Chromaster

Outstanding performance
Easy-to-use
Robustness

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.
Chromaster is a coined word combining Chromatograph and Master. It represents Hitachi’s vision of developing and providing a liquid chromatograph system that can make valuable contributions as a powerful tool for a skilled, “master,” chromatographer.

Easy-to-use

Outstanding performance

Robustness

After putting solvent bottles on the organizer, please lift the handle located on the front side of the organizer.
Outstanding performance

Two performance capabilities supporting data reliability: the excellent reproducibility made possible by the pump and autosampler and the easy-to-use and robustness.

[Easy-to-use]

Beyond the simplicity of operation and ease of use, a critical requirement for HPLC is ease of maintenance.

[Auto-purge function]

Provides an automatic air interface and permits the operation of analysis as a stand-alone basis.

[Auto-plunger washing function]

Prevents the precipitation of salts onto the plunger surface.

[Autosampler with thermostat]

Ensures reproducible performance even when the autosampler is operated in a range of up to 25 degrees above ambient temperature.

[Low-volume degassing unit]

Shorter solvent purging time for improved reproducibility of gradient and retention times.

[Diode Array Detector]

A variable air-volume fan for the diode array detector and a new cover designed for the optical system and achieves a further reduction in drift.

摄入 returned by the pump and autosampler and the

outstanding performance of the autosampler.

Two performance capabilities supporting data reliability: the excellent reproducibility made possible by the pump and autosampler and the easy-to-use and robustness.

[Robustness]

With a module width of 340 mm and a depth of 440 mm, the system provides space savings.

Most optional accessories are internally mounted to reduce HPLC system height. At the same time, the external covers are made of heat-resistance, chemical-tolerant, and UV irradiation-withstanding materials. The internal walls of the module are made with SUS material for the prevention of corrosion due to the humidity and the vaporization of solvents that prevail in the system. To minimize any adverse effect on the module in event of solvent leakage, the system incorporates an optimal leak sensor and a gas sensor.

A specially designed cover for the spectrometer and a variable air-volume fan

A large-column (2.0 mm inner diameter) accommodates a 300 mm to 500 mm column, fitted with a pressure

[Robustness]

With a module width of 340 mm and a depth of 440 mm, the system provides space savings. Most optional accessories are internally mounted to reduce HPLC system height. At the same time, the external covers are made of heat-resistance, chemical-tolerant, and UV-irradiation-withstanding materials. The internal walls of the module are made with SUS material for the prevention of corrosion due to the humidity and the vaporization of solvents that prevail in the system. To minimize any adverse effect on the module in event of solvent leakage, the system incorporates an optimal leak sensor and a gas sensor.
Outstanding performance

Two performance capabilities supporting data reliability: the excellent reproducibility made possible by the pump and autosampler and the excellent stability of the column oven and detector.

Pump

- Excellent gradient performance and the excellent flow rate precision
- The pump can accommodate various mobile phases, including high-viscosity solvents, and support high-efficiency columns. With the adoption of a variable air-volume fan and the provision of a specially designed cover for the spectrometer and a variable air-volume fan, the spectrometer greatly reduce the temperature change in the detector module. The result is a 30% shortening of solvent purging time.

Autosampler

- Excellent standard injection volume precision and the carry-over rate precision
- The newly adopted high-precision syringe drive unit provides excellent injection precision and low carry-over. Excellent injection volume precision and low carry-over are also ensured. Using the variable air-volume fan in the autosampler and the autosampler, the reproducibility made possible by the pump and autosampler and the stability of the column oven and detector.

Column oven

- Excellent stability of the column oven and detector.
- The Chromaster column management system manages the Log information on analytical conditions such as temperature and pressure. Log information can be written and read through a connector or a PC USB port mounted on the Chromaster autosampler.

Easy-to-use

Beyond the simplicity of operation and ease of use, a critical requirement for HPLC is ease of maintenance.

