

High Performance Liquid Chromatograph
Chromaster®

HITACHI
Inspire the Next

Chromaster



Science for
a better tomorrow

Chromaster

Outstanding performance

Easy-to-use

Robust

HPLC for today and tomorrow

Three critical components in HPLC: Performance, Functionality, and Reliability. For each component, we implement one fine improvement after another, giving birth to a new standard in HPLC. That's Chromaster.

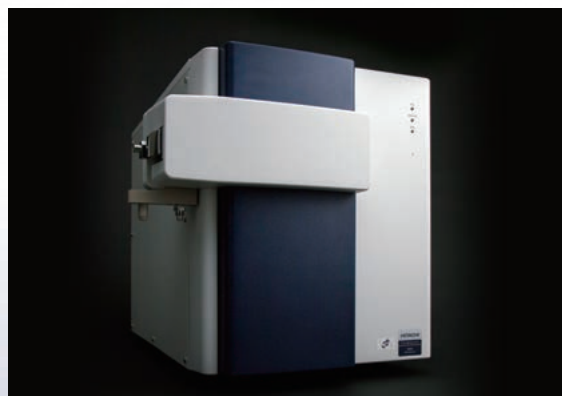


MS Detector is also available

EASY

RELIABLE

COMPACT



Hitachi offers a new MS detector, designed for HPLC users, that is different from existing mass spectrometers.

Introducing the Chromaster[®] modules





UHPLC entry-level model with a wide application range for HPLC users.

The lineup for Chromaster includes 5160 pump and 5260/5280 autosamplers that are compatible not only with conventional 40 MPa system but also with 60 MPa system.

The 60 MPa system, which can be used with columns containing 2.0 μm or smaller particles, and core-shell columns, is capable of conventional HPLC analyses and also ensures improved resolution performance and shorter analysis time.

Analysis Example from the Chromaster 60 MPa System

By connecting the Chromaster 60 MPa system to a UHPLC column, high-speed high-resolution analysis can be performed.

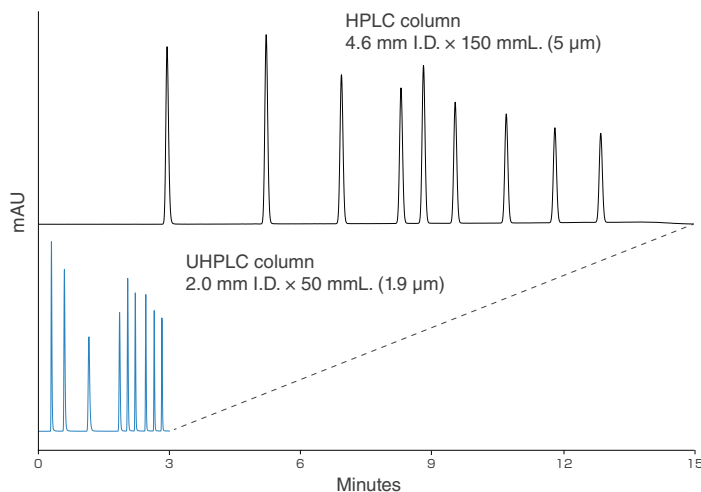
The 60 MPa system can also be used as an entry-level model for UHPLC.

Conditions

Sample: Alkylphenones
 Column: LaChrom II C18 (5 μm) 4.6 mm I.D. \times 150 mmL.
 LaChromUltra II C18 (1.9 μm) 2.0 mm I.D. \times 50 mmL.
 Column temperature: 40°C
 Mobile phase: A:H₂O, B:CH₃CN
 Gradient mode: High Frequency Mode
 Wavelength: 247 nm

The following options are used with UHPLC column

- Low dispersion piping kit
- Semi-micro mixer (200 μL)
- Semi-micro flow cell unit



For users of UHPLC columns

To maximize resolution, a UHPLC column with 2.0 μm or smaller particles should be used.

For the best resolution performance, diffusion contributions from components outside the column should be addressed. The low diffusion tube kit and semi-micro flow cells are available as optional items. Please contact us for details.

Improved gradient performance and excellent flow rate precision

Pressure
5110 : 40 MPa
5160 : 60 MPa

5110/5160 Pump

Excellent solvent delivery performance

One of the most important performance measures for HPLC is retention time reproducibility.

Excellent gradient performance resulting from the highly accurate solvent delivery by 5110/5160 pump with Hitachi's unique high-speed feedback real-time control system and High Frequency Mode (HFM) of the proportioning valve make the high retention time reproducibility possible.

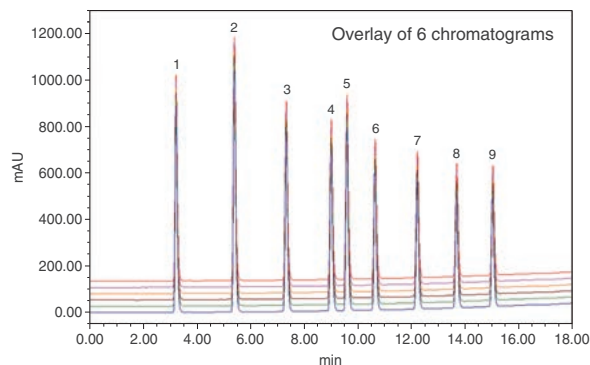
Analysis of alkylphenones 9 components

Gradient reproducibility data (retention time) (n=6) (HFM) (Mixer-less)

Conditions

Sample: Alkylphenones
 Column: Hitachi LaChrom C18
 4.6 mmI.D. x 150 mmL (5 μm)
 Column temperature: 40°C
 Mobile Phase: A H₂O+ 0.1%TFA
 B CH₃CN+ 0.1%TFA
 Gradient mode: High Frequent Mode
 Gradient: A:B (min)=65:35 (0)→5:95 (15)
 →5:95 (20)→65:35 (20.1)
 →65:35 (30)
 Injection Volume: 10 μL (100 ppm)
 Flow rate: 1 mL/min
 Detection: 247 nm

Peak No.	Component	Retention Time	
		AVE	%RSD
1	Acetanilide	3.220	0.03
2	Acetophenone	5.397	0.04
3	Propiophenone	7.328	0.03
4	Butyrophenone	9.006	0.02
5	Benzophenone	9.593	0.02
6	Valerophenone	10.642	0.02
7	Hexanophenone	12.214	0.02
8	Heptanophenone	13.679	0.02
9	Octanophenone	15.026	0.02



Pump options

6-channel degassing unit (480 μL/ch) (optional)

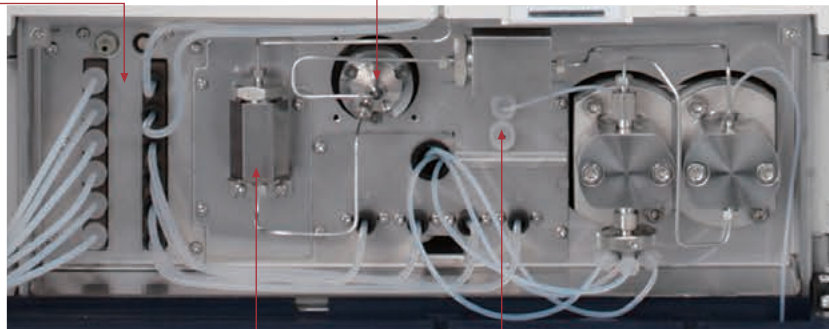
<Main specifications>

- 4 solvents for pump (Maximum) / 2 solvents for autosampler (Maximum)

