

HITACHI LACHROM ELITE HPLC SYSTEM



It's Tough to Keep a Secret.



Are You in the Loop?

The LaChrom *Elite* System provides precision, flexibility and reliability for the most demanding HPLC applications.

Inside the new LaChrom *Elite* HPLC are hardware and software innovations that set new performance standards for HPLC. Designed to meet the challenges of today's laboratory environment, fast results and demanding workload, LaChrom *Elite* couples automated tasks with innovative design. Virtual assistants for method development and system validation take the confusion out of separating complex, unknown compounds and take the chore out of validating your HPLC system. Control by the EZChrom *Elite*TM chromatography data system facilitates FDA 21 CFR 11 compliance with networking capabilities. New design and stringent specifications for each module set new standards in HPLC. In addition, synchronization of each module results in a powerful HPLC system that performs the most demanding applications.

Optimization based on Flow Rate Range

To meet various needs for your applications, Hitachi has developed two different pumps to maximize performance where you need it. The L-2100 SMASH (Semi-Micro Applicable Standard HPLC) and the L-2130 HTA (High Throughput Analyzer) pumps can be configured for optimization based on flow rate range. The SMASH system is applicable to high-sensitivity analysis using a small quantity of sample at semi-micro flow rates. The HTA system is suitable for fast analysis at conventional to semi-prep flow rates.

FEATURES:

Innovation

- **System synchronization.** A unique feature, Pump-Autosampler Synchronization (PASS), means that each injection occurs at exactly the same point in every pump cycle ensuring the best in retention time reproducibility.
- **Electronic Pulse Isolation and Compensation (EPIC).** Using two pressure sensors and closed-loop feedback between pumps provides the ultimate in precise solvent flow.
- **Interchangeable pump heads.** Depending on your application you can switch pump heads for optimal performance for flow rates from 0.001 to 9.999 mL/min.
- **Built-in degasser.** A built-in degasser saves bench space and assures trouble free operation and precise solvent flow.
- **Large sample capacity.** 200 standard vials or 3 microtitre plates come standard. Optional Peltier cooling is also available.
- **Programmable wavelength switching.** Optimize peak detection by changing detection parameters during a run for a particular compound of interest.
- **Solvent pre-heating and cooling.** A solvent pre-heating module is employed to minimize temperature gradients inside the HPLC column.

Performance

- Excellent signal to noise for low detection limits and better quantitative reproducibility.
- Fast detection response with low noise for high-speed chromatography such as with Chromolith columns.
- Sample-needle-in-the-flow-path design ensures the ultra-low carryover and best injection profile.

GLP

- Electronic maintenance logbook for each module automatically records valve usage, seal replacement date, total solvent flow between seals, lamp usage, etc.
- Built-in leak sensor in each module ensures system safety.
- Built-in Hg lamp for automatic calibration and validation.
- Lamp energy check with complete documentation through software control.

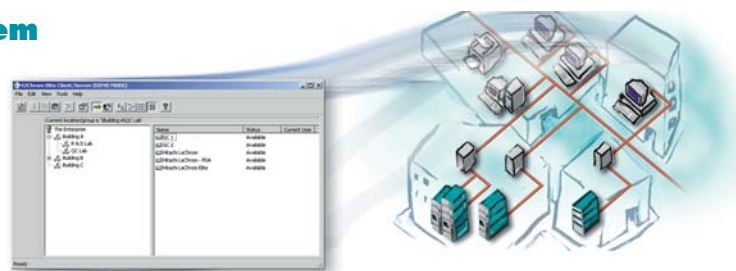
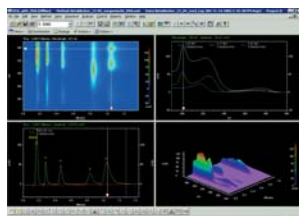
*EZChrom *Elite*TM is a trademark of Scientific Software, Inc.

EZChrom Elite™ Chromatography Data System

EZChrom Elite™, an advanced chromatography data station with extraordinary power, is the premier “virtual assistant” in the LaChrom Elite HPLC system. The data management resources and instrument control provided by EZChrom Elite™, combined with the unparalleled performance of the Hitachi LaChrom Elite HPLC system, offer the necessary tools to meet today’s challenging laboratory requirements.

