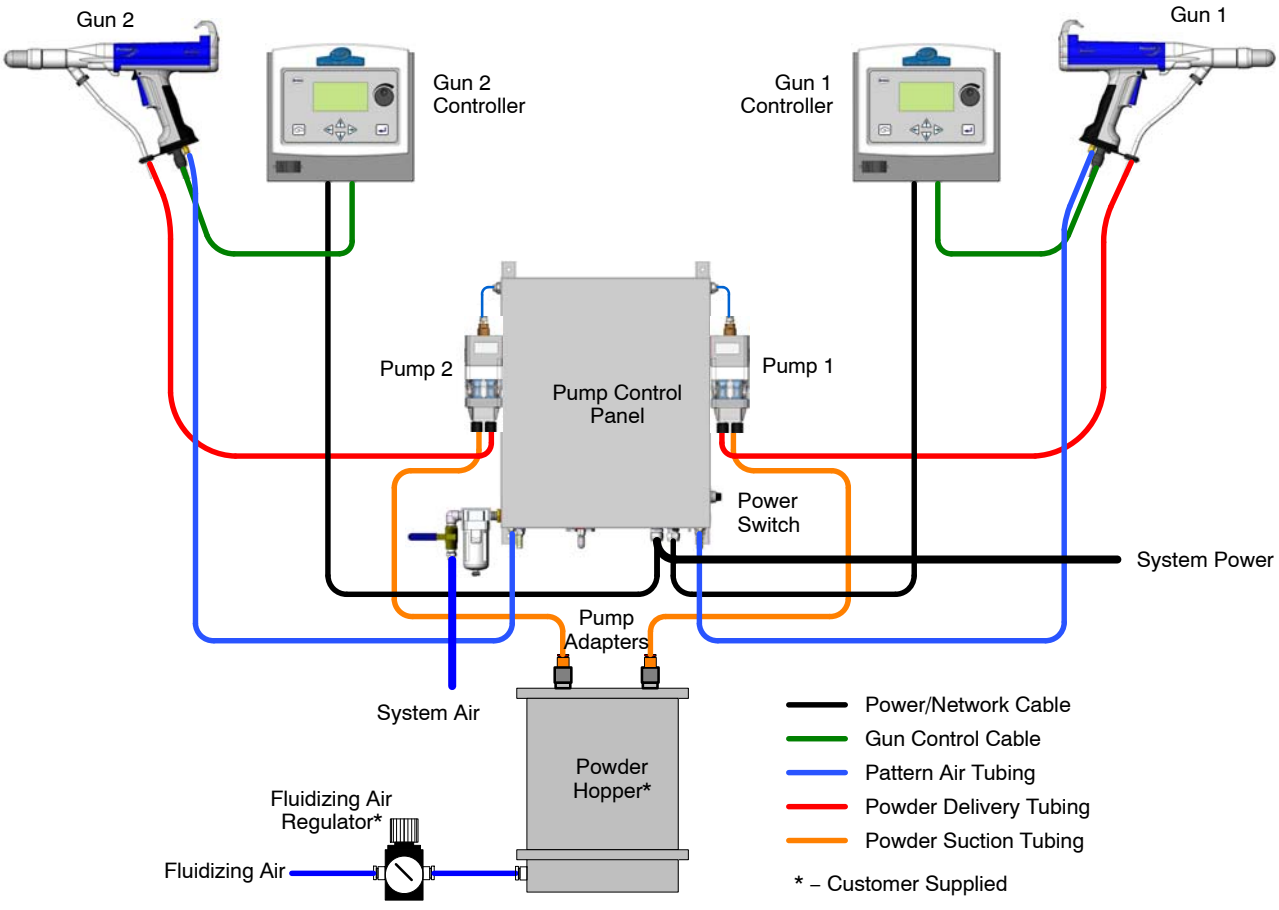


Figure 1 System Diagram (Two-Gun System Shown)

Operator Controls

Turn on the **Pump Control Panel power switch** to supply power to the system. Each controller has a separate power switch. The controller operator interface consists of the items shown in Figure 2.

