Process Sentry Controller (Body Shop Version)

Customer Product Manual
Part 331162C
Issued 7/02

Nordson

Table of Contents

Process Sentry Controller (Body Shop 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.

Personal Safety *(contd)*

- 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 Process Sentry is a dispensing application monitoring and control system. It interfaces with a robot controller and a dispensing gun.

A typical Process Sentry system consists of a controller, a flow meter, a pressure transducer, a resistance temperature detector (RTD), and a dispensing gun.

The controller has an operator interface (OI) panel on its front face consisting of a display and keypad.

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

Versions

This manual covers two versions of the Process Sentry: one version is used with an on/off dispensing gun such as a Nordson Auto-Flo gun; the other is used with the Nordson CP gun.

Process Sentry with On/Off Gun

This system is typically used with a Nordson Auto-Flo dispensing gun, which is a type of On/Off gun. When used with this type of gun, the controller monitors the volume of material dispensed on each part, along with material pressure and temperature, compares the reported values to programmed high and low limits, and sets alarms if any values fall outside the limits.

Process Sentry with CP Gun

In addition to the monitoring and reporting functions provided for the On/Off gun version, this version has a Bead Size adjustment panel added to the operator interface. Bead size can be adjusted from 0 to 99, with 0 corresponding to a completely closed gun valve and 99 corresponding to a fully open gun valve. The bead size number is arbitrary; it does not relate to any unit of measurement.

During the dispensing cycle, the controller maintains bead size regardless of robot speed by using the analog tool speed signal from the robot controller along with the bead size setting to control the gun valve. If the robot speed increases, the Process Sentry controller signals the gun regulator to increase the air pressure to the valve air cylinder, the gun valve opens further, and the volume dispensed increases. The opposite happens if the robot slows down.
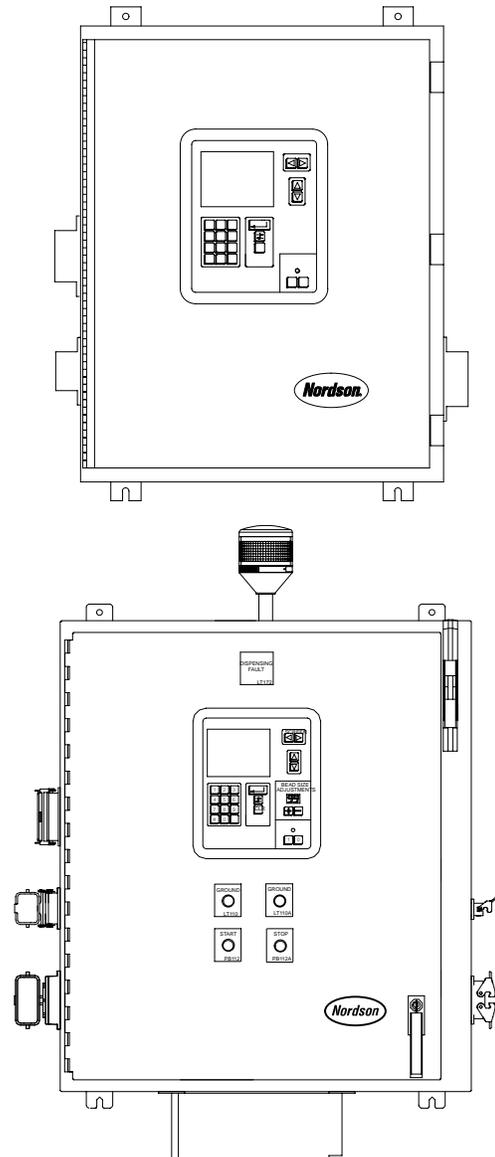
Figure 1   Typical Controllers

Operation Sequence

Refer to Table 1 for the operation sequence for the
On/Off gun version. Refer to Table 2 for the
operation sequence for the CP gun version.

Table 1 Operation Sequence — On/Off Gun Version

Sequence	Description
Part ID On	The robot controller sends a part ID signal to the Process Sentry controller. The signal is 5 bits long and corresponds to 1–32 unique parts.
Part Strobe On	The robot controller sends the Part Strobe signal to the Process Sentry controller as long as the part is being processed. This allows the controller to accumulate volume and pressure readings for the part. When the Process Sentry controller receives this signal, it • reads the part ID bits. • resets the internal flow meter counter and begins counting flow meter pulses to measure the volume dispensed. • resets the fault beacon and Part OK outputs to the controller.
Gun ON	The robot controller sends this signal to the Process Sentry controller when the robot is in position to start dispensing material. The Process Sentry controller then • activates the gun solenoid to start dispensing material. • monitors the material pressure and temperature.
Gun OFF	The robot controller sends this signal to the Process Sentry controller when the robot has completed its programmed tool path. The Process Sentry controller deactivates the gun solenoid to stop dispensing material.
Part Strobe Off	The robot controller turns off the part strobe signal. The Process Sentry controller then • stops counting the flow meter pulses and reads the total flow meter pulses accumulated for the part. • computes the total volume of material dispensed, based on the flow meter rating. • 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, and the system fault output and alarm beacon are turned on.
Part OK	If no faults were detected during the dispensing cycle, the Process Sentry controller turns on the Part OK output to the robot controller.

Operation Sequence *(contd)*

Table 2 Operation Sequence—CP Gun Version

Sequence	Description
Part ID On	The robot controller sends a part ID signal to the Process Sentry controller. The signal is 5 bits long and corresponds to 1–32 unique parts.
Part Strobe On	The robot controller sends the Part Strobe signal to the Process Sentry controller as long as the part is being processed. This allows the controller to accumulate volume and pressure readings for the part. When the Process Sentry controller receives this signal, it • reads the part ID bits. • resets the internal flow meter counter and begins counting flow meter pulses to measure the volume dispensed. • resets the fault beacon and Part OK outputs to the controller.
Analog Tool Speed Signal	The robot controller sends the analog tool speed signal to the Process Sentry controller. The Process Sentry controller uses the tool speed signal and bead size setting to control the bead size dispensed by the CP gun.
Gun ON	The robot controller sends this signal to the Process Sentry controller when the robot is in position to start dispensing material. The Process Sentry controller then • activates the gun solenoid to start dispensing material. • outputs a signal to the gun regulator to control bead size. • monitors the material pressure and temperature.
Gun OFF	The robot controller sends this signal to the Process Sentry controller when the robot has completed its programmed tool path. The Process Sentry controller deactivates the gun solenoid to stop dispensing material.
Part Strobe Off	The robot controller turns off the part strobe signal. The Process Sentry controller then • stops counting the flow meter pulses and reads the total flow meter pulses accumulated for the part. • computes the total volume of material dispensed, based on the flow meter rating. • 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, and the system fault output and alarm beacon are turned on.
Part OK	If no faults were detected during the dispensing cycle, the Process Sentry controller turns on the Part OK output to the robot controller.