EZChrom Elite™ is an intuitive and user-friendly software system providing one solution for controlling and managing data from a wide range of instruments.

Multiple views in one screen:
A 3D contour, a spectrum, and a chromatogram all combined in one window.



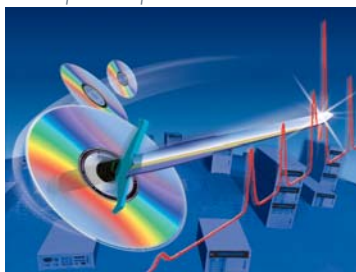
The data system is expandable from a single workstation into a full-featured client/server system for company-wide enterprise solutions.

- **Instrument Control and Connectivity** - Seamless integration and digital control of the Hitachi LaChrom Elite HPLC system.
- **Regulatory Compliance** - Facilitates compliance with 21 CFR Part 11 and GLP/GMP measures.
- **Network Scalability** - Stand-alone and client server architecture.

**EZChrom Elite™ is a trademark of Scientific Software, Inc.*

ChromSword® Auto Method Development Software

ChromSword® Auto automatically develops and optimizes methods.



Transfers retention data, peak area, and peak width

Stores data, refines the models, then predicts new conditions for the next run



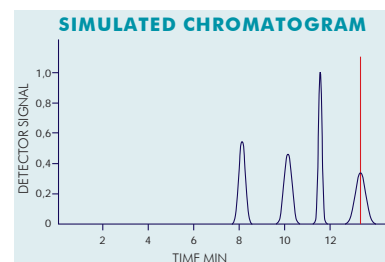
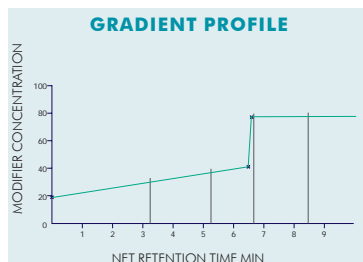
HPLC method development is a time-consuming process that requires extensive application and chromatography knowledge. **ChromSword® Auto is here to help!**

The first truly automated HPLC method development software, ChromSword® Auto, substantially reduces the cost of method development. Unattended (overnight) experiments produce optimal separations at minimum run times. Useful to both beginners and experienced chromatographers, ChromSword® Auto is a valuable tool for any HPLC laboratory.

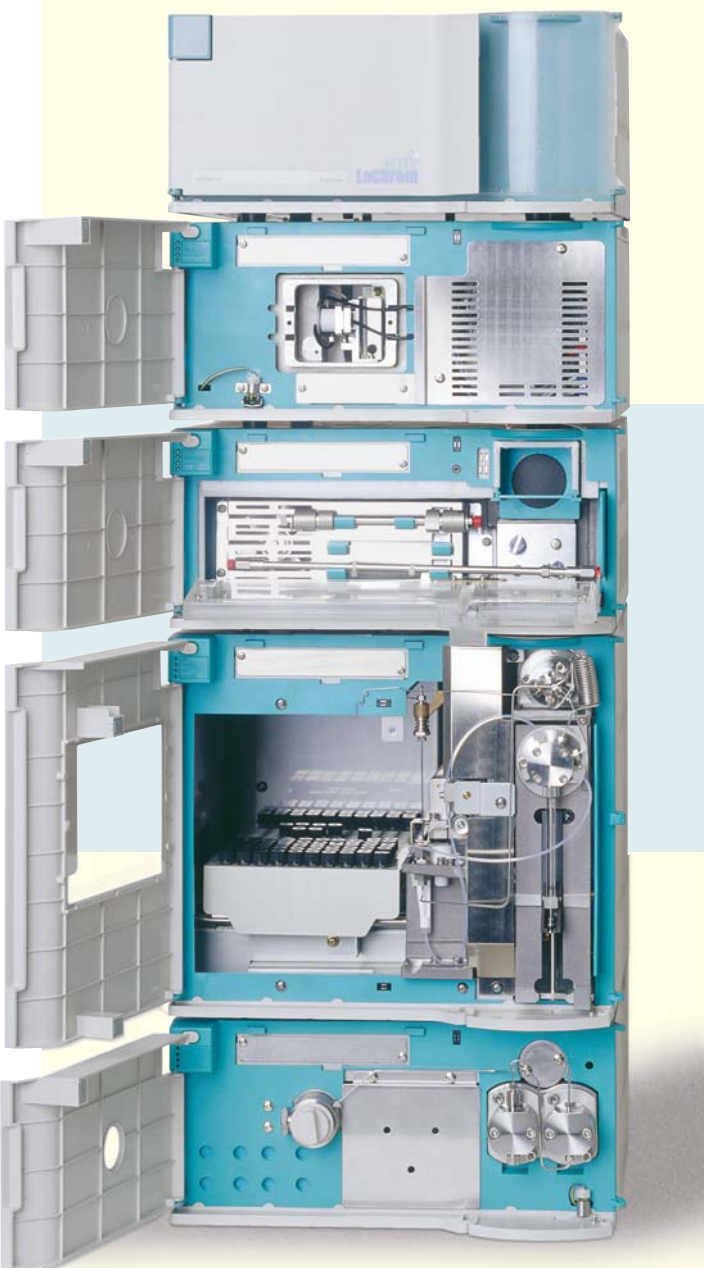
Gradient Optimization by Virtual Chromatography:

