

Thermo Scientific Exactive Plus

Benchtop Full-Scan Orbitrap™
Mass Spectrometer

- Routine FT mass accuracy
- Resolving power of up to 140,000 (FWHM) at m/z 200
- Maximum scan speed of 12 Hz
- Intra-scan dynamic range of > 5,000:1
- Mass range of 50 to 6,000 m/z
- S-lens ion source for increased sensitivity
- Full-scan MS analysis
- 'All Ion Fragmentation' with multiple dissociation techniques:
 - In Source CID (Collision-Induced Dissociation)
 - HCD (Higher-Energy Collisional Induced Dissociation) (optional)
- Onsite upgradable to Q Exactive mass spectrometer



The Thermo Scientific Exactive Plus benchtop LC-MS provides high-resolution, accurate-mass (HR/AM) full-scan mass spectra using proven Thermo Scientific Orbitrap technology. Advanced signal processing allows for a rapid scan speed of up to 12 Hz for demanding samples in complex matrices. Data can be acquired at a mass resolution of at least 140,000 (FWHM) at m/z 200 for screening and quantitative analysis with fast U-HPLC chromatography techniques.

The Exactive™ Plus mass spectrometer is the ultimate machine for screening applications, from routine compound identification to the most challenging analysis of trace level compounds in complex mixtures. Fast polarity switching between positive and negative scan modes saves time by allowing complete screening analyses to be completed in a single run. True high mass resolution data avoids false positives and reduces the need to reanalyze samples.

The optional HCD collision cell adds additional functionality to the benchtop system by providing 'All Ion Fragmentation (AIF)' for compound confirmation, while maintaining high resolution, accurate mass performance at high sensitivity.

The Exactive Plus benchtop system with full-scan and AIF modes is ideally suited for food safety and environmental analysis, forensic toxicology and clinical research, as well as drug metabolism studies.

Together with extended mass range of up to m/z 6000 and advanced signal processing which enables the Orbitrap mass analyzer to be more responsive in ion detection the Exactive Plus is an ideal mass spectrometer for the biopharmaceutical market.



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Hardware Specification

Thermo Scientific Ion Max API Source

- Enhanced sensitivity and ruggedness
- Reduced chemical noise upon sweep gas application
- 60° interchangeable ion probe orientation
- Removable metal ion transfer capillary provides vent-free maintenance

Ion Source

- H-ESI II probe with Dual Desolvation Zone technology
- A progressively spaced stacked ring ion guide (S-lens)
- The S-lens is a radio frequency (RF) device that captures and efficiently focuses the ions to a tight beam
- Large variable spacing between electrodes allows for better pumping efficiency and improved ruggedness

Transfer Ion Optics

- Advanced ion guides for high sensitivity and ruggedness
- High stability and ion transmission efficiency

Vacuum System

- Differentially pumped vacuum system with final vacuum $< 1 \times 10^{-9}$ mbar
- Two split-flow turbomolecular pumps and one rotary vane pump
- Seven vacuum regions

Orbitrap Mass Analyzer

- Gas (nitrogen) filled Curved Linear Trap (C-Trap)
- Highly efficient ion transfer to Orbitrap analyzer
- Orbitrap analyzer with 5 kV central electrode voltage
- Low-noise image current pre-amplifier
- 16-bit signal digitalization

Data Acquisition

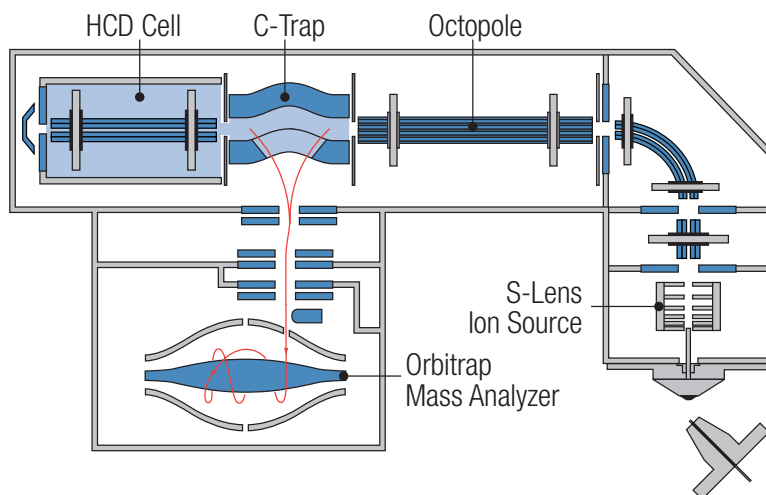
- Ultra fast real-time data acquisition and instrument control system
- Fully automated calibration via instrument control software
- Automated gain control

Performance Characteristics

Mass range	m/z 50-6,000
Resolving Power	up to 140,00 (FWHM) @ m/z 200
Max scan rate	Up to 12 Hz at mass resolution setting of 17,500 @ m/z 200
Mass accuracy	Internal: < 1 ppm RMS External: < 3 ppm RMS under defined conditions
Sensitivity	In Full MS mode: 500 fg Buspirone on column S/N 100:1 acquired with H-ESI II probe
Dynamic range	$> 5000:1$ in single scan, intra-scan dynamic range
Polarity switching	One full cycle in < 1 sec (one full-scan positive ion mode and negative ion mode each at mass resolution setting of 35,000 @ m/z 200)
Analog inputs	One analog input (0 - 1 V) One analog input (0 - 10 V)

