☞ **OBSOLETE** ☜

THIS DOCUMENT IS NO LONGER MAINTAINED.

Process Sentry PCI with Pro-Flo Gun

Customer Product Manual

Part 1007772C

Issued 9/04

NORDSON CORPORATION • AMHERST, OHIO • USA

Contact Us

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

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Safety

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 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.

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 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.
- While operating manual spray guns, make sure you are grounded. Wear electrically conductive gloves or a grounding strap connected to the gun handle or other true earth ground. Do not wear or carry metallic objects such as jewelry or tools.
- If you receive even a slight electrical shock, shut down all electrical or electrostatic equipment immediately. Do not restart the equipment until the problem has been identified and corrected.
- 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.
- Make sure the spray area is adequately ventilated.
- 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.

High-Pressure Fluids

High-pressure fluids, unless they are safely contained, are extremely hazardous. Always relieve fluid pressure before adjusting or servicing high pressure equipment. A jet of high-pressure fluid can cut like a knife and cause serious bodily injury, amputation, or death. Fluids penetrating the skin can also cause toxic poisoning.

If you suffer a fluid injection injury, seek medical care immediately. If possible, provide a copy of the MSDS for the injected fluid to the health care provider.

The National Spray Equipment Manufacturers Association has created a wallet card that you should carry when you are operating high-pressure spray equipment. These cards are supplied with your equipment. The following is the text of this card:

WARNING: Any injury caused by high pressure liquid can be serious. If you are injured or even suspect an injury:

- Go to an emergency room immediately.
- Tell the doctor that you suspect an injection injury.
- Show him this card
- Tell him what kind of material you were spraying

MEDICAL ALERT—AIRLESS SPRAY WOUNDS: NOTE TO PHYSICIAN

Injection in the skin is a serious traumatic injury. It is important to treat the injury surgically as soon as possible. Do not delay treatment to research toxicity. Toxicity is a concern with some exotic coatings injected directly into the bloodstream.

Consultation with a plastic surgeon or a reconstructive hand surgeon may be advisable.

The seriousness of the wound depends on where the injury is on the body, whether the substance hit something on its way in and deflected causing more damage, and many other variables including skin microflora residing in the paint or gun which are blasted into the wound. If the injected paint contains acrylic latex and titanium dioxide that damage the tissue's resistance to infection, bacterial growth will flourish. The treatment that doctors recommend for an injection injury to the hand includes immediate decompression of the closed vascular compartments of the hand to release the underlying tissue distended by the injected paint, judicious wound debridement, and immediate antibiotic treatment.

Fire Safety

To avoid a fire or explosion, follow these instructions.

- Ground all conductive equipment. Use only grounded air and fluid hoses. Check equipment and workpiece grounding devices regularly. Resistance to ground must not exceed one megohm.
- Shut down all equipment immediately if you notice static sparking or arcing. Do not restart the equipment until the cause has been identified and corrected.
- Do not smoke, weld, grind, or use open flames where flammable materials are being used or stored.
- Do not heat materials to temperatures above those recommended by the manufacturer. Make sure heat monitoring and limiting devices are working properly.
- Provide adequate ventilation to prevent dangerous concentrations of volatile particles or vapors. Refer to local codes or your material MSDS for guidance.
- Do not disconnect live electrical circuits when 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.
- Shut off electrostatic power and ground the charging system before adjusting, cleaning, or repairing electrostatic equipment.
- 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.

Halogenated Hydrocarbon Solvent Hazards

Do not use halogenated hydrocarbon solvents in a pressurized system that contains aluminum components. Under pressure, these solvents can react with aluminum and explode, causing injury, death, or property damage. Halogenated hydrocarbon solvents contain one or more of the following elements:

Element	Symbol	Prefix
Fluorine	F	“Fluoro-”
Chlorine	Cl	“Chloro-”
Bromine	Br	“Bromo-”
Iodine	I	“Iodo-”

Check your material MSDS or contact your material supplier for more information. If you must use halogenated hydrocarbon solvents, contact your Nordson representative for information about compatible Nordson components.

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 system electrical power. Close hydraulic and pneumatic shutoff valves and relieve pressures.
- Identify the reason for the malfunction and correct it before restarting the system.

Disposal

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

Description

See Figure 1. The Pro-Flo system automates the application of sealants and adhesives. The system includes a Pro-Flo gun and PCI controller that work in conjunction with a robot and robot controller.

The Process Sentry PCI controller uses signals from the robot controller and other sensors to control the gun dispensing rate. A constant bead size is maintained by adjusting the dispensing rate for changes in robot speed, material viscosity, and material delivery pressure.

The Process Sentry PCI controller also

- maintains a consistent dispensed volume even as the viscosity of the material varies,
- monitors the shear-thinning effects of the material and automatically adjusts the dispensing rate,
- displays recovery procedures if operation faults are generated by the controller or gun, and
- communicates faults to the robot controller.

Components

The following are components of the PCI controller:

- software program configured by Nordson Corporation for your application
- flowmeter assembly, which includes a flowmeter, an upstream pressure transducer, and a resistance temperature detector (RTD)
- electrical cables for connecting the controller to the gun, robot controller, and optional equipment

Monitoring Capabilities

In addition to controlling an extrude (dispensing) gun, the controller can be used to monitor or control the following system components:

- material cut-off (MCO) module (extrude guns only)
- proportioning valve (air-spray or swirl guns only)
- flowmeter
- upstream pressure transducer
- material supply regulator

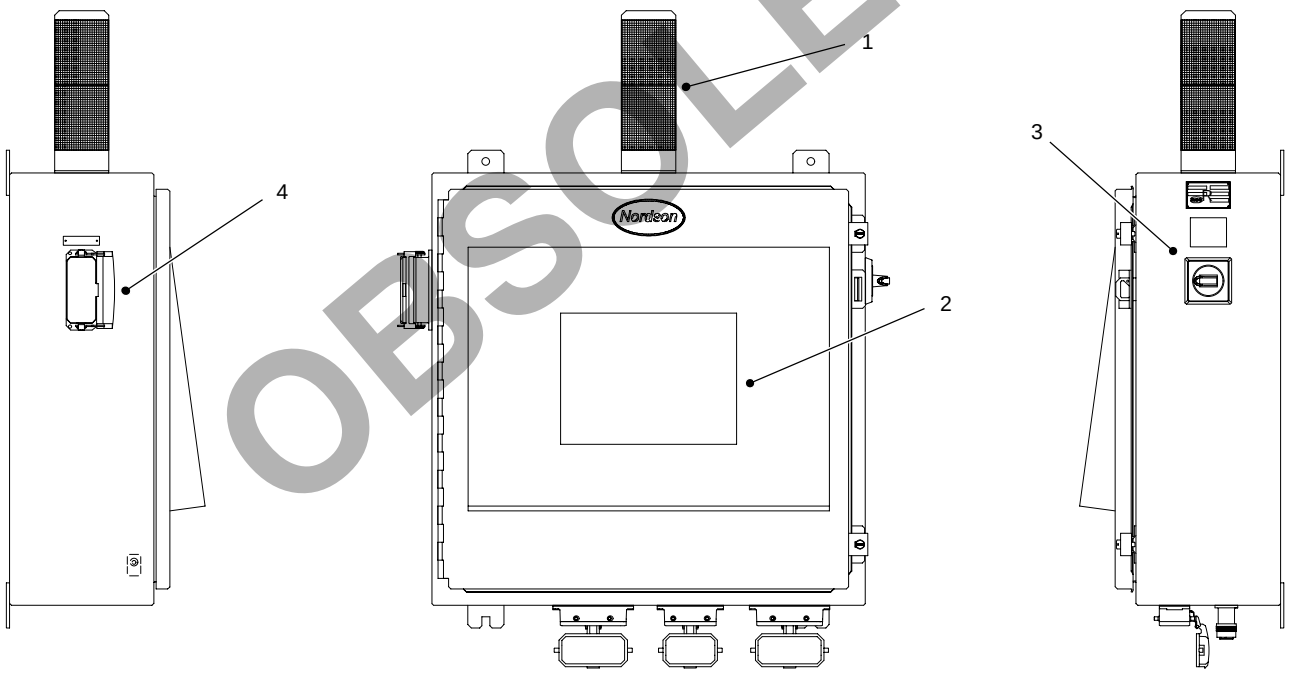


Figure 1 Typical Process Sentry PCI Controller

1. Alarm tower
2. Operator interface
3. Power switch
4. Programming port

Theory of Operation

The robot controller outputs an analog (tool-speed) signal that is proportional to the robot speed. The controller uses this signal to adjust the dispensing rate of the gun. When the robot speeds up, the Pro-Flo gun dispenses material faster, and when the robot slows down, it dispenses material slower.

The controller continuously monitors the volume of material dispensed and automatically adjusts the dispensing rate to maintain a constant bead size. The controller compensates for batch-to-batch variation in material and shear-thinning effects.

A second analog signal is output by some robot controllers and can be used to control the proportioning valve pressure in air-spray guns. More or less atomizing pressure is supplied from the proportioning valve when the robot speeds up and slows down, respectively. Precise bead-size control is achieved with independent control over the dispensing rate and delivery pressure.

Alarms

See Figure 1.

The controller alerts the operator when a fault occurs by lighting the alarm tower (1) . The fault screen on the operator interface (2) provides a description of the fault, the appropriate corrective action to take, or how to contact Nordson Corporation for assistance. The operator has the option of stopping the system to correct the fault, or running the system in back-up mode and correcting the fault later.

Installation

WARNING

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

NOTE

Installation is dependent upon the system configuration. Refer to your system documentation for specific installation procedures.

1. Unpack the PCI controller and inspect it for dents, scratches, corrosion, or other physical damage. If there is any visible damage, call your Nordson Corporation representative immediately.
2. See Figure 2 for mounting dimensions.
3. Mount the controller as close to the robot controller as possible.

Electrical Connections

Follow these requirements when installing electrical connections to the PCI controller:

- Install all electrical connections to local code.
- Install a locking disconnect switch or breaker in the service line ahead of any electrical equipment.
- Hard-wire the controller into a dedicated power supply to provide safe operation and to reduce interference from electrical noise.
- Use the System Interconnect drawing provided with the system documentation for specific cable routings.
- When connecting cables between a gun and the controller, make sure that there is enough slack to allow robot and gun movement. Use an extension gun cable if necessary.

WARNING

Risk of electrical shock. The robot controller contains electrical potentials that can be fatal. Disconnect and lock out electrical power before making connections.

NOTE

Each cable plug has a key that matches a notch in a receptacle.

Figure 2 illustrates the location of the cable connections for the PCI controller. See the System Interconnect drawing provided with your system documentation for specific cable routings.

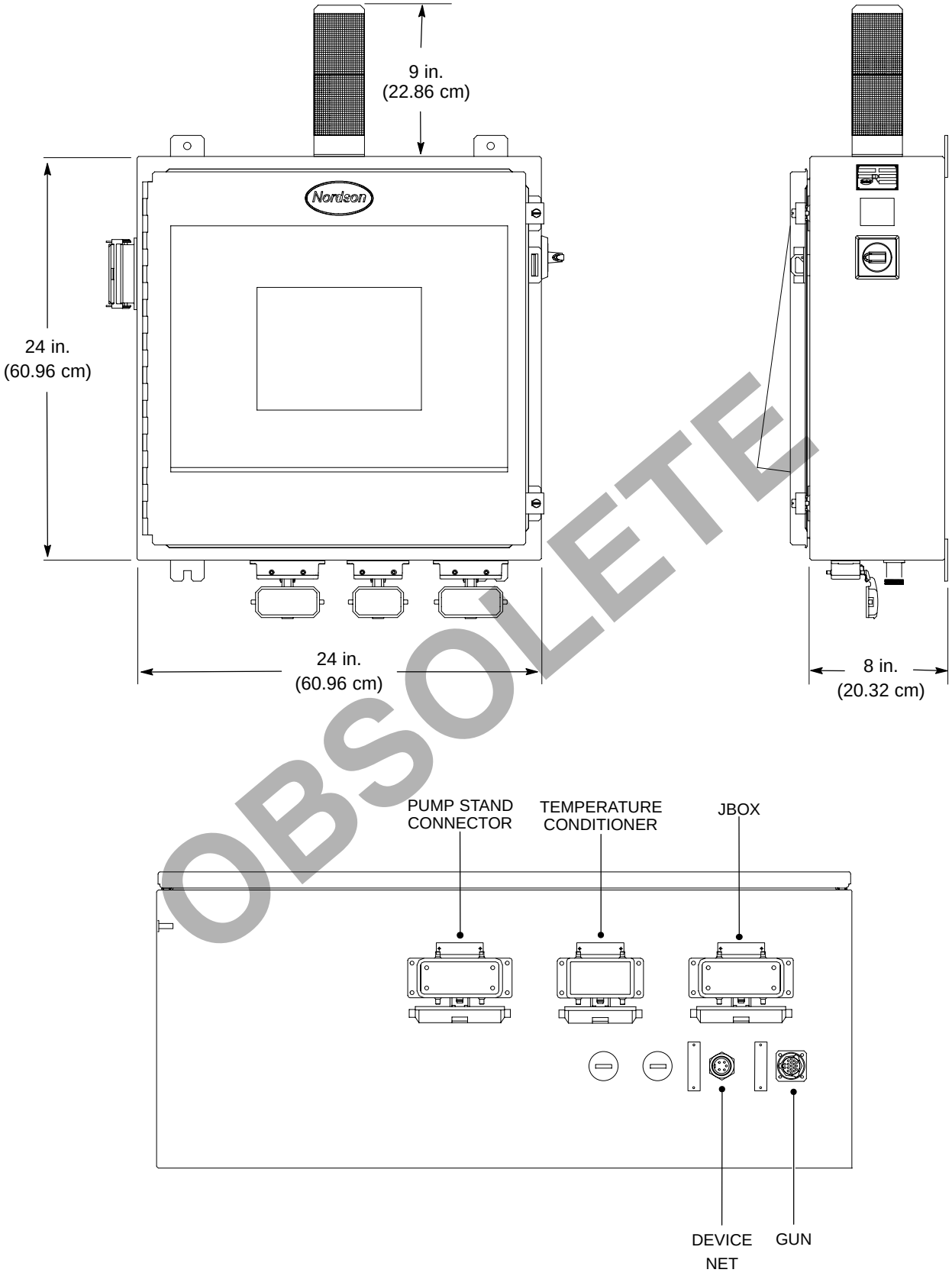


Figure 2 Installation

Pro-Flo Gun Connections

Figure 3 illustrates the location of the cable connections for the Pro-Flo guns. See the System Interconnect drawing provided with your system documentation for specific cable routings.