Alarms and Faults

The controller logs the following process control faults:

- High or Low Volume
- High or Low Pressure
- Temperature

These faults are logged into the **HELP** menu and SPC file. The fault output to the robot controller is turned on. These faults are automatically reset by the robot controller at the next part strobe signal.

The controller also logs the following system faults:

- Process Sentry 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 Process Sentry controller turns on the System Ready output to the robot controller.

Main Menus

Four main menus are accessible form 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.

SPC Data

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

- Date
- Time
- Part ID
- Current volume
- Material temperature
- Nozzle
- FM Inlet
- FM Outlet
- SPC fault code

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 Process Sentry, 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.

Your Nordson representative will install and configure your Process Sentry controller.

Before setting production parameters, make sure to perform the following tasks:

- 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 *Specfications* section and your robot controller manual for more information.

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

Operator Interface

See Figure 2 and refer to Table 3.

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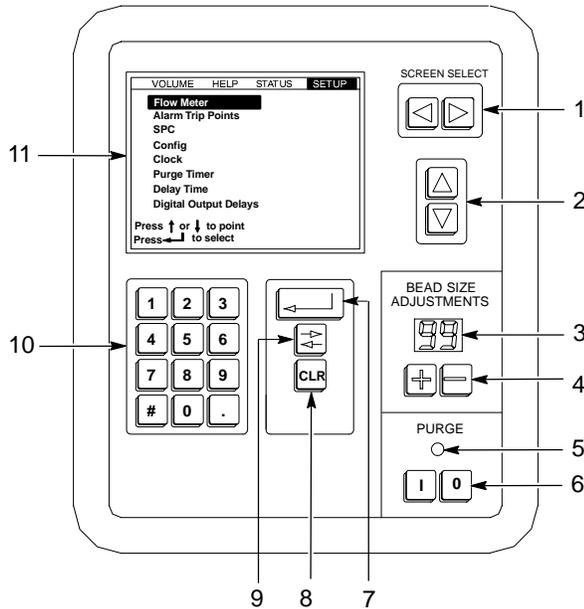
Figure 2   Operator Interface Functions

Table 3 Operator Interface Functions

Item	Description
1	SCREEN SELECT keys—Highlight the screens listed on the menu bar. Press the **[↵]** key to access the 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 display(CP Gun version only)—Displays the current bead size setting.
4	BEAD SIZE + and – keys(CP Gun version only)—Increases or decreases the bead size.
5	PURGE indicator—Lights when the purge is turned on.
6	PURGE ON and OFF keys—Turns the purge on and off. **Purge Time** is set from the **SETUP** menu. Purge will run until the timer runs out; press OFF if you want to shut off the purge before the timer runs out.
8	CLR key—Clears the current value.
7	Enter key—Selects the highlighted screen or item, and enters the current value.
9	Toggle key—Toggles the Yes/No values or selects between multiple, fixed choices.
10	Numeric keypad—Enters numeric values.
11	Display—Displays screens and prompts used for set up and operation.

Operator Interface Menus

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

VOLUME		HELP	STATUS	SETUP
			V o l u m ecc'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

The **VOLUME** menu monitors system operation during production. For each part run, the **VOLUME** menu displays the time, part ID, bead size, 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.

NOTE: Bead size is only displayed on CP gun versions.

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.

Press▼ for more Help text

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

STATUS Menu

Refer to Table 4.

```
 VOLUME     HELP      STATUS      SETUP
                System Status

Tool Speed  :2.75  Nozzle    :0   bar
Temperature :14 °C FM Inlet  :0   bar
Part ID     :0     FM Outlet :137 bar
Part Strobe :ON    Gun On/Off:ON
```

SETUP Menu

Refer to Table 5.

```
 VOLUME     HELP      STATUS      SETUP

    Flow Meter
    Alarm Trip Points
    SPC
    Configuration
    Clock
    Purge Time
    Bubble
    Delay Times


Press▲ or▼ to point
Press◄┘ to select
```

Table 4 **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
Nozzle	bar
FM Inlet	bar
FM Outlet	bar
Gun On/Off	ON or OFF

Table 5 **SETUP** Prompt Functions

Prompt	Function
Flow Meter	Enter the flow rate (K-value) stamped on flow meter ID plate. Enter this value for a newly installed system or anytime you install a new flow meter in the system.
Alarm Trip Points	Enter high and low limits for volume, nozzle pressure, FM inlet pressure, and FM outlet pressure for each part ID.
SPC	Clear SPC queue, start SPC data download.
Configuration	Starts the configurator program on the PC.
Clock	Set the time and date.
Purge Time	Enter the purge time, from 1 to 60 seconds.
Bubble	Enable/Disable **Bead Defect**; select **Sensor**; select **Time**; and set **Pressure Setpt**.
Delay Times (CP Gun version only)	Enter on/off delay times, from 0 to 5000 milliseconds.

Initial Setup

1. If your Process Sentry system is using a Nordson CP dispensing gun, configure the robot controller analog tool speed signal. Refer to the *Specifications* section.

2. Set the robot controller output signal timing sequence.

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

4. Use the SCREEN SELECT keys to highlight **SETUP** on the menu bar.

5. Make the following settings:

   a. Enter the flow rate (K-value) stamped on the side of the flow meter ID plate (**SETUP**>**Flow Meter**).

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

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

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

7. 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** screen to monitor pressure during the dispense cycle.

8. If you are using a CP gun, use the + and – keys to adjust the bead size until it is satisfactory.

9. From the **SETUP** menu, set the **Alarm Trip Points** 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.

10. If you are using a CP gun and you set a different bead size for each unique part, record the bead sizes and part IDs. To obtain repeatable results, you must set the bead size to the recorded value for each unique part.

11. Repeat steps 7 through 10 for each part ID.

Programming with Configurator

The Nordson Configuration Utility program (configurator) is used to create, read, and save configuration files to the Process Sentry 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:

    `CONFIG`

    The copyright screen appears:

```
PROCESS SENTRY CONFIGURATION UTILITY


 Version 1.00
 Nordson Corporation
 Copyrighted Material 2002
 All Rights Reserved




Press ENTER key to Continue:
```

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 one 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:

```
File:  DEFAULT.CFG Information

file is from PS DOS Config     versions 1.00

Date = 03/28/02     Time = 09:23:44

Press ENTER key to Continue:
```

The report includes the name of the file, the version of configurator program used to create it, and the date and time the file was modified last.

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

Commands appear 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
```

Save Files and Quit the Configurator Program

To save a file or quit the configurator program:

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

```
PROCESS SENTRY Quit
Exit Configuration Utility




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

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.

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

    NOTE: Only **Pressure 1** is used with the this version of the Process Sentry controller because systems using an On/Off or CP gun have only one pressure transducer.

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

```
Process Sentry Parameters, Data Entry Table
<ESCAPE = EXIT>
System Paramters:                        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:
```

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: LOAD and **SAVE** use the Nordson DataLink program to transfer files. Please 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:

   LOAD *FILENAME* COM1   transfers from PC to controller

   or

   SAVE *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 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 contents of this file are displayed.

