Spectrum® Series

Nordson
ELECTRONICS SOLUTIONS

ASYMTEK

Single-Axis Automatic Tilt Mechanism

Owner's Manual

Revision 02

NOTICE

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Table of Contents

1 Introduction

1.1 Overview

The Single-Axis Automatic Tilt Mechanism is designed for use with Asymtek's S-9XX or S2-9XX Series Dispensing Systems configured with DJ or DV Series Valves. This feature tilts the valve to allow for easier dispensing on the side of components.

This manual describes the software setup, hardware setup, and operation of the tilt mechanism. Refer to the applicable valve manual for detailed instructions on valve operation.

1.2 System Requirements

Dispensing System:	Spectrum S-9XX or S2-9XX Series Dispensing Systems
Dispensing Valve:	Any DispenseJet (DJ-series) or DV-series valves. For other valve types, contact Nordson ASYMTEK.
Software:	Fluidmove
Fluidmove Version:	Version 6.0 or higher

WARNING! ***CAUTION!***

DO NOT operate the dispensing system unless you have been trained to do so. Operating the dispensing system without proper training may result in personal injury or dispensing system damage.

1.3 System Components

The Single-Axis Automatic Tilt Mechanism consists of the following components:

- Tilt Bracket
- Tilt Bulkhead
- Mini Service Station Mounted on Front Conveyor Rail

Figure 1-1 Two-Position Tilt Bracket (Front/Rear)

Figure 1-2 Two-Position Tilt Bracket (Right/Left)

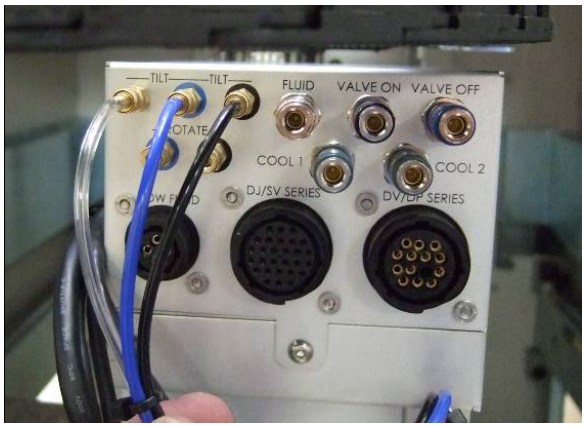

Figure 1-3 Tilt Bulkhead

Figure 1-4 Mini Service Station Mounted on Rear Conveyor Rail

1.4 Supported Dispensing Valves

The following Asymtek valves are supported for use with the tilt feature:

- DJ-9500
- DJ-2100 (with 90 degree dovetail adapter bracket)
- DV-7000 and DV-8000
- Legacy DV valves

The following Asymtek valves are not supported:

- DP-3000
- NexJet
- DJ-100
- SV-100

1.5 Theory of Operation

The Single-Axis Automatic Tilt Mechanism can tilt the dispensing valve in one of the following positions:

- Vertical
- Counterclockwise (CCW)
- Clockwise (CW)

The tilt angle can be adjusted 10, 20 or 30 degrees.

The tilt bracket can be mounted in two ways:

- Front and rear tilt
- Right and left tilt

The tilt bracket is driven by a three position air cylinder, where the top port controls whether a center stop is enabled or not. In order for the cylinder to reach the center position, the top and bottom ports must be energized at the same time. To create the proper center holding force, the air pressure on the top port must be about twice as much as the pressure on the bottom port. To create this pressure difference, there is a small regulator mounted on the left side of the bulkhead. This regulator should be set to 40 psi.

The angle of tilt is determined by where the stops are located. After the tilt system has been set up, the user is able to select a tilt direction in the Fluidmove software. After setting a tilt angle instruction in Fluidmove, all subsequent instructions are performed at the specified tilt until a new tilt instruction is added, see *4.5 Creating a Program with Tilt*.

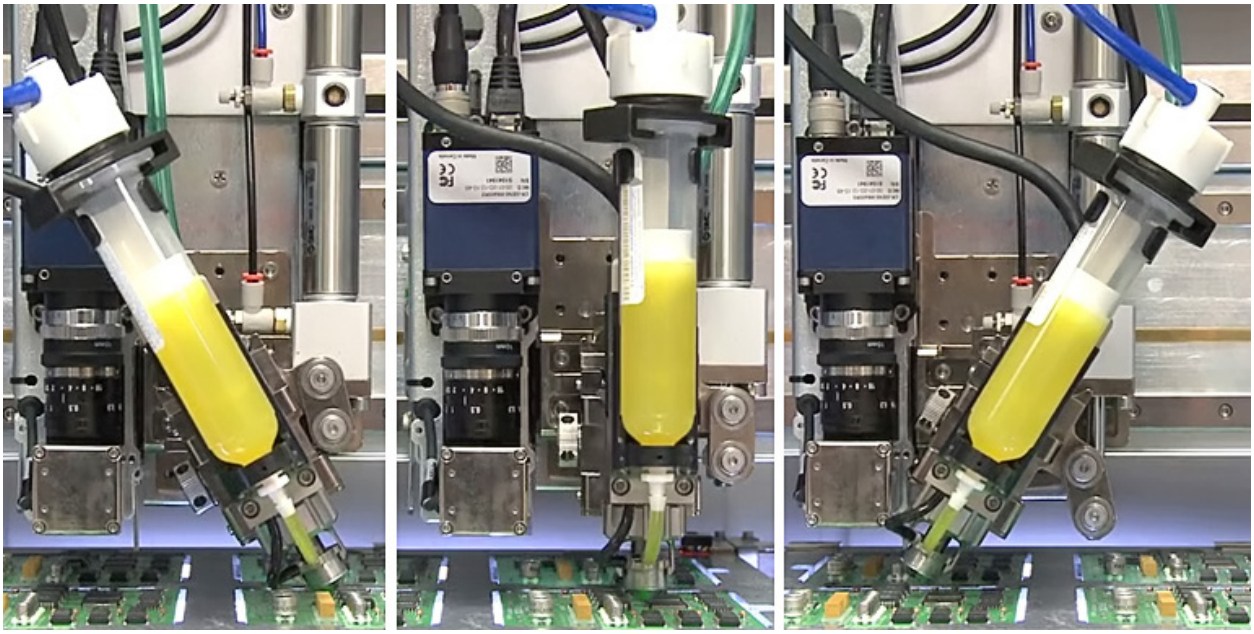

Figure 1-5 Tilt Angles

2 Safety

2.1 Overview

Dispensing system operation involves heat, air pressure, fluid pressure, mechanical and pneumatic devices, electrical power, and the use of hazardous materials. Refer to the safety section of your particular dispensing system and valve manuals prior to installing and operating the Single-Axis Tilt Mechanism.

Safety is considered a joint responsibility between the original equipment manufacturer (Asymtek) and the end-user (owner). All safety precautions and practices should be in accordance with local regulations and facility practice.

2.2 Safety Warning Symbols

The following warning symbols are located throughout the manual to warn of personal or property damage.

Table 2-1 Safety Warning Symbols

Symbol	Description
	**Personnel Safety Warning**. This symbol appears in a shaded text block to warn you about actions that could cause personal injury or death.
	**Property Damage Caution**. This symbol appears in a shaded text block to warn you about actions that could cause serious damage to the machinery, software, parts being processed, and facilities.

2.3 Equipment Use

2.3.1 Intended Use

Use of Asymtek equipment in ways other than those described in the documentation supplied with the equipment may result in injury to persons or damage to property.

2.3.2 Misuse

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

WARNING! Unsafe equipment conditions can result in personal injury or property damage. Failure to adhere to safety warnings and precautions can result in serious bodily harm to the user.

2.4 Safety of Personnel

- Only trained personnel should be permitted to perform installation, operation, maintenance, and troubleshooting procedures.
- Immediately push the red Emergency Machine Off (EMO) button on your dispensing system if personnel are in danger.
- Do not touch moving parts while the dispensing system is operating.
- Follow Material Safety Data Sheet (MSDS) recommendations for the proper handling of hazardous materials.
- Make sure all facility power sources are safely grounded.
- Routinely inspect all air hoses and electrical cables for damage.
- Relieve pneumatic pressure before adjusting or servicing pressurized components.

