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Agilent Technologies

Ion Source Replacement for VS C15 Leak Detector

FIELD INSTALLATION INSTRUCTIONS

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Varian Field Instruction Sheet

Ion Source Replacement for VS C15 Leak Detector

Preface

Documentation Standards

This manual uses the following documentation standards:

NOTE

Notes contain important information.



CAUTION

Cautions appear before instructions, which if not followed, could cause damage to the equipment or data loss.



WARNING

Warnings appear for a particular procedure or practice which, if not followed correctly, could lead to serious injury or death.



Hazard and Safety Information

The common international symbols used in this manual and on the equipment are defined below.



OFF Supply (Power)



ON Supply (Power)



AC – Alternating Current



Warning, Risk of danger



Frame or chassis Terminal



Earth (Ground) Terminal



Caution, Hot Surface



Caution, Risk of Electrical Shock



Protective Conductor Terminal



Operators and service personnel must be aware of all hazards associated with this equipment. They must know how to recognize hazardous and potentially hazardous conditions, and know how to avoid them. The consequences of unskilled, improper, or careless operation of the equipment can be serious. Every operator or service person must read and thoroughly understand operation/maintenance manuals and any additional information provided by Varian. All warning and cautions must be read carefully and strictly observed. Consult local, state, and national agencies regarding specific requirements and regulations. Address any safety, operation, and/or maintenance questions to your nearest Varian office.

Solvents

WARNING



The mechanical components of leak detectors may be cleaned with one of the recommended solvents. When heated, sprayed, or exposed to high-temperature equipment, these solvents become flammable and explosive, causing serious injury or death. Do not use these solvents near a high-temperature source. Ventilate the working area with a blower and work in a large, well-ventilated room.

Solvents are irritants, narcotics, depressants and/or carcinogens. Their inhalation and/or ingestion may produce serious side effects. Prolonged or continued contact with the skin results in absorption through the skin and moderate toxicity. Always ensure that cleaning operations are carried out in large, well-ventilated rooms, and wear eye shields, gloves, and protective clothing.

Due to the effective cleaning nature of VacuSolv solvent and its residue-free properties, Varian Component and Spectrometer Cleaning Kit (Part Number 670029096), used in accordance with the kit instructions, is recommended for cleaning spectrometer components. The kit can also be used for fine cleaning of other parts in the leak detector's vacuum system such as valves and fittings. No rinsing steps or high-temperature drying is required following cleaning with VacuSolv. Although appropriate precautions are advised, VacuSolv is compatible with most materials and does not contain toxic chemicals or CFCs (chlorofluorocarbons). Other acceptable solvents are isopropyl alcohol (IPA) or Dow Corning® OS-20.

To clean the leak detector enclosure, the LCD display and Front Panel buttons, use only a soft cloth slightly dampened with water or a mild soap.

Do NOT use excess water or cleaning solvents of any kind.

Avoid splashing any cleaning solvents into the unit through the ventilation openings or Front Panel buttons. Wipe the surface with a dry lint-free cloth.

Vacuum Equipment and Cleanliness

Cleanliness is vital when servicing the leak detector or any vacuum equipment. There are some techniques that are more important in leak detector servicing than in general vacuum work:

CAUTION



Wear non-powdered, ESD-safe Nitride or equivalent gloves to prevent skin oils from getting on spectrometer internal components.



O-ring Care

When removing, checking or replacing O-rings, keep in mind the following:

NOTE



Varian recommends replacing all O-rings during routine maintenance or during any maintenance procedure requiring that O-rings be removed.

CAUTION



Remove O-rings carefully with your fingers. Do not use metal tools for this task; this prevents scratching of any sealing surfaces.

- Wipe all O-rings clean with a lint-free cloth before installation to ensure that no foreign matter is present to impair the seal.
- Do not use grease or any other substance on O-rings that will come in contact with the vacuum surfaces.
- Do not use alcohol, methanol or other solvents on O-rings. Doing so causes deterioration and reduces their ability to hold a vacuum.
- Varian does not recommend the use of vacuum grease. If applicable, apply a small amount of Apiezon[®] L grease and wipe the O-rings shiny dry.

