

**HITACHI**  
Inspire the Next

# Primaide

Hitachi High Performance Liquid Chromatograph



Science for  
a better tomorrow

# Affordable and robust HPLC systems with seamless integration and reliability

High Performance Liquid Chromatography (HPLC) is utilized in a diverse range of fields, including medicine, food production, chemistry, and environmental science, making HPLC systems increasingly in-demand among the various types of analytical equipment. The Hitachi HPLC Primaide is designed for long-term, stable operation, and features both high reliability and great durability. It offers tremendous capability for everyday analysis.

Based on over 50 years of experience in the development and production of HPLC systems, Hitachi proudly introduces the Primaide. Make the most of your analytical equipment with Hitachi as the "Prime Aide" in your lab!

1967



**Model 034-0004** was Hitachi's first liquid chromatograph.

1975



**Model 635** was Hitachi's first HPLC system.

1995



**Model L-7000** is a regulation-compliant, PC-controlled model.

The **Chromaster** features improved operability with a GUI, as well as higher functionality and performance.



2004



The **LaChrom Elite L-2000** features a front-access layout and enhanced basic performance.

2011



The simple design of the **Primaide** provides superior operability in routine analysis.

## History of Hitachi HPLC Systems

Hitachi has been involved in the development and production of HPLC systems for nearly half a century. To meet growing demands in an increasingly broad range of fields where HPLC is applied, we never cease improving our technologies to create cutting-edge HPLC equipment.

# System engineered for the analyses



## The best choice for personal use

Even in small to mid-scale facilities, individual operators see increasing opportunities to use multiple HPLC systems. Thanks to its simple design and front-access layout, maintenance of the Primaide is easy. Even a beginner at LC analysis can confidently operate the Primaide.



## Excellent basic performance

The demand for HPLC systems with higher precision, better reproducibility, and improved stability is increasing daily. The Primaide is built according to strict specifications to meet stringent requirements. In addition, labs can apply the Primaide to an even wider range of applications by employing optional units, such as a sophisticated DAD\* and an autosampler cooler.



## Reliable durability

Hitachi HPLC systems have earned a reputation as highly durable machines, and Primaide is no exception. Our strict production quality standards ensure both high performance and endurance. This standard extends to all equipment from systems to accessories.



\* DAD : Diode Array Detector

# Applications

HPLC supports analysts in various fields involved in the development of novel pharmaceutical compounds and new materials, food safety assurance, and water quality testing for environmental protection.



Chemistry



Pharmaceutical



Food-related industries

## HPLC Principle and System Configuration

HPLC is a system for separating and quantifying the components in a mixed sample. The basic HPLC system consists of a pump, a separation column, and a detector. In many cases, however, systems are also equipped with an autosampler and a column oven.

### Overview of HPLC

The development of HPLC dates back to the beginning of the 20th century, with the discovery of its basic principle by M.S. Tswett, who separated the dyes in a plant extract with petroleum ether (mobile phase) and calcium carbonate powder (solid phase). In recent years, the stationary phase comprises a column of chemically treated silica gel or polymer micro-particles packed in a stainless tube. Pumps are used to make the mobile phase flow. HPLC takes advantage of the phenomenon whereby each component in a sample may take a different amount of time to flow through a column. The elution order and degree of separation depend on the choice of the mobile and stationary phases. HPLC analysis relies on the principle that, under the same conditions of measurement, the time between the injection of a component into the column and the elution of that component is constant. This characteristic can be used to perform qualitative or quantitative analysis.

### Basic demonstration of chromatography

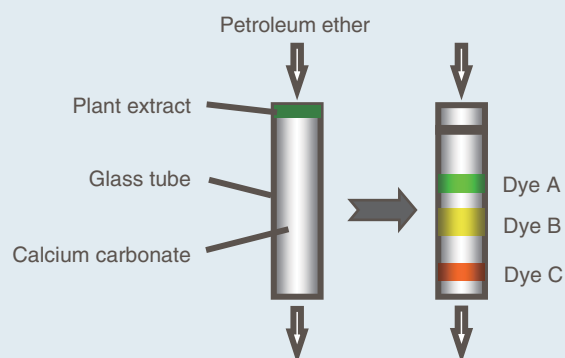


Diagram of Tswett's experiment (a Russian botanist)



HITACHI

Primaide  
1110 Pump



Bio-related fields

## Uses of HPLC

- Quality control
- Production process management
- Impurity analysis
- Qualitative/quantitative analysis

## HPLC System Configuration

### Organizer

The organizer accommodates bottles for solvents (mobile phase) as well as a cleaning solution. It also serves as a power supply box for each module.

### Detector

This module detects the components which are eluted from the column. A UV detector is most commonly used to carry out quantitative analysis by measuring absorbance. With a DAD, it is possible to simultaneously obtain not only a UV spectrum but also data for multiple components which absorb different wavelengths of light.

