



**WHERE  
PRECISION  
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# **PVA Portal**

**User Manual**

**Original Version**

**Revision H**

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# 1 Introduction

Before you use Portal, read the operation and setup manual. This will help you to become familiar with the product and ensure successful operation.

All machines are referenced in the manual as the workcell. This manual gives information on common options and configurations for a workcell. The machine related to this manual may not contain all items or may have additions. If the manual refers to an option that was not purchased, ignore that section. If there are options on the workcell not included in this manual, refer to the optional equipment section of the operating guide for more information.

If any questions or problems arise, contact PVA's Technical Support department.

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## 1.1 Document History

Revision	Revision Date	Reason for Changes
REV I	11/2018	
REV H	09/2016	FIS Update
REV G	2016	Part Manager and Quick Fid, Portal Version 1.2.0
REV F	2016	UV Warning updated
Rev E	2014	Portal Version 1.1.0
Rev D	2013	New Template
Rev C	2012	Grammar revised, Portal Version 1.0.7
Rev B		Content update
Rev A	Initial release	Original Version

***NOTE: All photographs and CAD model representations in this document are a “general representation” of the system and its components. The actual appearance of the system and its components can differ based upon customer specific configuration.***

## 1.2 Safety

Warning symbols on the machine correspond to notations in this manual. Before operating the system, identify these warning labels and read the notices described below. Not all labels may be used on any specific system. Read the workcell manual for additional safety information related to the workcell and its components.

***WARNING! The safety features should NEVER be bypassed, disabled, or tampered with. PVA is not responsible for any damages incurred, mechanical or human, because of alteration or destruction of any safety features. If the equipment is used in a manner not specified by PVA, the protection provided by the equipment may be impaired.***



*In situations where inattention could cause either personal injury or damage to equipment, a warning notice is used.*



*Always wear approved safety glasses when you operate or work near the workcell.*



*Before you operate the workcell, read and understand the manuals provided with the workcell.*



*Never put hands or tools in areas with this symbol when the workcell is in operation. A dangerous condition may exist.*



*Read and understand the manuals provided with the workcell before any repair or maintenance is done. Only a qualified individual should do service.*



*Use caution when near pressurized vessels. Find and repair any leaks immediately. Always wear applicable safety equipment when you work with pressurized vessels or vessels that contain chemicals.*



*Shear hazard from moving parts. Avoid contact.*



*Do not smoke near the workcell. Always have a fire extinguisher available for emergency use.*



*Before any repair or maintenance to the system is done, turn off power and lockout the power disconnect switch.*



*Warning notices are used to emphasize that hazardous voltages, currents, temperatures, or other conditions that could cause personal injury exist in this equipment or may be associated with its use. Only qualified personnel should enter areas designated with this symbol.*



*A laser light source is present. Do not stare directly into the beam. Do not use in the presence of highly reflective surfaces.*



*Pinch hazard from moving parts. Avoid contact.*



*Hot surface. Avoid contact.*



*Do not remove protective guarding.*



*Warning, UV light hazard. Do not look directly at UV light source.*

## 1.3 System Description

This manual applies to the following Precision Valve & Automation, Inc. workcells:

PVA350™	PVA6000™
PVA650™	Delta 6
PVA2000™	Delta 8
PVA3000™	

The dispense path and active heads are controlled by a program stored in the motion controller. The motion controller can save up to 30 programs at one time.

The operator controls the workcell with PVA Portal software. This includes machine setup, manual operation, program selection, and automatic operation. Machine status and error messages are shown in the program window and the light tower. The operator(s) must have read this manual, or have been trained and understand the operation of the machine.

Any uses that are not approved could result in dangerous conditions that the safety features on the system cannot prevent.

## 1.4 Personal Protective Equipment

Workcell operation includes air pressure, electrical power, mechanical devices, and the use of hazardous materials. Only qualified personnel can operate and service workcells.

Operators must use eye protection because material contents are under pressure. Always wear gloves when handling materials and solvents. Refer to MSDS sheets on the material that is used for other precautions.

## 1.5 PVA Portal Computer Requirements

Portal requires an Intel® Core i5 processor or equivalent processor with 4 Gigabytes of RAM, 2 Gigabytes free hard drive space and Windows® 7 Operating System or newer.

Your computer must also have:

- (2) Ethernet adapter
- (1) RS232 serial communications port
- 17" monitor with 1280 x 1024 resolution
- Mouse (USB)
- Keyboard (USB) with a touch pad if used with a PVA monitor mount
- Keyboard extension cable, 6'
- Mouse extension cable, 6'
- Monitor cable, 15' (Display port or DVI)
- Display port or DVI video support (VGA cannot be used)
- CDROM drive

Portal may not work correctly with systems that do not meet these minimum requirements.

### 1.5.1 Galil Controller Requirements

- Galil controller minimum of DMC 2000 or newer. Controllers must be purchased from PVA.

### 1.5.2 Security Software

Some security software packages and firewalls can interfere with PVA system software. PVA software uses Ethernet ports 23, 60007, and 502 by default. Security software and firewalls must be configured to allow traffic on these ports.

## 1.6 Operator Skills

The operator must have basic computer skills and be familiar with the Windows® 7 operating system.

## 2 Installation, Upgrade, and Recovery

Before you operate a tool, workcell, or program a path, know the tool and workcell components and the steps to program a path. Workcells from PVA will come with the current version of Portal installed. Refer to the installation guide for more information.

***NOTE: Restart the computer after you install or upgrade Portal or Portal Shell.***

### 2.1 Install Portal Shell or Portal

1. Insert the USB flash drive, or access the electronic file provided by PVA for the workcell.
2. Navigate to the software file named with the correct portal version and build.

***NOTE: The folder will be named according to the Portal version and build.***

3. Run 'PVAPortal\_Setup.exe' and follow the instructions on the screen.

***NOTE: Install the software in its default directory (c:\Program Files\PVA for 32 bit systems, c:\Program Files (x86)\PVA for 64 bit systems).***

### 2.2 Upgrade Portal

Upgrading Portal may include, but not is limited to, main program changes and configuration file changes. Before you upgrade Portal on any workcell, do the backup procedure and contact PVA for additional guidance.

### 2.3 Backup Portal

To backup Portal, copy and save the entire contents of the 'C:\Program Files\PVAPortal\Config' and 'C:\Program Files\PVAPortal\Lib' directories.

### 2.4 Restoring Portal

To restore Portal, do the installation process and then paste the backup 'Lib' and 'Config' folders into the 'C:\Program Files\PVAPortal' directory.

## 3 System Overview

### 3.1 Software

The complete Portal software package has several components. Every operator must understand what each piece of software is and its function before you operate the workcell.

#### ***3.1.1 Portal***

Portal is the main user interface that allows the user to interact with the workcell. It sets the mode the workcell is operating in, allows the operator to monitor each system of the workcell, allows the operator to select different PathMaster routines, and conveys system messages to the user.

#### ***3.1.2 PathMaster®***

PathMaster is PVA's Windows®-based programming software. It is used to create, maintain and download project files for the workcell. Refer to the PathMaster manual for more information.

## 3.2 Teach Pendant

PVA workcells come with a teach pendant. Each teach pendant has a Trackball, Teach button, Purge button, Axis selection button, and LED indicators for selected axes and teach function.

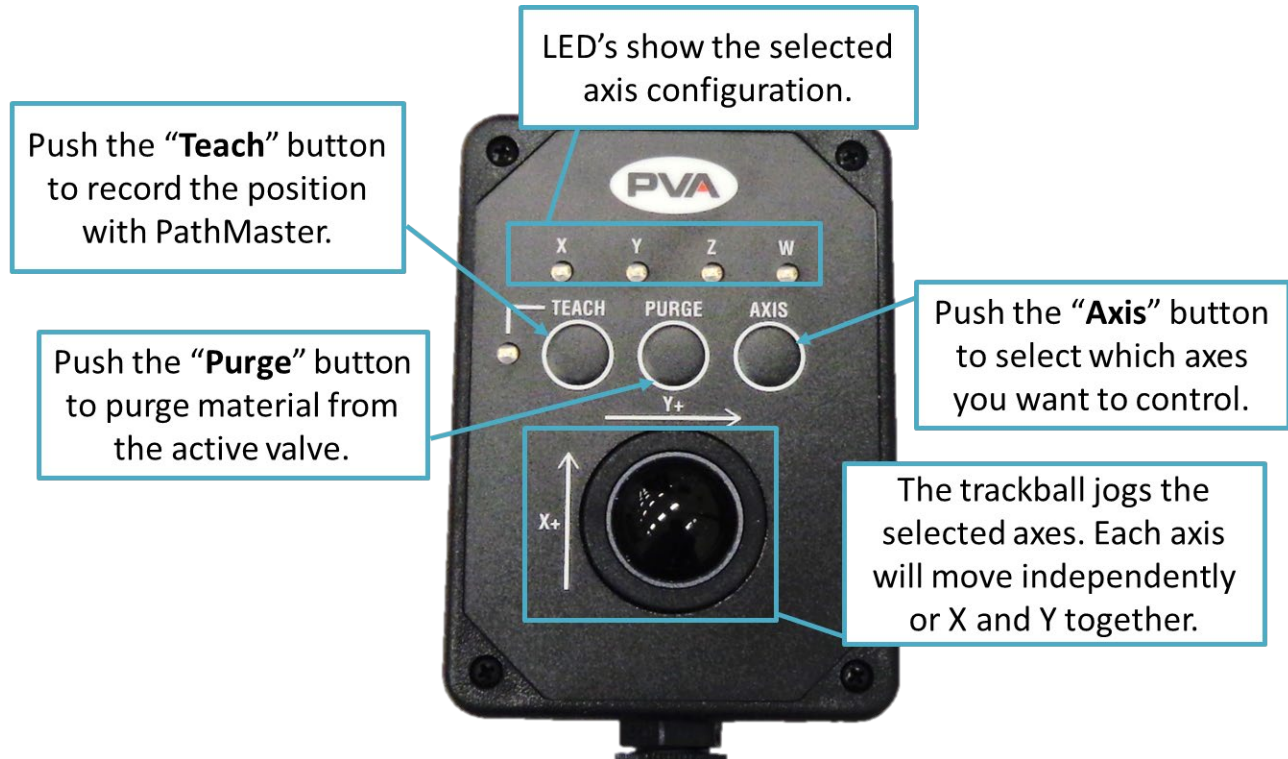


Figure 1: Teach Pendant-Update Image

**LED's** – The X, Y, Z and W LED's show the selected axis configuration. The Teach LED shows a position was correctly recorded by PathMaster®. The light tower buzzer will "beep" when the Teach LED illuminates.

**NOTE:** *W-axis trackball control is locked if the Teach Tool is enabled, unless the PathMaster Tool Offset window is open (Setup-> Machine Parameters-> "Tool Offsets"). This is so the operator does not accidentally teach a theta position with the teach tool. You can also enable or disable this function in Setup mode (refer to Figure 24). When teaching with a device that is not the camera, the theta position will be taught.*

The speed of the trackball can be changed if you have a vision system.

1. Push and hold the "Axis" button for three seconds.
2. The red teach light will illuminate and the trackball function will move 10x slower.
3. Do the steps again to change the speed back to normal.

## 4 Portal Shell Overview

Portal shell provides the operator with access to general setup of the workcell. It provides an interface to launch any software needed to interact with the workcell.

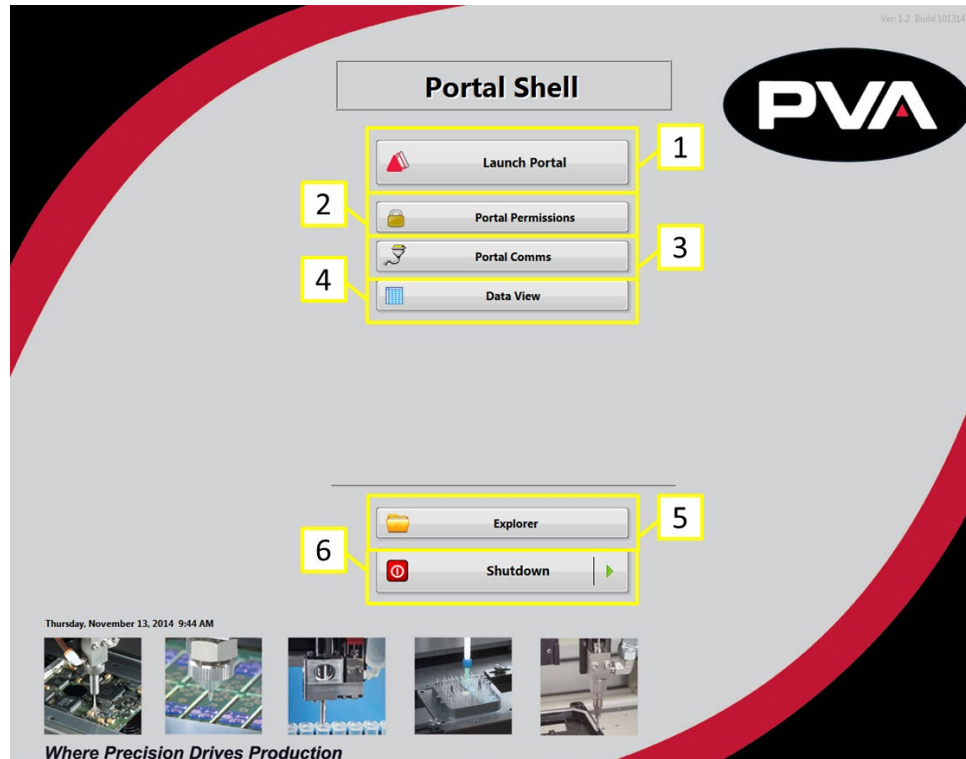


Figure 2: Portal Shell Overview

1. Select **“Launch Portal”** to start the Portal software and operate the workcell through the portal window. Refer to Section 5 for more information on Portal.
2. Select **“Portal Permissions”** to start the Portal Permissions software. This opens the options to adjust user access. Refer to Section 11 for more information on Portal Permissions.
3. Select **“Portal Comms”** to open the Portal Comms software, allowing the operator to adjust the Galil communication settings. Refer to Section 12 for more information.
4. Selecting **“Data View”** will allow the operator to view any logged data. Please refer to Section 13 for more information.
5. Selecting **“Explorer”** will open Windows® explorer, allowing the operator to navigate the folders located on the computer.
6. Selecting **“Shutdown”** will shut down the computer.

The number of options on the Portal Shell screen depends on the machine configuration. Refer to your machine specific manuals for more information

#### ***4.1.1 Portal Shell Keyboard Shortcuts***

***NOTE:*** You should not need to exit Portal Shell for normal operation, this is a maintenance feature.

Keys	Action
<b>F1</b>	Keyboard Shortcut Help
<b>Ctrl + Shift + F12</b>	Exit PortalShell Application
<b>Ctrl + Shift + D</b>	Launch Windows Desktop
<b>Ctrl + Shift + W</b>	Launch Desktop Then Exit PortalShell Application

## 5 Portal Overview

The Portal screen has several components. Understanding the sections of the Portal screen will help you to successfully navigate the Portal program.

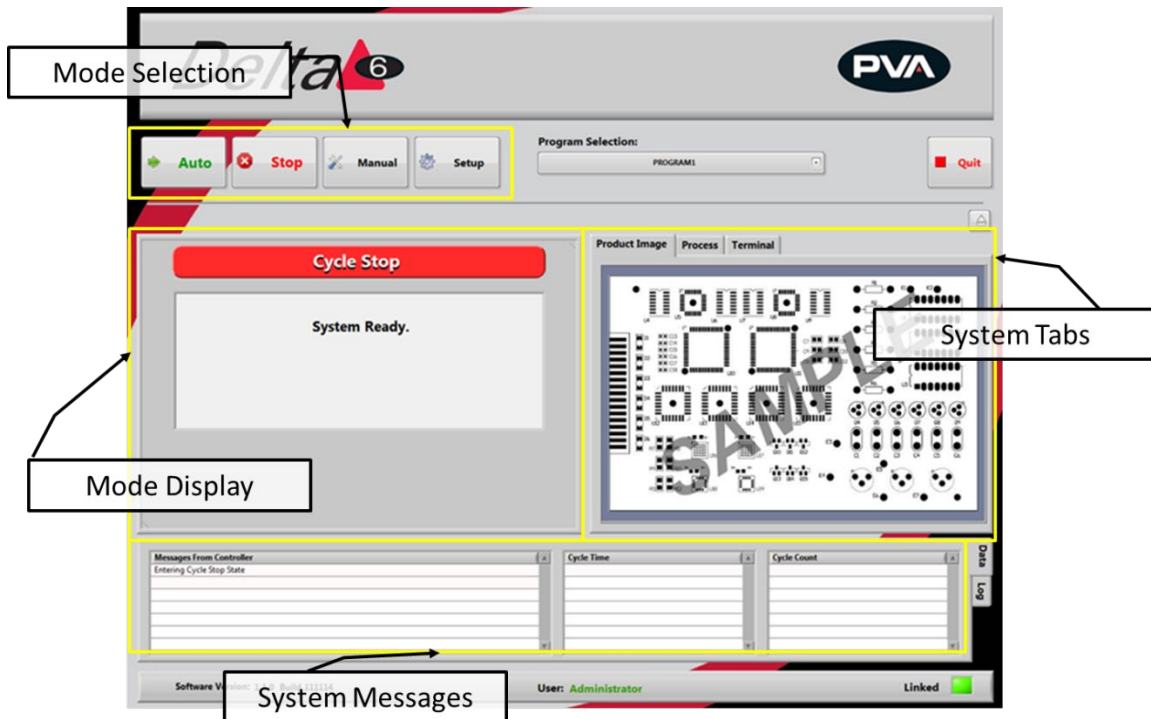


Figure 3: Portal Screen Overview

- Select the necessary mode from the mode selection.

**Note:** *You must be in Cycle Stop to select a new mode.*

- When you select a mode, the options for that mode will be shown in the mode display section of the screen.
- The system tabs section of the screen remains the same no matter what mode you select. This section of the screen contains the terminal used to communicate with the controller. The terminal is used as a debug tool.

## 5.1 Cycle Stop Interface

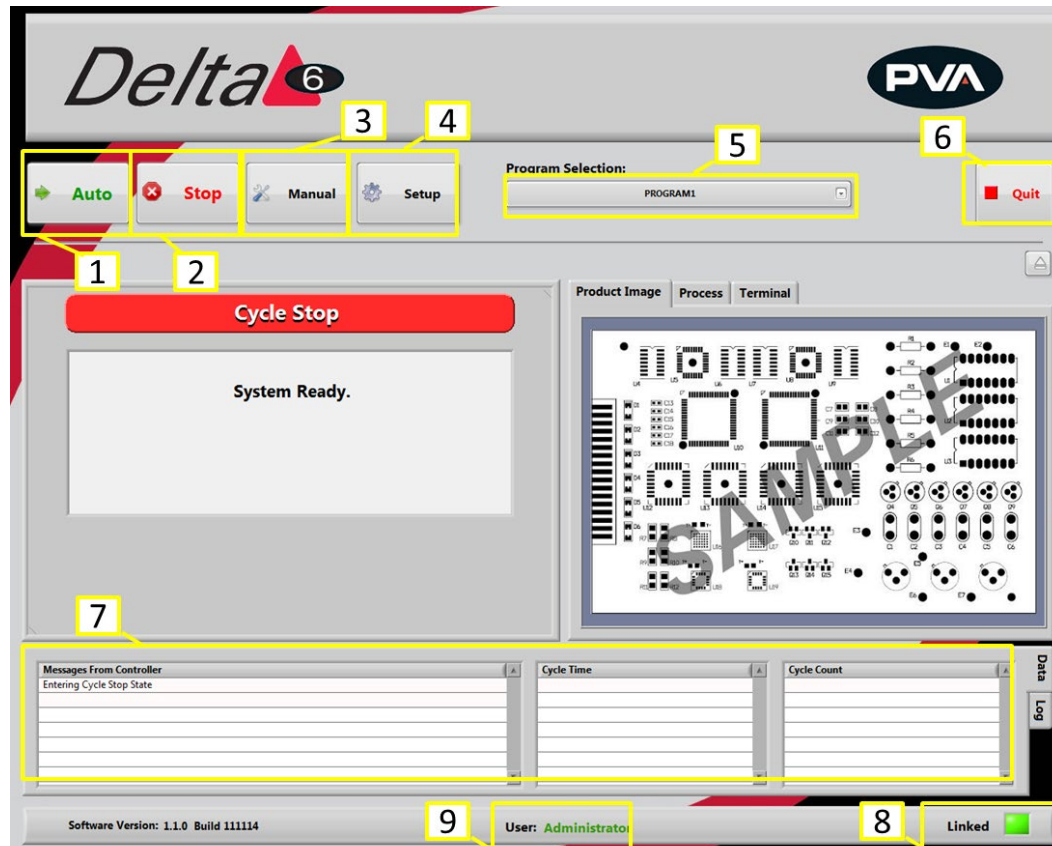


Figure 4: Cycle Stop

After you log in and select “Continue”, Portal opens in cycle stop mode. It is the default mode for the workcell. All other modes and options can be accessed from this mode with the buttons shown. You must return to Cycle Stop to access all other modes.

