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Agilent Technologies

# *Replacing the VS Ion Source Board*

*INSTRUCTION MANUAL*

Part No. 699904140
Rev. A
October 2008

# *Replacing the VS Ion Source Board*

# Warranty

Products manufactured by Seller are warranted against defects in materials and workmanship for twelve (12) months from date of shipment thereof to Customer, and Seller's liability under valid warranty claims is limited, at the option of Seller, to repair, replacement, or refund an equitable portion of the purchase price of the Product. Items expendable in normal use are not covered by this warranty. All warranty replacement or repair of parts shall be limited to equipment malfunctions which, in the sole opinion of Seller, are due or traceable to defects in original materials or workmanship. All obligations of Seller under this warranty shall cease in the event of abuse, accident, alteration, misuse, or neglect of the equipment. In-warranty repaired or replaced parts are warranted only for the remaining unexpired portion of the original warranty period applicable to the repaired or replaced parts. After expiration of the applicable warranty period, Customer shall be charged at the then current prices for parts, labor, and transportation.

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# Preface

## Documentation Conventions

This manual uses the following documentation conventions:

**WARNING**

*Warnings indicate a particular procedure or practice, which if not followed correctly, could lead to serious injury.*

**CAUTION**

*Cautions indicate a particular procedure or practice, which if not followed, could cause damage to the equipment.*

**NOTE**

*Notes contain important information.*

Before operating or servicing equipment, read and thoroughly understand all operation/ maintenance manuals provided by Vacuum Technologies. Be aware of the hazards associated with this equipment, know how to recognize potentially hazardous conditions, and how to avoid them. Read carefully and strictly observe all cautions and warnings. The consequences of unskilled, improper, or careless operation of the equipment can be serious.

In addition, consult local, state, and national agencies regarding specific requirements and regulations. Address any safety, operation, and/or maintenance questions to your nearest Vacuum Technologies office.

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# Replacing the VS Ion Source Board

This document describes replacement of the Ion Source board (P/N# R2120301) with the upgraded version P/N # R2120501. This version of the board prevents the leak detector from reporting the error message *GAIN TOO HIGH* due to erroneous data.

**WARNING** *Always unplug the main power cord from the wall before servicing the unit.*

**CAUTION** *Always wear a ground strap when working with the electronics boards.*

Plan approximately 30 to 40 minutes to complete this replacement.

*Required Tools:*

- ❑ Extended 5 mm hex wrench (longer than 8" – longer than a standard size)
- ❑ 4 mm hex wrench
- ❑ Small flat screwdriver
- ❑ Medium Phillips screwdriver
- ❑ Sheet of paper 8½" by 11" and 4" of scotch tape
- ❑ Paper Cup (or equivalent) to hold screws removed during disassembly

1. Using the extended 5 mm hex wrench, remove the four (4) screws holding the leak detector rear cover (Figure 1-1).

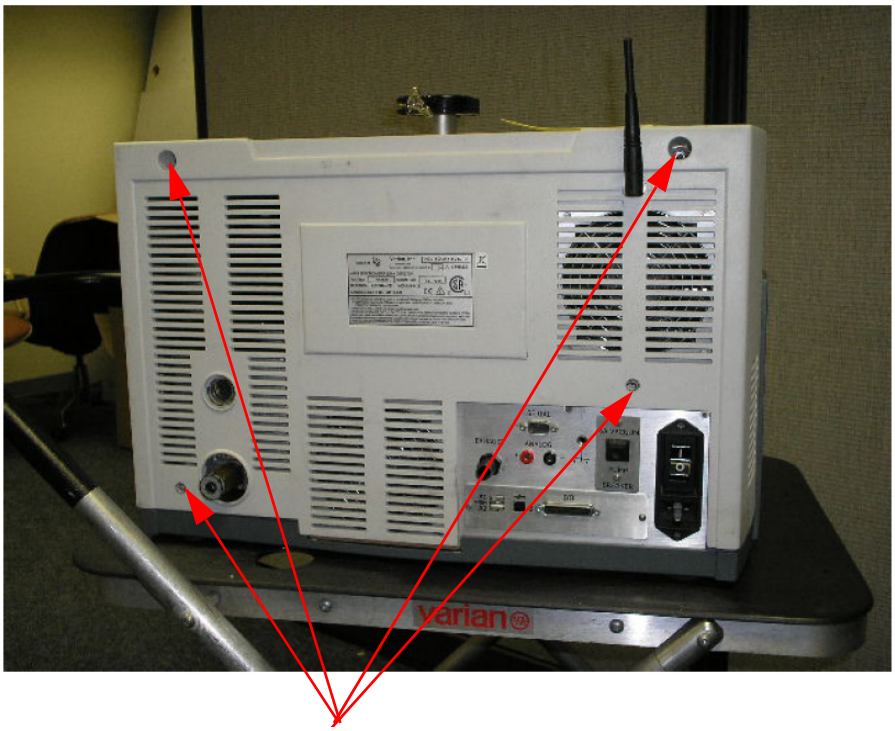


**Figure 1-1 Rear Cover Screws**

**NOTE**

*If your VS has a wireless remote, bend down the antenna as indicated in Figure 1-2 before removing the rear cover. The antenna has a flexible knuckle allowing it to lay flat.*

