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ALIGNMENT TOOLS

The following alignment tools are used to calibrate the FPC:

- Alignment Tool (C/N 1-43841-01)
- Alignment Homing Fixture (C/N 1-43729-01)
- Alignment Gauge (C/N 1-73446-01)

Refer to Figures 6-1, 6-2, 6-3, and 6-4.

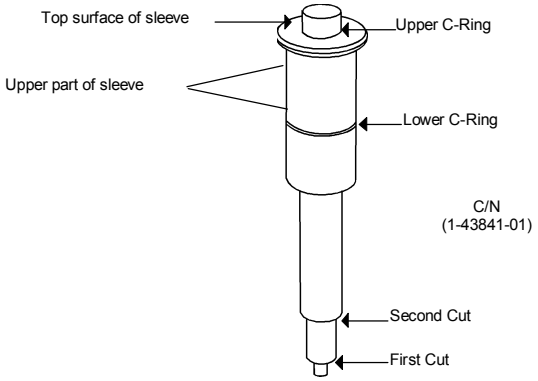


Figure 6-1. Alignment Tool

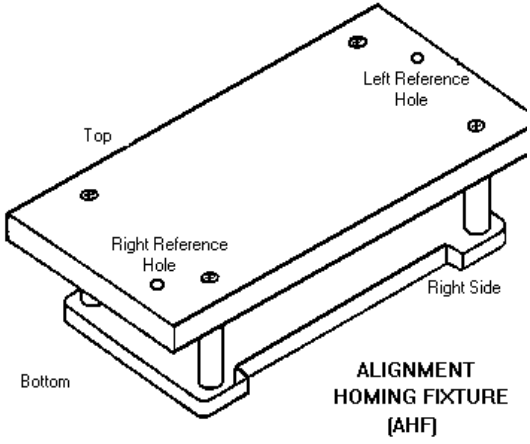


Figure 6-2. Alignment Homing Fixture

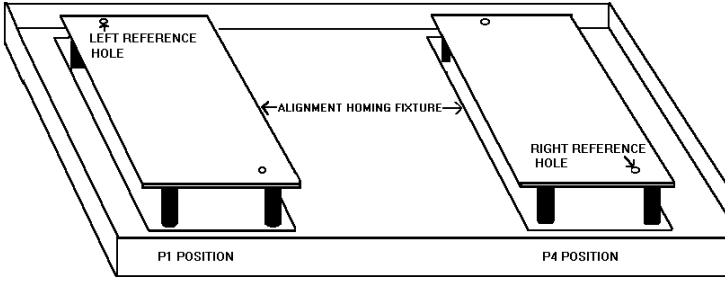


Figure 6-3. Platform Positions P1 and P4

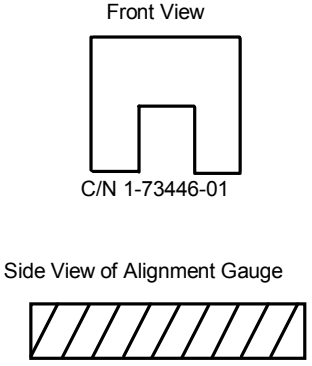


Figure 6-4. Alignment Gauge

X-AXIS ORIGIN AND Y-AXIS ORIGIN SWITCH LOCATION

X-AXIS ORIGIN SWITCH LOCATION

1. = To gain access to the X-Axis Switch Assembly, complete steps 1 - 5 of the X-Axis Switch Assembly Replacement as listed in the Component Replacement Section of this manual.
2. = Move the Z-Axis Assembly all the way to the right or left so the cover can be removed.
3. = Loosen the two X-Axis Origin Switch mounting screws (refer to Figure 6-5).
4. = Move the switch so it is interrupted before the Z-Axis Assembly reaches the physical limit of travel.
5. = Tighten the two mounting screws.
6. = Replace the covers.
7. = Perform the XYZ Software Positions Alignment procedure.

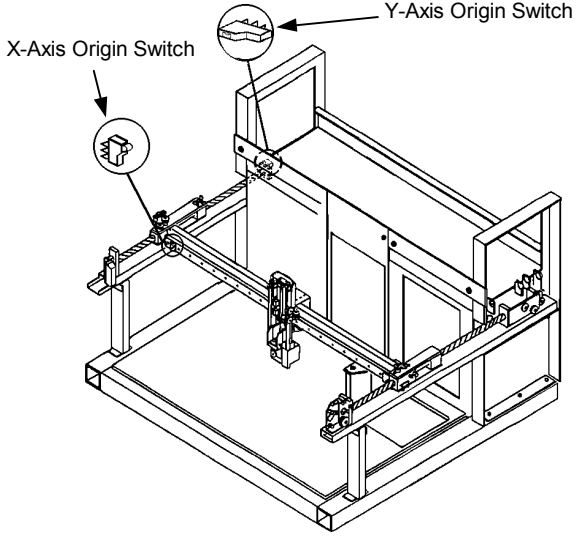


Figure 6-5. X-Axis and Y-Axis Origin Switch Locations

Y-AXIS ORIGIN SWITCH LOCATION

1. = Remove the Left Side Panel.
2. = Loosen two actuator mounting screws (refer to Figure 6-5).
3. = Move the actuator so it is interrupted just before the X-Axis Guide Bearing Block hits the physical stop.
1. = Tighten the two actuator mounting screws.
2. = Reattach the Left Side Panel.
3. = Perform the XYZ Software Positions Alignment procedure.

XYZ SOFTWARE POSITIONS

The X and Y-Axis Alignment procedures are identical for all eight positions called out on the Pipettor Homing Sequence Menu. The alignment procedures are for the platforms (left and right), Tip Racks 1 and 2 (left and right), and Diluent Bottles 1 and 2. Incremental stepper motor adjustments and a three digit position number are provided by pressing the **+** (plus) or **-** (minus) key to adjust the Pipettor tip to the right or left, forward or backward, or vertically (for Z-Axis Alignment). The new alignment values become the default values in the EEPROM on the MPU Board.

There are four steps for aligning all three X, Y, and Z-Axes:

1. = Highlight the selected column value.
2. = Enter **+** or **-** values (keys) to move the Pipettor right, left, or vertically for centering.
3. = Select **MOVE** (**F3**) to move the Pipettor tip.
4. = Press ↵**Enter**.

INSTALL THE ALIGNMENT HOMING FIXTURE (AHF) PLATFORM IN POSITION P1 ON THE PIPETTOR PLATFORM (refer to Figure 6-6).