### Column oven

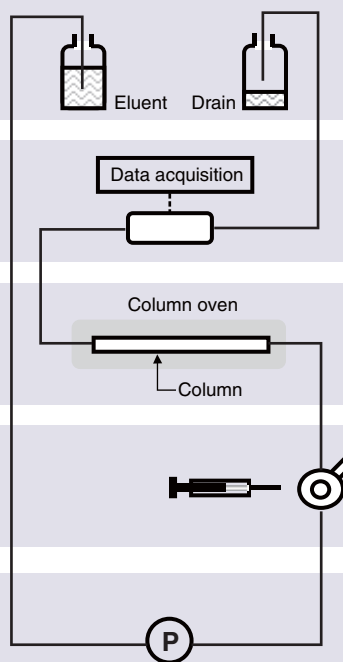
A column oven is necessary to maintain a constant column (stationary phase) temperature. Column temperature is an important parameter for separation, and should be well-controlled in order to achieve the most reproducible results.

### Autosampler

This unit injects the sample automatically, which is very useful in performing the sequential analysis of large numbers of samples and standards.

### Pump

This module pumps the mobile phase. Two techniques are available. In isocratic analysis, the composition of the mobile phase is constant. In gradient analysis, two or more solvents are mixed, and the mix ratio is changed during the analysis.



# Overview of the Primaide

Every detail of the Primaide is well designed to ensure worry-free operation by even a complete beginner at HPLC.

It is an easy-to-use system that incorporates simple design and a user-friendly layout where optional units are contained inside and access from the front enables easy maintenance.

## System Features

### • Optional units mounted inside provide clean appearance

All principal options, including a degassing unit, gradient unit, and sample cooling system can be mounted inside the main body. It is not necessary to make room for optional units.

### • Front access layout for improved operation and maintenance

Every module can be accessed and handled from the front. Since connections are arranged on the front side, it is easy to replace columns and manipulate the flow system. To support easier maintenance, the lamp and cell unit can also be accessed easily.

### • Leak sensors in all modules

Any leakage in the flow system is detected by leak sensors built into each module. After detection the system halts, ensuring improved safety and reliability.

### • Complete control with system manager

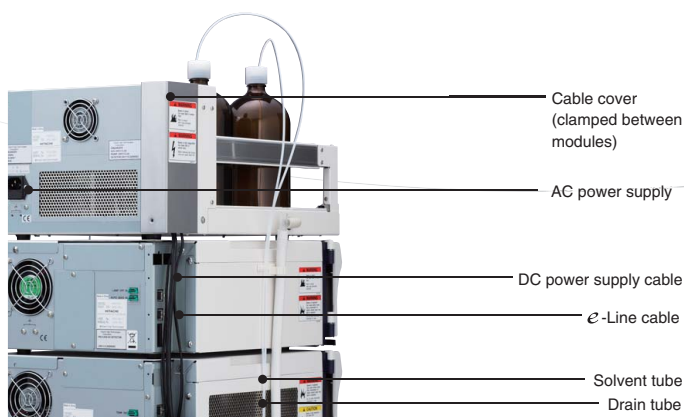
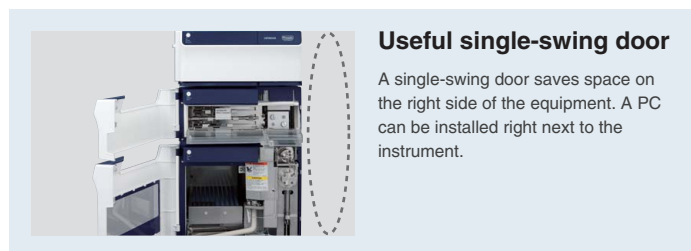
A control panel is not necessary, as everything can be controlled via the system manager. By installing a UI-pad (optional), each module can be controlled separately, in a conventional manner.

### • e-Line and USB

The e-Line is an advanced version of the existing D-Line. All modules are connected by an e-Line in a single chain, and all the communications are integrated. The use of digital signals improves the reliability of data transactions. The interface between the PC and equipment is via versatile USB. A wide range of PC types are supported, enabling flexible configuration.

### • GLP function

A Hg lamp is installed in the detector, and wavelengths in the UV range can be calibrated using its emission line (254 nm) (installed in the Primaide1410 UV / 1430 DAD). Each module stores various types of quality assurance information, for improved data reliability.



## Wiring and tubing

The arrangement of wiring and tubing between the modules has undergone detailed consideration. Electric cables are stored inside of covers for safety, and solvent/drain tubes are routed to allow easy user handling.

Organizer

UV Detector

Column Oven

Autosampler

Pump



Flow cell unit

Lamp house

Leak sensor

Leak sensor (gas sensor)

Column (added separately)

Preheat block

Leak sensor

Gradient unit (optional)

Degassing unit (optional)

Leak sensor

# Primaide module

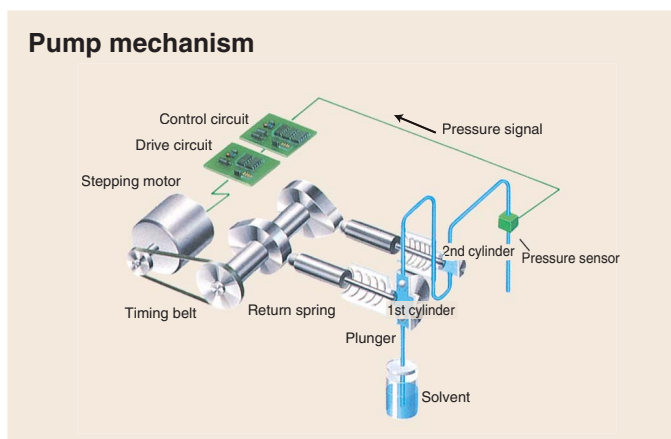
A pump with a pulse compensation system developed by Hitachi, and an excellent autosampler which enables reproducible injection.