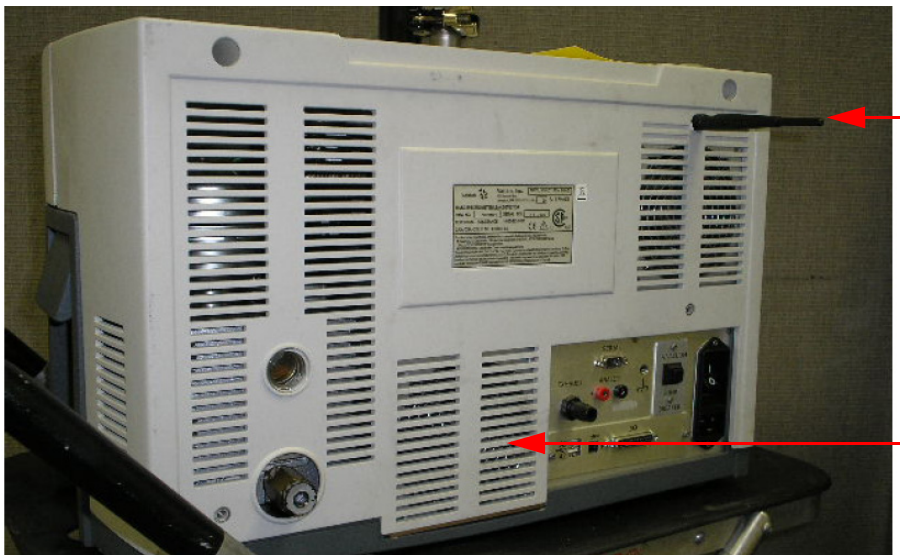



**Figure 1-2 Antenna Bent Down**

2. Release the leak detector lower *apron* from the detector base by pressing down (toward the table) on the gray plastic bottom with one hand while pulling the rear cover white *apron* toward you with the other hand (Figure 1-2 on page 1-2). This step allows the rear cover to slip off easier.
3. Remove the rear cover by grasping the sides with both hands and wiggling it towards you.

   Removing the rear cover of the VS leak detector exposes two of the four screws that hold the front cover in place. The screws (5 mm hex) are located at the left and right side of the unit as indicated in Figure 1-3.

**CAUTION**

*Be careful when removing the screws so that neither the washers nor the screws fall into the chassis of the leak detector.*

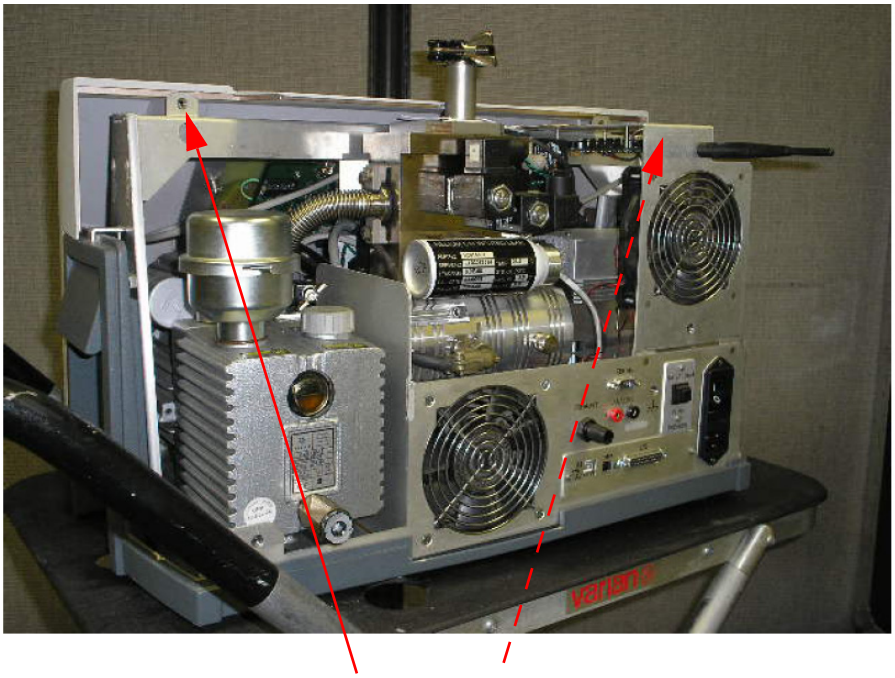
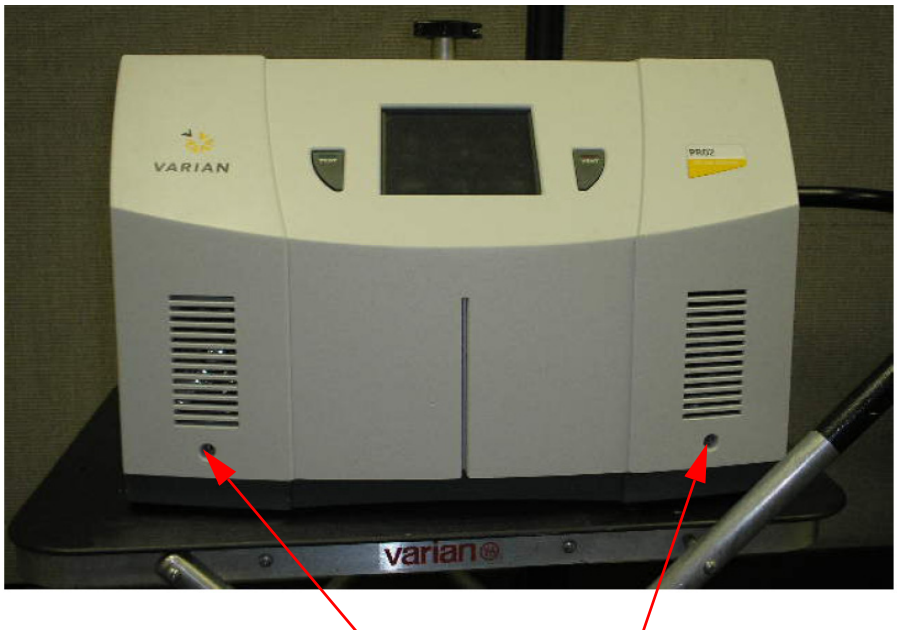


