TI 201B Forms for Flow Audits by Site Operators

The following forms are included. Computer files are contained in the directory v:\AQG_Ops\Improve\Field_Information\mailaudt

	date	initials
1point.doc	10/20/95	DEC
Mod_ABC_Audit,Set,Cal	12/19/96	DEC
Mod_D_Audit,Set,Cal	12/10/96	DEC

To: IMPROVE site operator Site Code: _____

From: Air Quality Group
Crocker Nuclear Lab
University of California
Davis, CA

Audit Device # _____

We would like you to assist us in the auditing the flow rate of **MODULE ___** of the IMPROVE aerosol sampler for quality assurance. Enclosed is a calibrated audit device and instructions on how to use it. The audit device is a magnehelic pressure gauge, similar to the ones in the sampler modules, which has been calibrated against a standard in Davis. Immediately AFTER your next sample change we would like you to do the following:

Assemble the audit device. It consists of two parts: the magnehelic gauge and the probe (see diagram on following page). The probe should have a white Teflon plug with an O-ring on the leading end. If this has become loose screw it onto the threaded end of the probe securely. The probe has a black hose attached. Connect the other end of this hose to the brass nipple on the side of the magnehelic gauge. If you notice any signs of damage or loose parts please call us at (916) 752-1123.

1. Remove the knurled plug at the base of the inlet stack. This plug, which is indicated in the diagram, may have a hose attached to it. If so, let the plug dangle by the hose.

2. Insert the probe of the audit device into the base of the inlet stack where the plug was. Push the probe in as far as it will go so that both O-rings are inside the inlet. Be careful not to restrict the orifice of the calibration probe in any way.

3. Place the gauge on a fairly level surface.
Record the 'zero' reading here: _____.

4. Flip the toggle switch for filter #1 as you would to take an initial reading (the 30 minute timer must be on, of course) and read the **audit device**.

Record the reading here: FILTER 1 = _____.

Flip switch #2 and record here: FILTER 2 = _____.

5. Remove the probe from the base of the inlet stack and install the inlet plug tightly.

...continues on next page...

6. Record the readings for the gauges **on the sampler module** for both filters below:

	small gauge	magnehelic
filter 1:	_____	_____
filter 2:	_____	_____

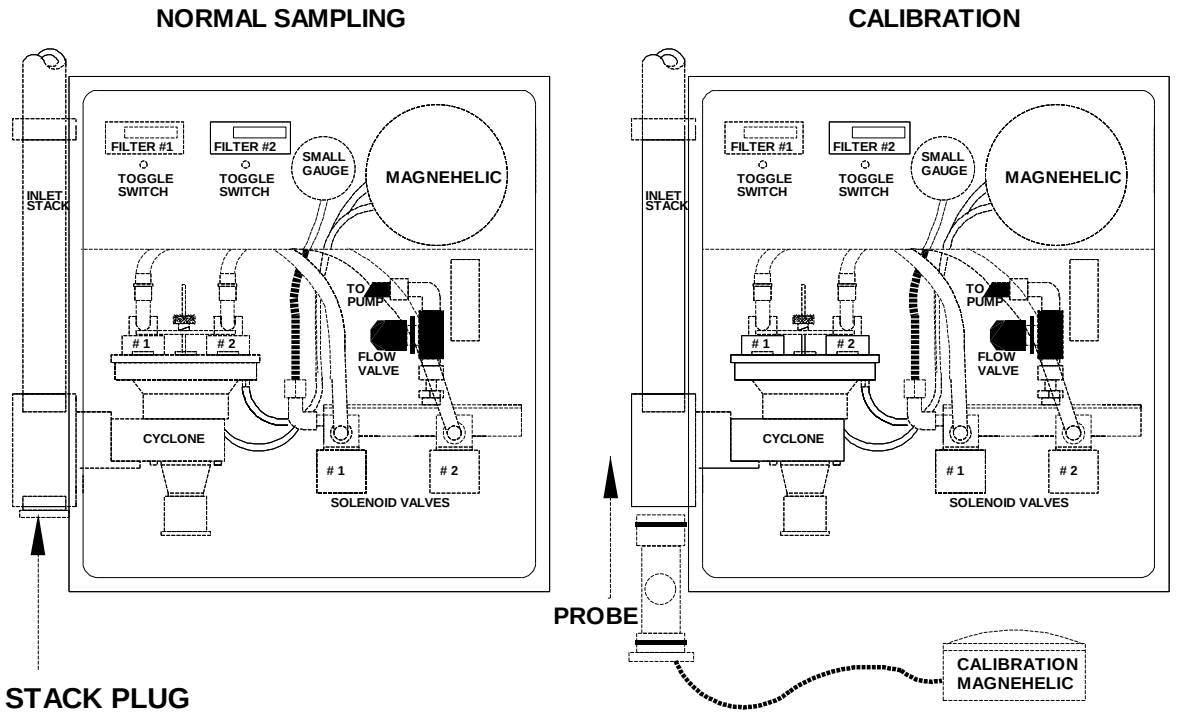
These readings should match the initial readings on the filter log sheet you recorded earlier. If not, check the hose that attaches the inlet plug to the sampler magnehelic (if your sampler has one) to see if it has come loose or cracked. If you cannot locate the problem, please finish the audit and call Davis ASAP.

No audit readings are necessary for the other modules at this time. Record your name (not just initials please), the time, date, and current temperature below:

Auditors name: _____

Time: _____ : _____ Date: _____ / _____ / _____ Temp. (°C): _____

Disconnect the hose from the audit magnehelic to the probe. Replace both parts in the mailing box with this form, reverse the mailing label, and return to the Air Quality Group. Thank you for your assistance.

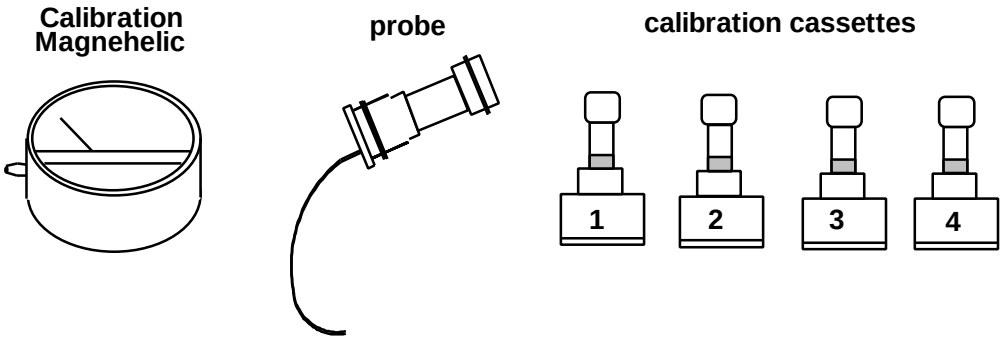


v:\AQG_Ops\Improve\Field_Information\mailaudt\TI 201B Flow Audit Forms .doc

IMPROVE aerosol sampler calibration audit instructions

Recent log-sheets from your site indicate that a calibration and/or adjustment of the air flow rate may be necessary for Module __ of the IMPROVE aerosol sampler. Please perform the following procedure during your next sample change, immediately after removing the exposed filters.

