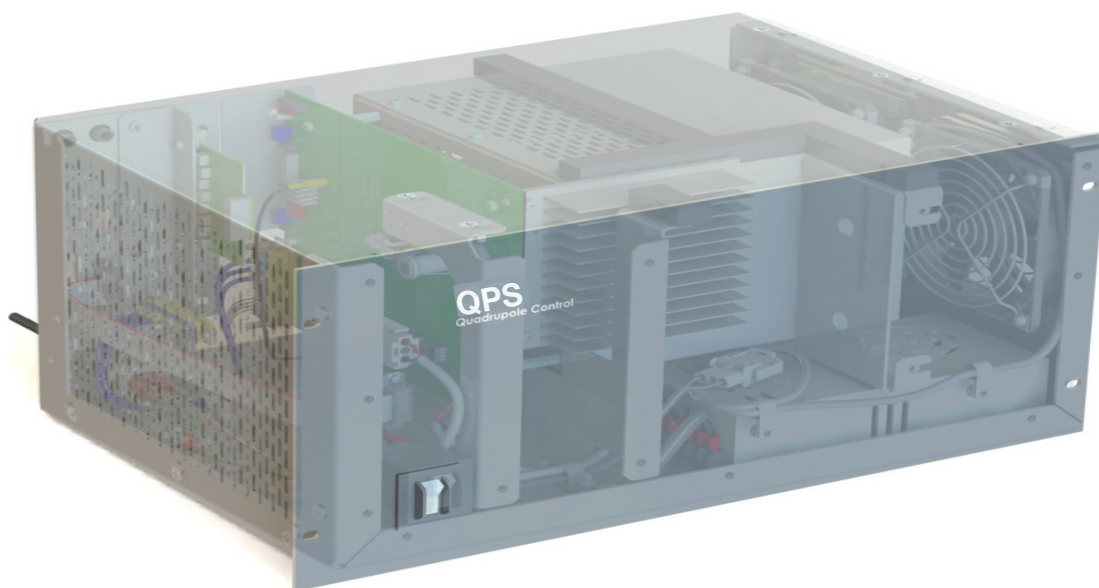
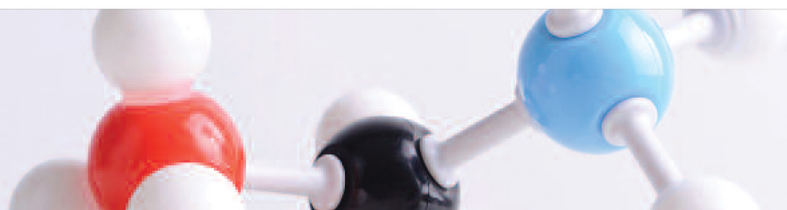


QPS

Quadrupole Power Supply



PRODUCT NOTE



Quadrupole Power Supply (QPS)

RF/DC and RF only Power Supply for Quadrupoles, Hexapoles and Octupoles

Extrel's Quadrupole Power Supply (QPS), provides high precision, high stability control and power for our Quadrupole Mass Filters, Octupoles and Hexapole Ion Guides and Collision Cells. They are offered in both RF/DC and RF only versions.

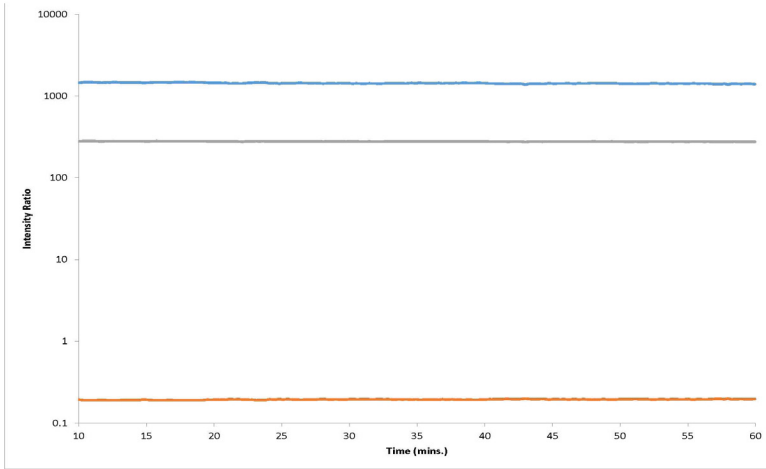


Figure 1: The Extrel QPS shows precise isotopic ratio stability.

The Extrel QPS is 2x faster than its predecessor, the 150-QC, allowing for up to 4000 amu/sec. Along with the added speed boost, the QPS has been optimized to be at least 2x more stable during normal operation (Figure 1). It has also been optimized to allow for better high-resolution analysis (Figure 2), as well as more efficient high mass transmission and detection (Figure 3).

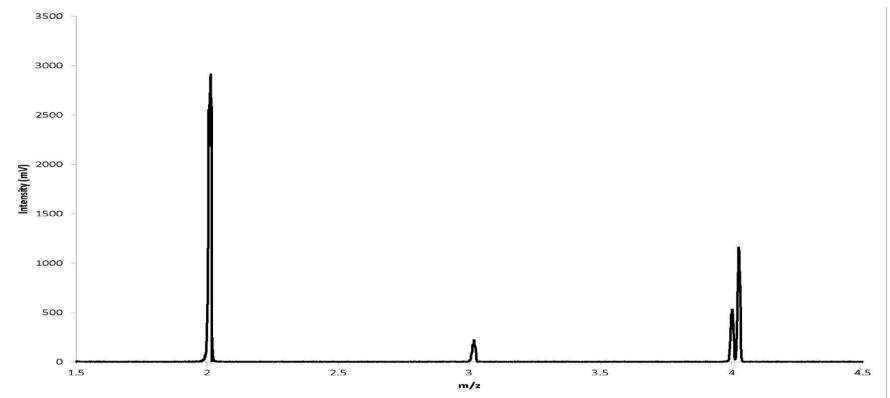


Figure 2: The Extrel QPS provides more stable high resolution data across a wider sweeping range.