**Figure 1-3 Front Cover Screws - Inside the VS**

4. Remove the front cover by:
    a. Removing the two front 5 mm hex screws.
    b. Grasping the cover with both hands at the sides and sliding it towards you.




5. Remove the front panel display assembly and metal work by:
    a. Removing the 4 mm hex screw on the sheet metal work as indicated in Figure 1-4.

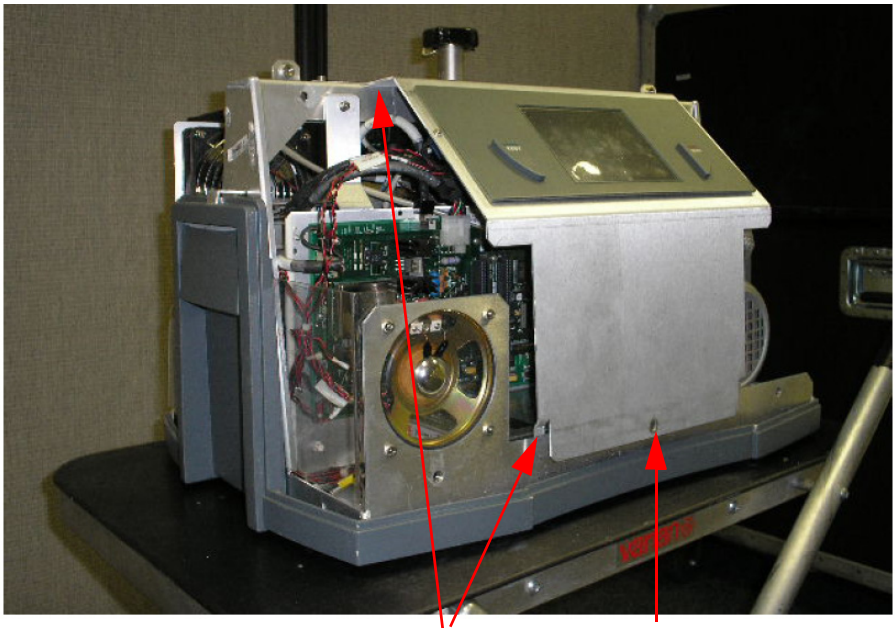



**Figure 1-4 Front Panel Display Assembly**

b. Grasping with both hands the sides of the lower part of the display metal work and flexing it up to release metal tabs at the bottom.

c. Rotating the display assembly at an angle until the lower flap of the metal work is parallel to the ground.

d. Holding the display assembly in the lifted position, slide the assembly ½" to the right (to release the hinges) and gently pull towards you. Ensure that you gently pull as the display has as many as wire connections in the back of the electronics board.

6. Disconnect the wireless connection, if applicable using a small flat screwdriver to remove the DB9 connector. See 1 in Figure 1-5.

7. Disconnect the front Panel Display Assembly from the VS by:

a. Disconnecting the internal digital communication network RJ45 connector (green cover). See 2 in Figure 1-5.

b. Squeezing the speaker connector top and bottom to remove it. See 3 in Figure 1-5.

c. Disconnecting the display 24 VDC power connector by squeezing the left and right sides. See 4 in Figure 1-5.

d. Using a small Phillips screwdriver, remove the chassis ground. See 4 in Figure 1-5.

e. Removing the display assembly from the VS.