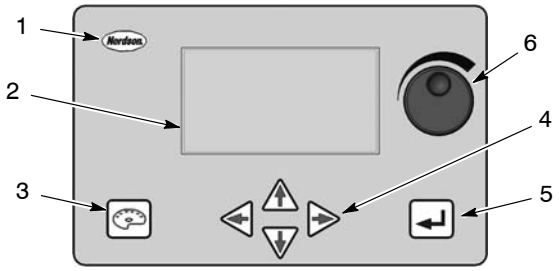


Figure 2 Manual Gun Controller Operator Interface

1. Nordson key
2. LCD display
3. Color change key
4. Arrow keys
5. Enter key
6. Rotary knob

The **arrow keys** and **rotary knob** move the cursor around the screen and change settings.
The **Color Change key** starts gun purging.
The **Nordson key** opens the Configuration screen if pressed and held when during controller power-up. During normal operation it opens the Fault screen.

The screen **cursor** is the solid triangular pointer on the side of the screen.

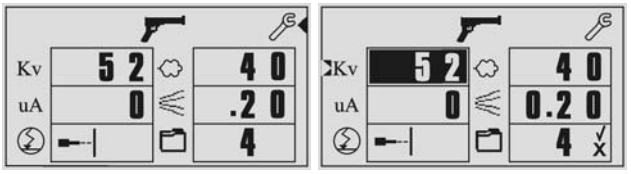


Figure 3 Using the Cursor

To open the Tool screen from the Main screen, point to the **Tools (wrench)** icon, and press ↵. To open other screens, point to the screen name and press ↵.

To return to the Main screen point to **RETURN TO MAIN SCREEN** and press ↵.

To change a setting, point the cursor at the setting, then press ↵. The value is reverse-highlighted.

Use the ▲ and ▼ arrow keys or the rotary knob to change the selected value. Press ↵ again to save your changes and deselect the setting.

Configuration

When a new controller is powered up for the first time, it automatically displays the first screen of the Configuration process, the Setup screen. For more information on configuration, refer to the Prodigy Manual Controller manual 1054580.

The configuration screens can be accessed manually by turning the controller off, then pressing and holding the **Nordson** key while turning the power on and waiting until the Configuration menu appears.

Spray Settings

NOTE: To make spray settings, the controller security must be unlocked. Refer to Password in the Configuration section of the Prodigy Manual Controller manual for instructions on locking and unlocking the controller.

All spray settings are made on the Main screen. While spraying powder, the Main screen displays the actual spray gun outputs. If you move the cursor the spray settings for the current preset are displayed.

Presets

A preset is a set of saved spray settings: electrostatic, powder flow, and pattern air. Ten presets can be stored. Use presets to save optimized settings for different parts or part shapes.

NOTE: You do not have to set up any presets at all to operate the spray gun; you can just make spray settings and start production.

Changing Preset Spray Settings

You can change a preset's spray settings at any time, temporarily or permanently, if the controller is unlocked.

1. Point to the setting you want to change.
2. Change the setting value. Press ↵ to start spraying with the new setting. If you do not press ↵ the controller will do it for you after 5 seconds. Yes (✓) and No (**X**) symbols appear next to the preset number.
3. To save the change, point to ✓ and press ↵. To discard the change, point to **X** and press ↵.

   You cannot change preset numbers until you save or cancel the change for the current preset.

   If you power off the controller, the current preset settings are retained in memory and restored on power up, even if you have not saved them.

