AMS/ACSM Tips, Tricks & FAQ’s

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AMS User’s Meeting
May 9, 2017
Leak Checking Tips
If the Airbeam (m/z 28, 32, 40) has a diff/closed ratio of < 2 you probably have a leak.
Leak Checking Tips

One can further get a clue as to where the leak is by carefully looking at your closed and difference Airbeam.

If the leak is in the PToF region, the difference Airbeam will be attenuated and the closed AB will not be changed too much from normal.

If it’s in the detection region, the difference AB will be about the same as normal, but the closed air signal will have an elevated background.
Using ToF as Leak Checker

- He or Ar are good choices.
- Using He may require a change in the timing window.
- Use controlled bursts of gas, don’t “flood” system.
- Depending on where the leak is, may need to wait several seconds for a response.
Doesn’t work as well here... But leaks here will cause a higher Backing Pressure

Consult Pump Currents, Lens and Backing Pressures to get a clue of where to look
Filament Installation
Install filaments such that they are as parallel as possible to the ion cage. Be EXTRA careful when installing that nothing is shorting. The ceramic washer is critical, as it isolates the filament from ground.
Critical ceramic washers
This side down!
ACSM Hardware
Always wait for vaporizer to cool before venting ACSM
Always wear gloves when working with any component that goes in high vacuum

Remove vaporizer power leads: Loosen nuts, don’t need to remove since connectors are hook shaped and will slip off

Disconnect thermocouple connectors: I usually hold socket (bottom) with gloved hand and use small needle nose pliers to pull pins

Remove mounting screw
Things to be careful about when mounting ACSM Vaporizer

Make sure there’s a gap here between the vaporizer mount and the plate

Make sure the vaporizer isn’t tilted and touching the screw terminal on either side
Move wires away from filament bodies by loosening screws on screw terminal using small Phillips head screwdriver and tweezers or small pliers.

Remove nut and ceramic washer from top of filament using small nut driver delivered with ACSM Screw terminals Nuts and ceramic washers.

Once nut is off filament can be removed. Under the filament there is a metal standoff – this should remain in place. Reattach wires using screw terminals terminals.

There should be continuity between all four filament screw terminals. There should not be continuity between those terminals and any other screw terminal, ground, or the vaporizer.
Tuning Tip:

• Tune *both* Filaments *before* leaving for the field.
  • This can save time and possibly prevent one from having to vent while in the field. Also, sometimes a filament does not tune as well as one would like, so one may get a better tune with the second filament.
AMS Maintenance

• Always monitor pump performance
• Always monitor MD1 pressure (load/no load)
• Clean vacuum chamber surface
• Check for loose/missing connections/fasteners
• Clean cooling fan filters
• Check for stressed cables
• Dirt inside computer
• “Dirt” on computer HD (clean up and defrag)
## Agilent Pumps

What are the operating currents for all pumps?

<table>
<thead>
<tr>
<th></th>
<th>Gas Load Off (mA)</th>
<th>Gas Load On (mA)</th>
<th>Delta T* (Closed/Open)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P2</td>
<td>~ 450</td>
<td>~ 850</td>
<td>9/13.3</td>
</tr>
<tr>
<td>P3</td>
<td>~ 250</td>
<td>~ 300</td>
<td>9/9.3</td>
</tr>
<tr>
<td>P4</td>
<td>~ 200</td>
<td>~ 250</td>
<td>6/5.9</td>
</tr>
<tr>
<td>P5</td>
<td>&lt; 200</td>
<td>&lt; 200</td>
<td>6.2/6.5</td>
</tr>
<tr>
<td>P6</td>
<td>~ 200</td>
<td>~ 200</td>
<td>9.6/9.6</td>
</tr>
</tbody>
</table>

*Delta T = Pump Temp – Ambient Temp
### Pfeiffer Pumps

What are the operating currents for all pumps?

<table>
<thead>
<tr>
<th></th>
<th>Gas Load Off (W)</th>
<th>Gas Load On (W)</th>
<th>Delta T* (Degrees C) (Closed/Open)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>~ 25</td>
<td>~ 70</td>
<td>9/13.3</td>
</tr>
<tr>
<td>P2</td>
<td>~ 3</td>
<td>~ 3</td>
<td>9/9.3</td>
</tr>
<tr>
<td>P3</td>
<td>~ 2</td>
<td>~ 2</td>
<td>6/5.9</td>
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*Delta T = Pump Temp – Ambient Temp*
What is the backing pump pressure?
What is the lens pressure?
Corrosion
Corrosion

Rust

Salt corrosion
Inspect Shipping Container

Fork Lift Damage

Don’t leave instrument in the shipping container
Maintenance Issues, cont’d

Missing fasters
Maintenance Issues, cont’d

Aluminum dust

Missing fastener, chaffing metal
Maintenance Issues, cont’d

Dirty fan filter

Stressed cables
Dust and Electronics are mortal enemies!
Lesson: This really shows how hard your instrument could be jerked around in transport. Be careful when selecting transport. This crate was knocked over in transport.
V84/V304 Testing
Compares V301 System to V304 System
Data for all pumps is shown (85 cc/min gas load)

V304 running at 50% higher load than V301.
P3 also running ~50% higher.
Compares V301 and V304 mounted on AMS at P2 position as load is turned on

V304 ultimately shut down due to 60C temperature limit
Pump Testing Summary

• Cooling is critical. Recommended to obtain Agilent’s cooling fan.

• Minor Replumbing will be necessary.

• Necessary adapter fittings are developed. (Agilent p/n 9699109M001 QS-T163)

• V84 will work with V84, V81, and V70 pump controllers.

• Several AMS systems are now running successfully with V84 Pumps.

• V304 pump **will not** work on the AMS. Aerodyne will be able to obtain the V301 for the foreseeable future. Agilent will continue to supply OEM’s with the V301.
Thank you!

Any Questions?