Auto-purge valve (Pumps with or without Auto-purge valve are available)

<Main specifications>

- Flow rate setting range (0.001 to 9.999 mL/min) (5110), (0.001 to 5.000 mL/min) (5160)
- Time setting range (1 to 30 min)



Conventional mixer (Accessory of the low-pressure gradient unit option)

- (Can also accept semi-micro/dynamic mixers)
- (Can install either of one from three mixers)

Plunger washing pump (optional) * Fitted inside the pump

<Main specifications>

- Flow rate setting (1 mL/min, fixed)
- Time setting range (1 to 300 sec)
- Automatic plunger washing function per one analysis available with CDS

<Notes>

- (1) Plunger washing mechanism: standard
- (2) Automatic plunger washing using only Item (1) is subject to the following limitations:
 - Requires 5260 Autosampler
 - Not compatible with two-solvent washing for the needle inner wall/inside the injection valve on autosampler

Two types of autosamplers are available to meet customers' needs

5260/5280 Autosampler



5260



5280

Product lineup to accommodate various applications

To accommodate various HPLC applications, the Chromaster product lineup includes autosamplers with loop injection systems and direct injection system.

As both autosamplers have a pressure range of 60 MPa, they are applicable to high-resolution, high-speed analyses of UHPLC columns as well as traditional HPLC.

Item	5260	5280
Sample injection system	Loop injection method	Direct injection method
Withstand pressure	60 MPa	60 MPa
Washing function	Equipped with built-in washing pump Two-solvent washing function	Wash solvent delivery by a syringe
Sample rack temperature control (Temperature setting range)	1 to 45 °C Capable of cooling and heating	1 to 35 °C cooling only
Sample capacity	Standard	120 × 1.5 mL
	Optional	72 × 4 mL
		200 × 1.5 mL
		128 × 4 mL

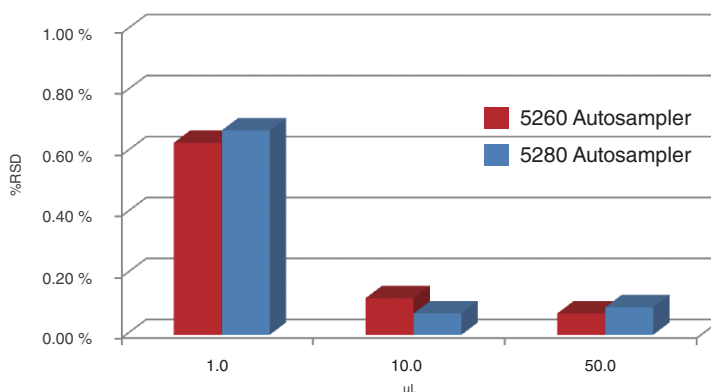
Excellent injection volume reproducibility supporting reliable analysis

The syringe and syringe moving part are optimized for each of the loop injection and direct injection systems. As a result, the measurement accuracy by the syringe is improved, resulting in excellent injection volume reproducibility.

Example: Injection volume reproducibility data

Conditions

Sample: 60 ppm Methylparaben
(Mobile phase: 60 % CH₃OH)
Flow rate: 1 mL/min
Wavelength: 265 nm
Injection method: (5260) Cut injection method



Extremely low carry-over

Low carry-over
 $\leq 0.003\%$
 (under a specified condition)

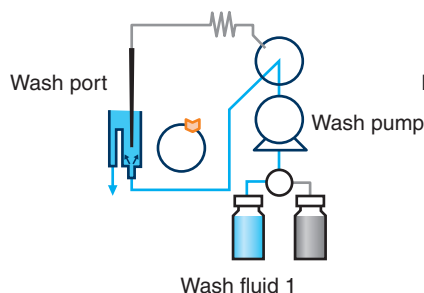
To reduce the amount of carry-over, an autosampler must be engineered and built to eliminate the dead volume in the flow path.

The Chromaster autosampler, due to thoughtful design of the tube connections and injection port shape, ensures extremely low carry-over for both the loop injection system and direct injection system.

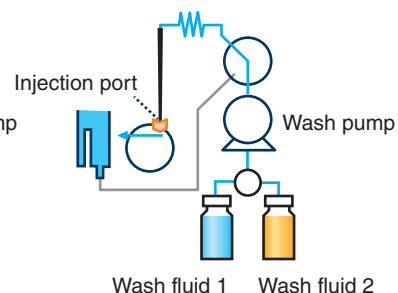
Loop injection autosampler for lower carry-over

5260 autosampler is equipped with a wash pump which provides highly efficient washing for the needle outer wall in order to achieve lower carry-over. As a result, the carry-over is as low as that from the direct injection system. In addition, the standard installation includes a two-solvent washing function for the needle inner wall to ensure low carry-over even for the analysis of the most persistent components.

<Washing of the needle outer wall>



<Washing of the needle inner wall>

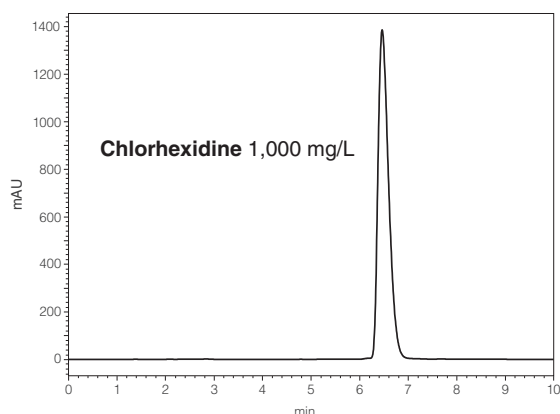


Additional settings to reduce carry-over

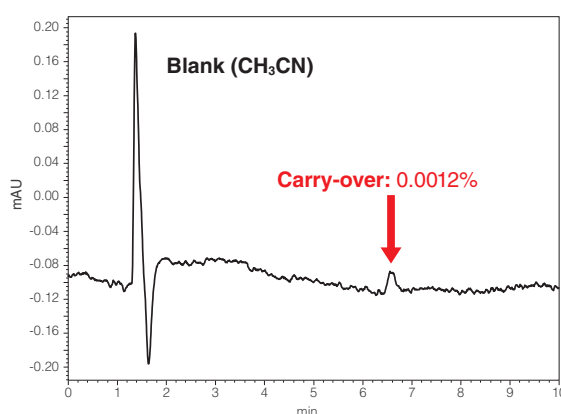
- Needle outer wall washing prior to sample drawing
- Two-solvent washing is available for the needle inner wall/inside the injection valve

Example: Carry-over analysis (5260)

Even when highly adsorbing Chlorhexidine is analyzed, the carry-over is extremely low.



Example of chlorhexidine analysis



Example of blank analysis after chlorhexidine analysis

Generous size column compartment width of 375 mm



* The photo is a column oven with a GUI controller (optional).

5310 Column Oven

Easily accommodates a 300 mm analytical column fitted with a guard-column

The door, which opens in an L-shape pattern and with internal dimensions 375 mm wide and 114 mm high, facilitates the connection and stowing tasks for guard-column equipped column. The oven can accommodate up to three 300 mm columns. The column installation space, which has an air circulation system, permits easy mounting and detaching of columns.

Pre-heating function and wide temperature control range

The block-type pre-heating function based on Peltier heating and cooling control, delivers excellent peak symmetry and shape.*¹ Also, the oven has the capability to regulate*² temperature from 15 degree below ambient temperature to ambient temperature +60°C, so it can accommodate various applications.

