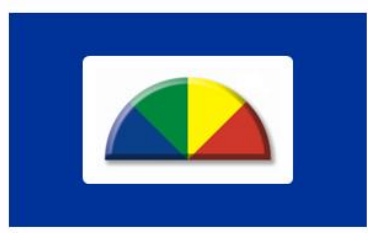


SunChrom HPLC

Customised HPLC Systems for Highest Performance

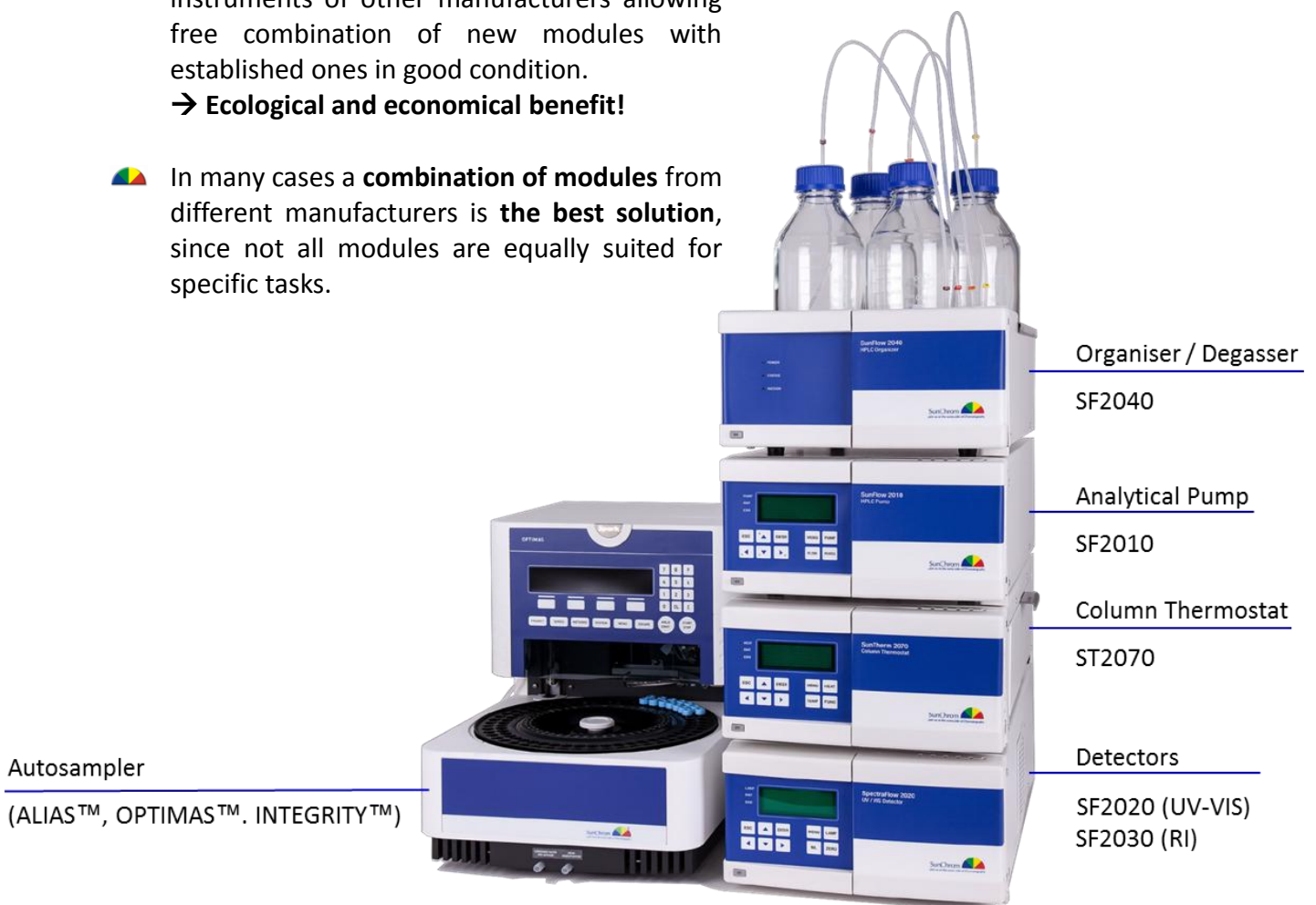


SunChrom HPLC - A modular HPLC system with intelligent modules

Our new HPLC system is composed of independent "stand alone" modules which contain their own intelligence. Each device is equipped with a so called "user interface" which includes keypad and display.

