

detectors

MSQ™ Plus Mass Spectrometric Detector



The MSQ Plus is the smallest and most sensitive single quadrupole MS detector on the market for both LC and IC. It features a newly designed self-cleaning triple orthogonal Atmospheric Pressure Ionization (API) source for outstanding sensitivity and noise reduction. The MSQ Plus is compatible with existing LC and IC methods, especially those including salts, ion-pairing agents, and dirty matrices. It is extremely robust and productive, allowing routine operation over extended periods, even in unattended mode.

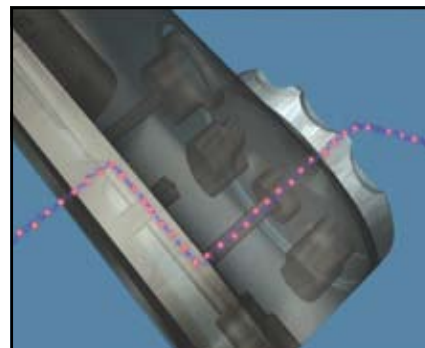
The complete system is very easy to use, achieving optimum sensitivity with very little set-up or tuning. With built-in fast calibration and infusion, the MSQ Plus is a truly automated mass spectrometric detection system. It's more sensitive, more rugged, more powerful, easier to use, and smaller than any other instrument of its kind.

Compact Design

At only 12 inches wide, the MSQ Plus is the most compact mass spectrometer on the market today. Its integrated design has led to an approximate two-fold decrease in footprint area and system volume compared to previous MS systems, with no compromise in system performance. On the contrary, design innovations in the MSQ Plus provide significant increases in performance and functionality.

New 60° M-Path™ Triple Orthogonal Source

This new source technology virtually eliminates neutral noise and background, assuring extreme sensitivity from real samples. The patented Cone Wash™ feature permits routine operation over extended periods—even with methods containing non-volatile buffers.



The innovative M-Path design increases system sensitivity.

The MSQ Plus comes with both Electrospray Ionization (ESI) and Atmospheric Pressure Chemical Ionization (APCI) capabilities for maximum versatility.

- Fast, easy, tool-free source maintenance leaves more time for running samples
- New titanium entrance cone is more durable and chemically resistant
- Positive and negative ion capabilities allow for analyses of cations and anions—even in the same run
- The system can switch source polarity or change the cone voltage (for fragmentation) on sequential scans across a chromatographic peak, yielding more information with fewer injections
- Cone Wash™ has a self-contained solvent delivery line with simple swing-action positioning for continuous cleaning (with optional solvent pump)



FastLoc probes for simple and rapid mode changes.

- ESI handles HPLC flow rates from capillary LC to conventional analytical LC (flow rate range from 20 µL/min up to 2 mL/min) without flow splitting
- APCI handles conventional HPLC columns (flow rate range from 0.2 to 2 mL/min) without flow splitting

Data System Integration

All the features of the MSQ Plus are fully supported in the latest Dionex MS software.

- Full control of all Dionex IC and LC chromatography systems
- Integrated displays and reports, including information from additional detectors such as PDA, UV, and conductivity detectors in addition to MS data
- Real time display of all chromatograms and spectra
- Full data system security, including audit trails and electronic signatures

Scan Functions

- Full scan produces complete mass spectra (chemical fingerprints) for rapid screening of compounds and for analyte confirmation
- Selected Ion Monitoring (SIM) monitors selected ions for target compound analysis and optimized trace level quantitation
- Data acquisition in centroid, profile, and MCA (averaging) modes provides for data handling flexibility

- Methods can include mixed mode and overlapping events, providing simultaneous full scan and SIM from the same method. Multiple events per method can be programmed

Vacuum System

The MSQ Plus features a state-of-the-art vacuum system.

- Clean, differentially pumped automatic vacuum system
- Efficient and quiet vacuum pumping with next-generation dual ported turbomolecular pump
- Low system power consumption (60W) with ducted air cooling for increased reliability
- High-performance roughing pump (30 m³/h) designed for high water tolerance
- Turbo vacuum control and system vent/pump cycles are digitally monitored and controlled to provide software control and ensure fail-safe operation in the event of a power failure

Ion Focusing Region

- Improved RF-only square quadrupole lens and separate RF generator for extremely efficient ion transfer to high-vacuum region

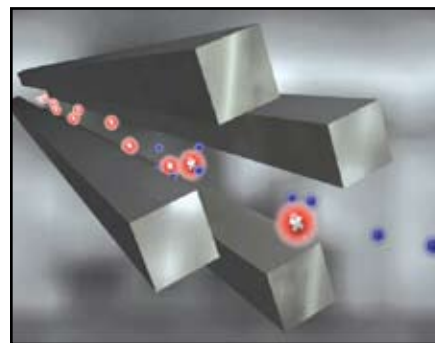


MSQ Plus source design features tool-free maintenance.

FastLoc™ Probes

The unique MSQ Plus API source uses a common heater for both ESI and APCI ionization modes. Changeover between modes is achieved by removal and replacement of single assembly, self-locking probe inserts.