Spectrometer

CAUTION



Store the Ion Source/Preamplifier sub-assembly in a cool, dry area in a tightly sealed, ESD protected container. Wear non-powdered, ESD-safe Nitride or equivalent gloves when handling the spectrometer. Wash hands thoroughly after handling the spectrometer filaments and especially before smoking or eating.

The spectrometer and PCB's are static sensitive devices. Wear a grounding strap when performing any maintenance on these units and especially when performing maintenance of static sensitive parts.

CAUTION



The spectrometer operates at a very high vacuum produced by the high vacuum turbomolecular pump. Service of the spectrometer requires that this vacuum be vented to the atmosphere.

Equipment Required

- Metric Allen Wrench (Range 1.5mm to 10mm)
- M3 Philips head screwdriver
- Non-powdered ESD-safe Nitrile or equivalent gloves
- Isopropyl alcohol
- Torque wrench, M5 head (must be adjustable to 45 in-lbs (5.0 N-m) and 90 in-lbs (10.2 N-m))

Installation Procedure

WARNING



Disconnect power from the unit before performing any maintenance procedure that requires physically disconnecting any part of the system.

NOTE



Inspect the kit for deformation, damage and filament coating flaking prior to installation. Do not install if damaged. Touching the filament under any condition will cause damage.

1. Disconnect the power to back of the unit and unplug.
2. Wait 30 seconds for the high voltage to dissipate.
3. Using an M4 Allen wrench, remove the two screws on the unit's top and open the unit (Figure 1: Unit Top Screws).



Figure 1: Unit Top Screws

4. If the unit was just running, either:
- Open the turbo vent valve, if the internal calibrated leak option was not installed (Figure 2: Turbo Vent),
 - Or crack the NW16 connection (Figure 3: NW-16 Vent) on the calibrated leak to bring the turbo to a controlled stop.