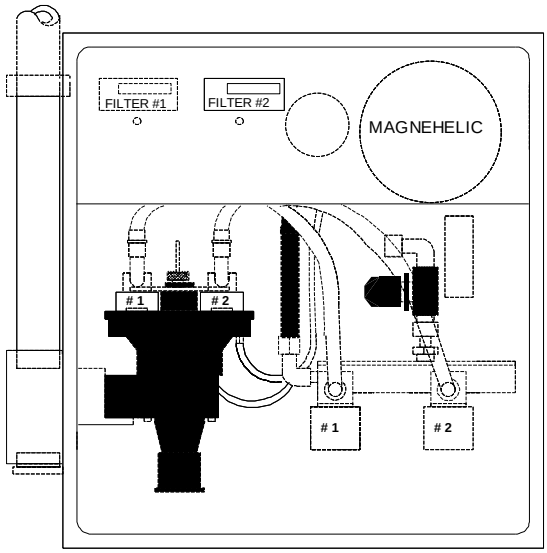
You should have received all of the items pictured below. If any are missing please call (916)-752-1123 before proceeding.



Step 1. Record your name and the date below

Calibration performed by: _____ Date: ___ / ___ / ___

Step 2. Install calibration cassettes #1 and #2

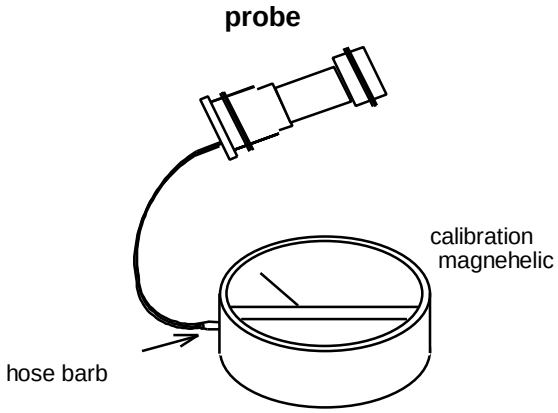


Step 3. Fill in readings for calibration cassettes in this Table.

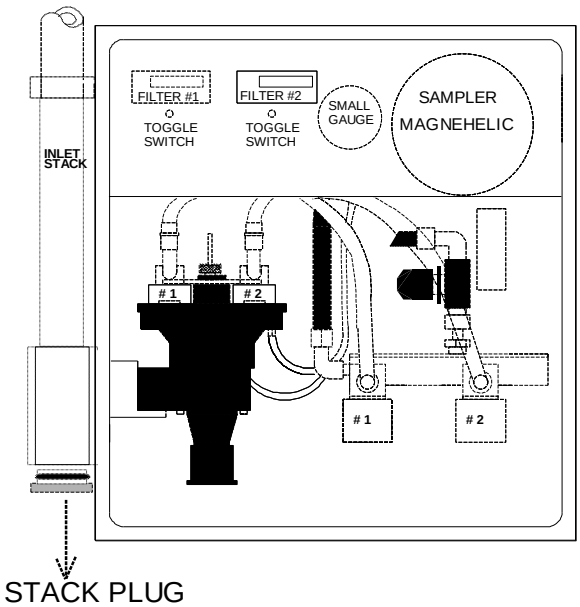
Pre-adjustment calibration Table A

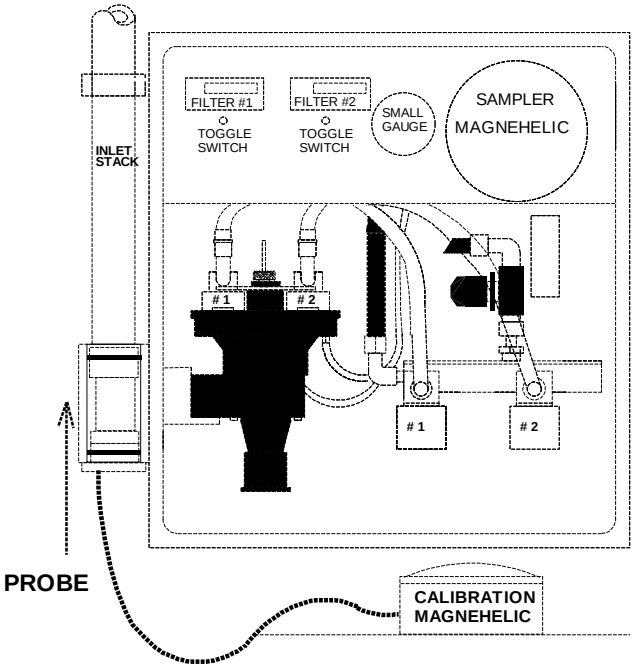
Calibration Cassette	**Small Vacuum Gauge** (" Hg)	**Sampler Magnehelic** ("H_2O)
# 1	__ __.__	.__ __
# 2	__ __.__	.__ __

Step 4. Connect hose from probe to calibration magnehelic.



Step 5. Remove stack plug and insert probe tightly into base of inlet. CALIBRATION MAGNEHELIC MUST REST FACE UP ON A FLAT SURFACE.



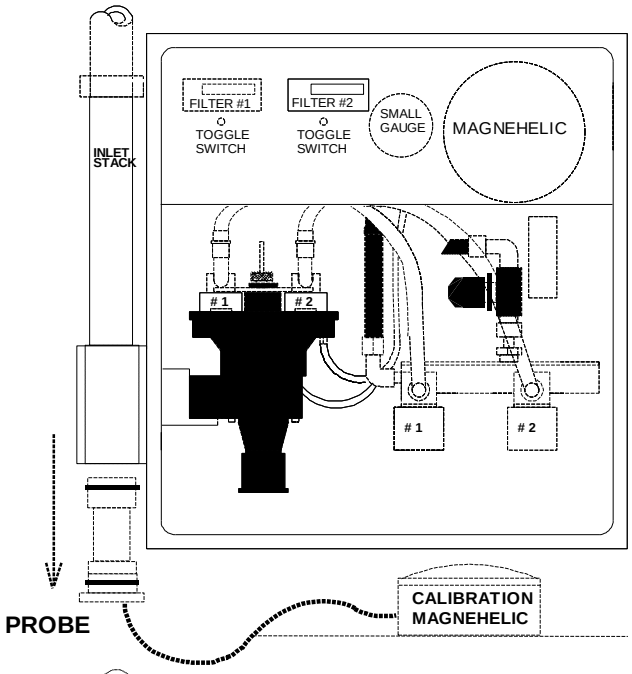


Step 6. Fill in readings for calibration cassettes in this Table. Read the Calibration Magnehelic, <u>not</u> the sampler magnehelic.