## Pump

The Primaide1110 Pump has been developed for reliable analysis and shares characteristics with Hitachi's existing HPLC pump models. Its consistently high level of performance provides users with strong support in everyday analysis.

### ■ Improvement of flow rate stability

For pulse compensation, a proprietary real-time feedback method has been developed for Hitachi's pumps. Not only has the pulse has been significantly reduced, but the Primaide1110 Pump estimates pressure fluctuations and employs the optimal timing to set the plunger speed interval.



Pump mechanism

### ■ Built-in optional units inside pump

Both degassing unit and gradient unit can be mounted inside the pump. A built-in degassing unit minimizes the tubing volume, and yields a more compact system by eliminating the need for additional modules.

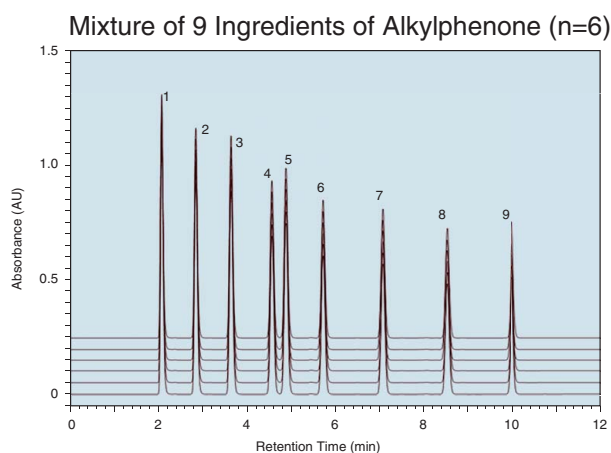
The gradient unit is capable of mixing 4 solvents via its solenoid valves, thereby controlling the mix ratio. The placement of the mixer in a high-pressure compartment enables high-precision, stable mixing, even with a single pump.



Configuration of the degassing unit and low pressure gradient unit

### ■ Improvement of retention time reproducibility

For gradient analysis, injection by the Primaide1210 Autosampler is synchronized with the movements of the pump. This ensures a highly-reproducible retention time, and guarantees precise analysis.



[Condition]

Column : HITACHI LaChrom C18 (5 μm) 4.6 mm I.D.x150 mm L.  
 Mobile phase : A : CH<sub>3</sub>CN B : H<sub>2</sub>O  
 Gradient program : 0 - 11 min A 65 → 100%  
 Column Temperature : 40°C  
 Flow rate : 1.0 mL/min  
 Detection : UV 247 nm  
 Injection vol. : 10 μL (100 g/mL each.)

### Gradient Performance Evaluation/RT and Area Reproducibility

Peak No.	Component	Retention time		Area	
		Average / min.	R.S.D. / %	Average	R.S.D. / %
1	Acetanilide	2.032	0.0762	5309454	0.2980
2	Acetophenone	2.793	0.0798	5163106	0.2887
3	Propiophenone	3.581	0.0958	5537572	0.2151
4	Butyrophenone	4.495	0.1019	4609949	0.2772
5	Benzophenone	4.809	0.0982	5044686	0.2999
6	Valerophenone	5.639	0.0832	4178904	0.2499
7	Hexanophenone	6.975	0.0820	4021828	0.2471
8	Heptanophenone	8.413	0.0677	3464625	0.2439
9	Octanophenone	9.882	0.0775	3667659	0.2814

## Glossary

### Gradient

Gradient elution is a technique for changing the composition of the carrier during analysis by mixing multiple solvents, so that elution time can be controlled. This is an effective method if the analysis takes too much time with a constant-component solvent (isocratic method) or the sample contains many components.

### Low-pressure gradient method

Using a single pump, the solvents are switched via solenoid valves, thereby controlling the mix ratio. Compared to the high-pressure gradient method which uses two or more pumps, installation costs are lower. A mobile phase can be prepared in this manner by mixing up to 4 types of solvent.

### Pulse

The flow rate may transiently drop at regular intervals due to the reciprocating motion of the plunger or other factors. To optimize HPLC analysis, the pump should achieve a constant and stable flow rate.



# Autosampler

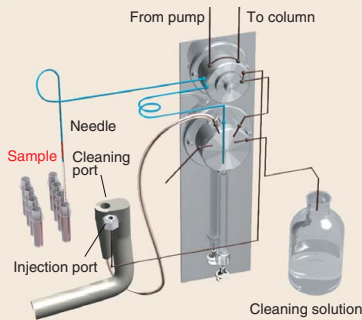
The Primaide1210 Autosampler incorporates direct injection, allowing the automation of consecutive analyses without wasting precious sample.