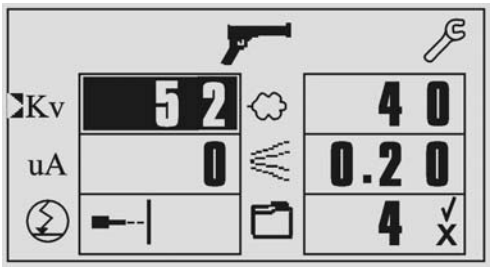


Figure 4 Main Screen with Change to kV Setting

Electrostatic Settings

You can choose to set kV output or AFC (standard mode), or use a Select Charge mode.

Point the cursor at the desired electrostatic mode icon and press ↵. Use the arrow keys to toggle through the modes.

Standard Modes

Kv Mode: Set high voltage output (25–95 kV). The higher the output, the greater the powder charge. µA cannot be set.

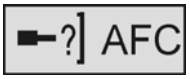
uA (AFC) Mode: Set current (µA) output limit. The controller limits current output to the setting while controlling voltage output to keep charging and transfer efficiency high. kV cannot be set.

Select Charge Modes

Recoat (Mode 1): Use for recoating parts that have already been coated and cured. Gun current is reduced to eliminate back ionization.

Special (Mode 2): Use for special powders such as dry blend metallics or micas.

Deep Cavity (Mode 3): Use for coating inside boxes or deep recesses in workpieces.



User Programmable (Mode 4): Allows you to set both kV and µA for a particular part or powder and save the setting.

Powder Flow Setting

Powder flow is a percentage of available output, from 0–100 %. When the spray gun is triggered, the value displayed should match the setting. This icon is displayed when Normal Flow mode is selected for the preset. In Normal Flow mode, the pump cycle rate varies with the powder flow setting.

If **Fast Flow** is enabled for the selected preset, an "F" appears above the flow icon. When Fast Flow is enabled, the pump runs at a continuous fast cycle rate. Use the Fast Flow mode with powders that are difficult to fluidize and tend to clump. Fast Flow mode will cause more wear to the pump pinch valves.

NOTE: Must have V. 3.0 and 2.0 for this feature.

Pattern Air Setting

Pattern air atomizes the powder and controls the shape of the powder pattern. Pattern air flow is 0.20–4.0 SCFM (0.34–6.8 SCMH). When the spray gun is triggered, actual air flow is displayed instead of the setting.

NOTE: Must have V. 3.0 and 2.0 for this feature.

Controller Tools

 Point the cursor to the **Tools** icon and press ↵.

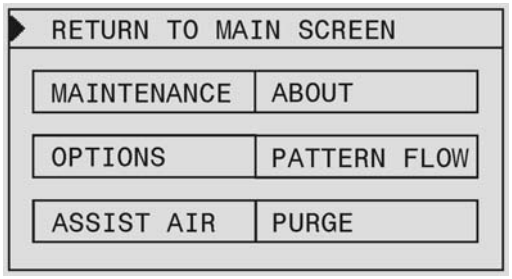


Figure 5 Controller Tools Screen

Maintenance

ALARM: When ON, alerts the operator to perform gun or pump maintenance when **HOURS** is equal to the **INT** setting. The alarm icon and a fault code appears on the display:
E19: Gun maintenance required
E20: Pump maintenance required

INT: Scheduled maintenance interval (in hours).
HOURS RESET: Resets HOURS to zero and cancels maintenance alarm fault code.
HOURS: Time since last reset.
TOTAL: Total operating hours.

Options (Units and LCD Settings)

UNITS: Set units to English or Metric.

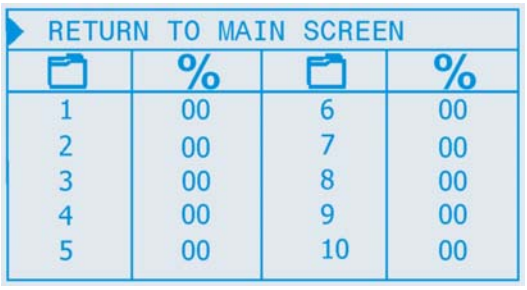
DISPLAY MODE: Change the display mode as desired:

- **NORMAL:** Dark characters on a light background.
- **REVERSE:** Light characters on a dark background.