*1 Pre-heating pipings tailored to the flow rate used are available (optional).

*2 Temperature setting range: 1 to 85°C

Pre-heating units

* The photo represents a unit in which a part of the pre-heating cover is removed.



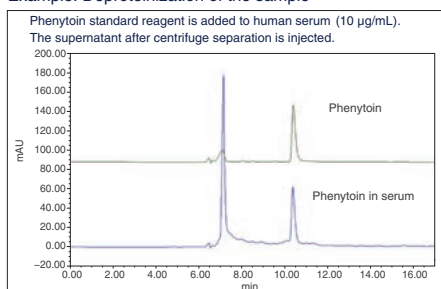
Valve options for sample preparation and method evaluation (optional)

2-position, 6-port valve and 3-column selector valve for use in automated sample pre-treatment for protein removal and for method evaluation are also available.

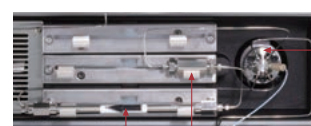
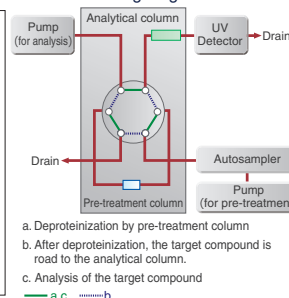
(Notes) 5310 column oven have a time program function.

Can install either of one from two valves.

Example: Deproteinization of the sample



Column switching diagram



2-position, 6-port valve

Analytical column

Pre-treatment column

Improved operability over a wider temperature range

6310 Column Oven



Temperature range of 4 to 90 °C*4 and superior temperature stability

- Faster heating and cooling time
- Temperature control range: [ambient temperature -15] to [ambient temperature +75]°C, and within the temperature setting range
- Temperature control precision: within ± 0.1 °C (20 to 90 °C)
- Maximum column capacity of 300 mm x 3*5

*4: The range of temperature control depends on the ambient temperature.

*5: When MEM column fitting and optional valves are not used.

Low volume pre-heating to suppress peak diffusion

The newly designed low volume pre-heating tube minimizes the peak diffusion while the temperature stability is maintained, resulting in high resolution analyses and high reproducibility.

	5310	6310
pre-heat piping volume	39 μ L	1 μ L

Built-in 3-liter Waste Tank

A 3-liter Waste Tank is housed within the column oven.

Typically, a waste solution container is placed underfoot, but now the space for the container can be utilized for other purposes, and safety is also improved.

(User is able to utilize a different waste solution container, if preferred.

Contact Hitachi for details.)

MEM column fitting (6310 optional)

Hitachi's unique column fitting reduces the dead volume to a minimal level.

- A built-in spring presses the connection tube to the column inlet port, so the dead volume is kept extremely low.
- It can be secured by finger-tightening and the excellent pressure tolerance (Pressure resistance when used separately: 140 MPa) can be maintained even after repeated use.



A view of column oven accommodating columns



3-liter Waste Tank



MEM column fitting



A view of operation of attaching a column



5430 Diode Array Detector

Excellent qualitative analysis performance

With a wide wavelength range of 190 nm to 900 nm, the 1,024-bit diode array in Chromaster Diode array detector delivers the world's best resolution.

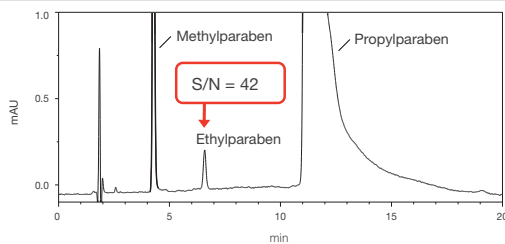
Achievement of further low noise and low drift

The 5430 diode array detector is comparable to conventional Ultraviolet (UV) detectors for baseline noise to 0.5×10^{-5} AU¹ (or less), and is capable of high-sensitivity detection.

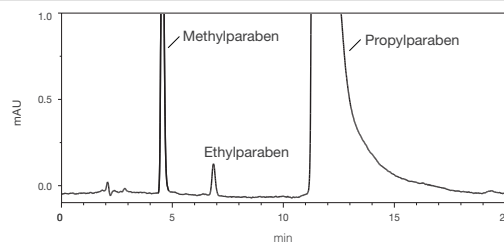
The adoption of a variable air-volume fan and the provision of a specially designed cover on the spectrometer minimize of influence of temperature change around the optical system and achieves a further reduction in drift to 0.4×10^{-3} AU/hr¹ (or less) and a reduction in lamp stabilization time by about 30% (In-house comparison).

¹ Under a specified condition

[Comparison of Diode Array Detector and UV Detector]



5430 Diode Array Detector



5410 UV Detector

The noise and drift of 5430 diode array detector are as low as those of UV detectors, and high-sensitivity analyses are possible.

Common features (5410/5420/5430)

Thermostat flow cell (optional)

Thermostat controlled flow cell minimizes the influence of ambient temperature changes. As a result, the baseline of detector is steady and data reliability improved.



Ultraviolet (UV) region wavelength check by means of a built-in Hg lamp

The emission lines of built-in D₂ and Hg lamps allow wavelength checks over the ultraviolet to visible range. As there is no physical change with the Hg lamp over time, the accuracy check will result in highly reliable data.

Excellent qualitative and quantitative analysis performance

5430 Diode Array Detector 5410 UV/5420 UV-VIS Detector



5410 UV/5420 UV-VIS Detector

Low noise, low drift, and a high sensitivity detection

A noise level $0.5 \times 10^{-5} \text{ AU}^2$ (or less) can be achieved, allowing better sensitivity than ever. With a low drift of $1.0 \times 10^{-4} \text{ AU} / \text{hr}^3$ (or less), these detectors deliver excellent baseline stability.

*2, 3 Under a specified condition

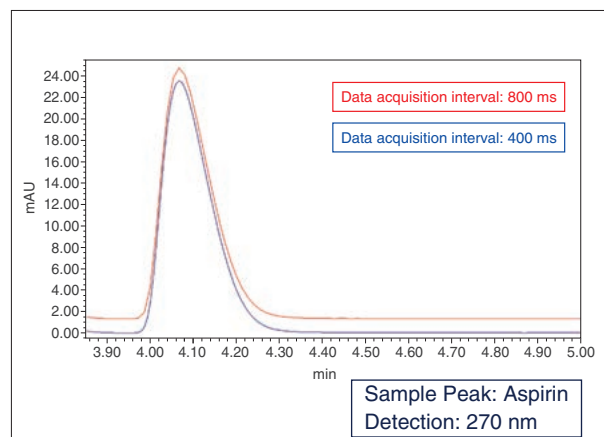
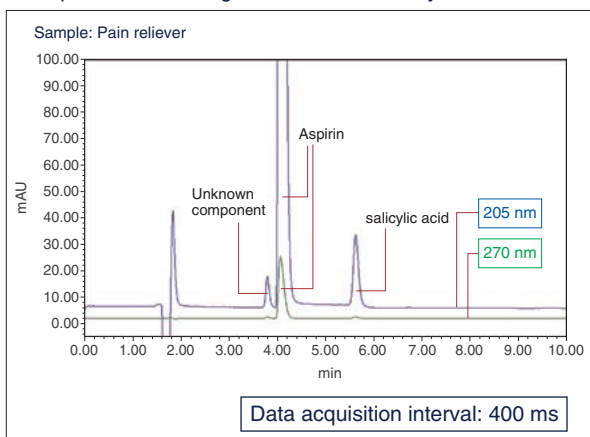
Two-wavelength simultaneous measurement function

The two-wavelength detection function*4 permits measurements at short data acquisition intervals of 400 ms*5 and 800 ms per wavelength. The result is chromatograms with sharp peak shapes.