   NOTE: If you type **LOAD** or **SAVE** without a filename at the command prompt and 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 properly:

- Use the **SAVE** command to save the configuration from the controller to a file on the PC whenever you change an 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 to a different name, such 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 used on.

Daily Operation

When the controller is turned on, it performs a self-test routine to verify proper operation. After the routine is completed, begin production.

1. Position the gun over a waste container and press the ON key to purge air from the dispensing system. Press the OFF key at any time to cancel purging.

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

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

4. If a fault occurs, use the **[◄►]** keys to select the **HELP** menu to 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.

Troubleshooting

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

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

NOTE: 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. Refer to the supply pump documentation.
	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 *Robot Controller Output Timing* in the *Specifications* section.
	Gun ON signal not received from robot controller or sent to gun	Check the cable continuity and replace the cables if necessary. Refer to the dispensing gun documentation.
	Gun malfunction	Refer to the dispensing gun documentation.
2. **Gun does not dispense material, gun not opening**	Absent or low control air pressure	Check the supply air pressure and increase it if necessary.
	Gun malfunction	Refer to the dispensing gun documentation.
3. **Gun does not change dispensing rate to control bead size (CP guns only)**	Cables damaged	Check the cable continuity and replace the cables if necessary. Refer to the dispensing gun documentation.
	Gun regulator malfunction	Refer to the dispensing gun documentation.
	Incorrect analog tool speed signal	Refer to *Tool Speed Signal Configuration for CP Gun Versions* in the Specifications section.
4. **Gun starts dispensing before robot moves**	Robot controller output signal timing incorrect	Set the correct timing sequence. Refer to *Robot Controller Output Timing* in the *Specifications* section.

Continued...

Problem	Possible Cause	Corrective Action
5. **Gun dispenses after cycle ends, gun closed**	Control air pressure low	Check the supply air pressure and increase it 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 or robot documentation.
	Process Sentry hardware fault	Check the **HELP** menu. Check or correct the signals from the outputs. Refer to the *Specifications* section.
6. **Dispensing delayed**	Gun ON signal from robot controller improperly timed	Set the correct timing sequence. Refer to *Robot Controller Output Timing* in the *Specifications* section.
	Gun malfunction	Refer to the dispensing gun documentation.
7. **Bead deposition "wiggles"**	Nozzle too high above work piece	Re-teach the robot's tool path; keep the nozzle closer to workpiece.
	Material speed through nozzle too high	Decrease the material pressure or change the nozzle size. If using a CP gun, decrease the bead size.
	Nozzle too small	Install a larger nozzle. Contact your Nordson Corporation representative for part numbers.
8. **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.

- If you order the assembly, items 1 and 2 will be included.

- If you order item 1, item 2 will be included.

- If you order item 2, you will receive item 2 only.

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

Letters in the Note column refer to notes at the end of each parts list. Notes contain important information about usage and ordering. Special attention should be given to notes.

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

Process Sentry Controller

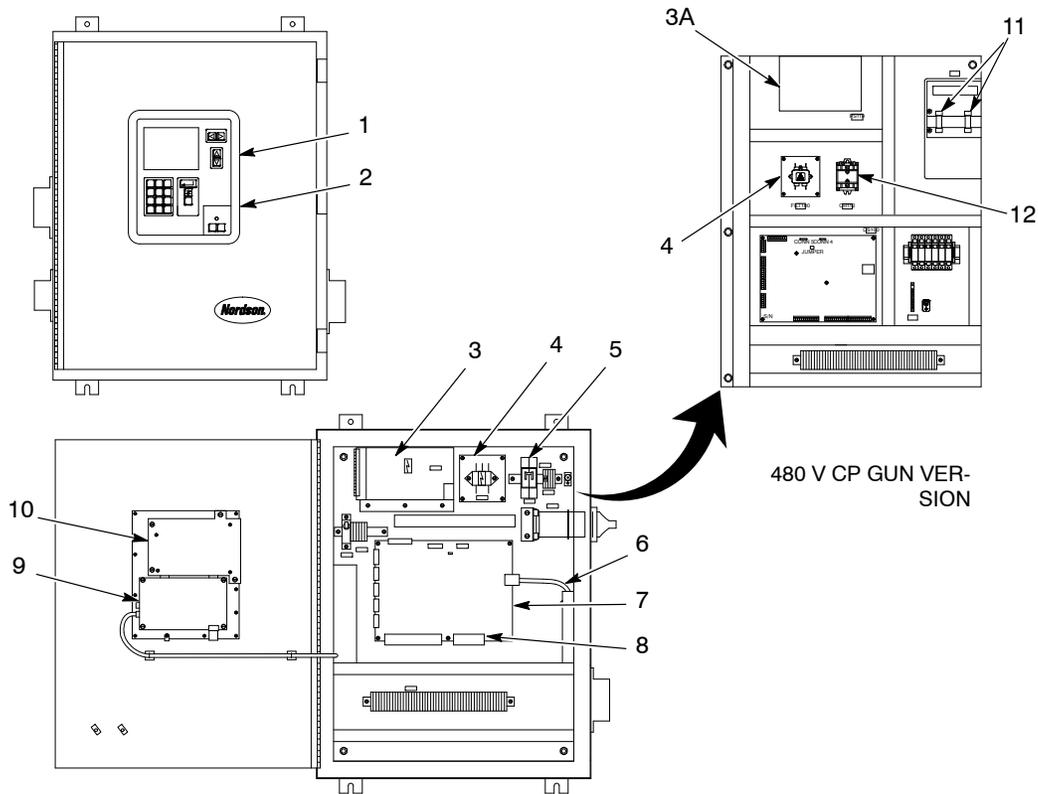See Figure 3 and refer to the following parts table.

480 V CP GUN VER-
SION

Figure 3   Process Sentry Controller

Item	Part	Description	Quantity	Note
1	281868	Gasket, keypad panel, PF II	1	
2	282964	Cover, bezel, keyboard, P/F II	1	
3	233612	Power supply, +5, +24, +15, -15	1	
3A	1017912	Power supply	1	
4	117272	Inductor, filter, EMI	1	
5	281739	Circuit breaker, 6A, DPDT	1	
6	230672	Cable, RJ45 to RJ45, 5 ft	1	
7	227282	PCA, Process Sentry	1	
8	307956	• Mini relay, 5 V, form A, 1 pole	12	
9	1604380	PCA keypad panel, Pro-Flo	1	A, C
10	1604375	Display, QVGA	1	B, C
11	1004677	Fuse, class J, 10 amp	2	
12	287724	Master control relay, 10 amp, 110 v, 8 N.O.	1	
NS	323902	Suppressor, quad assembly	1	
NS	1604376	Service kit, Pro-Flo display replacement		D
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).				
D: Service kit includes one 1604375 display and one 1604380 keypad panel.				
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 for CP Gun Versions

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 4.

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.

