

**Procedure for Tuning and Calibrating to Helium
for Varian/Agilent 947, 948 & 960 Leak Detectors**

1. Using your volt-meter, measure the Ion Source filament emission between TP1 and TP2 (1 volt = 1 milliamp)
2. Adjust emission to 1 volt using R5 on the Voltage/Valve Driver board.
3. Measure the Ion Voltage (voltage between TP101 and TP8 (GND))
4. Switch S7-8 on the I/O Board to the UP position: this enables the manual tune function. [notice that the leak rate exponent is flashing. If the exponent doesn't flash, or the voltages won't adjust, reset the electronics by turning the leak detector off, then on using the Electronics Circuit Breaker located on the rear of the machine. The LARGER/SMALLER buttons on the front panel should now be enabled to adjust the Ion Voltage]
5. Use the LARGER/SMALLER buttons to adjust the Ion Voltage to 250 volts.
6. Measure the Repeller Voltage (TP103 and TP8); adjust to 350 volts using R104.
7. Measure the Focus Voltage (TP102 and TP8); adjust to 200 volts using R108.
8. To clear any microprocessor faults that may have occurred during the voltage adjustments, turn the Electronics Circuit breaker off, then on.
9. Press START, wait for the system to pump down to Fine Test Mode. The system must be in the 10^{-7} , 10^{-8} , 10^{-9} or 10^{-10} range to accept an AUTO CAL command.
10. Press the AUTO CAL button to start the system through the Auto Calculation sequence; allow the system to proceed through.
11. Press the STD LEAK button to turn on the Standard Leak.
12. Switch S7-8 to the DOWN position, and S7-7 to the UP position to enable the manual gain function.
13. Press the SMALLER button on the front panel to remove the gain added to the raw helium peak. The Leak Rate bar graph should stop moving and flash when all the gain has been removed.
14. Adjust R104 and R108 on the High Voltage/Valve Driver Board to maximize the leak rate reading. (more specific goal? Quantify?)
15. Adjust the black knobs on the spectrometer tube for maximum leak rate reading. (really?!!)
16. Switch S7-7 to the DOWN position.
17. Press AUTO CAL to allow the system to recalibrate; allow the machine to go through it's sequence.
18. Press the STD LEAK button to verify the leak rate matches the internal leak value.

The system is now tuned and calibrated to helium.



800-910-4356

Notes:

-all voltages are DCV

-software changes may have affected certain functions: new revisions put the system in HOLD after AUTO CAL, which requires START to resume if there are no errors during calibration; or VENT to clear any errors before resuming.

-for Model 960 units LN2 is required in the cold trap system to calibrate and function normally.

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#	Step	Notes
1	Measure Ion Source filament emission voltage	Use a voltmeter between TP1 & TP2 (1 V = 1 mAmp)
2	Adjust emission to 1 V	Use R5 on Voltage/Valve Driver Bd.
3	Measure the Ion Voltage	Between TP101 & TP8 (GND) on High Voltage/Valve Driver Board
4	Switch S7-8 on the I/O Board to the UP position The LARGER/SMALLER buttons on front panel should now be enabled	enables manual tune function; note leak rate <i>exponent</i> flashing; if exponent doesn't flash, or voltages won't adjust, reset the electronics: cycle Electronics Circuit Breaker on rear of machine.
5	Adjust the Ion Voltage to 250 volts	Use the LARGER/SMALLER buttons
6	Measure the Repeller Voltage; adjust to 350 Volts using R104	Between TP103 & TP8 on High Voltage/Valve Driver Board
7	Measure the Focus Voltage; adjust to 200 Volts using R108	Between TP102 & TP8 on High Voltage/Valve Driver Board
8	Clear any microprocessor faults: turn Electronics Circuit breaker OFF/ON	To clear faults that may have occurred during the voltage adjustments.
9	Press START; wait for the system to pump down to Fine Test Mode.	The system must be in the 10^{-7} , 10^{-8} , 10^{-9} or 10^{-10} range to accept an AUTO CAL command
10	Press AUTO CAL to start Auto sequence calibration	Allow the system to proceed through it's sequence
11	Press the STD LEAK	Turns on the Standard Leak
12	Switch S7-8 to the DOWN position; Switch S7-7 to the UP position	Enables the manual gain function
13	Press SMALLER to remove gain added to the raw helium peak.	The Leak Rate bar graph should stop moving and flash when all the gain has been removed.
14	Adjust R104 and R108 to maximize the leak rate reading	on the High Voltage/Valve Driver Board (optimizes tuning parameters)
15	Adjust the black knobs on the spec tube to maximize the leak rate reading.	
16	Switch S7-7 to the DOWN position	
17	Press AUTO CAL to allow the system to recalibrate	Allow the machine to go through it's sequence.
18	Press STD LEAK, verify calibration	Matches the leak rate value of the internal leak

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- all voltages are DCV
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- for Model 960 units LN2 is required in the cold trap system to calibrate and function normally.