*4 Controlled by CDS only

*5 400 ms is available only if the wavelength interval is 160 nm or less.

Example: Two-wavelength simultaneous analysis data



The peak appears sharper by selecting a shorter data acquisition interval.

5440 Fluorescence Detector Advanced Spec 5450 RI Detector



5440 Fluorescence Detector Advanced Spec

High sensitivity with an S/N ratio of 1,200 or higher in water Raman

The detector incorporates low-light loss optics featuring a three-axis layout, Hitachi's proprietary condensing mirrors, a slit flow cell, and an optimized transmission light monitoring method. This is a high-sensitivity fluorescence detector with an S/N ratio of 1,200 or higher (based on the baseline method) in water Raman.

Fluorescence detector with a variable slit

The spectrometer slit on the fluorescence side is variable between 15 nm and 30 nm. For high-sensitivity analyses, use the 30 nm slit.

Automatic wavelength check using a built-in Hg lamp

Similar to the UV detector, the 254 nm bright line from the Hg lamp can be used to perform wavelength checks in the UV region that is often used in HPLC analyses.



5450 Refractive Index (RI) Detector

Short stabilization time

The RI detector permits the start of measurement about 1 hour after it is powered on.

Flow cell with variable temperature setting

The cell temperature can be set from 30 to 50°C (in 1°C step). (when the room temperature is 20°C).

Introducing a new mass detector from Hitachi designed for HPLC users



5610 MS Detector

Optimized for qualitative analysis

When measuring samples that do not absorb UV light or analyzing target compounds that cannot be identified by using UV spectra alone, additional information provided by mass spectra can improve the reliability of qualitative analysis.

Ease of use

Operability on par with standard HPLC systems. The atmospheric-pressure ion filter allows for replacement or cleaning of the filter without stopping the vacuum pump during maintenance.

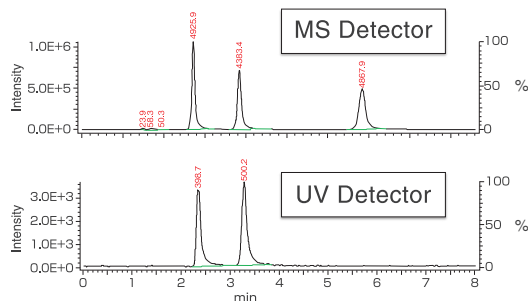


Compact design for small footprint

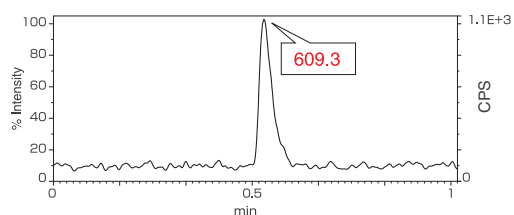
The space-saving footprint is equivalent to that of a standard HPLC system. The required power source is 200 to 240 VAC, allowing more flexibility when choosing the installation site. As the system is designed to use a minimum amount of N₂ gas (maximum flow rate of 3.4 L/min), even an N₂ gas cylinder can provide sufficient gas.

Application examples

Measurement of components that do not absorb UV light



Additional information m/z data

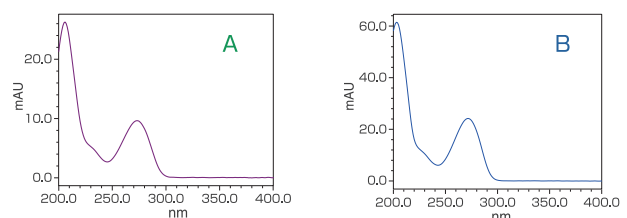


The m/z data can be displayed on the total ion chromatogram

*A software program for detector control and data analysis is supplied with 5610 MS Detector.

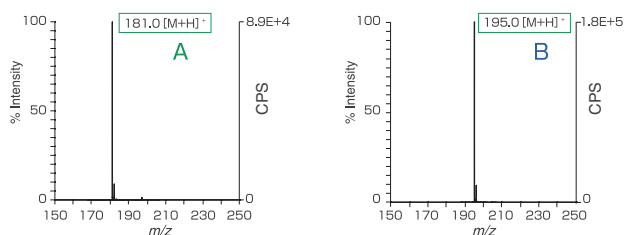
Improved data reliability

UV spectrum



UV spectra alone cannot distinguish between A and B

Mass spectrum



Additional mass spectra can help distinguish between A and B



Organizer

Organizer capable of accommodating various solvent bottles

The organizer can accept the simultaneous mounting of the following solvent bottles.

Example

1	3.785 L (U.S. gallon bottle) × 2 + 500 mL × 2
2	3.0 L (Japanese gallon bottle) × 2 + 500 mL × 2
3	2.5 L (EU gallon bottle) × 2 + 500 mL × 3
4	1.0 L bottle × 5 + 500 mL × 2

(1) to (3) are for isocratic, 2-liquid gradient analysis, designed for use in quality control operations.

(4) is for method development.

Organizer also doubles as a power supply module

The organizer, which is also a power supply module, supplies power to one pump, one autosampler, one detector (one UV detector, one UV-VIS detector, one Diode array detector or one RI detector), and one interface control board. Additional modules require an (optional) AC adapter or AC input.



Intuitive operation via unique touch panel

GUI Controller

Integrated module control

- A color LCD monitor (5.7-inch color TFT display with LED back light) and a touch panel make for easy viewing and simple operation.
- Modules^{*1, *2} can be controlled from this controller.
- Supports single/sequence run analyses as directed from the autosampler.
- Up to 10 programs involving a timer function, pre-analysis system tasks (Wakeup), and post-analysis system tasks (Sleep) can be created^{*1, *2, *3}.
- The GUI controller can control three pumps (of which one is isocratic) (useful for building pre-treatment systems, such as deproteinization).
- The GUI controller enables you to check the status of consumables usage on units^{*1, *2} that are connected to the system.



Main settings in the modules

Pump: Solvent feeding on/off, pump purging, and plunger washing
 Autosampler: Needle washing, rinse-port washing, and syringe purging
 Oven^{*2}: Temperature control on/off, temperature settings, and valve switching
 Detector: Lamp on/off, auto-zero, purging on/off (RI detector)

*1: Except 5610 MS detector *2: Except 6310 column oven *3: Except 5280 autosampler

Wakeup (automatic pre-analysis tasks) and Sleep (automatic post-analysis tasks) programs

Automatic system wakeup and sleep from GUI

- In conditioning, 10 programs for each pre-analysis system tasks (Wakeup) and post-analysis system tasks (Sleep) can be created in optional combination of settings.
- For Wakeup program ending time, you can specify any time up to three days later. The Sleep program starts at a specified time on the current day, the following day, or after the end of a continuous analysis run. The automation of system stand-by can reduce the amount of time required to make preparations for an analysis run.

Controller that pairs with one module – UI Pad (optional)

- The UI pad provides the flexibility of purchasing controllers for modules that require stand-alone operations.
- The large button size and a wide pitch enhance the ease of operation.
- Supports single/sequence run analyses by instructions received from the autosampler.



- * Cannot be used with 5430 diode array detector, 5610 MS detector, and 6310 column oven.
- * Controller is included with 5450 RI detector.

* Separate software for the instrument control and data processing is required when using 6310 column oven.