## Direct injection of micro-quantity samples and quicker analysis

In the direct injection method, the sampling needle becomes part of the flow channel so that the sample in the needle flows into the channel with zero waste. This is a great advantage in the analysis of valuable micro-samples. In addition, since the injection method is simpler than using a sampling loop, the injection cycle is shortened by half. This method accelerates throughput and improves efficiency in the analysis of many samples.

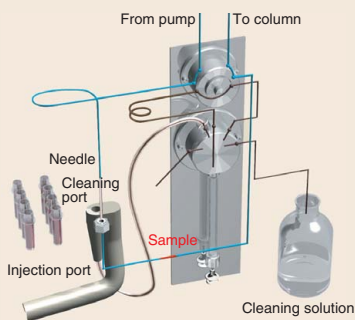
### Direct injection

#### (1) Diagram of flow channel



[Sample suction]  
The needle is positioned over the vial, and collects the samples via vacuum suction.

#### (2) Diagram of flow path

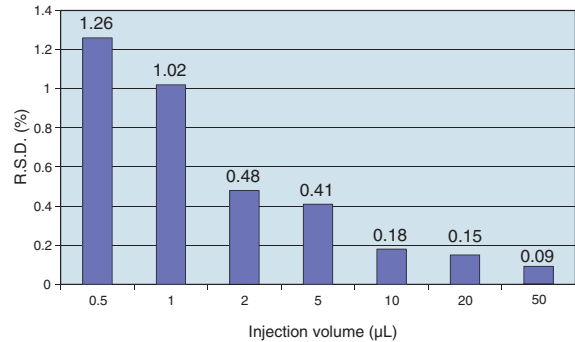


[Sample injection]  
The needle exterior is first washed in the cleaning port. The needle then moves to the injection port to inject the sample.

## Improved reproducibility results in high-precision analysis

The syringe for sample measurement is driven by a high-performance motor. The drive improves the reproducibility of injection. Furthermore, peak retention times are also more repeatable due to synchronization of injection with the pump motion, achieving higher analytical reliability.

### Injection Volume Reproducibility



[Condition]  
Sample : Methyl paraben  
Mobile phase : CH<sub>3</sub>OH : H<sub>2</sub>O = 60 : 40  
Flow rate : 1.0 mL/min  
Detection : UV 265 nm

## Wide opening enables operational checks

A wide sample rack, accommodating 200 1.5 mL vials is mounted on the Primaide, facilitating the measurement of many samples. The wide opening of the autosampler is very convenient for manipulating the rack and for carrying out operational checks of the syringe and needle.



### Retention time

Each substance takes a given amount of time to pass through the column and is detected as a peak in the chromatogram. This time is referred to as the retention time. The reproducibility of this parameter is vital, as it is important in qualitative analysis using HPLC.

### Carry-over

Sample carry-over occurs when residue from injected samples remains inside the needle or flow channel is detected in the next cycle. The needle washer and pipe configuration of the autosampler are well designed to reduce carry-over. However, analysts need to pay extra attention when analyzing highly concentrated or adsorptive samples.

# Primaide module

More resolved peaks are achieved by using a preheating column oven, a low noise and low drift UV detector and a high sensitive FL detector.

## Column Oven

The Primaide1310 Column Oven also functions as a cooler. The preheating function obtains better performance from columns, achieving a sharper peak shape.

### More resolved peaks with optimized heating

Pre-heating with an efficient block heater improves the symmetry and sharpness of peaks, eliminating the influence of ambient temperature changes. The column installation space, which features an air circulation system, permits the easy mounting and detaching of columns.

### Automatic analysis with 3-column selector unit (option)

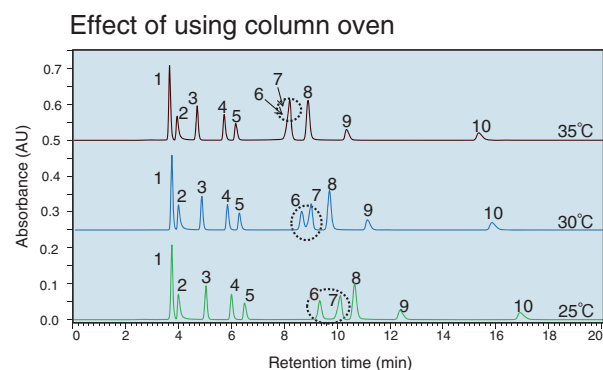
The 3-column selector unit, which can be built into the column oven, allows column selection for each analysis. It is optimum for examination of measurement conditions and multi-method analysis.

### Cooling function is included as standard

The oven can regulate the temperature from 5°C to 65°C.

### Influence of the column temperature on separation

Changes in column temperature substantially affect the degree of separation. The column oven makes it possible to perform analysis under constant conditions, eliminating the influence of ambient temperature. In order to achieve higher reproducibility of retention time and separation, the use of this column oven is recommended. The cooling function of the standard Primaide1310 Column Oven is useful for measurements around room temperature.