Figure 2: Turbo Vent

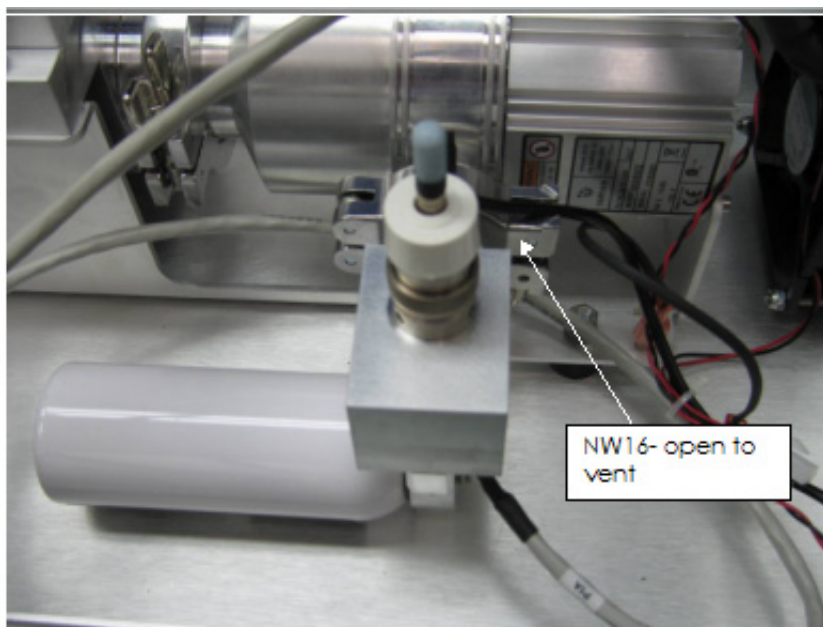


Figure 3: NW-16 Vent

5. Disconnect both cables from the spectrometer (Figure 4: Cables To Spectrometer).

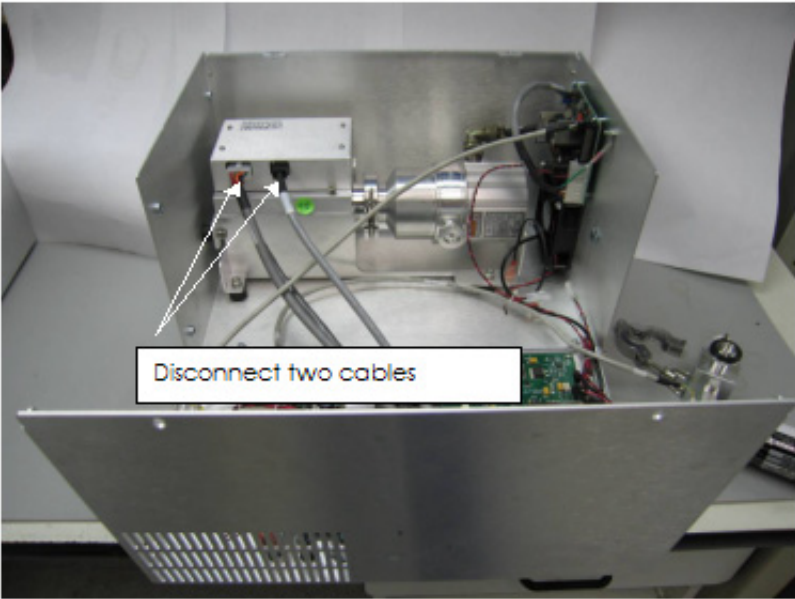


Figure 4: Cables To Spectrometer

CAUTION



Static sensitive device, ensure that personnel are properly grounded before proceeding.

6. Using an M3 Philips head screw driver, remove the four screws holding the spectrometer cover and ground strap on (Figure 5: Spectrometer Cover Screws).



Figure 5: Spectrometer Cover Screws

7. Using an M5 allen wrench, remove the six screws holding on the spectrometer header assembly (Figure 6: Spectrometer Header Assembly Screws).

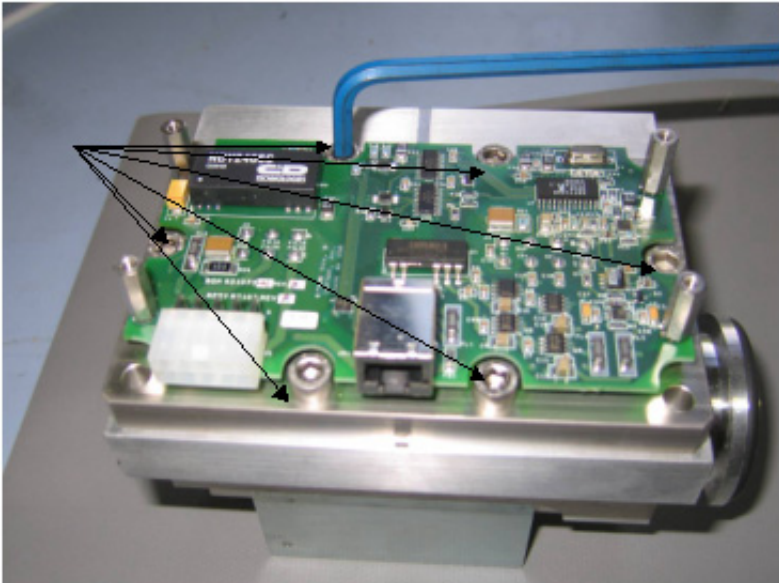


Figure 6: Spectrometer Header Assembly Screws



Wear non-powdered, ESD-safe Nitride or equivalent gloves (not included in kit) to prevent skin oils from getting on vacuum surfaces. Ensure that personnel are properly grounded before proceeding.

