

The LTQ XL linear ion trap mass spectrometer delivers confident structural information in routine applications

Thermo Scientific LTQ XL Ion Trap LC/MS

Exceptional Sensitivity and Flexibility for proteomics and metabolism applications

- Multiple dissociation techniques including CID, PQD and optional Electron Transfer Dissociation (ETD)
- Fast Positive/Negative Polarity Switching for higher throughput
- Intelligent Data Dependent acquisition for analysis of unknowns
- Upgrade path to hybrid, ultra-high resolution, accurate mass technology

The Thermo Scientific LTQ XL delivers MSⁿ performance to generate extensive structural information for routine proteomics and metabolism applications. The unmatched high quality spectra of the LTQ™ XL in combination with powerful software packages deliver complete solutions for your structural elucidation questions.

Hardware Features

2D Linear Quadrupole Ion Trap Mass Spectrometer

- High capacity linear ion trap with two detectors
- High-efficiency radial ion ejection
- Automatic system calibration
- Regulated helium flow for stable performance

Options

- Heated HESI-II probe standard, for better desolvation and compatible with liquid flow rates of <1 µL/min to >1 mL/min
- APCI/APPI source compatible with liquid flow rates of 50 µL/min to 2 mL/min, without splitting
- ETD enabled



- MALDI ion source combines speed with the selectivity of MSⁿ
- Nanospray source supports static packed tip and dynamic nanospray (liquid flow rates of 50 nL/min* - 2 µL/min)

**Lower limit is dependent on gauge of needle used*

Transfer Ion Optics

- High stability and ion transmission efficiency

Ion Max API Source

- Sweep Gas reduces chemical noise
- 60° interchangeable ion probe orientation

Vacuum System

- Differentially-pumped vacuum system to 10⁻⁵ Torr
- Split-flow turbomolecular pump controlling vacuum in three regions
- Dual rotary vacuum pump configuration

Detection System

- Patented dual conversion dynode detector

- Two off-axis continuous dynode electron multipliers with extended dynamic range
- Digital electronic noise discrimination

Integrated Divert Valve

- Fully-automated data system control enables user to divert the solvent front, gradient end point and any other portion of the HPLC run to waste

Integrated Syringe Pump

- Automated infusion under data system control

Software Features

Data System

- Thermo Scientific Xcalibur processing and instrument control software
- Thermo Scientific LCQUAN 2.6 quantification package
- Microsoft® Office software package
- Microsoft Windows® operating system
- High-performance PC with Intel® Pentium® microprocessor

Scan Functions

- Full-scan MS and product ion spectra for sensitive analyses
- 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 used for charge state determination of peptides
- Ultra ZoomScan for ultimate resolution
- TurboScan an ultra-fast scan to improve signal-to-noise and sampling rate

Exclusive Technologies

- Optional ETD capability - peptide sequence information not otherwise available
- Pulsed Q Collision Induced Dissociation (PQD) enables trapping of low mass fragment ions
- High Resolution Isolation (HRI) allows for the separation of an isobaric interfering species down to 0.3 Da or for isolation of thermally labile compounds
- Unique, Thermo Scientific Automatic Gain Control (AGC) ensures that the ion trap is always filled with the optimum number of ions
- 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 of ion trap mass spectrometers in MS/MS experiments, for reproducible data from instrument to instrument
- Multistage Activation generates combination MS/MS spectra and MS³ spectra based on user-defined neutral loss

Advanced Data Dependent Experiments

- Data Dependent features trigger acquisition of MSⁿ spectra only when a compound of interest is detected
- Triple Play determines the charge state and MS/MS scan range of a multiply charged ion

- Data Dependent Neutral Loss (NL) MS³ triggers MS³ scan only on the MS/MS product ions with the pre-defined neutral loss to identify and characterize metabolites and post-translational modifications
- Data Dependent Ion Tree performs MSⁿ experiments on up to 25 species

System Specifications

MS/MS Sensitivity

Electrospray Ionization (ESI) –

A loop injection of 2 µL of a 125 fg/µL solution of reserpine (250 femtograms 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.

MSⁿ Sensitivity

Electrospray Ionization (ESI) –

Sample introduction, LC conditions as above will produce a minimum signal-to-noise ratio of 25:1, for the transition of the unit isolated protonated molecular ion at *m/z* 609 to the product ion at *m/z* 397 which is further fragmented to the product ion at *m/z* 365, 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) –

Sample introduction, LC conditions as above 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 × 79 × 59 cm (h × w × d)
- MS: ~120 kg
- Two roughing pumps: 38.6 kg each

Performance Specifications

Mass Range

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

Resolution

- Down to 0.05 FWHM (full width half maximum) with Ultra ZoomScan

Polarity Switching

- 100 msec between positive and negative MS Scan Power
- MSⁿ for n = 1 through 15

Contact Closure

- Start In/Out
- Start Out is programmable

Analog Inputs

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

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