2.5 Preventing Equipment and Workpiece Damage

- Immediately push the EMO button on the dispensing system if the dispensing system, valve, or a workpiece is in danger of being damaged.
- Use standard Electrostatic Discharge (ESD) precautions when working near sensitive components. Always wear a grounding strap and connect it to the ESD ground before handling workpieces and equipment.
- Perform all recommended maintenance procedures at the suggested intervals.
- Immediately contain and clean up any caustic or conductive fluid spills as recommended in the material manufacturer's MSDS.
- Use only replacement parts that are designed for use with the original equipment.

2.5.1 Material Safety

- Follow Safety Data Sheet (SDS) recommendations for the proper handling, cleanup, and disposal of hazardous materials and fluids and their containers (i.e., syringes, cups, reservoirs, etc.) used with the dispensing system.
- Know the SDS recommendations for treatment of injury resulting from exposure to hazardous materials.
- Always wear appropriate Personal Protective Equipment (PPE) as recommended by facility safety practices and the material manufacturer's SDS.
- When working with multiple fluids, refer to the SDS to ensure the materials are compatible.
- If possible, save or recycle unused materials. Refer to the SDS before saving or recycling unused materials.

2.6 Disposal

Dispose of equipment and materials used in operation and servicing in accordance with local regulations.

3 Installation and Setup

3.1 Overview

In order to use the tilt feature, the tilt bracket must be setup properly.

This section includes the following instructions:

- Tilt Bracket Set Up
- Valve Connections
- Software Setup

3.2 Tilt Bracket Set Up

The tilt bracket can be set up in two ways and may be configured with or without sensors on the air cylinder.

3.2.1 Tilt Right and Left

To set up the right and left tilt bracket:

1. If using a DV 7/8000 valve, install a mount spacer on the Z-plate with four (4) M4 socket head screws and a 3mm hex wrench (not shown). The spacer would be installed in the same place as the mount (Figure 3-1).
2. Install the mount with four (4) M4 socket head screws and a 3mm hex wrench (Figure 3-1).
3. Install the tilt mechanism using a 4 mm Hex wrench (Figure 3-2).
4. Connect pneumatic lines (Figure 3-2).

Figure 3-1 Tilt Bracket Mount (Right/Left)

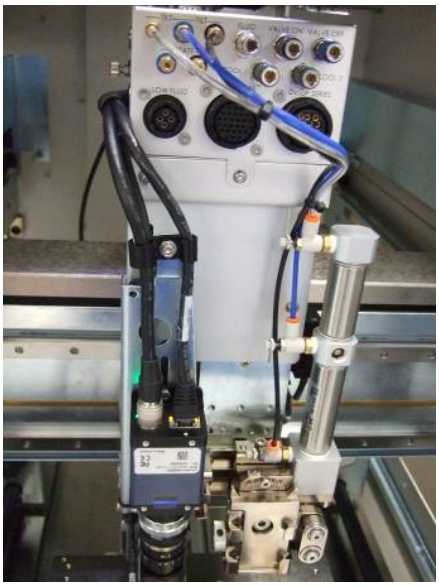

Figure 3-2 Tilt Bracket (Right/Left)

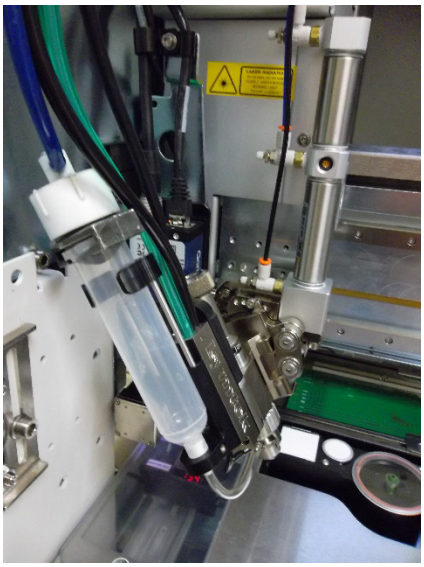

Figure 3-3 Home Position Adjustment (Right/Left)

Figure 3-4 Travel Limit Adjustment (Right/Left)

5. Adjust the horizontal position of the tilt bracket using a 4 mm hex wrench to allow the machine to home when the valve is tilted CCW (Figure 3-3).
6. Adjust the X travel limit to avoid collision when the valve is tilted CW (Figure 3-4).

3.2.2 Tilt Front and Back

To set up the front and back tilt bracket:

1. Install the mount with four (4) M4 socket head screws and a 3mm hex wrench (Figure 3-5).
2. If using a DV valve, install the mount in the right set of holes so that the DV does not collide with the machine during rotation.
3. Install the tilt mechanism using a 4 mm hex wrench (Figure 3-6).
4. Connect pneumatic lines (Figure 3-6).

Figure 3-5 Tilt Bracket Mount (Front/Back)

Figure 3-6 Tilt Bracket (Front/Back)

3.3 Valve Connections

To connect the valve hoses (Figure 3-7):

Connect the valve hoses for each valve to the dispensing system bulkhead as follows:

- Black Hose – Valve Off
- Clear Hose – Fluid Pressure
- Green Hose – Cool 1 (Active Air)

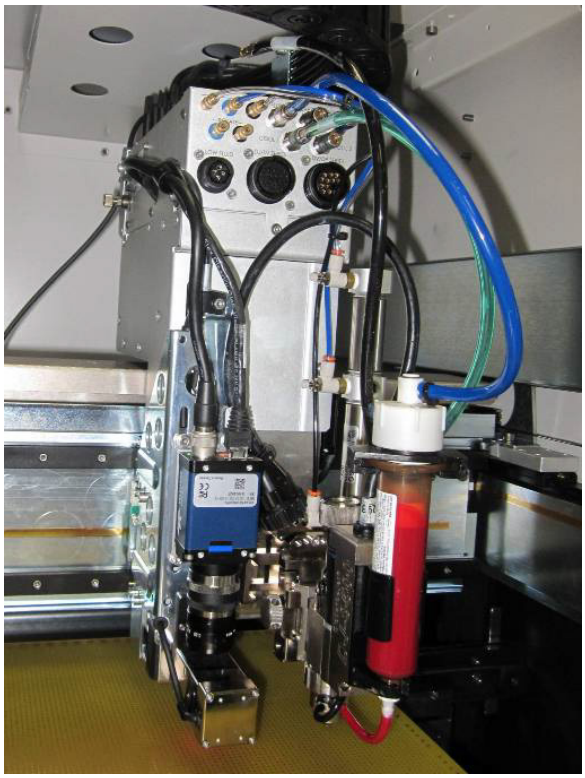

Figure 3-7 Valve Connections (Right/Left Bracket)

3.4 Software Setup

The Single-Axis Automatic Tilt Mechanism works in conjunction with the Fluidmove software, version 6.0 or higher. If necessary, install Fluidmove 6.0 according to the Readme file instructions included with the software.

WARNING! ***CAUTION!***

Refer to the safety section in the applicable dispensing system manual prior to operating the dispensing system. Failure to comply with any of the safety recommendations could cause serious injury to the user or damage to the dispensing system.

To configure the Fluidmove software:

1. Power on the dispensing system.
   - ➤ Refer to the applicable dispensing system manual if necessary.

2. Start Fluidmove.
   - ► Refer to the *Fluidmove User Guide* if necessary.
3. In the Fluidmove Main Window, select **Configuration > Setup Valves**.
   - ► The Setup Valves window opens (Figure 3-8).