Advantages of the SunChrom HPLC system

- 🌈 "Stand Alone" modules can be **operated independent** from any software control via own user interface
- 🌈 Modules are **fully compatible** with instruments of other manufacturers allowing free combination of new modules with established ones in good condition.
→ **Ecological and economical benefit!**
- 🌈 In many cases a **combination of modules** from different manufacturers is **the best solution**, since not all modules are equally suited for specific tasks.



SunChrom HPLC modules – at a glance

Organiser SunFlow 2040

The **Solvent Organizer SunFlow 2040** is suited for handling solvents in gradient systems. It accommodates a tray for solvent bottles, a built-in high-efficiency on-line degasser and a four-way gradient valve.

The degasser's unique design assures reliable operations and the highest level of continuous performance available without the need for helium degassing. One unit may degas up to four solvent lines simultaneously. One additional channel is reserved for degassing of gradient valve output.

The extremely low internal volume of each Teflon AF® channel (480 µL) offers very fast equilibration and very short startup times compared with PTFE degassing channels, which have the same degassing efficiency. The four-way gradient valve is controlled by the pump SF 2010. The pump's new sophisticated electronics allows for achieving a precise, low-pressure gradient. For example, gradual changes of mobile phase composition by mixing up to four liquids at the pump's entry.

It is also possible to predefine the percentage of composition when using the pump in an isocratic mode. The gradient profile can be defined through the computer. Up to 6 solvent bottles may be placed into the tray.



Pump SunFlow 2010

Analytical HPLC pump

This analytical pump works as an isocratic pump and together with the **Solvent Organizer SF 2040 with degasser** also as a gradient pump.

With a flow rate of 0.01-10.00 mL/min and a pressure limit at 40 MPa this pump is suited for analytical applications in liquid chromatography. It is designed with main and auxiliary pump heads connected in series with a piston diameter of $\frac{1}{8}$ ". A new sophisticated unit allows for achieving a precise low-pressure gradient, i.e. gradual changes of solvent composition by mixing up to four liquids at the pump's entry.



It is also possible to predefine the percentage of composition when using the pump in an isocratic mode. The gradient profile can be defined from a computer. There are many improvements which make the pump more reliable, safe and precise.

We also made maintenance easier. E.g. piston exchange is easier: New construction, new learning algorithm for pulsation suppression, leakage sensor etc. If necessary, it is possible to use the back flush of the pistons (e.g. when using buffered mobile phase). The pump is supported by the software Clarity® and ChromStar®.

Thermostat SunTherm 2070

Column Thermostat

The Peltier heating/cooling column oven can accommodate up to 3 columns with a length up to 25 cm. Precise temperature control enhances separation and reproducibility while improving the quality of analysis. Usage of Peltier technology offers the possibility of heating and cooling, providing complete independence of the ambient temperature. The unit is controlled by a keypad, RS232 or Ethernet (LAN) interface. With its built-in leak alarm it is a safe, accurate and flexible instrument. This module is also supported by software Clarity® or ChromStar®.



Detector SpectraFlow 2020

UV / VIS Detector

This detector has a continuously variable wavelength with a range of **190-600 nm (STD)** or alternatively **190-800 nm (EXT)**. The noise level of both detector models is $\pm 3 \times 10^{-6}$ AU.

The unit may be used for analytical applications as well as for preparative/flash chromatography, according to the selected cell. It is easy to operate; light intensities for reference and sample channels are available for detector diagnostics as well as information on lamp operating hours. The detector performs an automatic wavelength calibration after the lamp has been switched on. A high standard deuterium lamp in a special socket enables easy exchange.