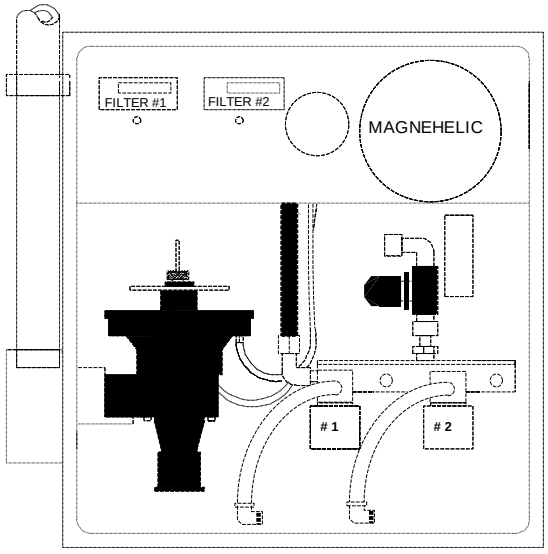
Pre-adjustment calibration Table B

Calibration Cassette	Small Vacuum Gauge (" Hg)	Calibration Magnehelic ("H_2O)
# 1	___ ___•___	•___ ___
# 2	___ ___•___	•___ ___

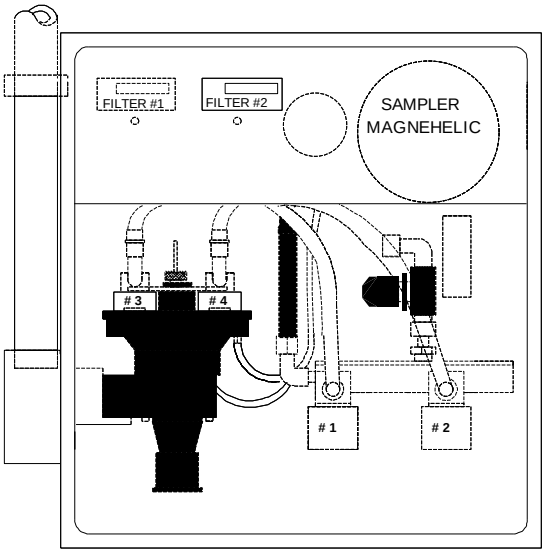
Step 7. Remove calibration probe from inlet stack and set aside (do not let probe dangle by hose or it may pull the magnehelic gauge off the shelf).



Step 8. Remove calibration cassettes #1 and #2.



Step 9. Install calibration cassettes #3 and #4

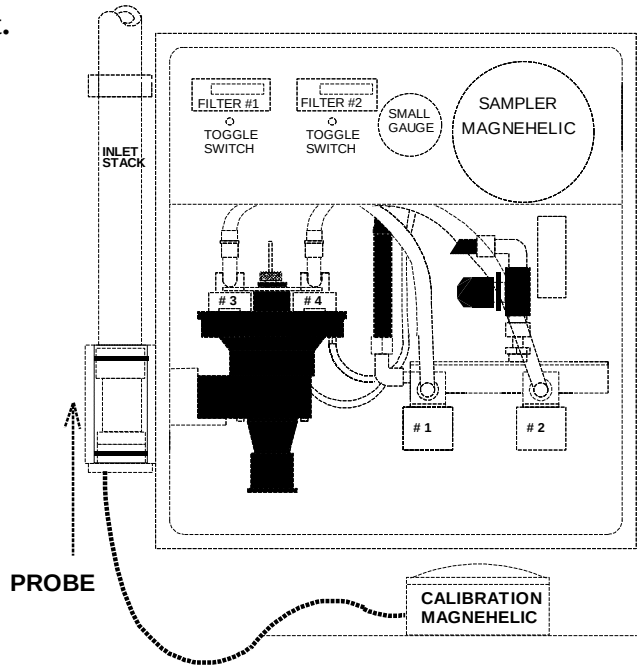


Step 10. Fill in readings for calibration cassettes in this Table.
Read the Sampler magnehelic.

Pre-adjustment calibration Table C

Calibration Cassette	Small Vacuum Gauge (" Hg)	Sampler Magnehelic ("H_2O)
# 3	___ ___•___	•___ ___
# 4	___ ___•___	•___ ___

Step 11. Insert probe tightly into base of inlet.

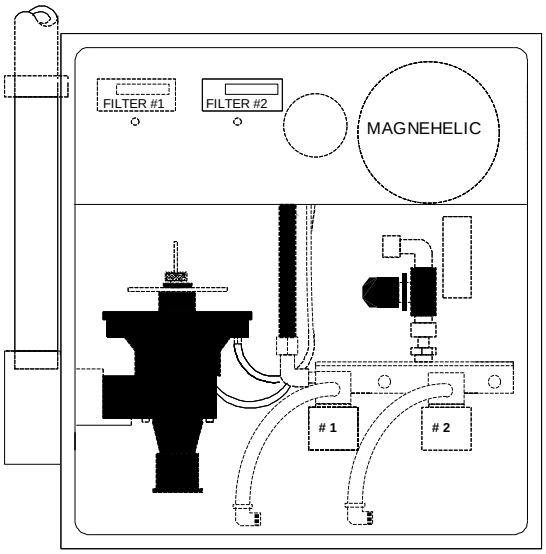


Step 12. Fill in readings for calibration cassettes in this Table. Read the Calibration Magnehelic, <u>not</u> the sampler magnehelic.

Pre-adjustment calibration Table D

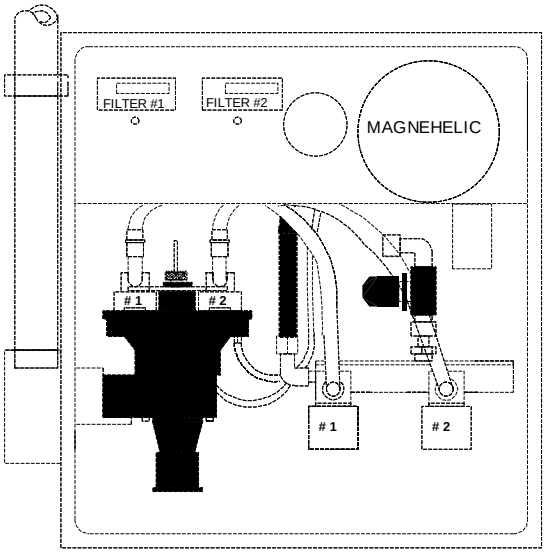
Calibration Cassette	Small Vacuum Gauge (" Hg)	Calibration Magnehelic ("H_2O)
# 3	___ ___.___	.___ ___
# 4	___ ___.___	.___ ___

Step 13. Remove calibration cassettes #3 and #4.