1. Select “**Auto**” to operate the machine in Auto Cycle. Refer to Section 7.
2. Select “**Stop**” to go to Cycle Stop mode from any other mode.
3. Select “**Manual**” to operate the machine manually. Refer to Section 6.
4. Select “**Setup**” to see or change the setup functions of the machine. Refer to Section 8.

**NOTE:** You must select “Stop” to change from one mode to another. For example to go from Manual mode to Auto Cycle you must select “Stop” and then select “Auto”. You must be in Cycle Stop to shut down Portal.

5. Select the desired program to use while in auto mode from the **Program Selection** dropdown menu. Refer to Section 5.2.
6. Select “**Quit**” to shutdown the program (Portal).

7. All system messages will be shown in the **Messages From Controller** window.
8. The **Linked** display shows the machine “heartbeat”. This indicator will blink while the PC is connected to the workcell, but NOT while the machine is in an error state.



Figure 5: Linked

9. To change the User, select Cycle stop and select the User at the bottom of the window.

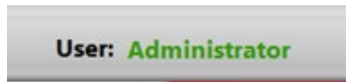


Figure 6: User

## 5.2 Program Selection

The active program can be changed at any time with the Program Selection drop-down menu. Path programs are downloaded to the motion controller with the PathMaster® software.

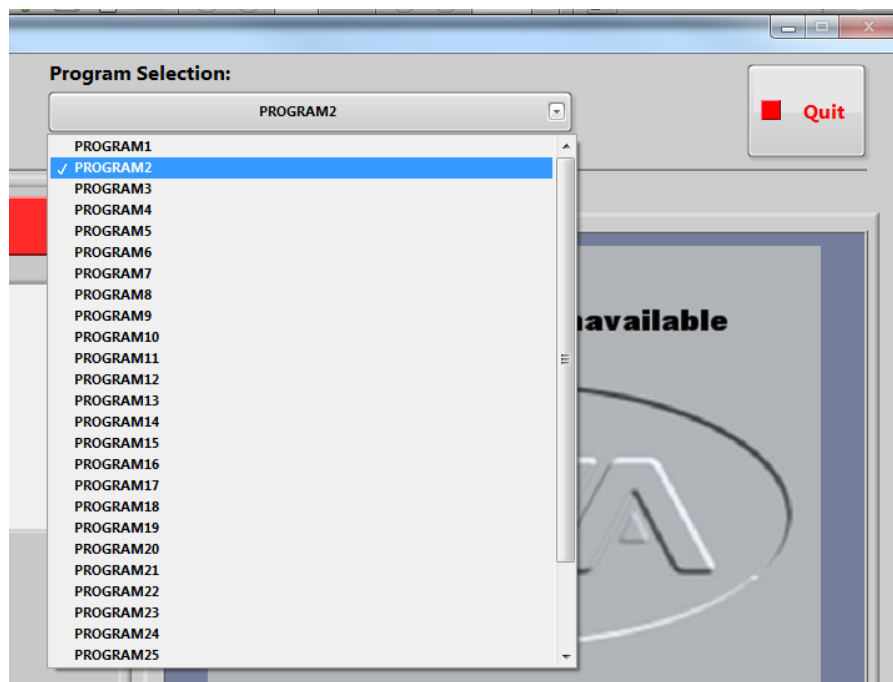


Figure 7: Program Selection

## 6 Manual Mode

The options shown in Portal depend on the workcell configuration. Refer to your machine specific manuals and appendices for more information.

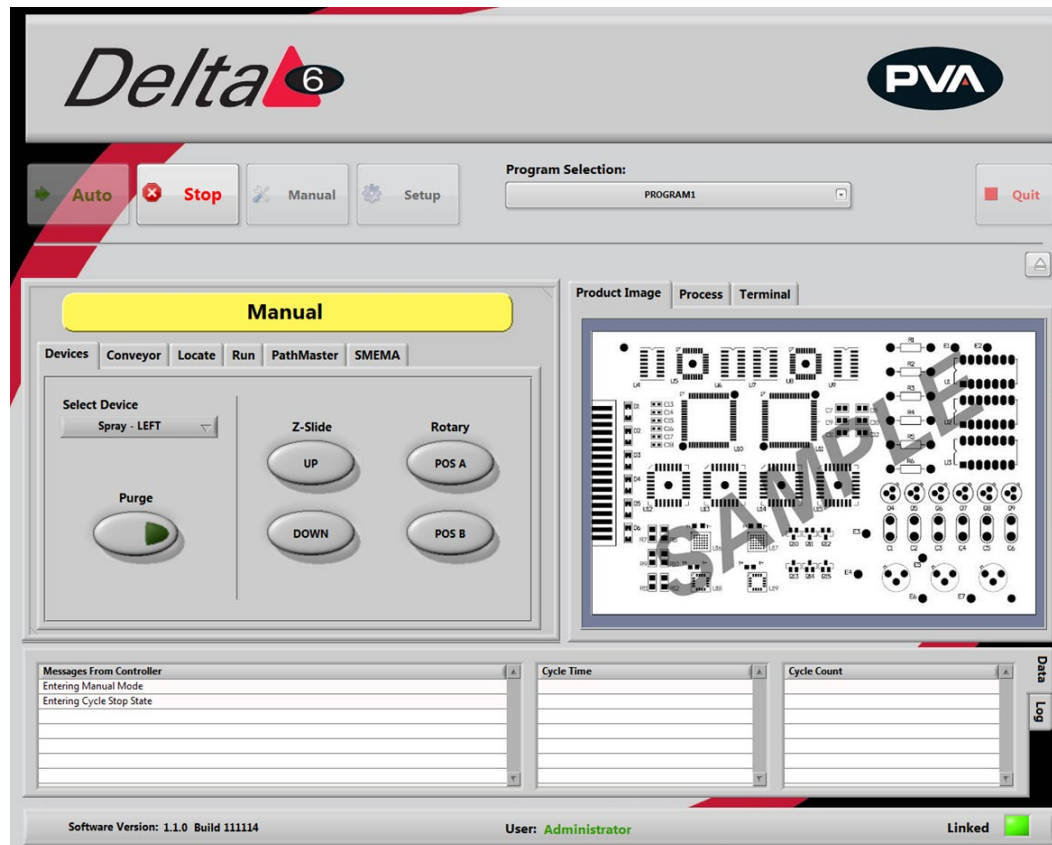


Figure 8: Manual Mode

In manual mode the operator has manual control of all devices on the workcell. There are tabs in manual mode that are used for different Portal functions. A trackball can be used to move the axes, operate the devices, and teach positions to PathMaster®. Only qualified personnel should operate the machine in manual mode.

You can program a path with the PathMaster® software when in manual mode in Portal. For more information refer to the separate PathMaster® manual.

- Select **“Stop”** to leave Manual mode and return to Cycle Stop.

The options that most workcells have are shown in the sections that follow.

## 6.1 Device Selection

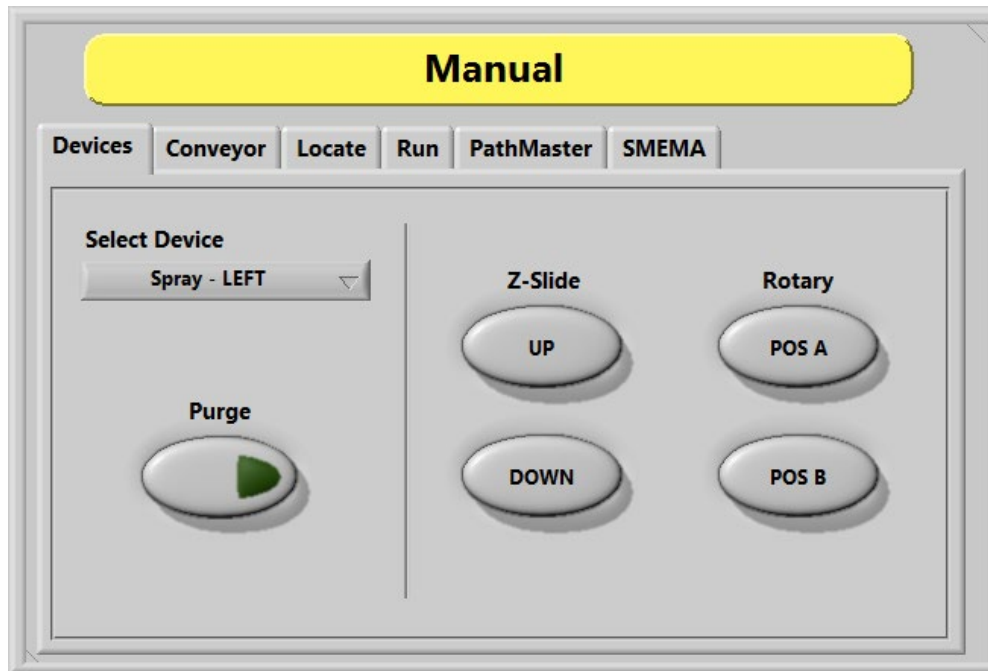


Figure 9: Device Selection, Manual Mode

Workcells with devices have Device Selection mode. Select the active head or valve from the drop-down menu under the “**Devices**” tab. The pneumatics Z-slide(s) and rotary(s) (if equipped) can be operated with the applicable buttons.

***NOTE: When you program or operate the workcell, do not use the valve to move components or boards. Precision Valve & Automation is not responsible for damages caused from operating the valves incorrectly.***

1. Select the “**Devices**” tab.
2. Select a device from the **Select Device** drop down menu.
3. Select “**Purge**” to operate the valve selected. The valve will purge until you release the “**Purge**” button so it is no longer selected.
4. Select Z-Slide “**UP**” or “**Down**” to raise or lower the pneumatic Z-slide for the active head.
5. Select Rotary “**POS A**” or “**POS B**” to put the rotary in the home position (Default, A), or the auxiliary position (B).

## 6.2 Conveyor Control

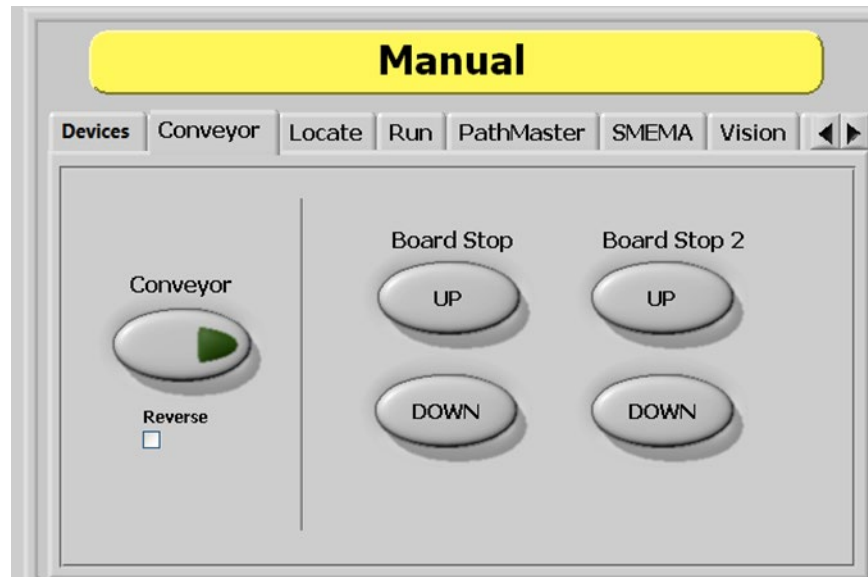


Figure 10: Conveyor Control, Manual Mode

The conveyor and the board stops are controlled under the “**Conveyor**” tab so the operator can adjust the position of boards in the workcell. Only workcells with conveyors will have this option.

1. Select the “**Conveyor**” tab.
2. Select the “**Conveyor**” button to toggle the conveyor on or off.
3. Select the “**Reverse**” (Bi-directional systems ONLY) checkbox to reverse conveyor direction.
4. Select **Board Stop “UP”** to turn the board stops off.
5. Select **Board Stop “DOWN”** to turn the board stops on.
6. **Board Stop 2** operates the upstream board stops for bi-directional systems. Do steps 4 and 5 for **Board Stop 2** to operate the upstream board stop. Could also be for any additional stops like a buffer, queue zone, or conveyor.

## 6.3 Board Locators

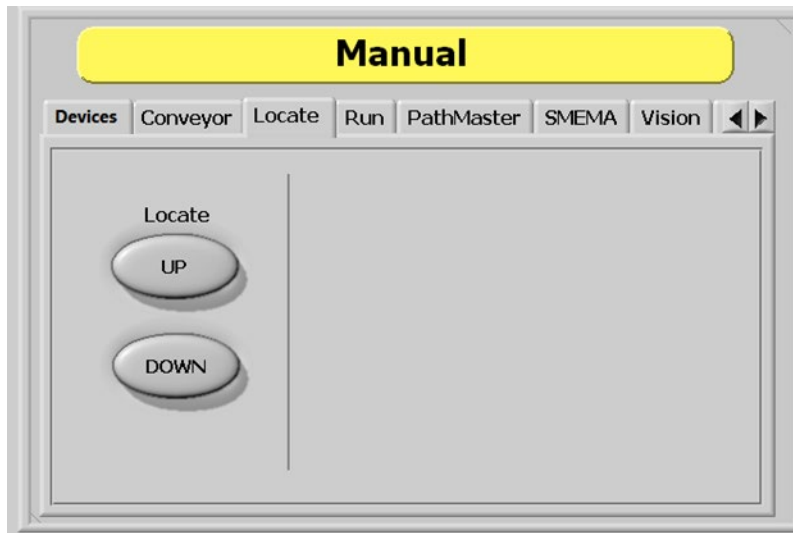


Figure 11: Board Locators, Manual Mode

Board Locators are controlled under the **"Locate"** tab. This is an optional feature for workcells with pneumatic-powered board locators. Only workcells with board locators will have this option. If this feature is present, the operator can move the board locators to the up and down positions.

1. Select the **"Locate"** tab.
2. Select Locate **"UP"** to move the locators to the up position.
3. Select Locate **"DOWN"** to move the locators to the down position.

## 6.4 Run Mode

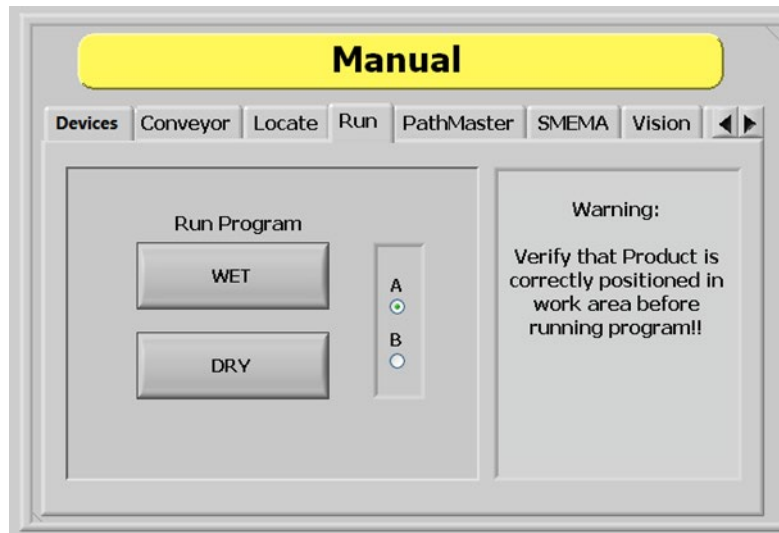


Figure 12: Run Mode, Manual Mode

In Run mode you can test a downloaded path program for a single cycle. You can run the path as “WET” or “DRY”. Make sure that the part is in the correct position inside the workcell before the path is run or the results will not be accurate and could damage the workcell.

1. Select the “**Run**” tab.
2. Select “**A**” or “**B**” (if necessary) to select which side will run. Select “A” for the left side program select drop down or B for right side program select drop down.
3. Select “**WET**” to run the selected program with the valves on.
4. Select “**DRY**” to run the selected program with the valves off (valves will move but will not dispense).

***NOTE: Make sure the correct program is selected from the Program Selection drop down menu. Make sure the part is correctly installed and all board stops and locators are in the correct position to prevent a crash.***

## 6.5 PathMaster®



Figure 13: Launch PathMaster from Manual Mode

This tab contains a button that launches the included PathMaster® software.

1. Select the PathMaster tab.
2. Select “**Run PathMaster**” to open the PathMaster®. The PathMaster window will open below the Portal screen.

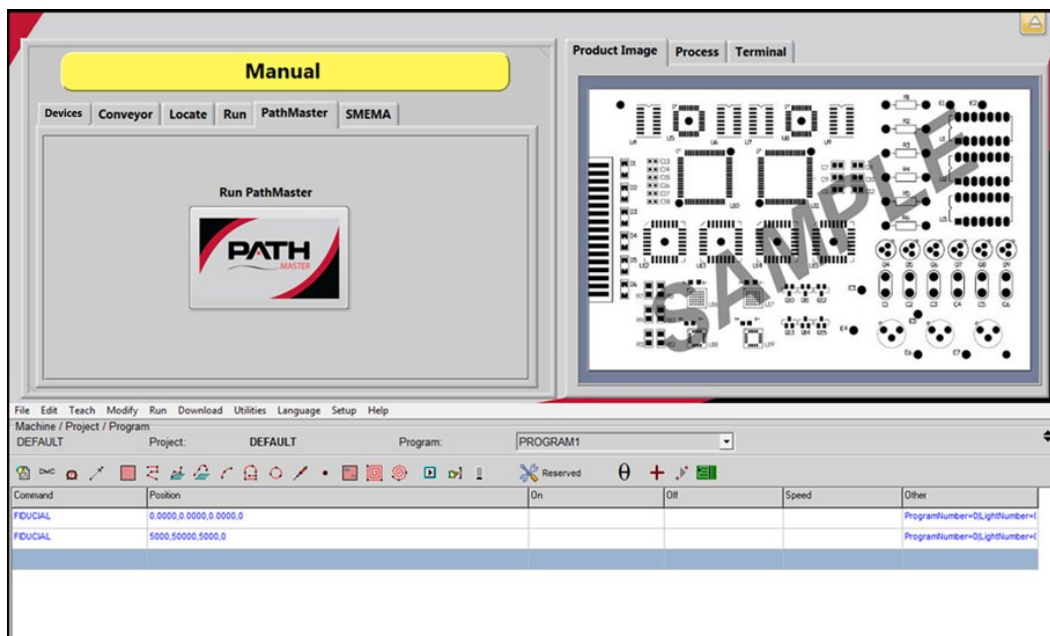


Figure 14: PathMaster Open in Manual Mode of Portal

## 6.6 SMEMA Status

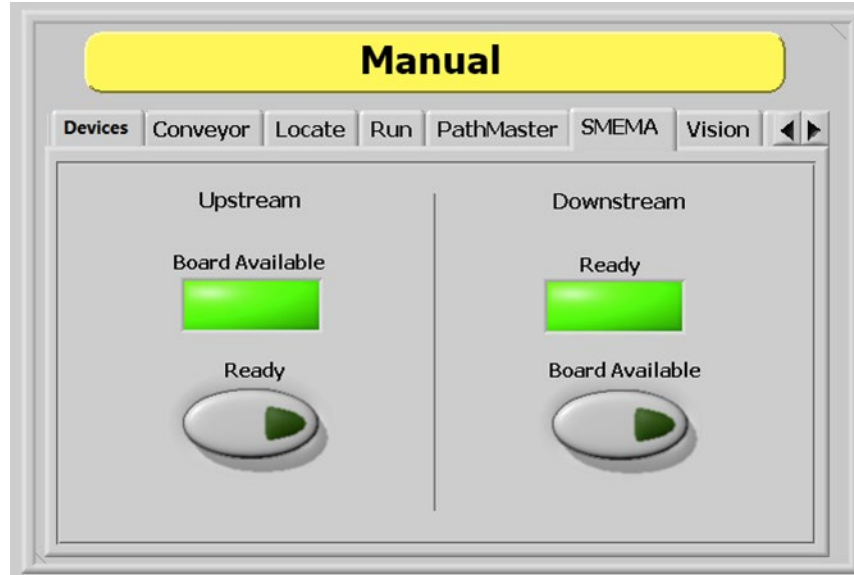


Figure 15: SMEMA Status, Manual Mode

When the workcell is put in-line, SMEMA signals communicate with upstream and downstream machines. You can check the inputs to the workcell and change the Upstream Ready and Downstream Board Available output signals under the “**SMEMA**” tab.

1. Select the “**SMEMA**” tab.

The Upstream “**Board Available**” signal turns on when the upstream machine sends a board available signal.

2. Select Upstream “**Ready**” to toggle the **Ready** output to the upstream machine on or off. When on, the workcell can receive parts.

The Downstream “**Ready**” signal turns on when the downstream machine sends a ready signal.

3. Select Downstream “**Board Available**” to toggle the **Board Available** output to the downstream machine on or off. When on, the workcell can send parts.

## 6.7 FIS

The PVA integrated factory information system (FIS) is an optional add-on. It is configurable and will interface and handshake with the majority of factory information systems. If necessary, messages can be customized.

