# Pro-Meter® Controller with Process Sentry® (DC Motor Version)

Customer Product Manual
Part 1007773B

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**Nordson**

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# Pro-Meter Controller with Process Sentry (DC Motor Version)

## 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-Meter controller with Process Sentry is a dispensing application monitoring and control system.  It interfaces with a robot controller, a gear metering pump, and a dispensing gun.

The controller includes an operator interface panel consisting of a display and a keypad.

The operator interface is used for system setup and dispense cycle monitoring.  The system can store operating parameters for up to 32 unique parts.

Slight variations to the front panel controls and side connector layout are possible due to your specific system configuration.

The controller monitors the volume of material dispensed on each part.  The controller compares material pressure to programmed high and low limits and sets alarms if any values fall outside the limits.  The bead size is adjustable via the front panel from 1 to 99.

The adjustment affects the flow rate, which is determined by the gear pump speed.  The bead size number is arbitrary and does not relate to any unit of measurement.
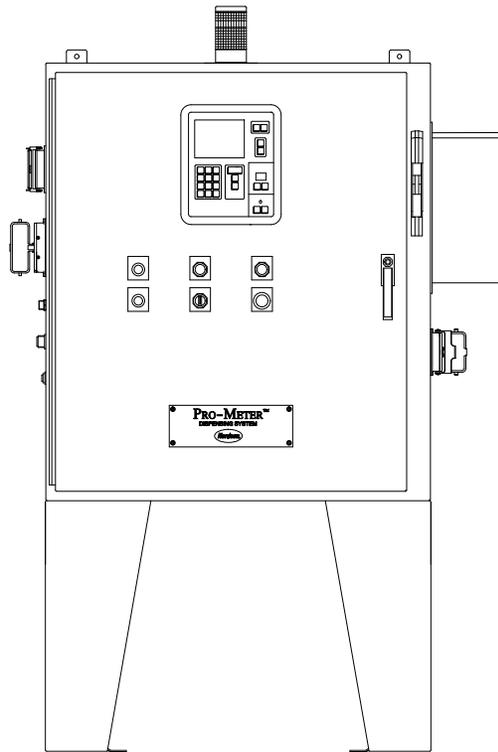


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Figure 1    Pro-Meter Controller with Process Sentry (DC Motor Version)

## Auto/Manual Flow Rate Switch

The Auto/Manual flow rate switch determines how the controller sets the material flow rate, which is dependent upon gear pump speed.  The gear pump is driven by a motor, which is governed by the motor controller inside the Pro-Meter controller cabinet.  The motor speed is set by a 0–10V analog signal from the Process Sentry circuit board to the motor controller.

If the switch is set to Auto, the flow rate or gear pump speed is set by a combination of the analog signal from the robot and the bead size setting for that part ID.  The following formula applies:

Analog Signal to Motor Controller =
(Bead Size/99) x (Analog Signal from Robot/10) x 10 Volts

If the switch is set to Manual, the bead size alone sets the flow rate or gear pump speed.  The analog signal from the robot is ignored.  The following formula applies:

Analog Signal to Motor Controller =
(Bead Size/99) x 10 Volts

## Bead Size Settings by Part ID

Setting bead sizes by part ID allows each part ID to have a different flow rate and its own unique alarm parameters.

The values for the bead size settings are adjustable in two different locations in the **SETUP** menu.  The first location is **Bead Size**, which lists three screens of part identifications and their respective bead sizes.  The second location is **Settings by Part ID**.

## Gun On Delays by Part ID

Gun On delay is used to pre-pressurize the material supply to the gun, which guarantees sufficient material at the start of the bead. This actuates the dispensing gun after the priming of the supply pumps. The delay starts at the robot gun ON signal. The delay is adjustable from 0-5000. It is unique to each part ID, and each part ID can have a different delay.

**Gun On Delay** values are adjustable on two different screens under the **SETUP** menu:

- **Delay Times**>**Delay Set-Up**>**Analog**/**Gun Delays** presents a list of three part ID screens and their respective **Gun On Delay** settings.
- **Settings by Part ID**>**Delay Set-Up**>**Set-up Screen 2** provides options to enter the part ID and the new value for **Gun On Delay**.

## Optional Bubble Detection System

The dispensing systems consist of bulk supply pumps that pump material from 55-gallon drums to a dispensing gun. Occasionally during barrel change, air is trapped underneath the pump follower plate. This causes bubbles to be passed into the hose/header delivery system.

The trapped air travels through the material delivery system. When exiting the dispensing gun nozzle, the air bubble expands. This causes an audible pop. The undesired effect is a skip or gap in the bead.

The optional bubble detection system detects air bubbles in the bead. Bubble detection system settings are accessed by selecting **SETUP**>**Bubble**.

Refer to the *Bubble Detection System for the Pro-Meter Controller with Process Sentry* instruction sheet for more information.

## Operation Sequence

Refer to Table 1 for the system operation sequence.

Table 1  Operation Sequence

| Sequence | Description |
|---|---|
| Part ID On | The robot controller sends a part ID signal to the controller.  The signal is 5 bits long and corresponds to a specific part. |
| Part Strobe On | The robot controller sends the Part Strobe signal to the Pro-Meter controller as long as the part is being processed.  This allows the controller to accumulate volume and pressure readings for the part.  When the Pro-Meter controller receives this signal, it<br><br>• reads the part ID bits.<br><br>• resets the internal flow meter counter and begins counting flow meter pulses to measure the volume dispensed.<br><br>• resets the fault beacon and Part OK outputs to the controller.<br><br>**NOTE:**  The part strobe signal is internally connected to the gun input.  For most glass applications, the dispense cycle consists of only one gun ON/OFF cycle.  If more than one gun ON/OFF cycle is used within a single part, the part strobe input must be disconnected from the gun input and controlled separately by the robot. |
| Analog Tool Speed Signal | The robot controller sends the analog tool speed signal to the Pro-Meter controller. The Pro-Meter controller uses the tool speed signal and bead size setting to control the bead size dispensed by the gun. |
| Gun ON | The robot controller sends the Gun ON signal to the Pro-Meter controller when the robot is in position to start dispensing material.  The Pro-Meter controller then<br><br>• activates the gun solenoid to start dispensing material.<br><br>• outputs a signal to the gun regulator to control bead size.<br><br>• monitors the material pressure. |
| Gun OFF | The robot controller sends the Gun OFF signal to the Pro-Meter controller when the robot has completed its programmed tool path.  The Pro-Meter controller deactivates the gun solenoid to stop dispensing material. |
| Part Strobe Off | The robot controller turns off the part strobe signal.  The Pro-Meter controller then<br><br>• stops counting the flow meter pulses and reads the total flow meter pulses accumulated for the part.<br><br>• computes the total volume of material dispensed, based on the flow meter rating.<br><br>• reports the material volume to the **VOLUME** menu and the **SETUP**>**SPC** (Statistical Process Control) screen.  If the total volume dispensed exceeds the high or low limits set for the part, or the material pressure or temperature exceeds the high or limits, a fault is generated.  The fault is reported to the **HELP** menu and the **SETUP**>**SPC** screen; the system fault output and alarm beacon are turned on. |
| Part OK | If no faults were detected during the dispensing cycle, the Pro-Meter controller turns on the Part OK output to the robot controller. |

## Alarms and Faults

The Pro-Meter with Process Sentry communicates the following discrete fault information to the robot via the controller outputs.

## High or Low Volume

The high or low volume alarms indicate that the dispensed volume was outside the programmed limits for a particular part ID.

## Bead Defect (Bubble) Detected (Optional)

A bead defect (bubble) detected output indicates that the optional bubble detection feature detected a bubble capable of causing a gap in the bead larger than the set value.

## System Fault

This output represents a collection of other faults depending upon how the controller is configured. The faults that can be displayed through this output include the high and low pressure faults.

The system faults are logged into the **HELP** menu and **SPC** file. The fault output and the bubble detected output (if appropriate) to the robot controller are turned on. These faults are automatically reset by the robot controller at the next part strobe signal. The faults can also be reset by the robot through the fault reset input or through the **HELP** menu.

The controller also logs these system faults:

- Pro-Meter controller hardware or software fault
- Flow meter fault (no signal)
- Pressure transducer fault (no signal)

These faults will activate the fault beacon and turn off the system ready output to the robot controller. The system will not operate until the fault is corrected and the Pro-Meter controller turns on the system ready output to the robot controller.

## *Main Menus*

Four main menus are accessible from the horizontal menu bar at the top of the display: **VOLUME**, **HELP**, **STATUS**, and **SETUP**. Refer to the *Operator Interface* section in *Operation* for more information.

## Service SETUP Menu

The password-protected service **SETUP** menu is accessible by pressing a hidden key on the front panel.  Only Nordson service personnel are authorized to access this menu during setup or system changes.  Contact your Nordson representative to make changes to the service **SETUP** menu.

## SPC Data

All data collected by the controller is written to a file that can be used for statistical process control.  The file contains the following information:

- Date
- Time
- Part ID
- Actual volume
- Pump, pump outlet, and nozzle pressures
- Fault codes

To download the data to a personal computer, you will need a serial cable and the Nordson DataLink program.  A serial port is furnished on the controller.  Refer to the *Nordson DataLink User's Guide* for download instructions.