- Automatic connection of pneumatic and electrical supply lines
- Total changeover time (beam to beam) of *less than one minute*

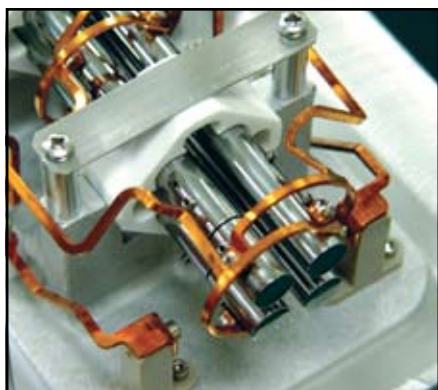


Ion focusing region with advanced high efficiency ion transmission.

- Increased low-mass transmission by up to 350 fold while maintaining high mass transmission efficiency
- Improved collisional cooling and beam confinement with reduced post-source adduct formation

Quadrupole Analyzer

- Precision engineered quadrupole analyzer has *in-situ* thermal compensation for rock-solid mass stability
- Quadrupole mass pre-filter maximizes resolution and eliminates main filter cleaning
- Main quadrupole filter gives unit mass resolution over entire mass range
- Solid-state RF generator provides high stability and minimal drift



Quadrupole analyzer with pre-filters for long term high performance.

Detector System

- High-energy conversion dynode for both positive and negative ion detection
- All new Ion Bright™ detector system is off-axis for the elimination of neutral noise and extended dynamic range
- The detector operates efficiently in both positive and negative ion modes and can switch rapidly between the two (sequential scans)

Reference Inlet System

The MSQ Plus features a self-contained reference inlet system for tuning and calibration.



Reference inlet system — calibrant bottles (lower left), flow switching valve (upper left), and source inlet (center).

System Autotune

The MSQ Plus comes with an advanced autotuning wizard that includes full system optimization and mass scale calibration.

At the click of a mouse, the full system autotune invokes algorithms for:

- Optimization of signal
- Resolution tuning
- Standard mass scale calibration from the reference inlet system
- Detector voltage setup for gain normalization

Electronics

- All new state-of-the-art DSP (Digital Signal Processing) for rapid data acquisition
- Delivers week-to-week and instrument-to-instrument reproducibility and stability
- New ultra-stable electronics with voltage and current regulated ESI and APCI for reproducibility between runs and for gradients
- Interscan pulsing of pre-filters and RF lens to enhance sensitivity

Data System

- Microsoft Windows XP operating environment
- Microsoft Office XP (Small Business Edition) software package
- High performance personal computer with Pentium microprocessor
- 17" flat panel color monitor

Environmental Requirements

- The maximum overall heat dissipation to the room is 3 kW. Operating environment must be stable between 40 and 80%, with no condensation.
- The minimum bench space required is 720 mm × 1310 mm (28" × 52") (for the MSQ Plus and PC). The instrument bench must be capable of supporting the weight of the MSQ Plus and PC plus allowances for any options.
- The rotary pump should be positioned within 1.5 m (59") of the rear of the instrument and be accessible for maintenance.
- The instrument must not be operated in areas with strong magnetic fields such as may emanate from NMR systems, magnetic sector mass spectrometers, power lines, transformers, etc.
- The system requires a vent for the source outlet and an additional vent for the mechanical pump exhaust. Please refer to the preinstallation manual (PN 031868) for information on laboratory requirements.

SPECIFICATIONS

Power Requirements:

230 VAC one switched power outlet (Rotary Pump and MSQ)

230 or 115 V ac (as required) for PC & monitor and additional hardware.

Gas Requirements:

MSQ Plus requires a supply of high purity (> 99%) nitrogen capable of supplying 12 L/min at 75 psi (5 bar)

Dimensions and Weight:

300 mm (12 in) W × 710 mm (28 in) D × 530 mm (21 in) H, 60 kg (132 lbs)

Ionization Modes (Supplied as Standard):

Electrospray (ESI)
Atmospheric Pressure Chemical Ionization (APCI)

Range:

17–2000 m/z with unit mass resolution

Sensitivity:

Sensitivity specifications are performed using loop injections at a flow of 1 mL/min in SIM mode. Noise is defined as RMS after appropriate smoothing.

Positive ion ESI—50 pg injection (10 µL × 5 pg/µL) of erythromycin: 1000:1 S/N

Negative ion ESI—20 pg injection (10 µL × 2 pg/µL) of *p*-nitrophenol: 500:1 S/N

Positive ion APCI—50 pg injection (10 µL × 5 pg/µL) of erythromycin: 200:1 S/N

Negative ion APCI—20 pg injection (10 µL × 2 pg/µL) of *p*-nitrophenol: 50:1 S/N

ORDERING INFORMATION

In the U.S., call 1-800-346-6390, or contact the Dionex Regional Office nearest you. Outside the U.S., order through your local Dionex office or distributor. Refer to the following part numbers:

Product Description	Part Number
MSQ Plus Mass Spectrometer with Data System.....	063116
Chromeleon® MS Support (MSQ MS control)	060726
Preventative/Annual Maintenance Kit	061494
Probe Maintenance Kit	061495
MSQ O-ring Kit.....	068236
AXP-MS Auxiliary Pump Kit.....	060684
MSQ18LA Nitrogen Generator (230 V ac).....	068126

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Passion. Power. Productivity.



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