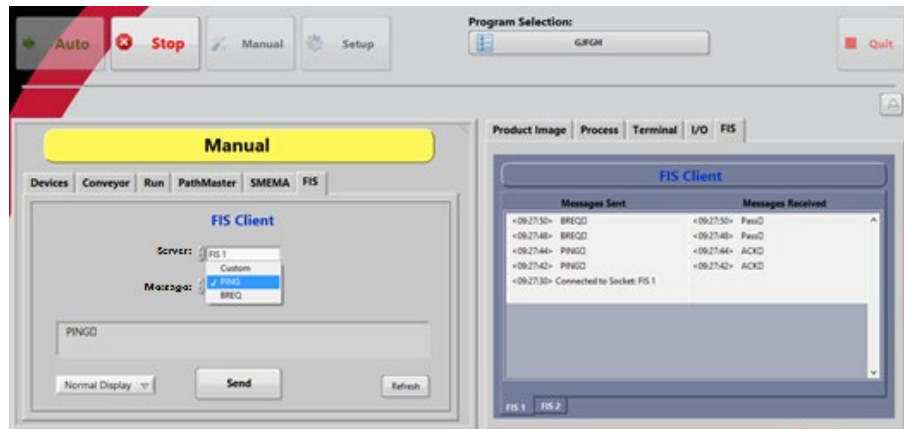


Figure 16: FIS Client Mode and Messages Screens

### 6.7.1 FIS Client Mode Screen

1. The FIS Client mode screen can be seen in manual mode when the FIS tab is selected.



Figure 17: FIS Function

2. To change the display format, select an option from the **Display** drop down menu (Normal, '\ Code, Hex Code).
3. Select the **Server** menu to select the sever you want to send a message to. This list is specific to each workcell.
4. Select the message you want to send from the **Message** drop down menu. The message will be shown in the message box.

5. If **Custom Message** is selected from the **Message** menu, you can edit the message window. Use the keyboard to type the message exactly as it should be received by the server.
6. Select **“Clear”** to clear the custom message. This button is only available for custom messages.
7. After you have selected or typed the message, select the **“Send”** button to send the message.
8. Select **“Refresh”** to refresh any dynamic data in the message, such as a Galil variable. The **“Refresh”** button is not shown for custom messages.

## 6.7.2 FIS Client Message Screen

- To see the FIS Client message screen, select the FIS tab from the systems tab.

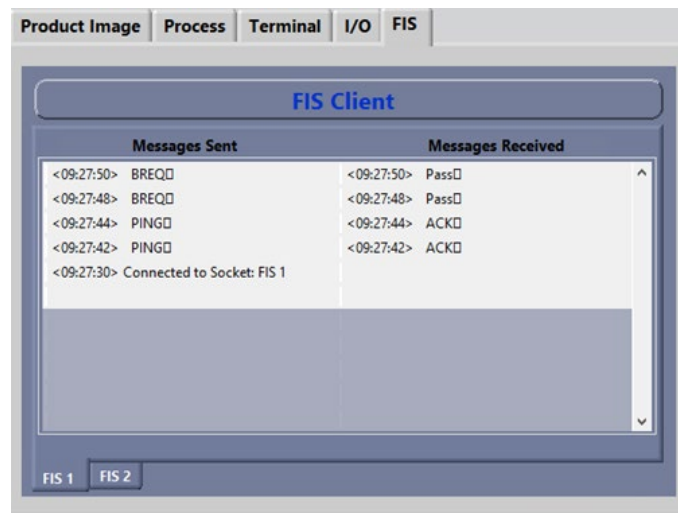


Figure 18: Message Terminal

- To access the large pop-up display, hold the “CTR” button on the keyboard and double click on the message terminal.

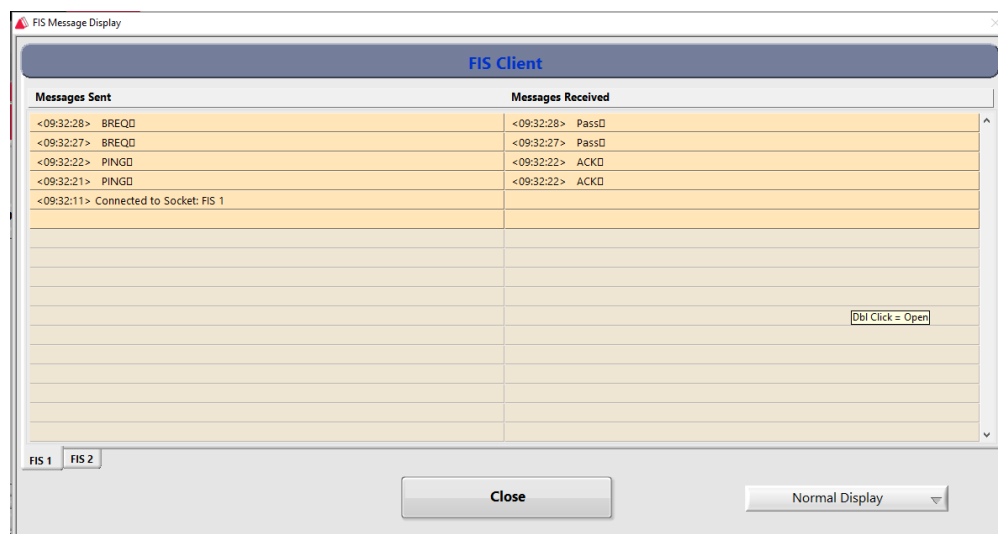


Figure 19: FIS Message Display Window

- To change the display format, select an option from the **Display** drop down menu (Normal, '\ Code, Hex Code).
- Select “**FIS 1**” or “**FIS 2**” at the bottom right corner the window to select the FIS instance (server) you would like to see.
- Select the “**Close**” button to close the popup window.

## 6.8 Vision

For more information on vision and fiducials, refer to your vision manual.

### 6.8.1 Camera Window

Shown below is the standard camera window. Each available function in the vision window is explained below. To access the vision window select the Vision tab from the system tab section of the screen.

- Select the **“Zoom”** button to zoom in, or increase the size of the image on the screen. This is available for static or live images.
- Select the **“Pan”** button to move across the zoomed image.
- Select the **“Center”** button to make the image the original size and align it with the center of the screen.
- Select the **“+”** (Crosshair) button to toggle the crosshair overlay on and off. This is available for live and static images.
- Select the **“Debug”** button to toggle the debug message window on and off. To hide the **“Debug”** button use the Vision.ini key.

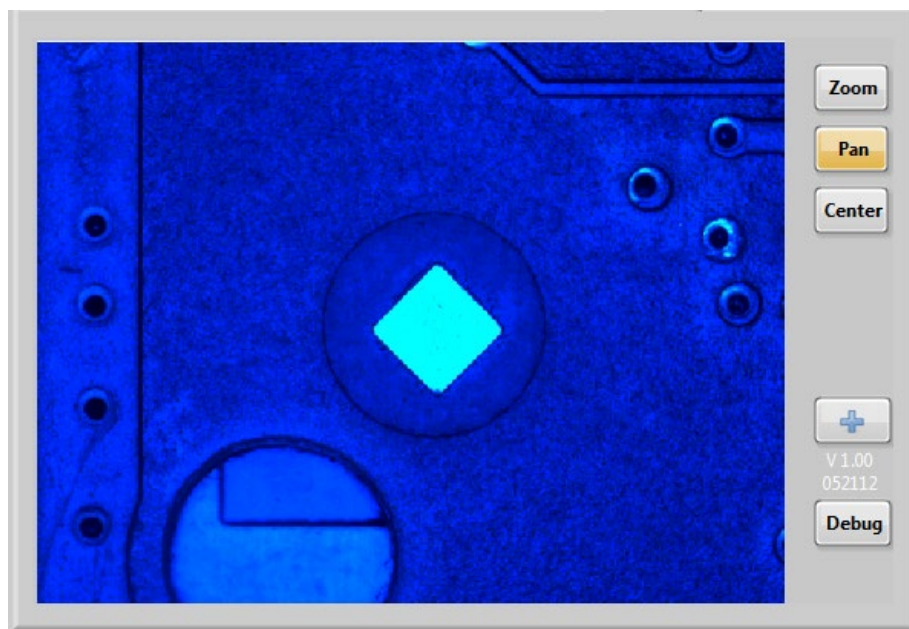


Figure 20: Vision Window

### 6.8.2 Manual Mode Vision Window

The vision window is used to set inspection attributes, create new fiducials (from template), edit and test inspections.

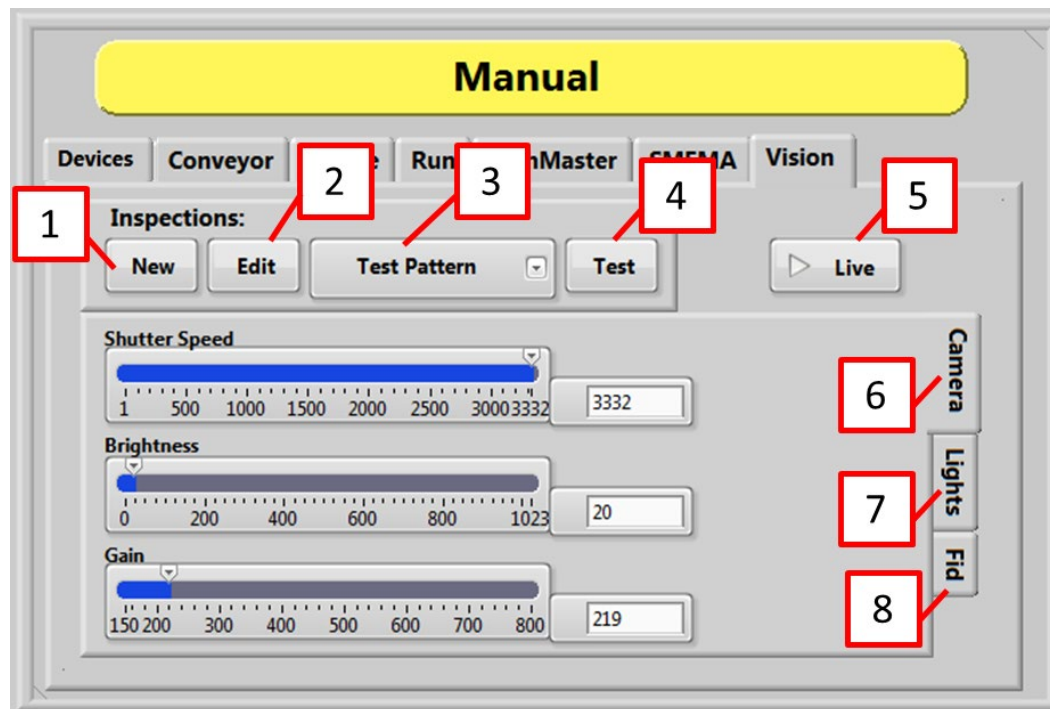


Figure 21: Manual Vision, Camera

1. Select the **"New"** button to create a new inspection from a list of templates.
2. Select the **"Edit"** button to take the current image and open NI Vision Builder to edit the steps of the current inspection.
3. Select the **Select Inspection** drop down menu to select the current inspection.
4. Select the **"Test"** button to take the current image and run the current inspection.
5. Select the **"Live"** to toggle camera live mode on and off.
6. Select the **"Camera Tab"** to set the camera attributes related to the current inspection. Also set the shutter speed, brightness, and gain.

**Warning:** *The selected program is changed as soon as you change the image adjustments for shutter speed, brightness, and gain.*

7. Select the **"Light Tab"** to toggle the selected light on and off. This is a manual only function that does not change on the automated inspection.

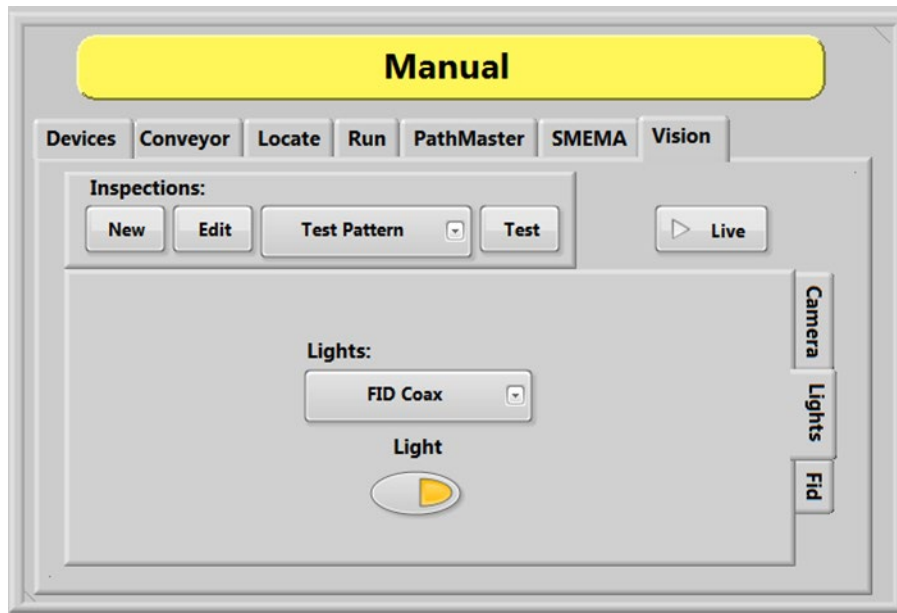


Figure 22: Manual Vision, Lights

8. Select the **"Fid Tab"** to set the tolerance for the B fiducial for the current inspection.

**NOTE:** An inspection can be used for an A or B fiducial or general inspection type. Fiducial tolerance is the radial tolerance from nominal for a fiducial B type inspection. Refer to the PathMaster Vision manual for more information.

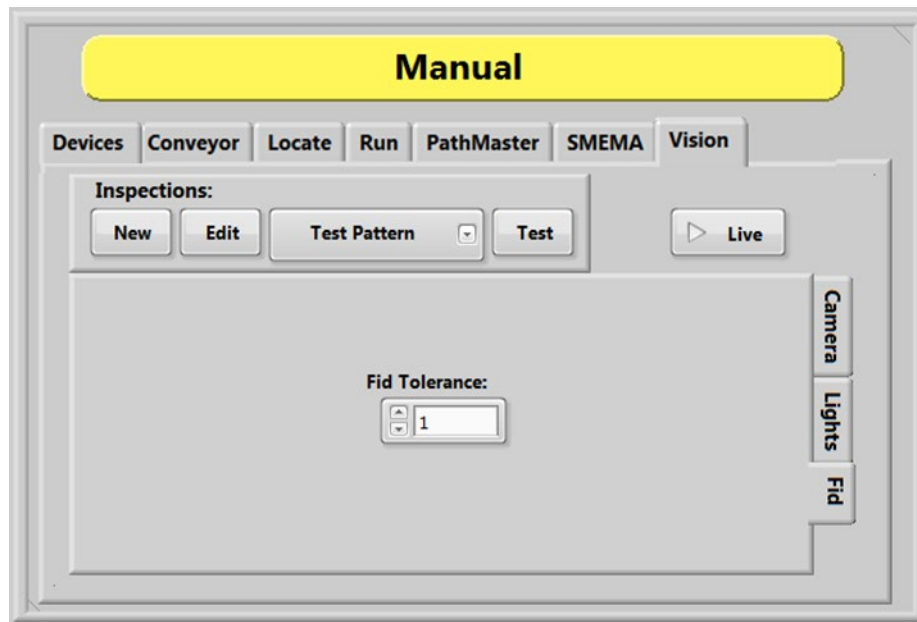


Figure 23: Manual Vision, Fid

### 6.8.3 Setup Tree Vision Options

The vision functions shown below are set in the “Vision” option under “Setup Tree” in Setup mode. Each option can be toggled to enable or disable it.

When the **Fiducial Check** function is enabled a fiducial check will run in Auto Cycle. The camera will go to the fiducial coordinate but will not run the inspection when disabled.

The **Run Camera Live** function, when enabled, will make the camera live unless an inspection is running or there is a failed inspection. If disabled, the camera will run live only during the inspection and then turn off.

**NOTE:** Any lights related to the inspection will shut off when the camera is not live.

The **Manual Mode Theta** function unlocks the theta position (W-axis) to prevent teaching an incorrect theta position.

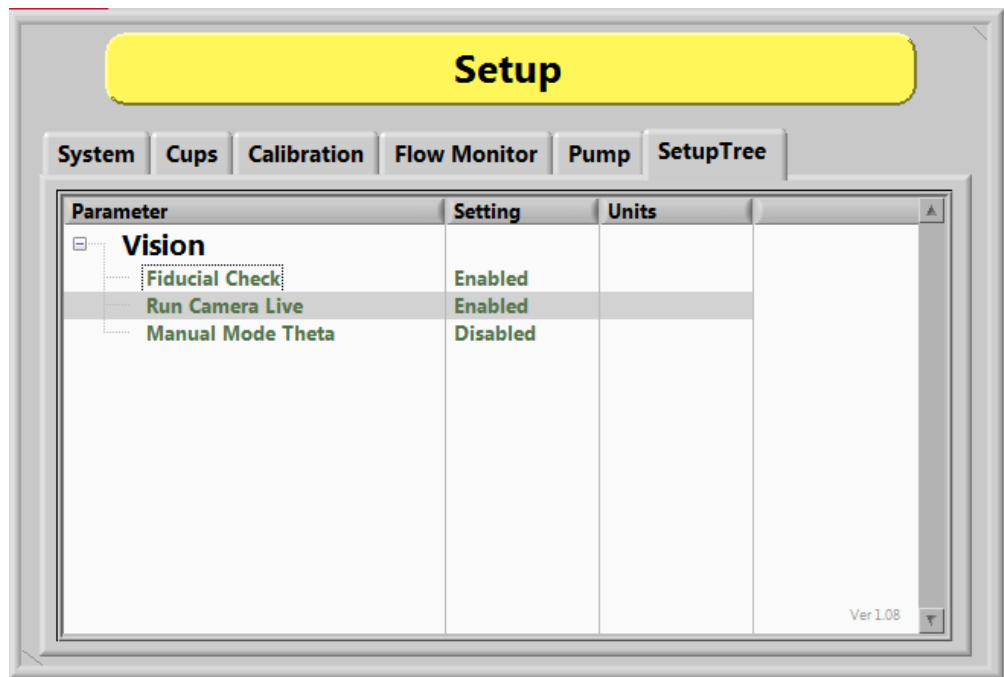


Figure 24: Vision Setup Tree

## 7 Auto Mode

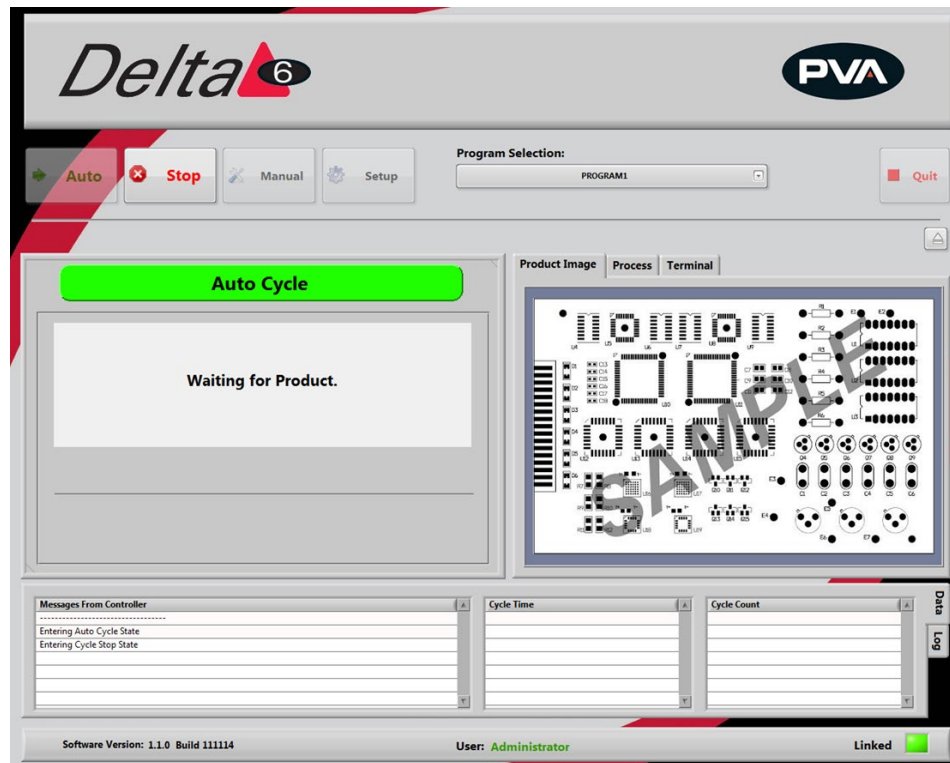


Figure 25: Auto Cycle

In this mode, the workcell automatically processes parts as they are available. Some possible workcell setups are:

- Conveyor equipped
- Stand-alone with a door
- Stand-alone with a light curtain

For a workcell with a conveyor, the part is put on the conveyor by an operator or through an upstream process. The part is sensed at the entrance of the workcell and is sent to the stop. When the part is against the stop, it is sensed and the PathMaster program will begin. When the PathMaster program is finished, the board is sent to the end of the conveyor for the next step. When the part is released or removed, the procedure starts again.