Options

- Axial Higher energy Collision-induced Dissociation (HCD) cell
- NanoSpray Flex Ion source – single set-up for all online nanoflow applications
- ESI probe compatible with liquid flow rates of < 1 $\mu\text{L}/\text{min}$ to 1 mL/min without splitting
- APCI source compatible with liquid flow rates of 50 $\mu\text{L}/\text{min}$ to 2 mL/min without splitting
- APCI/APPI source compatible with liquid flow rates of 50 $\mu\text{L}/\text{min}$ to 2 mL/min without splitting
- Metal needle kits for high and low flow analyses
- The Exactive Plus MS is upgradable to Q Exactive MS onsite



Schematic of the Thermo Scientific Exactive Plus Benchtop LC-MS

Data System

- High performance PC with Intel® processor
- High resolution LCD color monitor
- Microsoft Windows® 7 operating system
- Microsoft Office software package
- Thermo Scientific Xcalibur processing and instrument control software
- New workflow based method editor

Data Processing Software

- Thermo Scientific ExactFinder processing software for routine targeted and general unknown compound screening, quantitation and identification, with compound database and spectra library
- Thermo Scientific TraceFinder processing software for routine quantitation
- Thermo Scientific MetQuest software, automated processing software for Quant/Qual drug metabolic screening and pharmacokinetic analyses
- Thermo Scientific MetWorks software, metabolite identification processing software for the study of biotransformation
- Thermo Scientific SIEVE software, differential analysis software for the study of metabolomics
- Thermo Scientific LCQuan processing software for quantitative analysis of compounds supporting LC/MS data management activities within a 21 CFR Part 11 compliant environment
- Mass Frontier software, chemically intelligent mass spectral interpretation software for metabolite identification and structural elucidation

Operation Modes

- Full-Scan MS with high resolution accurate mass detection
- All Ion Fragmentation (AIF) in the HCD collision cell with high resolution accurate mass detection (optional)
- Source fragmentation of all ions in the source region
- Positive/negative ion switching on chromatographic timescale
- Data Dependent AIF upon on-the-fly decision making

Exclusive Technologies

- Optimum number of ions for all scans
- New high performance HCD collision cell for highest performance AIF fragmentation (optional)
- Collision energy profiling using different collision energies for HCD fragmentation
- Advanced signal processing
- Interleaved operation



Thermo Scientific Exactive Plus with Ultimate 3000 Rapid Separation LC system

Installation Requirement

Power

- 2 x 230 V_{ac} ± 10% single phase, 15 Ampere, 50/60 Hz, with earth ground for the instrument
- 120 or 230 V_{ac} single phase with earth ground for the data system

Gas

Nitrogen

High purity nitrogen gas supply (99% pure at 800 ± 30 kPa (8.0 ± 0.3 bar, 116 ± 4 psi))

Environment

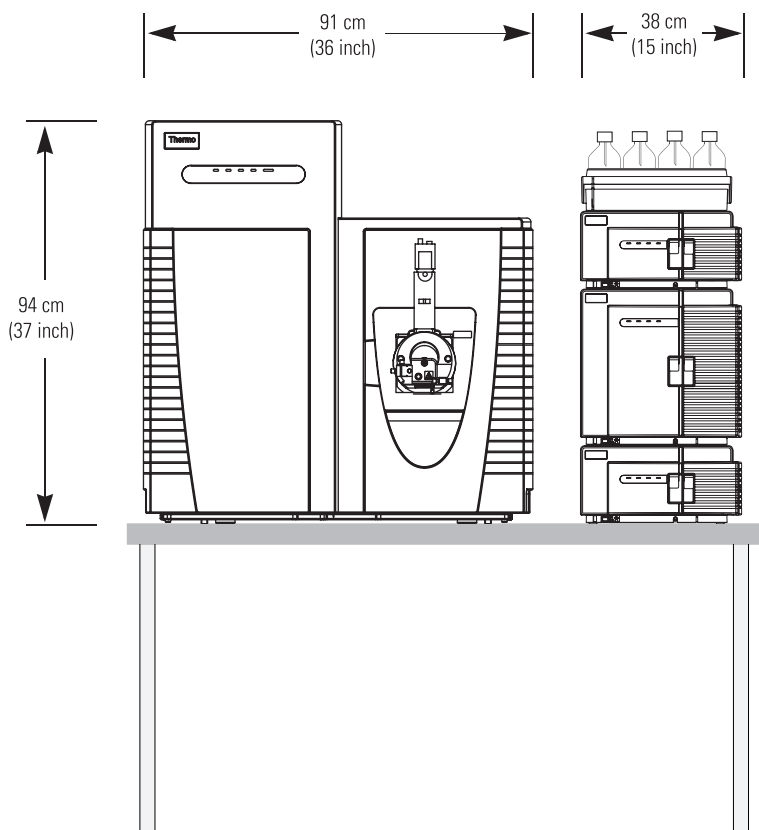
- System averages 2,500 W (~9,000 Btu/h) output when considering air conditioning needs
- Operating environment must be 15 - 26 °C (59 - 78 °F) and relative humidity must be 40 - 70% with no condensation

Weight

- Exactive Plus mass spectrometer without rotary vane pump: 175 kg (386 pounds)
- Forepump: 62 kg (137 pounds)

Dimensions

- Exactive Plus mass spectrometer:
(h x d x w) 94 x 83 x 91 cm
(37 x 33 x 36 inches)



For Research Use Only.

Not for use in diagnostic procedures.



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www.thermoscientific.com/ExactivePlus

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Africa-Other +27 11 570 1840
Australia +61 2 8844 9500
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 +1 608 276 5659

Middle East +43 1 333 50 34 0
Netherlands +31 76 579 55 55
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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