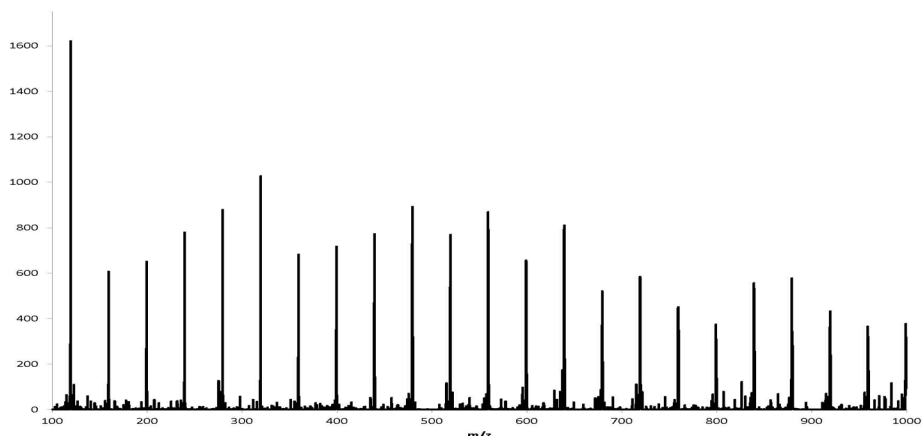


Figure 3: The Extrel QPS improved on the 150-QC's high mass transmission and sensitivity.

Choosing an RF Power Supply that is suited for your Application

Mass Range, Sensitivity, Abundance Sensitivity, Resolution and Transmission are determined by the combination of quadrupole rod size and the RF operating frequency.

Increasing the RF operating frequency increases:

- Sensitivity
- Abundance Sensitivity
- Resolution
- High Energy Ion Transmission

Increasing the quadrupole rod size increases:

- Ion Transmission

Decreasing either the quadrupole rod size or the RF operating frequency increases:

- Mass Range

The information in the Quadrupole Power Supply Selection Chart below can be used as a rough guide for choosing the Power Supply for an application.

Table 1:
QPS Quadrupole Power Supplies Selection Chart

| RF Frequency | Type | Maximum Mass Range for Extrel QPS Systems | |
|--------------|-------|---|--------|
| | | 9.5 mm | 19 mm |
| 880 kHz | RF/DC | 4-4000 | 1-1000 |
| 1.2 MHz | RF/DC | 2-2000 | 1-500 |
| 2.1 MHz | RF/DC | 1-500 | 1-120 |
| 2.9 MHz | RF/DC | 1-250 | 0.5-50 |

The RF frequency of a system can be changed using different Quadrupole Power Supplies. This allows a system to be modified for increased mass range or better performance as the requirements change.

Easy Stand Alone Operation

The QPS requires four DC input voltages, in addition to the AC voltage, one +/- 10 V for Mass Command and three +/- 5 V for Resolution (Delta M and Delta R) and Pole Bias. Mass Command requires one 0-10 V input. These voltages can be supplied by the user or from an Extrel MAX-CS control system. The QPS also supplies a bipolar Pole Bias voltage up to 200 V.

The QPS comes with 1.5 meter (5 feet) RF cables and 3 meter (10 feet) power cables. Longer or shorter cables are available, but changing the length will change the ultimate performance and achievable mass range of the system.

The standard Extrel QPS is able to be loaded onto any quadrupole device with a 25-35 picoFarad capacitance, which includes all quadrupoles manufactured by Extrel. Cabling options are available for devices with loads outside of this measurement and multipoles, such as an Octupole or Hexapole.

Specifications:

- Temperature Range: 15°C to 40°C (59°F to 104°F)
- Humidity Range: 0% to 95% (non-condensing)
- Particulates: Normal Lab Environment
- Power Input: 100 - 240 VAC with ground, 50/60 Hz, 290 W
- Mounting: Standard 19.00 inches Electronics Rack
- RF Output Voltage: Up to 3800V Peak RF (Option Dependent)

Quadrupole Power Supplies Dimensions

| | Height | Width | Depth |
|--------------------|------------------------|-------------------------|-------------------------|
| QPS Chassis | 221.5 mm (8.75 inches) | 444.5 mm (17.50 inches) | 304.8 mm (12.00 inches) |

Quadrupole Power Supply Options

| Single Quadrupole | Triple Quadrupole |
|---|---|
| QPS RF Power Supply | Multiple Extrel QPS for MS/MS operation |
| 1.5 m (5 feet) RF Cables | Quad Specific Lengths (ie. Q1, q2, Q3) |
| (1) Fixed Frequency QC | Three (3) Fixed Frequency QPS(s) |
| 200 VDC Internal Pole Bias Power Supply | 200 VDC Internal Pole Bias Power Supply |
| RF/DC and RF-only Operation | RF-Only q2 QPS for collision cell operation |

Support: For over 50 years, Extrel has been committed to providing the highest quality support services for the thousands of instruments installed worldwide. Factory trained and certified personnel offer industry-leading support to Extrel customers at every stage of the research environment.

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