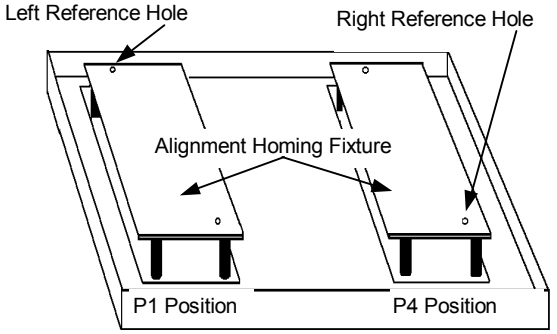
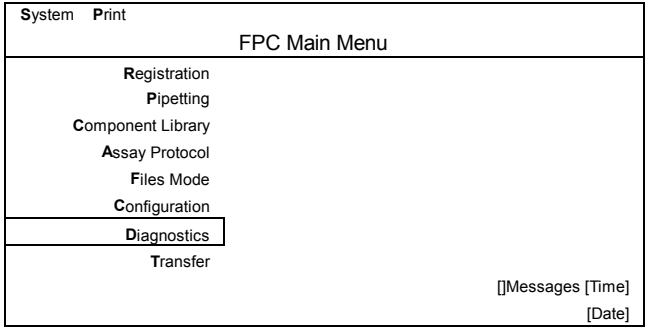
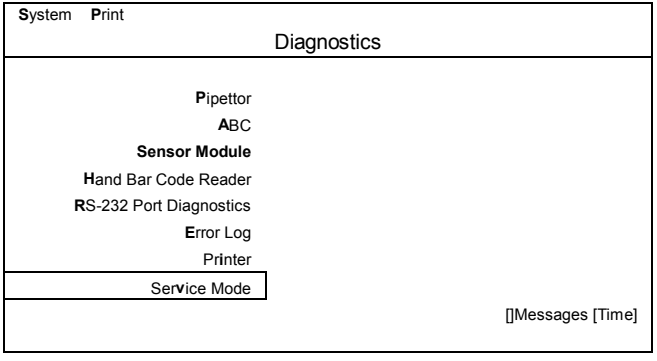


Figure 6-6. Alignment Homing Fixture Positions

1. Select **Diagnostics** from the Main Menu and press ↵**Enter**.



The following screen displays:



2. Select **Service Mode** from the Diagnostics Menu and press ↵**Enter**.

NOTE
The Following Is
For Abbott Service Personnel Use Only.

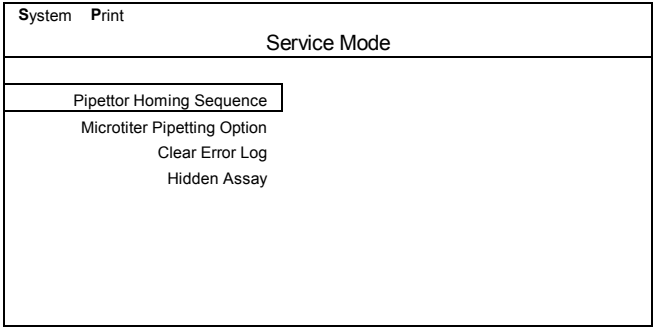
The following screen prompt displays:

PASSWORD ENTRY

ENTER PASSWORD_____

3. Enter the password **letusin** in *lowercase letters only* and press ↵**Enter**.

The following screen displays:



Select **Pipettor Homing Sequence** from the Service Mode Menu and press ↵**Enter**.

The following screen displays:

System Print Move Save

Pipettor Homing Sequence

	X Adjust	Y Adjust	Z Adjust
Platform Left:	+000	+000	+000
Platform Right:	+000	+000	+000
Tip Rack 1 Left:	+000	+000	+000
Tip Rack 1 Right:	+000	+000	+000
Tip Rack 2 Left:	+000	+000	+000
Tip Rack 2 Right:	+000	+000	+000
Diluent Bottle 1:	+000	+000	+000
Diluent Bottle 2:	+000	+000	+000

Use arrow keys to move to parameter to adjust. Use (+/-) key to adjust value. Select [Move] to move tip.

Each of the motor step movements are as follows:

1 motor Step in X direction = 0.0534 mm
1 motor Step in Y direction = 0.1068 mm
1 motor Step in Z direction = 0.0534 mm

+x	moves to the right
-x	moves to the left
+y	moves toward the front
- y	moves toward the back
+z	moves in the down direction
-z	moves in the up direction

The alignment for “platform left” and “platform right” requires using the Alignment Homing Fixture (AHF), Figure 6-6, in two locations on the platform.

NOTE:
The Alignment Tool is installed after the Pipettor Homing Sequence is initiated to avoid potential tool damage resulting when the pipettor nozzle goes to the Tip Bin to wipe off any disposable tip.

4. Remove the Pipette Nozzle Assembly and replace it with the Alignment Tool, Figure 6-7.
5. Insert the upper part of the sleeve (Figure 6-7) into the Nozzle Holder Assembly, then tighten the hex screw.
6. Ensure that the Nozzle Assembly is secured while the tool is in place to avoid tangling the tubing and wires while performing the alignments.

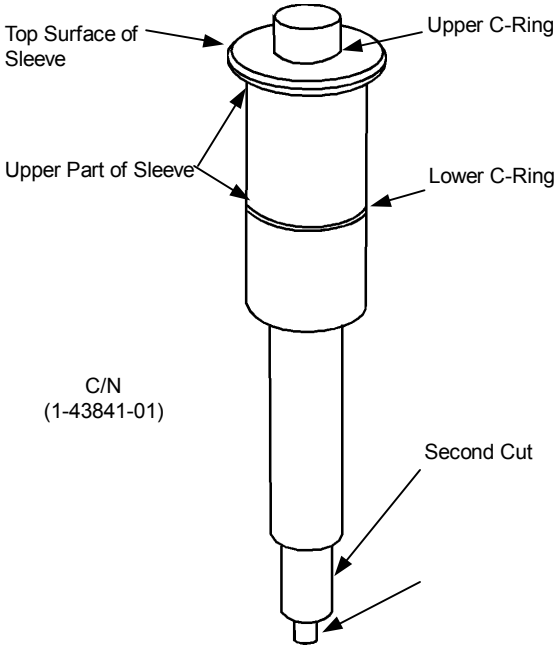


Figure 6-7. Alignment Tool

PLATFORM LEFT: X-AXIS ALIGNMENT PROCEDURE

1. Cursor to **X Adjust Platform Left: +000**.
2. Select MOVE (**F3**) and then press **↵Enter.**
3. Pipettor Alignment Tool moves over the Left Reference Hole on the Alignment Homing Fixture (AHF). Refer to Figure 6-6.
4. Center the Alignment Tool tip position directly over the Left Reference Hole using the **+** and **-** keys, MOVE (**F3**), and **↵Enter**.