#### [Condition]

Sample : 10 Ingredients of Organic Acids standard substance  
Column : HITACHI LaChrom C18-AQ (5 μm) 4.6 mm I.D. x 250 mm L.  
Mobile Phase : 1.0 mmol/L H<sub>2</sub>SO<sub>4</sub> + 8.0 mmol/L Na<sub>2</sub>SO<sub>4</sub> (pH 2.8)  
Column Temperature : 25°C, 30°C, 35°C  
Flow rate : 1.0 mL/min  
Detection : UV 210 nm

#### [Standard samples] (mg/L)

1. Tartaric acid (1000)
2. Formic acid (1000)
3. Malic acid (1000)
4. Lactic acid (1000)
5. Acetic acid (1000)
6. Pyroglutamic acid (100)
7. Citric acid (1000)
8. Fumaric acid (10)
9. Succinic acid (1000)
10. Propionic acid (1000)

### Easy-to-use UI-Pad

The UI-Pad is tilted to allow analysts to check and operate it from any direction. The display, which features an LED backlight is easily viewable.



## Glossary

### Advantages of the column oven

The oven maintains temperature and ensures reproducible retention times which could otherwise be affected by the ambient temperature. A temperature rise decreases the viscosity of the solvent, which also decreases the pressure on the apparatus; however, users need to consider the heat tolerance of the sample.

### Pre-heating

The pre-heating function matches the temperature of the mobile phase to the column temperature, before the solvent flows into the column. A temperature gradient between the column ends can broaden and distort peaks.

### Dead volume

Dead volume is the part of the volume between the injector and detector that does not contribute to separation. A dead volume that is too large diffuses samples, resulting in peak broadening and distortion. It is best to take care to minimize tubing length.



## UV Detector

The optics of the Primaide1410 UV detector allow data collection with lower noise and drift. The lamp and flow cell are situated in a front access layout, and are easily replaceable.

### ■ Low noise for high sensitivity detection

The Primaide1410 UV detector achieves a noise level of not more than  $0.6 \times 10^{-5}$  AU, greatly enhancing trace component analysis.

### ■ High response and low noise, enabling rapid analysis

Analysts can perform low noise measurements in 0.05 seconds. High sensitivity detection is possible, rapidly yielding sharp and accurate peaks.

### ■ Wavelength measurement in the UV region with a built-in Hg lamp

Users may employ the 254 nm emission line of the mounted Hg lamp to test the accuracy of wavelength measurement in the UV region, which is the most utilized region in liquid chromatography. This test is conducted using 3 wavelengths from the Hg and D<sub>2</sub> lamps, enabling highly reliable analyses across a broad wavelength range.

### ■ Front access layout and easy maintenance

Both the lamp and flow cell are replaced through the front of the module, allowing easy maintenance, regardless of where the instrument is installed. (Lamp replacement)



## FL Detector

The Primaide 1440 FL detector has a wide range of wavelength setting and high sensitivity. The front access layout makes easy maintenance possible as same as the Primaide 1410 UV detector.

### ■ Increased sensitivity with optical system that keeps light loss to a minimum

The Primaide 1440 FL Detector is a bright optical system which has attained a S/N greater than 900 (by baseline method, Em spectrum band width: 30 nm) versus a Raman peak of water.

### ■ Automatic wavelength calibration

Wavelength calibration is automated by the built-in Hg (mercury) lamp.

### ■ Front panel access for easy maintenance

User maintenance ( such as positional adjustment of Xe lamp, flow cell replacement, etc.) is facilitated through front panel access to the instrument.

### ■ Selectable slit

The slit of the emission side monochromator is selectable from 15 nm and 30 nm. This allows analysis with a higher sensitivity.

### Absorption

In an absorption analysis, the analyst measures the absorbance at a specific wavelength. In general, the measurement is performed at the maximum absorption wavelength of a target component, and the absorbance data is utilized for quantitative analysis.

### Signal-to-Noise ratio (S/N)

This refers to the ratio between the peak intensity and baseline noise. A good S/N is necessary to detect trace amounts of components. A reduced detector noise improves sensitivity.

# Primaide module

The DAD has many functions, including spectrum collection, chromatography using multiple wavelengths, a peak purity test, spectral library, and more.

## Diode Array Detector (DAD)

The Primaide 1430 Diode Array detector is as sensitive as a UV detector. The 1,024-bit photo diode array is very effective for the measurement of samples which has a characteristic UV spectrum.

### ■ High sensitivity

Novel optics reduces noise considerably ( $0.5 \times 10^{-5}$  AU or less). The idea that "DADs are less sensitive" is now obsolete.

### ■ Minimizing the influence of temperature changes in the measurement cell

The light source is stabilized via a large lamp housing. The spectrometer and housing are separated and thermally insulated. By cooling the lamp housing separately, the influence of ambient temperature is minimized.