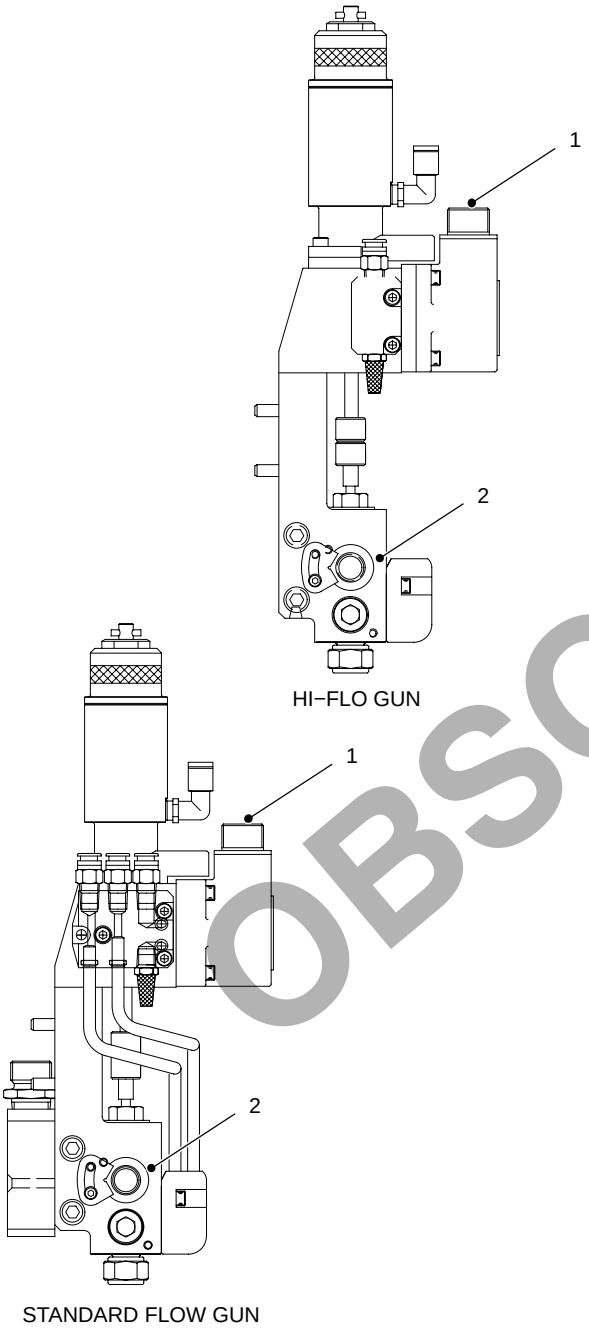


Figure 3 Typical Pro-Flo Guns

1. Gun control connector 2. Material inlet

Configure the Robot Controller

Use the following data to configure the robot controller analog signals.

Analog #1

See Figure 4. Configure the robot controller to vary the analog #1 (or tool speed) signal from 0 to 10 Vdc over the full range of robot speed.

1. Determine the highest and lowest robot speeds to be used in production.
2. Configure the robot controller to output an analog #1 signal of +10 Vdc when the robot is moving at, or slightly above maximum speed.
3. Configure the robot controller to output the analog #1 signal of 0 Vdc when the robot is stationary.

NOTE

Figure 4 presents an example of the approximate relationship between robot speed and analog #1 voltage as a guide for the operator. A robot speed of 80% corresponds to 8 Vdc. A robot speed of 40% corresponds to 4 Vdc.

Analog #2

If the robot supplies the optional analog #2 (or tool speed #2) signal and you are using a proportioning valve, more precise control over air pressure is possible. The controller controls the proportioning valve feeding air to the gun to adjust atomizing air pressure for robot speed. Establish the relationship between the signal and the pressure supplied to the proportioning valve.

Configure the robot controller to output an analog #2 signal of 2, 4, 6, and 8 Vdc when the pressure supplied to the proportioning valve is 1.38, 2.76, 4.14, and 5.52 bar (20, 40, 60, and 80 psi), respectively.

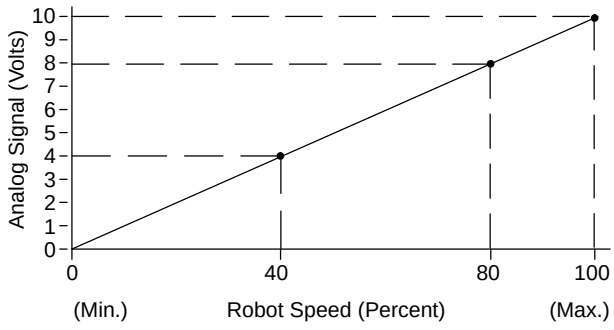


Figure 4 Relationship between Analog Signal #1 and Robot Speed

Set Timing Sequences

See Figure 5.

Adjust the timing sequence of output signals from the robot controller to suit the PCI controller. Refer to your robot controller manual for procedures to set the signal timing sequences.

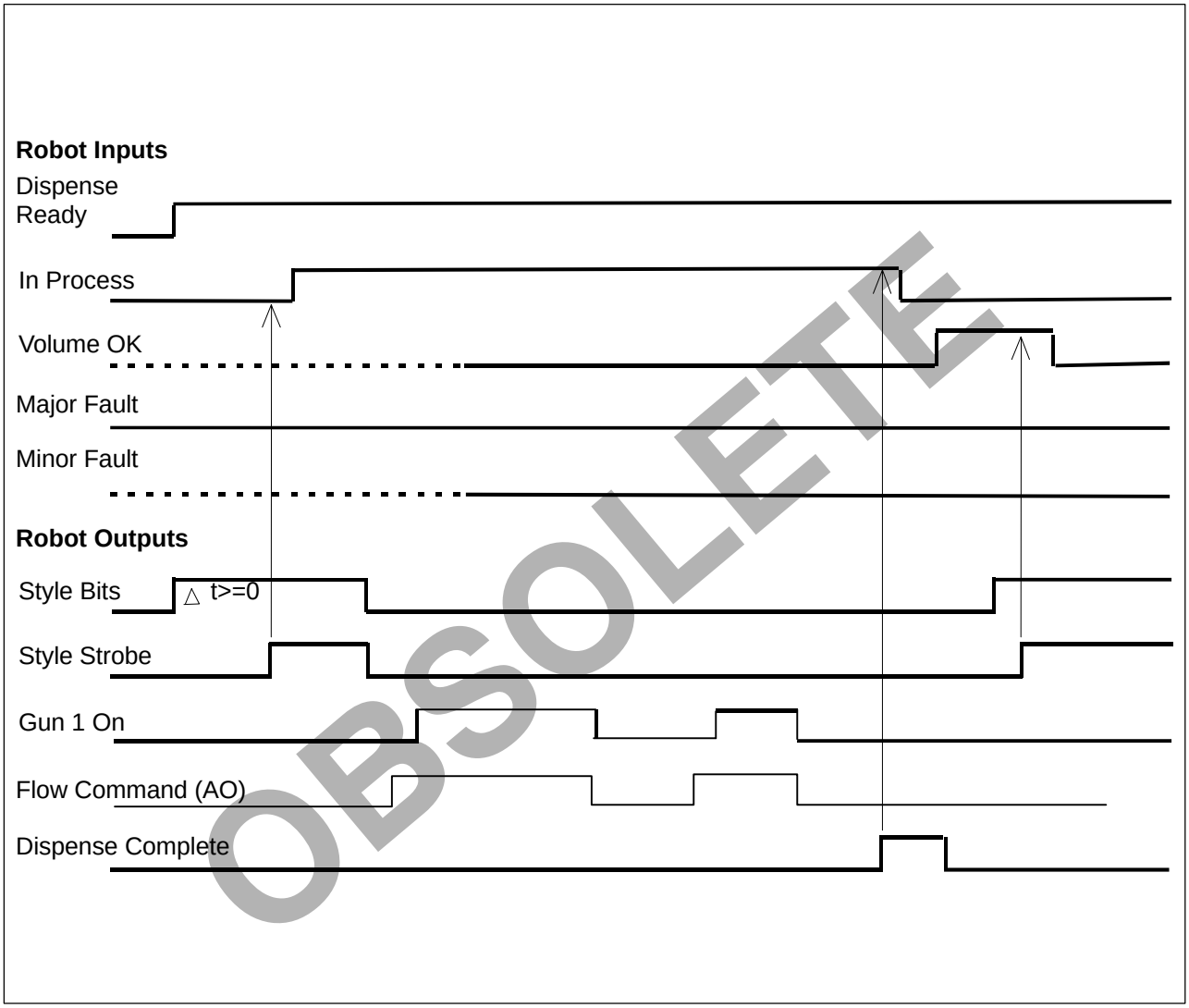


Figure 5 Normal Dispensing Cycle—Base Level Common Interface

Operator Interface and Screens

See Figure 6.

Touch the screen to select one of seven main menus (1):

- **SYSTEM STATUS**
- **VIEW FAULTS**
- **TEST POINTS**
- **SYSTEM SET-UP**
- **PROCESS DATA**
- **ONLINE MANUAL**
- **PREV. MAINT.** (Preventive Maintenance)

Refer to Table 1 for a description of the operator interface functions.

SYSTEM STATUS

See Figure 6.

The **SYSTEM STATUS** menu is the default screen. It monitors material dispensing characteristics during production. For each part run, the **SYSTEM STATUS** menu displays the

- system illustration which flashes when a fault condition occurs. To view the fault, touch the flashing part or touch the **VIEW FAULTS** button.
- status of **STYLE STROBE**, **GUN ON**, **ANALOG IN**, and **DISPENSE COMPLETE** signals.