NOTE:	
+X	**moves the tool tip to the right**
-X	**moves the tool tip to the left**
+Y	**moves the tool tip toward the front**
-Y	**moves the tool tip toward the back**

5. Repeat step 4 until the Alignment Tool Tip is centered directly over the Left Reference Hole in the X direction.

NOTE:
When the Alignment Tool Tip is centered over the Left Reference Hole in the X direction, X alignment at this position is complete.

PLATFORM LEFT: Y-AXIS ALIGNMENT PROCEDURE

1. Cursor to **Y Adjust +000.**
2. Repeat the above procedures for Y-Axis Alignment.
3. When the Alignment Tool tip is centered over the Left Reference Hole in the Y direction and the tip slides into the hole, Y Alignment at this position is complete.
4. If the tip does not slide into the Left Reference Hole, repeat the X and Y-Axis Alignment Procedures.

PLATFORM LEFT: Z-AXIS ALIGNMENT PROCEDURE

NOTE:
The Z-Height Alignments for both the left and right reference holes will be the average for both values for each location. The average value is what will be saved in the EEPROM.

NOTE:
+Z moves the tool tip down
-Z moves the tool tip up

1. Cursor to **Z Adjust Platform Left: +000.**
2. Select MOVE (**F3**) and press **↵Enter**.
3. The Pipettor Alignment Tool will move over the Left Reference Hole on the Alignment Home Fixture. Refer to Figure 6-6.

   Make sure the Upper C-Ring (Figure 6-7) is flush against the top surface of the sleeve.
4. Using the **+** and **-** keys, MOVE (**F3**) and **↵Enter**, adjust the Z-height to **3.25 mm**. The Z-height is the distance from platform to the first cut of the Alignment Tool (See Figure 6-9).

   To obtain the measurement, place the metric gauge (Wedge Gauge) on the surface of platform and slide the Wedge Gauge under the first cut of the Alignment Tool until the Tool and Wedge just make contact. Do not push the Wedge Gauge so hard that the tool slides up into the sleeve.

NOTE:
Use the FPC Metric Gauge (Wedge Gauge) (Part # 1-43627-01) to measure the height from the Alignment Homing Fixture (AHF) to the first cut of the Alignment Tool (Figure 6-7).

5. When a Z-height of 3.25 mm is achieved, the alignment is complete.
6. Make sure the Alignment Tool is clear of the Left Reference Hole, then move the Alignment Homing Fixture to the P4 position on the FPC platform.

PLATFORM RIGHT: X-AXIS ALIGNMENT PROCEDURE:

1. Cursor to **X Adjust to Platform Right: +000**.
2. Select MOVE (**F3**) and press **↵Enter**.
3. Pipettor Alignment Tool will move the Right Reference Hole on the Alignment Homing Fixture (AHF). Refer to Figure 6-6.
4. Center the Alignment Tool tip position directly over the Right Reference Hole using the **+** and **-** keys, MOVE (**F3**) and **↵Enter**.
5. Repeat step 4 until the Alignment Tool tip is centered directly over the Right Reference Hole in the X direction.
6. When the Alignment Tool tip is centered over the Right Reference Hole in the X direction, X Alignment at this position is complete.

PLATFORM RIGHT: Y-AXIS ALIGNMENT PROCEDURE

1. Cursor to **Y Adjust +000**.
2. Repeat above procedures for Y-Axis Alignment.
3. When the Alignment Tool tip is centered over the Right Reference Hole in the Y direction and the tip slides into the hole, Y Alignment at this position is complete.

   At this point, if both the X and Y Alignments are accurate, the Alignment Tool will slide into the Right Reference Hole.
4. If the tip does not slide into the Right Reference Hole, repeat the X and Y-Axis Alignment Procedures.

PLATFORM RIGHT: Z-AXIS ALIGNMENT PROCEDURE

1. Cursor to **Z Adjust Platform Right: +000**.
2. Press MOVE (**F3**) and press **↵Enter**.
3. The Pipettor Alignment Tool will move over the Right Reference Hole on the Alignment Homing Fixture (refer to Figure 6-6). Make sure the Upper C-Ring (Figure 6-7) is flush against the top surface of the sleeve.

   Using the **+** and **-** keys, MOVE (**F3**), and **↵Enter**, adjust the Z-height to **3.25 mm**. The Z-height is the distance from platform to the first cut of the Alignment Tool. See Figure 6-9.

4. To obtain the measurement, place the Metric Gauge (Wedge Gauge) on the surface of platform and slide the Wedge Gauge under the first cut of the Alignment Tool until the Tool and Wedge just make contact. Do not push the Wedge Gauge so hard that the tool slides up into the sleeve.

5. When a Z-height of 3.25 mm is achieved, the alignment is complete.

TIP RACK 1 LEFT: X-AXIS ALIGNMENT PROCEDURE

NOTE
Remove cardboard from tip racks.

1. Remove all tips and cardboard from the Tip Racks.

2. Cursor to **X Adjust Tip Rack 1 Left: +000**.

3. Select MOVE (**F3**) and press **↵Enter**.

4. The Pipettor moves to the Tip Rack 1 Left Location FF. Refer to Figure 6-8.

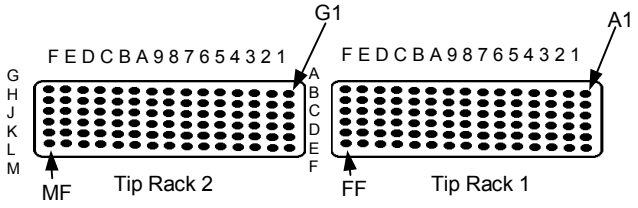


Figure 6-8. Tip Racks 1 and 2

5. Adjust Pipettor Alignment Tool using the **+** and **-** keys, MOVE (**F3**), and **↵Enter**, until the second cut in the tool is centered directly over Tip Rack 1 Left Location FF.

6. When the Alignment Tool is centered over location FF in the X direction, X Alignment at this position is complete.

TIP RACK 1 LEFT: Y-AXIS ALIGNMENT PROCEDURE

1. Cursor to **Y Adjust +000**.
2. Repeat the previous procedure for Y-Axis Alignment.
3. When the Alignment Tool is centered and second cut slides into the hole, Y-Axis Alignment is complete.