For workcells without a conveyor, all parts must be put in the workcell manually. Optional part-in-place sensors sense when a part is present. If a part is not sensed, a “Waiting for Product” message is shown. When the workcell is ready to operate, use the hand switches to produce parts. Remove all finished parts before the next cycle starts.

If the workcell has a light curtain, the light curtain can be used to initiate cycles.

## 8 Setup Mode

The options shown in Portal depend on the workcell configuration. Refer to your machine specific manuals and appendices for more information.



Figure 26: Setup Mode

In Setup mode you can control basic workcell functions. Auto Cycle parameters and some workcell parameters are set in Setup Mode.

### 8.1 System

1. Select the **"System"** tab.
2. Select **"Run Wet"** to toggle it on or off. Valve operation is off for Auto Cycle when the Run Wet is set to off. This does NOT affect the run option in the Manual mode. There is a separate option in Manual mode to select **"Wet"** or **"Dry"**.
3. Select **"Bi-Directional"** to toggle between single and bi-directional in auto cycle (on machines that have that option).
4. Select **"RESET"** to reset the cycle count to zero.
5. Select **"Stop"** to leave Setup mode and go to Cycle Stop.

## 8.2 Auto Purge/Solvent Cups Setup

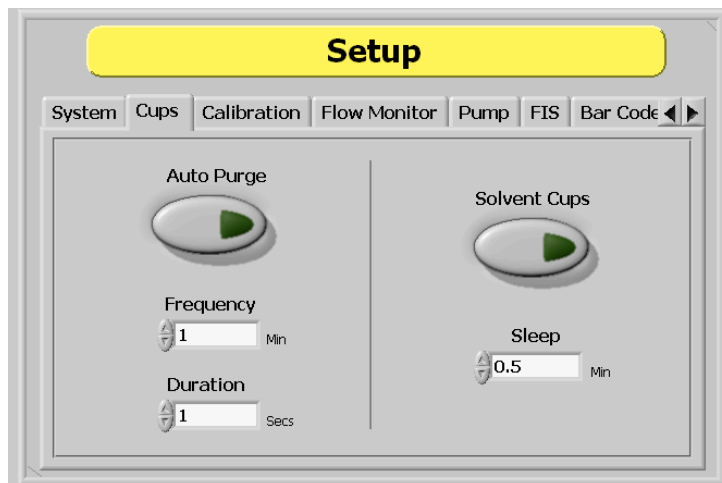


Figure 27: Auto Purge and Solvent Cups Setup

With the cups tab you can set the purge and/or solvent cup features. Auto purge dispenses material from all valves at specific intervals to stop valves from clogging. The default setting depends on the material used. The workcell only auto purges when in Auto Cycle or Cycle Stop. The workcell does not auto purge in other modes but will immediately auto purge when returned to Cycle Stop or Auto Cycle, if necessary.

**NOTE:** *If the workcell has solvent cups, the solvent cup routine overrides the auto purge settings. The system will only purge when necessary with the solvent cup sequence.*

1. Select the **"Cups"** tab.
2. Select **"Auto Purge"** to set the function to on or off. Solvent cups must be off for the auto purge function to work.
3. Use the up and down arrows to set the **Frequency** in minutes of how often the valves will purge. Or, type the necessary value in the box.
4. Use the up and down arrows to set the **Duration** in seconds for the time the valves will purge for (applies to both auto purge and solvent options). Or, type the necessary value in the box.
5. Select **"Solvent Cups"** to turn the solvent cups on or off. When the solvent cups are on, the auto purge function is overridden. The valves will purge any time they move out of the solvent position (not in manual mode).
6. Use the up and down arrows to set the **"Sleep"** value in minutes. Or, type the necessary value in the box. The sleep value is duration of inactivity during auto cycle before the heads move to the solvent cups.

## 8.3 Flow Monitor (Optional)

The Flow monitor will always be in setup tree with only on/off settings. Setpoint and deviation MUST be set in path programs.

Some workcells have flow monitors (up to four) installed. Workcell flow monitors measure the amount of material that flows through the supply line before it goes to supply individual valves. They are used to show when the actual values are outside of the set values. The operator sets the necessary material volume and permitted deviation.

### ***8.3.1 Priming the Flow Monitor***

The flow monitor must be primed before it is used to prevent damage. When you prime the flow monitor, the amount of air that goes through the unit during initial startup is reduced. Do the procedure below to prime the flow monitor.

1. Fill the pressure vessel with material and close tightly, refer to the system manual.
2. Set the material pressure regulator to 0 psi.
3. Turn the air inlet and material outlet valves to the closed position.
4. Disconnect the material line from the inlet port of the flow monitor.
5. Turn the air inlet and material outlet valves to the open position.
6. Use the material pressure regulator to slowly increase the material pressure until material flows from the disconnected material line.
7. Turn the material outlet valve to the closed position.
8. Reduce the pressure for the pressure vessel and adjust the material pressure regulator to 0 psi. Refer to the fluid system manual.
9. Connect the material line to the inlet port of the flow monitor again.
10. Do the manual purge procedure outlined in the operations and maintenance manual to open the valves, refer to Section 6.1.
11. Turn the material outlet valve to the open position.
12. Use the material pressure regulator to slowly increase the material pressure to the operating pressure.
13. Continue the manual purge procedure for each valve until material flows without any breaks in the flow.

### ***8.3.2 Find the Correct Material Volume***

You must have a complete path program before you find the correct material volume. Any change to a program changes the flow data results.

1. Load a completed program into memory.
2. In Portal, select Manual mode.
3. Put the board in the correct position, as related to the board stops, and run one cycle as **“WET”**. For more information on the Manual mode, refer to Section 6.
4. After the cycle is done, the dispensed volume is shown in the system messages window.
5. Select **“Stop”** to go to Cycle Stop.
6. Select **“Setup”** mode.
7. Select the **“Flow Monitor”** tab in Setup mode (In the setup tree adjust the setpoint to match the value found).
8. Change the flow set point to the value that was shown on the mode system messages window. This will be a DMC command in your path program, adjust the value of the variable to achieve this.
9. Select **“Stop”** to go to Cycle Stop.
10. Select **“Manual”** mode.
11. Operate the workcell for more cycles to make sure the path program dispenses the same amount of material each cycle.

### ***8.3.3 Set the Material Volume Check***

The settings for the material volume check must be programmed into the path program. If no settings are programmed in the path, the machine will use the flow monitor settings of the program run before it. To set the material volume check parameters, program these settings into the path program.

- Two variables are used: FC\_SETx and FC\_DEVx; if you set these to “0” it will cause errors.
- And “x” is the letter of the related flow monitor (A, B, C, or D).
- FC\_SETx is the set point for the material flow in cc.
- FC\_DEVx is the percent deviation allowed, which can be anywhere from 0 to 99.

As an example, entering the following line into a path program: FCA\_SET=0.500; FCA\_DEV=5 would put the volume setting for monitor ‘A’ at 0.5 cc and the allowable deviation at 5%.

### 8.3.4 Auto Cycle Flow Error

Auto Cycle checks the material flow after every cycle if the error is turned “ON” in the Flow Control mode. If the volume is within parameters, no indication is shown. When the volume is outside the parameters, the flow error screen is shown when the cycle completes (not immediately on error).

Remove the part before operating the workcell again.

***NOTE: Any changes made to settings in the material delivery system (material pressure, stroke adjustment, etc.) will affect the data from the flow monitor. When this happens, it will be necessary to find the correct material volume again.***

### 8.3.5 Flow Monitor Calibration

The flow monitor on the workcell measures the amount of material that moves through the material supply line before it splits to supply individual valves. It does not control the process, but reports deviations from the set values. Both the necessary material volume and the permitted deviation are determined by the operator. The flow monitor calibration should be examined once a month or if any changes are made to the fluid delivery system.

This procedure is to calibrate a single flow monitor, if the specific gravity of the dispensed material is known. This procedure would calibrate the A flow monitor, to calibrate the B, C, and D monitors replace the variable DEZ, with DEW, DEE, and DEF respectively, as well as FCA\_CAL, with FCB\_CAL, FCC\_CAL, and FCD\_CAL. See the Chart at the bottom of the page for the variables relating to each monitor.

1. Login to Portal.
2. Make sure the workcell is in Manual Mode.
3. Select the Terminal tab on the right side of the Portal screen to open the terminal screen.
4. Type DEZ=0 (for first flow monitor only) in the top section of the terminal screen and select the “Enter” button on the keyboard. This resets the flow monitor encoder to zero.
5. Weigh an empty purge cup and record the weight, or zero the scale with the empty purge cup on it.
6. Purge a quantity of material into the purge cup.
7. Type DEZ=? into the terminal and select the “Enter” button on the key board. A number will return (ex. 50 counts per cc dispensed). The factory set value is 1000cnt/cc. If zeros are returned or incorrect data, type MG\_DEZ=?

8. Weigh the dispensed quantity of material in grams. Subtract the weight of the cup if necessary.
9. Find the volume in cc with the equation below:  

$$\text{Grams of material} / \text{specific gravity} = \text{cc}$$

**Ex:**  $.500\text{g} / .96 = .5208\text{cc}$
10. Use this value (in cc) to find the correct number of counts per cc dispensed.  

$$\text{Counts/cc} = \text{counts per cc}$$

**Ex:**  $25\text{counts} / .5208\text{cc} = 48.003 \text{ counts per cc}$
11. Do this procedure at least three times and average the results.
12. Open the Main Program in a text editor such as Windows NotePad.
13. Search for the variable: **FCA\_CAL=** It will be in the section titled: REM !!!!  
 Machine-Specific Information!!!!
14. Type in the new value for **FCA\_CAL=** (Ex: FCA\_CAL=48.003)
15. Download the modified main program and test changes.

Flow Monitor	Variables
A	DEZ FCA_CAL
B	DEW FCB_CAL
C	DEE FCC_CAL
D	DEF FCD_CAL

**Table 1: Flow Monitor Variables**

## 8.4 Needle Calibration

The workcell has one of three calibration methods: Standard, Operator Defined, and Sensor Defined. If a sensor defined or operator defined method is installed on the workcell, the machine may or may not automatically enter its particular calibration mode when you enter Auto mode. This will depend on the application the workcell was set up for. Refer to Sections 8.4.1-8.4.3 for information on different calibration sequences.

### 8.4.1 Standard Needle Calibration

Standard needle calibration is the easiest calibration procedure.

1. Select the **“Calibration”** tab in Setup mode.
2. Select the necessary valve or tool from the drop down **“Select”** menu.
3. Select the **Reference Position “GO”** button. The selected valve will move to the calibration point.
4. Examine the position of the needle as it relates to the calibration point (such as cross-hairs).
5. If the needle is not directly above the point, use your hands to bend the needle or adjust the tool position so the needle is above the calibration point.

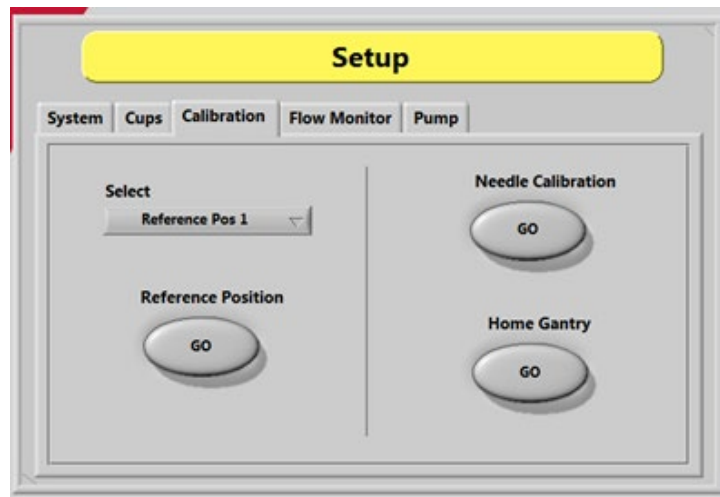


Figure 28: Needle Calibration

### 8.4.2 Operator Defined Needle Calibration

For operator defined needle calibration you must use the trackball to define the coordinate system to the position of a specific needle or dispense head. If the needle is in the correct position, this procedure is not necessary.

1. The head moves to a calibration point (specified in the main program).
2. When at the calibration position use the trackball to put the needle tip in correct position as it relates to a calibration point (such as cross-hairs).
3. Select the “**CAL**” function key to start this procedure if a needle needs to be replaced during operation.

### 8.4.3 Sensor Defined Needle Calibration

The Needle Calibration Unit (NCU) is referenced from the home position on the gantry. The start positions for each head to enter the NCU are referenced from the cross-hair mark on the top of the NCU. The coordinates are defined for each head using thru-beam sensors in the NCU.

- Z is always calibrated first in a downward motion into the Z sensor.
- The X and Y coordinates are then calibrated from this position in reference to the positioning of the NCU in the work area. The needle moves into the next sensor (X or Y) finding the first coordinate, then moves to the opposite side of the sensor and finds a second coordinate.
- The calibration routine then calculates the center of the needle average of the first and second coordinates and redefines the new position accordingly. This sequence is repeated for the remaining axis.

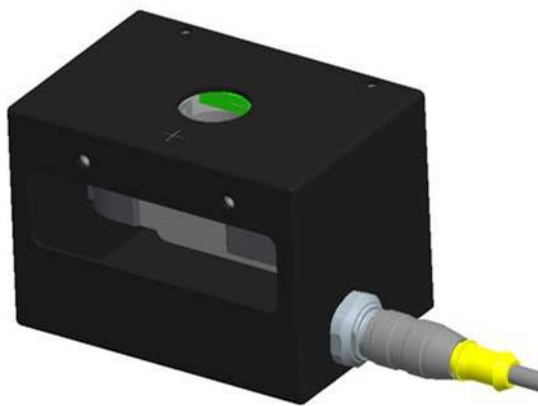


Figure 29: Needle Sensor Calibration Block

The end effector may have dispense heads, each of which has a needle. When a needle is replaced, or the machine is started, the needles should be calibrated. When the machine is in this mode, it automatically moves to a pre-set calibration point.

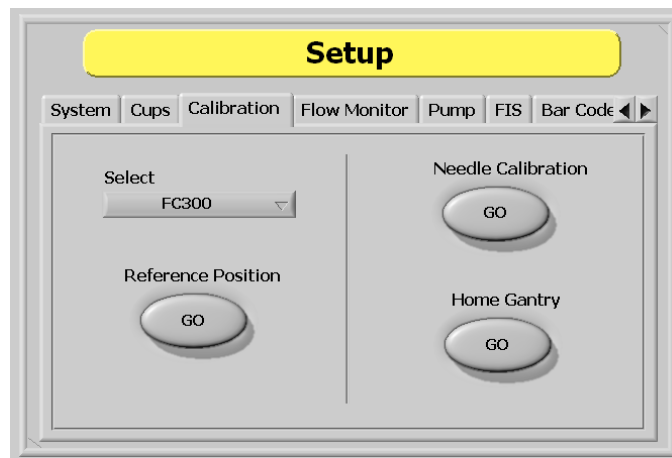


Figure 30: Sensor Defined Needle Calibration

Each head on the gantry will have a set reference position. The operator can select the head, and move the gantry to its related position. When at the preset point, the operator must physically reposition the dispense needle to make sure the calibration is correct.

***NOTE: If you have a calibration plate, each valve tip should align with the crosshair center point. If it does not, physically move the valve until it does. This is only for the mechanical alignment of the head assembly.***

1. In Setup mode, select the **Calibration** tab.
2. Select the **“Select Valve”** dropdown menu to change the active valve.
3. Select the **Reference Position “GO”** button to move the selected valve to the related reference position. This is useful when maintenance is done that might change the alignment of the gantry (to replace a valve after a head collision).
4. Select the **Home Gantry “GO”** button to home the system. The machine will NOT go to the standby point until the operator exits Setup mode.
5. Select the **Needle Calibration “GO”** button to start the needle calibration procedure. Do the steps shown on the screen to calibrate the needle.

## 8.5 Pump (Optional)

The pump configuration can be changed under the “**Pump**” tab in **Setup** mode as shown. Refer to the Optional Equipment folder of your electronic manual for more information.

1. In Setup mode, select the “**Pump**” tab.

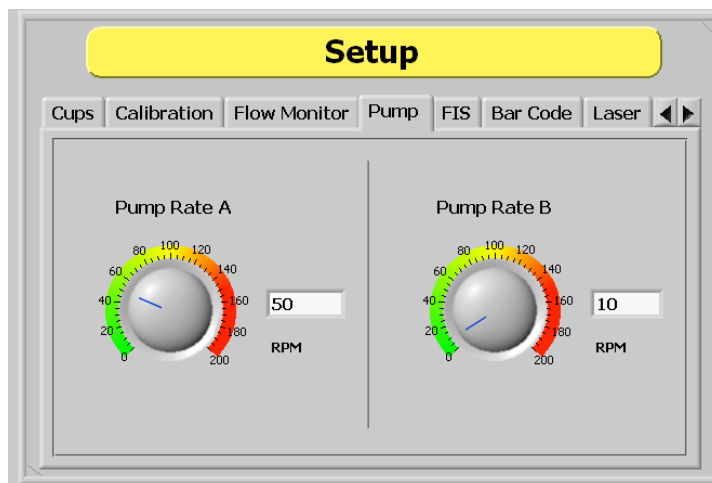


Figure 31: Pump Setup

2. To change the pump rate, type the value in the “**Pump Rate A (RPM)**” or “**Pump Rate B (RPM)**” box or use the cursor to move the dial to the necessary position.

**NOTE:** The stated RPM is of the motor, not the pump. In general, the ratio will be 20:1, 50:1 or 100:1 depending on the system. This in can also be found in the Setup tree. Refer to your valve manual for more information.

## 9 System Tabs

There are three normal system tabs: Product Image, Process, and Terminal. The options shown in Portal depend on the workcell configuration. Refer to your machine specific manuals and appendices for more information.

### 9.1 Product Image

The product image tab will show an imported image or the sample image shown below.

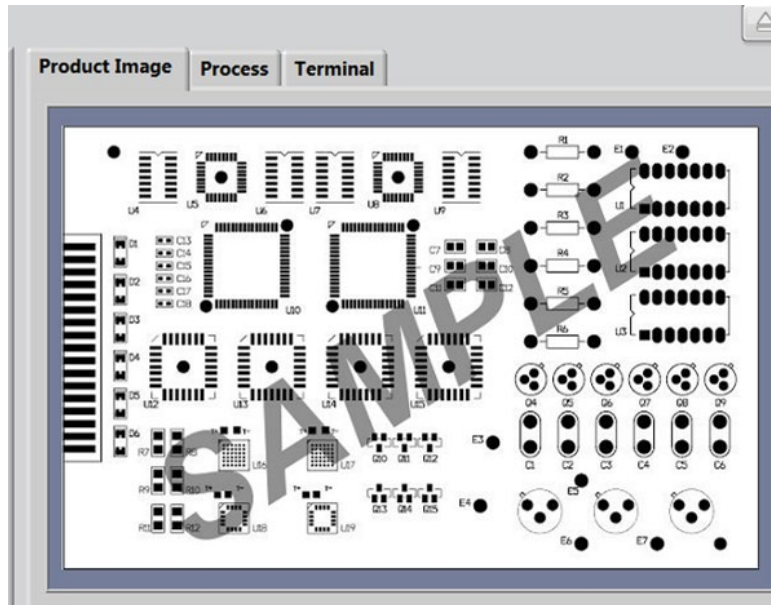


Figure 32: Product Image Tab

If the file name does not match the Program name or there are no images associated with a program, the following image will be displayed:

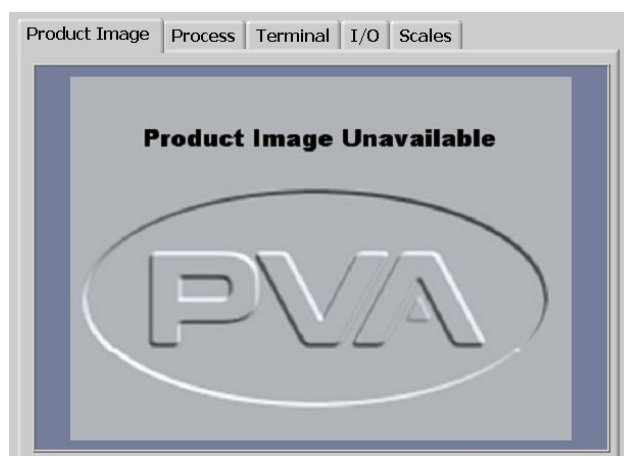


Figure 33: Product Image Unavailable

### 9.1.1 Adding Product Images

1. Copy and Paste the Product Image to the following Directory:  
`C:\Program Files\PVAPortal\Images`

**Note:** The images must be JPEG/JPG file type.

2. Rename the file to match the PathMaster Program Name.

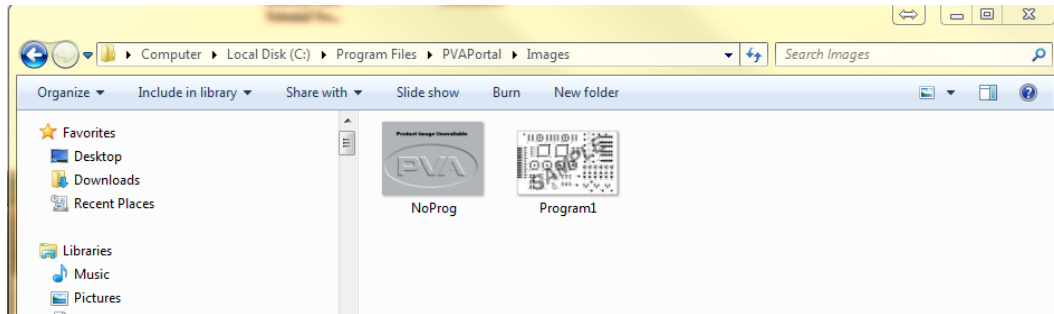


Figure 34: Product Image Directory

## 9.2 Process

### 9.2.1 Product

The **Product** tab is on the right hand side of the system tabs screens under the **Process** tab. This screen shows the cycle count and cycle time. It also shows the material volume from the previous Auto Cycle or One Shot Run. The data is updated after every run.