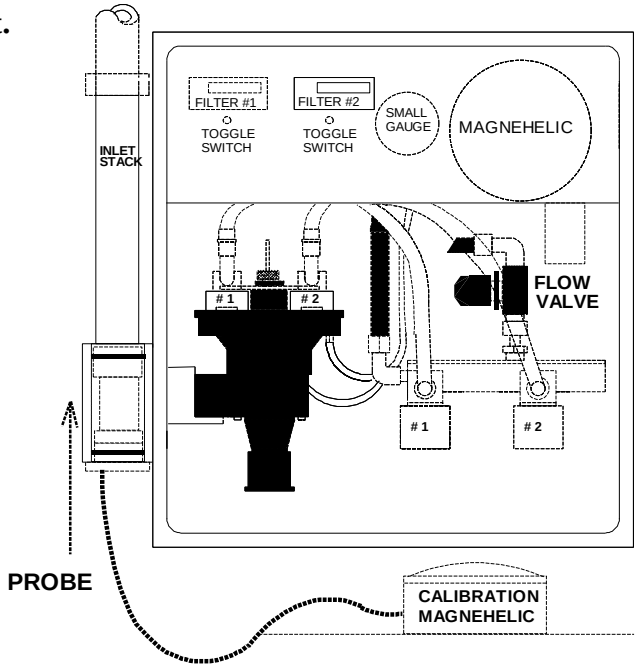


If a telephone is available at the site, please phone in your results to the Air Quality Group Lab Manager or Field Specialist (916) 752-1123

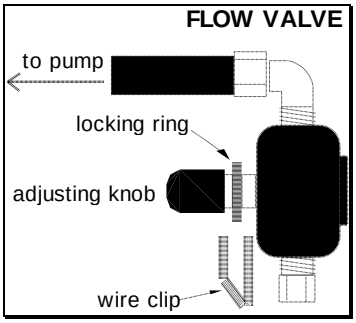
Step 14. Install calibration cassettes #1 and #2 again.



Step 15. Insert probe tightly into base of inlet.



Step 16. Remove the wire clip from around the shaft of the flow regulating valve (located below the sampler magnehelic) and pull up on the red locking ring until it turns freely.



Step 17. Flip and hold the toggle switch for <u>filter # 1</u> on the module faceplate so that air is flowing. Turn the black knob on the valve counterclockwise until the needle on the *<u>calibration magnehelic</u>*** gauge goes off scale (or reaches a maximum), then close the valve until the ***<u>calibration magnehelic</u>*** reads:**

._____

Step 18. When the correct value is set, lock the valve by pressing down on the red ring as far as it will go.

Step 19. Check the reading again to make sure the valve setting has not shifted. If it has, unlock the ring and re-adjust. (On some modules it may not be possible to lock the valve in exactly the desired position. If this is the case, lock the valve as close to it as you can.)

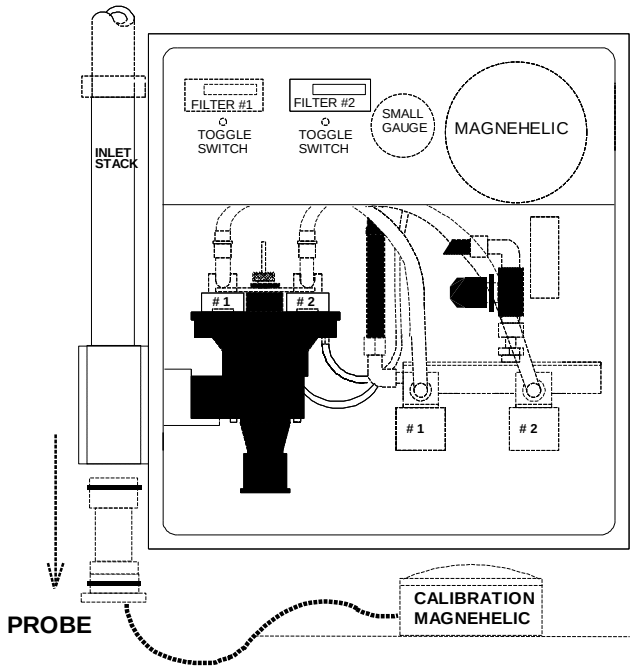
Step 20. When you are satisfied that the flow is correctly adjusted, replace the wire clip between the red ring and knob.

Step 21. Fill in readings for calibration cassettes in this Table. Read the Calibration Magnehelic, <u>not</u> the sampler magnehelic.

Post-adjustment calibration Table E

Calibration Cassette	Small Vacuum Gauge (" Hg)	Calibration Magnehelic ("H_2O)
# 1	___ ___.___	.___ ___
# 2	___ ___.___	.___ ___

Step 22. Remove calibration probe from inlet stack and set aside (do not let probe dangle by hose or it may pull the magnehelic gauge off the shelf).