   At this point, if both the X and Y Alignments are accurate, the Alignment Tool will slide into the Left Tip Rack 1 position.

TIP RACK 1 RIGHT: X-AXIS ALIGNMENT PROCEDURE

1. Cursor to **X Adjust Tip Rack 1 Right: +000**.
2. Select MOVE (**F3**) and press **↵Enter**.
3. The Pipettor goes to Right Rack 1 Location A1. Refer to Figure 6-8.
4. Adjust the Alignment Tool position using the **+** and **-** keys, MOVE (**F3**), and **↵Enter** until the second cut in the tool is centered directly over Right Rack 1 Location A1.
5. When Alignment Tool is centered over Location A1 in the X direction, X Alignment is complete.

TIP RACK 1 RIGHT: Y-AXIS ALIGNMENT PROCEDURE

1. Cursor to **Y Adjust +000**.
2. Repeat the above procedure for the Y-Axis Alignment procedure.
3. When the Alignment Tool is centered and second cut slides into the hole, Y-Axis Alignment is complete.

   At this point, if both X and Y Alignments are accurate, the Alignment Tool will slide into the Right Tip Rack 1 position.

TIP RACK 2 LEFT: X-AXIS ALIGNMENT PROCEDURE

1. Cursor to **Y Adjust Tip Rack 2 Left: +000**.
2. Remove all tips and cardboard.
3. Select MOVE (**F3**) and press **↵Enter**.
4. The Pipettor goes to Tip Rack 2 Left Location MF. Refer to Figure 6-8.
5. Adjust Alignment Tool position using the **+** and **-** keys, MOVE (**F3**), and **↵Enter** until the tool is centered directly over Tip Rack 2 Left Location MF.

6. When the Alignment Tool is centered over Location MF in the X direction, X Alignment is complete.

TIP RACK 2 LEFT: Y-AXIS ALIGNMENT PROCEDURE

1. Cursor to **Y Adjust +000**.
2. Repeat above procedure for Y-Axis Alignment.
3. When the Alignment Tool is centered and the second cut slides into the hole, Y-Axis Alignment at this point is complete.

   At this point, if both X and Y Alignments are accurate, the Alignment Tool will slide into the Tip Rack 2 Position.

TIP RACK 2 RIGHT: X-AXIS ALIGNMENT PROCEDURE

1. Cursor to **X Adjust Tip Rack 2 Right: +000**.
2. Select MOVE (**F3**) and press ↵**Enter.**
3. The Pipettor moves to the Tip Rack 2 Location G1. Refer to Figure 6-8.
4. Adjust the Pipettor Nozzle position using the **+** and **-** keys, MOVE (**F3**), and ↵**Enter** until the tool is centered directly over Tip Rack 2 Location G1.
5. When the Alignment Tool is centered over Location G1 in the X direction, X Alignment is complete.

TIP RACK 2 RIGHT: Y-AXIS ALIGNMENT PROCEDURE

1. Cursor to **Y Adjust +000**.
2. Repeat the above procedure for the Y-Axis Alignment procedure.
3. When the Alignment Tool is centered and the second cut slides into the hole, Y-Axis Alignment is complete.

   At this point, if both the X and Y Alignments are accurate, the Alignment Tool will slide into the Tip Rack 2 position.

NOTE:
The average value of the Z-Height Alignment for both racks will be saved in the EEPROM.

TIP RACK 1 LEFT: Z-AXIS ALIGNMENT PROCEDURE

NOTE:
Remove cardboard from Tip Racks.

1. Remove all cardboard and tips.
2. Cursor to **Z Adjust +000**.
3. Select MOVE (**F3**) and press **↵Enter.**
4. Using a metric feeler gauge (Wedge Gauge), measure for a 0.8 mm gap between the bottom edge of the Alignment Tool (second cut) and the top of the Tip Rack. Refer to Figure 6-9.
5. Adjust gap measurement using the **+** and **-** keys, MOVE (**F3**), and **↵Enter**.
6. When a 0.8 mm gap is achieved, the alignment is complete.

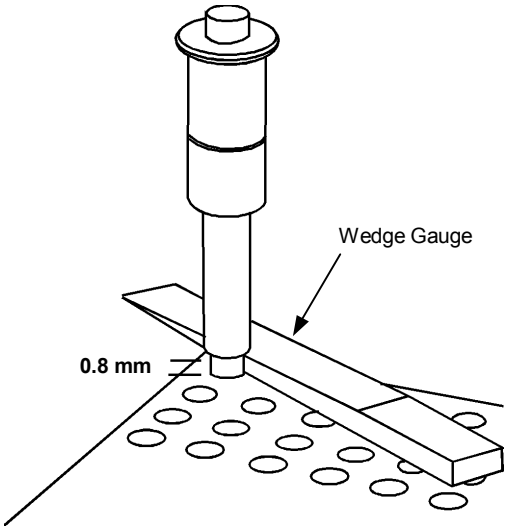


Figure 6-9. Z-Height Adjustment in Tip Rack 1 Left

TIP RACK 1 RIGHT: Z-AXIS ALIGNMENT PROCEDURE

1. Cursor to **Z Adjust Tip Rack 1 Right: +000**.
2. Select MOVE (**F3**) and press **↵Enter.**
3. The Alignment Tool moves to Tip Rack 1 Position A1. Refer to Figure 6-8.
4. Using a metric feeler gauge (Wedge Gauge), measure for a 0.8 mm gap between the bottom edge of the Alignment Tool and the top of the Tip Rack. Refer to Figure 6-10.
5. Adjust the gap measurement using the **+** and **-** keys, MOVE (**F3**), and **↵Enter**.
6. When a 0.8 mm gap is achieved, the alignment is complete.