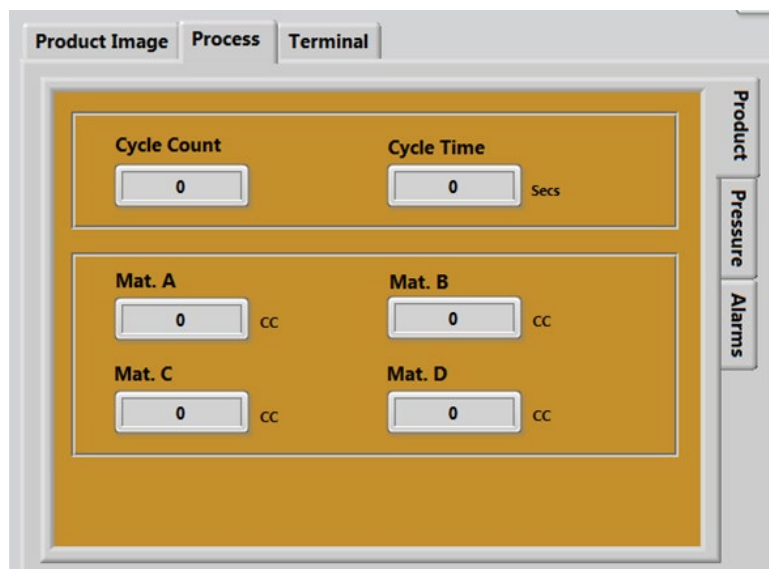


Figure 35: Process Product Tab

### 9.2.2 Process Pressure

The **Pressure** tab is on the right side of the system tabs screens under the **Process** tab. This screen shows the process pressure.

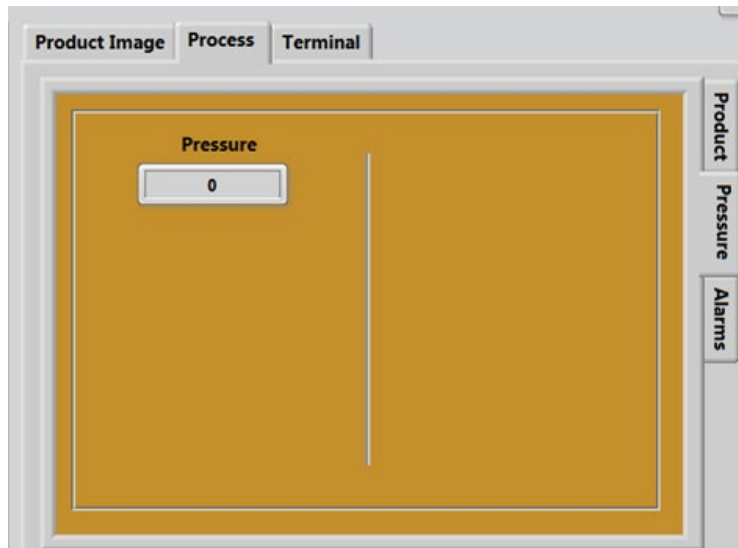


Figure 36: Process Pressure Tab

### 9.2.3 Process Alarms

The **Alarms** tab will show the operator any preconfigured system faults/warnings. These alarms are process dependent. Refer to your workcell specific manual for more information.

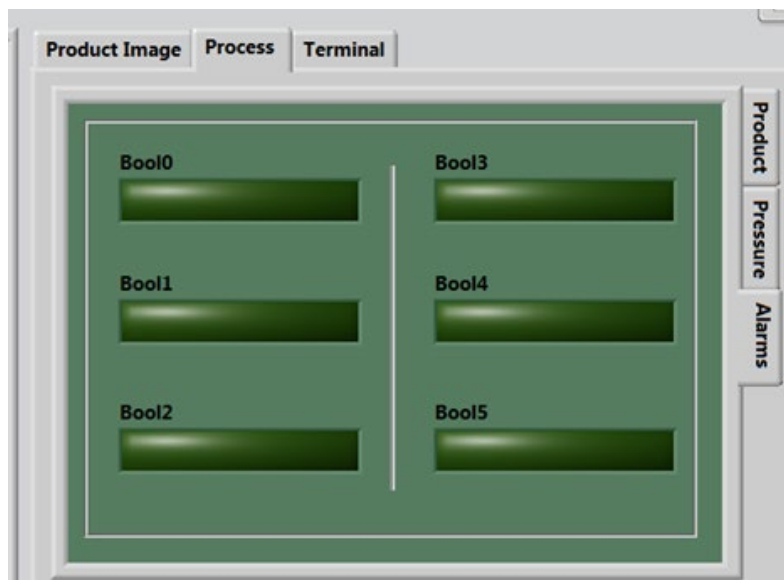


Figure 37: Process Alarms Tab

## 9.3 Terminal

The terminal is used to communicate with the controller. The terminal is used as a debug tool.

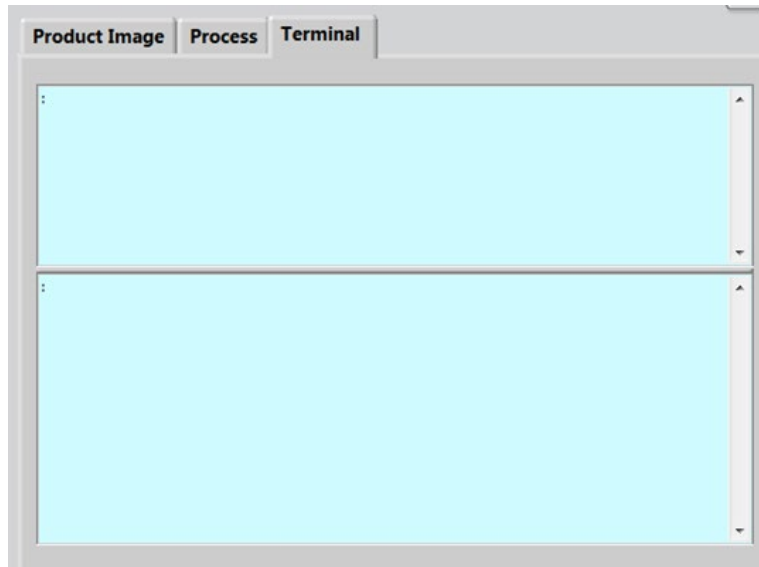


Figure 38: Terminal

## 9.4 I/O

The outputs can be toggled on and off and inputs can be verified in this window. Refer to the electrical schematics for I/O designation.

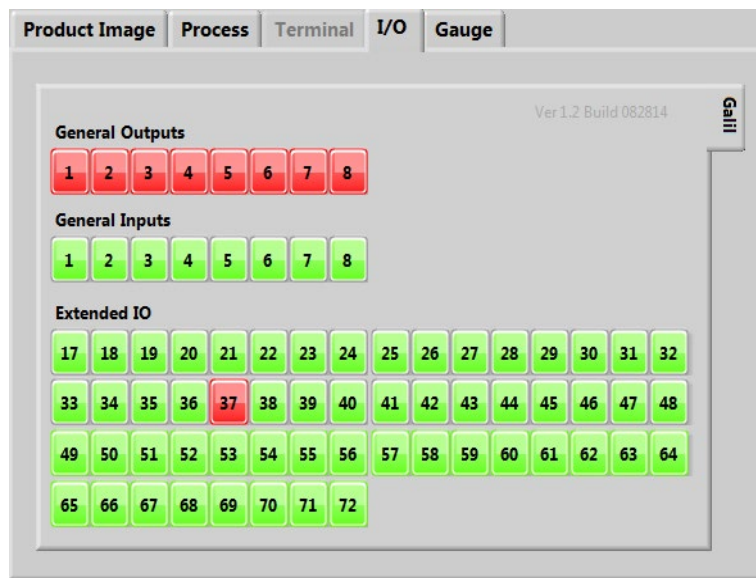


Figure 39: I/O Screen

## 10 Operation

**NOTE:** You must have administrator privileges to setup and correctly configure the workcell. Windows® User Account Control must be turned off.

### 10.1 Startup Procedure

**NOTE:** Do not power on the workcell, or add material to the pressure vessels until they are correctly grounded.

1. Turn the main power switch “On”.



Figure 40: Example of a Main Power Switch

2. Make sure the fluid and air pressures are in the correct pressure range.
3. Close all the doors.
4. Turn the DOOR BYPASS key switch to the “OFF” position (If applicable).
5. Engage the “Emergency Stop” button.
6. Turn the main power switch to the “On” position.

### 10.1.1 Portal Shell

7. Make sure the computer related to the workcell is on.

Portal Shell will open and give you a list of options.

8. Select “**Launch Portal**”.



Figure 41: Portal Shell

### 10.1.2 Login to Portal

9. Login to the PVA Portal Software. Select the correct user and enter the password. Push the “Enter” button on the keyboard.
10. PVA configures the default password as blank. Refer to portal permissions for more information.



Figure 42: User Selection

## 10.2 Exhaust Verification

Once the workcell has initialized, it will do a test of the exhaust flow rate. If initialization fails, refer to your workcell manual for fault diagnostics. The exhaust flow rate is monitored with the on board pressure differential switch.

The workcell must exhaust at a rate no less than 300 cubic feet per minute (CFM), otherwise a critical fault will occur and stop the motors. The test will also help to evacuate any vapors that are in the work area. The time this takes is based on the CFM and the area that must be evacuated. The screen below will be shown:

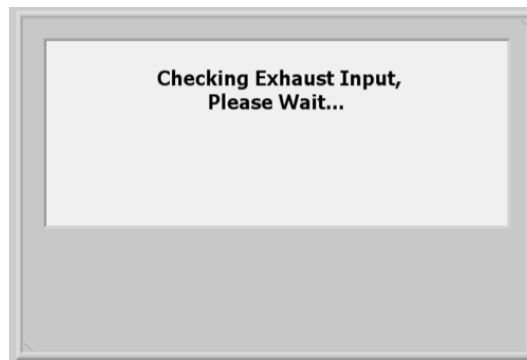


Figure 43: Exhaust Input Screen

## 10.3 Machine Safety Check

Once initialization and exhaust verification is complete, the operator interface shows the message below

The machine safety check makes sure the workcell safety devices (Emergency Stop, door interlocks, light curtain, etc.) operate correctly. During startup, the operator must start the safety check and complete it successfully, or the machine stops all operations.

1. Select **“Continue”**.

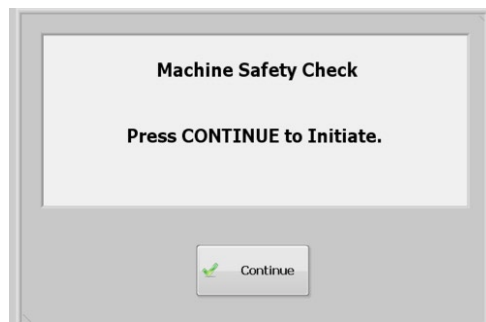


Figure 44: Machine Safety Check

2. You must activate and deactivate the safety devices when shown on the screen. All events in this procedure are timed. If an action is not done in 8 seconds an error screen will be shown.

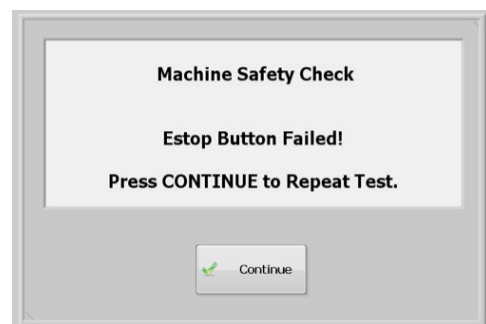


Figure 45: Safety Check, EStop Fail

3. Select **“Continue”** to repeat the test.

After the second failure, the workcell stops and must be restarted (turn the workcell power off and on again). The second failure does not have to be for the same device. An Emergency Stop failure followed by a door interlock failure stops the program.

***NOTE: If the safety check fails, a qualified person must examine the full system before the machine is operated again. Refer to the Troubleshooting Power Check Failures Document.***

## 10.4 Homing the Axes

After the safety check is complete, the screen below is shown.

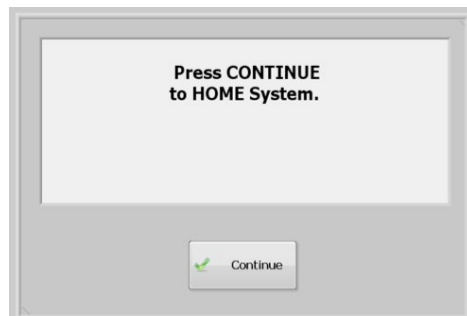


Figure 46: Home the System

1. Select "**Continue**" to home the system.
2. The axes home in the following order: Z, W (if installed), then X & Y simultaneously.

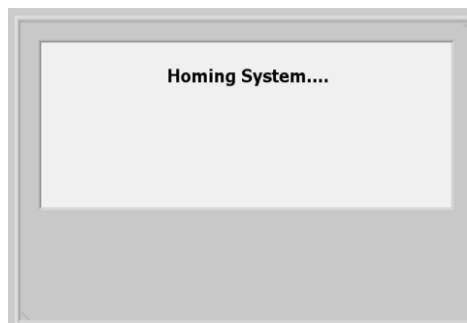


Figure 47: System Homing Screen

## 10.5 Standby Position

The end effector will move to the standby position when the homing sequence is complete, all calibration procedures are complete, a part is finished being processed, or if the machine is waiting for parts but it is not necessary to move to solvent or auto purge. The standby position is a defined location, different from the home position. Usually, the standby position is near the board stop to decrease travel during Auto Cycle. The workcell always goes back to the standby position in Cycle Stop. If the standby position needs to be changed, contact PVA.

1. When Portal opens select “**Continue**” to return the heads to standby and go to cycle stop mode.

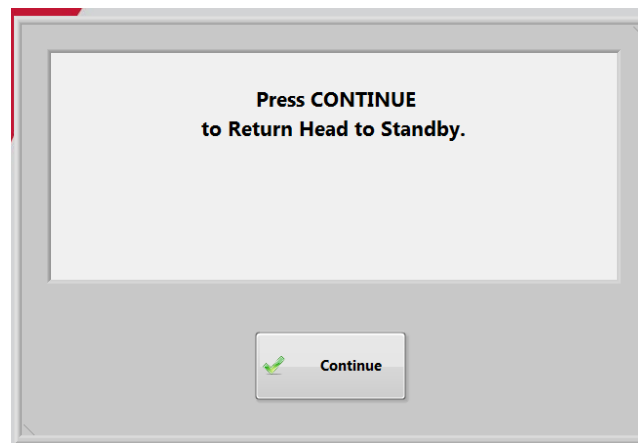


Figure 48: Press Continue Portal Screen

## 10.6 Solvent Cups

Some workcells have solvent cups installed. When solvent cups are used, the auto purge feature is overridden by the solvent cup routine. The Setup mode setting for frequency has no effect but after the device leaves the solvent cups the purge duration is used.

The solvent cup location is different for each workcell but will be in the workcell workspace. Solvent cups are used to keep the dispense/spray heads clean, if necessary.

- In Cycle Stop, the heads are in the solvent cups.
- In Manual mode, the heads will not go to the solvent cups until you exit Manual mode.
- In Auto Cycle, the heads do the purge routine automatically. They return to the solvent cups after a set period of inactivity.

To change the time delay before the heads enter the solvent cups in Auto Cycle, change the value in the Sleep field under the “Cups” tab in Setup mode, refer to Section 8.2.

## 10.7 Shut Down Procedure

If the machine is in cycle, wait for the cycle to finish and then return to Cycle Stop mode. The machine must be in Cycle Stop mode to shut down.

**NOTE:** *If your system needs to be flushed before it is shutdown, you must flush the system before you shutdown Portal.*

1. If you are in auto cycle wait for the cycle to finish.
2. Select the **“Stop”** button.
3. Close PathMaster.
4. Select **“Quit”** on the Portal interface, on the right side of the window.
5. The screen below will be shown, select **“Yes”**.

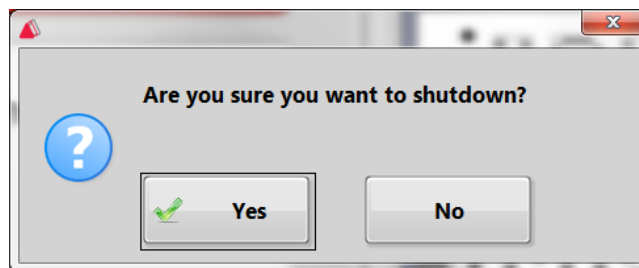


Figure 49: Portal Shutdown Question

A screen will show that Portal is shutting down.



Figure 50: Portal Shutdown Screen

6. When Portal is closed the Portal Shell window will be shown. Select the **“Shutdown”** button to shut down the attached PC.
7. To restart or log off select the green arrow on the Shutdown button and select the For a list of ways to exit the Portal Shell screen without turning off the computer, push the **“F1”** button on your keyboard. A window with shortcuts to exit the Portal Shell will be shown.

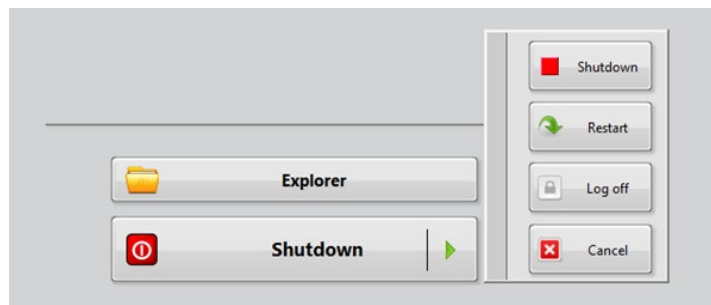


Figure 51: Portal Shutdown Options

***NOTE: Make sure that the PC has been correctly shutdown BEFORE you stop power to the workcell!***

Refer to your workcell manual for additional information on how to shut down your workcell.

## 11 Portal Permissions

Each user must have a password and user name. After any changes are made you must log out and log back in for any changes to be seen. To add a user or make changes to the password or user permissions do the steps that follow:

1. Select Portal Permissions from the Portal Shell screen.



Figure 52: Portal Permissions

2. The administrator must login.



Figure 53: Administrator Login

3. When the administrator is logged in, you have access to portal user accounts and can select the permissions for each user.

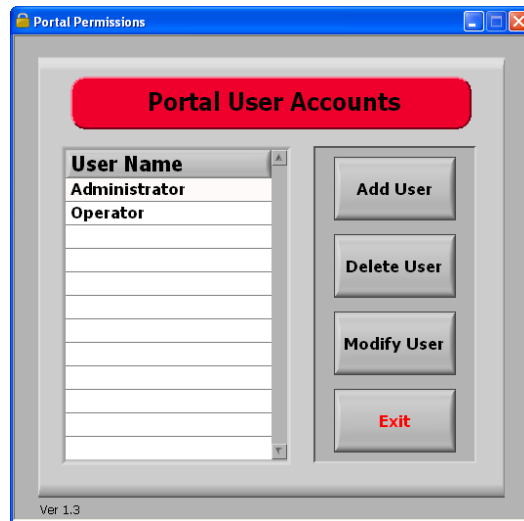


Figure 54: User Accounts

## 11.1 To Add a User Account

1. Select **"Add User"**.

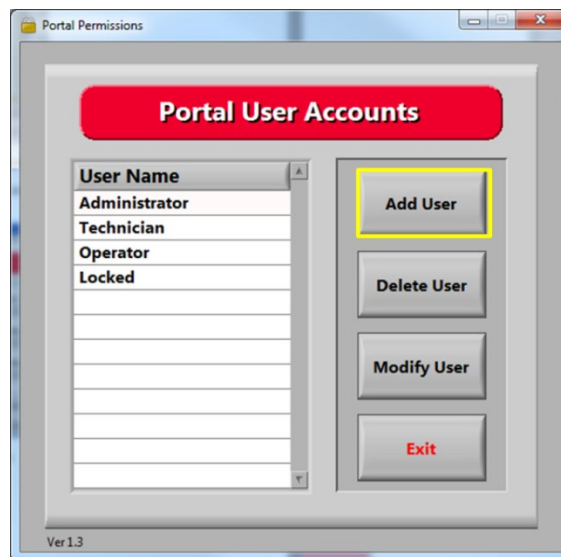


Figure 55: Select "Add User"

2. Under **User Login**, type the Username, Password, and ReEnter Password.
3. Select the correct Permissions for the user, click on the related permissions boxes. When selected, the boxes will be bright green.