User oriented, convenient and smart

- Most optional accessories are internally mounted to reduce HPLC system height. The handle located on the front side of the organizer moves vertically for easy access to solvent bottles.
- With a module width of 340 mm*1 and a depth of 440 mm, the system provides space savings.

*1 Exclusive of the column oven.

- Module operations and the replacement of consumable and maintenance parts can be performed from the front side.
- With attention to detail on the housing of tubes and wires, the system keeps tubes from getting tangled up, ensures the ease of replacement, and provides adequate seismic stability. In addition to incorporating these practical considerations, the system features a sleek, attractive appearance.

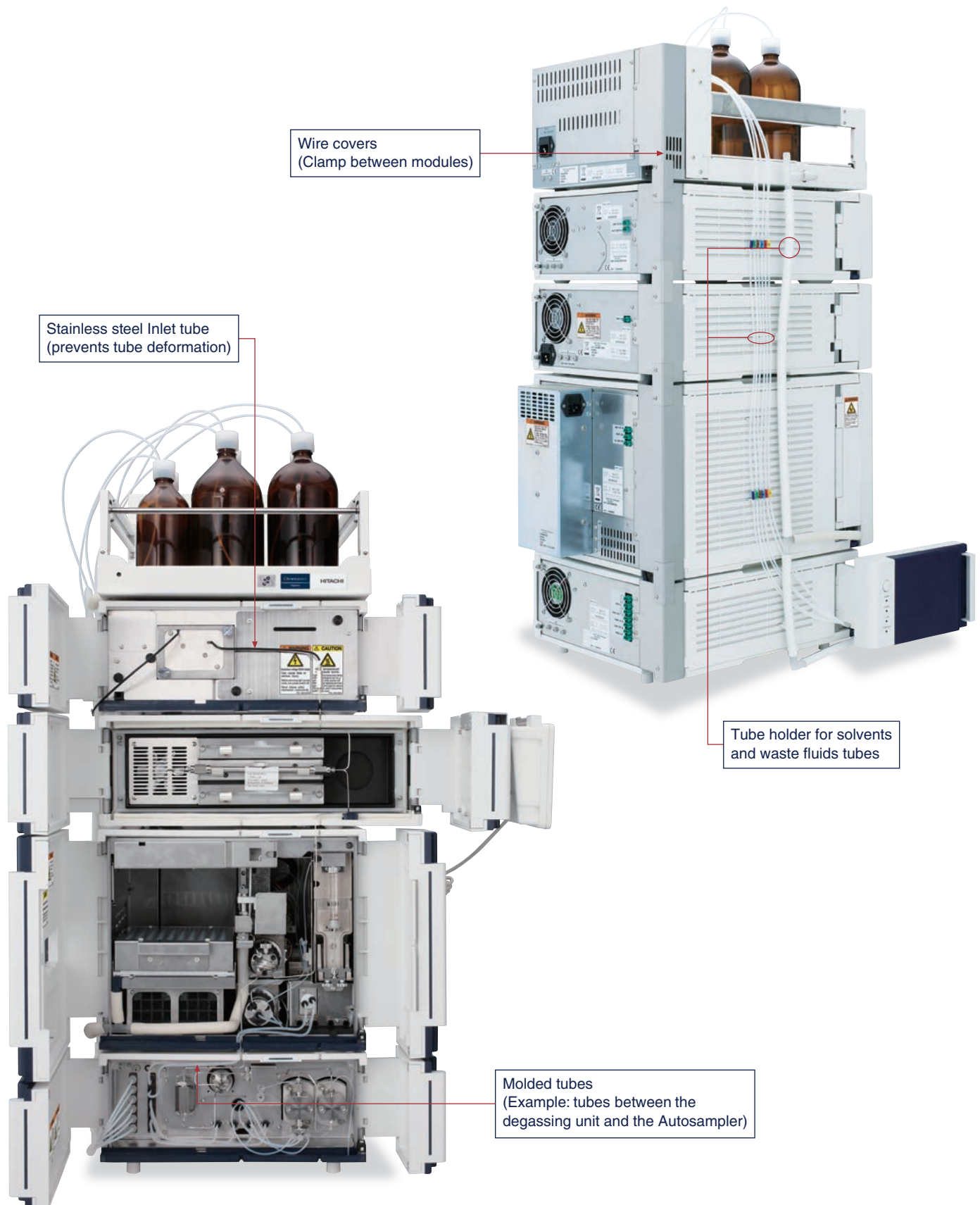


Front access
(Example: replacing lamps)



*The solvent bottles on the instrument are not included in Chromaster.

system design



Chromaster[®] Modules

5110/5160 Pump 5110/5160 Pump with Auto-purge valve



Main optional accessories

- | | | |
|--|-----------------------------------|---|
| • Low-pressure Gradient Unit for 5110/5160 (with Conventional Mixer) | • Manual Injector Holder | • THF kit for 5110/5160 |
| • 6-channel Degassing unit (480 µL / ch) | • Column Holder | • THF kit for 5110 with AP valve |
| • Plunger Washing Pump | • UI Pad for 5110/5160 | • THF kit for 5160 with AP valve |
| • Conventional Mixer (700 µL) | • AC adapter (150 W) | • THF kit for Low Gr unit for 5110/5160 |
| • Semi-micro Mixer (200 µL) | • Hexane Check Valve Set | • Low dispersion piping kit |
| • Dynamic Mixer (2,000 µL) | • Hexane Check Valve Set for 5160 | • Low dispersion piping kit for 5280 |

5310/6310 Column Oven



Main optional accessories

- 2-position, 6-port valve for 5310*
 - 3 column selector valve for 5310*
 - UI Pad for 5310
 - MEM Column Fitting for 6310
 - 6 column selector valve for 6310
- * Withstand pressure 40 MPa

5610 MS Detector



Main optional accessories

- System piping kit
- * Control and analysis software is standard accessory.

5410 UV Detector



Main optional accessories

- Analog signal output unit (1ch)
- UI Pad for 5410/5420
- AC adapter (150 W)
- Thermo cell for 5410/5420

5420 UV-VIS Detector



- Semi-micro flow cell unit for 5410/5420
- HP SM flow cell unit for 5410/5420
- Preparative flow cell unit for 5410/5420
- Thermo cell control unit for 5410/5420

5430 Diode Array Detector



Main optional accessories

- 2ch Analog signal output unit for 5430
- AC adapter (150 W)
- Semi-micro flow cell unit for 5430
- HP SM flow cell unit for 5430
- Preparative flow cell unit for 5430
- Thermo cell for 5430
- Thermo cell control unit for 5430

Organizer



- Can be used as a cabinet that holds solvent bottles
- Supplies power to one pump, one autosampler, one detector (one UV detector, one UV-VIS detector, one Diode array detector or one RI detector), and one interface control board

5260/5280 Autosampler 5260/5280 Autosampler with Thermostat/Thermo Unit



5260 Main optional accessories

- | | | |
|--------------------------------|--|-----------------------------------|
| • Sample rack (4 mL × 72) | • Thermostat micro plate rack (2 pcs) | • AC adapter (150 W) |
| • Thermostat rack (4 mL × 72) | • Syringe kit (70 µL, 700 µL, 3.5 mL) | • Wash pump (for Hexane) for 5260 |
| • Sample rack (1 mL × 195) | • Sample loop kit (5 µL, 10 µL, 20 µL) | • THF kit for 5260 |
| • Thermostat rack (1 mL × 195) | • 2-channel Degassing unit (250 µL / ch) | • THF kit for 5280 |
| • Micro plate rack (2 pcs) | • UI Pad for 5260 | |

5280 Main optional accessories

- | | | |
|---------------------------------|--|----------------------|
| • Sample rack (4 mL × 128) | • Thermo unit micro plate rack (3 pcs) | • AC adapter (150 W) |
| • Thermo unit rack (4 mL × 128) | • Syringe kit (500 µL, 1 mL) | |
| • Micro plate rack (3 pcs) | • UI Pad for 5280 | |

5440 Fluorescence Detector Advanced Spec



Main optional accessories

- Analog signal output unit (1ch)
- UI Pad for 5440

5450 RI Detector



Main optional accessories

- AC adapter (150 W)

Interface control board (IFC board)

Interface box



Front side



Back side

* The Photo is an Interface box(L)with another AID board installed.