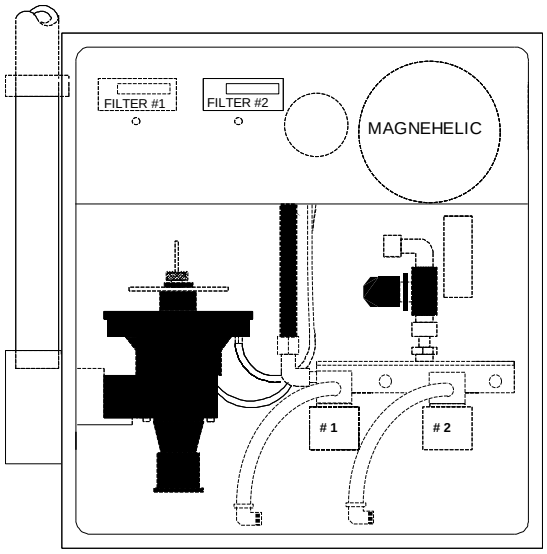


Step 23. Fill in readings for calibration cassettes in this Table

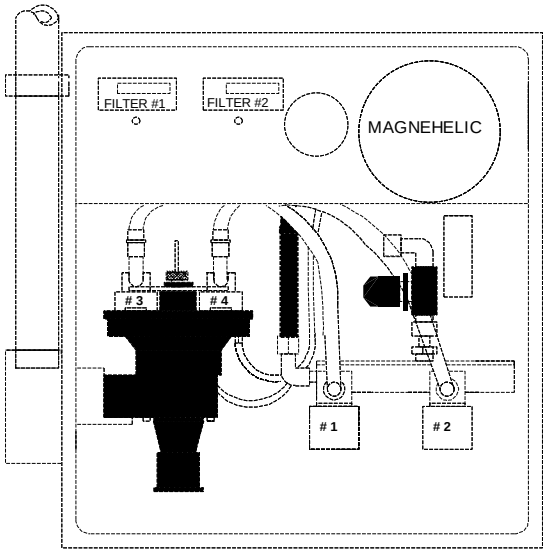
Post-adjustment calibration Table F

Calibration Cassette	Small Vacuum Gauge (" Hg)	Sampler Magnehelic ("H_2O)
# 1	___ ___.___	.___ ___
# 2	___ ___.___	.___ ___

Step 24. Remove calibration cassettes #1 and #2 and return to blue box.



Step 25. Install calibration cassettes #3 and #4

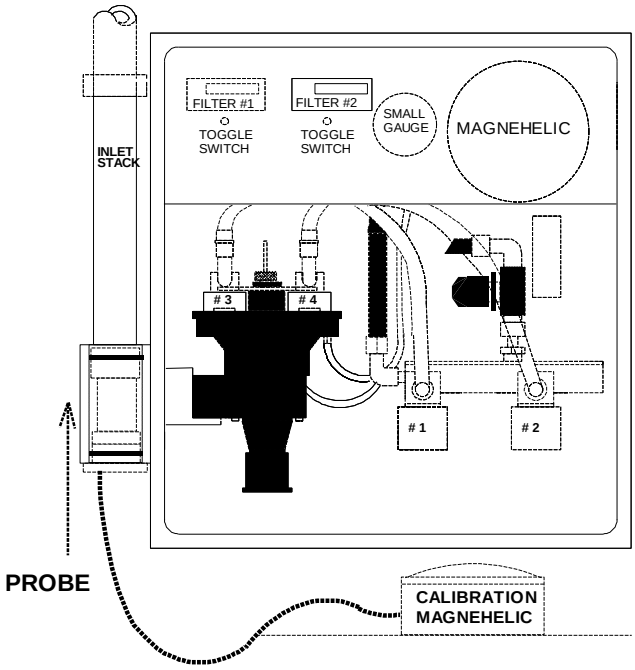


Step 26. Fill in readings for calibration cassettes in this Table

Pre-adjustment calibration Table G

Calibration Cassette	**Small Vacuum Gauge** (" Hg)	**Sampler Magnehelic** ("H_2O)
# 3	___ ___.___	.___ ___
# 4	___ ___.___	.___ ___

Step 27. Insert probe tightly into base of inlet.

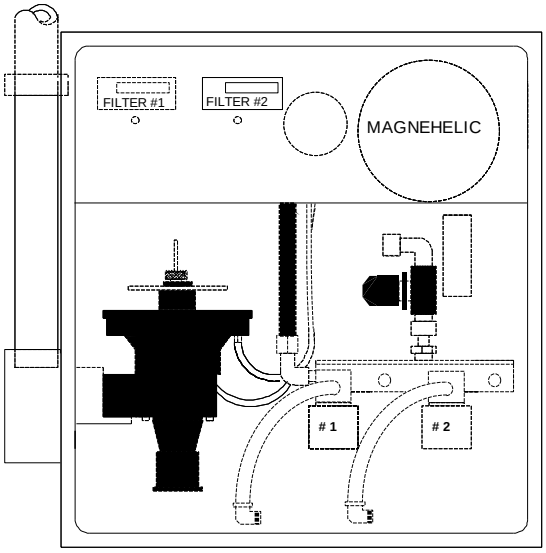


Step 28. Fill in readings for calibration cassettes in this Table. Read the Calibration Magnehelic, <u>not</u> the sampler magnehelic.

Pre-adjustment calibration Table H

Calibration Cassette	**Small Vacuum Gauge** (" Hg)	**Calibration Magnehelic** ("H_2O)
# 3	__ __.__	.__ __
# 4	__ __.__	.__ __

Step 29. Remove calibration cassettes #3 and #4 and return them to the blue box.



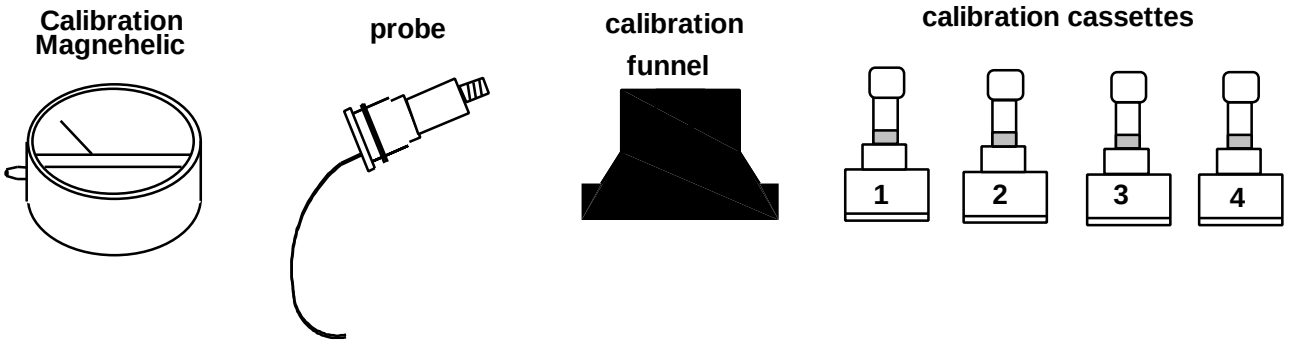
Step 30. Pack all calibration materials into the blue box, making sure that magnehelic gauge cannot bounce around, and reverse the mailing label for shipment back to U.C. Davis. If possible please call (916-752-1123) or fax (916-752-4107) the results of this calibration <u>before</u> mailing the box back.

Step 31. Continue with weekly sample change. Thank you for your assistance.

IMPROVE aerosol sampler calibration audit instructions

Recent log-sheets from your site indicate that a calibration and/or adjustment of the air flow rate may be necessary for Module D (Blue bands) of the IMPROVE aerosol sampler. Please perform the following procedure during your next sample change, immediately after removing the exposed filters.