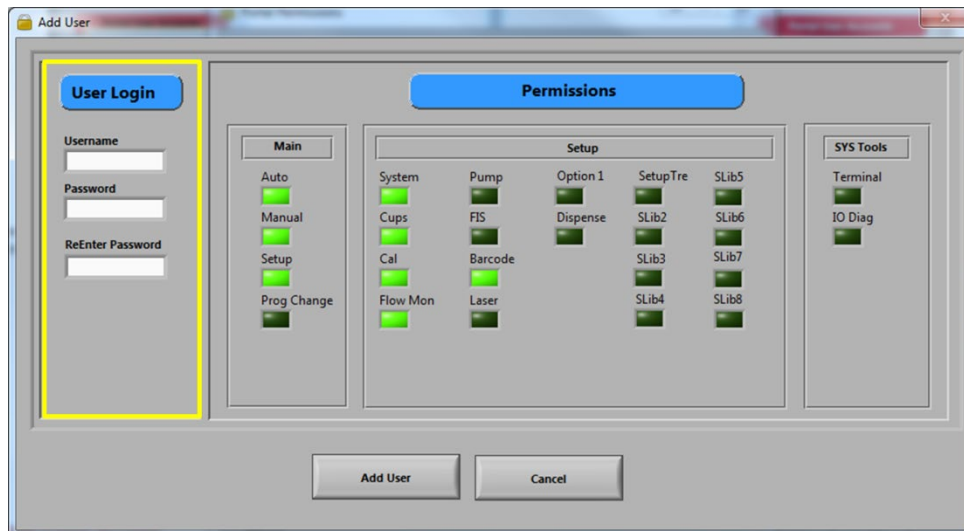


Figure 56: Add User and Permissions

4. Select **"Add User"**.
5. Do steps 1-4 as many times as necessary to set up all users.
6. Select **"Exit"** to save and close portal user accounts.

## 11.2 To Modify User Accounts

1. Select the User Name you want to change.

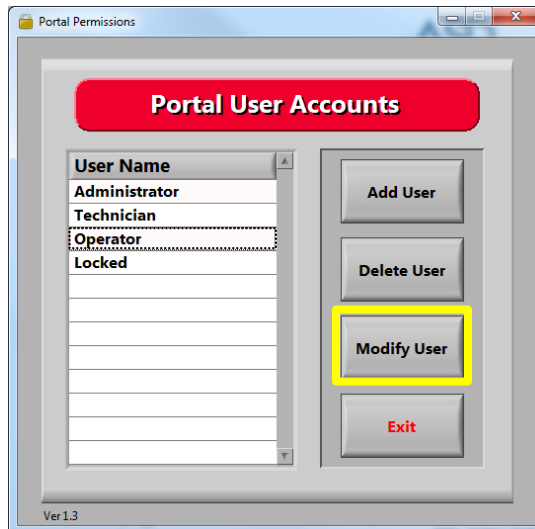


Figure 57: Select a User

2. Select “Modify User”.

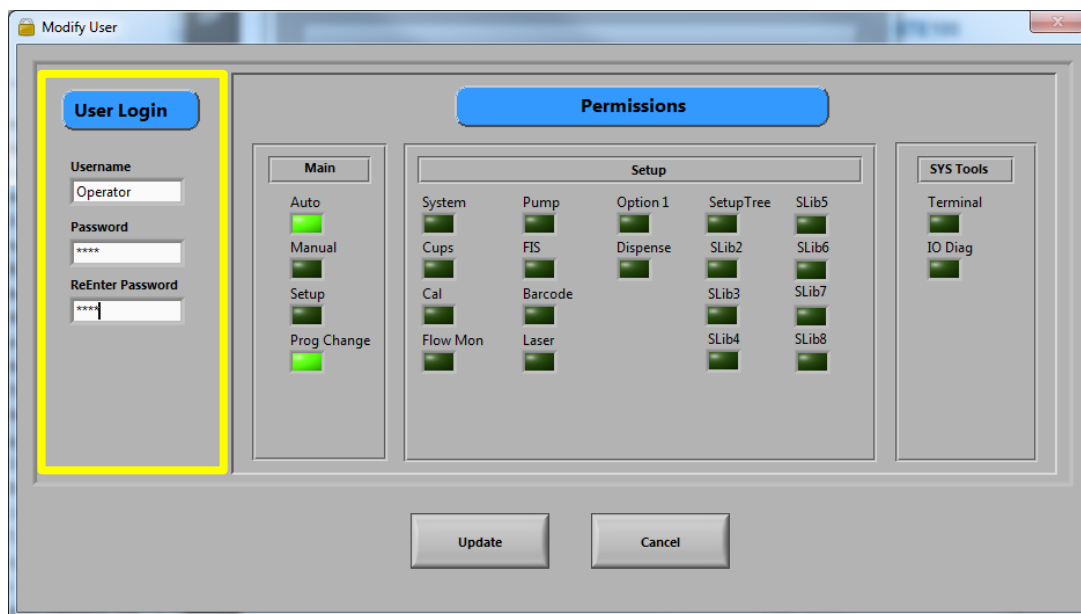


Figure 58: Modify User

3. Change the user settings. Select new permissions, or change the user password.
4. Select “Update” to save.

## 12 Portal Communications

Portal communications contains the parameters for communicating between Portal and the galil. There are two virtual communications established with the controller, the Primary Connection, and the Unsolicited Connection.

**NOTE:** *Changing the IP Address, Port, or Handle will cause communications issues unless main program modifications are done correctly. Contact PVA before you change any default values.*

### 12.1 Communications

The communications tab has the IP Address and the Timeout.

1. To change the **IP Address**, type the value in the box.
2. To change the **Timeout** value, type a new value in the box or use the arrows to increase or decrease the value.

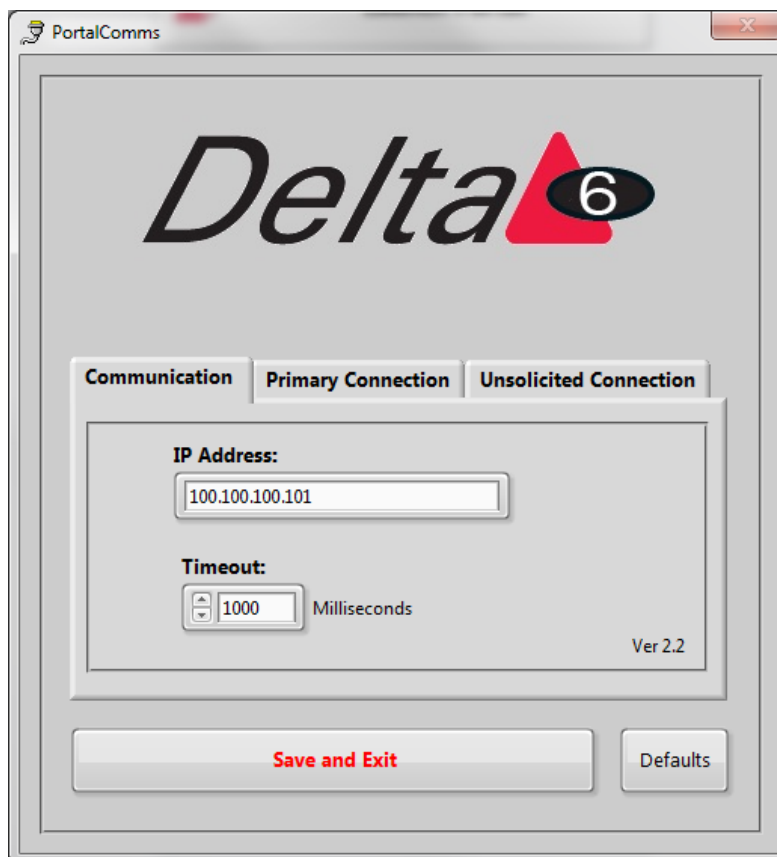


Figure 59: PortalComms Communication

## 12.2 Primary Connection

The **Primary Connection** tab has the settings for the primary handshaking between the Galil and Portal.

- The **Primary Handle** and **Type** must be different from the settings for the unsolicited connection.
- Select the arrow next to the setting to select a setting from the drop down menu.
- You can select “**Defaults**” at any time to return the Primary Connection settings to the default factory settings.



Figure 60: PotalComms Primary

## 12.3 Unsolicited Connection

The **Unsolicited Connection** tab has the settings for the system messages communication between the Galil and Portal.

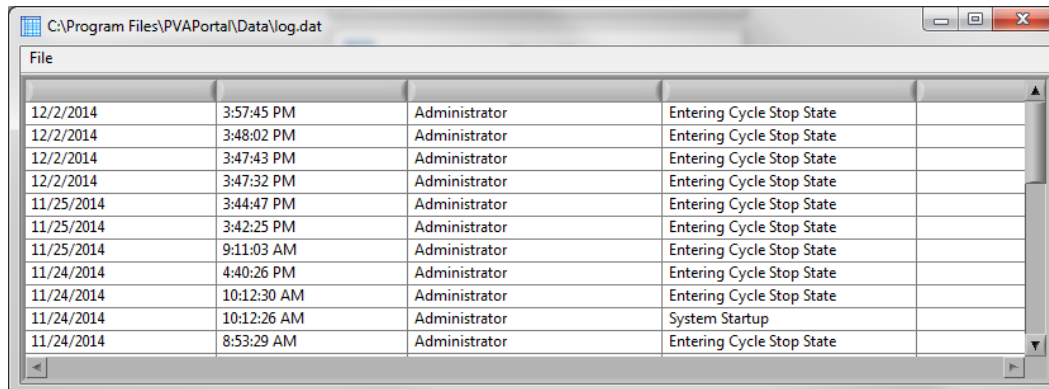
- The **Unsolicited Handle** and **Type** must be different from the settings for the primary connection.
- Select the arrow next to the setting to select a setting from the drop down menu.
- You can select “**Defaults**” at any time to return the Unsolicited Connection settings to the default factory settings.



Figure 61: PortalComms Unsolicited

## 13 DataView

The Portal Dataview application can run as a standalone application or as an embedded version within PVAPortal. The standalone version can be resized, maximized or minimized. The embedded version in the Log tab on the main Portal screen and has a fixed dimension that is sized accordingly. Additional configuration of each version of the DataView app is handled in the Portal Sysconfig.ini file. Refer to the ini configuration parameters listed below for more information.



The screenshot shows a window titled 'C:\Program Files\PVAPortal\Data\log.dat'. Inside, there is a table with the following data:

Date	Time	User	Action
12/2/2014	3:57:45 PM	Administrator	Entering Cycle Stop State
12/2/2014	3:48:02 PM	Administrator	Entering Cycle Stop State
12/2/2014	3:47:43 PM	Administrator	Entering Cycle Stop State
12/2/2014	3:47:32 PM	Administrator	Entering Cycle Stop State
11/25/2014	3:44:47 PM	Administrator	Entering Cycle Stop State
11/25/2014	3:42:25 PM	Administrator	Entering Cycle Stop State
11/25/2014	9:11:03 AM	Administrator	Entering Cycle Stop State
11/24/2014	4:40:26 PM	Administrator	Entering Cycle Stop State
11/24/2014	10:12:30 AM	Administrator	Entering Cycle Stop State
11/24/2014	10:12:26 AM	Administrator	System Startup
11/24/2014	8:53:29 AM	Administrator	Entering Cycle Stop State

Figure 62: Log File

### 13.1 Startup Log File

PVAPortal can write data to any of 10 different log files, however, DataView can only Display the content of one log file at a time. On startup, the default log file is loaded into DataView.

The default log is configured by setting the 'InitialLogFile' key in the [DataView] section of the configuration files.

To load a log file other than the initial log file:

1. With DataView is running in the standalone version, select the **File -> Open File** on the menu bar.

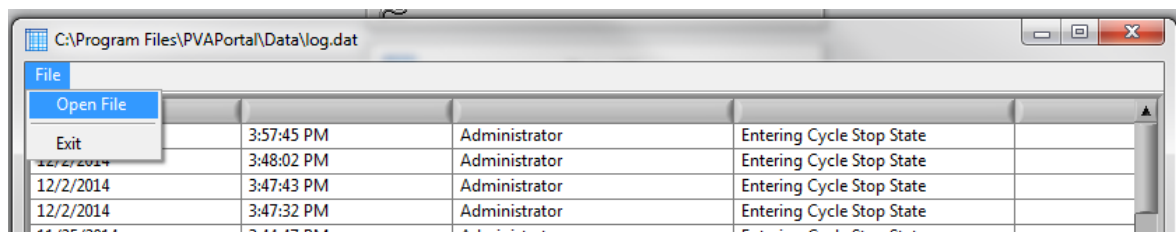


Figure 63: Open File from Standalone DataView

2. Select the log file you want to view.

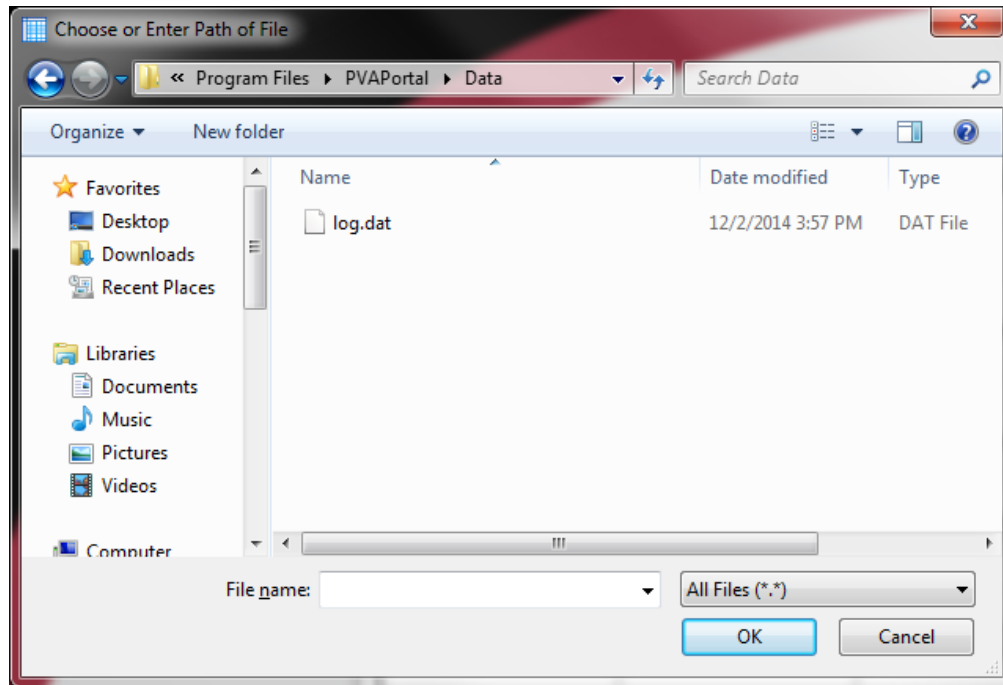


Figure 64: Log File Selection

- For the embedded version, press and hold the '**CTRL**' key while '**double clicking**' the data grid to select a log file to view. The Standalone version can be launched from within Portal by pressing and holding the '**ALT**' key while '**double clicking**' the data grid.

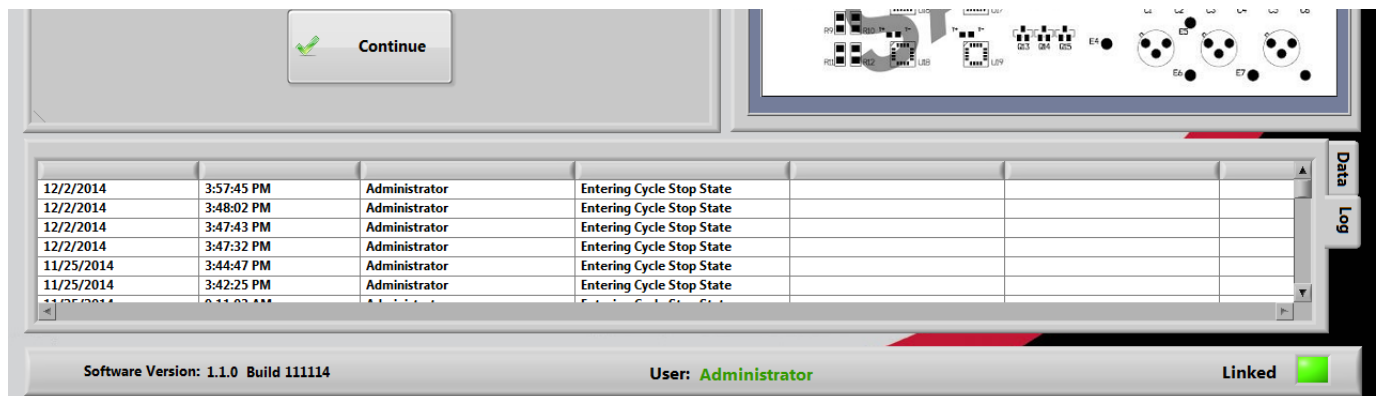


Figure 65: Embedded DataView

## 14 Part Manager

Part Manager is an embedded library used to manage Portal Part Selection and Part Recipes. Part recipes can be configured in the Recipe Manager window. The Recipe Manager window is accessible from the Portal Part Selection field when in the workcell is in Setup mode. The structure of a recipe can be defined from the 'PartDataType.cfg' file.

In Setup Mode you will have the **Recipe Manager** drop down menu. In every other mode, the drop down menu will say **Program Selection**.



Figure 66: Recipe Manager and Program Selection

### 14.1 Part Selection Console

1. To see the part selection console, select the drop down menu and select a part.

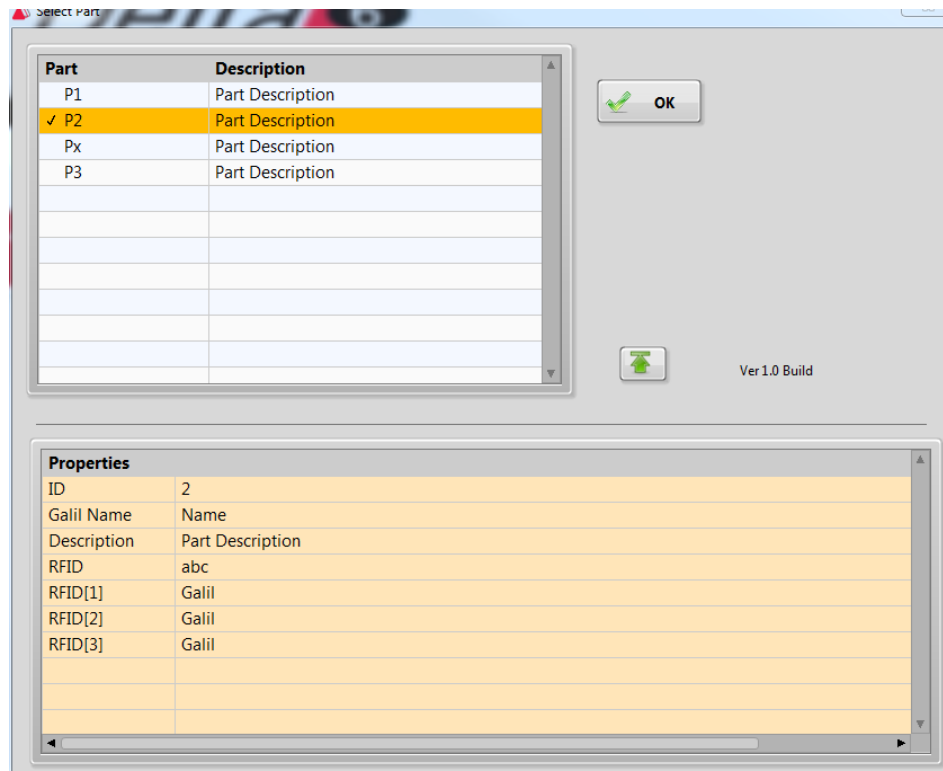


Figure 67: Part Selection Console

2. Select the column header to sort the part view.

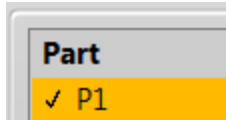


Figure 68: Column Header

3. Select “OK” to accept the selected highlighted part.



Figure 69: Select "OK"

4. Use the arrows to expand or collapse the window to view or hide Current Part Properties.



Figure 70: Expand or Collapse Window

## 14.2 Recipe Manager

1. In Setup Mode, select “Recipe Manager” to go to the recipe manager.

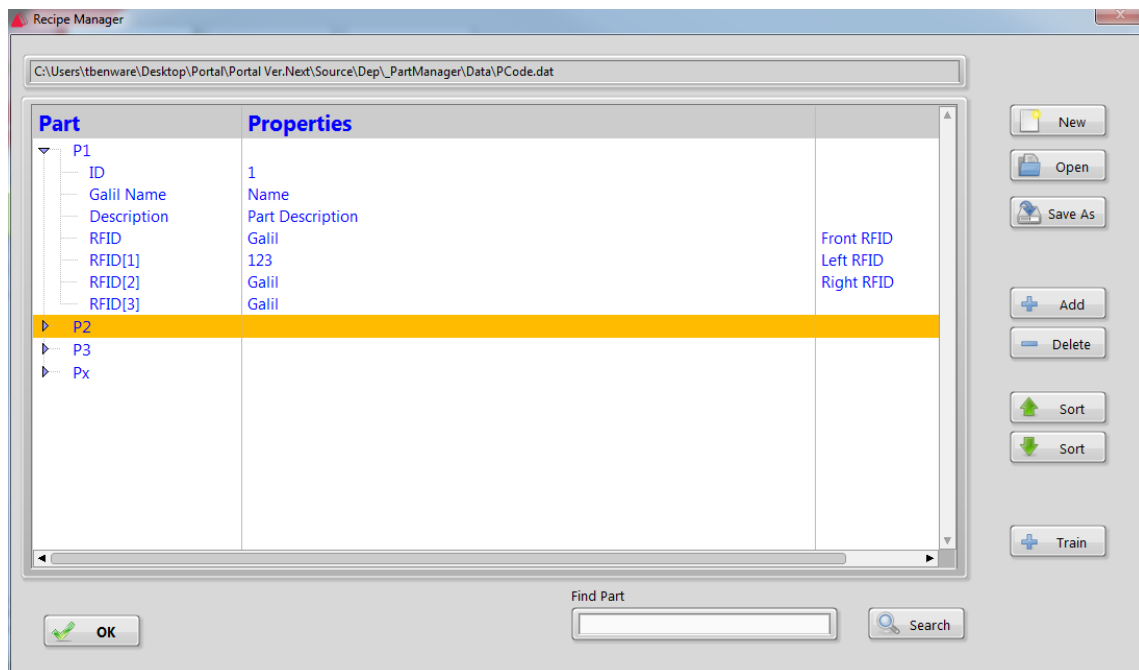


Figure 71: Recipe Manager

2. Select the “New” button to create a new Dataset file.

3. Select **“Open”** to open an existing Dataset file.
4. Select **“Save As”** to save the current Dataset file as a new Dataset file (Make a copy).
5. Select **“Add”** to add a new part to the current data set. Make sure the new part name is unique.