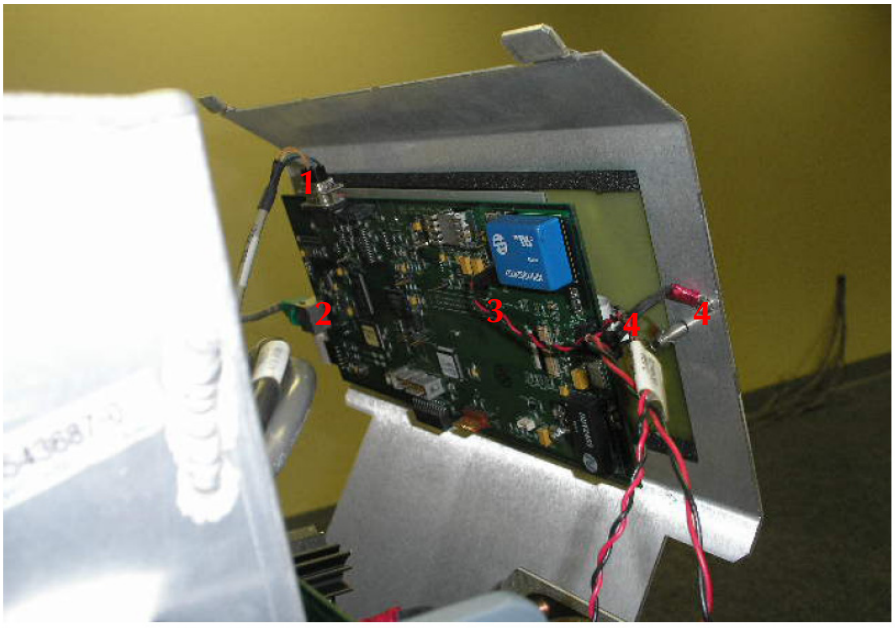



**Figure 1-5 Front Panel Display Assembly Connections**

8. Fold a piece of 8 ½ by 11" paper in half and slide it over the open vents of the 24 VDC power supply (Figure 1-6). Use some scotch tape to hold the paper in place during the disassembly.

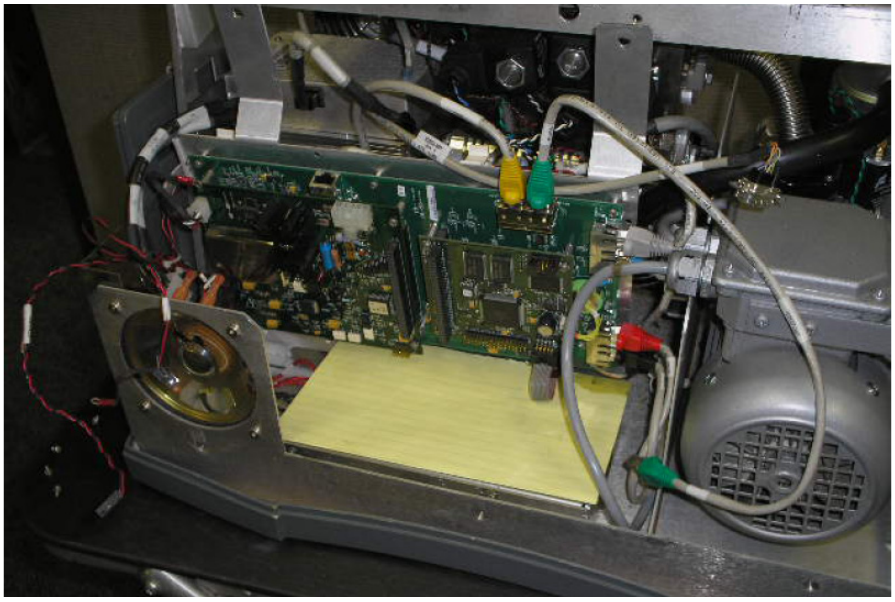


**Figure 1-6 Paper In Place**

9. Remove the two 3 mm hex screws holding the VS electronic assembly in place (Figure 1-7).

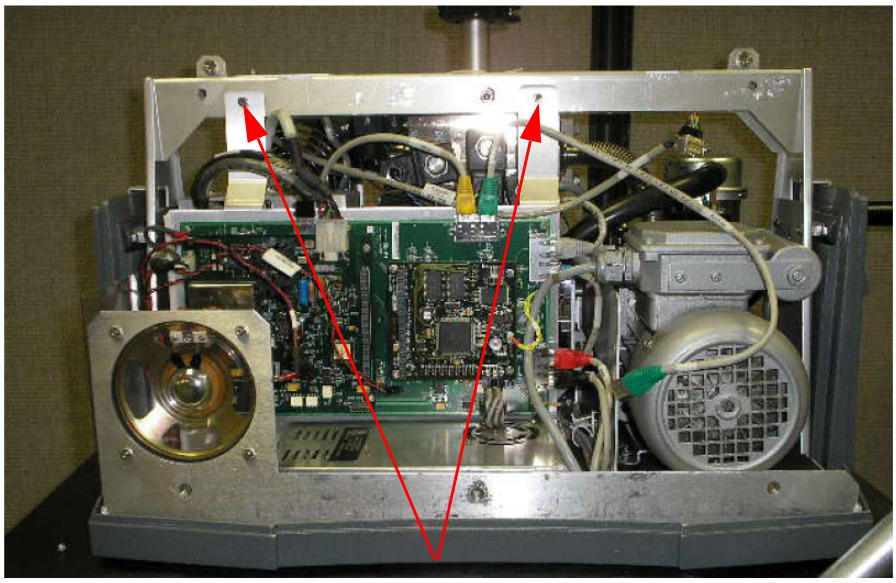


**Figure 1-7 Electronic Assembly Screws**

10. Disconnect the white 10 position connector and the RJ45 connector (black cover) on top of the Ion Source board. Both connectors have a clip in the center that needs to be squeezed towards the connector to release (Figure 1-8).