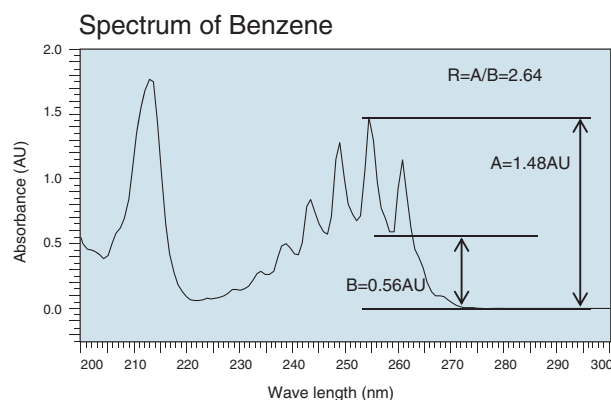
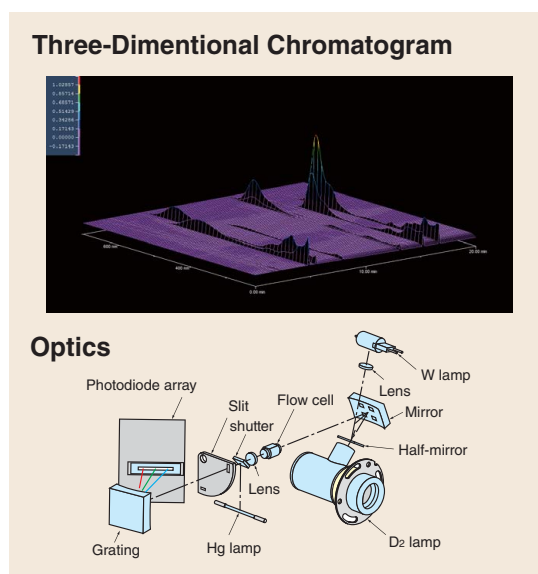
The new design incorporates temperature sensors as well as an associated variable rotation speed cooling fan, which largely eliminate temperature changes inside the instrument. This reduces noise and enhances stability, allowing for stable analysis day after day.

### ■ High resolution and accurate spectra

High wavelength resolution (0.78 nm/data point) is achieved with an array of 1,024 photo diodes. Uniform resolution is maintained throughout a wide range of wavelengths from the UV to VIS, thanks to the diffraction optics, which feature a grating.

### ■ Automatic wavelength calibration

A built-in Hg lamp is utilized in the automatic wavelength accuracy test for the commonly-used UV region.



## Glossary

### Diode Array Detector (DAD)

A Diode Array Detector enables multiple wavelength measurements. A beam passing through a flow cell is dispersed using a grating. UV spectra may be obtained, providing strong support for qualitative analysis. This sophisticated detector can display data in three dimensions (time, absorbance, and wavelength).



# Specifications

## Pump

	Primaide1110 pump
Liquid feed system	Dual plunger reciprocating pump (series connection, pulsation suppression)
Flow rate range	0.001 to 9.999 mL/min.
Maximum discharge pressure	39.2 MPa (0.001 to 5.000 mL/min.) 19.6 MPa (5.001 to 9.999 mL/min.)
Flow rate accuracy	±2 µL/min. (0.01 to 0.1 mL/min.) ±2 % (0.101 to 8.0 mL/min.) ±4 % (8.001 to 9.999 mL/min.)
Flow rate stability	SD 0.02min. or RSD 0.075 %, whichever is larger (retention time at 1.0 mL/min.)
Dimensions/weight	340(W) × 464(D) × 159(H) mm, approx. 13.0 kg

Options: Degassing unit, Low-pressure gradient unit, Pump seal washing kit, and UI-Pad.

## Gradient Unit

	Primaide Low-Pressure Gradient Unit
LiqNumber of solutions mixable	4 solutions
Mixing system	Solenoid valve opening/closing time control system
Recommended flow rate range	0.4 to 1.8 mL/min.

## Autosampler

	Primaide1210 Autosampler
Number of standard samples	1.5 mL × 200 pcs, 4 mL × 128 pcs (option)
Sample injection system	Direct injection system
Syringe capacity (standard)	100 µL
Sample injection volume	0.1 to 50 µL (standard syringe), up to 4,500 µL (option)
Injection volume reproducibility	0.3 % RSD (when 10 µL is injected)
Temperature setting range	1 to 35 °C (1 °C step), using Autosampler with a cooling unit
Dimensions / weight	340(W) × 464(D) × 297(H) mm, approx. 21.4 kg

Options: UI-Pad, 500 µL and 5 mL syringe kit

## Column Oven

	Primaide1310 Column Oven
Temperature control system	Block heating + Air circulation system
Temperature setting range	1 to 65°C (in 1°C step)
Temperature control range	(ambient temperature – 15°C) to (ambient temperature + 50°C)
Temperature control accuracy	± 0.1°C
Column accommodated	Up to 3 columns (250mm length max.)
Dimensions/weight	340(W) × 464(D) × 159(H) mm, approx. 10.6 kg

Options: UI-Pad

## UV Detector

	Primaide1410 UV
Optical system	Double-beam ratio photometry system
Light source	D <sub>2</sub> lamp, Hg lamp (for wavelength check)
Wavelength range	190 to 600 nm
Wavelength accuracy	± 1 nm
Noise	0.6 × 10 <sup>-5</sup> AU or less (250 nm)
Drift	1.0 × 10 <sup>-4</sup> AU/hr or less (250 nm)
Response	0.05, 0.1, 0.5, 1, 2, 4, 8 sec
Dimensions/weight	340(W) × 464(D) × 159(H) mm, approx. 12.6 kg