CONTRAST: Point to **CONTRAST** and use the ▲ or ▼ arrow keys or the rotary knob to adjust the screen contrast as desired.

Assist Air

Assist air is the air flow that pushes the powder out of the pump to the gun. This screen allows you to increase or decrease the assist air flow by a percentage of the total flow for each preset, to optimize pump and spray performance.



Point to the desired preset number and press ↵ to select the percentage, use the rotary knob to set the desired value, then press ↵ again.

Refer to the Prodigy II System Troubleshooting Guide for more performance solutions.

About

Use the information on this screen to view the gun number and purge mode settings, and to check the software version numbers. You may be asked to open this screen if you call for technical support.

Pattern Flow

Point to **PATTERN FLOW** and press ↵.

The spray gun pattern control trigger toggles between the preset settings (High mode) and the Low mode settings, changing the fan pattern and powder flow as needed.

 When in Low mode, a down-pointing arrow appears to the right of the gun icon.

NOTE: If you change presets while spraying in Low mode, the controller immediately switches to High mode, spraying with the new preset settings.

PATTERN TRIGGER: Choose OFF (trigger disabled) or HI/LO (trigger enabled).

LOW PATTERN AIR: Set the pattern air flow. The default setting is 0.20 SCFM (0.35 SCMH).

LOW POWDER FLOW: Set the powder flow percentage. The default setting is 20%.

Standard Purge

Refer to *Configuration* in the controller manual for purge mode settings. A standard purge cycle operates as follows:

1. **Soft Purge:** Pump assist air is directed back to the powder supply (Soft Siphon), then to the spray gun (Soft Gun).
2. **Pulse Purge:** Purge air is directed in pulses from the pump to the powder supply (Siphon Pulses), then from the pump to the spray gun (Gun Pulses). Pulse On sets duration of each pulse, Pulse Off sets time between pulses.

Purging is started by pressing the **Color Change key**. Make sure manual guns are aimed into the booth before purging them. Purge settings and defaults are:

SOFT SIPHON: 1–10 seconds, default 8
SOFT GUN: 1–10 seconds, default 8
PULSE ON: 0.1–1 second, default 0.2
PULSE OFF: 0.1–1 second, default 0.30
SIPHON PULSES: 1–99 pulses, default 7
GUN PULSES: 1–99 pulses, default 13

Color-on-Demand Purge

The COD Purge Cycle operates as follows:

1. **Manifold Purge:** The dump valve opens. The pump goes to 100% of flow to pump the remaining powder out of the manifolds.
2. **Soft Purge:** Assist air is directed through the pump and siphon tubing back to the powder supply (Soft Siphon), then through the pump and delivery tubing to the spray gun (Soft Gun).
3. **Pulse Purge:** Purge air is pulsed from the pump to the powder supply (Siphon Pulses), then from the pump to the spray gun (Gun Pulses). Pulse On sets duration of each pulse, Pulse Off sets time between pulses.
4. **Powder Pre-Load:** The new color powder is pumped to the spray gun for the set time at 100% of flow to load the system for production.

The color change cycle is started by the operator or by a remote signal to the Color-On-Demand controller. Purge settings and defaults are:

MANIFOLD PURGE: 0–10 seconds, default 2
SOFT SIPHON: 2–10 seconds, default 3.5
SOFT GUN: 1–10 seconds, default 2
PULSE ON: 0.1–1 second, default 0.2
PULSE OFF: 0.1–1 second, default 0.2
SIPHON PULSES: 1–99 pulses, default 20
GUN PULSES: 1–99 pulses, default 18

Operation

1. Check all electrical and tubing connections. Make sure the powder suction tubing is inserted into the pump adapter on the powder hopper.
2. Turn on the booth exhaust fan.
3. Turn on fluidizing air and allow the powder in the hopper to become fluidized.
4. Turn on the pump controller power switch.
5. Turn on the gun controller power switch.
6. Charge the spray gun with powder, then begin production.