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.
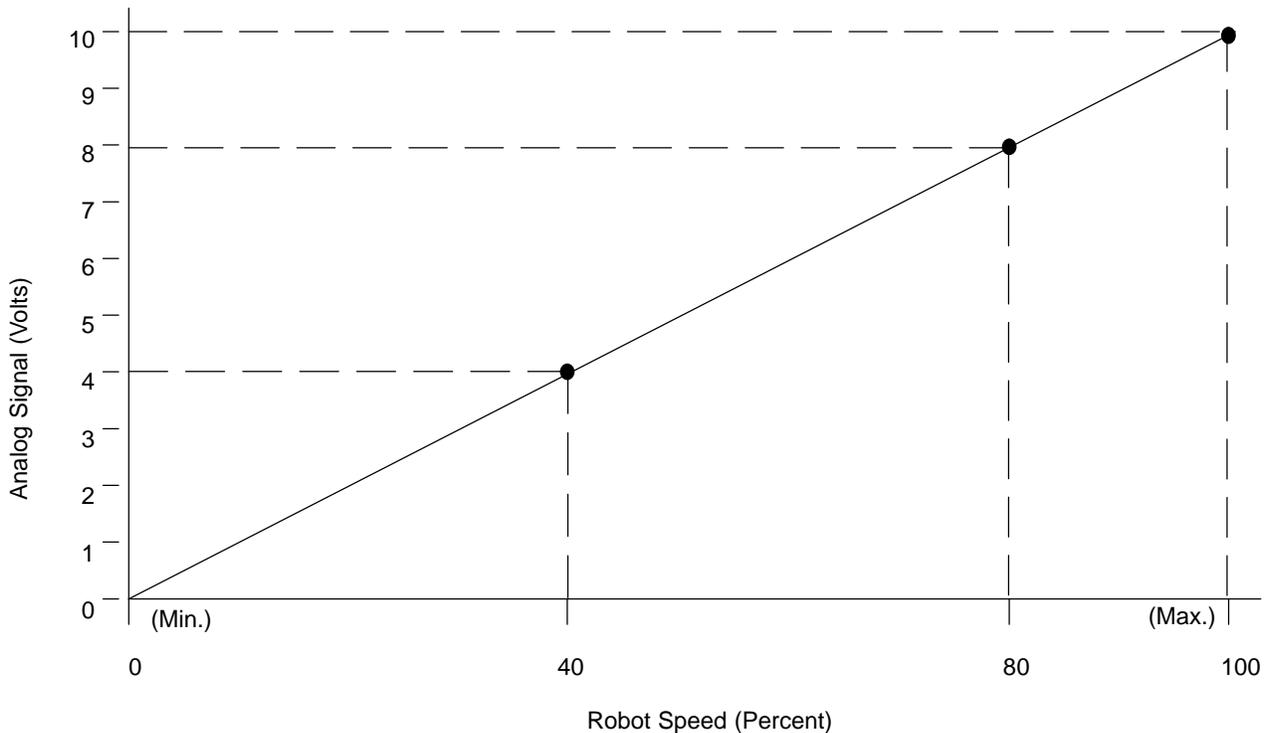

Figure 4   Analog Signal and Robot Speed Relationship

Robot Controller Output Timing

Output signals from the robot controller to the Process Sentry controller must be timed correctly. Refer to your robot controller manual for procedures to set signal timing.

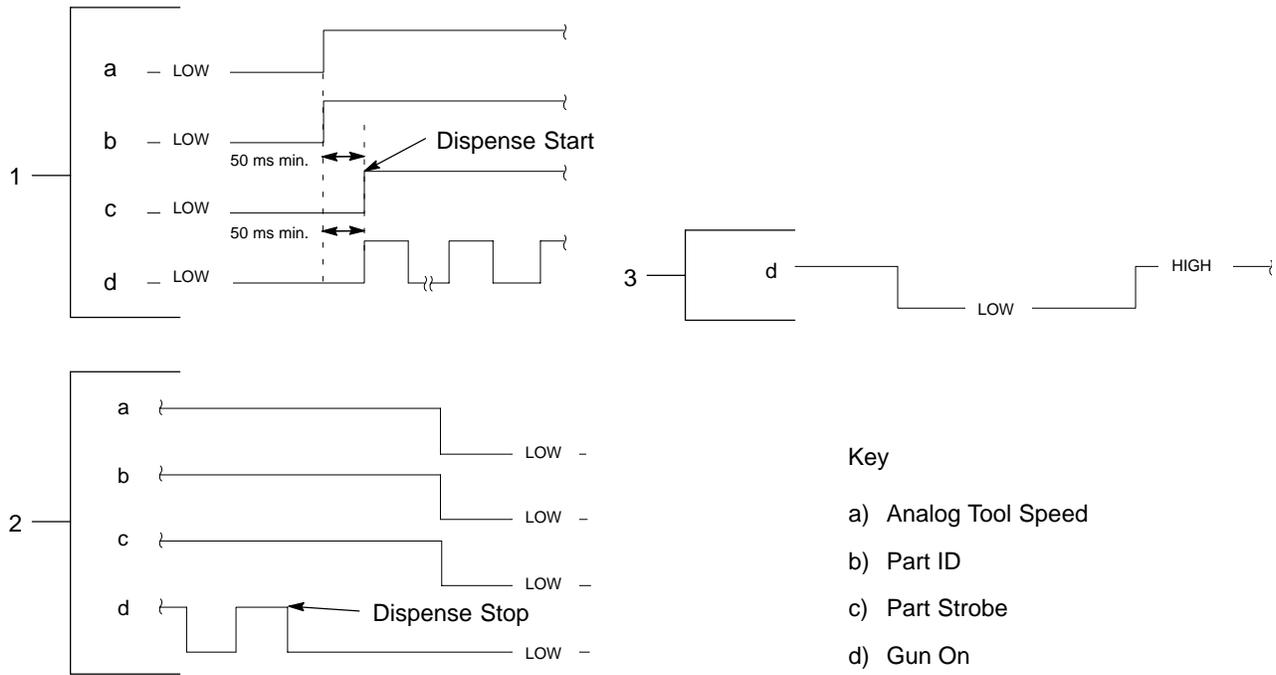See Figure 5.

Set the output signal timing as illustrated.

Key

a) Analog Tool Speed

b) Part ID

c) Part Strobe

d) Gun On

Figure 5   Robot Controller and Output Signal Timing

1. Dispense cycle start   2. Dispense cycle stop   3. Emergency stop

Receptacle Pinouts

Refer to Tables 6 and 7 for the pinouts on the Process Sentry controller interface cable receptacles.