## Configurator Program

To program the Pro-Meter controller, use the Nordson Configuration Utility program (configurator).  This program allows you to create a configuration file on a PC with all parameters set for each part ID.

Use the Nordson DataLink program to download the configuration file to the controller.  Refer to the *Operation* section for more information.

# Operation

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

**NOTE:**  Read and understand this entire section before performing any operation procedures.

This section contains instructions for using the operator interface to set customer-accessible production parameters and to operate the Pro-Meter controller.

Your Nordson representative will install and configure your Pro-Meter controller.

Perform the following tasks before setting production parameters:

- configure the analog tool speed signal from the robot controller
- set the robot controller output signal timing
- teach the robot the tool paths for each part

Refer to the *Specifications* section and your robot controller manual for more information.

## *Operator Interface*

See Figure 2 and refer to Table 2.

Use the operator interface to select and define production parameters.
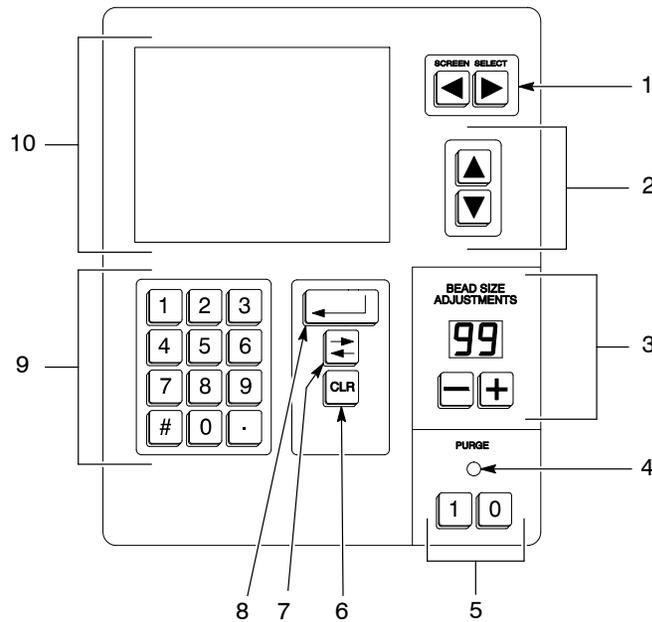
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Figure 2    Operator Interface

Table 2  Operator Interface Functions

| Item | Description | Function |
|------|-------------|----------|
| 1 | SCREEN SELECT keys | Highlight the screens listed on the menu bar.  Press the **[↵]** key to access a highlighted screen. |
| 2 | Up and down keys | Highlight the prompts listed vertically on the screens.  Press the **[↵]** key to access the prompt screen. |
| 3 | BEAD SIZE ADJUSTMENTS keys | Use the ⁺/_ keys to increase or decrease the displayed value. |
| 4 | PURGE indicator | Lights when purge is turned on. |
| 5 | 1 and 0 keys | Turns purge on and off.

**Purge Time** is set from the **SETUP** menu. Purge will run until the timer runs out; press the **[0]** key if you want to shut off purge before the timer runs out. |
| 6 | CLR key | Clears the current value. |
| 7 | Toggle key | Toggles the Yes/No values or selects between multiple, fixed choices. |
| 8 | Enter key | Selects the highlighted screen or item, and enters the current value. |
| 9 | Numeric keypad | Enters numeric values. |
| 10 | Display | Displays screens, menus, and prompts used for setup and operation. |

## *Operator Interface Menus*

See Figure 2.

Use the SCREEN SELECT keys to highlight one of four main menus: **VOLUME**, **HELP**, **STATUS**, or **SETUP**.  Use the **[▲ ▼]** keys to highlight the prompts on each menu.

### VOLUME Menu

See Screen 1.

The **VOLUME** menu monitors system operation during production.  For each part run, the **VOLUME** menu displays the time, part ID, actual volume dispensed, and whether the volume is within the high/low limits.

If the volume is within the high/low limits, **NO** appears in the **Fault** column. If the volume is not within the high/low limits, **YES** appears in the **Fault** column.

| VOLUME | HELP | STATUS | SETUP |
|--------|------|--------|-------|
| | | V o l u m e cc's | |

| Time | Part ID | Actual | Fault |
|------|---------|--------|-------|
| 11:17 | 00 | 9.5 | YES |
| 11:17 | 00 | 25.7 | YES |
| 11:16 | 00 | 25.7 | YES |
| 11:16 | 00 | 26.1 | YES |
| 11:16 | 00 | 26.0 | YES |
| 11:16 | 00 | 26.0 | YES |
| 11:16 | 00 | 26.0 | YES |
| 11:16 | 00 | 26.1 | YES |
| 11:16 | 00 | 26.2 | YES |

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Screen 1  **VOLUME** Menu (Example)

## HELP Menu

See Screen 2.

If a fault is detected during operation, the alarm beacon turns on and the type of fault is indicated on the **HELP** menu.

| VOLUME | HELP | STATUS | SETUP |
| --- | --- | --- | --- |

The pressure at Upstream/Outlet is low compared to the limits that were set.  Please verify the following items.

Is the pump pressure set correctly?  If not, adjust the air regulator to the correct value.

If the pump pressure does not respond to the change in the air regulator pressure, the pump may need to be rebuilt.

Is the gun opening correctly and dispensing material?  Verify that the solenoid valve is receiving air pressure and is responding to the trigger signal from

Press ▼ for more Help text

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Screen 2  **HELP** Menu (Example)

## STATUS Menu

See Screen 3 and refer to Table 3.

```
┌─────────────────────────────────────────────┐
│  VOLUME      HELP      ▐STATUS▌     SETUP     │
├─────────────────────────────────────────────┤
│             System Status                    │
│                                              │
│ Tool Speed  :2.52    Nozzle    :0    bar     │
│ Temperature :60 °C   Pump In   :0    bar     │
│ Part ID     :0       Pump Out  :2000 bar     │
│ Part Strobe :OFF     Gun On/Off:OFF          │
│ Actual Vol  :9.5   cc                         │
│ Flow Rate   :836.2 cc/s                       │
│                                              │
│                                              │
│                                              │
│                                              │
│                                              │
└─────────────────────────────────────────────┘
```

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Screen 3  **STATUS** Menu (Example)

Table 3  **STATUS** Menu Displays

| Prompt | Display |
|---|---|
| **Tool Speed** | 0−5 Vdc (half the actual voltage output by the robot controller) |
| **Temperature** | °C |
| **Part ID** | Part ID number |
| **Part Strobe** | ON or OFF |
| **Actual Vol** | Actual volume when not in cycle, in cc |
| **Flow Rate** | cc/s |
| **Nozzle** | bar |
| **Pump In** | bar |
| **Pump Out** | bar |
| **Gun On**/**Off** | ON or OFF |

## SETUP Menu

See Screen 4 and refer to Table 4.

```
┌─────────────────────────────────────────────┐
│  VOLUME     HELP      STATUS    ▐SETUP▌       │
│     ▐Bead Sizes▌                             │
│      Flow Meter                              │
│      Alarm Trip Points                       │
│      SPC                                     │
│      Configuration                           │
│      Clock                                   │
│      Purge Time                              │
│      Bubble                                  │
│      Delay Times                             │
│      Settings by Part ID                     │
│                                              │
│   Press ▲▼ to point, ↵ to accept             │
└─────────────────────────────────────────────┘
```
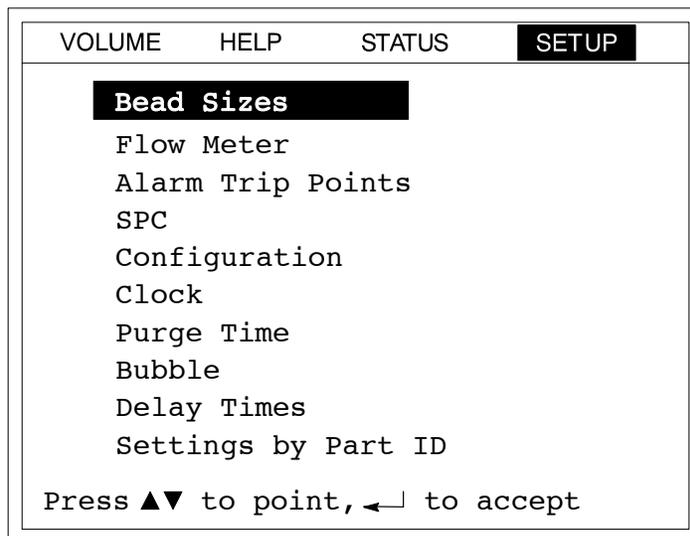
1100072A

Screen 4  **SETUP** Menu (Example)

*Note:*  **Bubble** is optional.

Table 4  **SETUP** Menu Prompt Functions

| Prompt | Function |
|---|---|
| **Bead Sizes** | Enter bead size for up to 32 parts. |
| **Flow Meter** | Enter a counts/liter value according to your gear ratio. |
| **Alarm Trip Points** | Enter high and low limits for volume, nozzle pressure, pump in pressure, and pump out pressure for each part ID. |
| **SPC** | Clear SPC queue, start SPC data download. |
| **Configuration** | Start the configurator program on the PC. |
| **Clock** | Set the time and date. |
| **Purge Time** | Enter the purge time, from 1 to 60 seconds. |
| **Bubble** (optional) | Enable/Disable **Bead Defect**; select **Sensor**; select **Time**; and set **Pressure Setpt**. |
| **Delay Times** | Enter ON/OFF delay times, from 0 to 5000 milliseconds. |
| **Settings by Part ID** | Enter the flow rate and unique alarm parameter for each part. |

## *Initial Setup*

When the controller is turned on, it performs a self-test routine to verify proper operation. After the test is completed, use this procedure to program your Pro-Meter controller. Settings not mentioned here must be programmed by your Nordson application engineer.