After the retention models have been established, no further experiments are necessary! ChromSword Auto optimizes linear and multi-step gradient methods on the PC, using the super-fast Monte-Carlo method.

- **Revolutionary** - Intelligent peak tracking and separation optimization without the use of pure standards.
- **Dynamic** - Incorporates structural information, column type, and solvent system to predict optimal starting conditions.
- **Virtual Chromatography** - Computer-controlled and automated method development using theoretical and/or real-time empirical data.



**ChromSword Auto is a trademark of IRIS Technologies, L.L.C.*



System synchronization between modules sets a new standard for overall HPLC system performance.

L-2400 UV/L-2420 UV-VIS/L-2455 DIODE ARRAY

The LaChrom *Elite* detectors utilize advanced optics and innovative electronics to produce superior sensitivity performance at fast response times over a broad dynamic range. Active noise filters combined with a wide range of response times enable optimized data acquisition in high-speed chromatography; the LaChrom *Elite* detectors can rapidly record eluting peaks at the highest signal-to-noise without compromising peak shape.

Automatic wavelength calibration and documentation within EZChrom *Elite*[™] facilitate regulatory compliance

L-2300/L-2350 COLUMN OVENS

The LaChrom *Elite* Column Ovens incorporate new technology affording unparalleled performance in temperature control and stability. The solvent is pre-heated prior to entering the column, which minimizes thermal gradients and produces a constant temperature environment throughout the column. Peltier heating and cooling offer short equilibration times, and system connectivity ensures that sample injections are made only when the desired temperature has been achieved.

L-2200 AUTOSAMPLER

Experience optimum sample management with the high-performance LaChrom *Elite* L-2200 Autosampler. The LaChrom *Elite* Autosampler represents a new standard of performance in HPLC. Whether you need high sample capacity, extreme precision, ultra-low carry over, or rapid cycle times between injections, the LaChrom *Elite* Model L-2200 excels. With the flexibility to use standard vials or microtiter plates and the ability to reproducibly inject as little as 0.5 μ L, it is the perfect sample management plat-

L-2100 AND L-2130 PUMPS

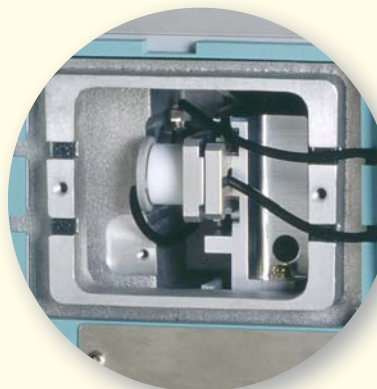
The LaChrom *Elite* Solvent Delivery Modules provide precision, flexibility, and reliability for the most demanding HPLC applications. Compatible with micro-bore, conventional, and high-throughput applications, the LaChrom *Elite* pumps deliver highly reproducible results over a wide range of flow rates in both isocratic and gradient modes of operation. As part of the LaChrom *Elite* HPLC system, the L-2100 and L-2130 pumps are designed to meet your most stringent requirements, including regulatory requirements for documentation and

ARRAY DETECTORS

for system suitability, and a variety of optional flow cells, pre-aligned and easy-to-install, are available for applications from micro to semi-preparative chromatography, making the LaChrom *Elite* detectors the right choice for any HPLC laboratory.