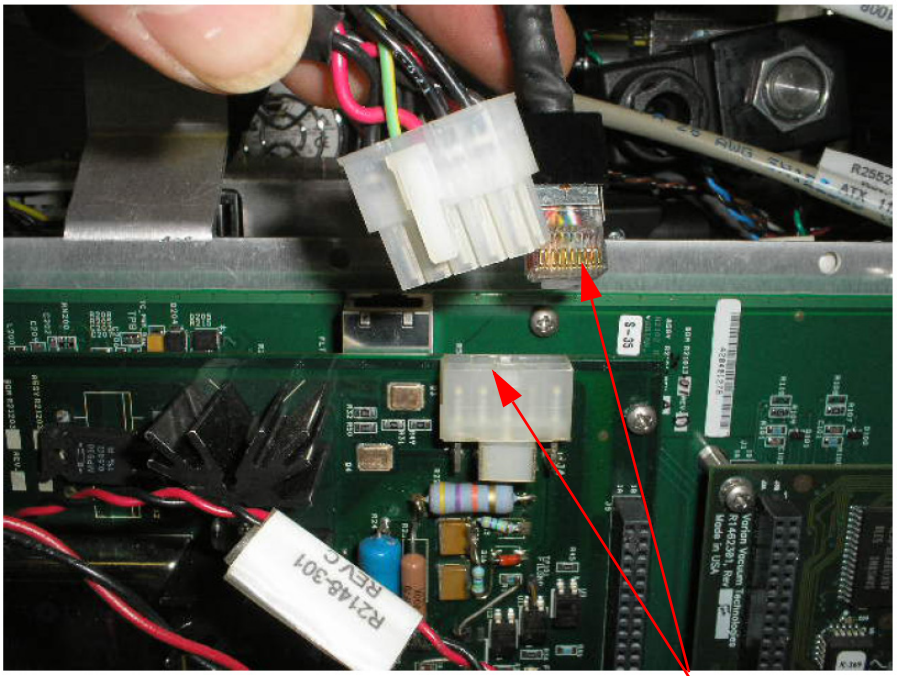


**Figure 1-8 Ion Source Board Connections - Top**

11. Disconnect the 24 VDC power on the lower left hand side of the Ion Source board by squeezing the connector from the left and right simultaneously. Take care when pulling the connector not to stress (break) the ground screwed to the metal work next to the Ion Source board and Main board (Figure 1-9).