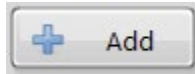


Figure 72: Add

6. Select **“Delete”** to delete the selected part record.



Figure 73: Delete

7. The part record can be viewed in ascending or descending order. To view the part record in ascending order, select the **“Sort”** button with the up arrow. To view the part record in descending order, select the **“Sort”** button with the down arrow.



Figure 74: Sort

8. Select **“Train”** to add a new part record based on a trained part code.

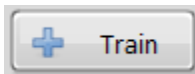


Figure 75: Train

9. Select **“Search”** to search for a part by name in the current dataset. The search is case sensitive.

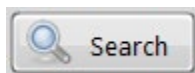


Figure 76: Search

#### ***14.2.1 To Edit Part Name or Part ID***

- To edit a Part Name or Part ID, hold the CTRL key down and double click the necessary field. This prevents accidental edits to these fields.

### 14.2.2 To Edit a Property Field

1. To edit a property field, click on the part name to expand the property list.
2. Double click on the property to be edited. The edit property window shown will depend on the data type of the selected property.

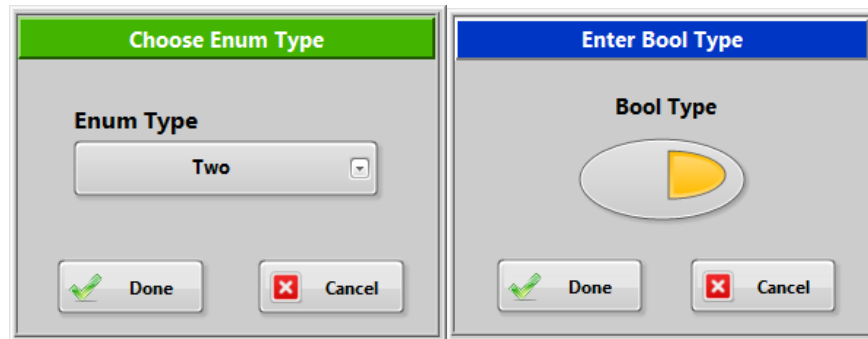


Figure 77: Example Windows

3. The edit field May have limits on what you can enter. For example a property of type 'String' may be restricted to a length of 12 characters and some characters may not be allowed. A property of type 'Num' may only allow numbers in the range of 1-30 to be entered.

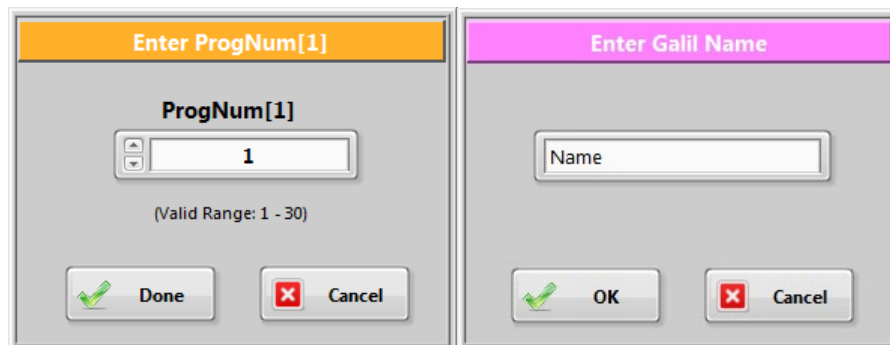


Figure 78: Num and String Window Examples

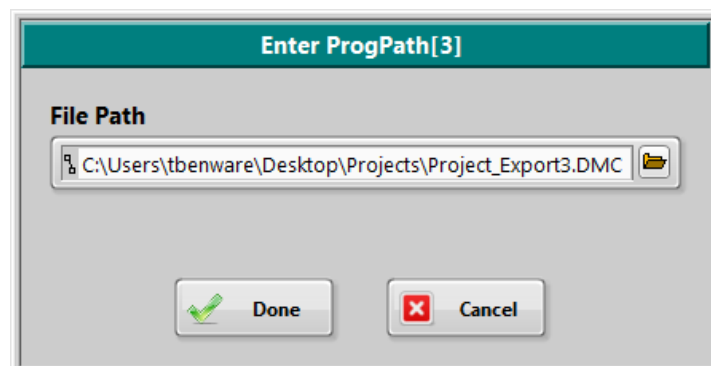


Figure 79: Path Program File

## 14.3 To Train A New Part

To make a new part record, you must train a partcode. A partcode could be a barcode, RFID tag, etc. Partcodes must be unique to the dataset. If the trained partcode is found in the dataset, the Train window will close and the part matching the partcode will be selected.

1. Select the **“Train”** button from the Recipe Manager window.

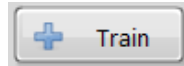


Figure 80: Train

2. The train window will open. Select **“Train Part”**.

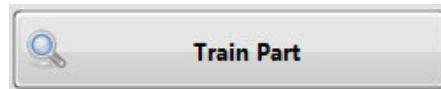


Figure 81: Train Part

3. The Train window will prompt you to put the partcode under the reader.

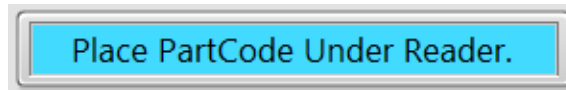


Figure 82: Partcode Prompt

4. After the partcode is read, the value is shown in the Partcode field.
5. Enter a unique part name in the part name field.

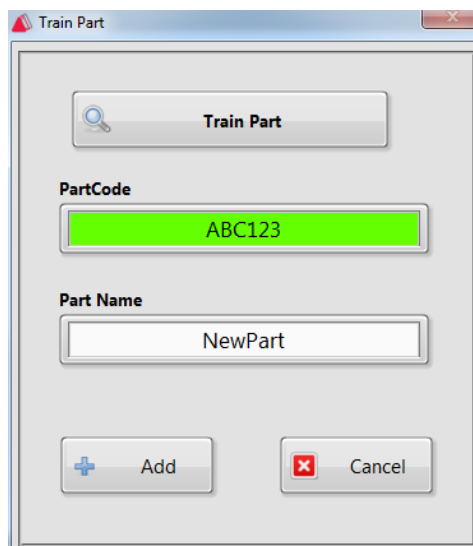


Figure 83: Train Part Window

- Click **"Add"** to add the new part to the dataset or click Train Part to train the partcode.



Figure 84: Add

**NOTE:** *If you need to correct an error in the partcode you scanned, or if the partcode scan was incomplete, select "Train Part".*

#### 14.3.1 Train Part Faults

There are two types of faults that can happen when you train a part.

##### Train Timeout

A timeout fault happens when the user clicked **"Train Part"** to request a partcode but the system did not respond within the 10 second timeout period.

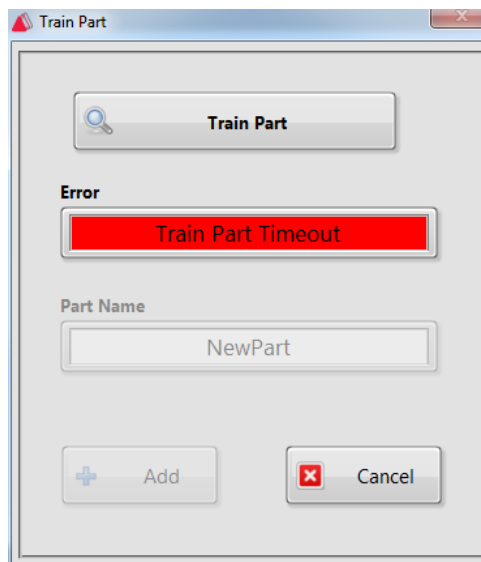


Figure 85: Train Part Timeout Error

## Train Failed

A Train Part Failed error happens when the system returns a negative acknowledge (NAK) when asked to read the partcode. This means device could not successfully read the partcode.

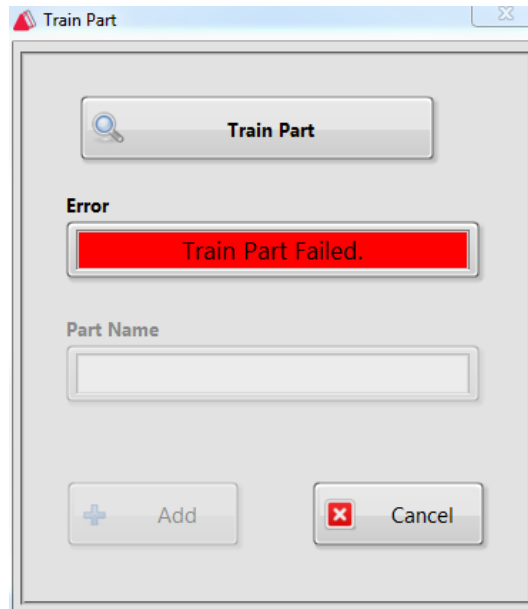


Figure 86: Train Part Failed

## 15 Quick Fid Inspection

Quick Fid Inspection is an optional application in Portal. You must have this option to use the functions shown. This application provides the use of fiducials without the ability to do inspections.

### 15.1 To Create a New Inspection

1. Uncheck **"Sandbox Mode"**. You cannot make changes to Inspections in Sandbox mode. Changes made to the Camera attributes in Sandbox Mode do not change the current inspection and are discarded.

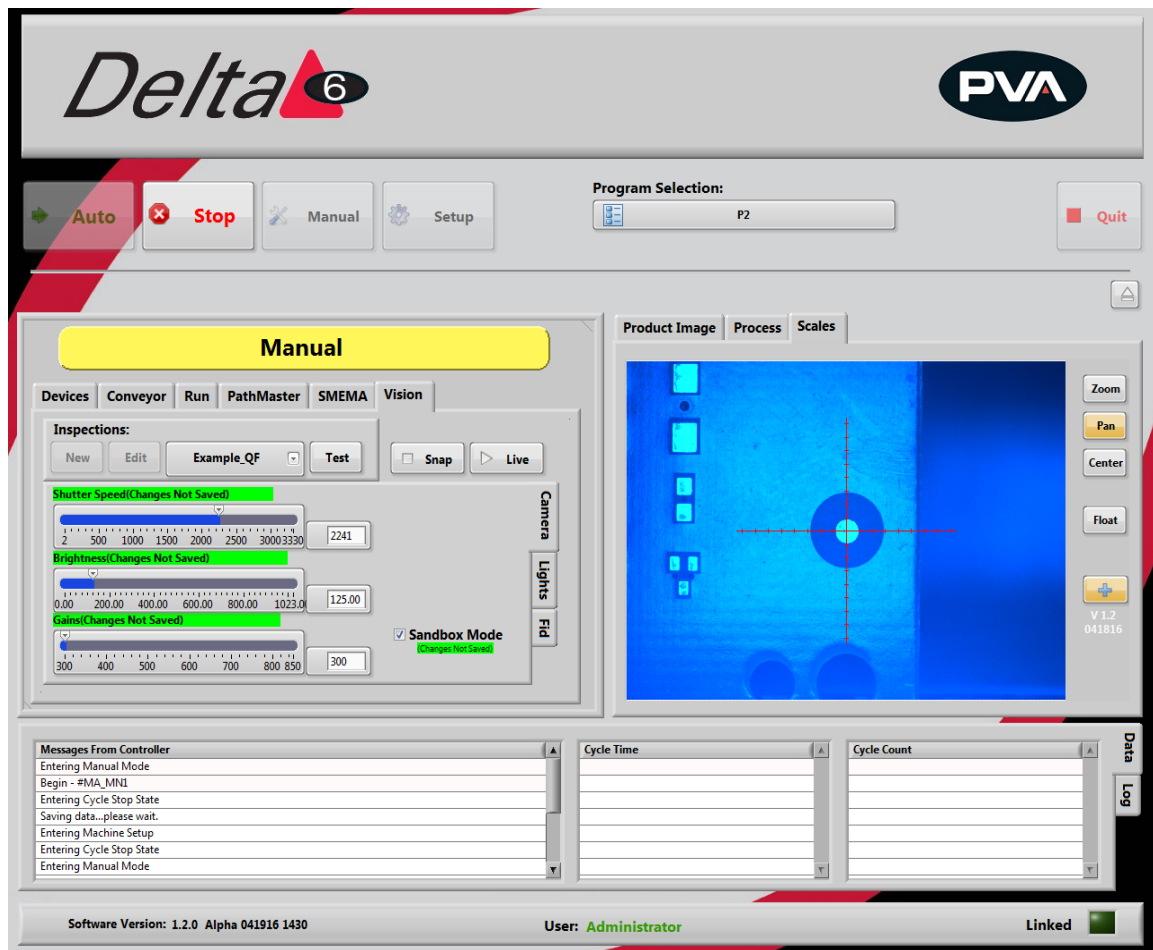


Figure 87: Quick Fids

2. Under Inspections, select **"New"**.
3. Select the **"Quick Fid"** inspection template.
4. Select **"OK"**.

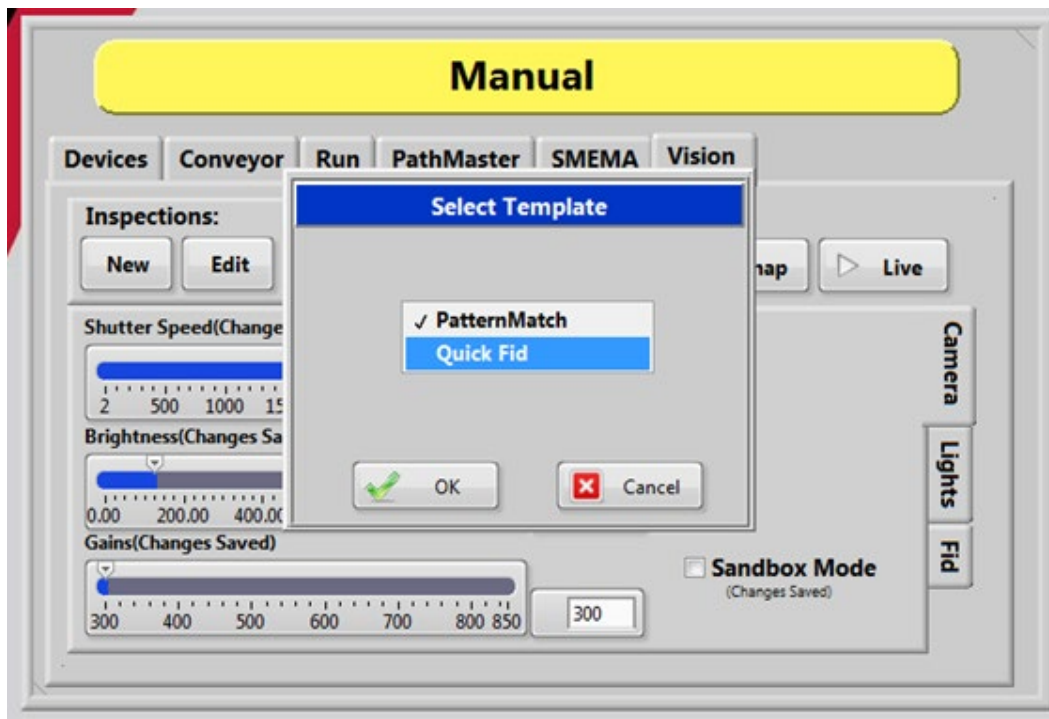


Figure 88: Quick Fid Template

5. Give the Quick Fid inspection a unique name and then click "OK".

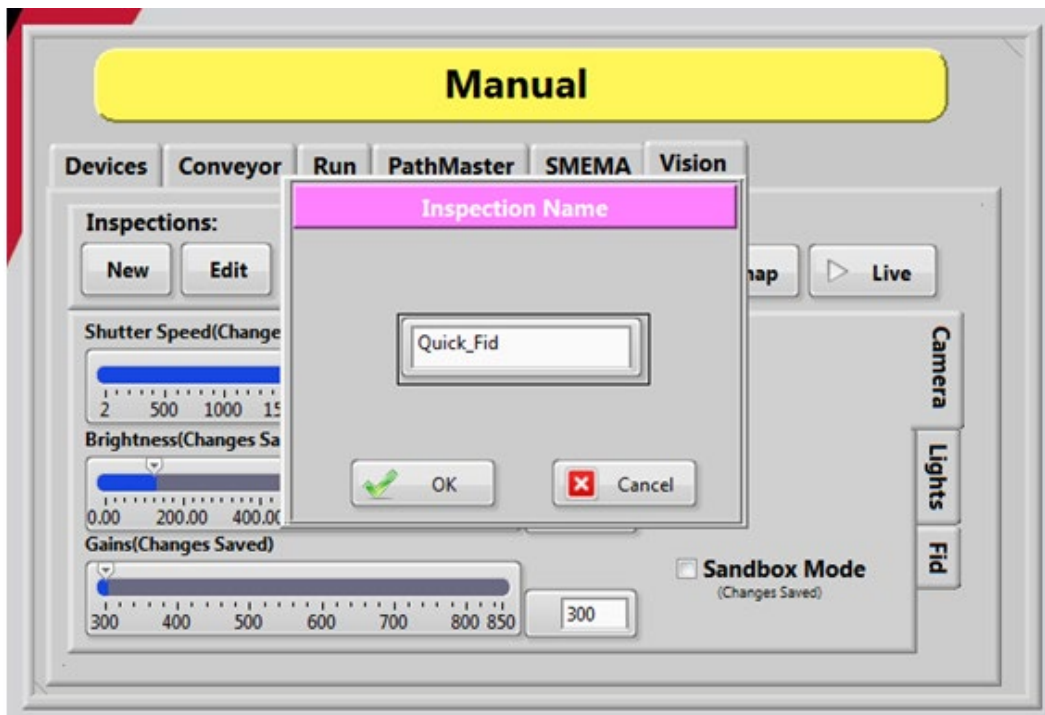


Figure 89: Inspection Name

The new Quick Fid inspection has been created.

## 15.2 Edit Inspection

1. To edit a Quick Fid inspection, click **"Edit"** inspection.

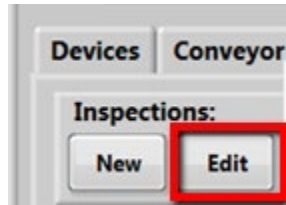


Figure 90: Edit Inspection

2. Select the rectangle tool, draw a rectangle around the fiducial template.
3. Select **"OK"** to save the changes, or select **"Cancel"** to exit and not save any changes.