Options: UI-Pad, Preparative flow cell for UV

## Diode Array Detector

	Primaide1430 DAD
Number of photodiode bits	1024
Light source	D <sub>2</sub> lamp, W lamp, Hg lamp (for wavelength check)
Wavelength range	190 to 900 nm
Wavelength accuracy	± 1 nm
Noise	0.5 × 10 <sup>-5</sup> AU or less (250 / 600 nm)
Drift	0.5 × 10 <sup>-3</sup> AU/hr or less (250 / 600 nm)
Spectrum acquisition cycle	Selectable from 50, 100, 200, 400, 800, 1600, 3200 msec
Dimensions/weight	340(W) × 464(D) × 159(H) mm, approx. 13.5 kg

Options: Preparative flow cell for DAD

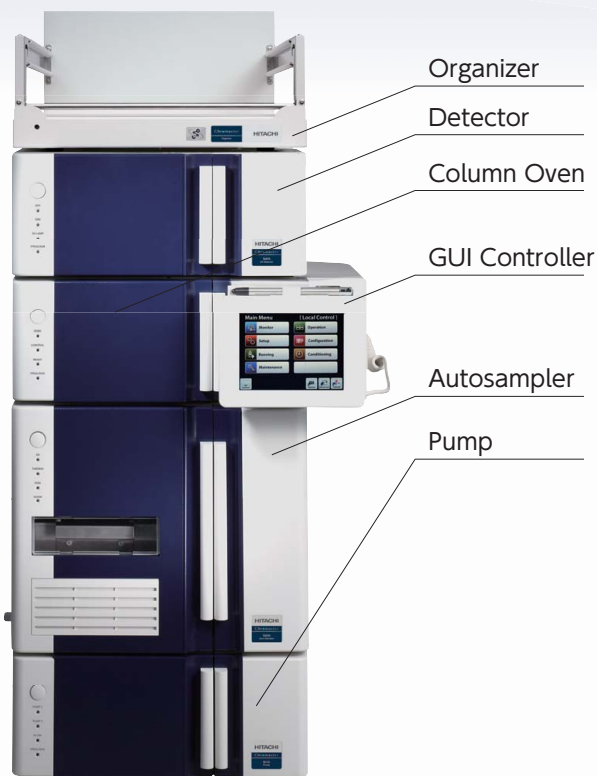
## FL Detector

	Primaide 1440 FL
Light source	150 W Xe lamp
Wavelength range	Ex: 200 to 850 nm, Em: 250 to 900 nm
Detection sensitivity (Raman peak to water S/N)	S/N ≥ 900 (Baseline method, Em 30nm)
Dimensions / weight	340 (W) × 464 (D) × 297 (H) mm, approx. 28.0 kg

## Organizer

	Primaide Organizer
Power supply	AC 100 to 240 V (50/60 Hz), 350VA
Output	DC 24V, 300W (provides DC power supply for 1110 pump × 1, 1210 Autosampler × 1, 1410UV / 1430DAD × 1)
Space to accommodate solvent bottles	314(W) × 280.8(D) mm
Dimensions / weight	340(W) × 445(D) × 207(H) mm, approx. 8.2 kg

# A wide range of HPLC systems for impr



## Chromaster

Power range : 400/600 bar

**Highly reliable HPLC system with superior extensibility**

Chromaster series provides from a basic manual system to a wide range of analysis systems such as preparative and GPC analysis. The 600 bar system made possible the use of a column with a particle size of 2.0  $\mu\text{m}$  or less, or a core-shell column, which can be used not only for conventional HPLC analysis but also for improvement of separation performance and for shortening of analysis time.

General Analysis

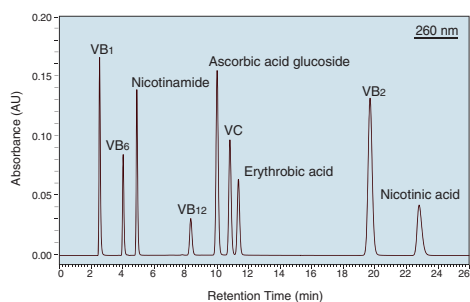
## Primaide

Power range : 400 bar

**Affordable and robust HPLC system**

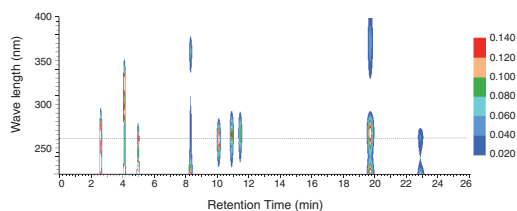
The Primaide is a standard reliable HPLC system suitable for academia and other small laboratories studies.

### Measurement of water-soluble vitamins by DAD



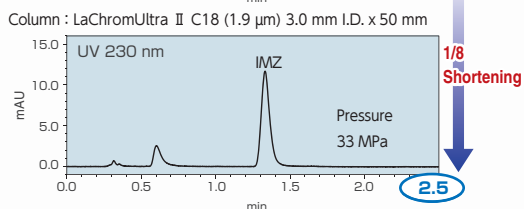
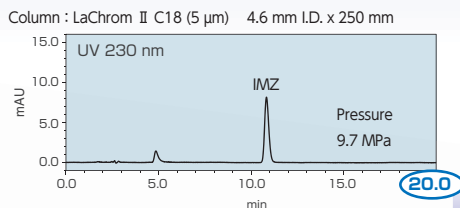
Nine water-soluble vitamins were subjected to simultaneous analysis with a reverse-phase column and detection with a DAD. Identification via the absorption spectrum using a DAD particularly facilitates analysis in cases where a sample contains many foreign substances.