- Spectrum recording with baseline subtraction
- Variable signal output for optimum peak presentation
- External inputs for lamp-off switching and auto zero
- Available with a wide range of flow cells

* Fluorescence (L-2485) and Refractive Index (L-2490) detectors also available.



Easy access to the flow cell makes maintenance and service a breeze.

Front-panel access makes installing columns a breeze. For added convenience, an optional column-switching valve can be installed inside the column oven.

- Optimized pre-heating for enhanced reproducibility (retention times).
- Optional valve systems to accommodate a variety of applications (multi-dimensional chromatography).
- Temperature values recorded throughout the analysis



form for the LaChrom *Elite* HPLC System.

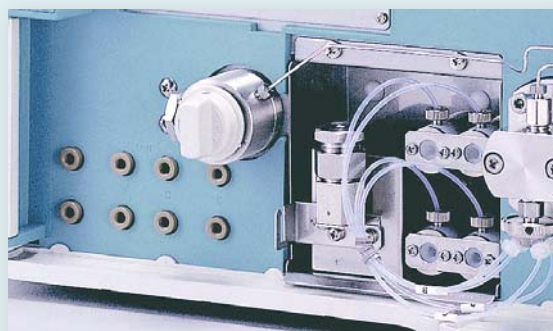
- A wide range of injection volumes from 0.1 μL to 4.5 mL
- Dual valve design for reduced cycle time
- Thermo-electric cooling option to prevent degradation of sensitive samples
- Programmable developers' kit for performing procedures such as automatic sample dilution and derivatization



Sample needle in the flow path minimizes carry-over

system suitability, while providing constant performance at a low operation/ownership cost.

- Binary high-pressure mixing or quaternary low-pressure mixing modes of operation
- Built-in timed events allow contact closure of external devices such as column switching valves
- High-resolution stepping motors and piston diameters tuned for flow rate afford efficient mixing at low volumes in high-pressure mode



SPECIFICATIONS

L-2400 UV/L-2420 UV-VIS DETECTORS

Optics:	Double beam and ratio mode	Response:	0.05, 0.1, 0.5, 1, 2, 4, 8 s
Calibration:	Built-in Hg lamp	Programs:	9 programmable steps
Range:	L-2400: 190 to 600 nm; L-2420: 190 to 900 nm	Max. Time:	600 min
Light source:	L-2400: D ₂ lamp, L-2420: D ₂ and W lamps	Max. Steps:	100 (in 9 programs)
Accuracy:	± 1 nm	Available functions:	Wavelength, time, autozero, and hold
Bandwidth:	6 nm	GLP functions:	Auto-calibration using Hg lamp
Noise:	≤ 0.6 x 10 ⁻⁵ AU		Lamp energy check, usage/replacement log
Drift:	≤ 1.0 x 10 ⁻⁴ AU		Serial number registration in unit memory
AUFS range:	0.25, 0.5, 1, 2 AU	Dimensions:	340 mm (W) x 400 mm (D) x 150 mm (H)

L-2455 DIODE ARRAY DETECTOR

Optics:	Single beam with 1024-bit diode array	Noise:	≤ 0.5 x 10 ⁻⁵ AU
Calibration:	Built-in Hg lamp	Drift:	≤ 0.5 x 10 ⁻³ AU
Range:	190 to 900 nm	GLP functions:	Auto-calibration using Hg lamp
Light source:	D ₂ and W lamps		Lamp energy check, usage/replacement log
Accuracy:	± 1 nm		Serial number registration in unit memory
Bandwidth:	1 nm and 4 nm (switchable)	Dimensions:	340 mm (W) x 400 mm (D) x 150 mm (H)