Table 6 Robot 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 (supply voltage)	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	Part OK	Part OK
10	Part Strobe	Part Strobe
11	Gun On	Gun On
12	Alarm Reset	Alarm Reset
13	System Fault	System Fault
14	System Ready	System Ready
15	Spare	Spare
16	Spare	Spare
17	Spare	Spare
18	Spare	Spare
19	Spare	Spare
20	Analog Signal #1 (+)	Analog Signal #1 (+)
21	Analog Signal #1 (−)	Analog Signal #1 (−)
22	Analog Signal #2 (+)	Analog Signal #2 (+)
23	Analog Signal #2 (−)	Analog Signal #2 (−)
24	Spare	Spare
Ground 2	Shield for Analog Signals	Shield for Analog Signals

Table 7 J-Box Interface Cable Receptacle Pinouts

Pin	Controller Side Reference Signal
1	Upstream Transducer + Excitation
2	Upstream Transducer – Signal
3	Upstream Transducer + Signal
4	Upstream Transducer – Excitation
5	Shield (for transducer only)
6	Flow Meter +15 V Supply
7	Flow Meter Signal
8	Flow Meter Signal Common
9	Shield (for Flow Meter and RTD)
10	RTD (+)
11	RTD (−)
12	Gun On
13	+ 24 V Supply
14	24 V Common
15	0 to 10 V for CP Gun Regulator
16	0 to 10 V for CP Gun Regulator
Ground	Ground

SPC Data

Refer to Table 8.

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

Table 8 Format of SPC Data

Column	Parameter	Units
1	Date	—
2	Time	—
3	Part ID	—
4	Volume set point	cc
5	Current volume	cc
6	Material temperature	°C
7	Nozzle	bar
8	FM Inlet	bar
9	FM Outlet	bar
10	SPC fault code	—

Decode SPC Fault Codes

Refer to Table 9.

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 **Code** 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.

Table 9 SPC Fault Codes

Code	Description
1	High Dispensed Volume
2	Low Dispensed Volume
4	High Pressure, Pressure 1
8	Low Pressure, Pressure 1
16	High Pressure, Pressure 2
32	Low Pressure, Pressure 2
64	Temperature Fault
128	Flowmeter Failure
256	High Pressure, Pressure 3
512	Low Pressure, Pressure 3
1024	Not used
2048	Not used
4096	Robot Signals Out Of Sequence
8192	Not used
16384	Bead Defect Detected

Main Circuit Board Test Points

Refer to Table 10 for the functions and channel allocations of the Process Sentry controller main circuit board test points.

Table 10 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 Pulses	
12	Analog Output Signal #1	DA1
13	Analog Output Signal #2	DA2
14	Not used	
15	Not used	

Main Circuit Board Connector Pin Assignments

Refer to Tables 11 through 18 for the main circuit board connector pin assignments used for the On/0ff and CP gun versions of the Process Sentry controller.

Table 11 Connector 1—Discrete Outputs

Pin	Description
1–2	System Ready
3–4	Gun 1 ON
5–6	Not used
7–8	Not used
9–10	Not used
11–12	Part OK
13–14	System Fault
15–16	Bead Fault
17–18	Fault Beacon
19–20	Not used
21–22	Spare
23–24	Spare

Table 12 Connector 2—Discrete Inputs

Pin	Description
1	Part ID BIT 0
2	Part ID BIT 1
3	Part ID BIT 2
4	Part ID BIT 3
5	Part ID BIT 4
6	Part Strobe
7	Gun On
8	Not used
9	Alarm Reset
10	Power On
11	Spare
12	Spare
13	Common

Table 13 Connector 2—Discrete Inputs
(480V CP Gun Version)

Pin	Description
1	Part ID BIT 1
2	Part ID BIT 2
3	Part ID BIT 4
4	Part ID BIT 8
6	Part Strobe
7	Gun On
8	Not used
9	Alarm Reset
10	Not Used
11	Purge
12	Not Used
13	Neutral

Table 14 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 15 Connector 8—Flow Meter
Outlet Pressure

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

Table 16 Connector 9—Flow Meter

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

Table 17 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 18 Other Connectors

Connector	Description
4	Gun/Nozzle Pressure (Not used)
5	RS-422
6	Network (Echelon)
7	Flow Meter Inlet Pressure (Not used)
10	Debug
11	Debug
13	RS-232
14	Expansion
15	Expansion
16	Expansion

Schematics

See Figure 6.

The following I/O connections apply:

- For 24 Vdc, connect TB3-14 and TB3-3; connect TB3-15 and TB3-24.

- For 120 Vac, connect TB3-14 and TB3-4; connect TB3-15 and TB3-10.

NOTE: Use the circled letters to trace circuits from sheet 1 to sheet 2.