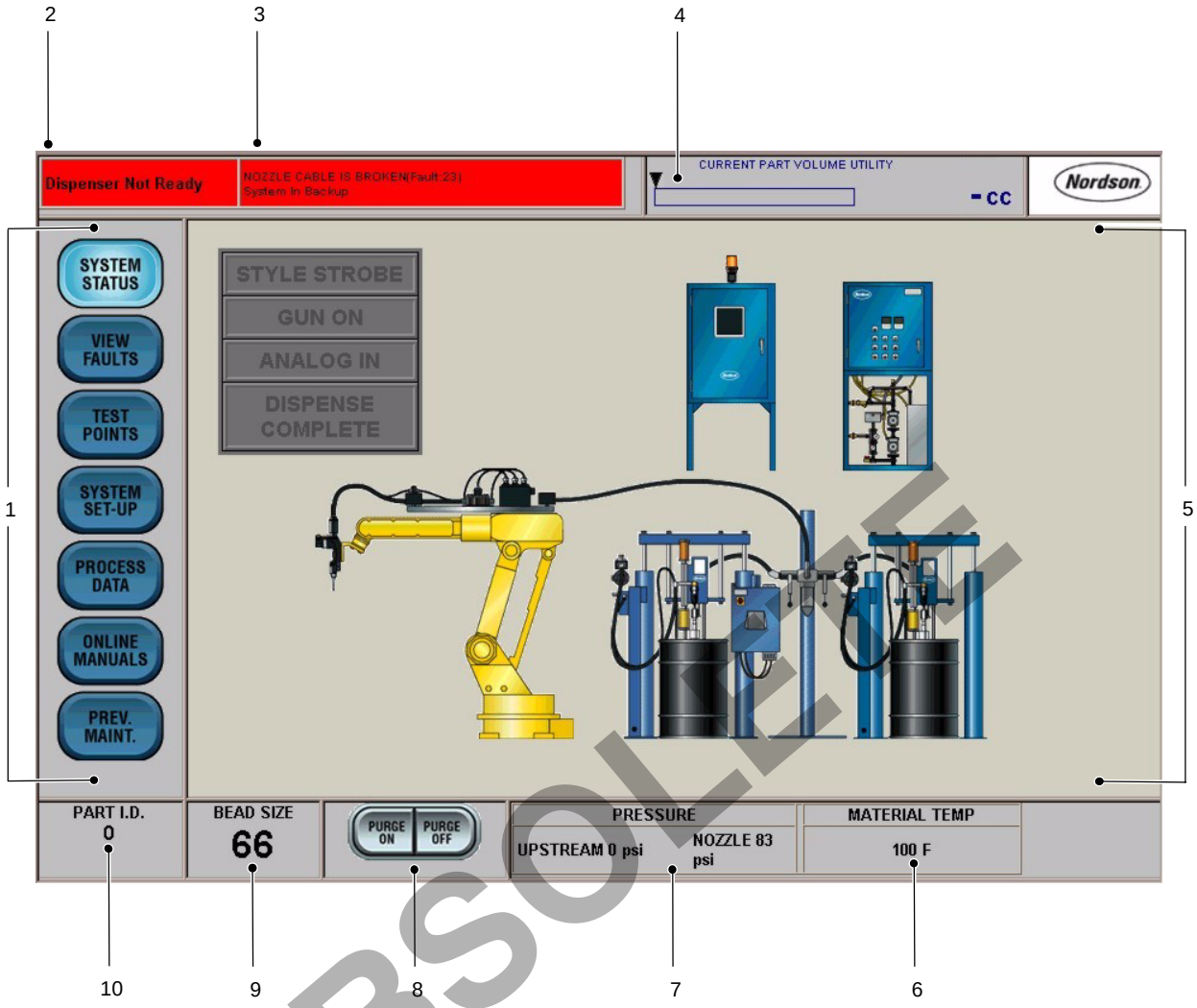


Figure 6 Typical Operator Interface

Table 1 Operator Interface Functions

Item	Description	Function
1	Menu Buttons	Set and view parameters of the application.
2	Dispenser field	Indicates the status of the dispenser: **Ready** or **Not Ready**.
3	Fault Indicator field	Displays fault messages.
4	**CURRENT PART VOLUME UTILITY**	Visually indicates the percent of the job which is completed and the actual dispensed volume at the end of the part cycle.
5	**SYSTEM STATUS**	Appears as the default screen; displays the system configuration.
6	**MATERIAL TEMP**	Indicates material temperature.
7	**PRESSURE**	Indicates system operating pressures.
8	**PURGE ON** **PURGE OFF**	Starts and stops the gun purge function.
9	**BEAD SIZE**	Displays bead size. Bead size is an arbitrary number between 1 and 99. Touch **BEAD SIZE** to increase or decrease bead size.
10	**PART I.D.**	Displays the current part I.D.

VIEW FAULTS

See Screen 1.

The **VIEW FAULTS** menu displays the fault description and the corrective action.

NOTE: Touch any of the bold or underlined text to proceed directly to the correction.

Touch **VIEW FAULTS**>**VIEW HELP** to view the corrective action for a fault.

TOP SCREEN

BOTTOM SCREEN

Screen 1 View Faults

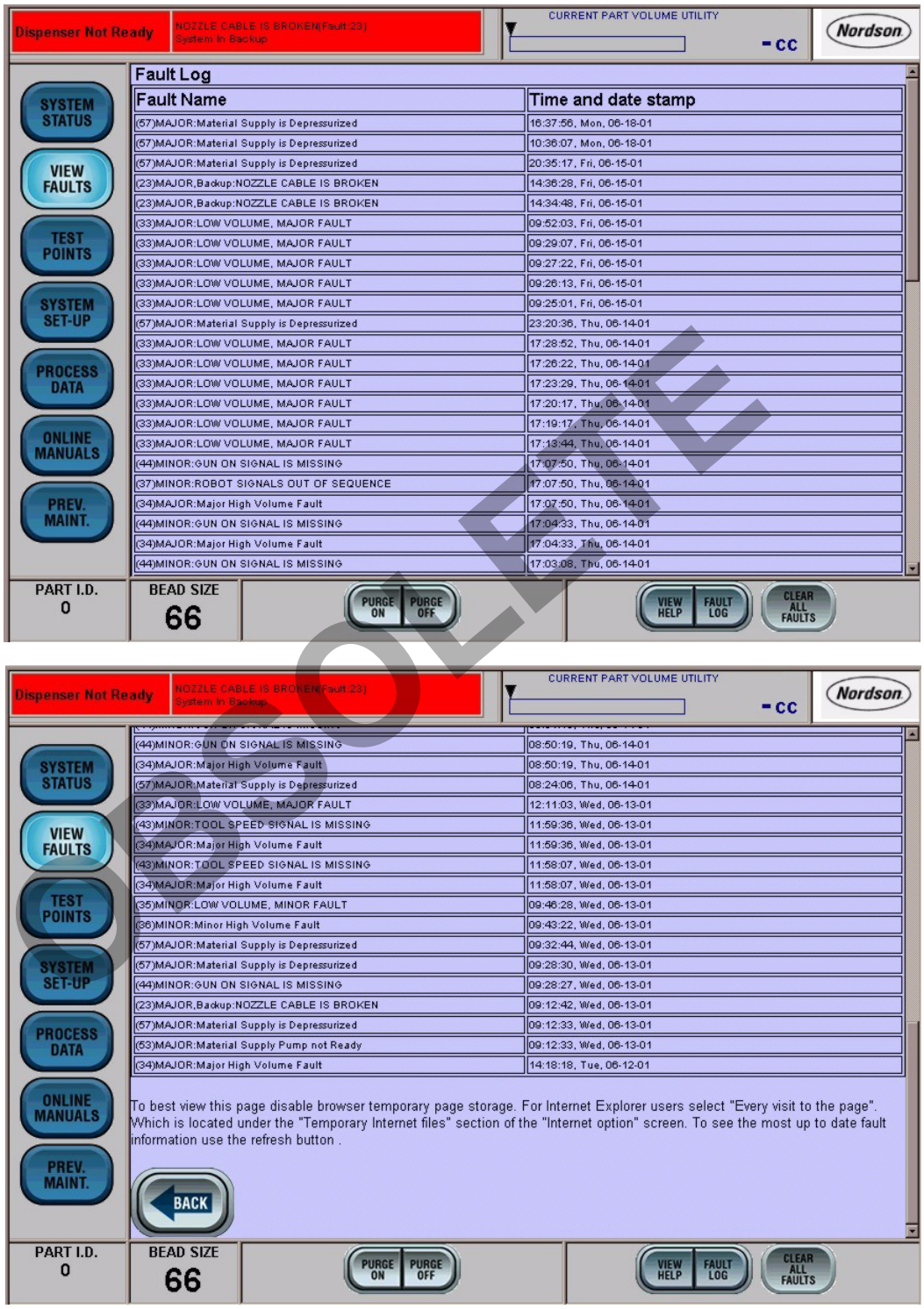
See Screen 2.

Touch **VIEW FAULTS**>**FAULT LOG** to view the name of the fault and that date and time that the fault occurred.

Touch **VIEW FAULTS**>**CLEAR ALL FAULTS** to clear the fault log.

TOP SCREEN

BOTTOM SCREEN

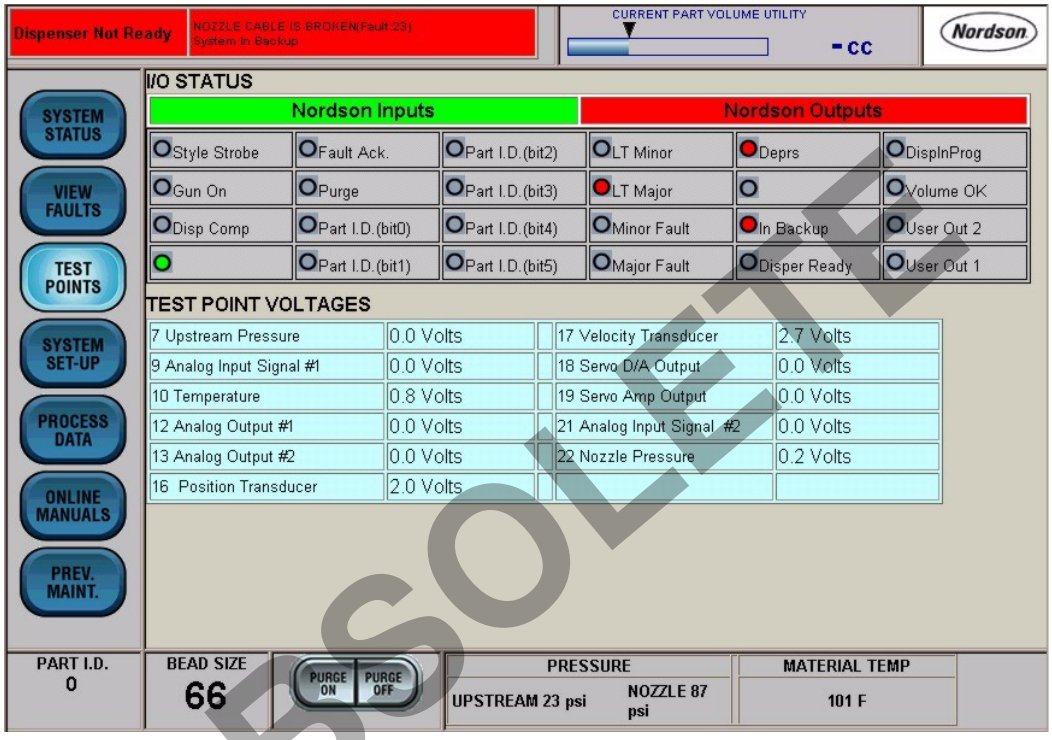


Screen 2 Fault Log

TEST POINTS

See Screen 3.

The **TEST POINTS** menu is used only by Nordson Corporation field service engineers.

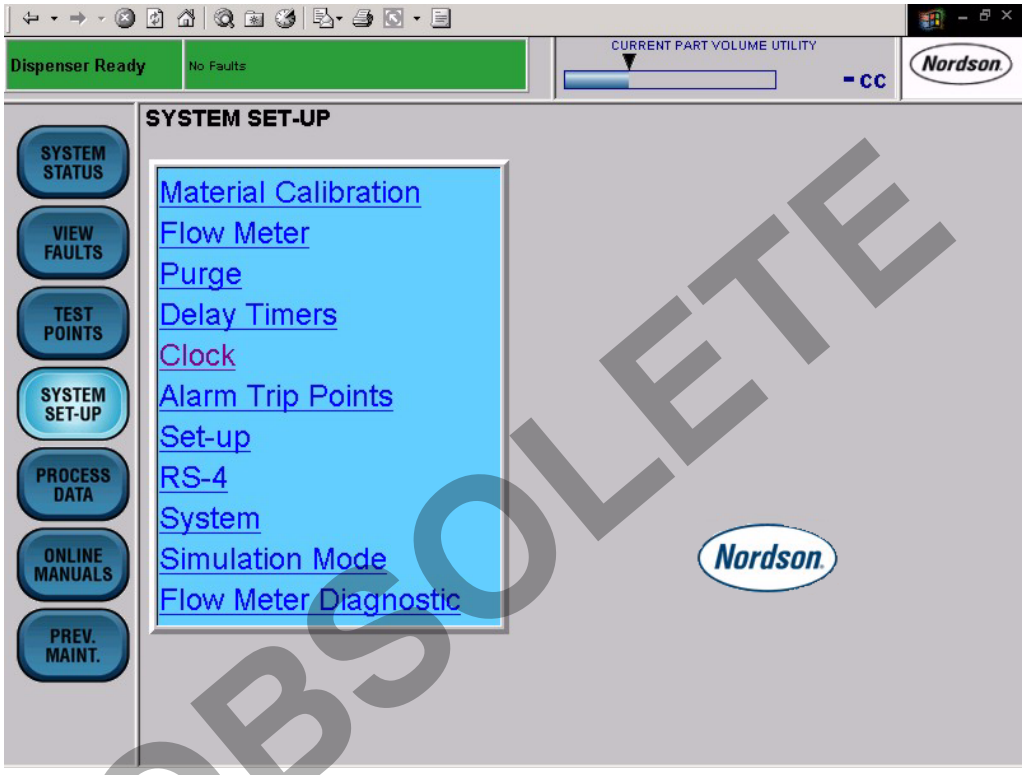


Screen 3 TEST POINTS

SYSTEM SET-UP

See Screen 4.

Use the **SYSTEM SET-UP** screen to configure the system parameters. The following paragraphs provide a description of each system parameter.