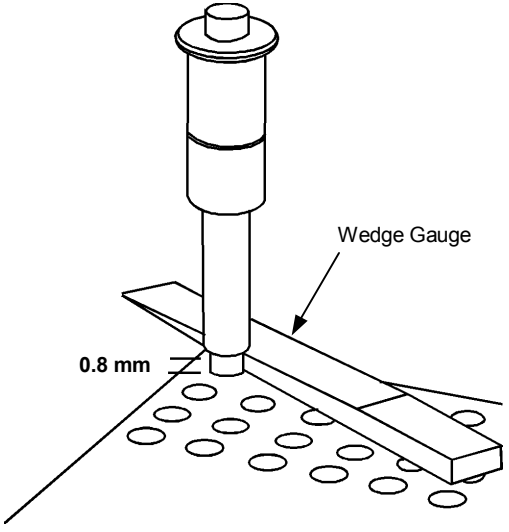


Figure 6-10. Z-Height Adjustment in Tip Rack 1 Right

TIP RACK 2 LEFT: Z-AXIS ALIGNMENT PROCEDURE

1. Cursor to **Z Adjust Tip Rack 2 Left: +000**.
2. Select MOVE (**F3**) and press **↵Enter.**
3. The Alignment Tool moves to Tip Rack 2 position MF. Refer to Figure 6-8.
4. Using a metric feeler gauge (Wedge Gauge), measure for a 0.8 mm gap between the bottom edge of the Alignment Tool and the top of the Tip Rack.
5. Adjust the gap measurement using the **+** and **-** keys, MOVE (**F3**), and **↵Enter**. Refer to Figure 6-10.
6. When a 0.8 mm gap is achieved, the alignment is complete.

TIP RACK 2 RIGHT: Z-AXIS ALIGNMENT PROCEDURE

1. Cursor to **Z Adjust Tip Rack 2 Right: +000**.
2. Select MOVE (**F3**) and press **↵Enter.**
3. The Alignment Tool moves to Tip Rack 2 position G1. Refer to Figure 6-8.
4. Using a metric feeler gauge, measure for a 0.8 mm gap between the bottom edge of the Alignment Tool and the top of the Tip Rack.
5. Adjust the gap using the **+** and **-** keys, MOVE (**F3**), and **↵Enter**.
6. When a 0.8 mm gap is achieved, the alignment is complete.

NOTE:
To verify the Tip Rack Z-Height settings are within the acceptance criteria, refer to the Z-Height Alignment Verification Procedure on page 6-20.

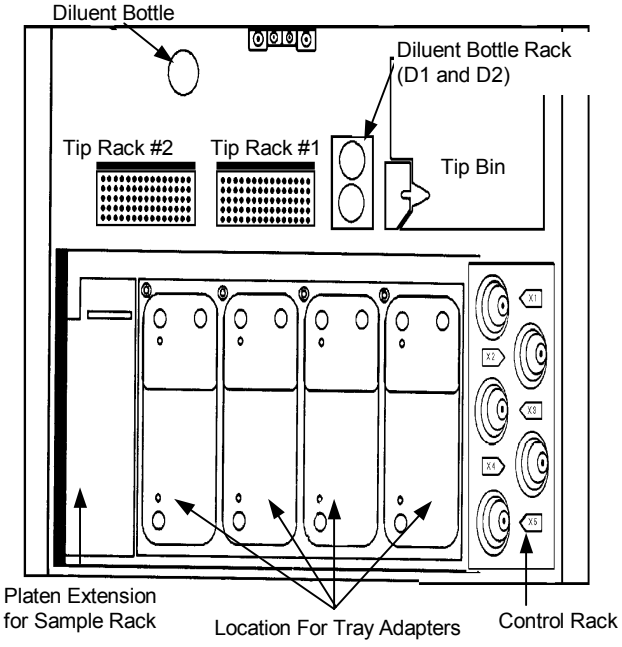


Figure 6-11. Diluent Bottle Racks D1 and D2

DILUENT BOTTLE 1: X & Y-AXIS ALIGNMENT PROCEDURE

NOTE:

Diluent Bottle Alignment does not require Z-Height Alignment.

1. = Cursor to **X Adjust Diluent Bottle 1: +000**.
2. = Select MOVE (**F3**) and press **↵Enter.**
3. = The Alignment Tool moves to Diluent Bottle Rack Position D1. Refer to Figure 6-11.
4. = Adjust the centering of the Alignment Tool using the **+** and **-** keys, MOVE (**F3**), and **↵Enter**.
5. = When the Alignment Tool is centered, the alignment is complete.

DILUENT BOTTLE 2: X & Y-AXIS ALIGNMENT PROCEDURE

1. Cursor to **X Adjust Diluent Bottle 2: +000**.
2. Select MOVE (**F3**) and press ↵**Enter.**
3. The Alignment Tool moves to Diluent Bottle Rack Position D2. Refer to Figure 6-11.
4. Adjust the centering of the Alignment Tool using the **+** and **-** keys, MOVE (**F3**), and ↵**Enter**.
5. When the Alignment Tool is centered, the alignment is complete.

PRINT AND SAVE

1. Select Print **(F2)** and press ↵**Enter** for a hard copy of screen values.
2. The following screen prompt appears:

Current Window
Assay Template
Map
Cancel Printing

Select **Current Window.**

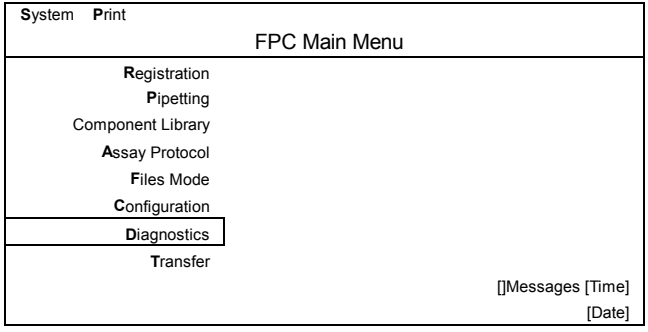
3. Remove the Alignment Tool and reinstall the Nozzle Assembly.
4. Select Save (**F4**) to save values and press ↵**Enter**.
5. Press the **Esc** key to exit.
6. The following screen prompt will be displayed:

CONFIRM
Power Down the pipettor for approximately 5 seconds to store the new homing values.
OK

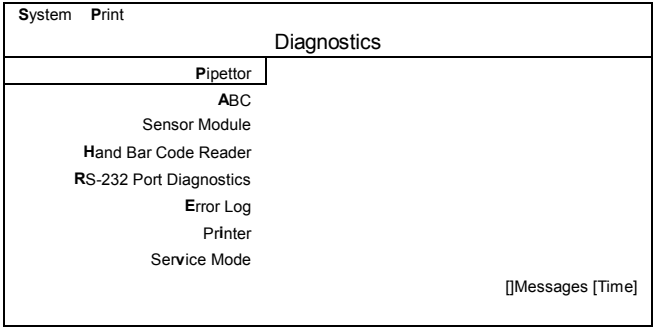
7. Power down the Pipettor.
8. Wait 5 seconds. Power up the Pipettor. Press ↵**Enter.**
9. The new values are now stored in the EEPROM on the MPU of the Pipettor.
10. Press the **Esc** key twice to exit to the Main Menu.
11. Now check Starting Dispense Height.