Primaide  
 Detector: 1430 Autosampler: 1210  
 Oven: 1310 Pump: 1110



# Improving reliability and analysis efficiency

## Measurement of Enilconazole (Fungicide)



\*AS/LC-049

In the analysis of imazalil, by shifting to high-speed analysis using a short column for UHPLC, the analysis time was shortened to 1/8. This system configuration improved the isolation of imazalil and reduced the analysis time.

In order to improve the separation performance using a UHPLC column with a particle size of 2.0  $\mu\text{m}$  or less, it is necessary not only to change the column but also to reduce the dispersion out of the column. For the achievement of a superior separation performance, a low dispersion kit and a semi-micro flow cell are offered as an option.

Instrument	
Chromaster	
Detector: 5410	Autosampler: 5260
Oven: 5310	Pump: 5160

High resolution  
High throughput  
High sensitivity

## ChromasterUltra<sub>RS</sub>

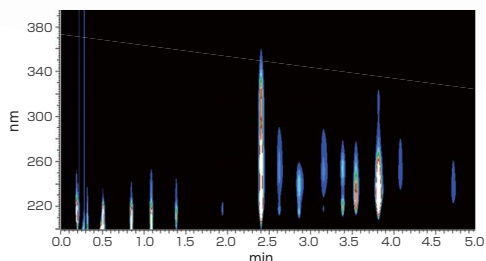
Power range : 1,400 bar

### An optimized UHPLC system that withstands 1400 bar, for faster and higher separation analysis

#### ChromasterUltraRs HPG system

The superior gradient performance and thoroughly reduced system volume makes possible a super high speed and high resolution analysis.

#### Simultaneous analysis of psychotropic drugs by DAD (example)



After using LaChrom Ultra II C18 (2 mm I.D. x 50 mm 1.9  $\mu\text{m}$ ), 14 psychotropic drugs components were confirmed with a high-speed and high-resolution analysis. In DAD measurement, with retention times and UV spectrums, identification of components becomes possible, improving the analysis reliability.

1. Barbitone
2. Allobarbitol
3. Phenobarbital
4. Cyclobarbitol
5. Pentobarbital
6. Nitrazepam
7. Desipramine
8. Nortriptyline
9. Imipramine
10. Trazodone
11. Midazolam
12. Diazepam
13. Clomipramine
14. Mianserin

Data provided by Keio University, Faculty of Pharmacy, Division of Physical Pharmaceutical Chemistry.



## Improvement for a more reliable analysis, 5610 MS detector

In order to further improve the reliability of analysis, it is useful to acquire mass information. 5610 MS detector eliminates the barriers related to traditional MS detectors, such as special installation environment, operability and maintenance.

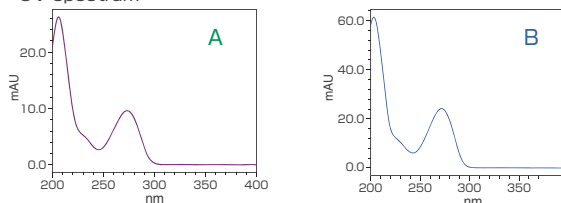


Item	Specifications
Measurement mass range (m/z)	20 to 1,000
Ion source	Electrospray ionization (ESI)
Dimensions and weight	440 (W) × 610 (D) × 430 (H) mm/ Approx. 51 kg
N <sub>2</sub> gas usage	Max flow rate 3.4 L/min. Pressure 300±20 kPa

## ■ Support of qualitative analysis (improved data reliability)

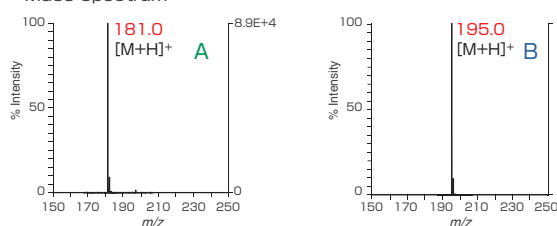
Even when it is difficult to qualify the target component only with UV spectrum, reliability of qualitative analysis is improved by using mass spectral information in combination.

### • UV spectrum



UV spectra alone cannot distinguish between A and B

### • Mass spectrum



Additional mass spectra can help distinguish between A and B



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CAUTION: For correct operation, follow the instruction manual when using the instrument.

Specifications in this catalog are subject to change with or without notice, as Hitachi: High-Tech Science Corporation continues to develop the latest technologies and products for our customers.

NOTICE: The system is For Research Use Only, and is not intended for any animal or human therapeutic or diagnostic use. These data are examples of measurement; the individual values cannot be guaranteed.

## Hitachi High-Tech Science Corporation

[www.hitachi-hightech.com/global/hhs/](http://www.hitachi-hightech.com/global/hhs/)

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