See Screen 4.

1. Set the robot controller output signal timing sequence, and configure the analog tool speed signal. Refer to the *Specifications* section for more information.

2. Teach the robot controller the tool paths for each part ID.

3. Use the SCREEN SELECT keys to highlight **SETUP**>**FLOW METER** on the menu bar.

4. Make the following settings from the **SETUP** menu:

   a. Enter counts/liter value according to your gear ratio:

   | Gear Ratio | Counts/Liter |
   |------------|--------------|
   | 25:1 | 37,400 |
   | 32:1 | 48,400 |
   | 50:1 | 74,250 |

   b. Set the system clock (**Clock**).

   c. Set the purge timer (**Purge Time**).

5. Position the gun over a waste container. Purge all air from the gun, hoses, and flow meter.

6. If using an ON/OFF gun, position a test part that has been assigned a part ID under the gun and start the dispensing cycle. Adjust the material pressure until you achieve a satisfactory bead. If necessary, change the robot speed or gun nozzle. Use the **STATUS** menu to monitor pressure during the dispense cycle.

7. From the **SETUP** menu, set the **Alarm Trip Point**s based on the actual volume dispensed and the material pressure during the dispense cycle (**VOLUME** and **STATUS** menus). Set the high and low limits for volume and pressure, for the part ID.

8. Repeat steps 6 and 7 for each part ID.

## *Programming with Configurator*

The Nordson Configuration Utility program (configurator) creates, reads, and saves configuration files to the Pro-Meter controller.

The program is distributed with two batch files called **LOAD** and **SAVE**.  **LOAD** transfers files from the PC to the controller; **SAVE** transfers files from the controller to the PC.

### Requirements

To run the configurator program, you must have an IBM-compatible computer with at least:

- 386 microprocessor
- 640 kb of RAM
- DOS operating system, version 3.0 or later
- One floppy drive and one hard drive
- RS-232 serial communications port and cable

### Installation

All commands are typed at the DOS prompt.

1.  Create a directory on your PC's hard drive to store the configurator program.  For example, to create a new directory called **CONF**, type:

    **MKDIR C:\CONF**

2.  Copy all files distributed on the program disk to the hard drive directory.  If the program disk is in floppy drive A, type:

    **COPY A: *.* C:\CONF**

3.  Press the **[Enter]** key on your keyboard to execute the installation.

    The installation is now complete.

4.  After installing the configurator program, remove the program disk from the floppy drive and store it in a safe place.

## Start the Configurator Program and Load Files

All commands are typed at the DOS prompt.

1. To make the configurator program directory the active current directory, type:

   **CD C:\CONF**

2. To start the program, type:

   **PSCONFIG**

   The copyright screen appears.

```
        PROCESS SENTRY CONFIGURATION UTILITY

         Version 1.00
         Nordson Corporation
         Copyrighted Material 1998
         All Rights Reserved




    Press ENTER key to Continue:
```
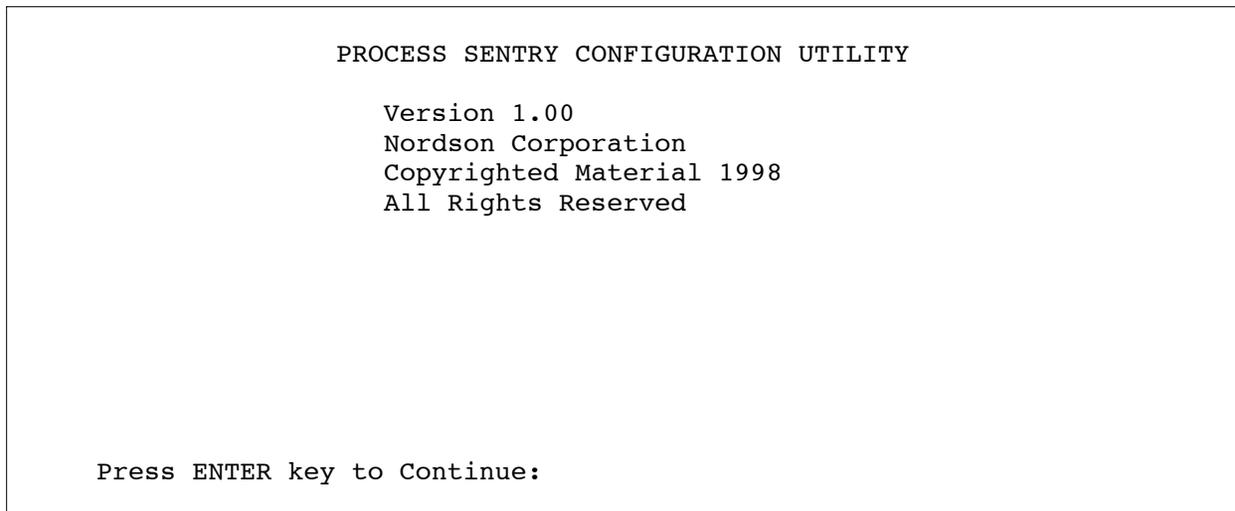
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Figure 3    Copyright

3. Press the **[Enter]** key on your keyboard.  The file selection screen appears.

4. At the `file:` prompt, type the name of the file you want to create or modify.  For example, to modify the default configuration file supplied with the program, type:

   **DEFAULT.CFG**

**NOTE:** If you want to modify an existing file, it must be located in the currently active directory (the directory from which the configurator program is started).

**NOTE:** File names must have no more than eight characters, and should not contain periods, spaces, or an extension. The extension `.CFG` will be added automatically.

5. Press the **[Enter]** key. A file report appears across the bottom of the screen. The report includes the name of the file, the version of the configurator program used to create it, and the date and time the file was modified last.

---

File: DEFAULT.CFG Information

file is from PS DOS Config     versions 1.00

Date = 11/23/98     Time = 09:23:44

Press ENTER key to Continue:

---

6. Press the **[Enter]** key. The top-level screen appears.

   See Screen 4.

   Commands are displayed across the top line of the top-level screen. Highlight a command by moving the blinking block cursor to the first character with the arrow keys. The second line is a description of the highlighted command.

   To execute the highlighted command, press the **[Enter]** key.

Commands                    Command Description

```
PROCESS SENTRY Quit
Configure Process Sentry Parameters
```
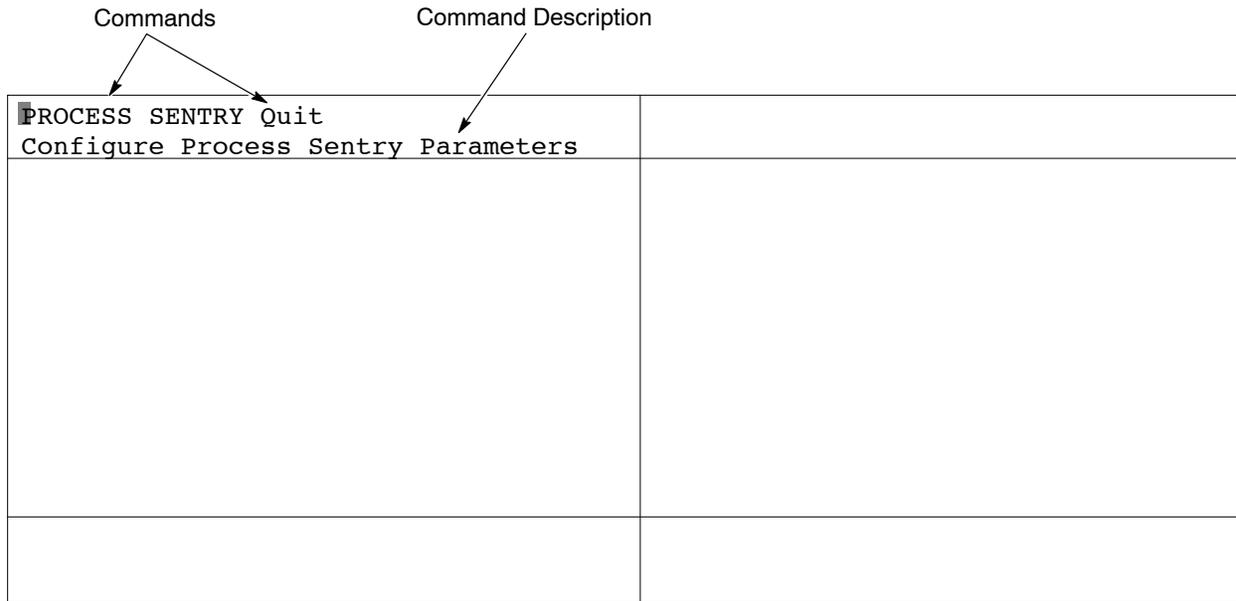
1100074A

Figure 4     Configurator Program Top-Level

## Save Files and Quit the Configurator Program

To save a file or quit the configurator program:

See Screen 5.