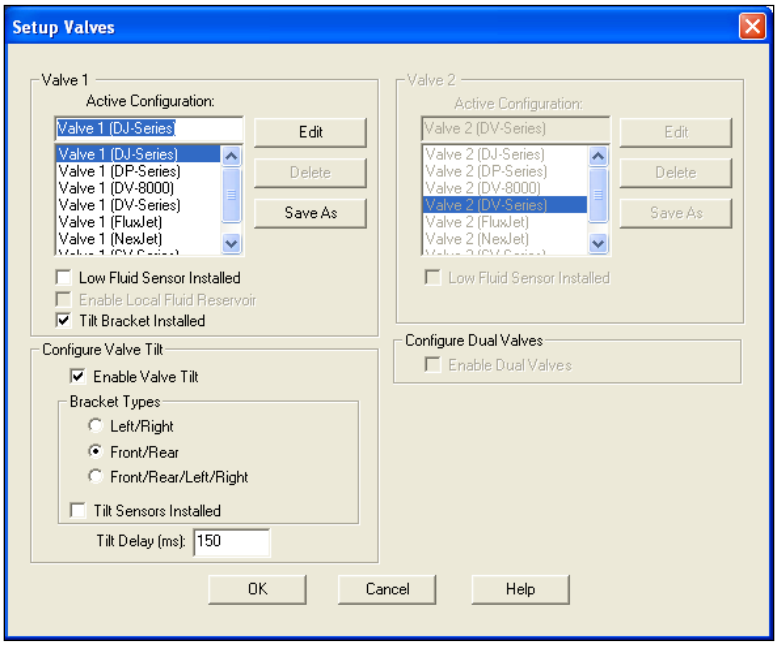

Figure 3-8 Setup Valves

4. Make sure the following options are enabled. A check mark indicates they are enabled (Figure 3-8).
   - Tilt Bracket Installed
   - Enable Valve Tilt
   - Bracket Type (Left/Right or Front/Rear)
   - Tilt Sensors, if applicable
5. Select the appropriate valve type and click on **OK**.

4 Operation

4.1 Overview

The DSPP is integrated into ECW utilizing an FIS terminal. Valve pitch control is split between the ECW-FIS and control program loaded on the motor controller. This section covers the following topics:

- Dot and Line Parameters for Tilt
- Valve Offsets
- Creating a Program with Tilt
- Running a Program

4.2 Safety First

Operation of your dispensing system involves heat, air pressure, electrical power, heat, mechanical devices, and the use of hazardous materials. It is essential that every person servicing or operating the dispensing system fully understands all hazards, risks, and safety precautions. Refer to the safety section in the applicable dispensing system manual for important safety information.

4.3 Dot and Line Parameters for Tilt

Prior to running valve offsets and creating a program, you must define dot and line parameters. Dot and line parameters control the size and accuracy of dot or line dispensing.

4.3.1 Dot Parameters

To edit dot parameters:

1. In the Fluidmove Main Window, select **Teach a Program.**
   - ➤ The Programming Window opens.
2. Select **Edit > Dot Parameters** from the drop-down menu.
   - ➤ The Dot Parameters window opens.
3. Select the Valve Tilt tab (Figure 4-1).
4. Select the tilt direction for each dot that will be used in the program.
   - ➤ The dispense gaps for lines and dots are set in the Dot Parameters, see *4.3.2 Line Parameters*.
5. Select **None** in the **Use Offset to Disp Gaps** pull down window.
   - ➤ **None** will force the user to run an offset for each dispense gap.
   - ➤ If **Dot Type 1** is selected, the offsets created by Dot Type 1 will be used for all dot types. This can result in dispense inaccuracies due to the different dispense gaps. If **Dot Type 2** is selected, the offsets created by Dot Type 2 will be used for all dot types, etc.
6. Click on **Apply** and then on **OK** to close the window.
7. Click on  to return to the Fluidmove Main Menu.

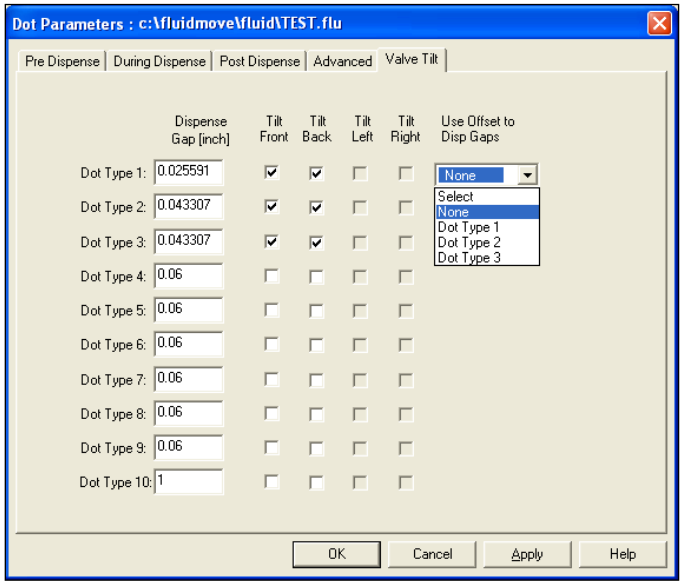

Figure 4-1 Dot Parameters

4.3.2 Line Parameters

NOTE The dispense gaps for both lines and dots are set in the Dot Parameters window. The line dispense gaps are the same as the dot dispense gaps of the same number. The Valve Tilt tab is only available in the Dot Parameters window (Figure 4-1).

To edit line parameters:

1. In the Fluidmove Main Window, select **Teach a Program**.
   - ► The Programming Window opens.
2. Select **Edit > Line Parameters** from the drop-down menu.
   - ► The Line Parameters window opens (Figure 4-2).

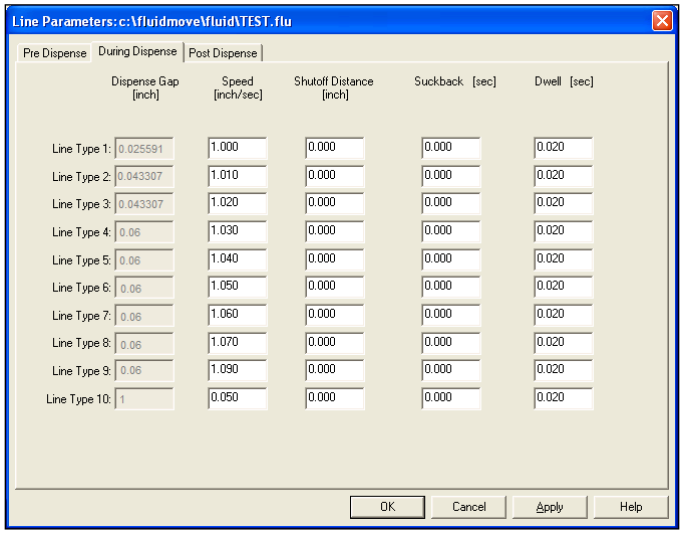

Figure 4-2 Line Parameters

3. Notice that the Dispense Gap column is grayed out. The values correspond with those set in the Dot Parameters window.
   - The Dispense Gap for Line Type 1 equals the Dispense Gap for Dot Type 1; the Dispense Gap for Line Type 2 equals the Dispense Gap for Dot Type 2, etc.
4. Click on **OK** to close the window.

4.4 Valve Offsets

Because the dispensing valves can be set to different tilt directions and dispense gaps, a valve offset routine must be performed. Valve offsets must be run in full to properly set up valves.

4.4.1 Machine Offset Parameters

To configure machine offset parameters:

1. In the Main Window, click on **Configuration > Machine Offsets > Machine Offsets Parameters**.
   - The Machine Offset Parameters window (Figure 4-3) opens.
2. Make sure **Scripted Valve Offsets** is selected.

