TECHNICAL BULLETIN

Advanced Instrument and System Calibrations

Step by step instructions for calibration of your Mercury Freedom System.

Introduction

ADVANCED INSTRUMENT CALIBRATION

1. Select MAIN MENU, INTRUMENT CONTROL, GAS MODE, INSTRUMENT ZERO. Wait 10 minutes.
2. Select MAIN MENU, CALIBRATION, Hg (0) BACKROUND. Press ↵ key to save background.
3. Select Hg (t) BACKROUND. Press ↵ key to save background.
4. Select MAIN MENU, INSTRUMENT CONTROLS, GAS MODE INSTRUMENT SPAN. Wait 10 minutes.
5. Select MAIN MENU, CALIBRATION FACTORS, adjust Hg(0) and Hg(t) COEFFICIENTS to 1.000.
6. Select MAIN MENU, INSTRUEMENT CONTROLS, SERVICE MODE. Press ↵ key to turn on the service menu.
7. Select MAIN MENU, SERVICE, PMT ADJUSTMENT. Increase or Decrease PMT voltage until 80i CONC is close to 81i OUT CONC. Press ↵ key to save PMT voltage.

Note: When adjusting the PMT setting, allow time for the concentration readings to stabilize.
(Tip: To speed up this step up, you can put the 80I into manual Hg(0) by going into the MAIN MENU, INTRUMENT CONTROL, AUTO/MANUAL MODE, Select MANUAL Hg(0) mode. In this mode you can change the AVG. TIME down to 20 seconds instead of 60 seconds, which will speed up the updates on the analyzer. After you have made the adjustment and the concentration has stabilized, change the display back to Hg(0)/Hg(t) mode by going into MAIN MENU, INTRUMENT CONTROL, AUTO/MANUAL MODE, and Selecting Hg(0)/Hg(t) mode. Wait a few minutes for the 80i analyzer concentrations to stabilize.

8. Select MAIN MENU, INTRUMENT CONTROLS, GAS MODE, INSTRUMENT ZERO. Wait 10 minutes.
9. Select MAIN MENU, CALIBRATION, Hg (0) BACKROUND. Press ↵ key to save background.
10. Select Hg (t) BACKROUND. Press ↵ key to save background.
11. Select MAIN MENU, INSTRUMENT CONTROLS, GAS MODE INSTRUMENT SPAN. Wait 10 minutes.
12. Select MAIN MENU, CALIBRATION , Hg (0) COEFFICIENT. Input the SPAN CONC to the same value as the 81i Hg OUTPUT (example: 10.00 μg/m3). Press ↵ key to calibrate the Hg (0) channel.
13. Select Hg (t) COEFFICIENT. Input the SPAN CONC to the same value as the 81i Hg OUTPUT (example: 10.00 μg/m3). Press ↵ key to calibrate the Hg (t) channel.
14. Select MAIN MENU, INSTRUMENT CONTROLS, SERVICE MODE. Press ↵ key to turn off the service menu.

ADVANCED SYSTEM CALIBRATION

15. Select MAIN MENU, INTRUMENT CONTROLS, GAS MODE, SYSTEM ZERO. Wait at least 15 minutes until concentration readings are stable.
16. Select MAIN MENU, CALIBRATION, Hg (0) BACKROUND. Press ↵ key to save background.
17. Select Hg (t) BACKROUND. Press ↵ key to save background.
18. Select MAIN MENU, INSTRUMENT CONTROLS, GAS MODE, SYSTEM SPAN. Wait at least 15 minutes until concentration readings are stable.
19. Select MAIN MENU, CALIBRATION FACTORS, adjust Hg(0) and Hg(t) COEFFICIENTS to 1.000.
20. Select MAIN MENU, CALIBRATION FACTORS, DILUTION RATIO. Adjust until 80i CONC is close to the 81i OUT CONC.
21. Select MAIN MENU, INTRUMENT CONTROLS, GAS MODE, SYSTEM ZERO. Wait at least 15 minutes.
22. Select MAIN MENU, CALIBRATION, Hg (0) BACKROUND. Press ↵ key to reenter background.
23. Select Hg (t) BACKROUND. Press ↵ key to re-enter background.
24. Select MAIN MENU, INSTRUMENT CONTROLS, GAS MODE, SYSTEM SPAN. Wait at least 15 minutes.
25. Select MAIN MENU, CALIBRATION, Hg (0) COEFFICIENT. Input the SPAN CONC to the same value as the 81i Hg OUTPUT (example: 10.00 μg/m3). Press ↵ key to calibrate the Hg (0) System channel.
26. Select Hg (t) COEFFICIENT. Input the SPAN CONC to the same value as the 81i Hg OUTPUT (example: 10.00 μg/m3). Press ↵ key to calibrate the Hg (t) System channel.
27. Select MAIN MENU CALIBRATION, INSTRUEMNT CONTROLS, GAS MODE, SAMPLE. Press ↵ key to put the System into Sample mode.