8. Remove the spectrometer header assembly (Figure 7: Spectrometer Assembly Removal).



Figure 7: Spectrometer Assembly Removal

9. Remove the O-ring and discard (Figure 8: O-ring).

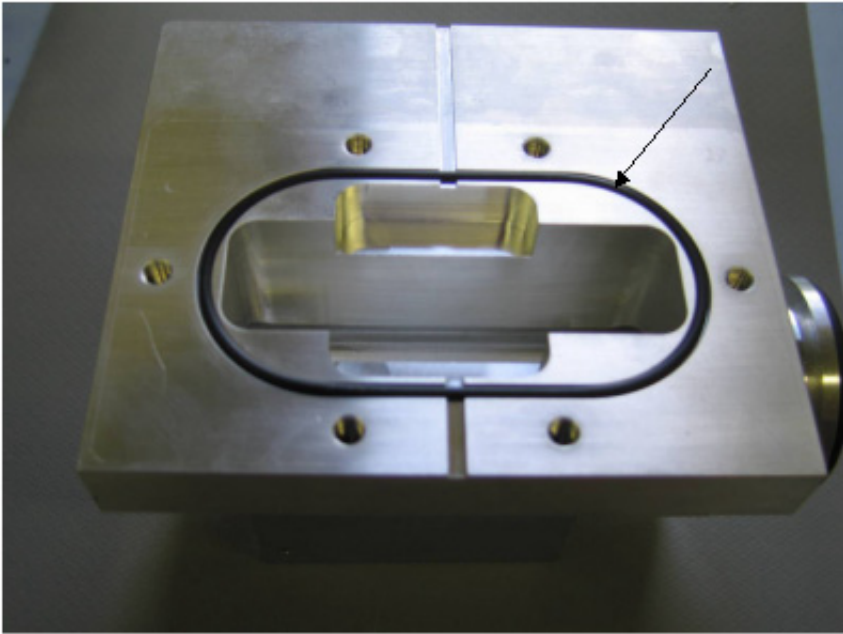


Figure 8: O-ring

10. If the inside of the spectrometer body appears to be dirty, clean it with a lint free wipe and Isopropyl alcohol (Figure 9: Inside of Spectrometer Body).

NOTE

Varian recommends that you use the Vac-u-solv spectrometer cleaning kit (PN: 670029096).

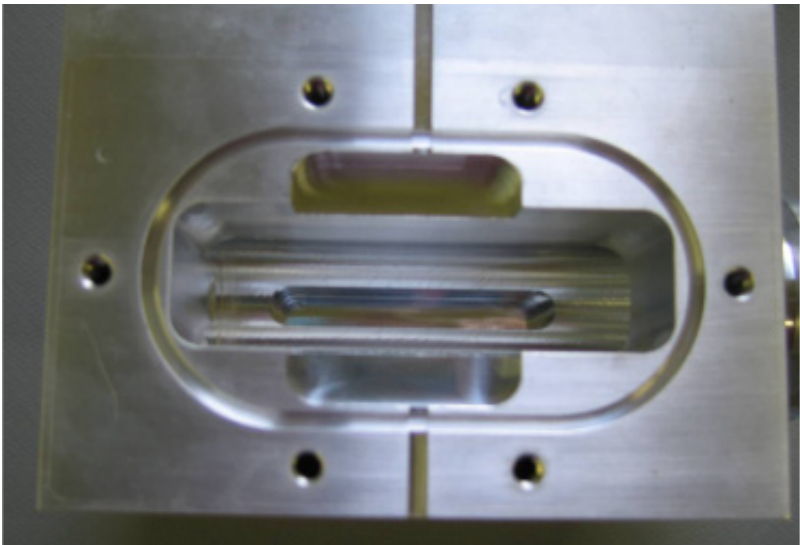


Figure 9: Inside of Spectrometer Body

11. Use an M1.5 Allen wrench to unscrew the six coupler screws and the collimator screw (Figure 10: Ion Support Assembly).