- [Slit controller] Provides an interactive user interface and permits the operation of analyzers on a spreadsheet basis.
- [Auto-plunger function] [Auto-purge function] [Auto-purge function] [Auto-purge function]
- [Low-volume degassing unit] [Low-volume degassing unit]
- [Auto-plunger washing function] [Auto-plunger washing function]
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- [Auto-plunger washing function] [Auto-plunger washing function]

Robustness

The Hitachi reputation for instrument robustness and reliability continues with the Chromaster, which is made using stronger materials and is manufactured with Hitachi’s strict quality control standards.
Introducing the Chromaster modules

Fulfilling the customer’s needs.

This goal underlies the data reliability and the ease of operation of the system. Intuitive operation based on an LCD touch panel. Consideration to details. True value of HPLC is here in the Chromaster.
Improved gradient performance and excellent flow rate precision

5110 Pump

New low-pressure gradient mode
High Frequent Mode (HFM)

"HFM" refers to the mode that has the double switching function of the proportioning valve for solvent changes. The HFM mode combined with Hitachi’s proprietary real-time feedback method delivers low pulsation pumping, resulting in excellent gradient*1 and retention time reproducibility without the use of mixers at 800 μL system delay volume*2 operations.

*1 Low-pressure gradient
*2 Configurations: Pump, Autosampler,Column oven, and Detector (UV and Diode Array detector)

Pump options

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

Main specifications:
- Maximum number of solvents: 4
- Maximum number of autosampler solvents: 2
- Flow rate setting range: 0.001 to 9.999 mL/min
- Time setting range: 1 to 30 min

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
- Time setting range: 1 to 30 min

Schematics on conventional switching function

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

Can also accept semi-dynamic mixers

Plunger washing pump (optional)

Main specifications:
- Flow rate setting: 1 mL/min, fixed
- Time setting range: 1 to 300 sec
- Controlled by CDS and auto-purge valve
- Automatic plunger washing function per one analysis available

Notes:
(1) Plunger washing mechanism: standard
(2) Automatic plunger washing using only Item (1) is subject to the following conditions:
- Requires an autosampler
- Not compatible with two-solvent washing function in the needle inner wall and the injection valve on autosampler

Measurement condition

Mobile phases: A: Water + 0.1% TFA B: CH3CN + 0.1% TFA

Gradient:
- Gradient mode: High Frequent Mode
- Gradient: A:B (min)=65:35 (0) → 5:95 (15) → 65:35 (20)

If you need even better gradient/retention time reproducibility and high-sensitivity analyses

Hitachi recommends the use of HFM and static mixer in combination.

For users of LaChrom Elite L-2000 system (model L-2130 pump with low-pressure gradient)

The L-2000 system and Chromaster have different system delay volumes. To use existing LaChrom Elite methods on Chromaster, use the conventional solvent mixing mode (Low Frequent Mode, LFM) and the conventional mixer: Also, delay volume kits are available (optional).

Analysis of alkylphenones 9 components

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

<table>
<thead>
<tr>
<th>Component</th>
<th>Retention Time</th>
<th>%RSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetanilide</td>
<td>3.220</td>
<td>0.03</td>
</tr>
<tr>
<td>Acetophenone</td>
<td>5.397</td>
<td>0.04</td>
</tr>
<tr>
<td>Propiophenone</td>
<td>7.328</td>
<td>0.03</td>
</tr>
<tr>
<td>Butylophenone</td>
<td>9.006</td>
<td>0.02</td>
</tr>
<tr>
<td>Benzophenone</td>
<td>9.593</td>
<td>0.02</td>
</tr>
<tr>
<td>Valerophenone</td>
<td>10.642</td>
<td>0.02</td>
</tr>
<tr>
<td>Hexanophenone</td>
<td>12.214</td>
<td>0.02</td>
</tr>
<tr>
<td>Heptanophenone</td>
<td>13.679</td>
<td>0.02</td>
</tr>
<tr>
<td>Octanophenone</td>
<td>15.026</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Overlay of 6 chromatograms

If you need even better gradient/retention time reproducibility and high-sensitivity analyses

Hitachi recommends the use of HFM and static mixer in combination.
Excellent injection volume reproducibility

A new high-precision syringe drive unit has improved reproducibility in the syringe positions and the syringe measurement, resulting in a reproducibility of 0.2% RSD or less (with a 10 μL injection volume, using a cut injection method and under specified conditions).