The output signal is available in both digital and analog form. The detector can be programmed, controlled and used together with the software Clarity® or ChromStar® via RS232 or Ethernet interface. The detector comes with an analytical flow cell (with 5 or 10 mm light path) as an included component. The cell can be easily removed from the front of the unit.

Detector RefractoFlow 2030

Refractive Index - Detector

The RI-Detector RF-2030 Differential Refractive Index Detector series offers the sensitivity, stability and reproducibility required for optimal RI detection. The thermal isolated optic with a countercurrent heat exchanger and programmable temperature control results in an extremely stable baseline and an optimal Signal/Noise ratio.

The RI 2000 series provide autopurge and autozero capabilities, as well as RS232 and LAN communication to acquire data directly without using any external signal interface.



Alternative Column Thermostat

The new **SunTherm** column oven provides the capability to maintain a precise temperature in the range **from 5°C to 100°C**. The heating transfer occurs via an aluminum block located in the heating area which provides for optimum contact with the column. The thermal energy is transmitted directly by contact to the metal. Since the **SunTherm** Column Oven does not include any movable parts it is **exceptionally effective and reliable**.

The cooling effect due to the introduction of cold eluents on the column is eliminated as SunChrom provides an optional heat exchanger. This provides for narrower and more symmetrical peaks, even though it increases the system volume by a few μL .



Properties

The entire length of the column is housed between aluminum blocks and with the pre-heating of the eluent the user obtains fast, optimal heating and straight transfer of heat to the column. The aluminum blocks are available for a number of lengths so that essentially all columns can be accommodated. The **SunTherm** Column Oven is available in two versions; the **SunTherm 100** has a heater while the **SunTherm 100_{COOL}** includes a heater **and** a Peltier-cooling system.

The microprocessor based controller provides control of two separate processes, heating and cooling. In the heating mode, the Peltier elements and the fan are disabled, while in the cooling mode, only the Peltier elements are in operation. The system continually monitors the temperature and both the heating and cooling elements are controlled so that the smallest change in temperature will activate the appropriate element. This ensures that the desired temperature is maintained. Since there are no moving parts except for the fan, the **SunTherm** Column Oven is extremely reliable and low-maintenance.

Column Oven MISTRAL™

Forced air heat-exchange is the most convenient way to control the column temperature. In contrast to heater blocks you have maximum freedom for column dimensions and unlike water jackets you have easy access to the column. Multiple columns are possible and even the injection valve can be mounted in the thermostat! Forced air is convenient, but GC technology has learnt that heat exchange is only efficient if you blow hard. Like the powerful cold "Mistral" winds that occasionally blow in the Rhone valley in France, the MISTRAL™ fan blows hard for proper heat exchange!



Stable and Safe

The selected column temperature is maintained within as little as $\pm 0.1^{\circ}\text{C}$ to guarantee maximum precision of retention times. The large area heating/cooling elements provide excellent temperature distribution and avoid hazardous "hot spots". In addition, a vapor alarm will alert you in case of solvent leakage in the thermostat. Comforting features when the emphasis is on stable and safe performance.

Peltier Technology for Full Range Control

The MISTRAL™ with Peltier cooling has an extended temperature range from 5°C up to 90°C . Integrated cooling by Peltier elements is most convenient, because it does not require an external cooling device and it accelerates cooling-down and warming-up!

Compatible with any HPLC system

The MISTRAL™ will fit in any HPLC system and flexible positioning of inlet and outlet tubing allows short connections to most detectors and autosamplers. A manual injection valve fits in the door of the thermostat for optimum temperature control and minimum tubing length between column and injector. Remote control is possible via conventional I/O and via the serial RS 232 port using the SparkLink communication protocol.

Autosampler for SunChrom HPLC Systems

Autosampler OPTIMAS™

Reliable, no-nonsense HPLC autosampler

OPTIMAS™ is optimising your injection automation by using reliable injection technology with a carousel holder for sample vial flexibility. OPTIMAS™ features our proven PASA™ injection concept, combining robust injection with high precision and accuracy. With its three injection modes including zero sample loss injection, OPTIMAS™ rivals top-class autosampler performance, while challenging middle-class autosampler prices!