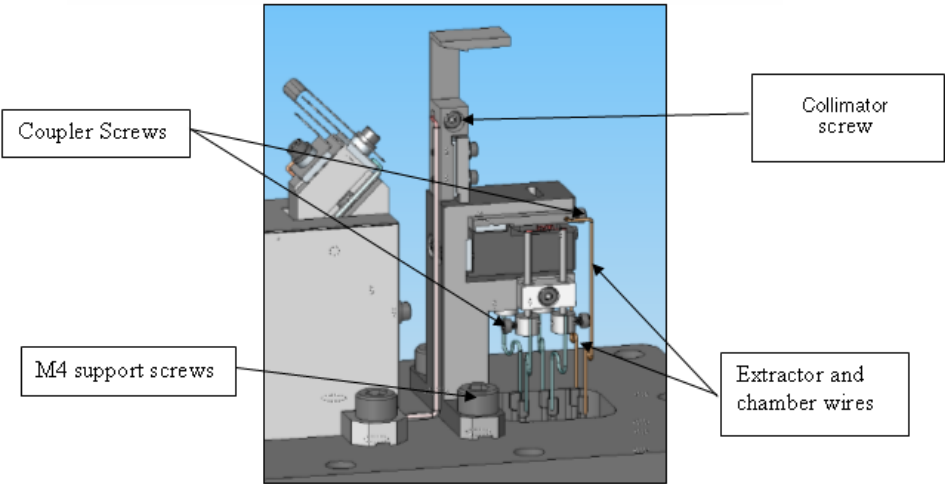


Figure 10: Ion Support Assembly

CAUTION



This is a static sensitive device, ensure that personnel are properly grounded before proceeding.

- 12. Remove the extractor, chamber and collimator wires from the assembly.
- 13. Remove the two M4 support screws (Figure 11: M4 Support Screws).

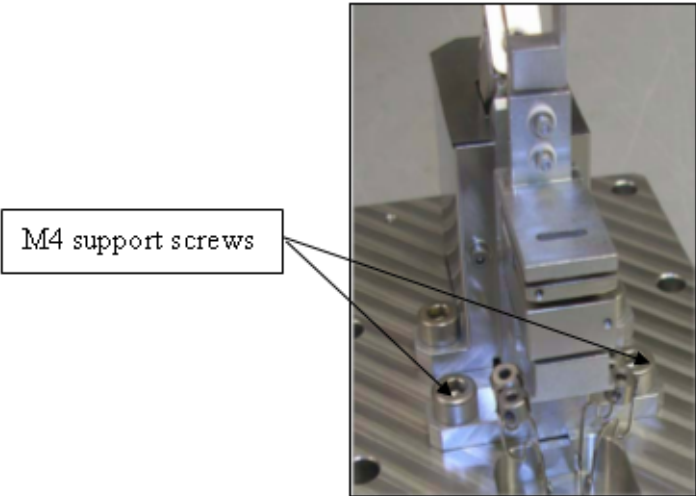


Figure 11: M4 Support Screws

- 14. Gently remove the ion support assembly from the spectrometer header.

NOTE

Ensure that no damage is done to the spectrometer wire during disassembly.