1. Highlight the **Quit** command and press the **[Enter]** key on your keyboard. The program prompts you to save or discard any changes.

2. Type **Y** for Yes to save the changes; type **N** for No to discard the changes. You can only save changes to the currently opened file.

```
PROCESS SENTRY Quit
Exit Configuration Utility




Save Changes to File *FILENAME* (Yes/No):
```
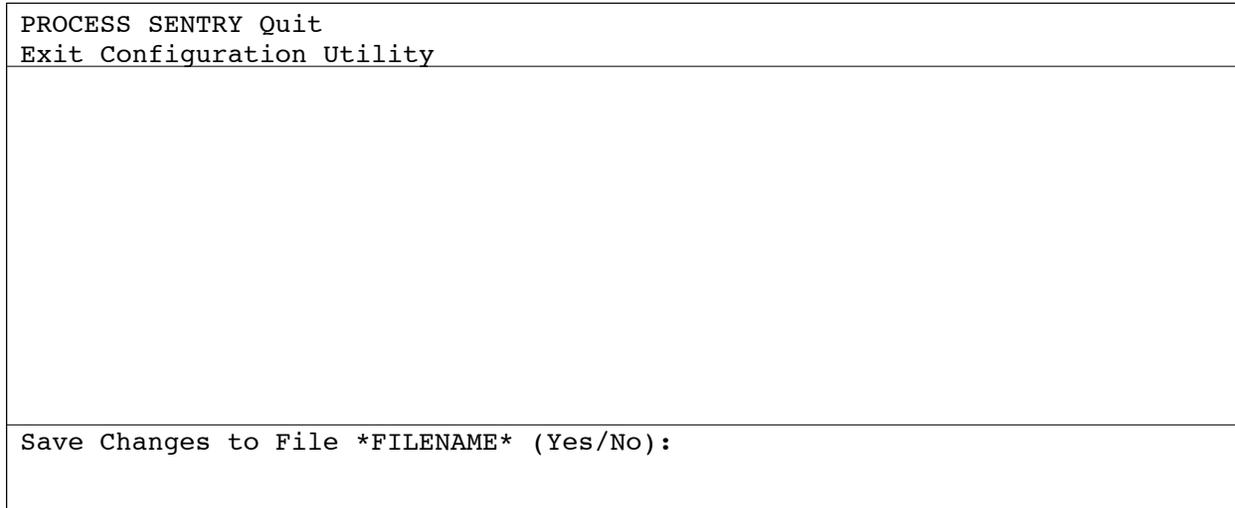
1100075A

Figure 5    Save and Quit

## Create a New File

Create new configuration files by modifying an existing file or the default file. If you are modifying an existing file, make sure it is in the same directory in which the configurator program is installed.

1. Change to the directory in which the configurator program is installed. For example, type:

   **CD C:\CONF**

2. To create a new file, type:

   **COPY DEFAULT.CFG NEWFILE.CFG**

3. Change the production parameters as described in the next section.

## Change Configuration File Parameters

1. Start the configurator program and open the desired file. Refer to *Start the Configurator Program and Load Files* for instructions.

2. Highlight the **PROCESS SENTRY** command.

3. Press the **[Enter]** key on your keyboard. The data entry screen appears.

4. See Screen 6.

   Use the arrow keys on your keyboard to move through the parameters. When you move the cursor to a parameter an explanation appears at the bottom of the screen.

```
Process Sentry Parameters, Data Entry Table
<ESCAPE = EXIT>
System Parameters:                    High Limit:
 Language (Eng,Ger,Fren):        Volume Set-Points:
 Volume Display (cc,oz):          Part ID:
 Clock Format (24,12hr):          High Volume (ccs):
System Unit Type:                 Low Volume (ccs):
Flowmeter Counts per Liter:       High Volume (%):
 COunts (1-1,000,000):            Low Volume (%):
Pressure 1
 Low Limit:
 High Limit:
Pressure 2
 Low Limit:
 High Limit:
Pressure 3
 Low Limit:

Select Configuration Name (max 8 digits); ENTER KEY for DEFAULT:
```

1100076A

Figure 6    Data Entry

5. To enter a numerical parameter on a new screen, type in the desired value on your keyboard. To change an existing numerical value, press the **[Backspace]** key and enter the new value using your keyboard.

6. To enter or change a text value, press the **[←→]** keys on your keyboard. Press the **[←→]** keys again to toggle the text values.

**NOTE:** The range of valid values for each entry is shown as part of the prompt. If you enter a number that is too high, the highest valid number will be displayed. If you enter a number that is too low, the lowest valid number will be displayed.

7. After making all of your changes, press the **[Esc]** key on your keyboard to return to the top-level screen. You can now quit the program and save all changes.

## Transfer Files to and from the Controller

This section describes how to transfer files between the PC and the controller using the **LOAD** and **SAVE** batch files.

**NOTE:** The **LOAD** and **SAVE** functions use the Nordson DataLink program to transfer files. Make sure that DataLink is installed in the same directory as the configurator program. Refer to the *Nordson DataLink User's Guide* for more information.

1. Connect a serial cable from a serial port on the PC to the serial port on the controller. You can use either COM1 or COM2 on your PC.

2. Change to the directory in which the configurator program and DataLink are located.

3. At the prompt type:

   **PSLOAD *FILENAME* COM1**        transfers from PC to controller

   or

   **PSSAVE *FILENAME* COM1**        transfers from controller to PC

**NOTE:** *FILENAME* is the name of the file you want to transfer. You do not need to add the **.CFG** extension. **COM1** is the name of the PC serial port used in this example; substitute **COM2** if that is the PC serial port you are using.

4. Press the **[Enter]** key on your keyboard to execute the command.

   The DataLink transfer screen is displayed on the PC as the file is transferred. The configurator program records any warnings or errors generated by the transfer in a file named trans.log. After the transfer is complete, the content of this file is displayed.

**NOTE:** If you type **LOAD** or **SAVE** without a filename at the command prompt and then press the **[Enter]** key, instructions on how to use the commands will appear on the screen.

## Maintain Configuration Files

Keep copies of the configuration files you create on your PC or a floppy disk. You may need to reload the files if the production parameters currently being used are accidentally changed or a new motherboard is installed in the controller.

Follow these tips to maintain your configuration files:

- Use the **SAVE** command to save the configuration from the controller to a file on the PC whenever you change a production parameter, or upgrade controller software or hardware.

- Before making the transfer, rename the old configuration file on the PC. Copy the new and old files to a floppy disk for backup.

- Before using the configurator program to change production parameters, copy the old configuration file, rename and save it as *OLDCFG*.

- Make the changes to the original file, then transfer it to the controller using the **LOAD** command.

- Name configuration files so you will know which controller uses them. Keep records of file names, dates and times transferred, and controller.

## Daily Operation

Upon startup, the controller performs a self-test routine to verify proper operation. After the routine is completed production can begin.

1. Position the gun over a waste container and press the **[1]** key on the operator interface to purge air from the dispensing system. Press the **[0]** key at any time to cancel the purge.

2. From the robot controller, start applying material to your parts.

3. Use the **[◄►]** keys to highlight the **VOLUME** menu. Monitor each dispensing cycle.

4. If a fault occurs, use the **[◄►]** keys to select the **HELP** menu and view the fault message. If the volume or pressure exceeds the high or low limit, the controller will clear the fault before beginning the next dispense cycle.

## Set the Gun On Delay Time

The **Gun On Delay Time** is used to pre-pressurize the material supply to the gun to guarantee sufficient material at the start of the bead. This actuates the dispensing gun after the priming of the supply pumps.

Set this parameter duration as short as possible to ensure that the right amount of material is available at the start of the bead. This minimizes a pressure surge or spike.

Even with the **Gun On Delay Time** set to its shortest duration, the pressure waveform at the start of a bead may have enough fluctuation to cause a false bead fault detection signal.

The system is able to ignore the pressure fluctuation at the start of the bead, using the time menu. This time delay begins after the **Gun On Delay Time** has expired.

**NOTE:** If a bubble occurs during this time, it will not be reported to the robot. It is critical to keep this value set to the minimum value to prevent false alarms.

## *Set the Gun On Delay Time(contd)*

See Screen 5.

The **Gun On Delay Time** can be set from

- **SETUP**>**Delay Times**.
- **SETUP**>**Settings by Part ID**.

### Gun On Delay Time Settings—Delay Times Screen

Perform these steps to set the **Gun On Delay Time** from the **Delay Times** screen:

1. Use the **[◄►]** keys to highlight the **SETUP** menu.
2. Use the **[▲▼]** keys to highlight **Delay Times**.
3. Press the **[↵]** key to display the **Analog**/**Gun Delays** screen.
4. See Screen 6.