From micro samples to preparative samples

Sample trays come in three configurations:

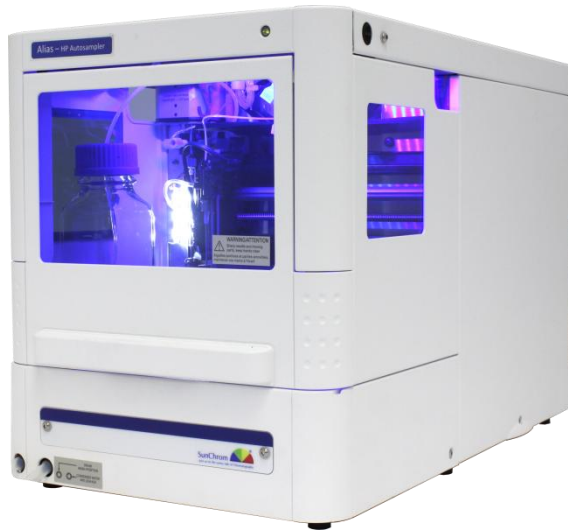
- 96 # standard or 2-mL vials or tapered vials for micro volumes
- 84 # standard 2-mL vials plus 3 # 10-mL vials used for reagents
- 24 # 10-mL vials for large injection volumes
- Trays can be interchanged within seconds

Reagent addition and mixing

Internal standard addition, sample dilution, or derivatization steps are easily programmed to reduce sample preparation time and errors associated with manual procedures.

Autosampler ALIAS™

ALIAS™ is a generic autosampler for HPLC and LC-MS using state-of-the-art injection technology with fast injection and wash cycles. Efficient, multi-solvent needle wash virtually eliminates carry-over. ALIAS™ handles well plates and sample vials, either open or sealed, and provides true 4°C sample cooling. Its compact, stackable design and its unrivalled performance make the ALIAS™ autosampler the best fit for your HPLC system and your UHPLC system.



ALIAS™ UHPLC

ALIAS™ is also available as a UHPLC compatible version permitting injection into UHPLC systems operated at pressures as high as 18,000 PSI. A special injection routine has been developed to eliminate influence of sample loop decompression on injection performance. The UHPLC version can also be equipped with sample cooling.

ALIAS™ Prep LC

A special modification for large volume injections turns ALIAS™ into a perfect injector for your preparative LC system. The ALIAS™ Prep version holds 24 vials of 10 mL and uses a 2.5 mL syringe. Needles, tubing and sample loop have larger capacity and allow rapid injection of sample volumes up to 10 mL.

Features and Options

- Metal free sampling with silica coated steel needle and PEEK valve (option)
- Reagent addition and mixing capabilities for derivatization, dilution, internal standard addition
- Solvent Selection Valve (SSV): Optional 6-port solvent selection valve for extended selection of reagents for needle wash and reagent addition (option)
- Integrated Stream Switching (ISS): Optional extra high pressure 6-port switching valve for column switching or other stream switching applications up to 18,000 PSI
- Quick-fit injection valve for fast service
- Very efficient cooling of the sample and the entire sample space

Autosampler Integrity™

The new **INTEGRITY™** autosampler from Spark sets a new standard in sample care.

- Sample and tray bar code reading
- < 20 sec injection cycle
- True 4 °C sample cooling of all samples
- Injection performance monitoring
- Vial bottom detection – inject 1 µL out of 1 µL
- Advanced wash capabilities to eliminate carryover
- Dual independent concentric needle concept
- Optimized for UHPLC
- Advanced reagent addition and derivatization
- Integrated on-line sample prep capabilities
- Up to 4 well plates or 216 standard sample vials
- Flexible workstation for many liquid handling needs of analytical samples



Sample care first

A number of innovative features ensure better and safer control of handling and tracking of samples – ensuring that you feel much more confident about the results.