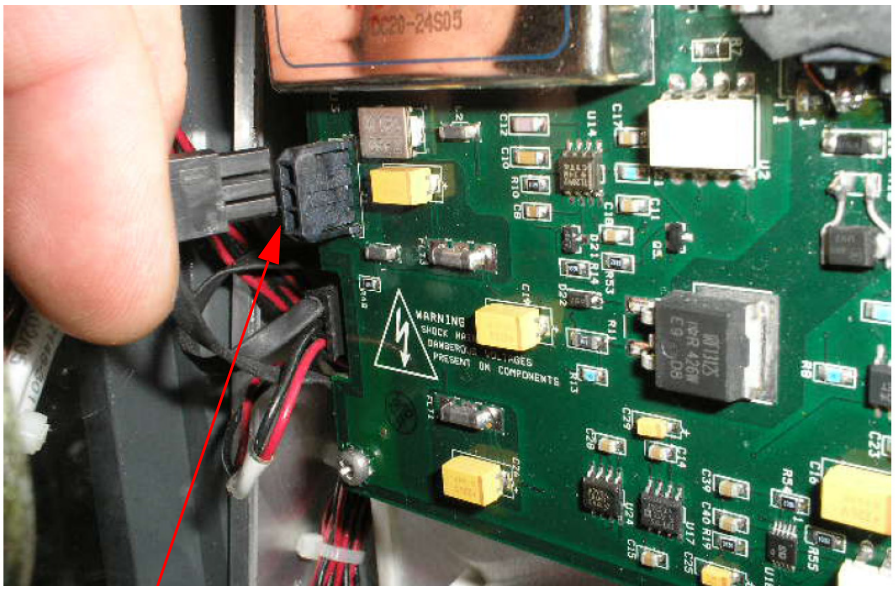


**Figure 1-9 Ion Source Board Connection - Bottom**

12. Remove the Ion source board by removing five (5) Phillips screws (Figure 1-10).

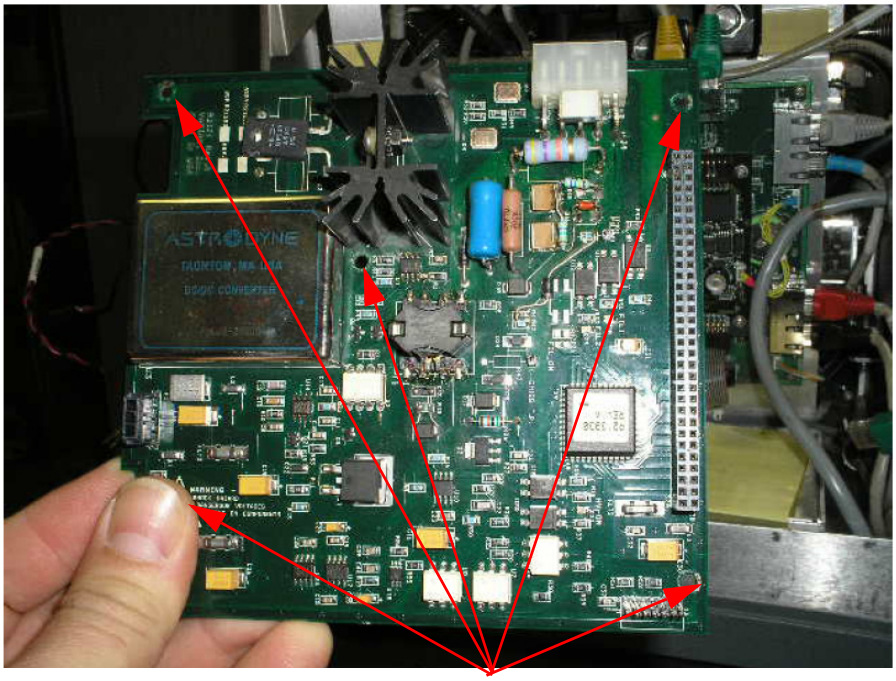


**Figure 1-10 Ion Source Board Screws**

**NOTE**

*Take care during the disassembly not to damage or bend the feed trough pins.*

13. Access the lower left hand screw on the ion source board by partially extracting the electronics sub assembly from the main chassis. Do this by:

    a. Grasping the assembly either from the bottom (Figure 1-11) or by the two metal tabs at the top and wiggling the assembly upwards by about 2 ½" (as the cable harness allows).

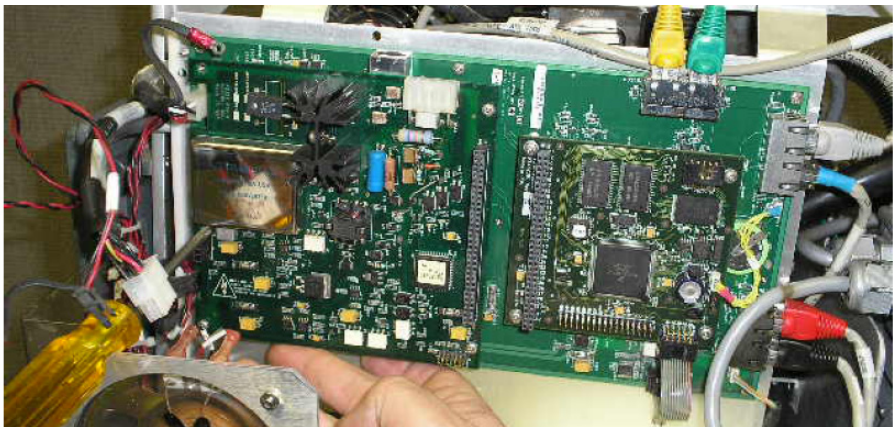


**Figure 1-11 Electronics Assembly Extraction**

b. Holding the assembly upwards with one hand, using a medium Phillips screw driver and removing the lower left hand screw, being careful not to drop into the VS (Figure 1-12).

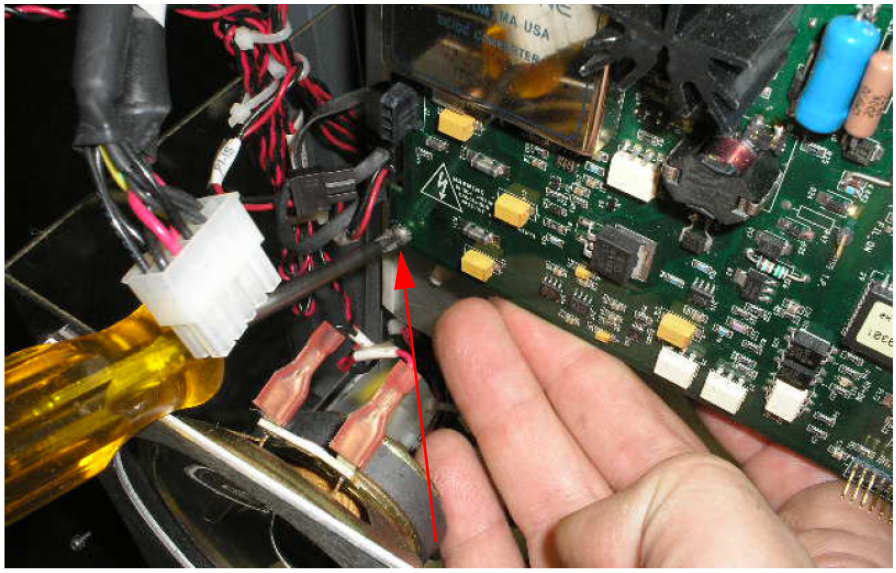


**Figure 1-12 Electronics Assembly - Left Hand Screw**

c. Removing the lower right hand, top right and top left hand screws with the electronic subassembly resting in its original position (Figure 1-13).