15. Position the new ion support assembly onto the spectrometer header and align.

16. Secure to the spectrometer header using two M4 support screws.

17. Connect the collimator wire to the collimator plate using an M1.5 screw (Figure 12: Partial Pressure Plate).

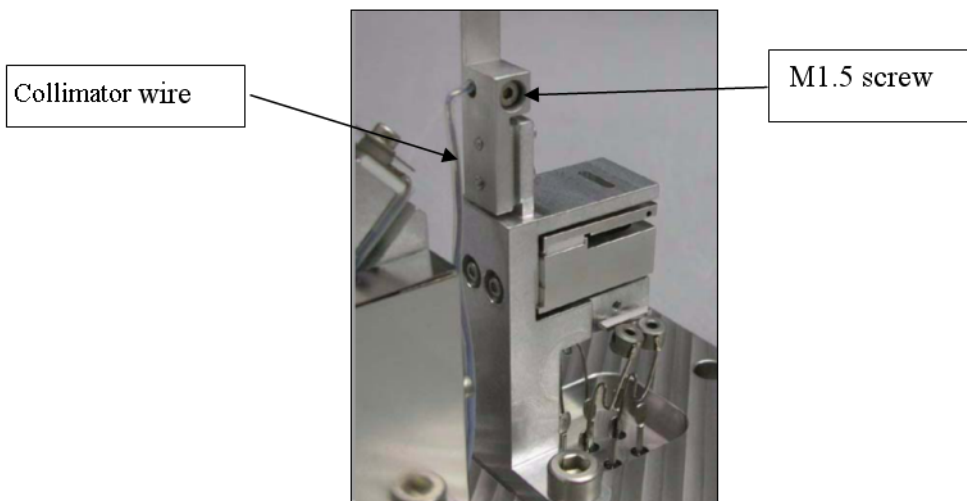


Figure 12: Partial Pressure Plate

18. Insert the chamber and extractor wires into the ion support assembly (Figure 13: Extractor Plate).

CAUTION

Do not cut the wires by over tightening. Ensure that wires are contacting the assembly where required and that no short circuit exists.

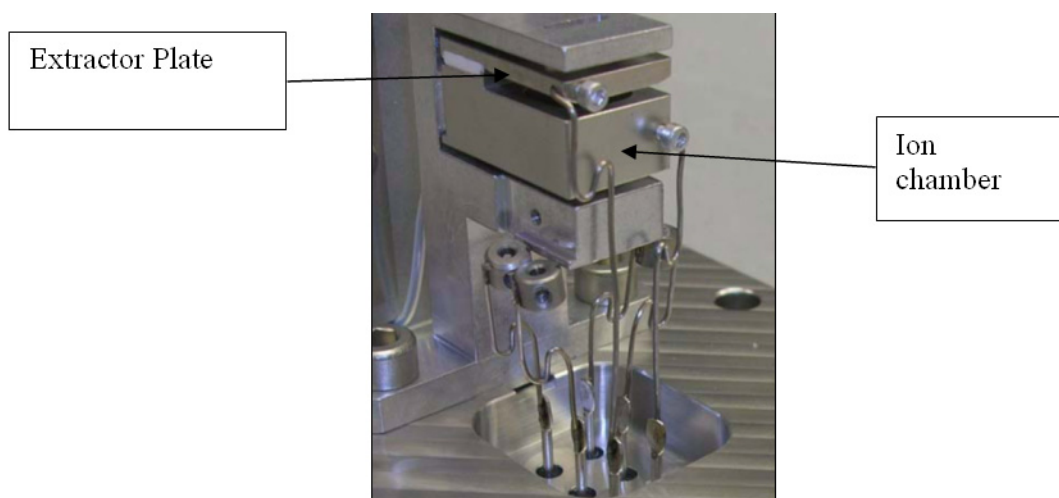


Figure 13: Extractor Plate

19. Insert each new filament assembly into a pair of couplers.
20. Guide the ceramic against the bottom and side ribs of the ion source support block (Figure 14: Coupler and Filament Assembly and Figure 15: Filament Position). Correct positioning of filament is critical for proper spectrometer operation.