- Interface control board (IFC board)
(for installing a 5260 autosampler)
- Interface box (S) (with an IFC board)
- Interface box (L) (with IFC board and one AID board)

* For systems that do not have an organizer, AC adapter (60 W) is required.

GUI Controller



- GUI Controller * Interface Control Board is required.

AC adapter

- AC adapter (60 W) (for IFC board/Interface box)
* For systems that do not have an organizer
- AC adapter (150 W)
(for Pump, Autosampler and UV/UV-VIS/Diode array detector/RI detector)
* For systems that do not have an organizer

Chromaster[®] Specifications

Main specifications

5110/5160 Pump

Item	Specifications	
	5110	5160
Pumping system	Dual plunger reciprocating pump system Series connection, pulsation elimination system	
Operating flow rate range	0.001 to 9.999 mL/min	0.001 to 5.000 mL/min
Maximum operating pressure	40 MPa (0.001 to 5.000 mL/min) 20 MPa (5.001 to 9.999 mL/min)	60 MPa (0.001 to 2.500 mL/min) 30 MPa (2.501 to 5.000 mL/min)
Flow rate accuracy	±1.0 % or ±2.0 µL /min, whichever is greater (0.010 to 5.000 mL/min, under a specified condition)	±1.0 % or ±2.0 µL /min, whichever is greater (0.010 to 2.500 mL/min, under a specified condition)
Flow rate precision	SD0.02 min or RSD0.075 %, whichever is greater, under a specified condition	
Materials of wetted parts	Stainless steel, ruby, sapphire, ceramics, PTFE, carbon-containing PTFE, PEEK* ¹ (Auto-purge valve)	Stainless steel, ruby, sapphire, ceramics, PTFE, carbon-containing PTFE, Vespel* ² (Polyimide resin) (Auto-purge valve)
Functions of GLP	(a)Total flow rate display (b)Double speed error (c)Changeover number of times of the proportioning valve (d)Running time of the dynamic mixer (e)Changeover number of times of the auto purge valve (f)Operating time of the plunger wash pump	
Dimensions and weight	340 (W) × 440 (D) × 140 (H) mm, Approx.14 kg	
Power supply and Power consumption	DC 24 V, 4 A (Maximum) 96 W (power supply from organizer)	
Others	Pumps are available with and without an auto-purge valve.	

Low pressure gradient unit (Optional)

Item	Specifications
Number of mixed solvents	Up to 4
Mixing system	Electromagnetic valve open/close time control system
Composition accuracy	±0.5 % (5 to 95 %)
Flow rate range recommended for analysis	0.4 to 1.8 mL/min

5260/5280 Autosampler

Item	Specifications	
	5260	5280
Sample capacity	120 × 1.5 mL (Standard)	200 × 1.5 mL (Standard)
Sample injection system	Loop injection method (Cut injection, All volume injection, Full loop injection method)	Direct injection method
Syringe volume	175 µL (standard) (option syringe available)	100 µL (standard) (option syringe available)
Sample injection volume	0.1 to 50 µL (100 µL loop) (standard), 0.1 to 100 µL (200 µL loop) (accessory)	0.1 to 50 µL (standard)
Injection volume precision	≤0.2 %RSD (10 µL, cut injection method) ≤0.25 %RSD (5 µL, cut injection method) ≤0.9 %RSD (1 µL, cut injection method) ≤1.0 %RSD (1 µL, All volume injection method) ≤0.2 %RSD (5 µL, full loop method)	≤0.3 %RSD (10 µL, standard syringe)
Carry-over	≤0.003 % (cut method)	≤0.003 % RSD (under a specified condition)
Materials of wetted parts	Stainless steel, Vespel* ² , fluororesin, PP, EPDM, PEEK* ¹ , UHMWPE	Stainless steel, PEEK* ¹ , fluororesin, PP, EPDM, Vespel* ² , UHMWPE, DLC
Withstand pressure	60 MPa	60 MPa
Temperature setting range	1 to 45 °C (1 °C step), using Autosampler with a thermostat	1 to 35 °C (1 °C step), using Autosampler with a thermo unit
Temperature control range	[RT-21 °C] to [RT+25 °C] and range of the temperature setting (with a vial) [RT-15 °C] to [RT+20 °C] and range of the temperature setting (with a MTP) (using Autosampler with thermostat) An autosampler (with a thermostat) should be selected for the analysis of thermally sensitive samples.	4 to (RT - 5) °C at ambient temperature of 15 to 25 °C and humidity of 60 %
Functions of GLP	a)Injection port seal (b)Injection valve seal (c)Syringe valve seal (d)Syringe (e) Wash pump operation time	(a)Injection port seal (b)Injection valve seal (c)Syringe valve seal (d)Syringe
Dimensions and weight	340 (W) × 440 (D) × 280 (H) mm, Approx.23 kg (with thermostat, 340 (W) × 500 (D) × 280 (H)mm, approx.26 kg)	340 (W) × 520 (D) × 320 (H) mm, Approx.24 kg (with thermo unit, approx.26 kg)
Power supply and Power consumption	DC24 V, 4 A (Maximum)/96 W (power supply from organizer) AC100 to 240 V (50 Hz/60 Hz) 110 VA (using Autosampler with thermostat)	DC24 V, 4 A AC100 to 240 V ±10 % (50 Hz/60 Hz) 110 VA (using Autosampler with thermo unit)
Others	Autosamplers are available with and without a thermostat.	Autosamplers are available with and without a thermo unit.

5310/6310 Column Oven

Item	Specifications	
	5310	6310
Temperature control system	Heating/Cooling block + air circulation system	
Temperature setting range	1 to 85 °C (1 °C step)	4 to 90 °C (1 °C step)
Temperature control range	[Ambient temperature -15 °C] to [Ambient temperature +60 °C] and range of the temperature setting	[Ambient temperature -15 °C] to [Ambient temperature +75 °C] and within temperature setting range
Temperature accuracy	± 1.0 °C (20 to 85 °C, part of Pre-heat)	± 0.5 °C (20 to 50 °C), ± 1.0 °C (51 to 90 °C), after calibration
Temperature control precision	SD≤0.2 °C (under a specified condition)	± 0.1 °C (20 to 90 °C)
Time program functions	• Temperature setting • Switching valve (changing of position)	• Temperature setting • Switching valve (changing of position)
Functions of GLP	Recording of the changeover number of times and exchange dates of the optional changeover valve.	
Column capacity	300 mm × 3 (Maximum)	
Dimensions and weight	410 (W) × 440 (D) × 140 (H) mm , Approx.13kg	165 (W) × 515 (D) × 689 (H) mm (Legs are not included), Approx.24 kg
Power supply and Power consumption	AC100 to 240 V (50 Hz/60 Hz)/230 VA (with optional valves) *The Organizer and the AC adaptor are not necessary.	AC100 to 240 V (50 Hz/60 Hz)/300 VA *The Organizer and the AC adaptor are not necessary.