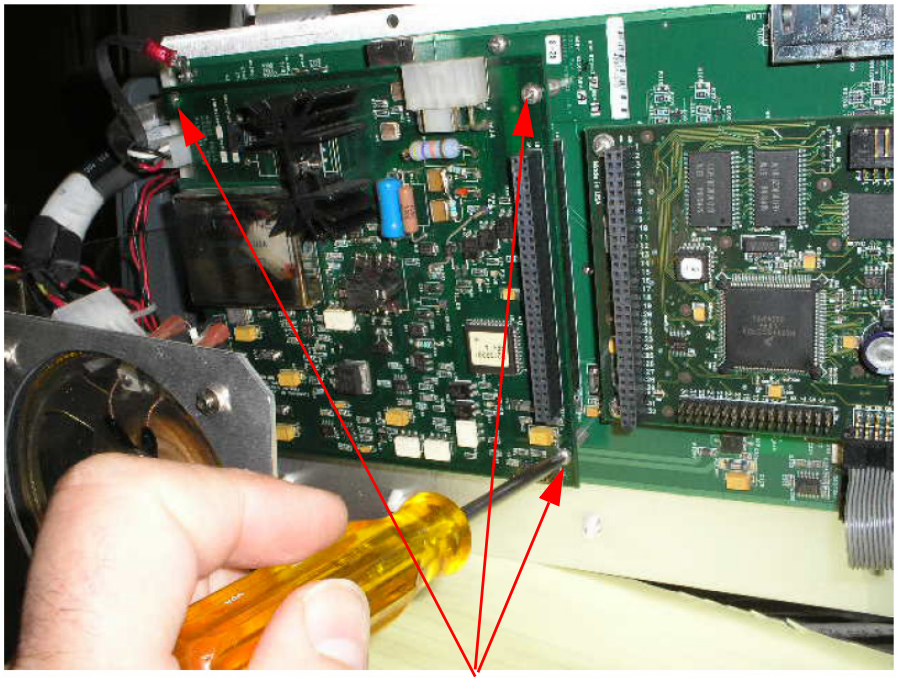


**Figure 1-13 Electronics Assembly - Right Hand and Top Screw**

d. Removing the center screw by slightly elevating the electronics assembly from its natural rest position (Figure 1-14).

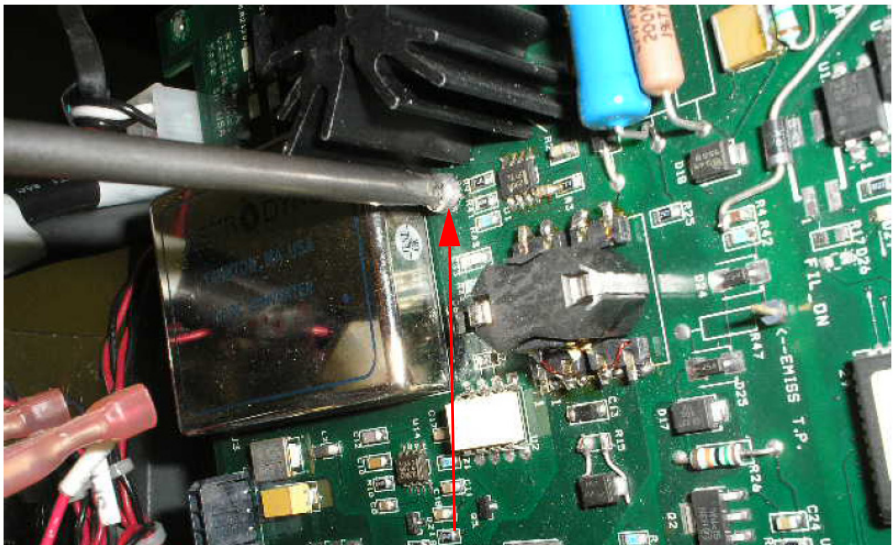


**Figure 1-14 Electronics Assembly Center Screw**

e. Gently rocking the Ion Source board top to bottom to release multi-pin feed through.

14. Inspect the main board multi-pin connector for any damage or broken pins left behind.
15. Line up all the pins and seat them evenly with even pressure.
16. Replace the five (5) Phillips screws that hold the Ion source board in place.
17. Place the electronics subassembly back to its original position and reinstall the 3 mm screws.
18. Reconnect the ion source board connections (24 VDC, 10-position white connector, RJ45 with black cover).
19. Remove the paper that was placed over the 24 VDC power supply.
20. Reconnect all connections on the display subassembly (RJ45 with the green cover, 24 VDC power with ground screw lug and the speaker audio connection).
21. Reinstall the display sheet metal work subassembly onto the VS chassis and tighten with the 4 mm hex screw. Adjust the subassembly so that the *Start* and *Vent* buttons properly fit into their cutouts.
22. Install the front cover, ensuring that the cover does not obstruct the operation of the test and vent buttons.
23. Install the rear cover.
24. Power on the VS leak detector and verify normal operation by initiating a calibration on filament #1 and then initiating a calibration on filament #2.

25. Record the following data for both filaments:

**Table 1-1 Filament Data**

| | Filament 1 | Filament 2 |
|---|---|---|
| Ion | | |
| Emission | | |
| Gain | | |
| Offset | | |

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VARIAN

# *Request for Return*
# *Health and Safety Certification*

ISO 9001 REGISTERED

1. Return authorization numbers (RA#) **will not** be issued for any product until this Certificate is completed and returned to a Varian, Inc. Customer Service Representative.
2. Pack goods appropriately and drain all oil from rotary vane and diffusion pumps (for exchanges please use the packing material from the replacement unit), making sure shipment documentation and package label clearly shows assigned Return Authorization Number (RA#) VVT cannot accept any return without such reference.
3. Return product(s) to the nearest location:

| **North and South America** | **Europe and Middle East** | **Asia and ROW** |
|---|---|---|
| Varian, Inc.<br>121 Hartwell Ave.<br>Lexington, MA 02421<br>Fax: (781) 860-9252 | Varian S.p.A.<br>Via F.lli Varian, 54<br>10040 Leini (TO) – ITALY<br>Fax: (39) 011 997 9350 | Varian Vacuum Technologies<br>Local Office |

For a complete list of phone/fax numbers see www.varianinc.com/vacuum

4. If a product is received at Varian, Inc. in a contaminated condition, **the customer is held responsible** for all costs incurred to ensure the safe handling of the product, and **is liable** for any harm or injury to Varian, Inc. employees occurring as a result of exposure to toxic or hazardous materials present in the product.

