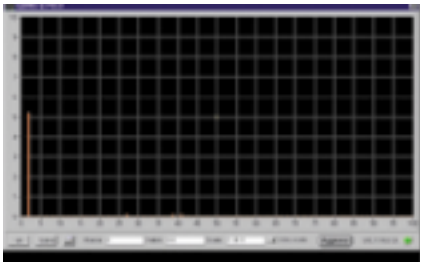

Figure 8 - Residual gas analysis

Pumping of Different Gases
In general, all ion pumps can pump all gases to some degree. To obtain the best performance and base pressure, different types of ion pumps have been developed with optimized performance in different pressure ranges and with different gases.

Varian's Vaclon *Plus* is a complete product family that offers the choice among three different elements: Diode, Noble Diode and StarCell®.

Whatever the application, there is a Vaclon *Plus* pump designed for it.

Long Operating Life
All Vaclon *Plus* pumps have rated lives in excess of many thousand of hours at a pressure of $1x10^{-6}$ mbar (50,000 hours for the Diode pump, and 80,000 hours for the StarCell®).

With many ion pumps, maintenance may be required well before the rated life, due to metallization of insulators or pumping element distortion.

All Vaclon *Plus* elements are designed to minimize cathode distortion (even after repetitive bake-outs and starting at high pressure), and the insulators are protected from sputtered titanium by using a double re-entrant design and a cap shield.

Pressure Reading
The ability to read pressures using an ion pump is due to the direct proportionality between pump current and operating pressure.

The reliability of pressure readings at very low pressure is limited by leakage current, and the leakage current from field emission is heavily dependent on the voltage applied to the pump.

The Dual controller, designed for use with any Vaclon *Plus* pump, provides the unique ability to adjust the voltage in accordance with the operating pressure. By doing this, the leakage current is minimized at low pressure, providing a reliable pressure reading down to the 10^{-10} mbar range.

Custom Design and Flexibility
All ion pumps can be mounted in any position, and do not need any isolation valve from the system in case of venting or power failure.

Vaclon *Plus* pumps are the most compact ion pumps in each speed range. The pumps can be configured with additional flanges and can accomodate other pumping systems (like TSP), allowing the best use of available space.

New Feedthrough
The whole Ion Pump line is provided with an innovative feedthrough.
The improved feedthrough of the ion pump line is a major breakthrough. The greatest advantages of the ion pumps are listed here below:

- **Corrosion Free**
  The design of the feedthrough will reduce drastically the corrosion that may occur when the pump is used in humid environments.
  Our tests and experience have demonstrated that the corrosion starts and increases with the presence of humidity between feedthrough and connector. The high voltage during the pump operation ionizes the entrapped water vapor; the ions react with the brazing alloy and corrode it. The design of the feedthrough aims to solve these issues:
  – On one hand the design structure of the feedthrough presents a negligible quantity of air.
  – On the other hand, the brazing is done on the vacuum side so that the brazing alloy surface exposed to air is minimal.
- **High Voltage Cable Interlock**
  The feedthrough has been designed for the "HV cable safety interlock" implementation. This feature avoids any electrical shock since the voltage is automatically cut off as soon as the cable is disconnected from the pump.
  Our Ion Pump control units (MidiVac, Dual) and the HV cable are already able to support this safety feature when connected to an ion pump with the feedthrough.
- **Easy Connection**
  The connection of the cable connector to the feedthrough requires simply inserting and pushing the connector.
  No use of retention screws is required.
- **Safety against Unintentional Extraction**
  When the HV cable connector is inserted into the new patented feedthrough, it is firmly and mechanically secured to it. A latch on the cable prevents disconnection.
- **Compactness**
  The feedthrough design allows a significant gain of space for the customer.