

High Resolution



VeraSpec™
HRQ

P R O D U C T N O T E



 **Extrel**
Core Mass Spectrometers

High Resolution Quadrupole Analysis

Extrel is widely respected for the quality of mass spectrometer systems that are available to the world's top research scientists. In response to increasing requests for complete turn-key systems built around their well-respected quadrupole mass spectrometer technology, Extrel has introduced the VeraSpec™ line of research grade mass spectrometer systems.

MAX Performance

The heart of the VeraSpec™ HRQ is the MAX-50 flange mounted quadrupole mass spectrometer. This system is designed for precision mass analysis of low molecular weight species, while delivering exceptional transmission characteristics. The system consists of a mass spectrometer probe, including an electron impact ionizer, tri-filter quadrupole mass filter, and electron multiplier detector, controlled by the MAX-CS mass spectrometer control system and MAX-QCi integrated quadrupole control system. The 19 mm tri-filter quadrupole with precision machined rod set, RF-only pre- and post-filter stages, and stabilizing rods combine with the CS control system and the QCi quadrupole control RF supply to deliver excellent transmission, resolution, and abundance sensitivity characteristics at low masses. The whole system is operated via Extrel's Merlin Automation™ data system software. The HRQ has a 50 amu mass range and resolution of better than 3000 ($m/\Delta m$) at m/z 40.



Advantages of Extrel Complete System Approach

- **Design:** Extrel has a great deal of experience integrating the required components, and in many cases, modifying existing designs to meet the customer's individual needs. This experience can help eliminate trial-and-error approaches that cost more and take longer.
- **Integration:** Alignment, in-vacuum wiring, and system control are all complex issues when designing a system. An Extrel engineered system minimizes the integration complexity.
- **System Testing:** Systems are validated for overall operation prior to leaving the facility.
- **Training:** Included with typical systems is installation by qualified Extrel technicians to verify the instrument functions as it did in the factory, and validate functionality for faster operation.
- **Time:** In the research environment, funding depends on acquiring data and publishing results. Extrel's design team can help dramatically shorten the time it takes to get a system producing data. In one case, a customer's self-built system took **18 months** to get operating, but the subsequent system Extrel delivered allowed them to be publishing data in **only 6 months**.

Hydrogen and Helium/Deuterium Analysis

The analysis of molecular hydrogen can be a challenge for anything but a high-resolution mass spectrometer. Another challenge presented by research in the area of nuclear energy is the