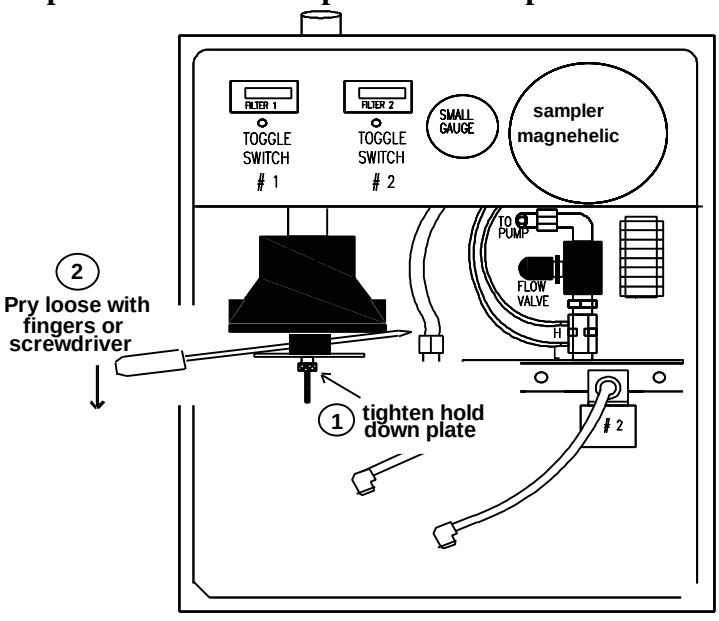
You should have received all of the items pictured below. If any are missing please call (916)-752-1123 before proceeding. You may also need a large screwdriver.

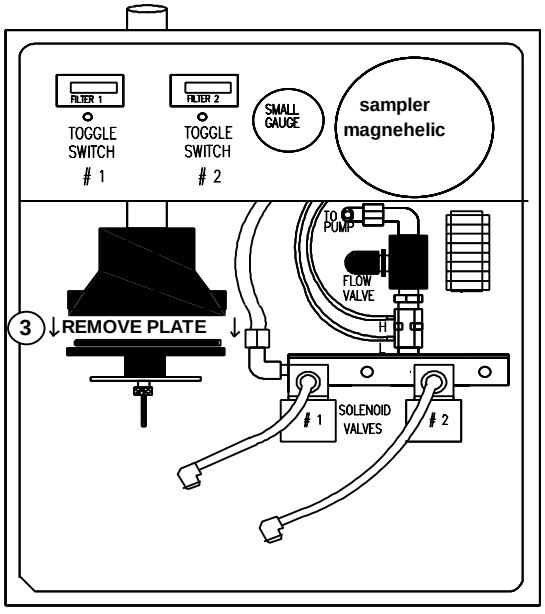


Record your name and the date below.

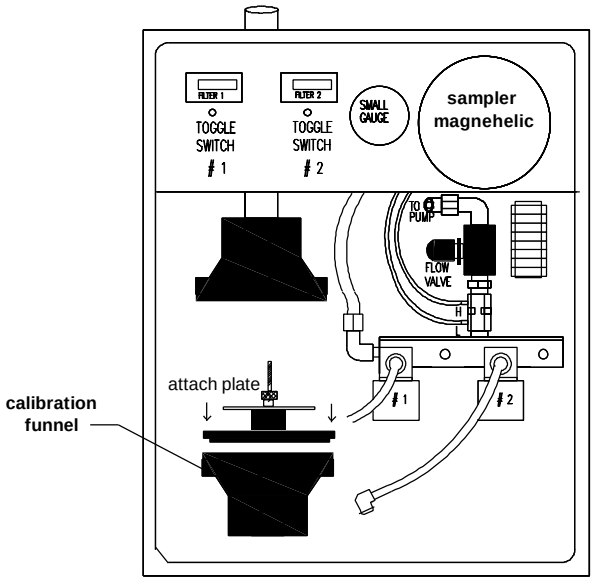
Calibration performed by: _____ Date: ___ / ___ / ___

Step 32. Remove cover plate from sampler funnel.

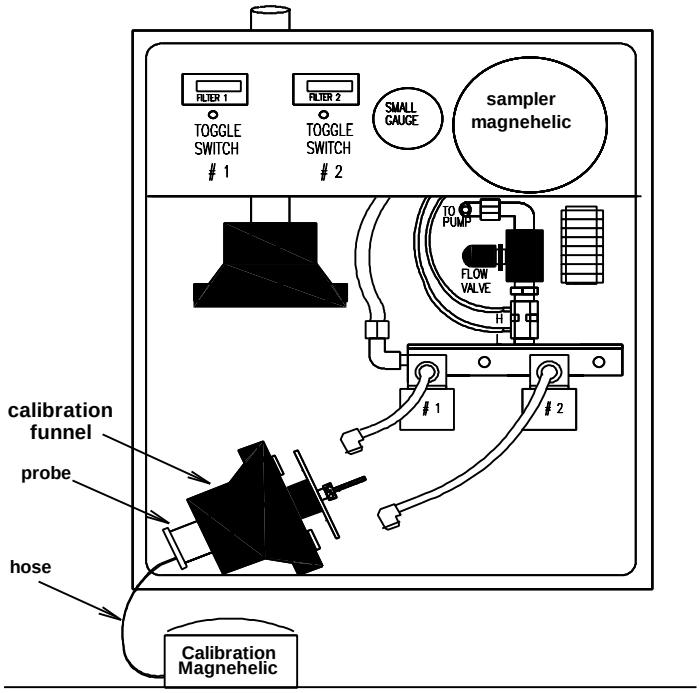




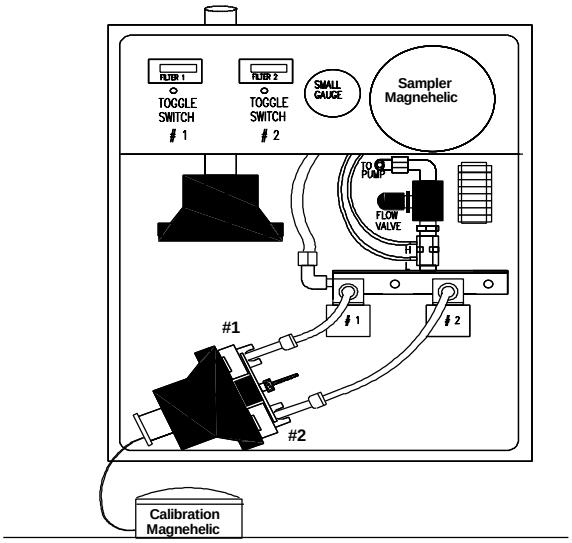
Step 33. Attach cover plate to calibration funnel. Plate must fit flush all around edges (no gap).