Charging the Spray Gun

You must charge the powder tubing and gun with powder before starting production. Point the spray gun into the booth and pull the trigger. When powder begins spraying from the gun, release the trigger, then begin production.

Using the Pattern Control Trigger

Press the Powder Control trigger to change the powder flow and pattern air flow to the Low mode settings. Press the switch again to return to the preset settings.

Purging/Color Change

Standard systems: Disconnect the suction tubing from the pump adapter and direct the end of the tubing into the booth. Point the spray gun(s) into the booth and press the **Color Change** key to start the purge cycle. To stop the purge cycle before it is complete, press the **Nordson** key.

COD systems: Point the gun into the booth. Select a new color and touch the START button, or touch the Start button first then select the new color. If the system is equipped with a foot pedal, point the gun into the booth, press the foot pedal to start the color change, then select a new color.

Maintenance Timers

Refer to page 4 to set the maintenance timers. When an E19 (Gun) or E20 (Pump) fault code and alarm icon appears on the display, perform the required maintenance, then reset the timer.

Troubleshooting

Fault Code Troubleshooting

The alarm symbol and a fault code will appear on the Main screen to indicate that a fault has occurred and is logged on the fault screen.

Press the **Nordson** key to open the Fault screen. This screen lists the last 5 faults, current fault at the top of the list, and a brief description of each fault.

To reset the faults move the cursor to **RESET** and press ↵. The fault message will reappear if you do not fix the problem causing the fault.

Fault Code Troubleshooting		
Fault	**Description**	**Action**
E00	No gun number	Gun cannot be set to 0, must be a number from 1–4.
E01	EEPROM read failed	Reset the fault (press the Nordson key to open the fault screen). This fault will sometimes occur when the software is upgraded.
E07	Gun open circuit	Check the LED on the back of the spray gun with the trigger pulled. If the LED is not lit, check for a faulty gun cable. If the LED is lit, refer to the gun controller manual for diagnostics.
E08	Gun short circuit	Check the LED on the back of the spray gun with the trigger pulled. If the LED is not lit, refer to the gun controller manual for diagnostics.
E10	Gun output stuck low	Replace the controller circuit board.
E11	Gun output stuck high	Replace the controller circuit board.
E12	Communications fault	Check the power/network cable and cable terminations.
E15	Foldback fault	Check the LED on the back of the spray gun with the trigger pulled. If the LED is not lit, refer to the gun controller manual for diagnostics.
E19	Gun maintenance timer has run out	Perform gun maintenance, then reset the maintenance hours.
E20	Pump maintenance timer has run out	Perform pump maintenance, then reset the maintenance hours.
E21	Pattern air flow valve fault	Check for a loose connection on the pattern air flow valve. If the connections are good, replace the valve.
E22	Pump air flow valve fault	Check for a loose connection on the pump air flow valve. If the connections are good, replace the valve.
E23	Powder low PWM	Check for obstruction in pump flow air servo valve. Refer to Flow Control Valve Cleaning under Repair in manual 1062382.