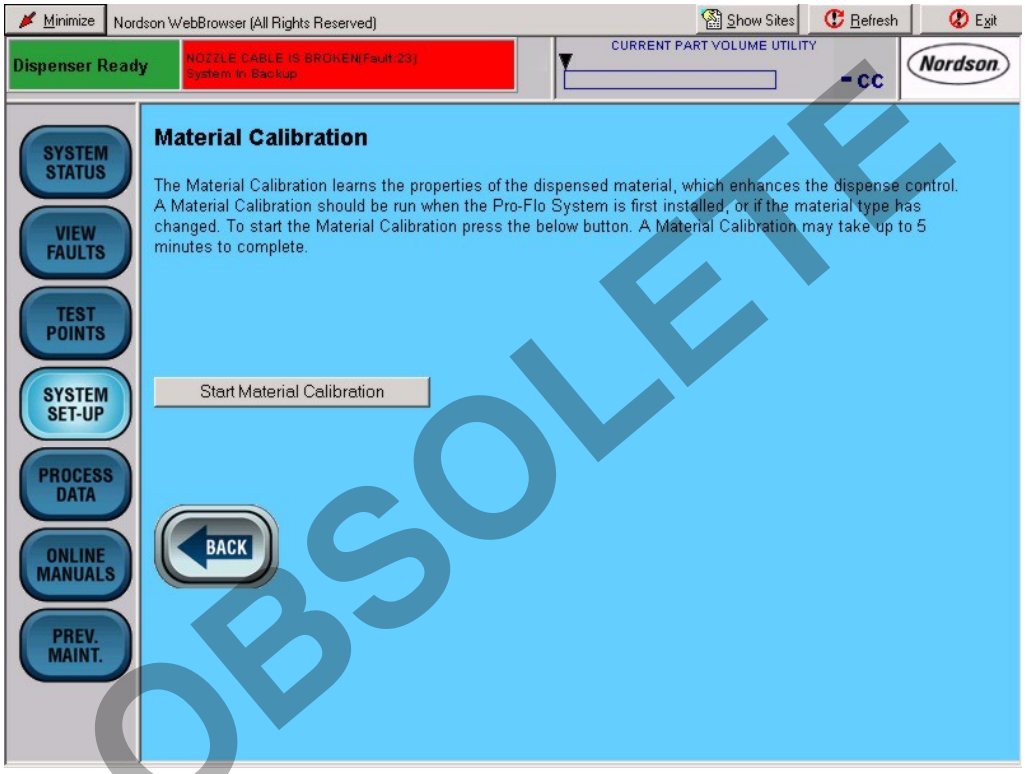


Screen 4 SYSTEM SET-UP

Material Calibration

See Screen 5.

Run a material calibration after the controller is installed and whenever you change the type of dispensing material. Material calibration allows the controller to learn the material's shear thinning properties. When this prompt is selected, the controller runs an automatic routine for up to 5 minutes while dispensing material.



Screen 5 Material Calibration

Flow Meter

See Screen 6.

When a new flowmeter is installed, enter its flow rate (or K-value) in counts/liter. The K-value is stamped on the side of the flowmeter body. Touch the screen keyboard to enter counts/liter from 1−100,000,000.

Screen 6 Flow Meter

Purge

See Screen 7.

Purge determines how long the gun stays open each time the **PURGE ON** button is pressed. Touch the screen keyboard to enter a **Dispense Time** from 1−60 seconds.

Screen 7 Purge

Delay Timers

See Screen 8.

To delay the controller's reaction to robot motion, enter a **Tool Speed** delay from 0−5000 msec.

To delay the controller's reaction to the gun-on and gun-off signals from the robot controller and adjust the start and stop time of material dispensing, enter **Gun On** and **Gun Off** delays from 0−5000 msec.

Screen 8 Delay Timers

Clock

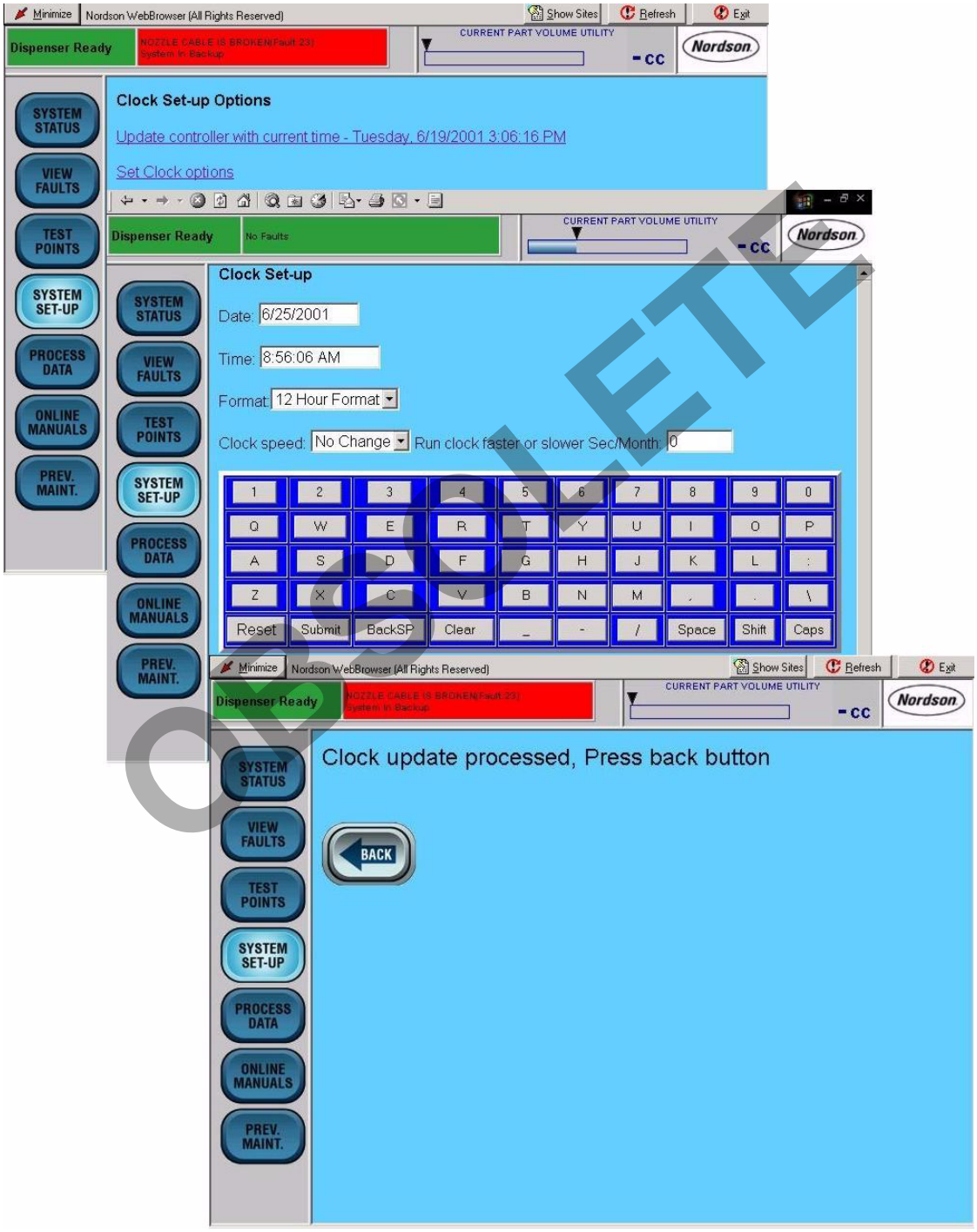
See Screen 9.

Although the time and date are set during initial setup, you may change the parameters manually or automatically.

To update the time and date automatically, touch **Update controller with current time**.

To update the time and date manually, touch **Set Clock options**. The **Clock Set-up** screen appears. Touch the screen keyboard to set the parameters.

The clock update screen appears to indicate that the system was automatically updated.



Screen 9 Clock

Alarm Trip Points

See Screen 10.

Touch the keyboard to set required parameters and enable diagnostics for the flowmeter, material flow, and nozzle. An alarm will sound if the parameters are not met.

Screen 10 Alarm Trip Points

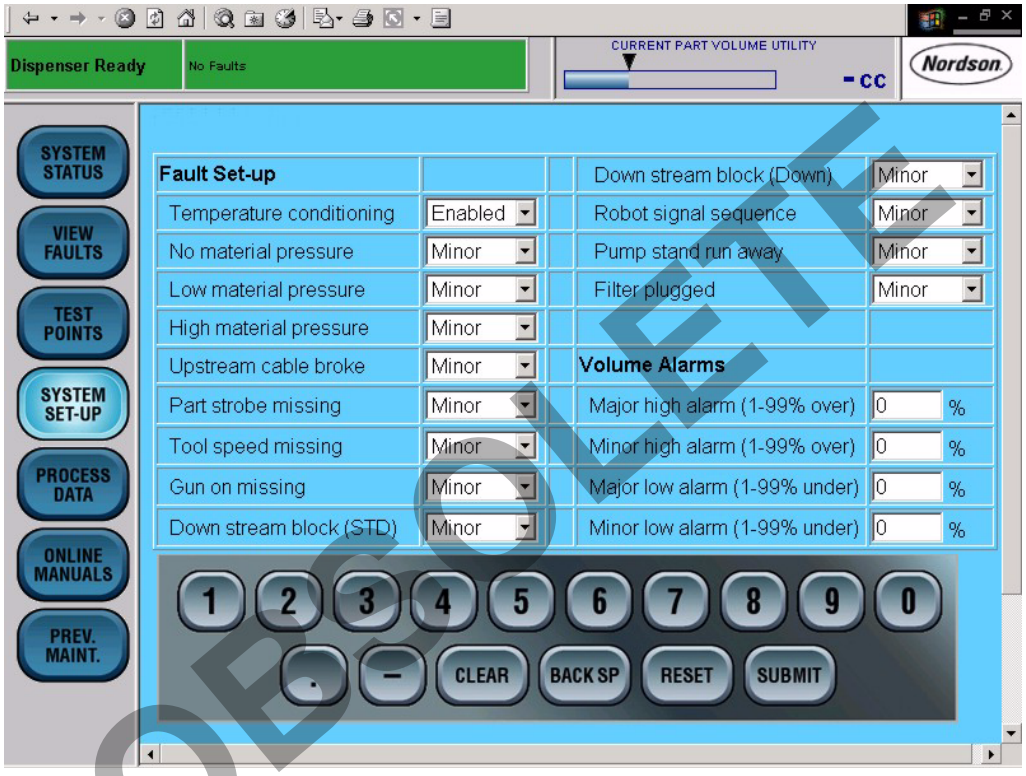
Set-up

Touch **Set-Up** to enter the delay times for any **Miscellaneous** digital outputs and to enter parameters for **Bead Options**.

Fault Set-up

See Screen 11.

Use this screen to set the fault conditions and volume alarms. Touch the drop-down menus to set the fault conditions. Use the keyboard to enter values for the volume alarms.



Screen 11 Set-Up

System

See Screen 12.

Touch the keyboard to select Metric or English system units; clock format; type of pressure unit; fault report location; and type of application.

Screen 12 System

Simulation Mode

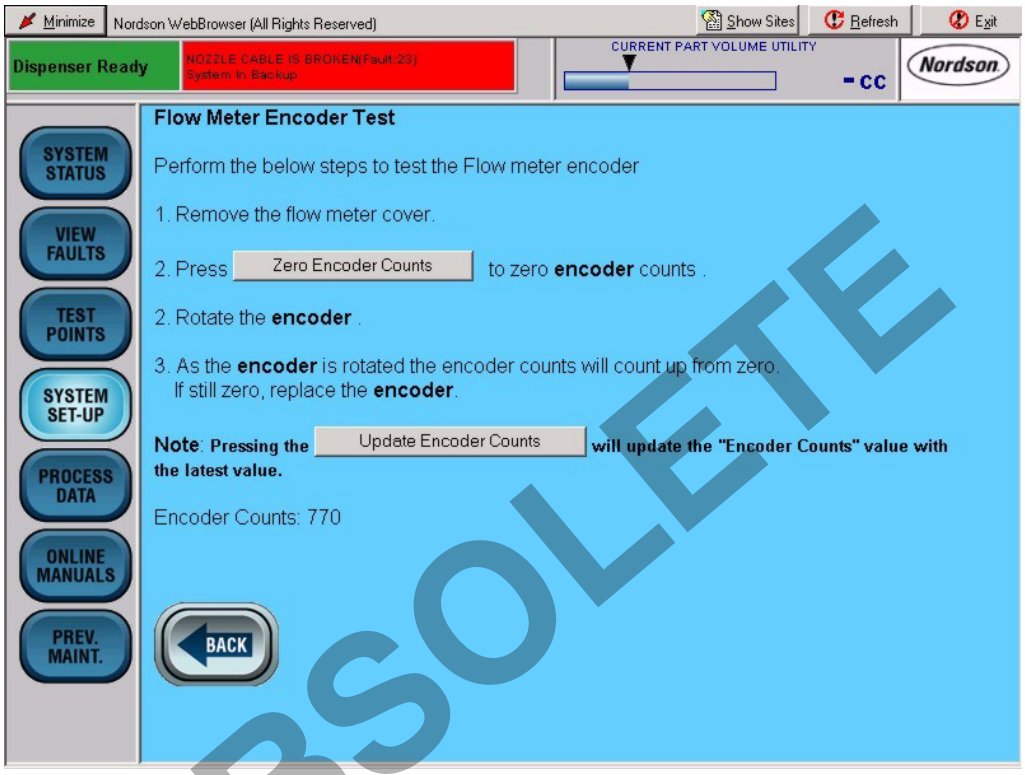
See Screen 13.

Enter the applicable data and select **Yes** from the **Run Simulation Now** drop-down field to simulate a production run without dispensing material.

Screen 13 Simulation Mode

Flow Meter Diagnostics

Follow the directions on the screen to test the flowmeter encoder.