TIP RACK (Z-HEIGHT ALIGNMENT VERIFICATION PROCEDURE)

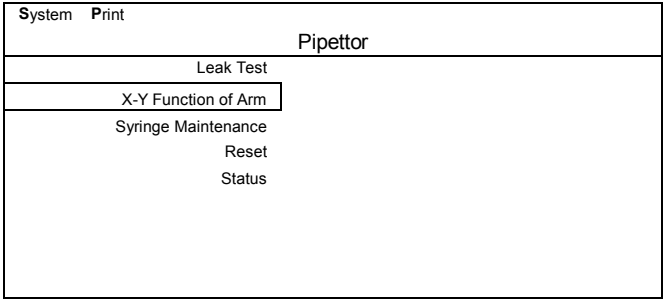
1. From the FPC Main Menu, select **Diagnostics** and press **↵Enter**.



2. From the Diagnostics Menu, select **Pipettor** and press **↵Enter**.



3. From the Pipettor Diagnostics Screen, select **X-Y Function of Arm** and press **↵Enter**.



4. = Select **4 60 Well Trays** and press ↵**Enter**.

Pre-Defined Pattern
4 60 Well Trays
4 Microtiters
3 FPIA Carousels
3 MEIA Carousels

5. = Place 4 Tray Platforms on the Pipettor. Remove all tips and cardboard from both racks.

6. = Place one (1) tip in Rack #1, position TA1.

System **P**rint

X-Y Function Test Object Placement

Place objects below on the platform

Destination Position
Destination Position #1:60 Well Tray
Destination Position #2:60 Well Tray
Destination Position #3:60 Well Tray
Destination Position #4:60 Well Tray

Confirm Placement: Yes or No

[ ] Message [Time]
[Date]

7. = **DISCONNECT JAMMING SENSOR CABLE CONNECTOR**

8. = Confirm placement Yes and press ↵**Enter.**

The following screen will appear:

System **P**rint **C**ycle **S**ingle

X-Y Function Test

Pattern Pos 1:=	Tip Rack #1 TA1=	Pattern Pos 2=	Tip Rack #1 TFF
Pattern Pos 3:=	Tip Rack #2 G1=	Pattern Pos 4=	Tip Rack #2 TMF
Pattern Pos 5:=		Pattern Pos	
Pattern Pos 7:=		Pattern Pos	
Pattern Pos 9:=		Pattern Pos	
Pattern Pos 11:=		Pattern Pos 12	
Pattern Pos 13:=		Pattern Pos 14	
Pattern Pos 15:=		Pattern Pos 16	
Pattern Pos 17:=		Pattern Pos 18	
Pattern Pos 19:=		Pattern Pos 20	

[ ] Messages [Time]
[Date]

9. = Select CYCLE (**F3**) and press ↵**Enter**.

10. Pause the Pipettor when the Sample Nozzle and pipette tip have reached the lowest travel at tip rack position A1.

11. Measure the tip pickup height as shown in Figure 6-12.

12. Repeat steps 10 - 11 for Tip Rack positions FF, G1, MF.

13. All four (4) readings must be within 0.8 mm to 1.0 mm.

14. If any of the Tip Rack Z-heights are not in the 0.8 mm to 1.0 mm specification, repeat the Tip Rack Z-Axis Alignment procedure.

15. Install the alignment gauge onto the shaft notch as shown in Figure 6-12.

16. Set the Z-height alignment to 0.8 mm using the Sample Nozzle Tip Height Alignment Gauge and a pipette tip. The Tip Racks' one and two Z-height must be repeated. Refer to Figure 6-12, if necessary, when setting the 0.8 mm gap using the Sample Nozzle Tip Height Alignment Gauge and pipette tip method.

17. Reconnect the Jamming Sensor.

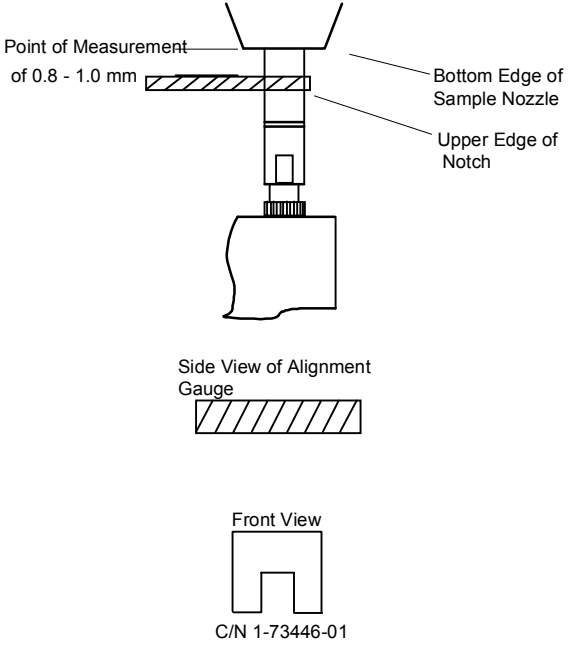
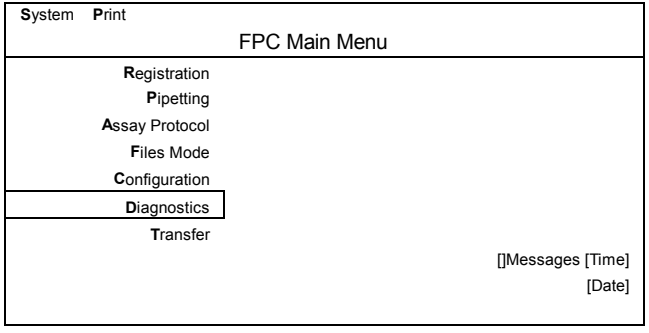


Figure 6-12. Tip Rack Z Reference

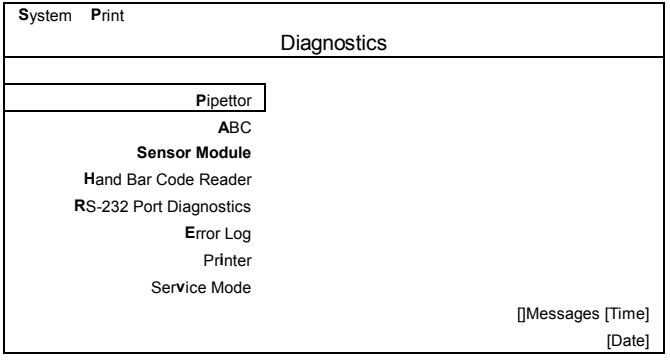
STARTING DISPENSE HEIGHT (SDH)

To check the SDH of each tray platform location, pause the Pipettor at each assay tray platform location. Measure the tip to platform distance with a metric gauge.