SBI™ - Zero doubts on sample identity

1D and 2D sample and sample tray identification codes can be read, filed and linked to sample assay results. It is even possible to record an image of the vial during sampling for visual verification of the injection and the sample vial afterwards. Combined with positive feedback motion control for the sample tray positioning, the risk of assigning results to the wrong sample is zero.

IPM™ - Injection performance monitoring

Injecting the proper sample is one thing but how to verify that the injection itself has been performed correctly? The answer is pressure monitoring of the sample flow path during the entire injection cycle!

Pressure profiles of injection cycles are recorded for every injection and by comparison with reference profiles, indications for malfunctioning caused by blockage, leakage, air bubbles, needle damage, valve problems etc. can be easily recognised in case of suspected erroneous results.

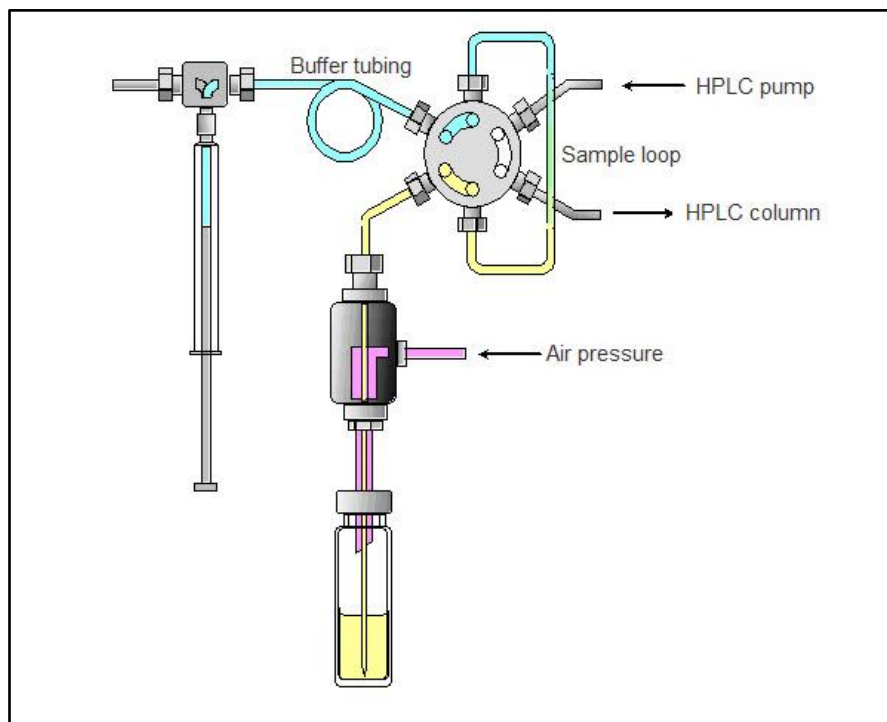
Autosampler Injection Principles

All of our autosamplers are capable to use three injection modes:

- **Full loop injections** - for maximum precision
- **Partial loopfill injections** - for maximum flexibility
- **µL Pickup injections** - for zero sample loss

These three injection modes accommodate the use of a wide variety of applications.

Moreover, our **Pressure Assisted Sample Aspiration (PASA™)** concept avoids sample-syringe contact and air bubbles and has proven its robustness in more than 25,000 autosamplers. A comforting number, if you demand a reliable autosampler for your HPLC instrumentation.



Principle of PASA™ (Pressure Assisted Sample Aspiration)

PASA™ is a proven concept that combines high precision with simplicity and reliability. The syringe is used to aspirate the sample from a vial into the sample loop. Buffer tubing between the syringe and the injection valve prevents the risk of contamination of the syringe. For that purpose, wash solvent is used to rinse the buffer tubing and sample needle and to remove the sample from them. The PASA concept highly reduces the risk for bubbles in the sample line and additionally avoids wearing of the needle port and its contamination.



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SunChrom GmbH
Industriestr. 27
61381 Friedrichsdorf
Germany
Tel.: +49 6172 / 953350
Fax: +49 6172 / 953399
E-Mail: sales@sunchrom.de

For more information visit us at

www.sunchrom.de/hplc