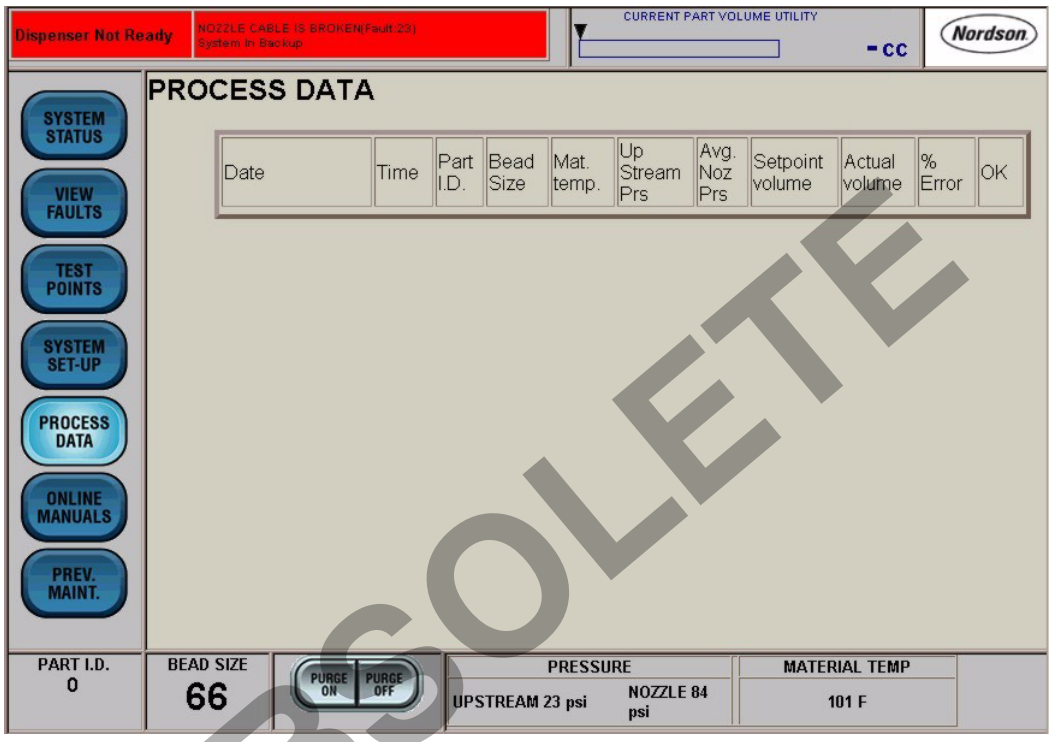


Screen 14 Flow Meter Diagnostics

PROCESS DATA

See Screen 15.

Touch **PROCESS DATA** to view production data.



Screen 15 PROCESS DATA

ONLINE MANUALS

See Screen 16.

Touch **ONLINE MANUALS** for links to the following documentation:

- Flowmeters
- Bulk pumps
- Controllers
- Guns
- Accessories/Kits
- Temperature conditioning

Touch the part number in the **Part No.** column to access the document.

NOTE

Manuals that appear on this screen are dependent upon the system configuration.

PREV. MAINT.

Touch **PREV. MAINT.** to view preventive maintenance data.

Screen 16 ONLINE MANUALS (Typical).

Operation

WARNING

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

Follow the instructions given in this section to operate the PCI controller. The controller has been configured by a Nordson Corporation representative.

NOTE

- Before operating the controller, make sure that each robot is taught the proper tool path. Refer to the robot controller manual for procedures.
- When entering data, touching the field next to the corresponding parameter positions the cursor inside of the field.

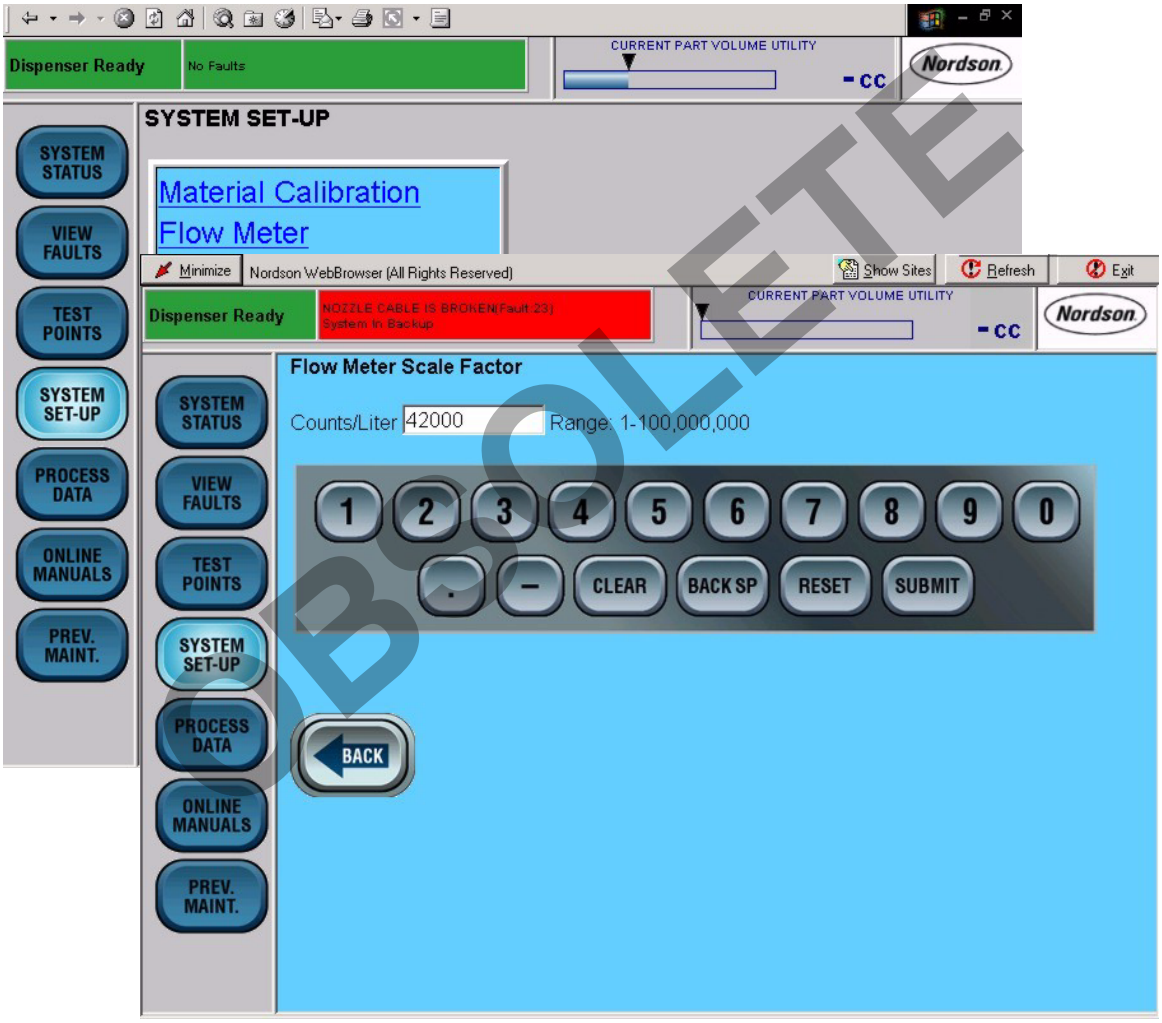
See Screen 17. Some parameters require the use of the screen keyboard to enter data. When entering data, touch

- **CLEAR** to delete the current value in a field.
- **BACK SP** to backspace.
- **RESET** to restore a value.
- **SUBMIT** to save changes.

Screen 17 Typical Screen Keyboard

Initial Setup

1. Turn on the controller. The controller runs a self-test to verify proper operation.
2. See Screen 18.
   Touch **SYSTEM SET-UP**>**Flow Meter**.
3. Touch the keyboard to enter the K-value stamped on the side of the flowmeter body.
4. Place a waste container under the gun.

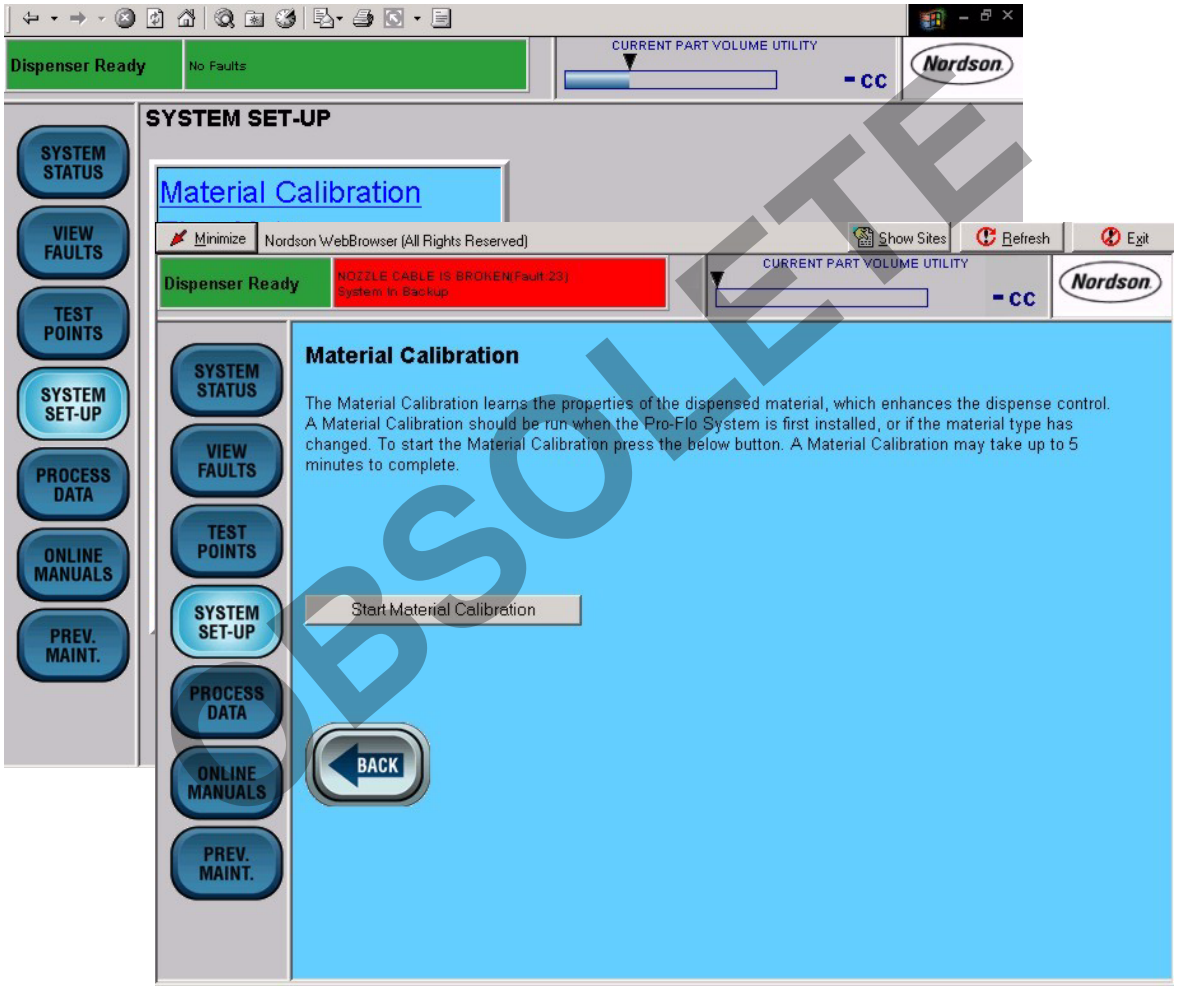


Screen 18 Accessing the Flow Meter Setup Screen

5. See Screen 19.
   Touch **SYSTEM SET-UP**>**Material Calibration**.
6. Touch the **Start Material Calibration** button to run a material calibration. The controller runs an automatic routine for up to 5 minutes while dispensing material.
7. Touch **BEAD SIZE.** Enter a bead size for the applicable Part I.D.

NOTE

Bead size has no units; it is a relative number.



Screen 19 Accessing the Material Calibration Screen

Test Your Setup Parameters

Run a test to determine if your setup parameters are correct. Follow these procedures to achieve a bead of the correct size and shape.

1. Position the part under the gun and begin material dispensing from the robot controller.
2. Check the bead size. To adjust the bead size touch **BEAD SIZE** and make the necessary adjustment.
3. See Screen 20. If dispensing did not start or stop at the correct time, adjust the **Gun On** or **Gun Off** delay times. Touch **SYSTEM SET-UP**>**Delay Timers**.