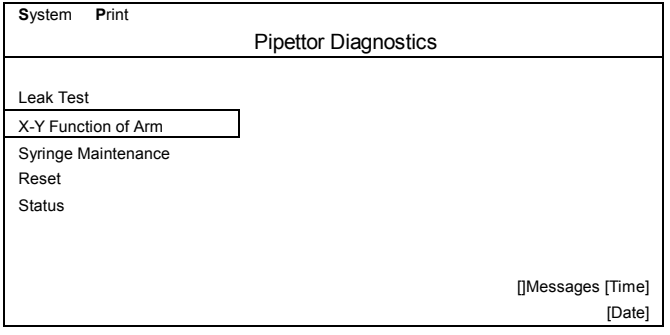
1. From the Main Menu move cursor, highlight **Diagnostics** and press ↵**Enter.**



2. Move cursor to **Pipettor** and press ↵**Enter.**



3. Move cursor to **X-Y Function** and press ↵**Enter.**



4. Select **4 60-Well Trays**.

Pre-defined Pattern
4 - 60-Well Trays
4 - Microtiters 3 - FPIA Carousels 3 - MEIA Carousels

5. Place 4 tray platforms on the Pipettor. Remove all the tips and cardboard from both racks.

6. Place one tip in rack #1, position TA1.

System **P**rint

X-Y Function Test Object Placement

Place objects below on the platform
Destination Position:
Destination Position #1: 60 Well Tray
Destination Position #2: 60 Well Tray
Destination Position #3: 60 Well Tray
Destination Position #4: 60 Well Tray
Confirm Placement: Yes or No

[] Messages [Time]
[Date]

7. Disconnect the Jamming Sensor Cable Connector.

8. Confirm placement **Yes** and press **↵Enter.**

System **P**rint **C**ycle **S**ingle

X-Y Function Test

Pattern Pos1: Tip Rack #1TA1	Pattern Pos2: Tip Rack #1TFF
Pattern Pos3: Tip Rack #2TA2	Pattern Pos4: Tip Rack #2TMF
Pattern Pos5:	Pattern Pos6:
Pattern Pos7:	Pattern Pos8:
Pattern Pos9:	Pattern Pos10:
Pattern Pos11:	Pattern Pos12:
Pattern Pos13:	Pattern Pos14:
Pattern Pos15:	Pattern Pos16:
Pattern Pos17:	Pattern Pos18:
Pattern Pos19:	Pattern Pos20:

[]Messages [Time]
[Date]

9. Select CYCLE (**F3**) and press **↵Enter**.

NOTE:
The Pipettor will pick up the tip and position it over the center of each tray platform. The tip will proceed downward until it is at the Starting Dispense Height "SDH" (the farthest down Z position).

10. Press the Pause button at the moment the tip reaches the "SDH" position.

11. Measure the tip to platform distance with the metric gauge (Wedge Gauge) and record the measurement. Refer to Figure 6-13.

12. Press the Pause button again to resume Pipettor motion allowing the Pipettor to continue to the next tray platform location.

13. Repeat steps 10-12 until all four measurements are obtained.

14. All four readings must be within 3.0 mm to 3.5 mm.

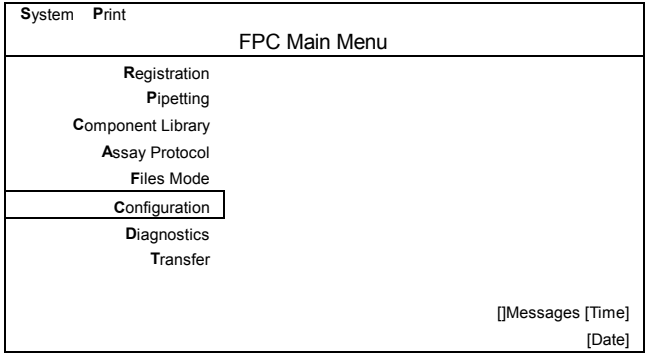
15. **Repeat Platform Left & Right Z-Height Alignments until all four readings are within 3.0 mm to 3.5 mm.**

16. Reconnect the Jamming Sensor Cable Connector.

TIP WIPEOFF POSITION

NOTE:
The XYZ Software Positions Alignment must be correct before doing this alignment.

1. From the FPC Main Menu, select **Configuration** and press ↵**Enter**.



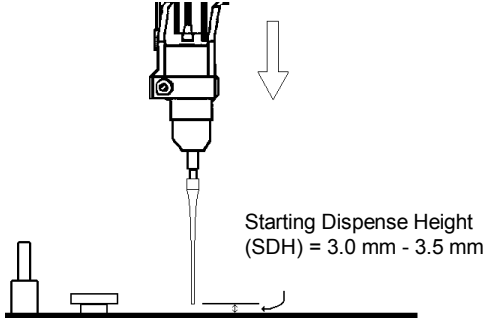
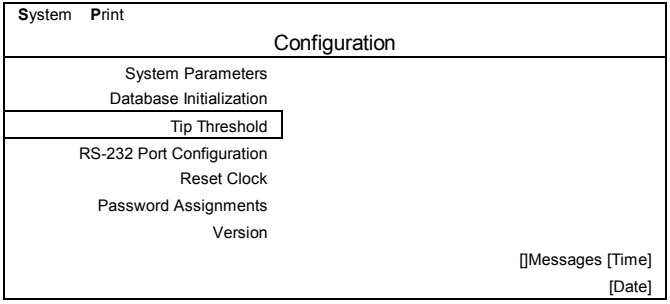
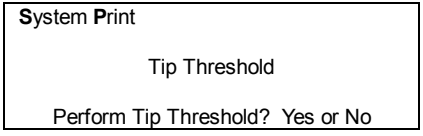


Figure 6-13. Starting Dispense Height Measurement

2. From the Configuration Menu, select **Tip Threshold** and press ↵**Enter.**



The following screen prompt displays:



3. Select **Yes** and press ↵**Enter**.

4. In this step you will be trying to stop the tip while it is down in the Tip Ejector Slot (refer to Figure 6-14). The Z-Axis Assembly will home, pick up a tip, and then eject the tip at the wipeoff position 10 times. Using the Pause button, stop the tip while it is in the slot of the Tip Ejector. Keep trying until it stops in the correct position.