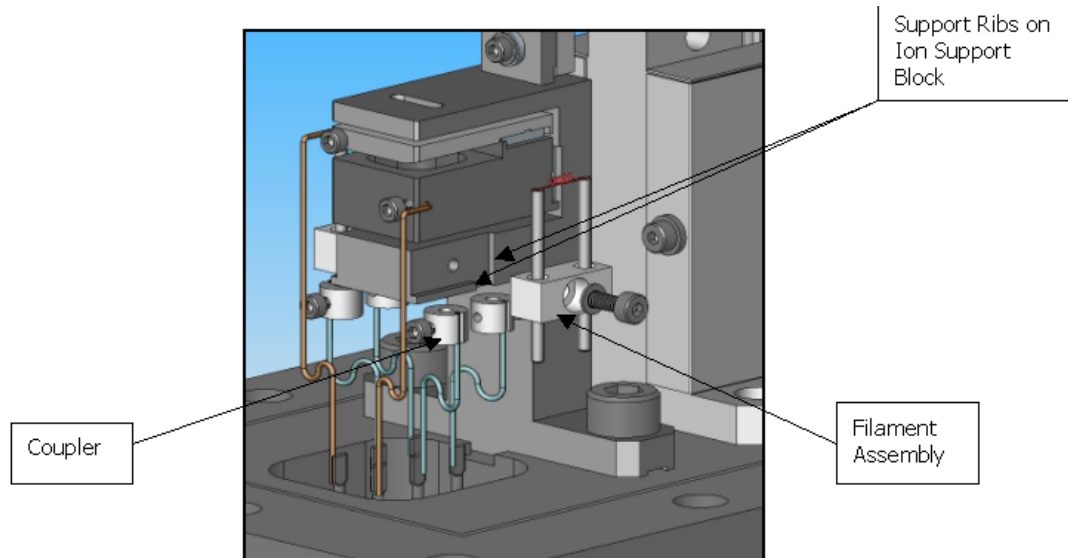


Figure 14: Coupler and Filament Assembly

21. While holding the filament in position, insert the M2 screw and washer and tighten (Figure 15: Filament Position).
22. Tighten the coupler screws onto the filament posts (Figure 15: Filament Position).
23. Verify ceramic is tight against the bottom and right side ribs. Ensure that the filament is positioned in the slot of the ion source as shown (Figure 15: Filament Position and Figure 16: Filament Alignment).