**Injection volume reproducibility data (cut injection method) (n=10)**

![Injection volume reproducibility data](image)

Improved throughput for sample processing

An integrated Interface Control Board (IFC) that controls the communication between the chromatography data station (CDS) and the Chromaster system reduces the response time. The interval of CDS’s single run direction to the autosampler response is about 10 seconds. Further, the high-speed, high-precision control of the needle XYZ axis motion mechanism achieves a minimum injection cycle time of about 30 seconds (on a stand-alone basis, under specified conditions).

Excellent injection volume reproducibility and low carry-over

The first hurdle to be overcome in reducing the amount of carry-over is to create a structure by eliminating the dead volume in the autosampler flow path. 5210 autosampler represents a revamping of the basic structure to minimize the dead volume. Additionally, active wash of the needle outer wall by dedicated pump provides constant washing effect. The result is extremely low carry-over.

**Extremely low carry-over**

![Extremely low carry-over](image)

**Other features**

- Automatic door lock mechanism: The door is locked only when the needle/syringe are operating.
- 2-channel degassing unit: For 5210 Autosampler (250 μL/hr) (optional). Build-in autosampler degassing unit enable degassing even when system is utilized without Chromaster pump.
- A sample rack with a unique effluent flow path: The sample rack having a tilted radial effluent flow path prevents an accumulation of water of condensation at the bottom of the rack and ensures smooth water discharge.
- Temperature settings up to 1 to 45°C (Autosamplers w/ or without thermostat are available) + Controlled temperature is limited by ambient temperature
- Instrument and column data are transferred to the analyzer by using IFC.
- Built-in autosampler degassing unit enable degassing even when system is utilized without Chromaster pump.

**Additional settings for reducing the carry-over**

- Washing the needle outer wall prior to sample drawing
- 2-solvent washing for the needle inner wall/inside the injection valve

**Sample : 60 ppm methylparaben**

Eluent: 60% CH3OH

Column: 0.25×20 m, SUS coil

Flow rate: 1 mL/min

Detection: 265 nm

Measurement condition (under a specified condition)
5310 Column Oven

Adequate size with column compartment width of 375 mm

Easily accommodates a 300 mm analytical column fitted with a pre-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 pre-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. Also, the oven with a capability to regulate temperature from 15 degree below ambient temperature to ambient temperature +60°C can accommodate various applications.

Column management system (optional)

Hitachi column management system can manage the Log information on analytical columns and pre-columns from any manufacturer. Log information can be written and read through a connector mounted on the column oven or USB port in the computer. ID Tags can be used repeatedly.*3

Valve options for sample preparation and method evaluation

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.

Example: Deproteinization of the sample

Phenytoin standard reagent is added to human serum (10 μg/mL). The supernatant after centrifuge separation is injected.

Phenytoin

Phenytoin in serum

Column switching diagram

2-position, 6-port valve

Analytical column

Pre-treatment column

Valve options for sample preparation and method evaluation

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.
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 highest level of wavelength resolution.

**Excellent qualitative analysis performance**

The noise can achieve $0.5 \times 10^{-5}$ AU*2 (or less), for improved sensitivity more than before.

With a low drift of $0.1 \times 10^{-4}$ AU/hr*3 (or less), these detectors deliver excellent baseline stability.

*2, 3 Under a specified conditions

**Low noise, low drift, and a high sensitivity detection**

The two-wavelength simultaneous measurement function *4 permits measurements at short data acquisition interval of 400 ms *5 and 800 ms per wavelength. The result is chromatogram with sharp peak shapes.

