

Thermo Scientific LCQ Fleet Ion Trap LC/MSⁿ

Exceptional Analytical Value

The LCQ Fleet ion trap mass spectrometer enables the confident analysis of complex samples in a rugged, reliable, and cost-effective platform.

- Fast Positive/Negative Polarity Switching for higher throughput
- Normalized Collision Energy eliminates the need for tuning
- Data-Dependent Acquisition enables automated analysis of unknowns
- Dynamic Exclusion allows the detection of low intensity ions

The LCQ Fleet™ ion trap mass spectrometer delivers high quality structural information for routine analysis of complex samples, on a high-throughput basis. It integrates seamlessly with fast HPLC systems under a convenient single point of control. Equipped with many advanced features, including MSⁿ, a powerful tool for confident structural characterization, the LCQ Fleet enables all users, from novice to expert, to easily analyze and interpret sample data.

Hardware Features

Ion Max-S API Source

- Enhanced sensitivity and ruggedness
- Sweep Gas reduces chemical noise
- 60° interchangeable ion probe orientation
- Removable metal ion capillary tube provides vent-free maintenance

Options

- HESI-II source compatible with liquid flow rates of < 1 $\mu\text{L}/\text{min}$ to 1 mL/min, without splitting
- HESI-II probe offers metal needle options for high- and low-flow analyses
- APCI/APPI source compatible with liquid flow rates of 50 $\mu\text{L}/\text{min}$ to 2 mL/min, without splitting
- Nanospray II source supports static, packed tip and dynamic nanospray experiments, compatible with liquid flow rates of 50 nL/min* to 5 $\mu\text{L}/\text{min}$ * Lower limit is dependent on gauge of needle used

Transfer Ion Optics

- Advanced multipole ion guides
- High stability and ion transmission efficiency

Vacuum System

- Differentially-pumped vacuum system to 10⁻⁵ Torr



- Split-flow turbomolecular pump controls vacuum in three regions
- High-vacuum machined aluminum analyzer chamber

Detection System

- Proprietary conversion dynode detector
- Off-axis continuous dynode electron multiplier with extended dynamic range
- Digital electronic noise discrimination
- High-efficiency axial ion ejection

Integrated Divert Valve

- Fully-automated data system control enables user to divert to waste the solvent front, gradient end point and any other portion of the HPLC run
- User-definable default state of the valve, either "to waste" or "to source"

Integrated Syringe Pump

- Syringe Pump allows automated infusion under data system control

Software Features

Data System

- Thermo Scientific Xcalibur processing and instrument control software
- Thermo Scientific LCQUAN quantification package
- Microsoft® Office software package
- Microsoft Windows® operating system
- High-performance PC with Intel® Pentium® microprocessor
- High-resolution LCD color monitor

Scan Functions

- Full-scan feature provides full-scan mass spectra for sensitive analyses and produces spectra for rapid screening of unknown compounds
- Selected Ion Monitoring (SIM) monitors selected ions for target compound analysis
- Full-scan MS/MS produces fast, full scan, information rich, product ion spectra
- Selected Reaction Monitoring (SRM) for a traditional LC/MS/MS quantitative analytical experiment
- MSⁿ for multi-stage MS experiments to probe the structure of ions
- ZoomScan a high-resolution, full-range scan to resolve isotopic envelopes which is often used for charge state determination of peptides and oxidation state determination of organometallics
- TurboScan an ultra-fast scan to improve signal-to-noise and sampling rate

Exclusive Technologies

- Unique, proprietary Automatic Gain Control (AGC) ensures that the ion trap is always filled with the optimum number of ions for any scan type
- Dynamic Exclusion allows acquisition of MS/MS and MSⁿ spectra from lower intensity ion species
- WideBand Activation generates more structurally informative spectra
- Normalized Collision Energy compensates for the mass-dependent energy deposition characteristics, providing reproducible data from instrument to instrument
- Pulsed-Q Dissociation (PQD) – enables trapping of low mass fragment ions