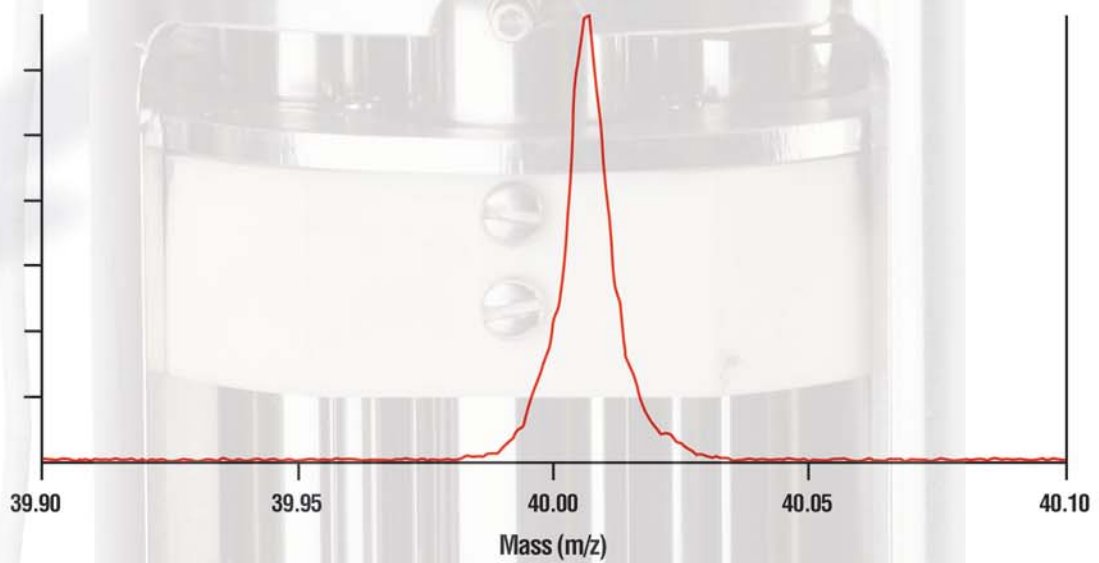
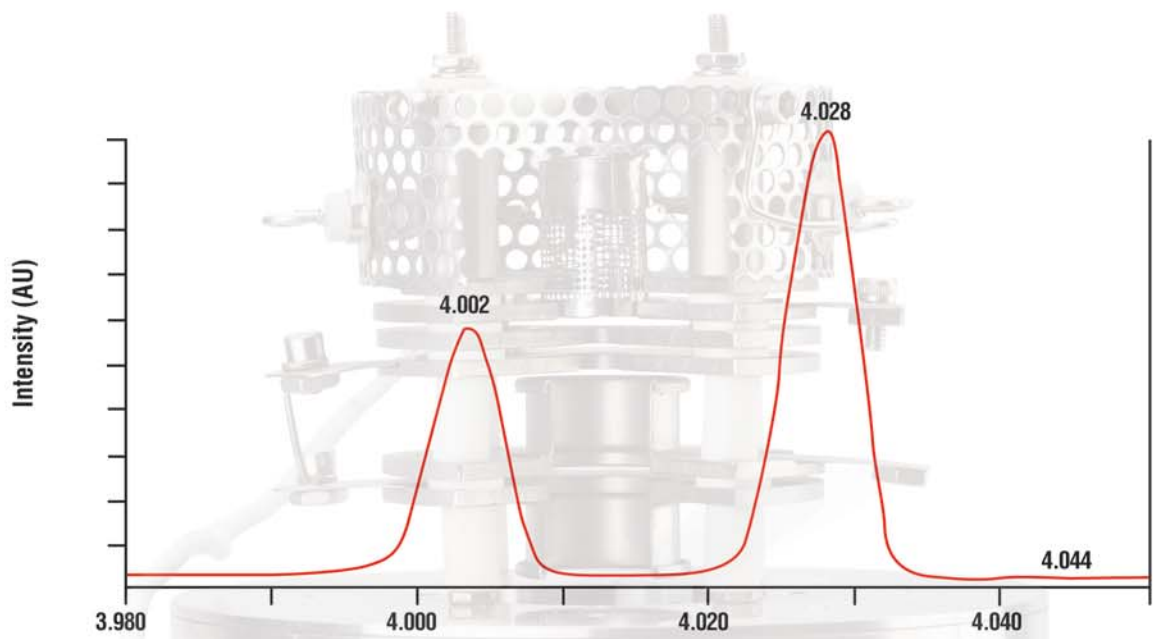
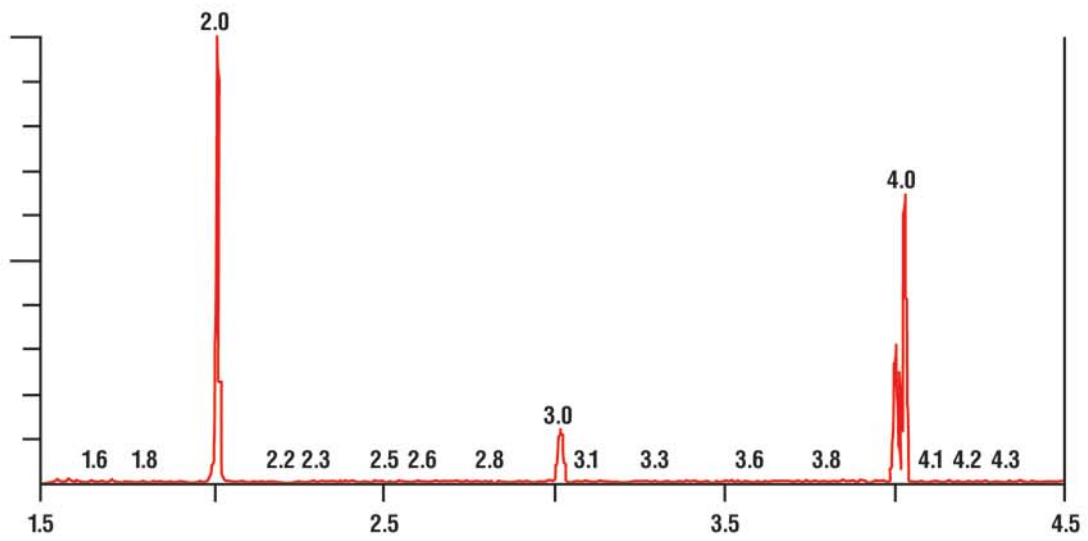
separation of fractional masses, such as the separation of Helium and Deuterium. The VeraSpec™ HRQ has the resolution and sensitivity to handle these demanding requirements.

Isotopic Analysis

Isotopic analysis is another application where high-resolution performance is attractive in order to detect sub-amu differences in adjacent isotopes. Figure 3 shows the analysis of naturally-occurring argon isotopes. The VeraSpec™ HRQ allows the

researcher the flexibility to look at consecutive masses at a resolution normally only seen in more expensive and complex mass spectrometer systems.