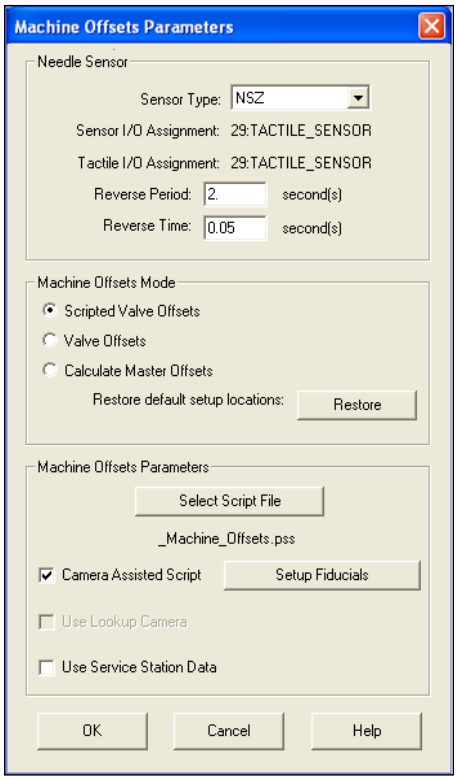

Figure 4-3 Machine Offset Parameters Setup

3. In the Machine Offsets Parameters section, make sure "_MachineOffsets.pss" is the selected script file.
   - If not, click on **Select Script File** and select it from the list.
4. Select camera assisted script and click on **Setup Fiducials**.
   - The Machine Fiducial Setup Screen opens (Figure 4-4).

5. Click on the check box next to the device(s) to be located by fiducials during the setup procedure.
   - ► The Setup button(s) for the selected device(s) becomes active.
6. If you want to use the automated fiducial finding procedure for the Service Station, perform the following steps. These positions will be used when the valve offsets procedure is run.
   a. Click on **Setup** next to the device to open the corresponding Fiducial Setup window and select the appropriate options.
      - ► The setup window for the selected device opens (Figure 4-4).
   b. Click on **Teach** and follow the on-screen prompts.
   c. When finished, click on **OK**.
   d. Repeat for all devices.

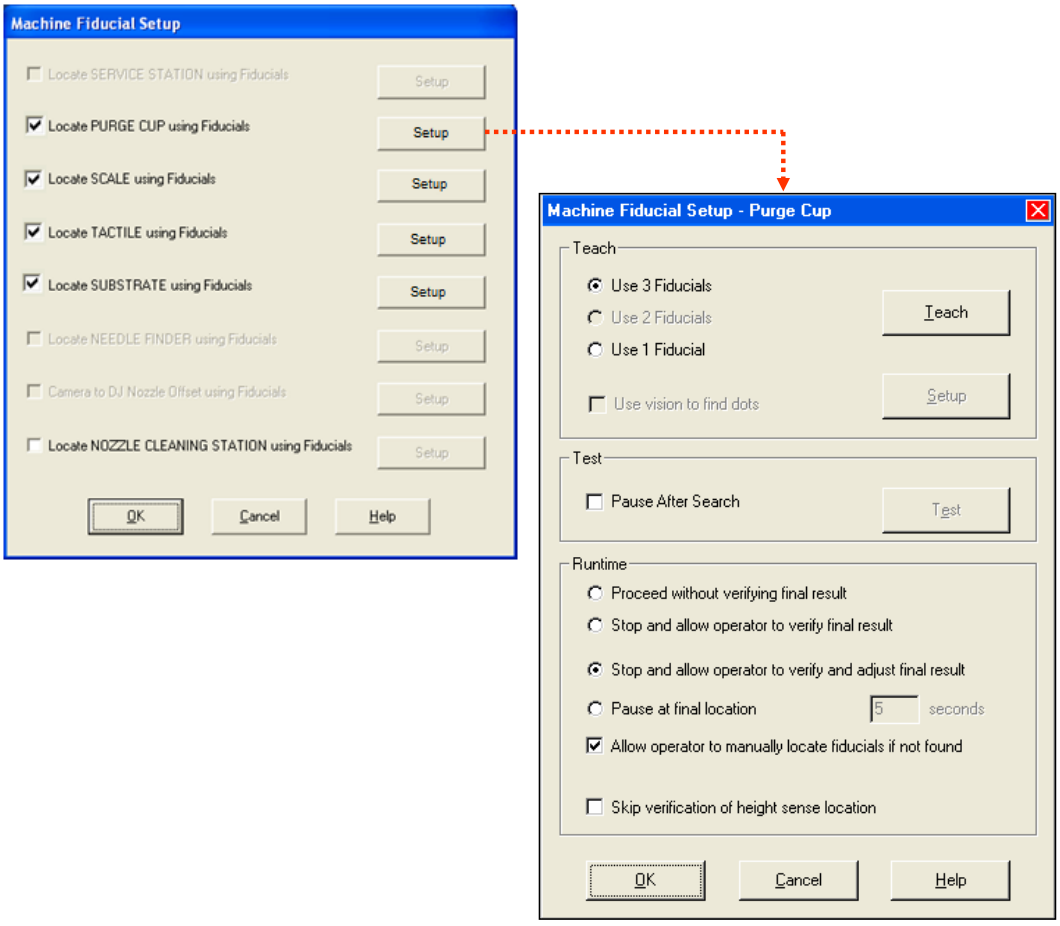

Figure 4-4 Fiducial Assisted Setup Windows

4.4.2 Running the Valve Offsets Procedure

NOTE All valve offsets should be performed on the mini service station mounted to the rear rail.

To run the valve offsets procedure:

1. Make sure the camera has been calibrated before performing this routine. Refer to the applicable dispensing system manual if necessary.
2. Clear the work area of any obstacles that might interfere with dispensing head movement.
3. In the Fluidmove Main Window, select **Configuration > Machine Offsets > Scripted Valve Offsets**.
   - ► The Machine Setup window opens (Figure 4-5).
4. If the desired script is not selected, click on **Select File** and select the desired script from the list.
   - ► The current script file is displayed at the top of the window.

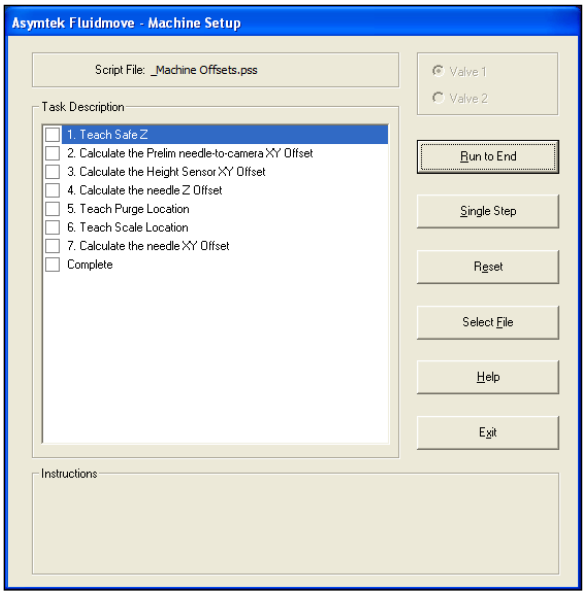

Figure 4-5 Machine Setup Window

NOTE The tasks in the Machine Setup window will vary depending on the setup script selected. The tasks will be performed in the order listed. When a task is complete, a checkmark appears in the box next to the task.

5. Click on **Run to End**.
   - ► If a message warns you that the dispensing head will move to the Home position, click on **Yes**.
   - ► The first of a series of Teach Windows opens.
6. Follow the on-screen prompts. Click on **Help** if you have questions.

NOTE The script file selected in Figure 4-5 runs offsets for Valve 1. The following sections describe the steps.

4.4.2.1 Safe Z Height

To teach safe Z height (Figure 4-6):

1. When prompted to teach Safe Z Height, move the dispense tip to a height that is clear of obstacles when moving in all XY directions.
2. Click on **Teach**.
3. Click on **Done**.