Step 34. Insert probe tightly into base of calibration funnel and connect hose to calibration magnehelic. CALIBRATION MAGNEHELIC MUST REST FACE UP ON A FLAT SURFACE.



Step 35. Install calibration cassettes #1 and #2

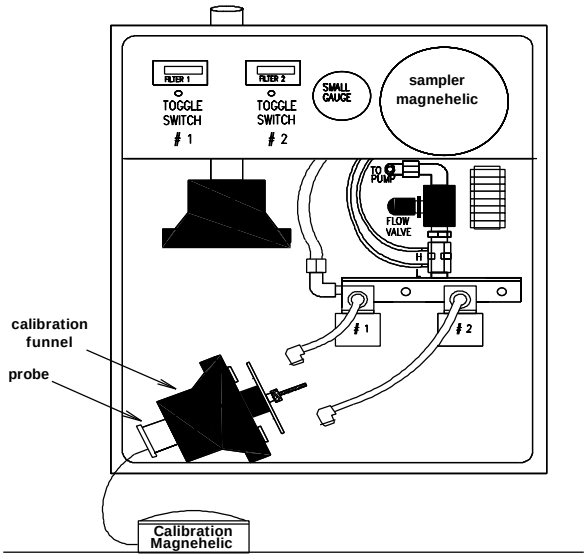


Step 36. Fill in readings for calibration cassettes in this Table

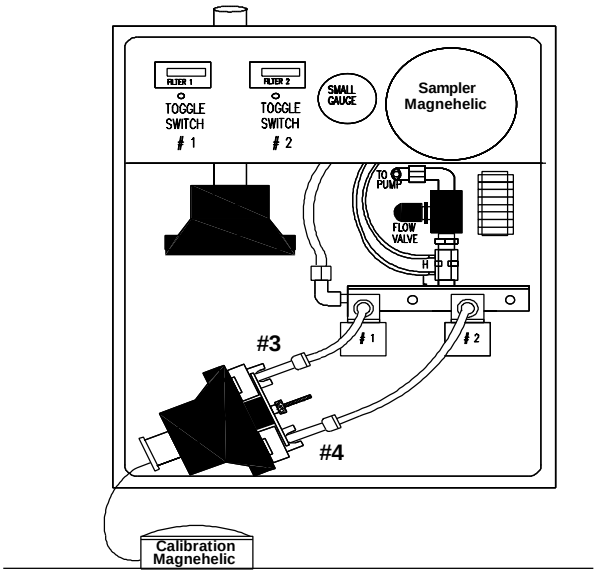
Pre-adjustment calibration

Calibration Cassette	**Calibration Magnehelic** ("H_2O)	**Small Vacuum Gauge** (" Hg)	**Sampler Magnehelic** ("H_2O)
# 1	·__ __	__ __·__	·__ __
# 2	·__ __	__ __·__	·__ __

Step 37. Remove calibration cassettes #1 and #2.



Step 38. Install calibration cassettes #3 and #4

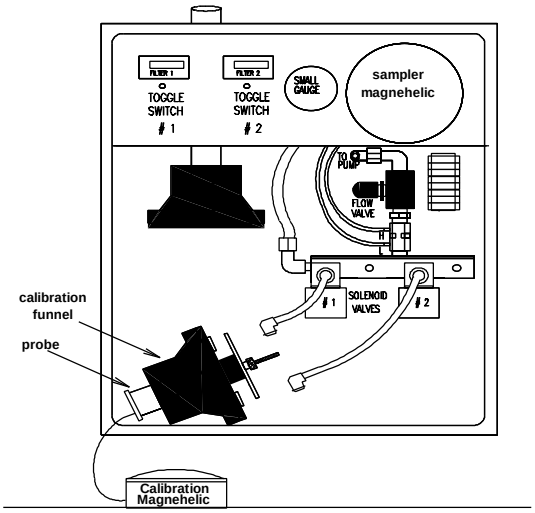


Step 39. Fill in readings for calibration cassettes in this Table

Pre-adjustment calibration

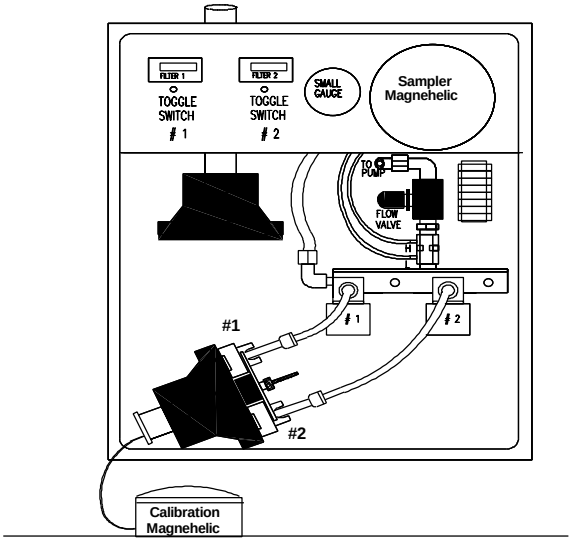
Calibration Cassette	Calibration Magnehelic ("H2O)	Small Vacuum Gauge (" Hg)	Sampler Magnehelic ("H2O)
# 3	·— —	— —·—	·— —
# 4	·— —	— —·—	·— —

Step 40. Remove calibration cassettes #3 and #4.

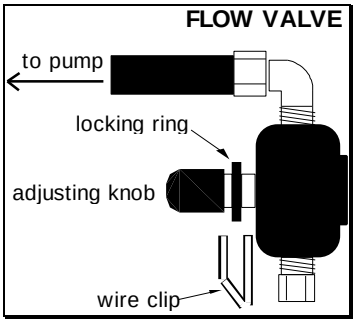


If a telephone is available at the site, please phone in your results to the Air Quality Group Lab Manager or Field Specialist (916) 752-1123

Step 41. Install calibration cassettes #1 and #2 again.



Step 42. Remove the wire clip from around the shaft of the flow regulating valve (located below the sampler magnehelic) and pull up on the red locking ring until it turns freely.



Step 43. Flip and hold the toggle switch for <u>filter # 1</u> on the module faceplate so that air is flowing. Turn the black knob on the valve counterclockwise until the needle on the *<u>calibration magnehelic</u>*** gauge goes off scale (or reaches a maximum), then close the valve until the ***<u>calibration magnehelic</u>*** reads:**

▪_____

Step 44. When the correct value is set, lock the valve by pressing down on the red ring as far as it will go.

Step 45. Check the reading again to make sure the valve setting has not shifted. If it has, unlock the ring and re-adjust. (On some modules it may not be possible to lock the valve in exactly the desired position. If this is the case, lock the valve as close to it as you can.)