■ 5410 UV Detector

Item	Specifications
Optical system	Double-beam ratio photometric system
Light source	D ₂ lamp, Hg lamp for checking wavelength
Wavelength range	190 nm to 600 nm
Wavelength accuracy	±1 nm
Spectral bandwidth	6 nm
Noise	≤0.5 × 10 ⁻⁴ AU at 250 nm, under a specified condition
Drift	≤1.0 × 10 ⁻⁴ AU/h at 250 nm, under a specified condition
2-wavelength measurement	2 wavelengths in wavelength regions 190 to 350 nm and 351 to 600 nm, respectively (Minimum wavelength interval 5 nm, max. wavelength interval 160 nm with data sampling period set at 400 ms)
Response	0.01, 0.02, 0.05, 0.1, 0.5, 1, 2 sec
Materials of wetted parts	Quartz glass, Fluororesin, Stainless steel
Functions of GLP	(a)D ₂ lamp/Hg lamp lighting time, lighting number of times, and replacement record (b)Key lock (c)D ₂ lamp energy check and D ₂ lamp wavelength check (d)Hg lamp wavelength check
Flow cell	13 μL (Optical path length 10 mm)
Thermostatically flow cell	Optional, Environmental temperature range: 4 to 30°C
Dimensions and weight	340 (W) × 440 (D) × 140 (H) mm, Approx. 13 kg
Power supply and Power consumption	DC24 V, 2.5 A (Maximum)/60 W (power supply from organizer) * Please purchase the AC adaptor (150 W) when there is no organizer.

■ 5430 Diode Array Detector

Item	Specifications
Detection type	1,024 bit PDA
Light source	D ₂ lamp, W lamp, Hg lamp for checking wavelength
Wavelength range	190 to 900 nm
Wavelength accuracy	±1 nm
Noise	≤0.5 × 10 ⁻³ AU at 250 nm, 600 nm, under a specified condition
Drift	≤0.4 × 10 ⁻³ AU/h at 250 nm, 600 nm, under a specified condition
Response	0.01, 0.02, 0.05, 0.1, 0.5, 1, 2 sec
Slit type	1 nm/4 nm (Variable)
Materials of wetted parts	Quartz glass, Fluororesin, Stainless steel
Functions of GLP	(a)D ₂ lamp/W lamp/Hg lamp lighting time, lighting number of times, and replacement record (b)D ₂ lamp energy check (c)W lamp energy check (d)Hg lamp wavelength check (e)D ₂ lamp wavelength check
Flow cell	13 μL (Optical path length 10 mm)
Thermostat flow cell	Optional, Environmental temperature range: 15 to 30°C
Dimensions and weight	340 (W) × 440 (D) × 140 (H) mm, Approx. 14 kg
Power supply and Power consumption	DC24 V, 3.5 A (Maximum) /84 W (power supply from organizer) * Please purchase the AC adaptor (150 W) when there is no organizer

■ 5450 RI Detector

Item	Specifications
Refractive index range	1 to 1.75
Noise	≤2.5 × 10 ⁻⁹ RIU
Drift	≤0.2 × 10 ⁻⁶ RIU/h
Time constant	0.05, 0.1, 0.25, 0.5, 1, 1.5, 2, 3, 6 sec
Temperature control range	OFF, and 30 to 50 °C
Materials of wetted parts	Stainless steel, Fluororesin, Quartz glass, Sapphire (Al ₂ O ₃)
Dimensions and weight	340 (W) × 440(D) × 140 (H) mm, excluding projections, Approx. 14 kg
Power supply and Power consumption	DC24 V, 5 A (Maximum)/120 W (Maximum) (power supply from organizer) * Please purchase the AC adaptor (150 W) when there is no organizer.

■ 5610 MS Detector

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. 52 kg
Power supply and Power consumption	AC 200 to 240 V (50 Hz/60 Hz)/1,000 VA
N ₂ gas usage	Max flow rate 3.4 L/min, Pressure 300 ± 20 kPa

■ 5420 UV-VIS Detector

Item	Specifications
Optical system	Double-beam ratio photometric system
Light source	D ₂ lamp, W lamp, Hg lamp for checking wavelength
Wavelength range	190 nm to 900 nm
Wavelength accuracy	±1 nm
Spectral bandwidth	6 nm
Noise	≤0.5 × 10 ⁻⁴ AU at 250 nm, 600 nm, under a specified condition
Drift	≤1.0 × 10 ⁻⁴ AU/h at 250 nm, 600 nm, under a specified condition
2-wavelength measurement	2 wavelengths in wavelength regions 190 to 350 nm, 351 to 400 nm, 401 to 600 nm and 601 to 900 nm (D ₂ &W mode) 2 wavelengths in wavelength regions 190 to 350 nm and 351 to 600 nm (D ₂ mode) 2 wavelengths in wavelength regions 380 to 600 nm and 601 to 900 nm (W mode) (Minimum wavelength interval 5 nm, max. wavelength interval 160 nm with data sampling period set at 400 ms)
Response	0.01, 0.02, 0.05, 0.1, 0.5, 1, 2 sec
Materials of wetted parts	Quartz glass, Fluororesin, Stainless steel
Functions of GLP	(a)D ₂ lamp/W lamp/Hg lamp lighting time, lighting number of times, and replacement record (b)Key lock (c)D ₂ lamp energy check and D ₂ lamp wavelength check (d)W lamp energy check (e)Hg lamp wavelength check
Flow cel	13 μL (Optical path length 10 mm)
Thermostatically flow cell	Optional, Environmental temperature range: 4 to 30°C
Dimensions and weight	340 (W) × 440 (D) × 140 (H) mm, Approx. 14 kg
Power supply and Power consumption	DC24 V, 3.6 A (Maximum)/87 W (power supply from organizer) * Please purchase the AC adaptor (150 W) when there is no organizer.

■ 5440 Fluorescence Detector Advanced Spec

Item	Specifications
Light source	Xe lamp, Hg lamp for checking wavelength
Wavelength range	Ex: 200 to 850 nm Em: 250 to 900 nm (Change photomultiplier at 731 nm or more)
Wavelength accuracy	± 3 nm
Response	0.01, 0.02, 0.05, 0.1, 0.5, 1, 2 sec
Spectral bandwidth	Ex: 15 nm, Em: 15, 30 nm (Variable)
Sensitivity	> 1,200 S/N ratio of water raman (Bandwidth 30 nm, Ex=350 nm, TC=2 s, Baseline method, standard cell)
Materials of wetted parts	Quartz glass, Fluororesin, Stainless steel
Functions of GLP	(a)Lamp energy check, (b)Wavelength accuracy check, (c)Lamp lighting time, lighting number of times, and replacement record
Flow cell	Irradiation volume 12 μL
Thermostat flow cell	Optional, Environmental temperature range: 4 to 30°C
Dimensions and weight	340 (W) × 440 (D) × 280 (H) mm, Approx. 26 kg
Power supply and Power consumption	AC100 to 240 V (50/60 Hz)/330 VA * The Organizer and the AC adaptor are not necessary.