MANUAL DAILY INSTRUMENT CALIBRATION

1. Select MAIN MENU, INTRUMENT CONTROLS, GAS MODE, INSTRUMENT ZERO. Wait 10 minutes.
2. Select MAIN MENU, CALIBRATION, Hg (0) BACKROUND. Press ↵ key to save background.
3. Select Hg (t) BACKROUND. Press ↵ key to save background.
4. Select MAIN MENU, INSTRUMENT CONTROL, GAS MODE INSTRUMENT SPAN. Wait 10 minutes.
5. Select MAIN MENU, CALIBRATION , Hg (0) COEFFICIENT. Input the SPAN CONC to the same value as the 81i Hg OUTPUT (example: 10.00 μg/m3). Press ↵ key to calibrate the Hg (0) channel.
6. Select Hg (t) COEFFICIENT. Input the SPAN CONC to the same value on the 81i Hg OUTPUT (example: 10.00 μg/m3). Press ↵ key to calibrate the Hg (t) channel.

Note: if coefficients are not between 0.7 to 1.3, perform the Advanced Instrument Calibration
Note: Auto calibration will only adjust background or coefficients if it is set to do so.

MANUAL DAILY SYSTEM CALIBRATION

7. Select MAIN MENU, INTRUMENT CONTROLS, GAS MODE, SYSTEM ZERO. Wait at least at least 15 minutes.
8. Select MAIN MENU, CALIBRATION, Hg (0) BACKROUND. Press ↵ key to save background.
9. Select Hg (t) BACKROUND. Press ↵ key to save background.
10. Select MAIN MENU, INSTRUMENT CONTROLS, GAS MODE, SYSTEM SPAN. Wait at least 15 minutes.
11. Select MAIN MENU, CALIBRATION, Hg (0) COEFFICIENT. Input the SPAN CONC to the same value as the 81i Hg OUTPUT (example: 10.00 μg/m3). Press ↵ key to calibrate the System Hg (0) channel.
12. Select Hg (t) COEFFICIENT. Input the SPAN CONC to the same value as the 81i Hg OUTPUT (example: 10.00 μg/m3). Press ↵ key to calibrate the System Hg (t) channel.

Note: If coefficients are not between 0.7 to 1.3, perform the Advanced System Calibration

13. Select MAIN MENU CALIBRATION, INSTRUMENT CONTROLS, GAS MODE, SAMPLE. Press ↵ key to put the System into Sample mode.

SYSTEM LINEARITY CHECK

1. Select MAIN MENU, INSTRUMENT CONTROLS, GAS MODE, SYSTEM SPAN.
2. Select MAIN MENU, CALIBRATION, SYS Hg SPAN CONC. Use up and down arrows to select SPAN 1, press ENTER. After at least 15 minutes document the 80i Hg (t) concentration reading.
3. Repeat step 2 with SPAN 2, SPAN 3, etc.
4. Select MAIN MENU, INSTRUMENT CONTROLS, GAS MODE, SAMPLE.
5. Select MAIN MENU, CALIBRATION, SYS Hg SPAN CONC. Return Span setting to the original number.

SYSTEM INTEGRITY CHECK

Ensure Chlorine gas is turned on and pressure is set between 10 and 15 psi.

1. Select MAIN MENU, INSTRUMENT CONTROLS, GAS MODE, OXIDIZER Hg CAL. Press ↵ key to put the System into Oxidizer mode.

Integrity test will run for 3 phases. During Phase (1) only Elemental Mercury will flow through the system. During Phase (2) Elemental Mercury and Chlorine will flow into the oxidizer creating mercuric chloride. During Phase (3) the system will purge.

After approximately 30 minutes the test will be complete.

2. The system will automatically go to SAMPLE mode after the test is finished.

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