L-2300/L-2350 COLUMN OVENS

Temp control range:	L-2300: [Room Temp - 15 °C] to 65 °C L-2350: [Room Temp - 15 °C] to [Room Temp + 65 °C]	Column capacity:	L-2300: Up to three 250 mm columns L-2350: Up to four 500 mm columns
Temp setting range:	L-2300: 1 to 65 °C (in 1 °C increments) L-2350: 1 to 85 °C (in 1 °C increments)	Options:	L-2300: 3-column selector valve, Manual Injector L-2350: 3-column selector valve, 6-way 2-position valve, 10-way 2-position valve, Manual Injector
Temp setting accuracy:	± 1 °C	Dimensions:	L-2300: 340 mm (W) x 400 mm (D) x 150 mm (H) L-2350: 210 mm (W) x 360 mm (D) x 615 mm (H)
Stability:	± 0.1 °C		
Safety:	Built-in leak/vapor sensor		

L-2200 AUTOSAMPLER

Carry Over:	< 0.01% (< 0.003% with typical results)	% RSD of slopes:	Correlation coefficient > 0.999
Injection Method:	Direct all injection	Response factor:	< 5% RSD
Capacity:	200 vials (1.5 mL) or 3 microtiter plates	Repeatability:	0.3% RSD (at 10 µL injection)
Rack options:	128 vials (4mL), 336 vials (1mL) Microtiter rack (3 plates)	Cooling option:	4 to 20 °C (at ambient)
Injection volumes:	0.1 to 50 µL standard, 50 µL to 4.5 mL optional	Syringe volumes:	0.100 mL standard
Max. # inj./vial:	99		0.5, 1, 2.5 and 5 mL optional
Maximum cycle time:	999.99	Dimensions:	340 mm (W) x 400 mm (D) x 300 mm (H)

L-2100 SMASH PUMP

Accuracy:	± 2 µl (0.005 to 0.050 mL/min) ± 2% (0.051 to 2.000 mL/min) ± 4% (2.001 to 2.499 mL/min)
Precision:	± 0.075% RSD or 0.02 min SD at 0.2 mL/min
Constant Pressure:	290 to 5600 psi at 0 to 1.25 mL/min
Solvent Delivery:	25 µL/stroke
Dimensions:	340 mm (W) x 400 mm (D) x 150 mm (H)

L-2130 HTA PUMP

Accuracy:	± 2 µl (0.01 to 0.1 mL/min) ± 2% (1.01 to 5.00 mL/min) ± 4% (8.001 to 9.99 mL/min)
Precision:	± 0.075% RSD or 0.02 min SD at 1.0 mL/min
Constant Pressure:	290 to 5600 psi at 0 to 5.0 mL/min
Solvent Delivery:	100 µL/stroke
Dimensions:	340 mm (W) x 400 mm (D) x 150 mm (H)

HIGH PRESSURE GRADIENT: HIGH PRESSURE GRADIENT:

Flow rate range:	0.05 to 2.0 mL/min recommended
Binary:	Up to 2 eluents
Composition Range:	1 to 100% (0.1% increments)
Accuracy:	± 1% (0.2 mL/min)
Precision:	0.1% RSD or 0.02 min SD at 0.2 mL/min

Flow rate range:	0.2 to 5.0 mL/min recommended
Binary:	Up to 2 eluents
Composition Range:	1 to 100% (0.1% increments)
Accuracy:	± 1% (0.2 mL/min)
Precision:	0.1% RSD or 0.02 min SD at 1.0 mL/min

LOW PRESSURE GRADIENT: LOW PRESSURE GRADIENT:

Flow rate range:	0.05 to 1.8 mL/min recommended
Quaternary:	Up to 4 eluents
Composition Range:	0 to 100% (0.1% increments with CDS; 1% increments with front panel control)
Accuracy:	± 1% (0.2 mL/min)
Precision:	0.1% RSD or 0.02 min SD (0.2 mL/min)

Flow rate range:	0.4 to 5.0 mL/min recommended
Quaternary:	Up to 4 eluents
Composition Range:	0 to 100% (0.1% increments with CDS; 1% increments with front panel control)
Accuracy:	± 1% (0.2 mL/min)
Precision:	0.1% RSD or 0.02 min SD (1.0 mL/min)

HITACHI SERVICE AND SUPPORT

Hitachi High Technologies America has a nationwide service organization for installation, qualification, and technical support. Committed to customer satisfaction, full service contracts are available for each instrument sold. For further information, call customer service or visit our web site.

HITACHI
Inspire the Next

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