   Use the numeric keypad to enter the new **Analog On** and **Analog Off** parameters.

```
   VOLUME     HELP      STATUS      SETUP

        Bead Sizes
        Flow Meter
        Alarm Trip Points
        SPC
        Configuration
        Clock
        Purge Time
        Bubble
        Delay Times
        Settings by Part ID

    Press ▲▼ to point,◄┘ to accept
```

1100077A

Screen 5 **SETUP**

```
   VOLUME     HELP      STATUS      SETUP
            DELAY TIME

   Analog On (0-5000msec): [100 ]
   Analog Off (0-5000msec): [0    ]
   Gun1 On    (0-5000msec): [100 ]
   Gun1 Off   (0-5000msec): [100 ]
   Gun2 On    (0-5000msec): [100 ]
   Gun2 Off   (0-5000msec): [100 ]


 Press ▲▼ to point, ◄┘ to select

 Press CLR to restore, [0-9] to change
```

1100078A

Screen 6 **Analog Gun Delays**

## Gun On Delay Time Settings—Settings by Part ID Screen

Perform these steps to set the **Gun On Delay Time** from the **Settings by Part ID** screen:

1. Use the **[◀▶]** keys to highlight the **SETUP** menu.

2. Use the **[▲▼]** keys to highlight **Settings by Part ID**, and press the **[↵]** key.

3. Use the **[▲▼]** keys to highlight **Set-up Screen 2**, and press the **[↵]** key.

4. See Screen 7.

   Enter the Part ID to be changed.

5. Use the **[▲▼]** keys to highlight **Gun On Delay** and **Gun Off Delay**.

6. Use the numeric keypad to enter the new parameters.

```
VOLUME      HELP       STATUS      SETUP


Part ID       (0-31)     :[0    ]
Part Name                :
Gun On Delay  (0 to 5000):[100 ]
Gun Off Delay (0 to 5000):[100 ]
```
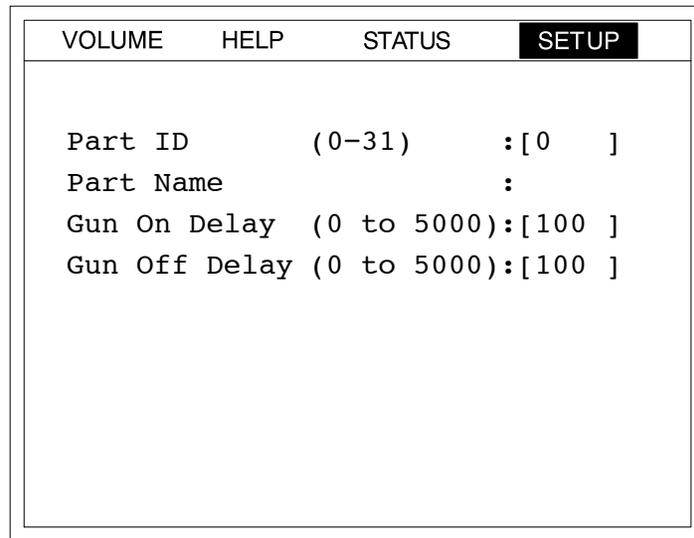
1100079A

Screen 7  **Delay Set-Up Screen 2**

## Change the Bead Size Settings

See Screen 8.

The **Bead Sizes** settings can be adjusted in

- **SETUP**>**Bead Sizes**.
- **SETUP**>**Settings by Part ID**.

```
 VOLUME    HELP      STATUS    SETUP

         Bead Sizes
         Flow Meter
         Alarm Trip Points
         SPC
         Configuration
         Clock
         Purge Time
         Bubble
         Delay Times
         Settings by Part ID

 Press ▲▼ to point, ◄┘ to accept
```
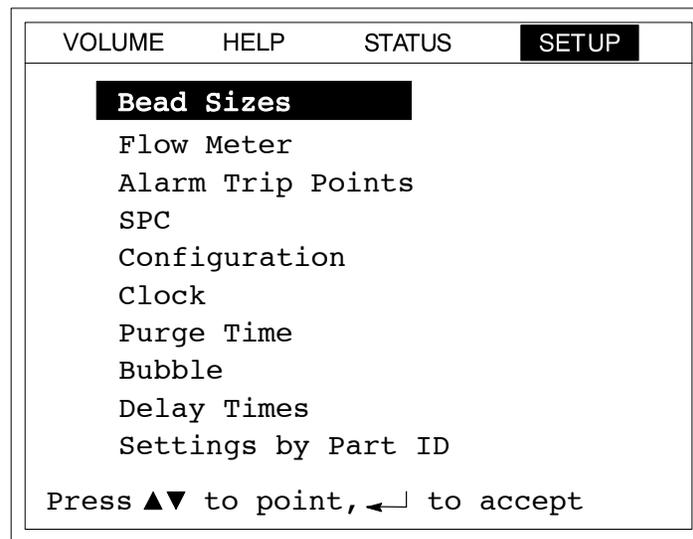
1100072A

Screen 8  **SETUP**

## Bead Size Settings—Bead Sizes Screen

Perform these steps to change the bead size settings from the **Bead Size Adjustment** screen:

1.  Use the **[◄►]** keys to highlight the **SETUP** menu.

2.  Use the **[▲▼]** keys to highlight **Bead Sizes**.

3.  See Screen 9.

    Use the **[▲▼]** keys to select one of the **Part IDs** ranges.

4.  Press the **[↵]** key to select the desired range.

5.  Use the numeric keypad to enter the new parameters.

```
 VOLUME      HELP        STATUS      SETUP

           Bead Size Adjustment


    Part IDs   0- 7
    Part IDs   8-15
    Part IDs  16-23
    Part IDs  24-31
    Return to Main Menu



Press ▲ or ▼ to point
Press ↵ to select
```
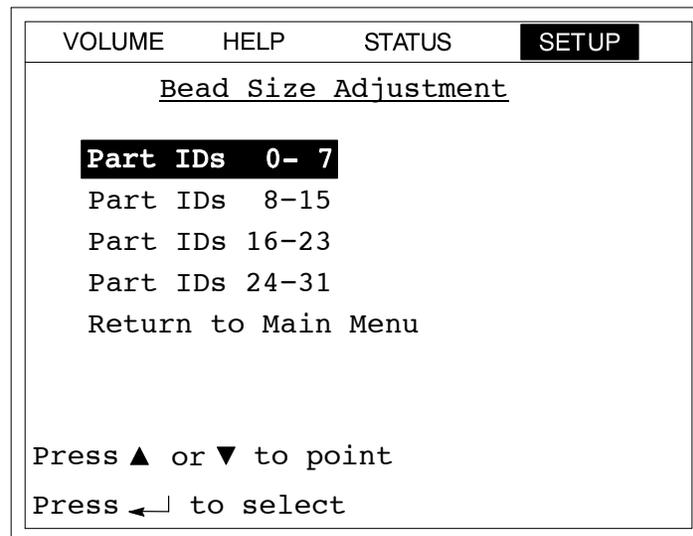
1100080A

Screen 9  **Bead Size Adjustment**

## Bead Size Settings—Settings by Part ID Screen

Perform these steps to change the bead size settings in the **Settings by Part ID** screen:

1. Use the **[◀▶]** keys to highlight the **SETUP** menu.

2. Use the **[▲▼]** keys to highlight **Settings by Part ID**, and press the **[↵]** key.

3. Use the **[▲▼]** keys to highlight **Set-up Screen 1**, and press the **[↵]** key.

4. See Screen 10.

   Use the **[▲▼]** keys to highlight the **ID**, and use the numeric keypad to enter the new bead size value.

```
 VOLUME      HELP        STATUS      SETUP
   ID   Name       Bead Size
    0                [1 ]
    1                [1 ]
    2                [1 ]
    3                [1 ]
    4                [1 ]
    5                [1 ]
    6                [1 ]
    7                [1 ]
Press ▲ or ▼ to point
Press CLR to restore, [0-9] to change
```

1100081A

Screen 10  **Bead Size Settings by Part ID**

# Troubleshooting

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

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

Refer to your system documentation for more information.

| Problem | Possible Cause | Corrective Action |
|---|---|---|
| 1. **Gun does not dispense material** | Material supply pressure low | Increase the material supply pressure. |
| | | Check the inlet pressure on the gear pump. |
| | Nozzle blocked | Remove and clean the nozzle.  Refer to the dispensing gun documentation. |
| | Material supply hose blocked | Check the output from the material supply hose.  Clean the hose or replace it. |
| | Robot controller output signal timing incorrect | Set the correct timing sequence. Refer to *Part Cycle Signal Sequence* in the *Specifications* section. |
| | Gun ON signal not received from robot controller or sent to gun | Check cable continuity and replace the cable if necessary.  Refer to the dispensing gun documentation. |
| | Gun malfunction | Refer to the dispensing gun documentation. |
| 2. **Gun does not open** | Absent or low control air pressure | Check supply air pressure and increase if necessary. |
| | Gun malfunction | Refer to the dispensing gun documentation. |
| 3. **Gun starts dispensing before robot moves** | Robot controller output signal timing incorrect | Set the correct timing sequence. Refer to *Part Cycle Signal Sequence* in the *Specifications* section. |

*Continued...*

| Problem | Possible Cause | Corrective Action |
|---------|----------------|-------------------|
| 4. **Gun dispenses after cycle ends, gun closed** | Control air pressure low | Check the supply air pressure and increase the air pressure if necessary. |
| | Cured material or contaminants preventing gun valve from closing | Purge the gun. Refer to the dispensing gun documentation. |
| | Gun or robot malfunction | Refer to the dispensing gun documentation. |
| | Process Sentry hardware fault | Check the **HELP** menu. Check or correct the signals from the outputs. Refer to the *Specifications* section. |
| 5. **Dispensing delayed** | Gun ON signal from robot controller improperly timed | Set the correct timing sequence. Refer to *Part Cycle Signal Sequence* in the *Specifications* section. |
| | Gun malfunction | Refer to the dispensing gun or robot documentation. |
| 6. **Bead deposition "wiggles"** | Nozzle too high above work piece | Re-teach the robot's tool path; keep the nozzle closer to the workpiece. |
| | Material speed through nozzle too high | Decrease the material pressure or change the nozzle size. |
| | Nozzle too small | Install a larger nozzle. Contact your Nordson Corporation representative for part numbers. |
| 7. **Unexpected bead-size change** | Nozzle partially blocked | Clean the nozzle. Refer to the dispensing gun documentation. |
| | Material exceeded shelf life | Use fresh material. |

# Parts

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.