■ Organizer

Item	Specifications
Output power	DC24 V, 450 W Supplies power to one pump, one autosampler, one detector (one UV detector, one UV-VIS detector, one Diode array detector, or one RI detector), and one interface control board
Bottle capacity and the space	1.0 L bottle × 6 and 500 mL bottle × 3 (Maximum), 314 (W) × 280.8 (D)mm
Dimensions and weight	340(W) × 420(D) × 200(H)mm, approx. 9 kg
Power supply and Power consumption	AC100 V to 240 V (50 Hz/60 Hz), 520 VA

*1 "PEEK" is a registered trademark of VICTREX PLC. in the European Union.

*2 VespeL: "VESPEL" is a registered trademark of E I Du Pont De Nemours and Company in Denmark and Switzerland.

LaChrom column series

A wealth of column choices to fulfill a broad range of analysis needs



In addition to LaChrom II C18 with a wide pH tolerance range, 4 types of C18 columns with different separation characteristics are available

By using these columns according to the characteristics of the samples, the analysis conditions can be optimized.

[LaChrom II C18]

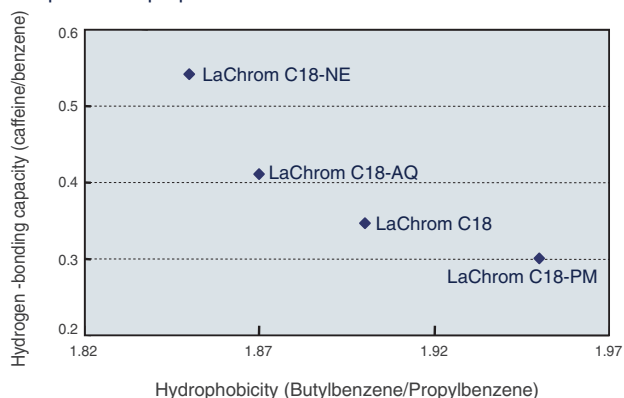
An inorganic-organic composite type silica material with the improved physical and chemical durability compared to the conventional silica gel is used. This C18 column, with a characteristic of the excellent peak symmetry, has a wide application range because of the superior alkali resistivity as well as the low adsorption. Mobile phases with a wide pH range between 1 and 12 can be used and therefore, it is possible to freely control the retention and selectivity for ionic compounds.

[LaChrom C18 series]

Four different types of high-purity silica-based C18 columns are available. Selections can be made based on the target compounds and mobile phases.

For LaChrom C18/C18-AQ, 2 μm particles packing is also available. It provides lower pressure and higher-speed analysis, compared with sub-2 μm particle column.

Comparison of properties of HITACHI LaChrom ODS series columns



Guard columns and guard column holders are also available. (3 μm or 5 μm particles packing)
Please contact us for the column catalogue describing the prices and other details.

■ LaChrom II column • LaChrom column series

Product name	Particle size (μm)	Column size (mm I.D. x mm L.)	P/N
LaChromUltra II C18 An inorganic-organic composite type silica material is used. Excellent peak shape and alkali resistivity (pH 1 to 12)	1.9	2.0 x 50	889-0901
		2.0 x 100	889-0902
		2.0 x 150	889-0903
		3.0 x 50	889-0904
		3.0 x 100	889-0905
LaChrom II C18 Same particle packing as LaChromUltra II C18	3	4.6 x 100	889-0909
		4.6 x 150	889-0910
	5	4.6 x 150	889-0911
		4.6 x 250	889-0912
LaChromUltra C18 Standard C18 column First choice for various analyses * Lower pressure than a sub-2 μm particle column, resulting in high-speed analyses.	2	2.0 x 50	891-5000
		2.0 x 75	891-5001
		2.0 x 100	891-5002
		3.0 x 50	891-5010
		3.0 x 75	891-5011
		3.0 x 100	891-5012
LaChrom C18 Same particle packing as LaChromUltra C18	3	4.6 x 100	891-5030
		4.6 x 150	891-5035
	5	4.6 x 150	891-5050
		4.6 x 250	891-5055
LaChromUltra C18-AQ Low-carbon ODS column for highly polar compounds Compatible with 100% aqueous mobile phases * Lower pressure than a sub-2 μm particle column, resulting in high-speed analyses.	2	2.0 x 50	891-5021
		2.0 x 75	891-5022
		2.0 x 100	891-5023
		3.0 x 50	891-5024
		3.0 x 75	891-5025
		3.0 x 100	891-5026
LaChrom C18-AQ Same particle packing as LaChromUltra C18-AQ	3	4.6 x 100	891-5036
		4.6 x 150	891-5037
	5	4.6 x 150	891-5058
		4.6 x 250	891-5059
LaChrom C18-PM Polymeric C18 column High planer recognition capability and broad-range pH tolerance (pH 1 to 10)	3	4.6 x 100	891-5038
		4.6 x 150	891-5039
	5	4.6 x 150	891-5062
		4.6 x 250	891-5063
LaChrom C18-NE Non-encapped C18 column Application of the interaction with silanol groups for separation	5	4.6 x 150	891-5062
		4.6 x 250	891-5063

ChromAssist Data Station

ChromAssist supports HPLC analysis with features from a variety of perspectives based on user preferences.

Friendly graphical user interface (GUI)

ChromAssist

Operations can be performed using an intuitive screen with each parameter represented by an image.

Inherits the D-2000, Chromaster System Manager workflow

Status: Confirm system status
Method: Create and select analysis conditions
S.Table: Create and select analysis schedule
Queue: Create and select analysis schedule

Pump 1 Manual Setting

	Min	Max
Pressure (MPa)	0.0	40.0
Flow Rate (mL/min)	0.000	

A B C D
 % 100.0 0.0 0.0 0.0

Pumping conditions can be entered here.

*1 DAD: Diode Array Detector

*2 MSD: MS Detector

Support and Maintenance

The enhanced assistance features reduce the time spent for complex maintenance and troubleshooting in analytical work.

Maintenance

- Replacement of consumable parts
- Consumable parts list
- Performance confirmation
- Daily check
- Column

Basic of column
=> Handling the columns

ChromasterS410 UV DETECTOR

- Replacing D2 Lamp
- Washing and Replacing Flow Cell
- Replacing Hg Lamp
- Cleaning Leak Sensor

Replacing D2 Lamp

[Promotional] Switch three screws of the D2 Lamp cover and separate this cover. Remove lead wire one by one through the cover.

Baseline Fluctuation, noise and drift

In order to prevent troubles

Troubleshooting

=> Baseline fluctuation, noise and drift

At the time of poor reproducibility and carry-over.
=> Poor reproducibility, carry-over

At the time of increased and fluctuated pressure
=> Pressure abnormality

Ultra High Performance Liquid Chromatograph

ChromasterUltra^{Rs}

ChromasterUltra[®] Rs

A UHPLC system developed to meet the essential requirements of separation analysis

High Resolution

The newly developed LaChromUltra II column line includes UHPLC columns up to 250 mm long. Excellent high-resolution analysis can be achieved when used with the ChromasterUltra Rs, which features a minimal system volume.

High Sensitivity

Various features, such as the high-sensitivity diode array detector, low-pulsation solvent delivery unit, and extremely low carry-over, autosampler combine to provide high-sensitivity analysis.

Usability

The entire system has been designed for ease of use, with many unique features including complete control via the GUI Controller*, tool-less MEM column fitting, and a built-in waste tank, just to name a few.

* Optional

* The solvent bottles on the instrument are not included in ChromasterUltra Rs.

Please contact us for the product-specific catalog, which is available separately.



Science for
a better tomorrow

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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 its 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 an example of measurement; the individual values cannot be guaranteed.

 **Hitachi High-Tech Science Corporation**

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