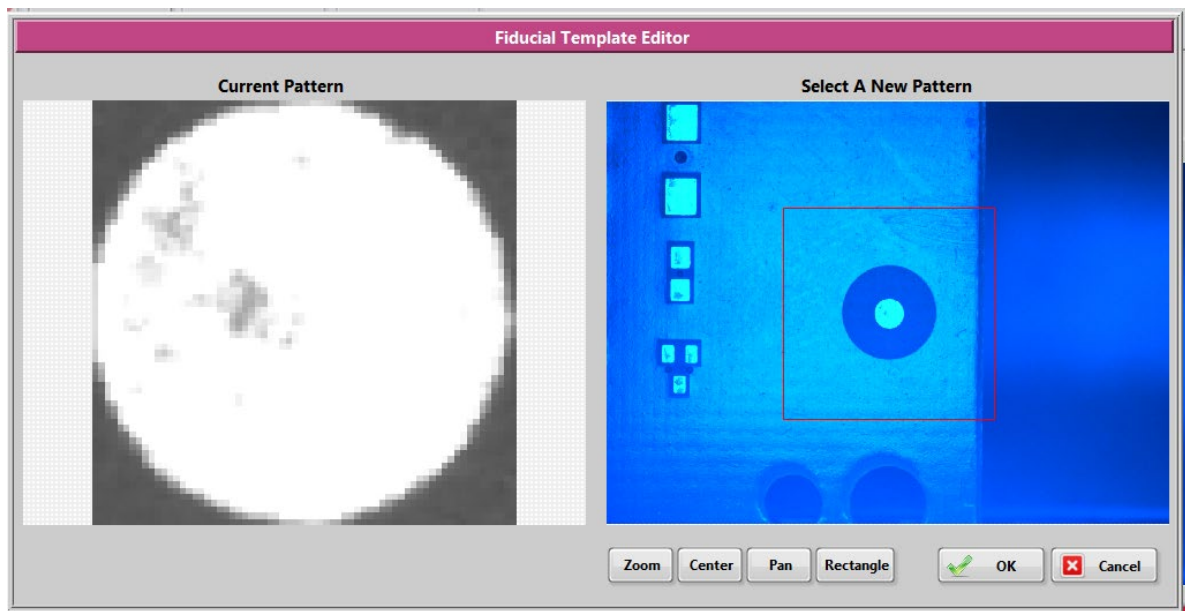


Figure 91: Fiducial Template Editor

## 15.3 Sandbox Mode

In sandbox mode you can adjust the settings and view the effects without saving any changes.

1. Make sure the Sandbox mode box is selected (checked).

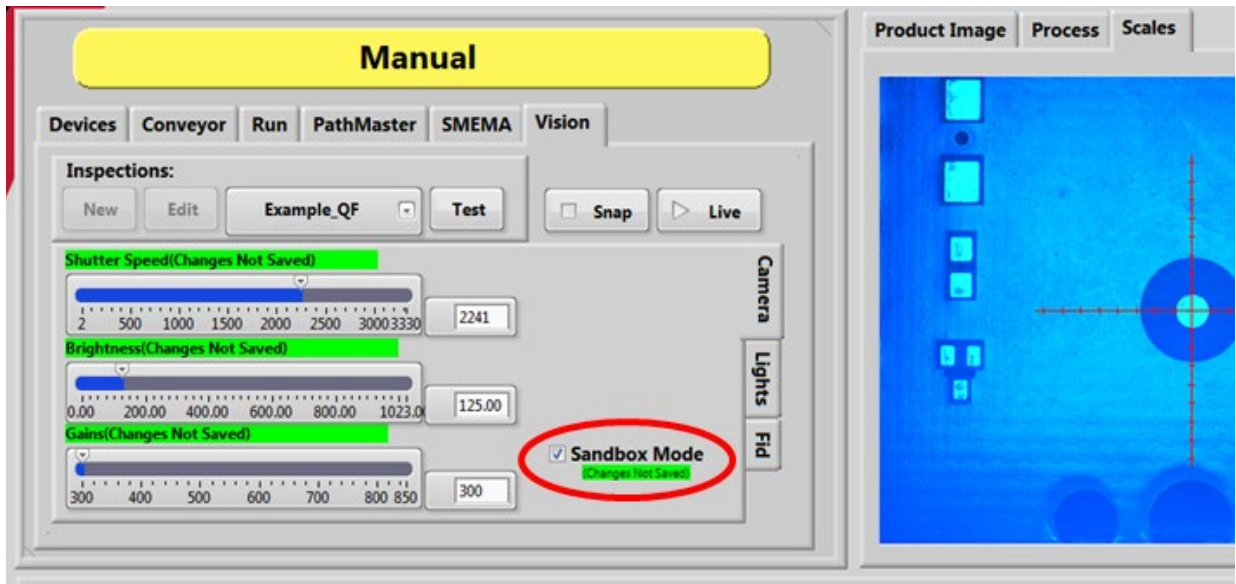


Figure 92: Sandbox Mode

2. Adjust the Shutter Speed, Brightness, and Gains to see how they affect the image on the right.

## 16 Fault Recovery

### 16.1 Recovering From Emergency Stop and Other Machine Errors

If the Emergency Stop button is engaged or the machine encounters a system error, do this procedure to return the machine to normal operation.

***WARNING! If the Emergency Stop was engaged because of system failure, DO NOT disengage the Emergency Stop button. Shutdown the system and have qualified personnel repair the machine.***

Do not operate the workcell again until the cause of the failure has been repaired.

1. Open the front doors and remove all parts/PCBs from the work area.
2. Close the doors and disengage the “**Emergency Stop**” button if it was not engaged because of a system failure.
3. Push “**Continue**”.
4. Press “**Continue**” to return the head to the standby position. The screen returns to Cycle Stop.

***NOTE: All functions are disengaged until the “Emergency Stop” button is disengaged.***

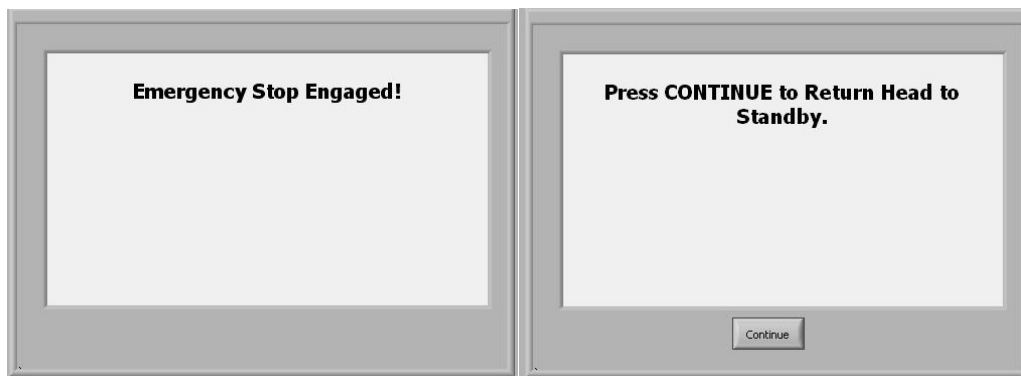


Figure 93: Emergency Stop

5. Correct the fault which caused the operator to engage the “**Emergency Stop**” button.
6. Open the access door.
7. Remove all parts from the work area. Find the parts that can still be used and put them in the input queue.

8. Close the access door.
9. Do the Startup Procedure.

If a door is open while the DOOR BYPASS switch is in the OFF position, or any machine state besides manual mode or calibration, it will cause a door error. Recovery from a door error is like the recovery from an Emergency Stop.

Other workcell errors can occur, such as: low air pressure, low material flow or insufficient exhaust air flow. You must correct these errors first, and then do the startup procedure to continue. Refer to the section that relates to your error.

Examples of the other possible error screens:

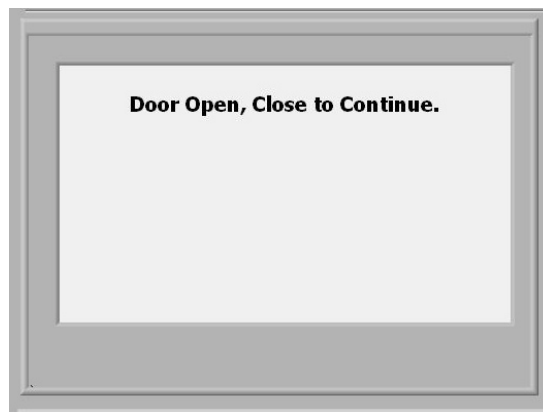


Figure 94: Door Open Error

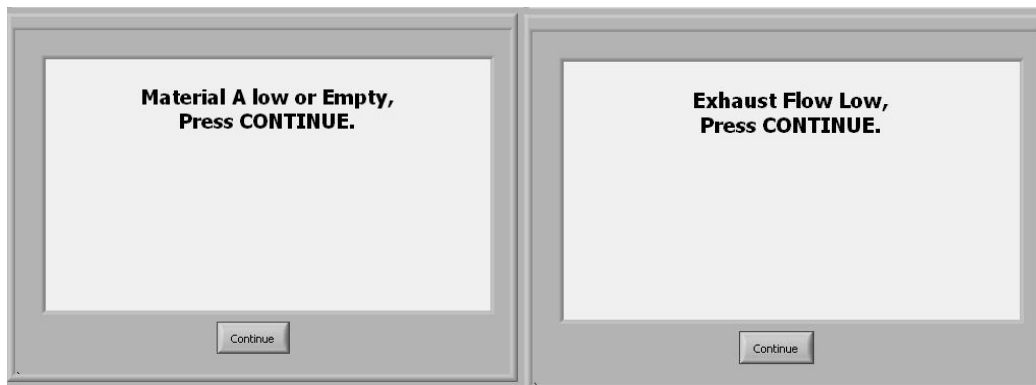


Figure 95: Low Material Level and Low Exhaust Flow

## 16.2 Low Material Level

There are three common ways to monitor the material level:

- Scales are the most common and the most flexible option to monitor the material level. They have two settings one for an empty level and one for a low material level. When the low material level is reached, the operator will be shown a message, but the workcell will continue to operate. When the empty level is reached the workcell will stop.
- Floats are also a way to monitor the material level. This option only tells you when the material is low.
- Proximity sensors are used for cartridges or syringes. The sensor is activated when the ram moves to the low material position.

The workcell only measures the material level(s) when in auto cycle or manual mode “One Shot Wet”. If there is a material level error, the machine can operate in all modes, except for auto cycle or manual mode “One Shot Wet”, until the material level is raised above the Low level.

***NOTE: A low material level will not stop a cycle. The cycle will complete the path program and then stop machine operation.***

1. To view material levels, select the Scales tab on the right side of the portal screen. This can be viewed in any mode. The amount of material in the tank is shown.

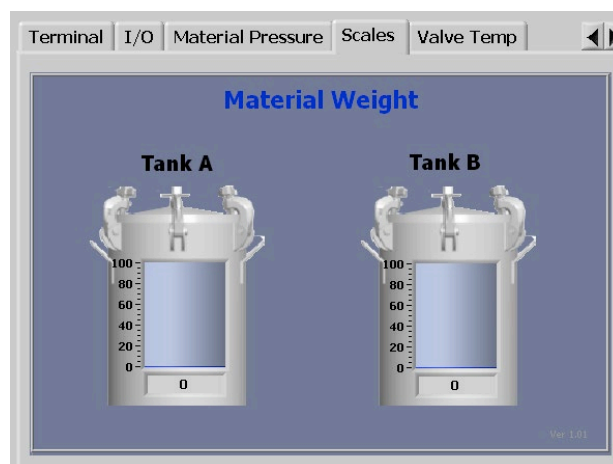


Figure 96: Material Level

## 16.3 Resetting the Exhaust Fan Overload Relay

Machines with exhaust fans may have errors if the overload relays trip. Do these steps to return to normal operation:

1. Set main power switch to “OFF”.
2. Open the electrical enclosure.
3. Examine the overload relay for a tripped flag.
4. Make sure that the current set point is set correctly on the overload relay.  
Examine the rating on the exhaust fan housing for current draw.
5. If necessary, push the reset button to reset the relay.
6. Restart the machine. If the problem persists, refer to for more information.

## 16.4 Pneumatic Error Recovery Procedure

The system’s pneumatics are checked for errors every time they operate. The pneumatics must be in their home position before the axes can home or move to the standby position. If a pneumatic fails, an error will be shown.



Figure 97: Pneumatic Error Example

1. Find the cause of the problem.
2. Correct the problem.
3. Select “Continue”.
4. Refer to the pneumatic actuator failure section in your workcell manual for more information.

## 16.5 Run-Time Error Recovery Procedure

Run-time errors are generated during the operation of a program. This type of failure should not occur during normal operation. The error type and program line number will be displayed in the system messages window.

1. Find your error type.
2. Find the program line number.
3. Record info (error and line shown in the system messages window) and contact PVA Technical support.
4. Select continue.
5. Do the startup/recovery procedure. Refer to Section 16.1.
6. Download the updated program and run it to see if the error was corrected.

***NOTE: For more on error codes please refer to the Troubleshooting guide. For more information on programming paths, refer to your PathMaster manual.***



**Figure 98: Command Error Example**

## 16.6 Position Error Recovery Procedure

A position error occurs when the difference between the commanded position and the current position is more than the maximum allowable error limit for an axis.

You can get an error limit if the dispense/spray head hits a hard stop in Manual mode, if the speed or acceleration is set too high, or if the axes drives are not powered. Make sure the “**Emergency Stop**” button is not engaged. The motor stop codes are shown in the system messages window.

**NOTE:** Refer to Section 16.8 for more information on stop codes.



Figure 99: Position Error

To correct the position error, do the steps that follow:

1. Engage the “**Emergency Stop**” button.
2. Open the access door.
3. Move the dispense head to the center of the work area. The Z-axis has a brake. Turn the Z-axis motor coupling by hand to move the dispense head as necessary.
4. Close the access door.
5. Disengage the “**Emergency Stop**” button.
6. Select “**Continue**” to clear the error.
7. Do the startup procedure.

## 16.7 Limit Error Recovery Procedure

The machine encounters a limit error when the gantry exceeds the software or hardware limits. The stop codes are shown in the system messages window.



Figure 100: Limit Error

1. Engage the “**Emergency Stop**” button.
2. Open the access door.
3. Move the dispense head to the center of the work area. The Z-axis has a brake. Turn the motor coupling by hand to move the dispense head as necessary.
4. Close the access door.
5. Disengage the “**Emergency Stop**” button.
6. Select “**Continue**” to clear the error.
7. Do the startup procedure.

## 16.8 Stop Codes

For position and limit errors, the error screen shows the stop codes for all the motors. This shows which axis (or axes) caused the machine to fault.

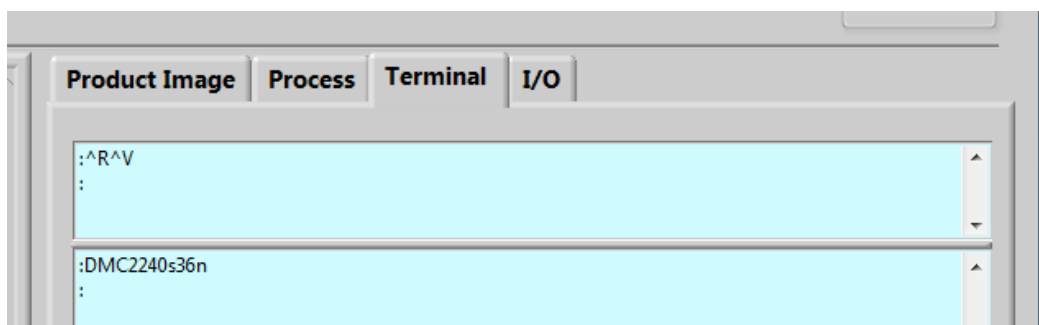
**Table 2: Stop Code Definitions**

Code	Meaning
0	Motors are running, independent mode.
1	Motors stopped at commanded independent position.
2	Decelerating or stopped by FWD limit switch or software.
3	Decelerating or stopped by REV limit switch or software.
4	Decelerating or stopped by Stop Command (ST).
6	Stopped by Abort input.
7	Stopped by Abort command (AB).
8	Decelerating or stopped by Off-on-Error (OE1).
9	Stopped after Finding Edge (FE).
10	Stopped after Homing (HM).
50	Contour running.
51	Contour Stop.
99	MC timeout.
100	Motors are running, vector sequence.
101	Motors stopped at commanded vector.

## 16.9 Request the Motion Controller Version

Do the procedure below to request the motion controller firmware version. Refer to the PathMaster® Manual.

1. Select the **Terminal** tab on the right side of the portal window.
2. In the terminal window type '^R^V'.



**Figure 101: Portal Terminal Window**

3. Press **"Enter"**.

The motion controller model and firmware version are shown in the terminal window.

## 17 Notes

## 18 Warranty

### PVA Warranty Policy

PVA warrants the enclosed product against defects in material or workmanship on all components for one year from the date of shipment.

The warranty does not extend to components damaged due to misuse, negligence, or installation and operation that are not in accordance with the recommended factory instructions. Unauthorized repair or modification of the enclosed product, and/or the use of spare parts not directly obtained from PVA (or from factory authorized dealers) will void all warranties.

All PVA warranties extend only to the original purchaser. Third party warranty claims will not be honored at any time.

Prior to returning a product for a warranty claim, a return authorization must be obtained from PVA's technical support department. Authorization will be issued either via the telephone, facsimile, or in writing upon your request.

To qualify as a valid warranty claim, the defective product must be returned to the factory during the warranty period. Upon return, PVA will repair (or replace) all components found to be defective in material or workmanship.

(Retain this for your records)

#### Product Information:

PRODUCT: \_\_\_\_\_

SERIAL NUMBER: \_\_\_\_\_

DATE OF PURCHASE: \_\_\_\_\_

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## 21 Appendix A – Definitions

**Auto Cycle:** Machine state where cycles are running.

**Auto Purge:** A machine function that automatically purges material after a predefined period of time or during solvent cups procedures.

**Calibration Position:** The location in the workspace where the X, Y, Z and W locations for the needle(s) is normalized.

**Cycle Stop:** Machine state where no action is occurring and the machine is at the standby position.

**Depress:** Push and hold for the duration of the operation.

**Dispense/Spray Path:** A continuous motion profile. The valve is on (dispense/spray) during the entire motion profile. This is also known as a **Path** or **Motion Sequence**.

**DMC:** Language used to program the motion controller in the workcell.

**End Effector:** The dispense/spray head assembly. The end effector is moved by the axes.

**Head:** Dispensing/spraying valve.

**Home Position:** The (0, 0, 0, 0) location of the workspace. This position is determined by the location of the home sensors. It is NOT the same as the **Standby Position**.

**Jog:** Moving any combination of axes continuously at a set rate of speed until commanded to stop.

**Light Tower:** The light tower consists of three stacked lights, red, amber and green (top to bottom). It is used to indicate the status of the machine.

**Main Program File:** A text file containing the code that runs the workcell during normal operations. Main Program File

**Motion Sequence:** A continuous motion profile. The valve is on (dispensing) during the entire motion profile. This is also known as a **Dispense/Spray Path** or **Path**.

**Path:** A continuous motion profile. The valve is on (dispense/spray) during the entire motion profile. This is also known as a **Dispense/Spray Path** or **Motion Sequence**.

**PathMaster®:** Windows® programming software. Used to create, maintain and download program files for the workcell.

**Push:** Push and release.

**Program:** A collection (or series) of motion sequences.

**Project:** File containing the code for one or more programs (typically 30 programs).

**Purge Position:** The location in the workspace where the head moves to perform all auto purge operations.

**PVA:** Precision Valve & Automation, Inc.

**Solvent Cups:** Reservoirs containing a compatible solvent used to maintain the dispense/spray valves when the workcell is not processing product.

**Solvent Position:** The location in the workspace where the head moves to rest in a solvent solution to maintain the dispense/spray valves when the workcell is not processing product.

**Standby Position:** The rest position for the end effector. The machine moves here after homing and after each cycle. This position is usually located near the start point for the program(s). It is NOT the same as the **Home Position**.

**Terminal:** A program used as a communication link between the motion controller and operator.

**Teach:** A process by which the workcell registers its current gantry location with PathMaster® to create a motion sequence.

**Workcell:** A model PVA250™, PVA250E™, PVA350™, PVA550™, PVA650™, PVA650-FT™, PVA750™, PVA1000™, PVA2000™, PVA2000C™, PVA3000™, Delta 6, and Delta 8 automated system.

## 22 Appendix B – Serial Communication

### 22.1 Serial Communication

The workcell can communicate with a computer using the EIA RS-232C standard. This is used for debug purposes. The computer is the Data Terminal Equipment (DTE Device) and the motion controller is the Data Communications Equipment (DCE Device). The tables below give a brief overview of the connections required to communicate between DTE and DCE devices.

***WARNING! The computer must be at the same ground potential as the workcell. Damage to the workcell or computer may result if the ground potentials are different. Use the workcell service outlet for computer power if provided.***

### 22.2 9 Pin Serial Connector

Table 3 describes the pin configuration for standard serial ports found on most portable computers.

**Table 3: DTE 9 Pin Serial Connector**

Pin	Description
1	Carrier Detect (CD)
2	Received Data (RD)
3	Transmitted Data (TD)
4	Data Terminal Ready (DTR)
5	Signal Ground
6	Data Set Ready (DSR)
7	Request to Send (RTS)
8	Clear to Send (CTS)
9	Ring Indicator (RI)