## Pro-Meter Controller

See Figure 7 and the following parts list.

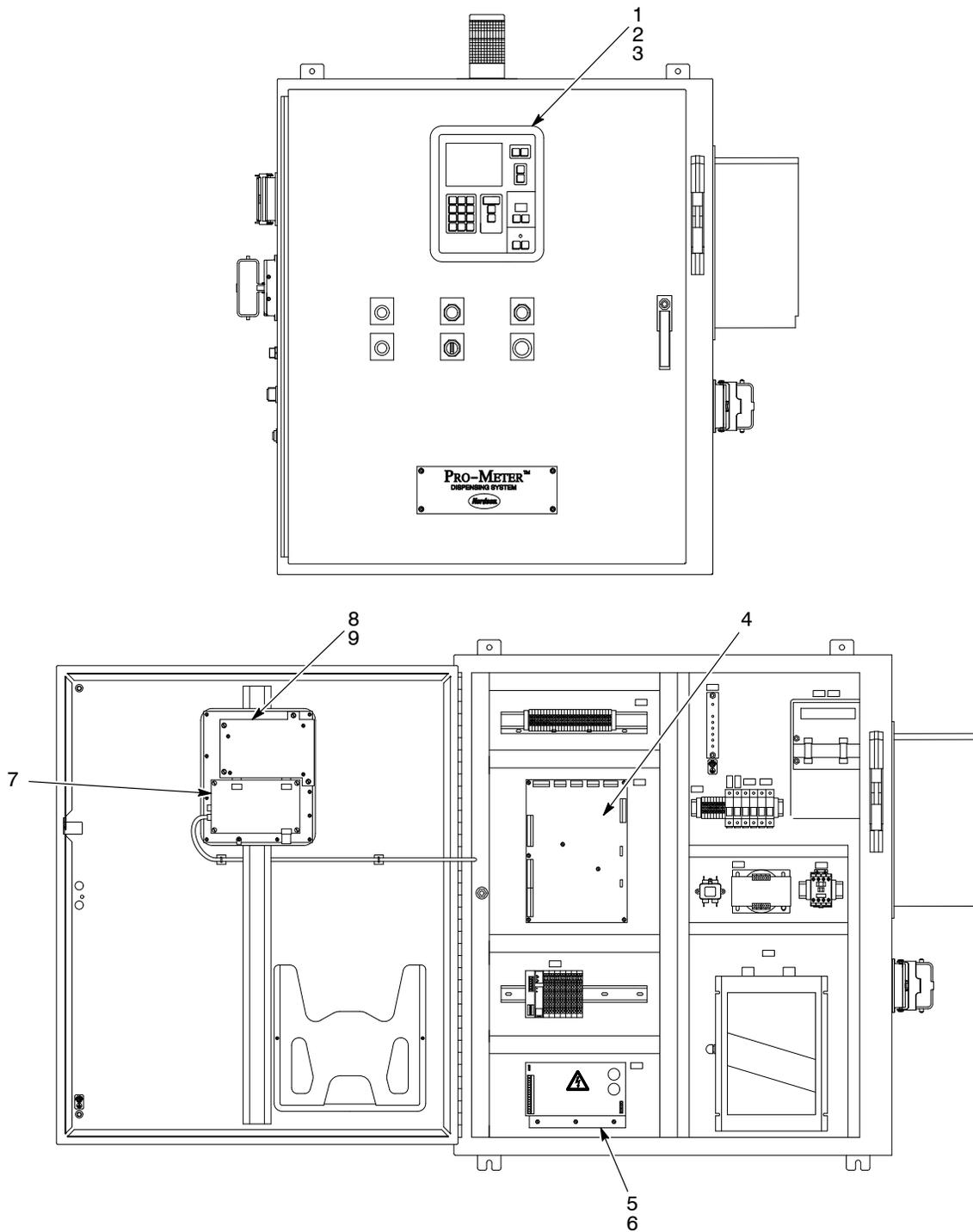**NOTE:** For more information, refer to your system documentation provided with your Pro-Meter controller.



Figure 7    Pro-Meter Controller Parts

## *Pro-Meter Controller* *(contd)*

| Item | Part | Description | Quantity | Note |
|---|---|---|---|---|
| — | - - - - - - | Controller, Pro-Meter with Process Sentry, DC version | 1 | |
| 1 | 185670 | Assembly, keyboard, Pro-Flo II, English | 1 | |
| 2 | 282964 | • Cover, bezel, keyboard, Pro-Flo II | 1 | |
| 3 | 281868 | • Gasket, keypad panel, Pro-Flo II | 1 | |
| 4 | 227282 | • PCA, Process Sentry | 1 | |
| 5 | 233612 | • Supply, power, +5, +24, +15, −15 | 1 | |
| 6 | 282431 | • Bracket, support, power supply | 1 | |
| NS | 1604376 | • Service kit, Pro–Flo display replacement | | |
| 7 | 1604380 | • • PCA, config. keypad panel, Pro-Fo | 1 | A, C |
| 8 | 1604375 | • • Display, QVGA | 1 | B, C |
| 9 | 282895 | • Bracket, support, display, Pro-Flo II | 1 | |

NOTE   A:  1604380 PCA replaces obsolete part number 185657.

B:  1604375 display replaces obsolete part numbers 221699 and 1034019

C:  An obsolete keypad board (185657) will not work  with a new display (1604375).

NS:  Not Shown

# Specifications

This section covers tool speed signal configuration, robot controller output signal timing, interface cable pinouts, SPC data, SPC fault codes, main circuit board test points, main circuit board connector pinouts, and schematics.

## *Tool Speed Signal Configuration*

Configure your robot controller to output an analog signal that will vary from 0 to 10 Vdc over the full range of robot speed.

See Figure 8.

1. Determine the highest and lowest robot speeds to be used in production.

2. Configure the robot controller to

  • output an analog signal of +10 Vdc when the robot is moving at or slightly above maximum speed.

  • output an analog signal of 0 Vdc when the robot is stationary.

**NOTE:** The following illustration displays the relationship between robot speed and output voltage. A robot speed of 80% corresponds to 8 Vdc. A robot speed of 40% corresponds to 4 Vdc.
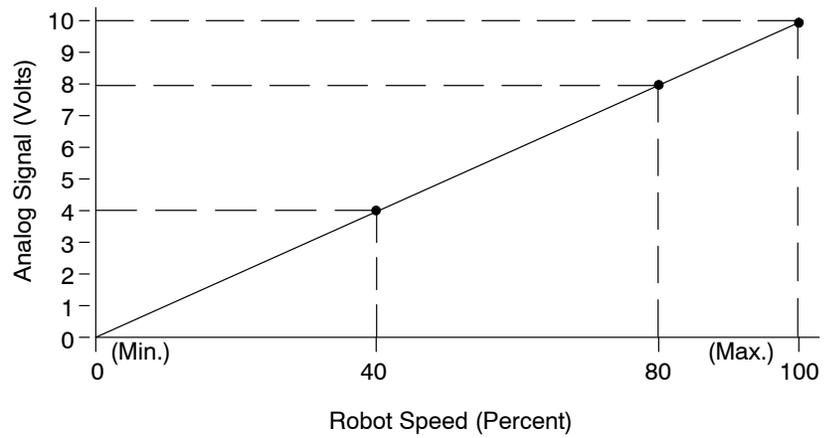


Figure 8    Analog Signal and Robot Speed Relationship

## *Receptacle Pinouts*

Refer to Tables 5 and 6 for the pinouts on the Pro-Meter controller interface ports.

**NOTE:** This port is for direct wired I/O only.  If some type of remote I/O block or network connection is used, refer to the system drawings.