5. Loosen the two Tip Ejector mounting screws.

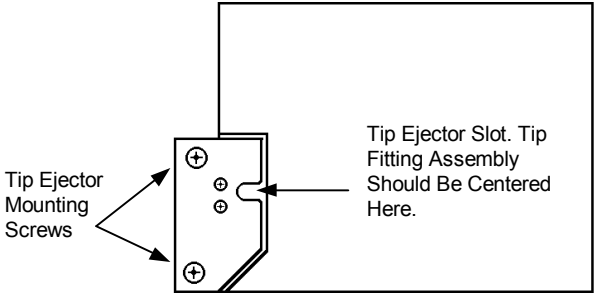


Figure 6-14. Tip Wipeoff Position Alignment

6. Remove the Tip Bin.

7. = Loosen the three Tip Ejector mounting-post screws at the bottom of the post and move the post until the tip is centered in the Tip Ejector Slot in the Y-Axis.

8. = Rerun the Tip Threshold to reset the threshold values.

9. = To return to the Main Menu, use the **Esc** key.

PUMP ORIGIN SENSORS

1. = Remove the Main Control Assembly (refer to the Component Replacement Section of this manual).

2. = Remove the Pump Assembly (refer to the Component Replacement Section of this manual).

3. = Reinstall the Main Control Assembly leaving the Right Front Cover off the Pipettor (refer to the Component Replacement Section of this manual).

4. = Cut the two cable ties holding the Pump Assembly Communication Cable to the Main Control Assembly. Route this cable from the position of the Right Front Cover.

5. = Remove the Pump Assembly Side Cover from the side to be adjusted.

NOTE:
When doing the right side, also remove the mounting plate.

6. = Connect the Pump Assembly Communication Cable to the Pump Assembly. At this point, do not connect the Sampling and Dilution Pump Drive Cables.

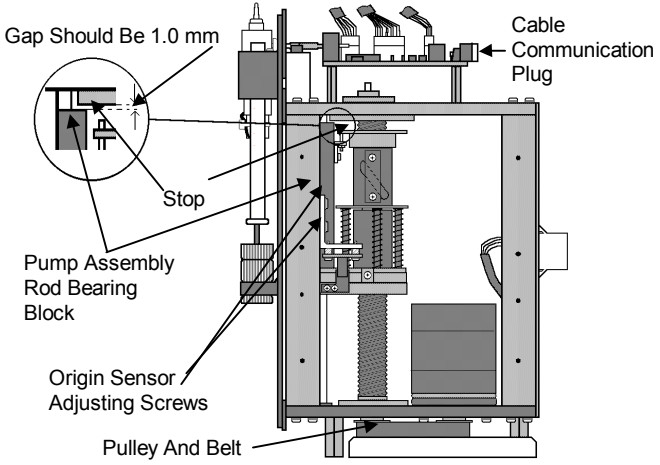


Figure 6-15. Pump Origin Sensor Gap

7. = Loosen the two Pump Origin Sensor Adjusting Screws (refer to Figure 6-15).

8. = Install the power cord in the wall outlet and FPC, then turn on the power to the Pipettor.

9. = By turning the pulley and belt and using a 1.0 mm feeler gauge (0.019 and 0.020 inch), move the Pump Assembly Rod Bearing Block until it is 1.0 mm from the stop (refer to Figure 6-15).

10. = While observing the appropriate LED on the Sensor Interface and ADC Board (slot #6), adjust the sensor to the point where the LED just comes on. For the Diluent Syringe, observe LED #6 and for the Sample Syringe, observe LED #5.

11. While keeping the sensor at this point, tighten the two Pump Origin Sensor alignment screws.

12. Power off the FPC and remove the power cord.

13. Reinstall the Pump Assembly Side Cover.

14. Reinstall the Pump Assembly Communication Cable in the Pipettor by tying the cable as it was with two new cable ties.

15. Reinstall the Main Control Assembly (refer to the Component Replacement Section of this manual).

16. Reinstall the Pump Assembly (refer to the Component Replacement Section of this manual).

SENSOR MODULE +5VDC CHECK AND CALIBRATION

This calibration procedure should only need be performed when there are problems with the Sensor Module.

1. = Measure the +5VDC at the Sensor Module. This should be read between pins 5 (GND) and 8 (+5) on the Sensor Module's BCR connector. Refer to Figure 6-16.

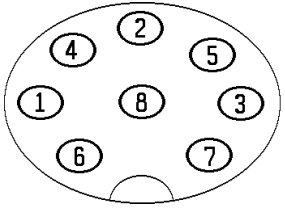


Figure 6-16. Sensor Module BCR Connector Pinout

2. = The reading should be between 4.90 and 5.20 volts. If it is not within this range, proceed to step 3. If it is in this range, the check and alignment are complete.

3. = Remove the Rear Cover to gain access to the Main Control Assembly.

4. = Connect the meter to the Sensor Interface and ADC Board +5V and GND test points to monitor the +5VDC on the card cage. Refer to Figure 6-17.

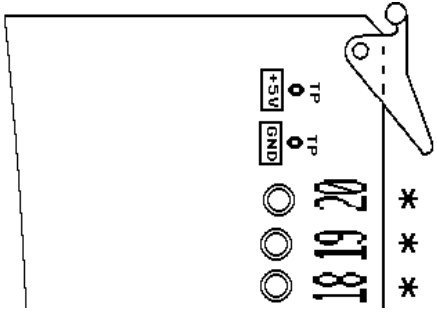


Figure 6-17. Sensor Interface and ADC Board Test Points

5. = Using a slotted screwdriver, carefully insert it into the slot of the +5VDC switching power supply potentiometer of the DC Power Supply. Adjust the potentiometer so the voltage between the two test points in step 4 is 5.15VDC ± 0.01V. The potentiometer is a one turn potentiometer, so be careful when adjusting it. Refer to Figure 6-18.

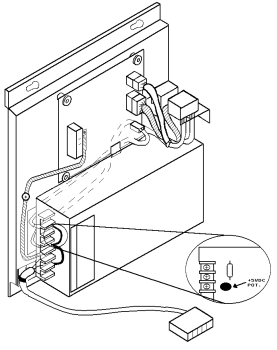


Figure 6-18. +5VDC Potentiometer Location

6. = Install the Rear Cover back on the instrument.

NOTES