NOTE

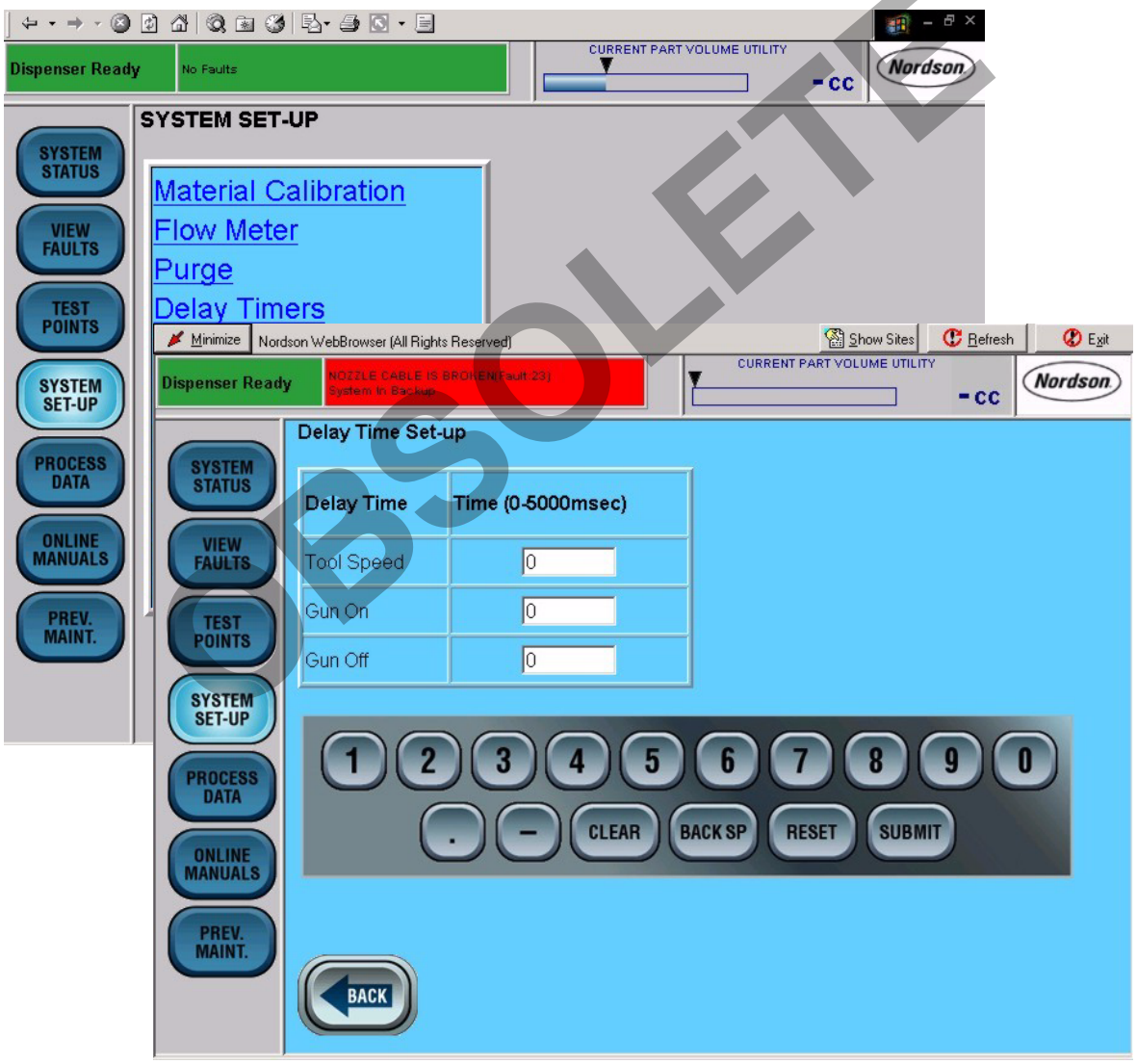
Improper robot programming may be the cause of the incorrect dispensing start and stop times.

4. Repeat steps 1 through 3 until you achieve a bead of the correct size and shape.
5. Record the bead size and the part ID. Return to this bead size every time this type of part is run.

NOTE

Once set correctly, the delay times should not need readjusting as other types of parts are run.

6. Repeat these steps to determine the desired bead size for every type of part to be run.



Screen 20 Accessing the Delay Timers Screen

Startup

Startup procedures are provided in the following steps.

NOTE

Perform a material calibration if you are using a different type of material since the last production run. Only personnel with Administrator Level access can perform the material calibration procedure.

1. Turn on the controller. The controller runs a self-test to verify proper operation.
2. See Screen 21. Place a waste container under the gun (7).
3. Touch **PURGE ON** (5) to remove air from the material supply hose and nozzle.
4. Purging stops after the purge time has elapsed. If desired, press **PURGE OFF** (6) to stop purging immediately.
5. See Screen 19. If you have changed the type of material since the last production run, perform a material calibration.
   Touch **SYSTEM SET-UP**>**Material Calibration**.
6. Touch the **Start Material Calibration** button to run a material calibration. The controller runs an automatic routine for up to 5 minutes while dispensing material.
7. See Screen 21. Check the correct bead size used for the part being run. Touch **BEAD SIZE** (4) to make adjustments.
8. In the **Bead Options** fields, touch the keyboard to change the values.
9. Touch **PROCESS DATA** (3) to monitor material dispensing characteristics.
10. Position the part and begin dispensing from the robot controller.

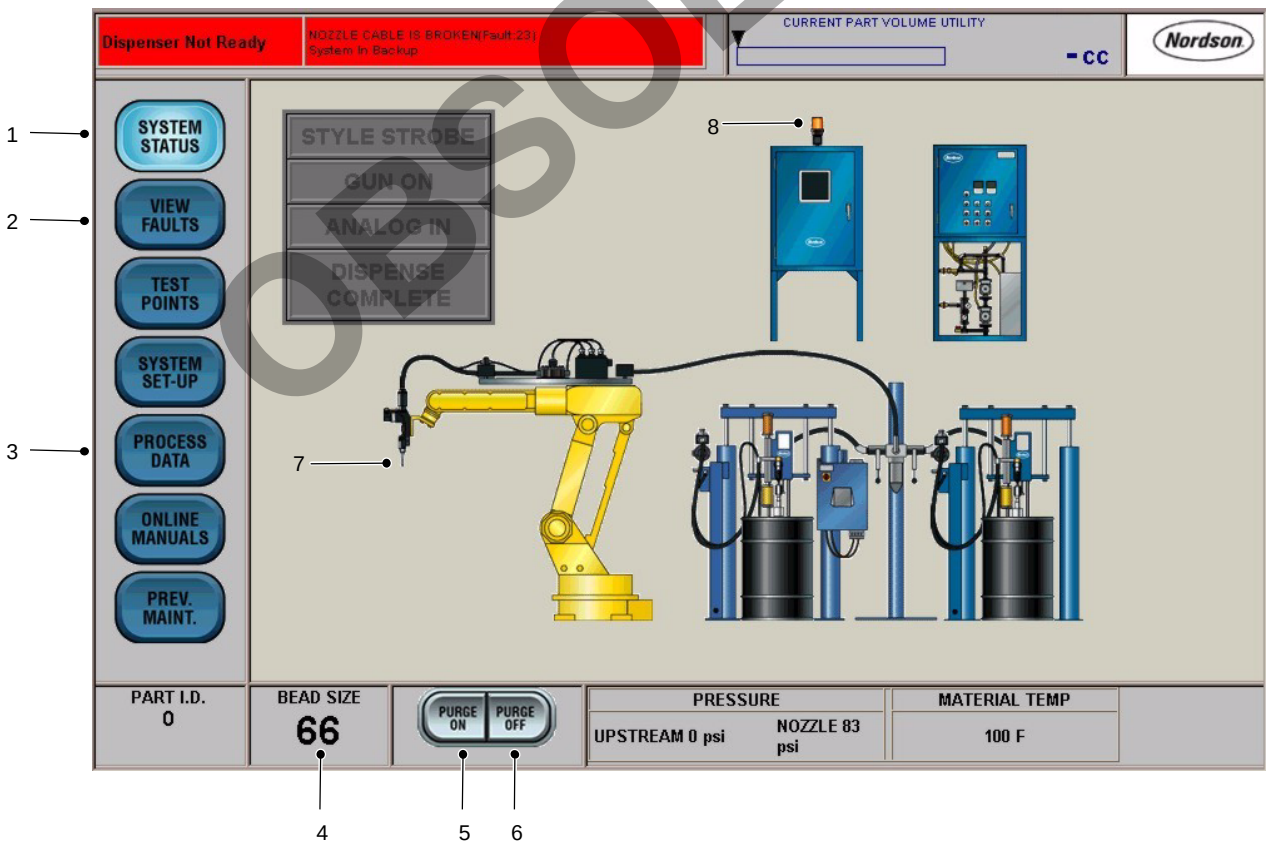
NOTE

During dispensing, the robot signal indicators illuminate when signals are received from the robot controller. During normal operation, these lights flash on and off in specific sequence.

Fault Messages

See Screen 21. If a fault is detected during operation, the alarm tower (8) red light turns on and the type of fault is indicated on the operator interface.

1. Touch **VIEW FAULTS** (2). A description of the fault appears along with the corrective action.
2. Touch any of the bold or underlined text to proceed directly to the correction.



Screen 21 Operator Interface

Decode Statistical Process Control Listings

All data collected by the PCI controller is written to a file for statistical process control (SPC). Refer to Tables 2 and 3. The controller collects SPC Error Codes and SPC System Status Codes.

NOTE

Only personnel with Administrator Level access to the controller can perform this procedure.

Follow these steps to decode an SPC Control listing:

1. Access the *c:\nordson\serial* directory and select the *spc.dat file.*
2. Subtract the largest number from the code column that yields a remainder greater than or equal to zero. This is the value of the first decoded error code.
3. If the remainder is greater than zero, subtract the largest number from the code column that yields a remainder greater than or equal to zero. This value is the second decoded error code.
4. Continue subtracting the largest possible value until a remainder of zero is obtained.

Table 2 SPC Error Codes

Code	Description
1	High dispensed volume
2	Low dispensed volume
4	High material supply pressure
8	Low material supply pressure
16	No material supply pressure
32	Nozzle clog or down stream blockage
64	Gun cable failure
128	Flowmeter failure
256	Nozzle pressure transducer failure
512	Flowmeter cable failure
1024	Not used
2048	DeviceNet from robot failure
4096	Robot signals out of sequence
8192	Gun or controller failure
16384	Auxiliary device failure either temperature conditioning unit or pumps
32768	Low average nozzle pressure or minimum setpoint error

EXAMPLE

An SPC status code of 1060 is listed. The largest code that can be subtracted is 1024. The remainder is 36. The largest code that can be subtracted from the remainder is 32. Subtracting 32 from 36 yields 4. The largest code that can be subtracted from 4 is 4. The remainder is 0 and decoding is complete. The following was detected:

- 1024 — Dispenser Ready was low but robot attempted to run a part
- 32 — The “a” value changed due to a purge
- 4 — Material Calibration has been run

Table 3 SPC System Status Codes

Code	Description
1	In Back-up
2	Deferred Back-up
4	Material Calibration has been run
8	New pressure transducer offsets have been measured
16	“a” or “n” value has been changed through the keypad
32	The “a” value changed due to a purge
64	Not used
128	New configuration file or defaults have been loaded
256	SPC data has been downloaded
512	Dispenser Ready went from low to high prior to dispense cycle
1024	Dispenser Ready was low but robot attempted to run a part
2048, 4096, 8192, 16384	Not used
32768	Part cycle ran in Simulation Mode

Back-Up Mode

If one of the following faults is detected, you may stop production to correct the fault or continue production in back-up mode with some sacrifice to bead dispensing characteristics:

- Gun cable
- Gun pressure transducer
- Flowmeter
- Flowmeter cable

If one of these faults is detected, the **FAULT INDICATOR** field will include a prompt to enter back-up mode. When you enter back-up mode, the **BACKUP MODE** indicator on the operator interface and the alarm tower light shuts off. You can continue production dispensing without interruption.

Once the fault is corrected, the **BACKUP MODE** indicator light shuts off after the next part is run or the gun is purged.

Shutdown

Use the following shutdown procedure to remove power from the PCI Controller:

1. Touch **Minimize** (1) at the top of a screen display.
2. Touch **start** (2) on the Windows task bar to access the **Start Menu**.
3. Touch **Shut Down** (3) on the **Start Menu**.
4. Make sure that **Shut Down** is displayed in the **Shut Down Windows** field. Touch **OK**.
5. Turn the controller off and relieve all pressures.