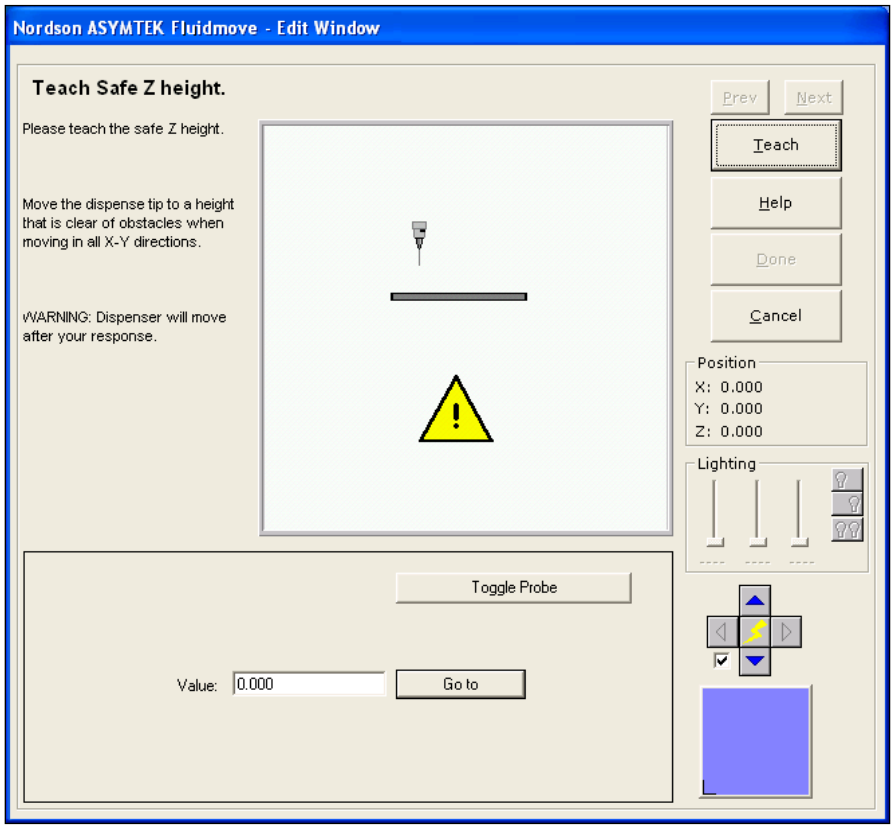

Figure 4-6 Valve Offsets: Safe Z Height

4.4.2.2 Preliminary Needle to Camera XY Offset

Prior to teaching the needle to camera XY offset, prepare the offsets substrate by placing putty on the mini service station substrate located behind the front conveyor rail.

To teach needle to camera XY offset (Figure 4-7):

1. Lower Valve 1 into the putty (just enough to make a mark).
2. Click on **Teach**.
3. Align the camera crosshairs over the mark in the putty.
4. Click on **Teach**.
5. Repeat Steps 1-4 for both tilt directions.

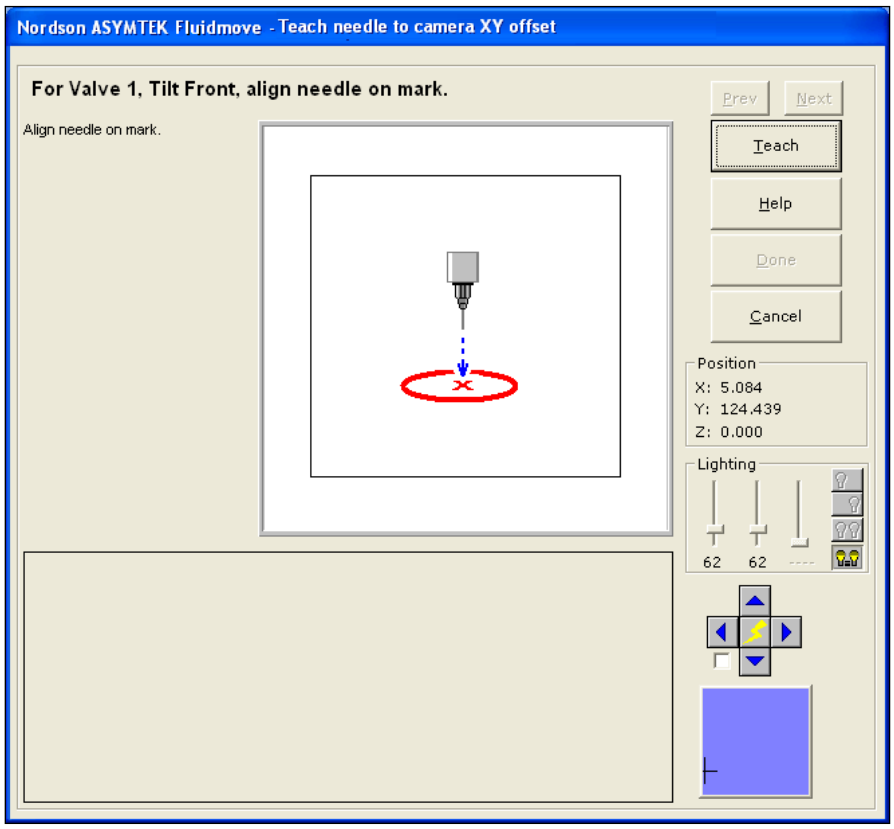

Figure 4-7 Teaching Needle-to-Camera XY Offset

4.4.2.3 Height Sensor XY Offset

To teach camera to height sensor XY offset (Figure 4-8):

1. Align the laser or mechanical height sensor over the mark in the putty.
2. Click on **Teach**.
3. Align camera crosshairs over mark over the mark in the putty.
4. Click on **Teach**.
5. Click on **Done**.

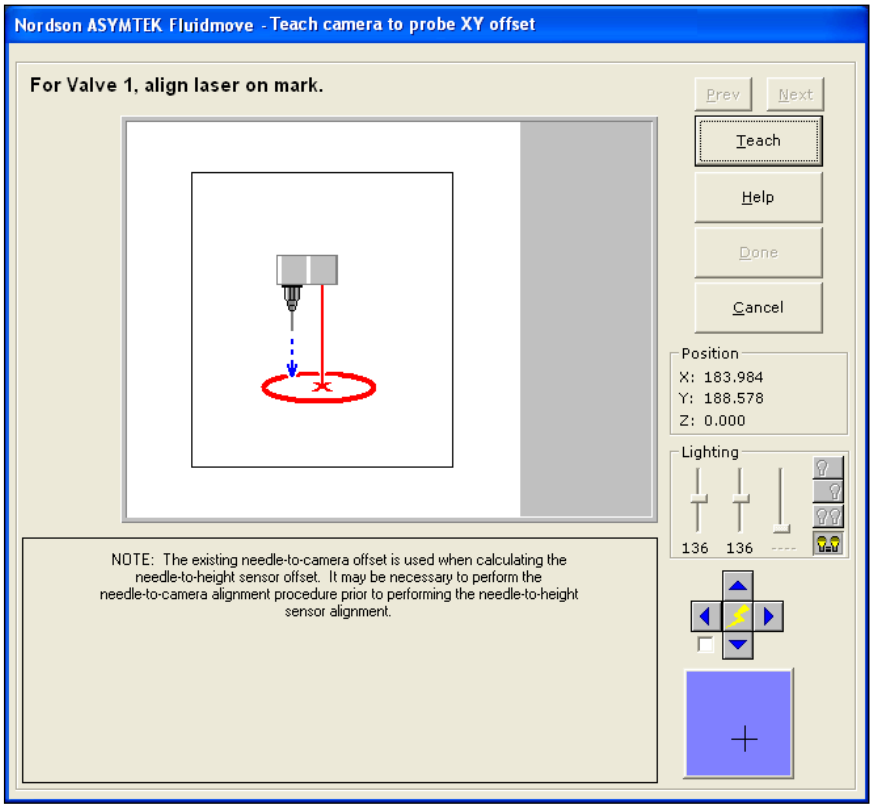

Figure 4-8 Camera to Height Sense Probe or Laser XY Offset

4.4.2.4 Setup Routine Instructions

To teach needle to height sensor Z offset:

1. Select the Teach Center Method (Figure 4-9.

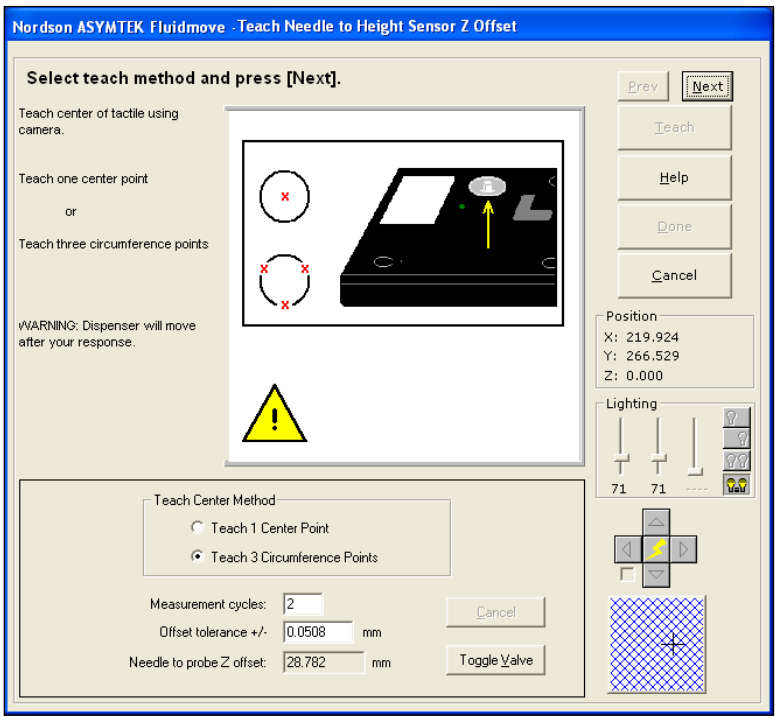

Figure 4-9 Needle to Height Sensor Z Offset

2. Use the position controls to move the camera crosshairs to the teaching point(s) on the tactile sensor and click on **Teach**.
3. Click on **Done** when finished.
   - The machine will now calculate the offset measurements for the vertical and the front/rear or left/right tilts. The tilt direction is specified in the Setup Valves window (Figure 3-8).
   - The Z Offset Summary will appear (Figure 4-10).
4. Click on **Front** to see the offset values for the front tilt.
5. Click on **Rear** to see the offset values for the rear tilt.
6. Click on **OK** to close the summary.

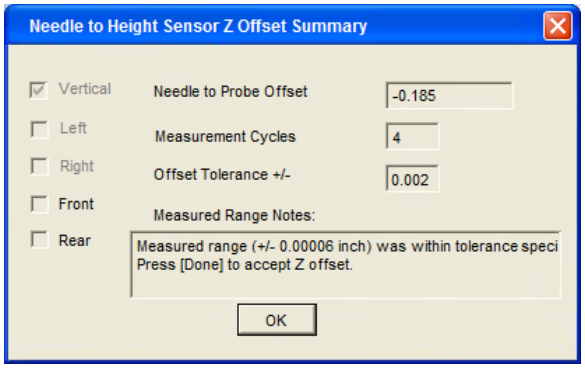

Figure 4-10 Needle to Height Sensor Z Offset Summary

NOTE In this example, the left and right tilt values are grayed out. If the tilt direction selected in Setup Valves is left/right, these values would be active and the front and rear values would be grayed out.

4.4.2.5 Purge and Scale Locations

To teach the purge location (Figure 4-11):

1. Select the Teach Center Method.
2. Click on **Next** to continue.
3. Use the position controls to move the camera crosshairs to the center of the purge station.
4. Click on **Teach**.
5. To teach the height sense location, use the position controls to move camera crosshairs to the flat surface of the purge boot on the purge station.
6. Click on **Teach**.
7. Click on **Done**.

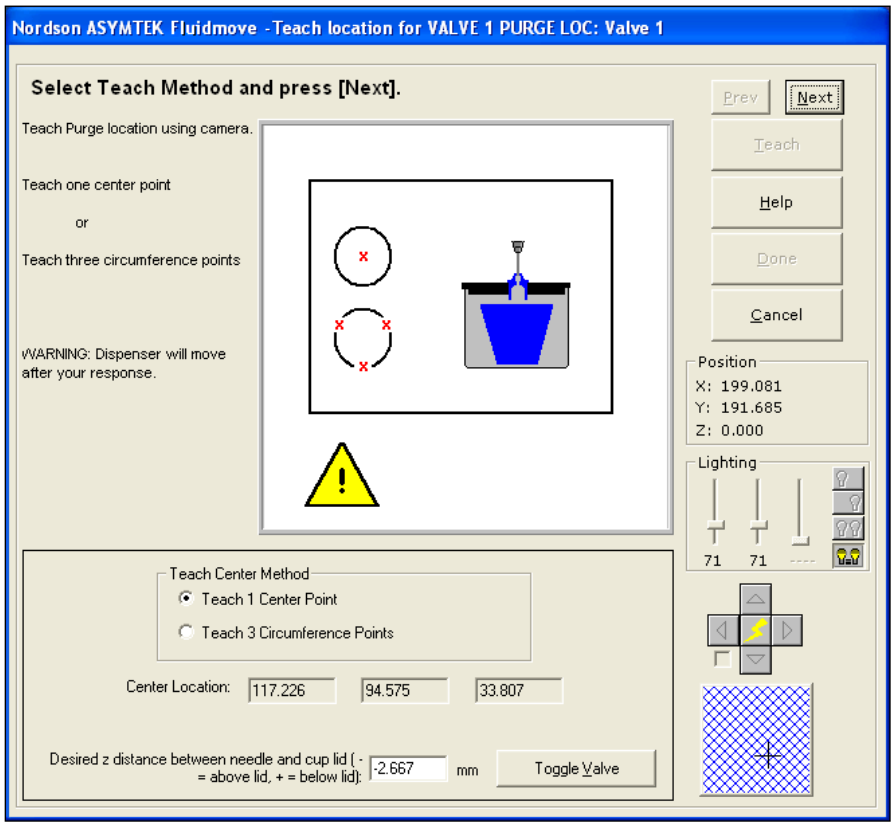

Figure 4-11 Valve 1 Purge Location

To teach the scale location (Figure 4-12):

1. Select the Teach Center Method.
2. Click on **Next** to continue.
3. Use the position controls to move the camera crosshairs to the center on the scale station.
4. Click on **Teach**.
5. To teach height sense location, use the position controls to move camera crosshairs to a location near the scale hole.
6. Click on **Teach**.
7. Click on **Done**.

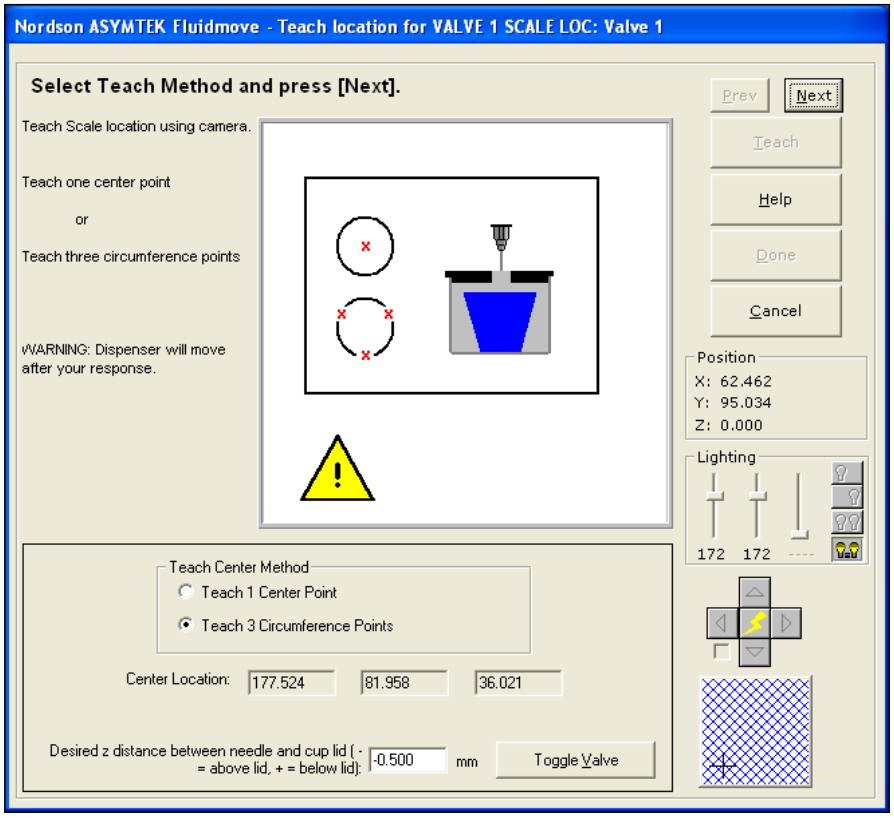

Figure 4-12 Valve 1 Scale Location

4.4.2.6 Needle XY Offset

To calculate the needle XY offset (Figure 4-13):