Optional Thermo Scientific Application-Specific Software

- Mass Frontier software – spectral interpretation and classification for the identification of unknowns
- MetWorks software – automated metabolite identification using spectral trees
- E-Quan kit – solution for online SPE and preconcentration of environmental samples
- LCQUAN software – acquisition and analysis package for quantitation data

System Specifications

MS/MS Sensitivity

Electrospray Ionization (ESI) –

A loop injection of 2 µL of a 1 pg/µL solution of reserpine (2 picograms, 3.28 picomoles total sample) at a flow of 400 µL/min of 50% isopropyl alcohol/50% water will produce a minimum signal-to-noise ratio of 100:1, for the transition of the isolated protonated molecular ion at *m/z* 609 to the largest two product ions, 397 and 448, when the mass spectrometer is operated at unit resolution in the full-scan MS/MS mode, scanning the product ion spectrum from *m/z* 165 – 615.

Atmospheric Pressure Chemical Ionization (APCI) –

A loop injection of 2 µL of a 1 pg/µL solution of reserpine (2 picograms, 3.28 picomoles total sample) at a flow of 400 µL/min of 50% isopropyl alcohol/50% water will produce a minimum signal-to-noise ratio of 100:1, for the transition of the isolated protonated molecular ion at *m/z* 609 to the largest two product ions, 397 and 448, when the mass spectrometer is operated at unit resolution in the full-scan MS/MS mode, scanning the product ion spectrum from *m/z* 165 – 615.

Installation Requirements

Power

- One 230 Vac ±10.0%, 15 Amps, 50/60 Hz, single phase, with earth ground dedicated to the instrument
- 120 or 230 Vac single phase, with earth ground for the data system

Gas

- One high-purity (99% pure, flow rate 15 L/min) nitrogen gas supply for the API source
- One ultra high-purity helium gas supply (99.998% pure) with less than 1 ppm each of water, oxygen, and total hydrocarbons for the mass analyzer

Environment

- System averages 2300 W (8000 Btu/h) output when considering air conditioning needs
- Operating environment must be 15-27 °C (59-80 °F) and relative humidity must be 40-80% with no condensation
- Optimum operating temperature is 18-21 °C (65-70 °F)

Dimensions /Weight

- MS: 56 cm x 79 cm x 59 cm (h x w x d)
- MS: ~120 kg
- Roughing pumps: 38.6 kg

Performance Specifications

Mass Range

- *m/z* 15 – 200
- *m/z* 50 – 2000
- *m/z* 100 – 4000

Resolution

- Down to 0.3 FWHM (full width half maximum) with Zoom Scan

Polarity Switching

- <100 msec between positive and negative MS Scan Power

Scan Power

- MSⁿ, for n = 1 through 10
- Contact Closure
- Start In/Out
- Start Out is programmable

Analog Inputs

- One (1) analog Input (0-1 V)
- One (1) analog Input (0-10 V)

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Africa-Other +27 11 570 1840
Australia +61 3 9757 4300
Austria +43 1 333 50 34 0
Belgium +32 53 73 42 41
Canada +1 800 530 8447
China +86 10 8419 3588
Denmark +45 70 23 62 60

Europe-Other +43 1 333 50 34 0
Finland/Norway/Sweden +46 8 556 468 00
France +33 1 60 92 48 00
Germany +49 6103 408 1014
India +91 22 6742 9434
Italy +39 02 950 591

Japan +81 45 453 9100
Latin America +1 561 688 8700
Middle East +43 1 333 50 34 0
Netherlands +31 76 579 55 55
New Zealand +64 9 980 6700
Russia/CIS +43 1 333 50 34 0
South Africa +27 11 570 1840

Spain +34 914 845 965
Switzerland +41 61 716 77 00
UK +44 1442 233555
USA +1 800 532 4752



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