Schematics—480V CP Gun Version

See Figure 7.
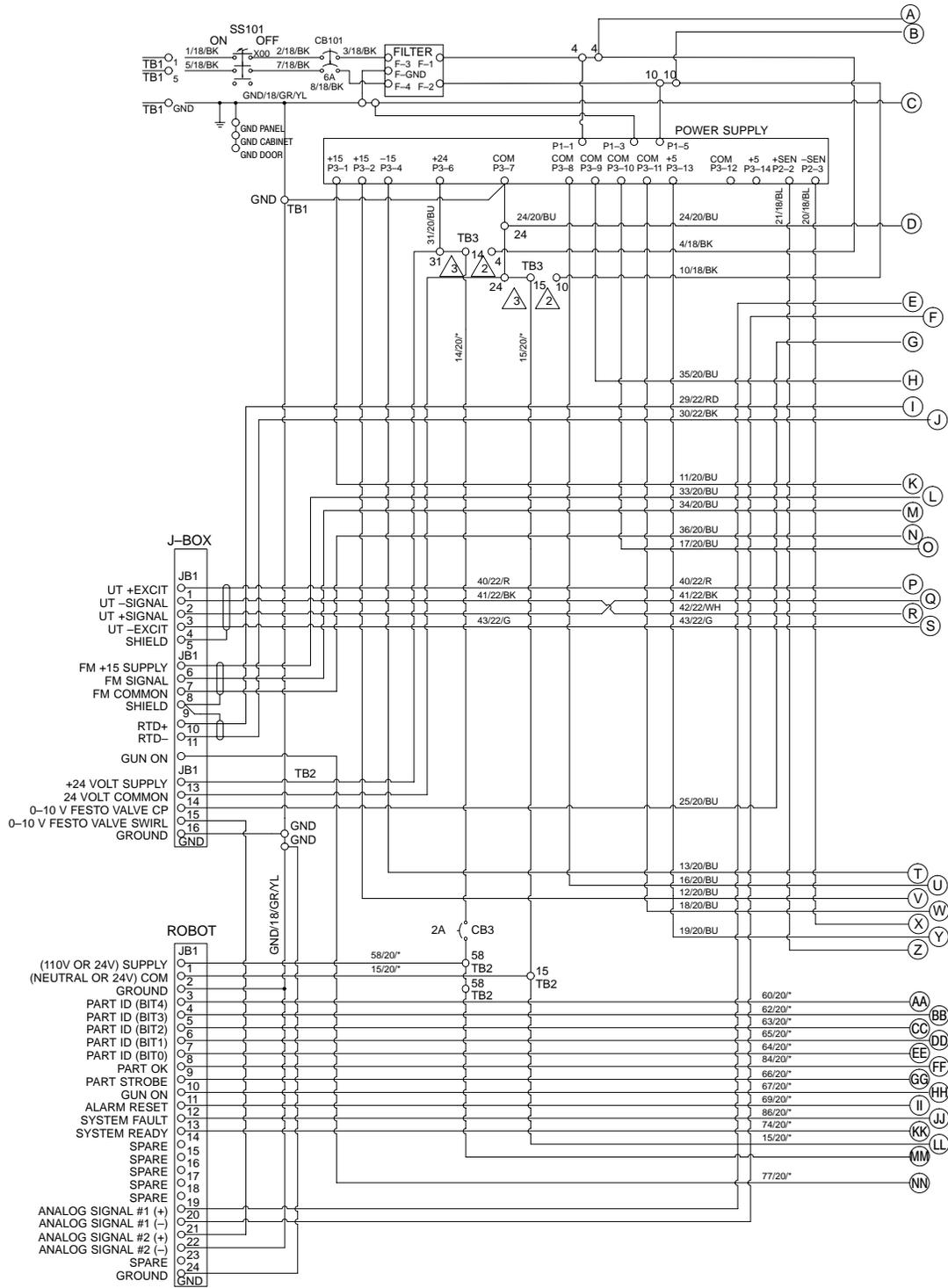
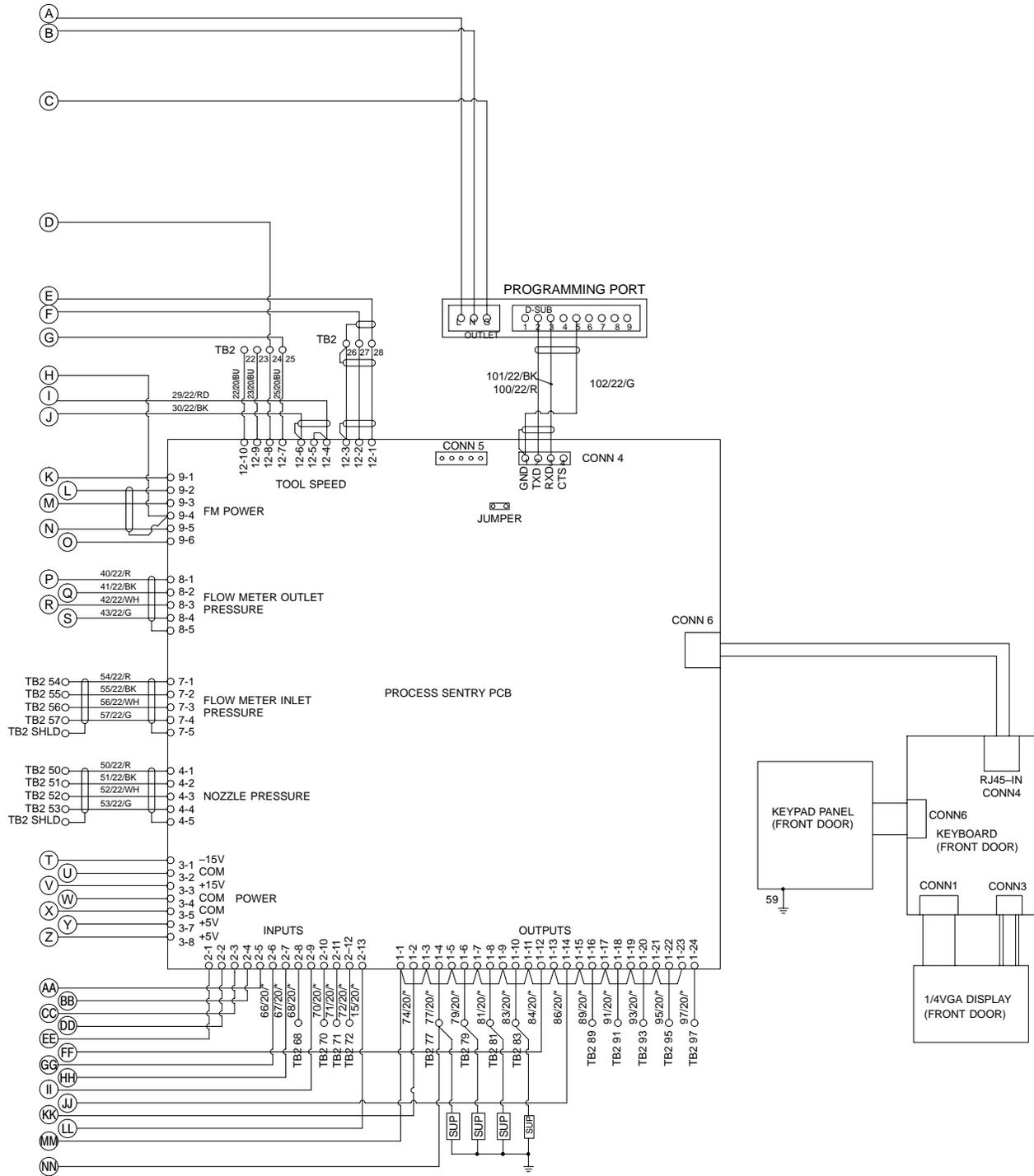Figure 6   Process Sentry Schematic (1 of 2)