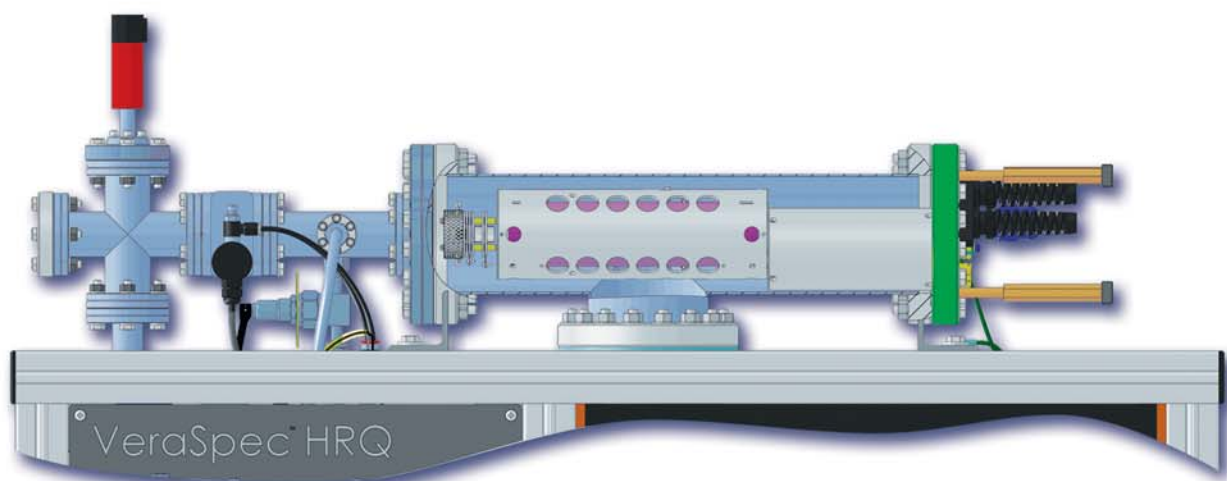


Figure 4.
Cutaway view of the MAX probe in the HRQ
 System includes a customized gas inlet with automated gate valve.

Inlet Customization

Extrel recognizes that every analytical requirement for a research project has its own unique demands. The VeraSpec™ family of systems is engineered to allow a level of design flexibility sufficient to address these unique needs. Extrel's application scientists and engineers are available to customize aspects of these products to meet

your needs. For the VeraSpec™ HRQ, this typically takes the form of designing appropriate sample inlets and calibration gas handling systems. Extrel personnel will take the time to understand your experimental requirements and work with you to design the customized solution right for you.

System	Quadrupole Mass Filter	Operating Frequency	Mass Range	Relative Transmission	Resolution M/ΔM	General Sensitivity (mA/Torr)
MAX-50	19 mm (3/4") tri-filter	2.9 MHz	1-50	75%	3000	4
MAX-120	19 mm (3/4") tri-filter	2.1 MHz	1-120	65%	2500	3

Extrel VeraSpec™ HRQ

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Installation Requirements:

- **Recommended Power Supply:**
(3) 120 VAC, 50/60 Hz, 20 Amp circuit
(3) 220 VAC, 50/60 Hz, 20 Amp circuit
- **Ambient Temperature:**
55° F to 80° F (13° C to 27° C)
- **Relative Humidity:**
0-90% non-condensing
- **Area Classification:**
Laboratory/General Purpose
- **Analyzer Weight:**
200 – 250 lbs (90 - 120 kg)
- **Analyzer Dimensions:**
Height: 54" (138 cm)
Depth: 24" (61 cm)
Width: 41" (104 cm)

Merlin Automation™ Data System Software:

- **Control Unit:** Information and control are transmitted and displayed via USB or Ethernet to a PC with Microsoft Windows 7 or XP operating system
- **Analysis Mode:** Scan Mode, Single Ion Monitoring (SIM), Multiple Reaction Monitoring (MRM)
- **Analysis Rate:** Maximum 80 microseconds per point in Scan Mode, typically 5 milliseconds per ion in SIM
- **Number of Ions:** Up to 72 ions with 20 scan segments
- **Analog Input/Outputs:** 10 or 20 channel, 12 bit, 0 to 10 V or -10 V to +10 V Outputs, 6 differential Analog Inputs, 12 bit, -10 V to +10 V
- **Digital Inputs/Outputs:**
8 Inputs, 8 Outputs,
16 User Selectable
Input/Outputs
(all I/O's 1 bit TTL)
- **External Communications:**
Several options, please refer
to Extrel for more information



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