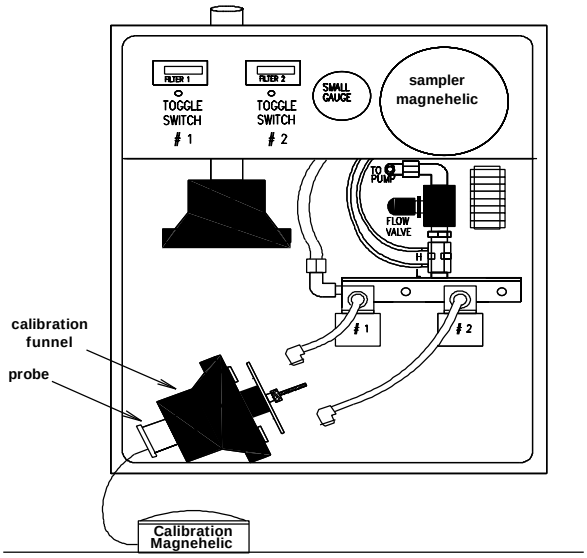
Step 46. When you are satisfied that the flow is correctly adjusted, replace the wire clip between the red ring and knob.

Step 47. Fill in readings for calibration cassettes in this Table

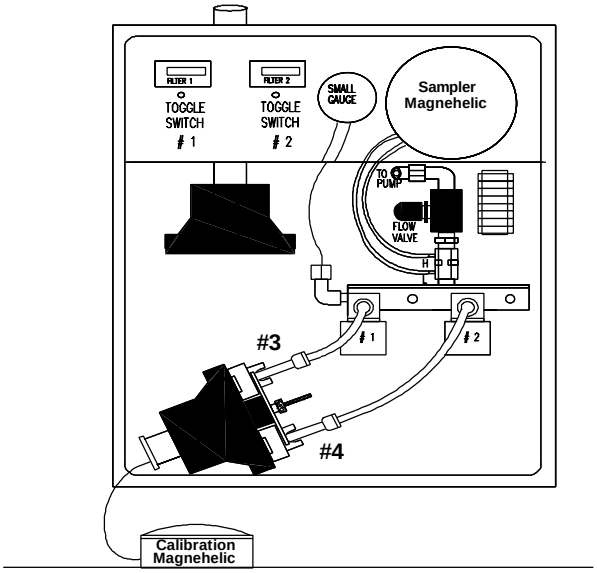
Post-adjustment Calibration

Calibration Cassette	Calibration Magnehelic ("H2O)	Small Vacuum Gauge (" Hg)	Sampler Magnehelic ("H2O)
# 1	·— — (should be ._ _)	— —·—	·— —
# 2	·— —	— —·—	·— —

Step 48. Remove calibration cassettes #1 and #2 and return them to the blue box.



Step 49. Install calibration cassettes #3 and #4

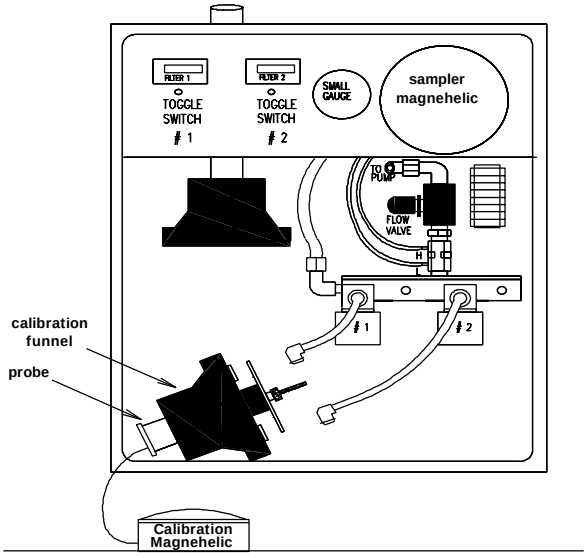


Step 50. Fill in readings for calibration cassettes in this Table

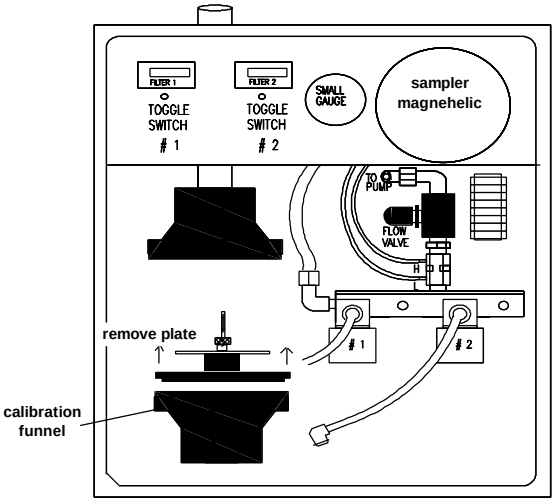
Post-adjustment Calibration

Calibration Cassette	Calibration Magnehelic ("H2O)	Small Vacuum Gauge (" Hg)	Sampler Magnehelic ("H2O)
# 3	·— —	— —·—	·— —
# 4	·— —	— —·—	·— —

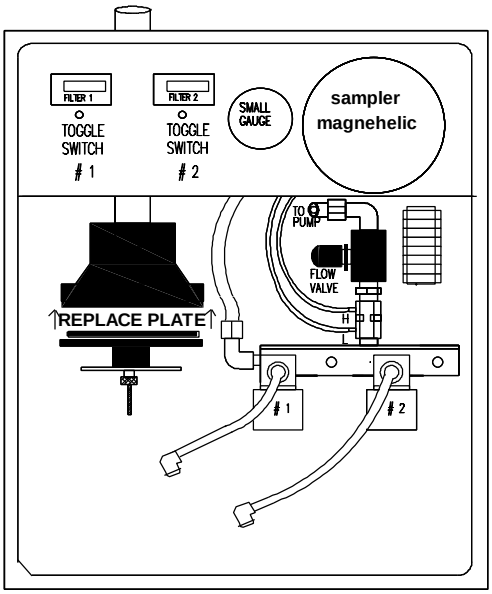
Step 51. Remove calibration cassettes #3 and #4 and return them to the blue box.



Step 52. Remove cover plate from calibration funnel.



Step 53. Re-attach cover plate to sampler funnel. Plate must fit flush all around edges (no gaps).



Step 54. Pack all calibration materials into the blue box, making sure that magnehelic gauge cannot bounce around, and reverse the mailing label for shipment back to U.C. Davis. If possible please call (916-752-1123) or fax (916-752-4107) the results of this calibration before mailing the box back.

Step 55. Continue with weekly sample change.

Thank you for your assistance.