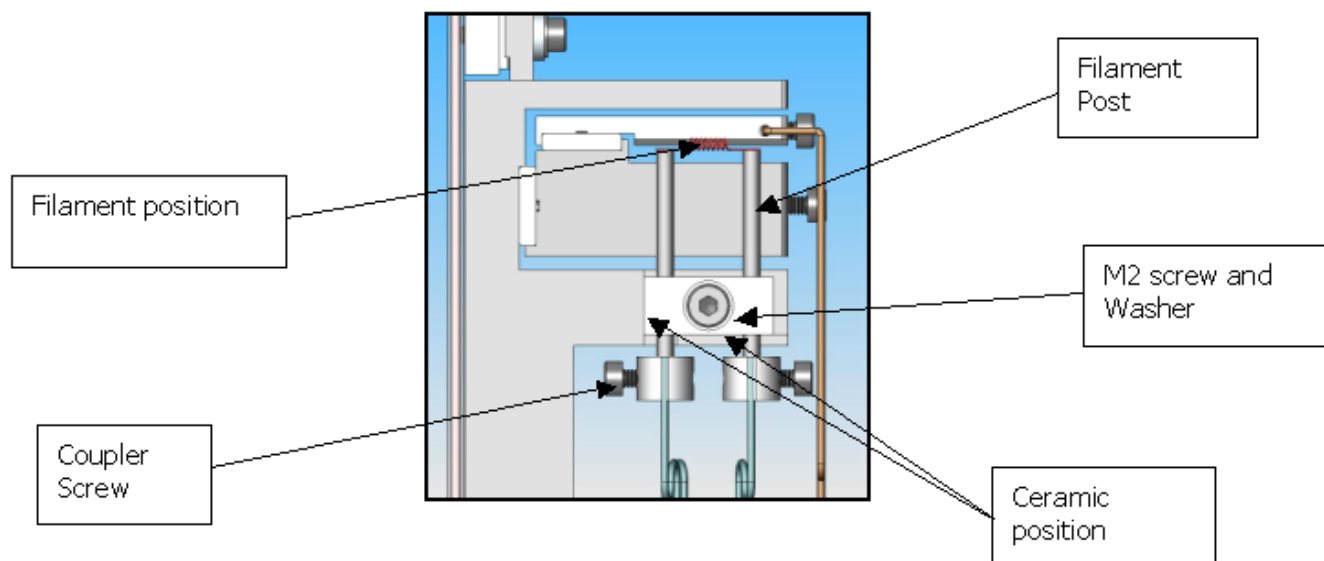


Figure 15: Filament Position

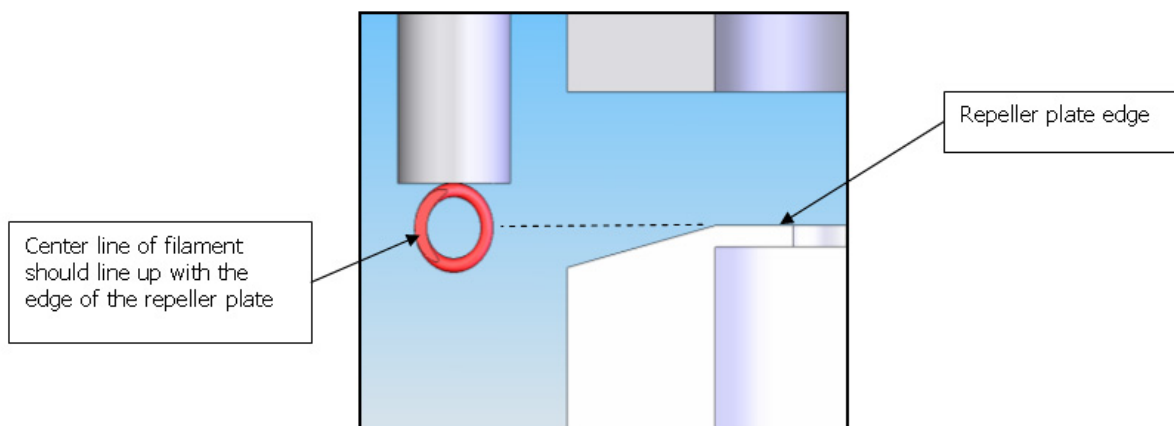


Figure 16: Filament Alignment

NOTE

Reuse the cover on the old header assembly when it is shipped back to Varian.



24. Clean the mating surfaces of the spectrometer body and header with Isopropyl alcohol and a clean lint free wipe.
25. Install the new header with the six existing screws. Torque to 10.2 N-M (90 IN-LB).

NOTE

The cones of the Belleville washers should all point to the head of the screw.



26. On the PCB, use the resistance meter to verify an open circuit between any two of the six ion source header pins (except FIL-1 to FIL-1 and FIL-2 to FIL-2 which should be 0.3 Ohms or less). Also verify an open circuit between the body of the spectrometer and any of the ion source header pins (Figure 17: Ion Source Header Pin Schematic). If there is continuity (short circuit) at any of the points, remove the header and inspect for shorting.

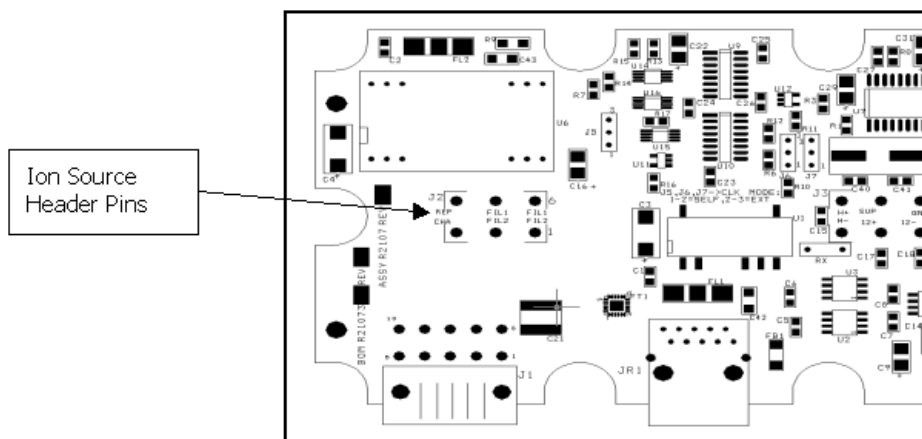


Figure 17: Ion Source Header Pin Schematic

27. Re-Install the cover with the four screws.
28. Re-plug in both cables and ground strap.
29. Verify that turbo vent valve is closed.
30. Leak check the spectrometer to ensure a leak free joint.
31. Close the cover and secure using existing hardware.
32. Power up the leak detector.
33. Let the unit run for 20 minutes, then perform a calibration (via the I/O, front panel display or RS232), per the user manual, to validate a successful installation.



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