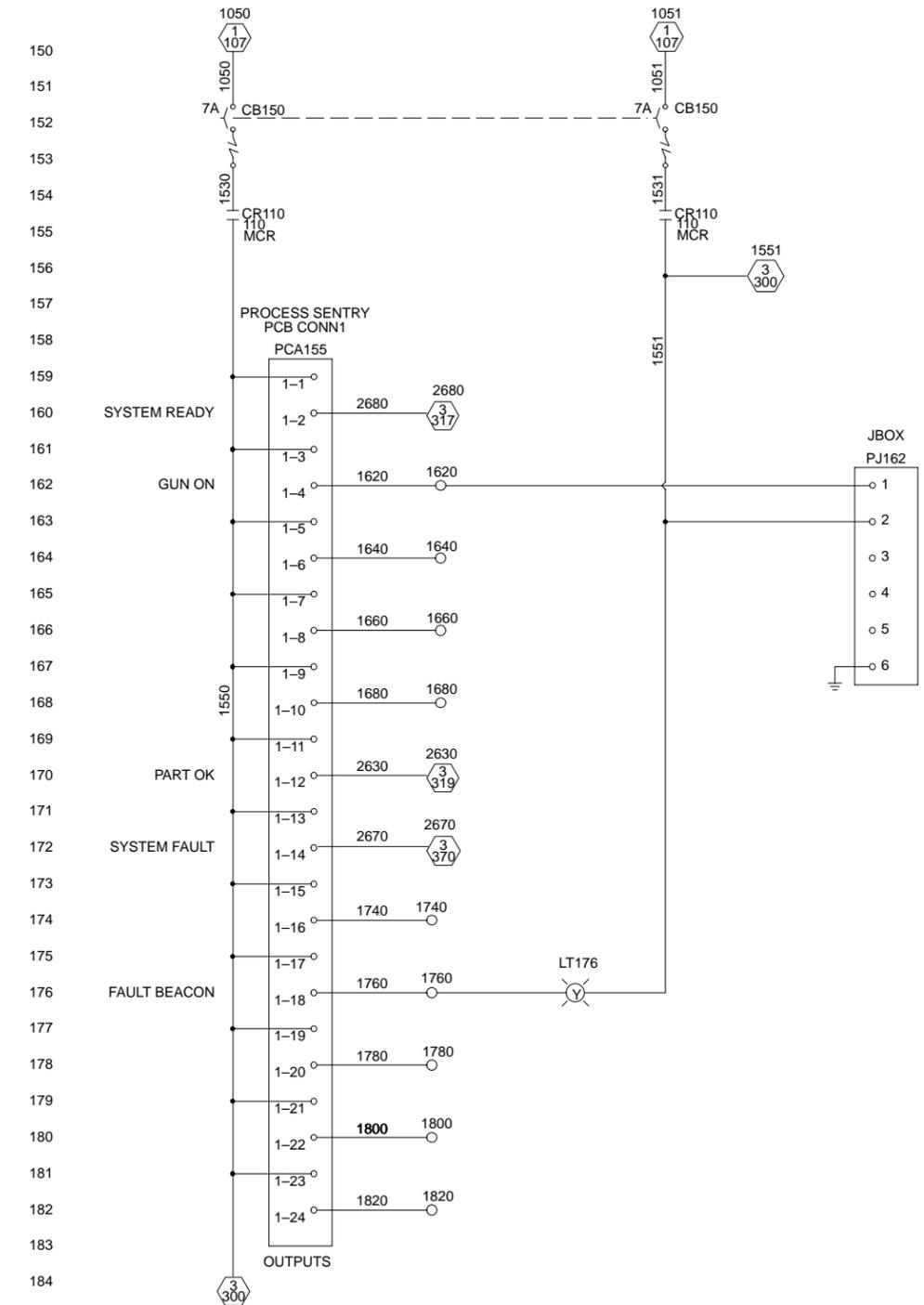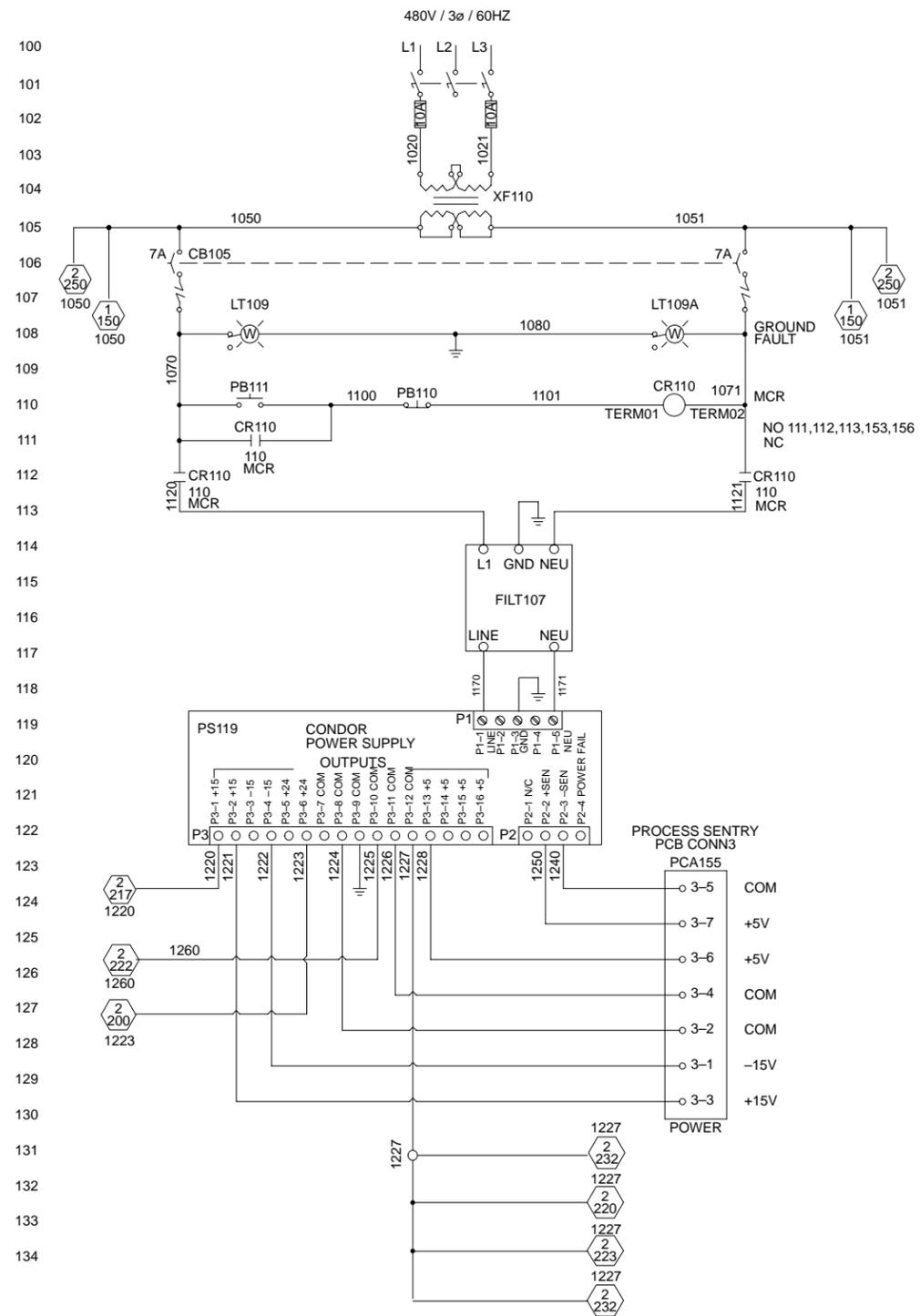
Figure 6   Process Sentry Schematic (2 of 2)
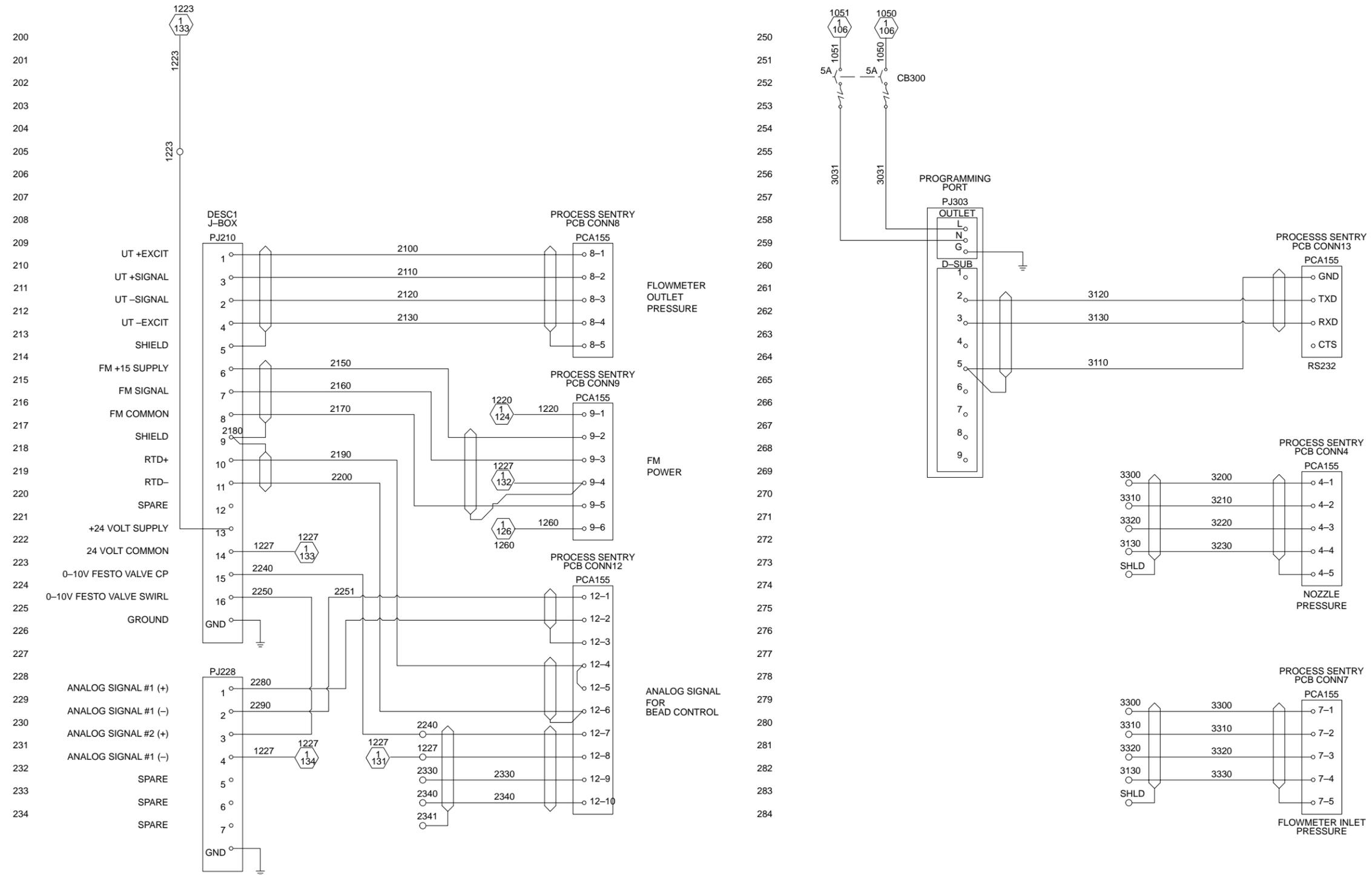