Table 5  Interface Cable Receptacle Pinouts

| Pin Number | 24 Vdc I/O Reference Signal | 110 Vac I/O Reference Signal |
|---|---|---|
| Ground 1 | Ground | Ground |
| 1 | 24 V | L1 (110 V) |
| 2 | 24 V Common | L2 (110 V Neutral) |
| 3 | Ground | Ground |
| 4 | Part ID (Bit 4) MSB | Part ID (Bit 4) MSB |
| 5 | Part ID (Bit 3) | Part ID (Bit 3) |
| 6 | Part ID (Bit 2) | Part ID (Bit 2) |
| 7 | Part ID (Bit 1) | Part ID (Bit 1) |
| 8 | Part ID (Bit 0) LSB | Part ID (Bit 0) LSB |
| 9 | Low Volume | Low Volume |
| 10 | Gun ON | Gun ON |
| 11 | Alarm Reset | Alarm Reset |
| 12 | System Ready | System Ready |
| 13 | System Fault | System Fault |
| 14 | Bubble Detection Fault | Bubble Detection Fault |
| 15 | High Volume | High Volume |
| 16 | Dispense in Progress | Dispense in Progress |
| Ground 2 | Shield for Analog Signals | Shield for Analog Signals |

Table 6  J-Box Interface Cable Receptacle Pinouts

| Pin | Controller Side Reference Signal |
|-----|----------------------------------|
| 1 | Pump Outlet Transducer |
| 2 | Pump Outlet Transducer |
| 3 | Pump Outlet Transducer |
| 4 | Pump Outlet Transducer |
| 5 | Shield (for both transducers inside cable) |
| 6 | Tach Ring +15 V Supply |
| 7 | Common |
| 8 | Signal A to Flow Meter input for Volume Monitoring |
| 9 | Signal B |
| 10 | Signal 2X to Motor controller for Speed Feedback |
| 11 | Shield |
| 12 | Pump Inlet Transducer |
| 13 | Pump Inlet Transducer |
| 14 | Pump Inlet Transducer |
| 15 | Pump Inlet Transducer |
| 16 | Shield |
| 17 | Nozzle Transducer for Bubble Detection |
| 18 | Nozzle Transducer for Bubble Detection |
| 19 | Nozzle Transducer for Bubble Detection |
| 20 | Nozzle Transducer for Bubble Detection |
| 21 | Shield |
| 22 | Spare |
| 23 | Spare |
| 24 | Spare |

## *Receptacle Pinouts* *(contd)*

Refer to Tables 7 through 10 for the pinouts on the motor receptacle, the gun ON control, the analog signal connector, the heater hose header connector, the unloader empty connector, and the pump solenoid connectors.

Table 7  Motor Receptacle Pinouts

| Pin | Pro-Meter Controller Side Reference Signal |
|-----|---------------------------------------------|
| 1 | To thermostat in motor |
| 2 | Blank-No Pin |
| 3 | Motor Lead |
| 4 | Blank-No Pin |
| 5 | Motor Lead |
| 6 | Blank-No Pin |
| 7 | Motor Lead |
| 8 | Blank-No Pin |
| 9 | Blank-No Pin |
| 10 | Shield |
| 11 | Blank-No Pin |
| 12 | Spare |
| 13 | Blank-No Pin |
| 14 | Spare |
| 15 | Blank-No Pin |
| 16 | Signal from thermostat in motor |
| 17 | Ground wire |

Table 8  Gun ON Control

| Pin | Function |
|-----|----------|
| A | 120 Vac/24 Vdc Gun ON |
| B | 120 Vac/24 Vdc Neutral |
| C | Ground |

Table 9  Analog Signal Connector

| Pin | Function |
|-----|----------|
| A | Analog (+) |
| B | Analog (−) |
| C | Spare |
| D | Spare |
| E | Spare |

Table 10  Pump Solenoid Connectors

| Pin | Function |
|-----|----------|
| A | 120 Volt to Pump A ON |
| B | 120 Volt Neutral |
| C | Ground |
| D | 120 Volt Pump B ON |
| E | 120 Volt Neutral |
| F | Ground |

## SPC Data

Refer to Table 11.

The SPC data is presented in ASCII format, as comma-delimited text.

Table 11  Format of SPC Data

| Column | Parameter | Units |
|--------|-----------|-------|
| 1 | Date | — |
| 2 | Time | — |
| 3 | Part ID | — |
| 4 | Bead size | — |
| 5 | Current volume | cc |
| 6 | Temperature | °C |
| 7 | Nozzle | bar |
| 8 | Pump In | bar |
| 9 | Pump Out | bar |
| 10 | SPC fault code | — |

## *Decode SPC Fault Codes*

Follow these steps to decode an SPC fault code:

1. 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 fault code.

2. If the remainder is greater than zero, subtract the largest number from the **Cod**e column that yields a remainder greater than or equal to zero. This value is the second fault code.

3. Continue subtracting the largest possible value until a remainder of zero is obtained.

Refer to Table 12 for a description of the SPC fault codes.

Table 12  SPC Fault Codes

| Code | Description |
|---|---|
| 1 | High Dispensed Volume |
| 2 | Low Dispensed Volume |
| 4 | High Pressure, Nozzle |
| 8 | Low Pressure, Nozzle |
| 16 | High Pressure, Pump Outlet |
| 32 | Low Pressure, Pump Outlet |
| 64 | External Device Fault |
| 128 | Not Used |
| 256 | High Pressure, Pump Inlet |
| 512 | Low Pressure, Pump Inlet |
| 1024 | No Flow Fault |
| 2048 | Not Used |
| 4096 | Not Used |
| 8192 | Not Used |
| 16384 | Bubble Detected |

## Main Circuit Board Test Points

Refer to Table 13 for the functions and channel allocations of the main circuit board test points.

Table 13  Main Circuit Board Test Points

| Test Points | Function | Channel |
|:---:|---|:---:|
| 1 | Ground | AN6 |
| 2 | + 5 Volts | |
| 3 | Nozzle Pressure or Gun Pressure | AN0 |
| 4 | Detection on Nozzle or Gun | AN1 |
| 5 | FM Inlet Pressure | AN2 |
| 6 | Detection on FM Inlet Pressure | AN3 |
| 7 | FM Outlet Pressure | AN4 |
| 8 | Detection on FM Outlet Pressure | AN5 |
| 9 | Analog Input Signal | AN6 |
| 10 | Temperature | AN7 |
| 11 | FM Counts | |
| 12 | Analog Output Signal #1 | DA1 |
| 13 | Analog Output Signal #2 | DA2 |

## Main Circuit Board Connector Pin Assignments

Refer to Tables 14 through 20 for the main circuit board connector pin assignments used for the on/off gun version of the Pro-Meter controller.

Table 14  Connector 1 Discrete Outputs

| Pin | Description |
|:---:|---|
| 1–2 | System Ready |
| 3–4 | Gun 1 ON |
| 5–6 | High Volume |
| 7–8 | Bulk Pump 1 ON |
| 9–10 | Bulk Pump 2 ON |
| 11–12 | Low Volume |
| 13–14 | System Fault |
| 15–16 | Bubble Detection Fault |
| 17–18 | Fault Beacon |
| 19–20 | Motor Drive Enable |
| 21–22 | Dispense in Progress |
| 23–24 | Spare |

## *Main Circuit Board Connector Pin Assignments* *(contd)*

Table 15  Connector 2 Discrete Inputs

| Pin | Description |
|-----|-------------|
| 1 | Part ID 0 |
| 2 | Part ID 1 |
| 3 | Part ID 2 |
| 4 | Part ID 3 |
| 5 | Part ID 4 |
| 6 | Part Strobe |
| 7 | Gun ON |
| 8 | Auxiliary Device Fault |
| 9 | Alarm Reset |
| 10 | Auto Flow Rate |
| 11 | Spare |
| 12 | Spare |
| 13 | Common |

Table 16  Connector 3 Power

| Pin | Description |
|-----|-------------|
| 1 | −15 Volts |
| 2 | +/− 15 Volts Common |
| 3 | + 15 Volts |
| 4, 5 | + 5 Volts Common |
| 6, 7 | + 5 Volts |

Table 17  Connectors 4, 7, 8 Pressure Input

| Pin | Description |
|-----|-------------|
| 1 | + 5 Volts |
| 2 | + Signal |
| 3 | − Signal |
| 4 | + 5 Volt Common |
| 5 | Shield |

Table 18  Connector 9 Flow Meter

| Pin | Description |
|-----|-------------|
| 1 | + Voltage from Power Supply |
| 2 | + Voltage to Flow |
| 3 | + Signal from Flow Meter |
| 4 | Signal Common from Flow Meter |
| 5 | Supply Common from Supply |
| 6 | Supply Common to Flow Meter |

Table 19  Connector 12 Analog I/O

| Pin | Description |
|-----|-------------|
| 1 | + Analog Input |
| 2 | − Analog Input |
| 3 | Shield |
| 4 | + RTD |
| 5 | − RTD |
| 6 | Shield |
| 7 | + Analog Output 1 |
| 8 | − Analog Output 1 |
| 9 | + Analog Output 2 |
| 10 | − Analog Output 2 |

Table 20  Other Connectors

| Connector | Description |
|-----------|-------------|
| 5 | RS-422 |
| 6 | Network (Echelon) |
| 10 | Debug |
| 11 | Debug |
| 13 | RS-232 |
| 14 | Expansion |
| 15 | Expansion |
| 16 | Expansion |

Part 1007773B

## *I/O List*

The Process Sentry circuit board in the Pro-Meter controller has the following input and output connections.

### Inputs

Refer to Table 21 for a description of all inputs except external device fault interface to the robot.

Table 21  I/O List Inputs

| Inputs (12) | Connector | Terminal | LED |
|---|---|---|---|
| Part ID 0 | 2 | 1 | 14 |
| Part ID | 2 | 2 | 13 |
| Part ID | 2 | 3 | 12 |
| Part ID | 2 | 4 | 11 |
| Part ID | 2 | 5 | 10 |
| Part Strobe | 2 | 6 | 9 |
| Gun ON | 2 | 7 | 8 |
| External Device Fault | 2 | 8 | 7 |
| Fault Reset | 2 | 9 | 6 |
| Auto Flow Rate | 2 | 10 | 5 |
| Spare | 2 | 11 | 4 |
| Spare | 2 | 12 | 3 |

## Outputs

Gun 1, pump 1, pump 2, fault beacon, motor drive enable, and spare do not interface with the robot.