1. Click on the **Next** button to start Offsets for Dot Type 1.
2. Click on the **Yes** to reteach substrate corners on the mini service station on the back of Conveyor Rail 2.
   a. Use the position controls to move the camera crosshairs to the upper left substrate corner and click on **Teach**.
   b. Use the position controls to move the camera crosshairs to the lower right substrate corner and click on **Teach.**
3. Move the camera crosshairs to the dot locations and click on **Teach**.
4. Click on **Done** when finished with Dot Type 1 Vertical.
5. Repeat steps 1, 3 and 4 for all dot types in CW (clockwise) tilt direction.
6. Repeat steps 1, 3 and 4 for all dot types in CCW (counterclockwise) tilt direction.
   ► You will return to the Machine Setup Window.
7. Click on **Exit** in the Machine Setup Window when all offsets are complete.

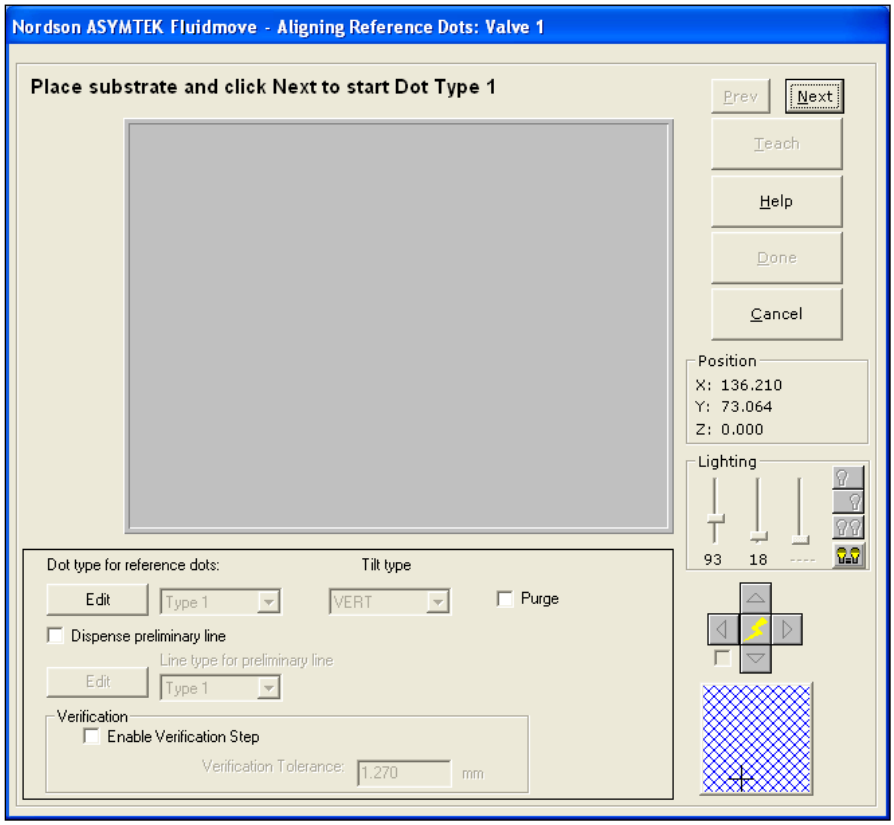

Figure 4-13 Alignment Dot 1 Dispensing Valve 1

4.5 Creating a Program with Tilt

To create a program with tilt:

1. Select **Teach a Program** from the Main Menu.
   - ► The Programming Window opens (Figure 4-14).
   - ► The last saved program opens when you start Fluidmove.

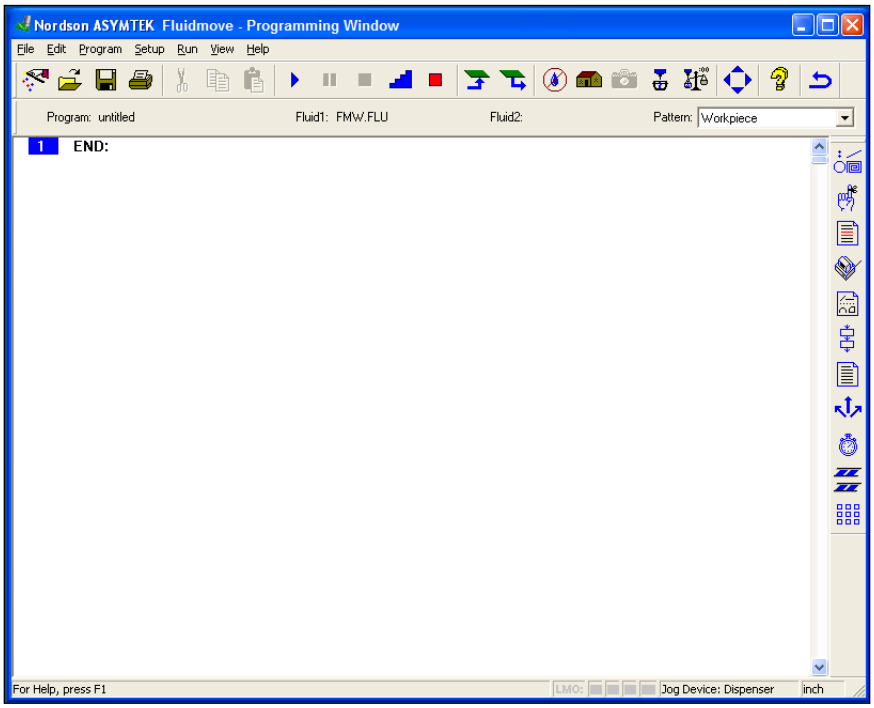

Figure 4-14 Programming Window

2. To create a new program, select **File > New** from the menu bar or click on the **Program Wizard** icon on the toolbar.
3. The Create Workpiece Window opens (Figure 4-15).

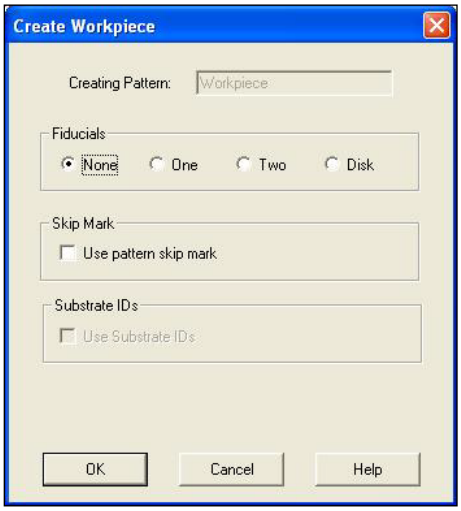

Figure 4-15 Create Workpiece

4. Select the number of fiducials and click on **OK**.
   - If one or more fiducials are selected, you will be prompted to teach fiducial location. Refer to the *Fluidmove User Guide* for instructions.
   - The Programming Window (Workpiece Pattern) opens. See the *Fluidmove User Guide* for information on creating additional patterns.
5. Add a height sense command.
   a. In the Programming Window, select **Program > Process Commands > Find Substrate Height**.
   b. Follow the prompts.
6. Select the tilt direction.
   a. In the Programming Window, select **Program > Process Commands > Tilt**.
   b. Select the tilt direction and click on **OK**.
      - Available tilt directions depend on software configuration, see *3.4 Software Setup*.