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

**Two-wavelength simultaneous measurement function**

The two-wavelength detection function *6 permits measurements at short data acquisition interval of 400 ms*7 and 800 ms per wavelength. The result is chromatogram with sharp peak shapes.

*6 Controlled by CDS only
*7 400 ms is available only if the wavelength interval is 160 nm or less.

**Achievement of further low noise and low drift**

The Adoption of a variable air-volume fan and the provision of a specially designed cover on the spectrometer minimize the influence of temperature change around the optical system and achieve a further reduction in drift to $0.4 \times 10^{-3}$ AU/hr*1 (or less) and a reduction in lamp stabilization time by about 30% (in this company’s comparison).

*1 Under a specified conditions

**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**

You can perform wavelength checks in the ultraviolet region frequently used in HPLC, by using of 254 nm bright line from the Hg lamp. In combination with bright lines from the D2 lamp, checks are performed at six wavelengths, resulting in highly reliable data. The Hg lamp, which is immune to physical changes, is highly reliable and provides a long life.

**Excellent qualitative and quantitative analysis performance**

The noise can achieve $0.5 \times 10^{-5}$ AU (or less), for improved sensitivity more than before.

With a low drift of $0.1 \times 10^{-4}$ AU/hr (or less), these detectors deliver excellent baseline stability.

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

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*6 Controlled by CDS only
*7 400 ms is available only if the wavelength interval is 160 nm or less.
5440 Fluorescence Detector
5450 RI Detector

High sensitivity with an S/N ratio of 900 or higher in water Raman

The detector incorporates low-light loss optical systems featuring a three-dimensional optical axis layout optical design, 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 900 or higher (based on the baseline method) in water Raman.

Thermostat flow cell (optional)

Thermostat controlled flow cell that minimize the influence of ambient temperature changes is available. You can use the flow cells when you need to perform measurements at a fixed, stable sensitivity.

5440 Fluorescence Detector

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 in about 1 hour after it is turned 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).

Organizer

Organizer capable of accommodating various solvent bottles

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

<table>
<thead>
<tr>
<th>Example</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.785 L (U.S. gallon bottle) x 2 x 500 mL x 2</td>
</tr>
<tr>
<td>2</td>
<td>3.0 L (Japanese gallon bottle) x 2 x 500 mL x 2</td>
</tr>
<tr>
<td>3</td>
<td>2.5 L (EU gallon bottle) x 2 x 500 mL x 2</td>
</tr>
<tr>
<td>4</td>
<td>1.0 L bottle x 5 x 500 mL x 2</td>
</tr>
</tbody>
</table>

(1) to (3) are for isocratic, 2-liquid gradient analysis, designed for use in quality control operations. (4) is for method development work.

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, or one Diode array detector), and one interface control board. Additional modules require an (optional) AC adapter or AC input.

Thermostat controlled flow cell that minimize the influence of ambient temperature changes is available. You can use the flow cells when you need to perform measurements at a fixed, stable sensitivity.
Feature of the GUI controller

- The configuration comprising a color LCD monitor (5.7-inch color TFT display with LED back light) and a touch panel method makes for easy viewing and simple operations.
- All modules 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 tasks of system (Wake up), and post-analysis tasks of system (Sleep) can be created.
- 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 all units 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: Temperature control on/off, temperature settings, and valve switching
- Detector: Lamp on/off, auto-zero, purging on/off (RI detector)

Introduction of main screens and their functions

Main Settings in the modules

- Operation
  - Monitor: Data monitoring and status monitoring
  - Setup: Select method and sample parameters
  - Maintenance: Module calibration, setting of maintenance parameters, and GLP function

- Conditioning
  - Wakeup and Sleep programs

- Running
  - Single/sequence run method settings, and starting a run.

Examples of Wakeup/Sleep settings

1) The analysis will begin this afternoon. Finish the preparation run by 1 p.m.
2) The analysis will finish at 2 p.m. tomorrow.

