

Varian 500-MS LC Ion Trap Mass Spectrometer

Specifications

The Varian 500-MS LC ion trap is an ion trap based LC/MS system. The 500-MS exceptional sensitivity, mass stability, resolution and enhanced charge capacity (ECC™) makes the 500-MS LC ion trap the system of choice for pharmaceutical, clinical toxicological, environmental, and other applications.

Analyzer

- Mass range: 50 to 2000u
- Resolution: <0.5u FWHM over the entire range
- Mass axis stability: $\pm 0.1u$ over 24 hours at constant (+/-3°C or +/-6°F) temperature
- Scan rates: 5000 and 15000 Da/sec
- Max ion time 500,000 μ sec
- Triple resonant scanning
- Unidirectional mass ejection
- Enhanced Charge Capacity (ECC™)
- He damping gas : 0.1 mL/min to 7.0 mL/min, typical 0.8 mL/min
- Linear dynamic range: up to 10^5 , compound-dependent based upon analytical methods
- Full scan and MS^n ($n=10$) scanning using non-resonant or frequency modulated resonant CID, Time programmable: in all modes during the analytical run

Atmospheric Pressure Ionization (API) Interface

- SelecTemp™ allows temperature programming of the drying gas throughout the analysis
- Drying gas temperature: 400°C max, time programmable
- Drying gas flow rate: 4.5 L/min typical
- Spray chamber temperature: 65°C max
- Spray needle: off-axis from the capillary axis
- Spray needle: wide range of adjustments for x-y positioning; independent adjustment of the inner liquid capillary needle to the outlet of the nebulizing gas
- Hexapole ion guide: 6° off-axis from the capillary axis
- Deflector gating optics

Electrospray Ionization Source (ESI)

- LC flow range: 1 to 1000 μ L/min
- Needle voltage: 6 kV max
- Nebulizing gas: 1.5 L/min typical

Built in Syringe Pump and diverter valve

- Accommodates syringe volumes from 100 μ L to 10 mL
- Flow range: 0.05 mL/min to 1 mL/min (Depending on syringe size)

Performance Specifications

- +ESI MS/MS (full scan): 250fg reserpine S/N 100:1, based on RMS noise

NOTICE: This document contains references to Varian. Please note that Varian, Inc. is now part of Agilent Technologies. For more information, go to www.agilent.com/chem.

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Detection System

- Detector: off-axis design, ± 15 kV HED and electron multiplier

Vacuum system

- Dual turbo molecular pumps, 280 L/sec each
- Ion gauge, manifold: Bayard-Alpert gauge tube with burn-out resistant, thoria-coated iridium (ThO-Ir) filaments
- Thermal vacuum gauge, foreline
- Dual HS652 Foreline Pumps
 - Dual stage, rotary vane
 - Voltage: 100/120/230 V (universal voltage)
 - Pumping speed greater than 340 L/min (20 m³/hr)

Options:

Atmospheric Pressure Chemical Ionization (APCI) Source

Easy Switching

The APCI option is a separate needle/chamber assembly that uses the same hinge/clip mounting system as the ESI chamber. A switch from ESI to APCI takes a few minutes to disconnect and connect the appropriate electrical, gas and LC lines. Switching back to ESI is just as fast. The use of separate chambers guarantees that the optimized position for each needle assembly is maintained during the changeover.

APCI Specifications

- LC flow range: 100 μ L/min to 2 mL/min
- Nebulizing gas: 1.5 L/min typical
- Auxiliary gas flow rate: 4 L/min typical
- Auxiliary gas temperature: 550°C max; optimum is compound, mobile phase and flow dependent
- Drying gas flow rate: 2 L/min typical
- SelecTemp™ allows temperature programming of the drying gas throughout the analysis
- Corona current: -50 to +20 μ A
- Spray chamber temperature: 65°C max
- Spray needle: off-axis from the capillary axis; adjustable distance from spray plate

Utilities and environment

- Power requirements for the MS and mechanical pumps: 100-120, 200-240 Vac, ± 10 %, 50/60 Hz, 3200 VA (steady state)
- Venting for the API spray chamber: up to 20 L/min
- Venting for the foreline pumps: up to 2 L/min
- He damping gas: up to 7 mL/min
- Nitrogen (+ESI) nebulizing and drying gas: up to 5 L/min, regulated at 80 psi
- Air (-ESI) nebulizing gas: up to 5 L/min, regulated at 80 psi
- Humidity: 20% to 80% relative humidity (without condensation)
- Temperature: 16°C to 30°C, it is recommended to maintain the operating environment within $\pm 3^\circ\text{C}$ ($\pm 6^\circ\text{F}$).

Chromatography Options

The 500-MS workstation fully controls a wide range of chromatography products to include:

- AutoSamplers: ProStar™ 400, 410, 420, 430, and HTS PAL
- Solvent Delivery Modules: ProStar 210, 220, 230, and 240; PrepStar™ 218, SD-1, and SD-2
- Column Valve Module: ProStar 500
- Detectors: ProStar 325, 340 UV-Visible Absorbance, 335 Photodiode Array, and 363 Fluorescence
- Fraction Collectors: ProStar 701 and 704

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Dimensions*:

- Height: 18 in/ 46 cm (19 in / 49 cm with needle)
- Width: 20 in/ 49 cm (21 in/ 54 cm with vacuum ports)
- Depth: 32 in/ 82 cm (33 in/ 84 cm with gas connectors)

* First number is basic footprint size, second number is maximum hardware dimension. Additional space is required for hoses and cables. See pre-installation manual for detailed space requirements

Weight :

- MS - 135 lb/ 62 kg
- Foreline Pump: 73 lb/ 33 kg (x 2)