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Company name: .....

Contact person: Name: ..... Tel: .....

Fax: ..... E-mail: .....

Ship method: Shipping Collect #: ..... P.O.#: .....

Europe only: VAT Reg Number: ..... *USA only:* ❒Taxable ❒Non-taxable

Customer ship to: ..... Customer bill to: .....

..... .....

..... .....

*PRODUCT IDENTIFICATION*

| **Product Description** | **Varian, Inc. Part Number** | **Varian, Inc. Serial Number** |
|---|---|---|
| | | |
| | | |
| | | |

*TYPE OF RETURN (check appropriate box)*

| | | | | |
|---|---|---|---|---|
| ❒ Paid Exchange | ❒ Paid Repair | ❒ Warranty Exchange | ❒ Warranty Repair | ❒ Loaner Return |
| ❒ Credit | ❒ Shipping Error | ❒ Evaluation Return | ❒ Calibration | ❒ Other |

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**VARIAN, INC. CANNOT ACCEPT ANY BIOLOGICAL HAZARDS, RADIOACTIVE MATERIAL, ORGANIC METALS, OR MERCURY AT ITS FACILITY. CHECK ONE OF THE FOLLOWING:**

❒ I confirm that the above product(s) has (have) **NOT** pumped or been exposed to any toxic or dangerous materials in a quantity harmful for human contact.

❒ I declare that the above product(s) has (have) pumped or been exposed to the following toxic or dangerous materials in a quantity harmful for human contact (Must be filled in):

Print Name..... Signature ..... Date .....

**PLEASE FILL IN *THE FAILURE REPORT SECTION* ON THE NEXT PAGE**

Do not write below this line

Notification (RA) #: ..... Customer ID #: ..... Equipment #: .....

VARIAN

# *Request for Return Health and Safety Certification*

ISO 9001 REGISTERED

*FAILURE REPORT*
(Please describe in detail the nature of the malfunction to assist us in performing failure analysis):

**TURBO PUMPS AND TURBOCONTROLLERS**

| **Claimed Defect** | | **Position** | **Parameters** | |
|---|---|---|---|---|
| ❒ Does not start | ❒ Noise | ❒ Vertical | Power: | Rotational Speed: |
| ❒ Does not spin freely | ❒ Vibrations | ❒ Horizontal | Current: | Inlet Pressure: |
| ❒ Does not reach full speed | ❒ Leak | ❒ Upside-down | Temp 1: | Foreline Pressure: |
| ❒ Mechanical Contact | ❒ Overtemperature | ❒ Other ..... | Temp 2: | Purge flow: |
| ❒ Cooling defective | ❒ Clogging | | Operation Time: | |
| Describe Failure: | | | | |
| Turbocontroller Error Message: | | | | |

**ION PUMPS/CONTROLLERS**

| | |
|---|---|
| ❒ Bad feedthrough | ❒ Poor vacuum |
| ❒ Vacuum leak | ❒ High voltage problem |
| ❒ Error code on display | ❒ Other ..... |
| Describe failure: | |
| Customer application: | |

**VALVES/COMPONENTS**

| | |
|---|---|
| ❒ Main seal leak | ❒ Bellows leak |
| ❒ Solenoid failure | ❒ Damaged flange |
| ❒ Damaged sealing area | ❒ Other ..... |
| Describe failure: | |
| Customer application: | |

**LEAK DETECTORS**

| | |
|---|---|
| ❒ Cannot calibrate | ❒ No zero/high background |
| ❒ Vacuum system unstable | ❒ Cannot reach test mode |
| ❒ Failed to start | ❒ Other ..... |
| Describe failure: | |
| Customer application: | |

**INSTRUMENTS**

| | |
|---|---|
| ❒ Gauge tube not working | ❒ Display problem |
| ❒ Communication failure | ❒ Degas not working |
| ❒ Error code on display | ❒ Other ..... |
| Describe failure: | |
| Customer application: | |

**ALL OTHER VARIAN, INC.**

| | |
|---|---|
| ❒ Pump doesn't start | ❒ Noisy pump (describe) |
| ❒ Doesn't reach vacuum | ❒ Overtemperature |
| ❒ Pump seized | ❒ Other ..... |
| Describe failure: | |
| Customer application: | |

**DIFFUSION PUMPS**

| | |
|---|---|
| ❒ Heater failure | ❒ Electrical problem |
| ❒ Doesn't reach vacuum | ❒ Cooling coil damage |
| ❒ Vacuum leak | ❒ Other ..... |
| Describe failure: | |
| Customer application: | |

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