Introduction of main screens and their functions

- Main Menu
  - Local Control
  - Configuration
  - Operation
  - Conditioning
  - Maintenance

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.

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: Temperature control on/off, temperature settings, and valve switching
- Detector: Lamp on/off, auto-zero, purging on/off (RI detector)
User oriented, convenient and smart system design

- 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.
Chromaster Modules

5110 Pump
5110 Pump with Auto-purge valve

Main optional accessories
- Low-pressure Gradient Unit for 5110 (with Conventional Mixer)
- Semi-micro Mixer (20 μL)
- UI Pad for 5110
- 4-channel Degassing unit (480 μL / ch)
- Dynamic Mixer (2,000 μL)
- AC adapter (150 W)
- Plunger Washing Pump
- Manual Injector Holder
- Conventional Mixer (500 μL)
- Column Holder

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

Main optional accessories
- Thermo cell for 5410/5420
- Analog signal output unit (1ch)
- UI Pad for 5410/5420
- AC adapter (150 W)
- Thermo cell control unit for 5430
- Thermo cell control unit for 5430
- 2ch Analog signal output unit
- AC adapter (150 W)

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, or one Diode array detector), and one interface control board

5310 Column Oven

Main optional accessories
- Column management system for 5310
- Injection, 6-port valve for 5310
- 3-position selector valve for 5310
- UI Pad for 5310

5210 Autosampler
5210 Autosampler with Thermostat

Main optional accessories
- Sample rack (4 mL x 72)
- Thermostat micro plate rack (2 pcs)
- 2-channel Degassing unit (200 μL / ch)
- Thermostat rack (4 mL x 72)
- Spring lid (75 μL)
- AC adapter (150 W)
- Sample rack (1 mL x 195)
- Sample loop kit (5 μL)
- AC adapter (150 W)
- Sample loop kit (10 μL)
- UI Pad for 5210
- Sample loop kit (50 μL)

AC adapter

- AC adapter (60 W) (for IFC board)
- For systems that do not have an organizer

Chromatography Data Station

For details, see the Chromatography Data Station brochure.
### Chromaster Specifications

#### B310 Pump

- **Item**
  - Type: Single
  - specifications
  - Pumping system: High-pressure reciprocating pump system
  - Sense connection, pulsation elimination system

- **Operating range**
  - Maximum operating pressure: 40 MPa (0 to 100 MPa)
  - Flow accuracy: ±0.5% (0.1 to 5.000 mL/min)

- **Features of GLP**
  - Flow rate accuracy
  - Pressure
  - Maximum operating pressure
  - Operating flow range
  - Pumping system

- **Specifications**
  - AC100 to 240 V (50 Hz/60 Hz)
  - 340 (W)
  - 440 (D)

#### B310 Autosampler

- **Item**
  - Type: Single
  - specifications
  - Sample capacity: 195 to 1 mL
  - Bottle capacity and the space: 72 to 1 mL
  - 2 to 100 μL

- **Operating range**
  - Temperature setting range: -20 to 120 °C
  - Flow rate range: 0.003 to 1 mL/min
  - Temperature accuracy: ±1.0°C (20 to 85 °C)
  - Time program functions
  - Functions of GLP
  - Temperature setting range
  - Flow rate accuracy
  - Pressure
  - Maximum operating pressure
  - Operating flow range
  - Pumping system

- **Specifications**
  - DC 24 V, 6 W (power supply from organiser)
  - 440 (D)
  - 140 (H) mm, Approx. 14 kg

#### B310 UV-Vis Detector

- **Item**
  - Type: Single
  - specifications
  - Light source: D2 lamp, W lamp, Hg lamp
  - Wavelength range: 200 to 850 nm
  - Power consumption: 450 W
  - 340 (W)
  - 440 (D)

- **Operating range**
  - Light source: D2 lamp, W lamp, Hg lamp
  - Wavelength range: 200 to 850 nm
  - Power consumption: 450 W
  - 340 (W)
  - 440 (D)