Figure 4-16 Set Tilt Instruction

7. Add dispensing instructions. See the *Fluidmove User Guide* for detailed information.

NOTE All dispensing instructions after a Set Tilt Instruction will be performed at that tilt angle until the next tilt instruction.

4.6 Running a Program

When the program is run, the system will verify that offsets have been run for all dot and line types in the program.

To run production:

1. Click the **Run** button.
   - The **Run Production** button appears in the Production Window, along with the manual run commands (Figure 4-17).

NOTE Clicking the **Run Production** button opens the Run Window. It does not start the production run. To start the production run, you must click on **Go** in the Run Window.

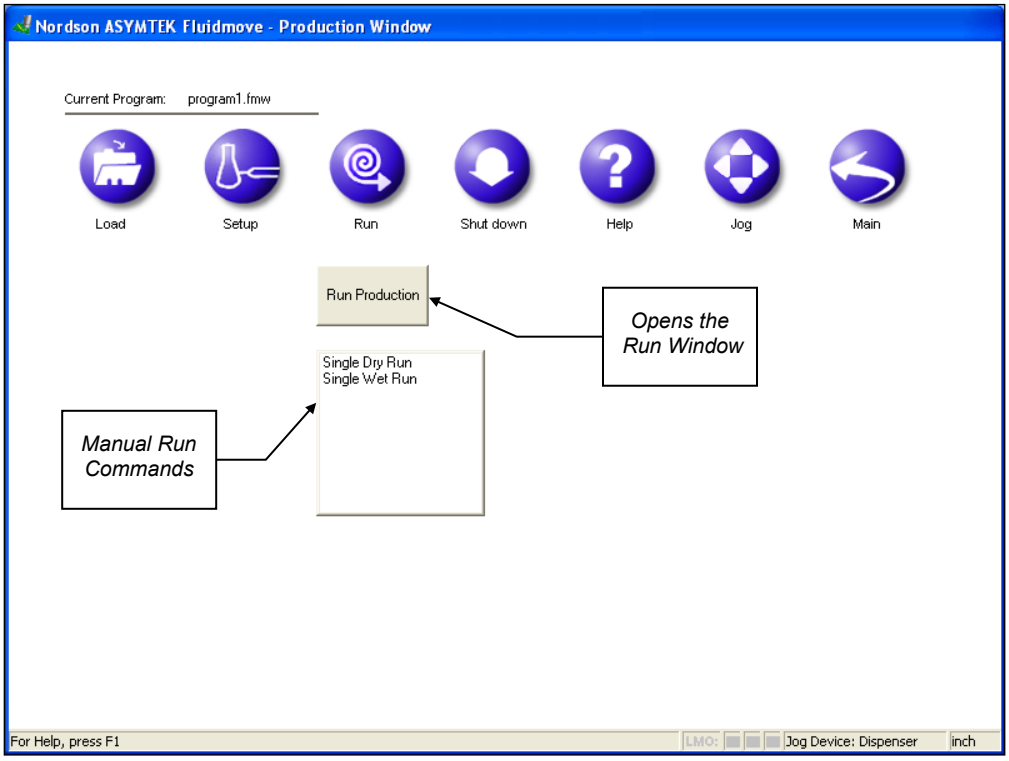

Figure 4-17 Run Production

2. To execute one of the manual run commands, highlight the desired command. The manual run commands are described in Table 4-1.

Table 4-1 Manual Run Commands

Command	Description
Single Dry Run	Select this option to perform one complete run of the program for one workpiece without dispensing fluid.
Single Wet Run	Select this option to perform one complete run of the program for one workpiece.

3. Click on the **Run Production** button to run the program.

NOTE To execute one of the manual run commands, you must click on the command PRIOR to clicking on the **Run Production** button.

5 Troubleshooting

5.1 Overview

If you have difficulty operating your dispensing system, use this section to identify a possible solution to the problem. If you have difficulties not listed in this section, or the suggested solution does not correct the problem, contact Asymtek Technical Support.

5.2 Safety First

Operation of your dispensing system involves heat, air pressure, electrical power, mechanical devices, and the use of hazardous materials. It is essential that every person servicing or operating the dispensing system fully understands all hazards, risks, and safety precautions. Refer to *Section 2 - Safety* for additional information.

CAUTION! Allow only qualified personnel to perform system troubleshooting. Observe and follow the safety instructions in this document and all other related documentation. Failure to do so may cause serious bodily injury to the user or damage to the equipment.

5.3 Record Keeping

The type of procedure performed should be recorded in maintenance records for the dispensing system. Dates, part numbers/serial numbers of replaced parts, names of technicians, and other pertinent data should be recorded.

Table 5-1 Troubleshooting

Symptom	Possible Cause	Recovery
Mechanism tilts in the opposite direction as commanded	The pneumatic hoses from the tilt mechanism are not connected to the correct fittings on the bulkhead.	Connect the pneumatic hoses as shown in Figure 3-7.
Tilt mechanism will not tilt in all directions	The pneumatic regulator on the side of the bulkhead is set incorrectly.	Go to the I/O window (see *6.2 I/O Test*) to toggle each tilt bit independently. After toggling open the hatch, try to rotate the tilt mechanism by hand. The force applied to each direction should be about equal. Adjust the regulator on the side of the Z head to adjust the pressure. Pressure to the black and blue ports for the tilt should be about 60 psi.

6 Functional System Check

6.1 Initialization Test

To perform an initialization test:

1. If applicable, exit the Fluidmove software.
2. Power the machine OFF and then ON again.
3. Restart the Fluidmove software.
   - ► By default the tilt mechanism should be in the vertical position.

6.2 I/O Test

To test tilt I/O's:

1. In the Fluidmove Main Window, select **Tools**.
2. In the Tools Window, click on **I/O Test** and then on **Dispenser**.
   - ► The I/O Test Dialog opens.
3. Click on the Outputs 0-31 tab (Figure 6-1).

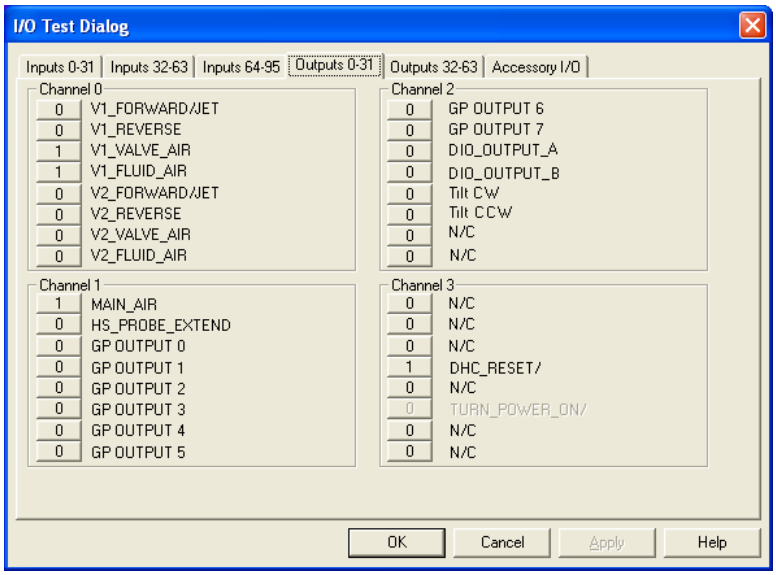

Figure 6-1 I/O Test Dialog

4. The Channel 2 section contains bits for Tilt CW and Tilt CCW. Below is a table showing position vs. I/O.

Table 6-1 Tilt Direction I/O

Direction \ IO	Tilt CW	Tilt CCW
Vertical	0	0
Tilt CW	1	Either 1 or 0
Tilt CCW	0	1

5. By toggling the Tilt CW and Tilt CCW I/O bit from 0 to 1, a change in the mechanism should be seen.

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