Fault	Description	Action
E24	Pattern low PWM	Check for obstruction in pump flow air servo valve. Refer to *Flow Control Valve Cleaning* under Repair in manual 1062382.
E25	Powder high PWM	Check output of flow regulator (center regulator in pump panel) – should be 85 psi. Check for kinked or blocked powder delivery tubing. Check for blocked pump flow air servo valve. Refer to *Flow Control Valve Cleaning* in manual 1062382.
E26	Pattern high PWM	Check output of flow regulator (center regulator in pump panel) – should be 85 psi. Check for kinked or blocked pattern air tubing. Check for blocked pattern flow air servo valve. Refer to *Flow Control Valve Cleaning* in manual 1062382.
E27	Trigger on at power up	Release the gun trigger and reset the fault. If the fault re-occurs, check the gun cable or switch for shorts. Refer to *Troubleshooting* in the gun manual for cable/switch continuity check.
E28	Data version changed	Reset the fault (press the Nordson key to open the fault screen). This fault will sometimes occur when the software is upgraded.
		Continued...
E29	System conf mismatch	Manual gun controller and pump control board configuration do not match. Make sure both the controller and control board are set for the same configurations. Refer to *Configuration* in the controller manual 1054580 and *Configuring the Circuit Board* in manual 1062382.
E30	Calibration Invalid	Calibration values for A or C are out of range. Refer to *Calibration* in manual 1054580.

Pump and Gun Troubleshooting		
Problem	**Possible Cause**	**Corrective Action**
1. Reduced powder output (pinch valves are opening and closing)	Blocked delivery tubing	Check the tubing. Purge the pump and spray gun.
	Defective pump air flow control valve	Clean the pump air flow control valve. If the problem persists, replace the valve.
	Defective check valve	Replace the check valves on pump top.
2. Reduced powder output (pinch valves are not opening and closing)	Defective pinch valve	Replace the pinch valves and filter discs.
	Defective solenoid valve	Replace the solenoid valve on manifold.
	Defective check valve	Replace the check valves on pump top.
3. Reduced powder input (loss of suction from feed source)	Blocked suction tubing	Check the tubing. Purge the pump and spray gun.
	Loss of vacuum	Check the vacuum generator for contamination. Check the vacuum generator exhaust muffler and replace it if it is plugged.
	Defective pump air flow control valve	Clean the pump air flow control valve.
4. Spray gun fan pattern changes	Defective pattern air flow control valve	Clean the pattern air flow control valve.
	Plugged nozzle	Remove the nozzle and blow it out with air. If necessary, disassemble the nozzle and clean the components. To do this, unscrew the electrode ring from the back of the nozzle.

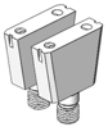
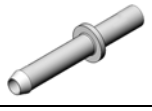
Quick Reference Parts

Refer to the individual component manuals for detailed parts lists and exploded views. The following parts can be ordered for both the Prodigy spray gun and the Prodigy II spray gun unless otherwise indicated.

Gun Nozzles and Kits

	1062223 70 Degree Conical Nozzle Kit (Quantity of 1) (One supplied with gun)
	1062166 100 Degree Conical Nozzle Kit (Quantity of 1) (Note identifying groove)
	1073706 Dual-Slot Flat-Spray Nozzle Kit (Quantity of 1) (One supplied with gun)
	1073682 Nozzle Tool
	1053912 Resistor Kit (Includes 1 resistor and 1 dielectric grease applicator)
	1077424 Resistor Holder Kit (Includes resistor and grease)
	288552 Power Supply, 95 kV, negative
	1080539 6-Meter Cable Kit (Quantity of 1)
	1093440 Adapter, tubing

Pump Kits and Service Parts

	1081221 Pinch Valves Kit (Includes 8 pinch valves, 1 insertion tool, and 8 filter discs)
	1057258 Fluidizing Tubes Kit (Includes 4 tubes and 8 O-rings)
	1078152 Check Valve (Quantity of 1) (each pump requires 2)
	1057260 Lower Manifold Wear Blocks Kit (Includes 2 wear blocks and 2 O-rings)
	1057262 Upper Y-Manifold (Includes manifold and gasket)
	Refer to manual 1081195 Solenoid Valve (Quantity of 1)
	Refer to manual 1081195 Flow Control Valve (Quantity of 1)
	Refer to manual 1081195 Pump Control Board Replacement Kit (Quantity of 1)
	1062348 Pump Adapter (Quantity of 1)
	1078006 Adapter, tube, barb, Pump
	1078007 Adapter, tube, barb, Color-on-Demand

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