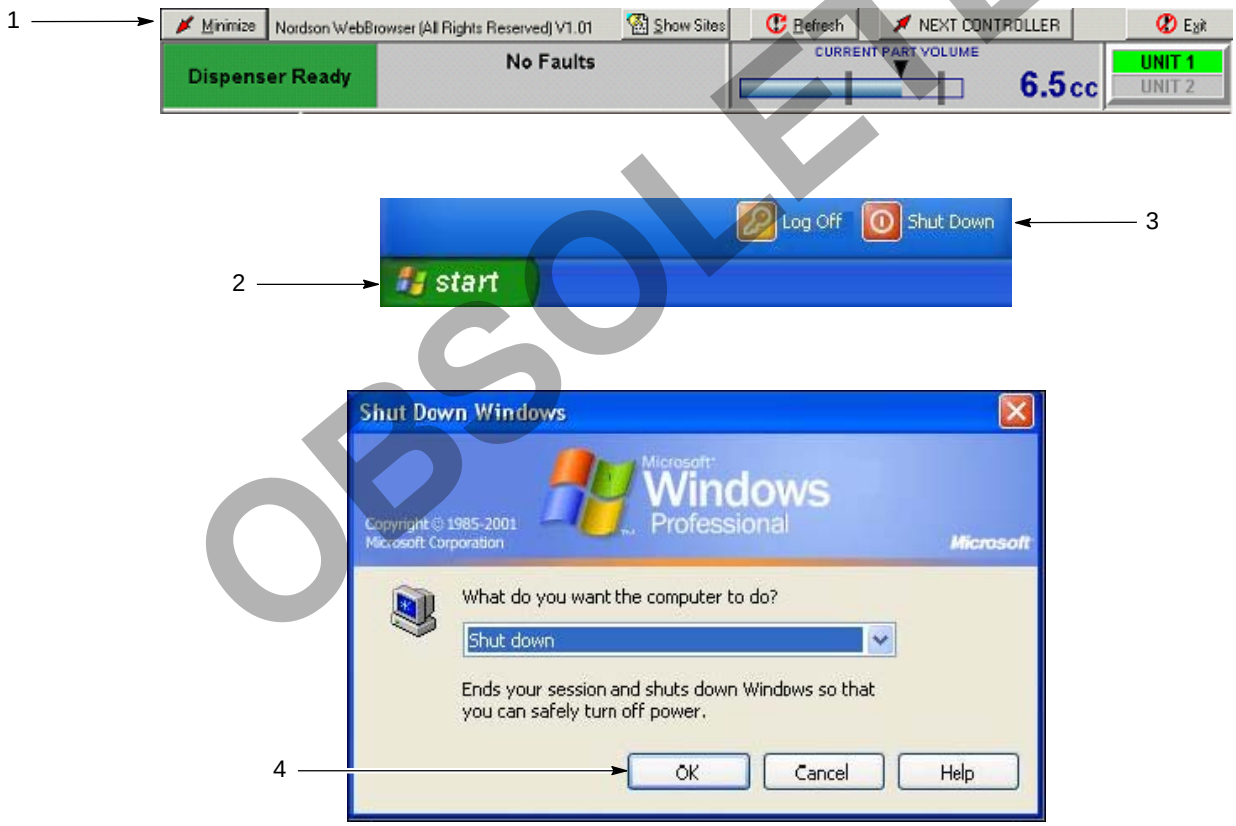


Figure 7 PCI Controller Shutdown

Troubleshooting

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

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

Problem	No.	Page
Gun does not dispense material	1	33
Gun does not dispense material, does not open	2	33
Gun does not dispense material, opens fully	3	36
Gun does not change dispensing rate to control bead size	4	36
Gun does not change dispensing rate to control bead size, opens fully	5	36
Gun dispenses early, before robot moves	6	36
Gun dispenses after cycle, gun closed	7	36
Dispensing delayed	8	36
Bead deposition “wiggles”	9	36
Unexpected bead-size change	10	36
Material leaks from bonnet	11	36

Cable Continuity

! CAUTION !

Disconnect power before removing cables and testing them.

Check the cables for continuity with an ohmmeter. See the cable wiring diagrams included with your system documentation.

Troubleshoot the Controller

Problem	Possible Cause	Corrective Action
1. Gun does not dispense material	Material supply pressure low	Increase the material supply pressure. Refer to the drum unloader manual.
	Nozzle blocked	Remove and clean the nozzle. Refer to the Pro-Flo gun manual.
	Material supply hose blocked	Check the material supply hose and unblock it. Refer to the Pro-Flo gun manual.
	Signals not received from robot in proper timing sequence	Set the proper timing sequence. Refer to *Set Timing Sequences* in the *Installation* section.
	Signals not received from robot controller or sent to gun	Check the cable continuity and replace the cable if necessary. Refer to the Pro-Flo gun manual.
	Spring closures are not retracted	Verify that there is power to the controller and that the controller is on. Verify that the solenoid supply air to the gun is on. Verify that air is present at the gun and that the pressure is correct. Replace the spring closure assembly if it is defective.

Problem	Possible Cause	Corrective Action
2. Gun does not dispense material, does not open	Absent or low control air pressure	Check the supply air pressure and increase it if necessary.
	Stem binding	Remove the trimset valve and loosen the bonnet screw on a packing-type bonnet. Check and replace the stem and bonnet if necessary. Refer to the Pro-Flo gun manual.
	Actuator malfunction	Replace the gun. Refer to the Pro-Flo gun manual.
	Spring closures are not retracted	Verify that there is power to the controller and that the controller is on. Verify that the solenoid supply air to the gun is on. Verify that air is present at the gun and that the pressure is correct. Replace the spring closure assembly if it is defective.

Continued on next page...

Problem	Possible Cause	Corrective Action
3. Gun does not dispense material, opens fully	Trimset valve blocked	Remove and clean the trimset valve. Refer to the Pro-Flo gun manual.
4. Gun does not change dispensing rate to control bead size	Cordset damaged	Check the continuity of cordset and replace it if necessary. Refer to the Pro-Flo gun manual.
	Gun control or extension cable damaged	Check the cable continuity and replace cable if necessary. Refer to the Pro-Flo gun manual.
5. Gun does not change dispensing rate to control bead size, opens fully	Pressure transducer in controller malfunction	Check the pressure output voltage of the controller board. Contact your Nordson Corporation representative.
6. Gun dispenses early, before robot moves	Signals from robot controller timed improperly	Set the proper timing sequence. Refer to *Set Timing Sequences* in the *Installation* section.
	Gun ON or Tool Speed delay too short	Increase the parameter settings. Refer to the *Operation* section.
7. Gun dispenses after cycle, gun closed	Control air pressure low	Check the supply air pressure and increase it if necessary.
	Needle not seating	Purge the gun. Refer to the Pro-Flo gun manual.
	Stem and trimset valve seat worn	Replace the trimset valve. Refer to the Pro-Flo gun manual.

Problem	Possible Cause	Corrective Action
8. Dispensing delayed	Gun ON signal from robot controller timed improperly	Set the proper timing sequence. Refer to *Set Timing Sequences* in the *Installation* section.
	Gun ON delay too long	Decrease the parameter setting. Refer to the *Operation* section.
	Packing-type bonnet: Stem binding	Loosen the packing nut. Refer to the Pro-Flo gun manual.
9. Bead deposition "wiggles"	Nozzle too high above work piece	Lower the nozzle. Refer to the robot controller manual.
	Material speed through nozzle too high	Decrease the bead size. Refer to *Startup* in the *Operation* section.
	Nozzle not large enough	Install a larger nozzle. Contact your Nordson Corporation representative for part numbers.
10. Unexpected bead-size change	Nozzle partially blocked	Clean the nozzle. Refer to the Pro-Flo gun manual.
	Material exceeded shelf life	Use fresh material.
11. Material leaks from bonnet	Lip-type seals: Bonnet seals worn	Replace the bonnet. Refer to the Pro-Flo gun manual.
	Packing-type: Bonnet screw loose	Tighten the bonnet screw. Refer to the Pro-Flo gun manual.
	Packing-type: Bonnet packings worn	Replace the bonnet. Refer to the Pro-Flo gun manual.

Repair

Repair consists of replacing the operator interface panel and the PCAs.

WARNING

- Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.
- Disconnect equipment from the line voltage. Failure to observe this warning may result in personal injury, death, or equipment damage.
- This unit contains electrostatic sensitive devices (ESD). Wear a grounding wrist strap to prevent damage to ESD parts.

Operator Interface Panel

There are two types of operator interface panels. Check the PCI controller part number and perform the applicable procedure.

Process Sentry PCI Controllers 1017349 and 1021021

1. Turn off and lock out external electrical power to the controller.
2. See Figure 8. Turn off the power switch (4).
3. Open the enclosure door (1).
4. Disconnect the connector (5) from the operator interface (6).
5. Remove the nuts (2) and lock washers (3) securing the operator interface (6) to the enclosure.
6. Install the new operator interface (6) using the lock washers and nuts. Tighten the nuts securely.
7. Connect the cable (5) to the operator interface (6).
8. Close the enclosure door (1).

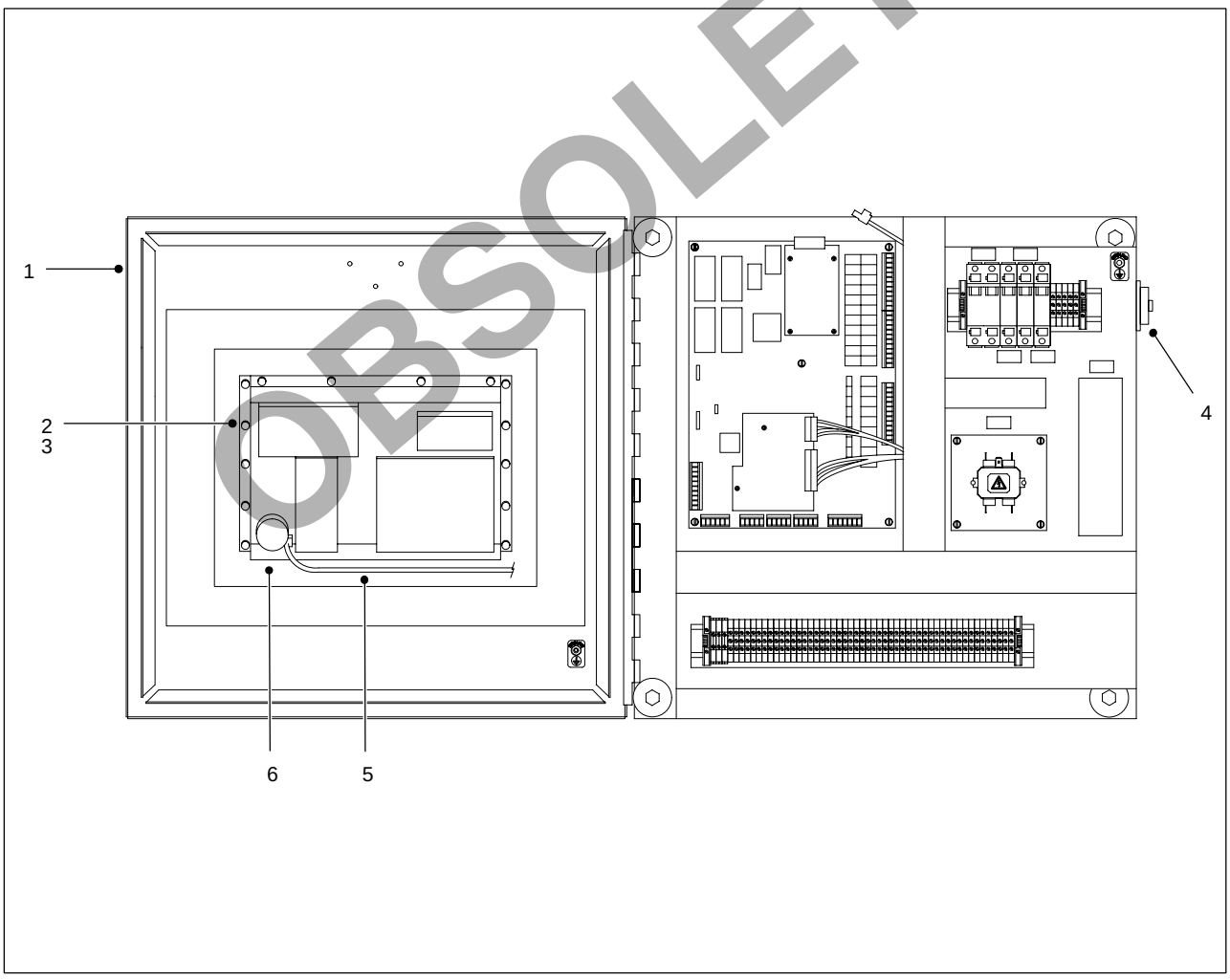


Figure 8 PCI Controller 1017349 Operator Interface

Process Sentry PCI Controller 1055798

1. Turn off and lock out external electrical power to the controller.
2. See Figure 9. Turn off the power switch (7).
3. Open the enclosure door (1).
4. Disconnect the AC (4), COMM (5), and DeviceNet (6) cables from the operator interface (3).
5. Remove the mounting clips (2) securing the operator interface (3) to the enclosure door (1). Remove the operator interface from the enclosure door.

NOTE

Do not apply sealing compounds to the operator interface. The operator interface has a sealing gasket that forms a compression-type seal.

6. Make sure that the sealing gasket on the operator interface (3) is properly positioned.
7. Install the new operator interface (3) into the enclosure door (1).
8. Install the mounting clips (2). Using the torque sequence shown in Figure 9, tighten the mounting clips to 10 in.-lb (1.1 N•m).
9. Connect the AC (4), COMM (5), and DeviceNet (6) cables to the operator interface (3).
10. Close the enclosure door (1).

Process Sentry PCA Board

1. Turn off and lock out external electrical power to the controller.
2. See Figure 10. Open the enclosure door (12).
3. Disconnect the electrical connectors (6, 8, 9) from the Process Sentry PCA (2).
4. Disconnect the electrical connectors (5, 7) from the hybrid PCB (3) and Pro-Flo PCA (11).
5. Remove the screws (4, 10) from the hybrid PCB (3) and Pro-Flo PCA (11).
6. Remove the screws (1) securing the Process Sentry PCA (11) to the enclosure.
7. Install the hybrid PCB (3) and Pro-Flo PCA (11) to the new Process Sentry PCA (2) using the screws (1). Tighten the screws securely.
8. Install the Process Sentry PCA (2) to the enclosure using the screws (1). Tighten the screws securely.
9. Connect the electrical connectors (6, 8, 9).
10. Close the enclosure door (12).