Refer to Table 22 for a description of the outputs.

Table 22  I/O List Outputs

| Outputs (12) | Connector | Terminal | LED |
|---|---|---|---|
| System Ready | 1 | 1, 2 | 12 |
| Gun 1 | 1 | 3, 4 | 11 |
| High Volume Fault | 1 | 5, 6 | 10 |
| Pump 1 | 1 | 7, 8 | 9 |
| Pump 2 | 1 | 9, 10 | 8 |
| Low Volume Fault | 1 | 11, 12 | 7 |
| System Fault | 1 | 13, 14 | 6 |
| Bead Fault | 1 | 15, 16 | 5 |
| Fault Beacon | 1 | 17, 18 | 4 |
| Motor Drive Enable | 1 | 19, 20 | 3 |
| Dispensing in Progress | 1 | 21, 22 | 1 |
| Spare | 1 | 23, 24 | 2 |

System Ready is an output from the Pro-Meter controller to the robot, indicating that the dispensing system is ready to dispense.  It enables the robot to check this signal immediately prior to a dispense cycle, to ensure that the Nordson system will dispense material on the part.

Dispensing in progress indicates that the Pro-Meter controller has seen and acted on the gun ON signal.  It is not necessary for the robot to monitor this output.  However, it does provide a means of the robot to determine if there has been a malfunction with the Nordson system that is preventing the correct sequencing of this output.

## *Part Cycle Signal Sequence*

See Figure 9.

**NOTE:** At high volume fault, the former part OK output is now set to low volume.
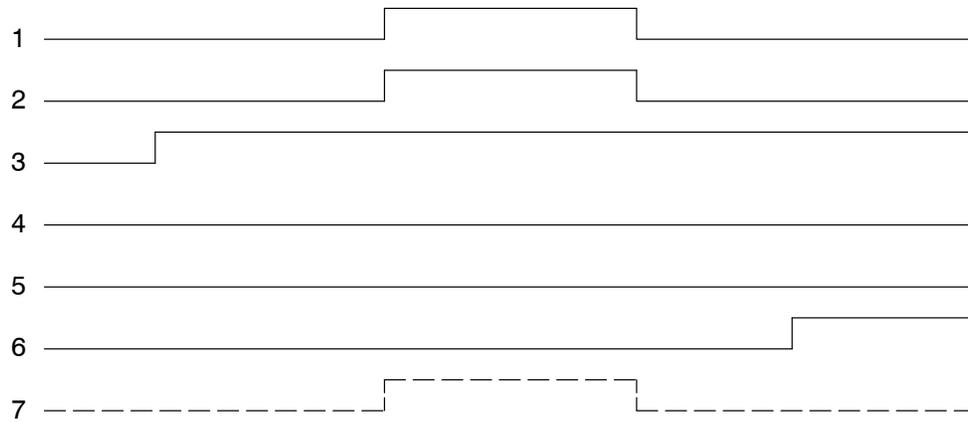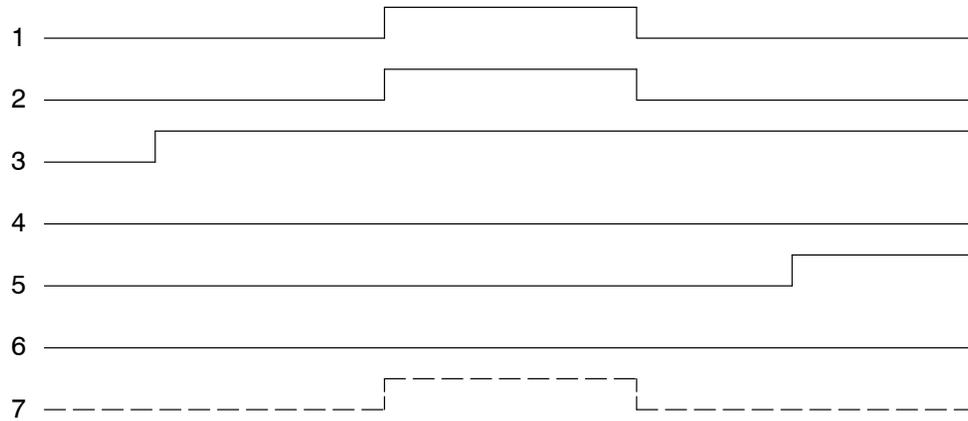


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Figure 9   High Volume Fault

1. Part strobe (from robot)
2. Gun ON (from robot)
3. System Ready (from PS)
4. System Fault (from PS)
5. Low volume (from PS)
6. High volume (from PS)
7. Dispensing in progress (from PS)

See Figure 10.

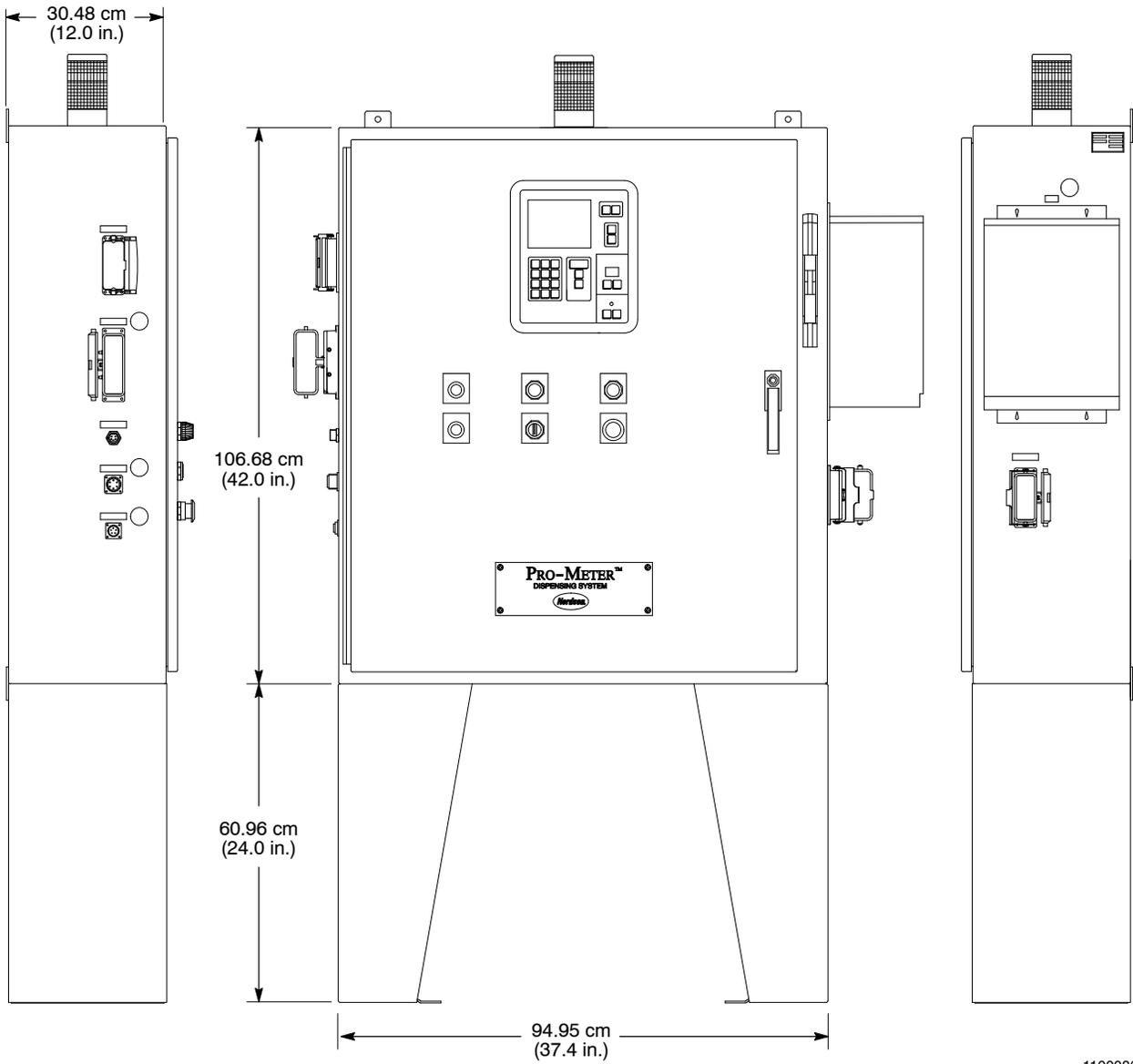**NOTE:** At low volume fault the former part ID output is now set to low volume.



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Figure 10  Low Volume Fault

1.  Part strobe (from robot)
2.  Gun ON (from robot)
3.  System Ready (from PS)

4.  System Fault (from PS)
5.  Low volume (from PS)

6.  High volume (from PS)
7.  Dispensing in progress (from PS)

## *Dimensions*



30.48 cm
(12.0 in.)

106.68 cm
(42.0 in.)

60.96 cm
(24.0 in.)

94.95 cm
(37.4 in.)

PRO–METER™
DISPENSING SYSTEM

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Figure 11   Dimensions