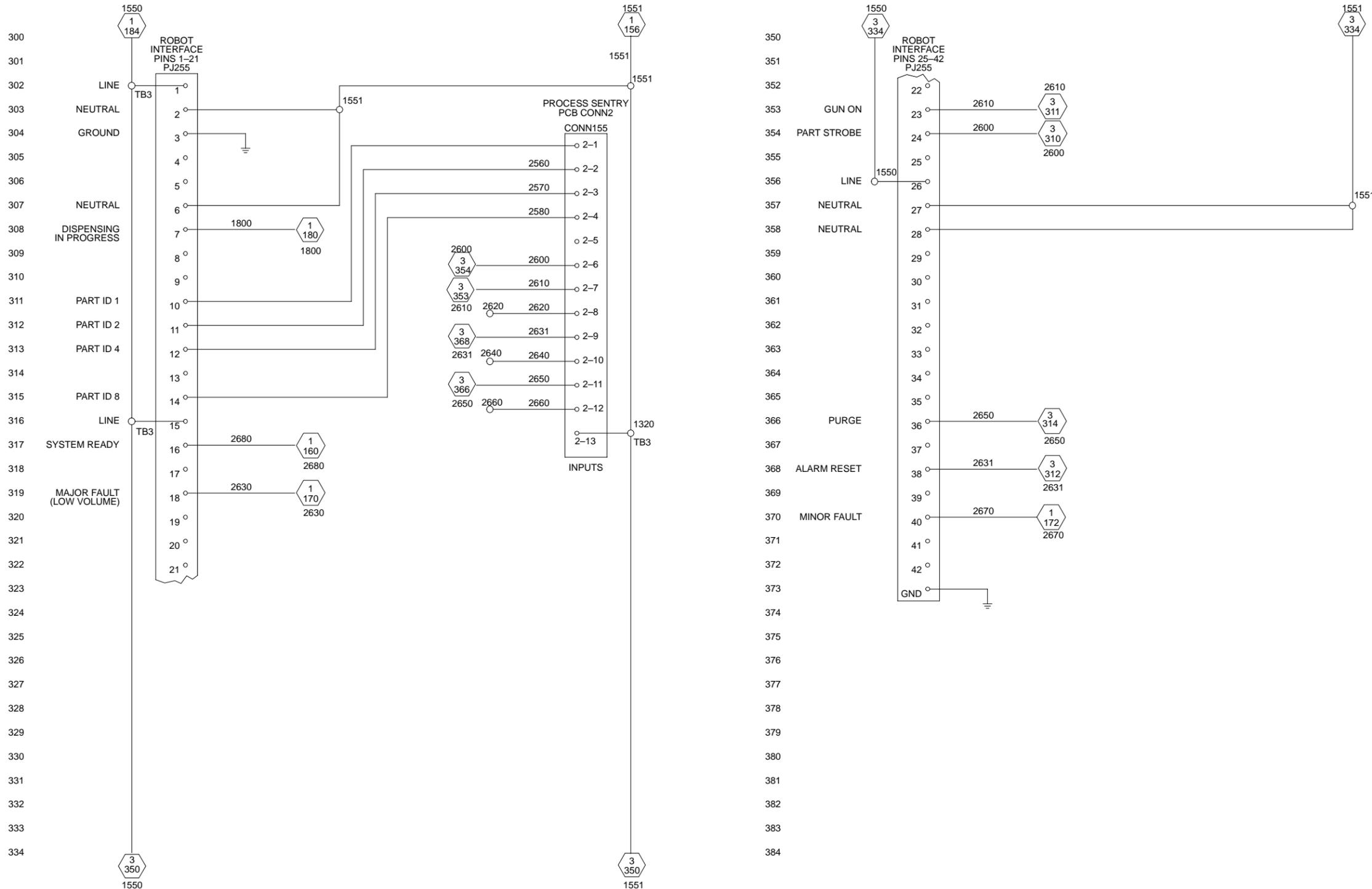
Notes

Figure 7 480V CP Gun Version (1 of 3)

Figure 7 480V CP Gun Version (2 of 3)

Figure 7 480V CP Gun Version (3 of 3)

1100275A