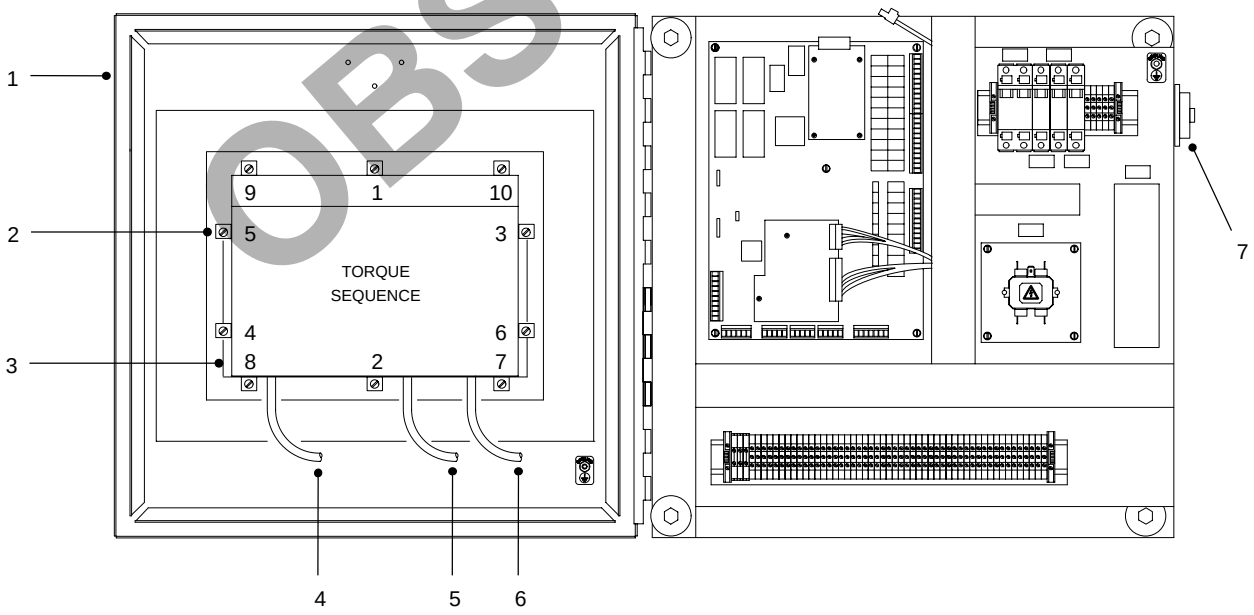


Figure 9 PCI Controller 105798 Operator Interface

Hybrid PCB Board

1. Turn off and lock out external electrical power to the controller.
2. See Figure 10. Turn off the power switch (13).
3. Open the enclosure door (12).
4. Disconnect the electrical connector (5) from the hybrid PCB (3).
5. Remove the screws (4) securing the hybrid PCB (3) to the Process Sentry PCA (2).
6. Install the new hybrid PCB (4) to the Process Sentry PCA (2) using the screws (4). Tighten the screws securely.
7. Connect the electrical connector (5).
8. Close the enclosure door (12).

Pro-Flo PCA Board

1. Turn off and lock out external electrical power to the controller.
2. See Figure 10. Turn off the power switch (4).
3. Open the enclosure door (12).
4. Disconnect the electrical connectors (7) from the Pro-Flo PCA (11).
5. Remove the screws (10) securing the Pro-Flo PCA (11) to the Process Sentry PCA (2).
6. Install the new Pro-Flo PCA (11) to the Process Sentry PCA (2) using the screws (10). Tighten the screws securely.
7. Connect the electrical connectors (7).
8. Close the enclosure door (12).

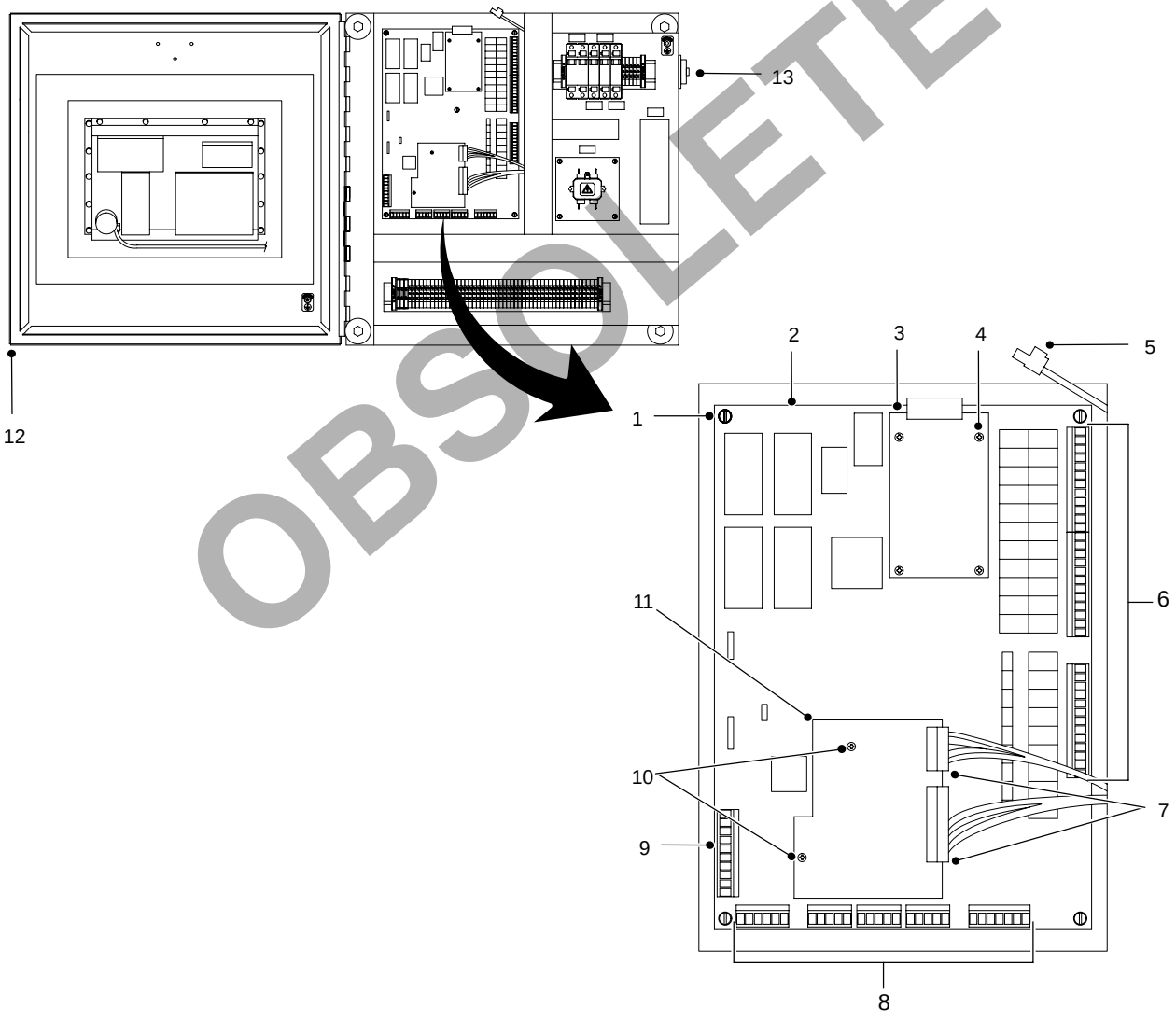


Figure 10 Replacing Circuit Boards

Parts

To order parts, call the Nordson Customer Service Center or your local Nordson representative.

Process Sentry PCI Controllers

See Figure 11 and the following parts list.

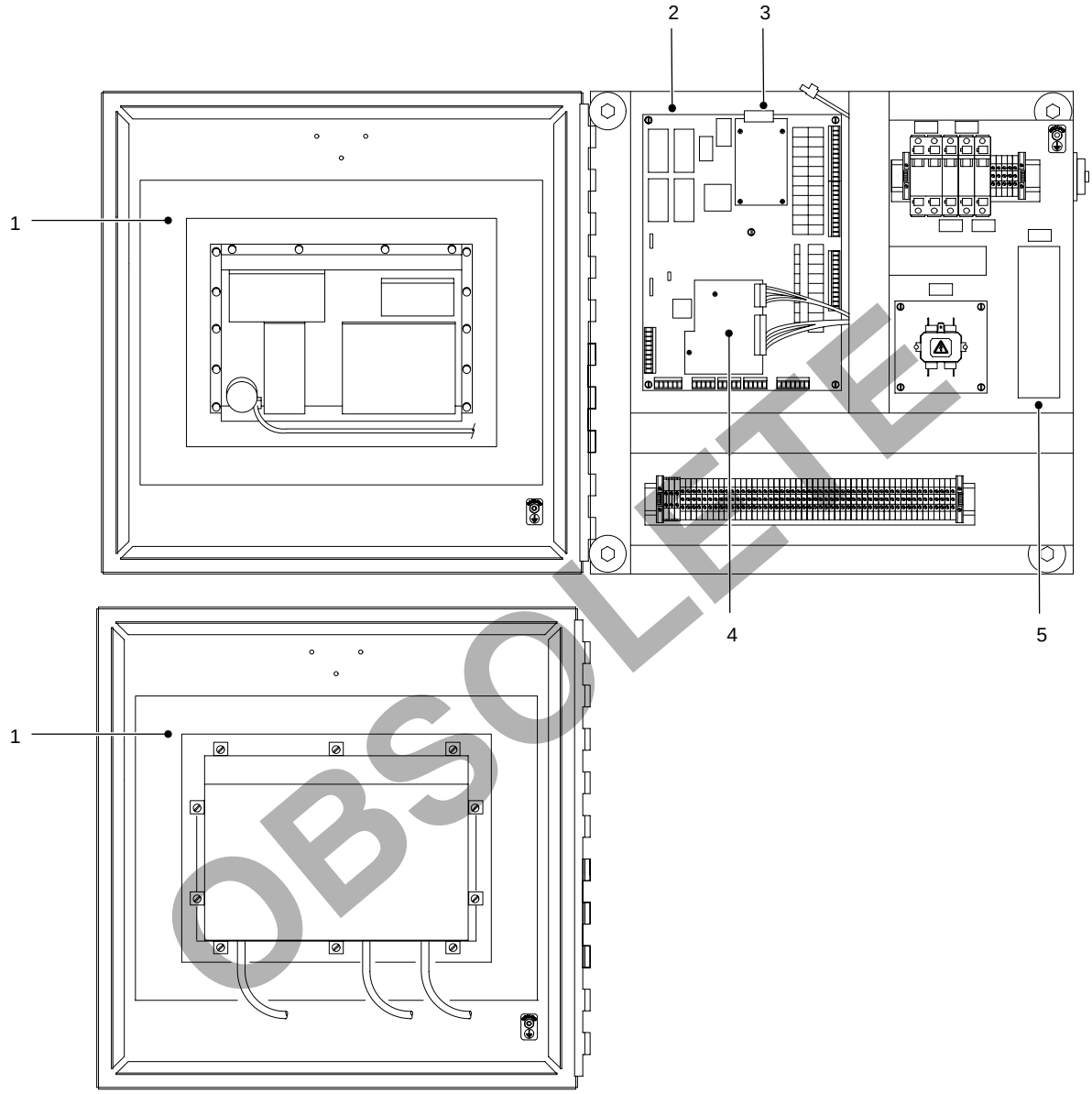


Figure 11 PCI Controller Parts

PCI Controllers			1017349	1021021	1055798
Item	**Part**	**Description**	**Qty**	**Qty**	**Qty**
1	1040541	• Touch screen assembly	—	—	1
1	1012797	• Touch screen assembly	1	1	—
2	1017285	• PCA, Process Sentry, PCI	1	1	1
3	320255	• Hybrid, UCS-on-1, open PCB	1	1	1
4	320300	• PCA, Pro-Flo option	1	1	1
5	1017912	• Power supply, 110/220 Vac, +5/+24/+12/-12, panel	1	1	1

Accessories and Kits

These accessories may be purchased separately.

Part	Description
281132	Valve, proportional assembly
1020179	Kit, MCO module, solenoid

Cables

Use this list to order replacement cables of the correct type and length.

Part	Description	Note
- - - - - -	Cable, robot, interface, 5 pin, DeviceNet	A
235876	Cable, Pro-Flo gun, sacrifice, 70 ft	
235872	Cable, Pro-Flo gun, sacrifice, 16 ft	
335625	Cable, 16 pin, 70 ft	
327456	Cable, 16 pin, 2 connector, 70 ft, pump power and I/O	
327442	Cable, 10 pin, 2 connector, 70 ft, temperature conditioning interface	
NOTE A: Customer-supplied.		

Schematics and Wiring Diagrams

See the system documentation for the schematics and wiring diagrams that are specific to your system.

Specifications

The PCI controller may be purchased for either 120 or 240 V line voltages. Each configuration requires 2A of current.

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