#### D303 Diode Array Detector

- **Item**
  - Type: Single
  - specifications
  - Light source: W lamp, Hg lamp for checking wavelength
  - Wavelength range: 200 to 850 nm
  - Power consumption: 450 W
  - 340 (W)
  - 440 (D)

#### D340 Fluorescence Detector

- **Item**
  - Type: Single
  - specifications
  - Light source: Hg lamp, Hg lamp for checking wavelength
  - Wavelength range: 200 to 850 nm
  - Power consumption: 450 W
  - 340 (W)
  - 440 (D)

#### D450 RI Detector

- **Item**
  - Type: Single
  - specifications
  - Light source: D2 lamp, W lamp, Hg lamp
  - Wavelength range: 200 to 850 nm
  - Power consumption: 450 W
  - 340 (W)
  - 440 (D)

#### D450 UV/VIS Diode Array Detector

- **Item**
  - Type: Single
  - specifications
  - Light source: D2 lamp, W lamp, Hg lamp
  - Wavelength range: 200 to 850 nm
  - Power consumption: 450 W
  - 340 (W)
  - 440 (D)

#### D5130 Column Oven

- **Item**
  - Type: Single
  - specifications
  - Temperature control range: 10 to 500 °C
  - Temperature setting range: 110 to 115 °C
  - Temperature accuracy: ±0.1°C (20 to 85 °C)

- **Operating range**
  - Flow rate range: 0.003 to 1 mL/min
  - Temperature accuracy: ±0.1°C (20 to 85 °C)
  - Time program functions
  - Temperature setting range
  - Flow rate accuracy
  - Pressure
  - Maximum operating pressure
  - Operating flow range
  - Pumping system

- **Specifications**
  - AC100 V, 3.5 A (Maximun) /90 W (power supply from organizer)
  - 450 (W)
  - 540 (D)

### Organizer

- **Item**
  - Type: Single
  - specifications
  - Power supply and Power consumption
  - Power supply and Power consumption

- **Operating range**
  - Output power: 450 V, 50 W
  - Power supply: 450 V, 50 W
  - Power supply: 450 V, 50 W
  - Power supply: 450 V, 50 W
A wealth of product offerings to fulfill a broad range of analysis needs

Four type of C18 columns with different separation properties

By using these columns according to the characteristics of the samples to be analyzed, highly optimized separations can be developed.

Comparison of properties of HITACHI LaChrom ODS series columns

In addition to ODS, Hitachi provides reverse phased, normal phase, and HILIC mode columns

C8 phenyl, cyano, amino, diol, and silica columns also available.

<table>
<thead>
<tr>
<th>Product name</th>
<th>Particle size (μm)</th>
<th>Column size (mm I.D. x mm L.)</th>
<th>P/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>HITACHI LaChrom C18</td>
<td>3</td>
<td>4.6×100 4.6×150</td>
<td>891-5030 891-5035</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.6×150 4.6×200</td>
<td>891-5030 891-5035</td>
</tr>
<tr>
<td>HITACHI LaChrom C18-NE</td>
<td>3</td>
<td>4.6×100 4.6×150</td>
<td>891-5030 891-5035</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.6×150 4.6×200</td>
<td>891-5030 891-5035</td>
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Guard columns (Holders and Cartridges) are also available.
LaChrom C18 and LaChrom C18-AQ are also available for UHPLC (3 μm particle size).

By using these columns according to the characteristics of the samples to be analyzed, highly optimized separations can be developed.

Comparison of properties of HITACHI LaChrom ODS series columns

In addition to ODS, Hitachi provides reverse phased, normal phase, and HILIC mode columns

C8 phenyl, cyano, amino, diol, and silica columns also available.

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<th>Product name</th>
<th>Particle size (μm)</th>
<th>Column size (mm I.D. x mm L.)</th>
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</table>

Guard columns (Holders and Cartridges) are also available.
LaChrom C18 and LaChrom C18-AQ are also available for UHPLC (3 μm particle size).