CHROMATOGRAPHY

SYKAM Chromatography Products

Version: February 2011

HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

High Performance Liquid Chromatography (HPLC) is a form of liquid chromatography to separate compounds that are dissolved in solution. HPLC instruments consist of a reservoir of mobile phase, a pump, an injector, a separation column, and a detector. Compounds are separated by injecting a plug of the sample mixture onto the column. The different components in the mixture pass through the column at different rates due to differences in their partitioning behavior between the mobile liquid phase and the stationary phase. Instrumentation

Solvents must be degassed to eliminate formation of bubbles. The pumps provide a steady high pressure with no pulsating, and can be programmed to vary the composition of the solvent during the course of the separation. The liquid sample is introduced into a sample loop of an injector with a syringe. When the loop is filled, the injector can be inject the sample into the stream by placing the sample loop in line with the mobile phase tubing. The different types of HPLC columns are described in a separate document. The presence of analytes in the column effluent is recorded by detecting a change in refractive index, UV-VIS absorption at a set wavelength, fluorescence after excitation with a suitable wavelength, or electrochemical response. Mass spectrometers can also be interfaced with liquid chromatography to provide structural information and help identify the separated analytes.

CHROMATOGRAPHS

Sykam Chromatographs are modular systems optimized to the customer‘s needs. The system composition is set individually according to analytical needs. Every single system can be configured from simple routine HPLC instruments to highly sophisticated systems controlled by computer software for a multitude of possible analytical appliations. Any existing Sykam HPLC can be upgraded simply by adding additonal components.

SOLVENT DELIVERY

The range of Sykam HPLC pumps include a variety of different instruments from simple high pressure isocratic pumps to fully-programmable quaternary gradient pumps, also including low-pressure syringe and peristaltic pumps for specialized applications.

SAMPLE INJECTION

The sample injection of a Chromatograph can be done either automatically by an Autosampler or manually with a Manual Injection Valve.
Autosamplers have the big advantage of automized sample sequences, but also a higher reproducibility than manually injected samples.

DETECTORS

Sykam offers the full range of HPLC detectors from routine UV/Vis Detectors and RI Detectors to sophisticvated Electrochemical, Conductivity and Fluorescence Detectors. With this range Sykam can offer a solution for any application.

DEGASSER & REAGENT ORGANIZER

The Sykam Reagent Organizers, with integrated gas supply and valve-equipped bottles provide a clean solution for storing solvents on your Chromatograph.
The integrated gas supply can be used for degassing or for keeping solvents oxygen-free.
Additionally, Sykam offers a Vacuum Degasser for keeping your solvents gas free to insure a proper working of the Chromatograph.

SWITCHING VALVES

Sykam offers a variety of motor switching valves to be integrated into the Chromatograph.

SOFTWARE

For data acquisition, integration and instrument control, Sykam offers software packages at different price and feature levels to meet the idnividual customer‘s needs.

SYKAM S 1122 HPLC PUMP

The HPLC pump S 1122 is a dual plunger solvent delivery system. The mechanical design includes short plunger stroke technology with only two check valves. This results in low pulsation, typically observed with dual plunger pumps and high reliability otherwise achieved only by single plunger pumps.
The delivery plunger performs a two mm stroke, the compensation plunger makes one mm. The nearly pulseless solvent delivery of the pump results from the high stroke frequency and the use of the compensation plunger. The two plungers are counter rotating installed. While the delivery plunger pushes out the solvent volume, the compensation plunger, located on the pressure side, collects half of the volume. During the return movement of the delivery piston, the collected volume is pumped from the compensation plunger.
The microprocessor controlled speed regulation leads to a very stable speed of the D.C. motor, driving the plungers. Additionally, an integrated calculation software continuously corrects the pressure dependent differential between the preset and actual flow rates. This results in a very constant volume delivery throughout the entire range, independently of the resulting back pressure.
Through the alphanumerical display, the pump's parameters are shown in clear text and the user can easily control or change the data.
The programming is easily done by a stepwise dialogue. There is basically a choice between two operation modes. The delivery with „constant flow", and the delivery with „constant pressure". Normally, the constant flow delivery is used for analytical purposes and the constant pressure mode for specific operations, e.g. column packing, etc. The following parameters can be programmed for the respective modes:

Constant Flow Mode

Constant flow in ml/min, minimum pressure level (time delayed), maxiumum pressure level, compressibility factor from 0.7 (for methanol) up to 1.0 for aqueous solutions, run time from 1 - 999 minutes, delay time from 1 - 999 minutes, time ramp for soft-start, time ramp for soft-stop.

Constant Pressure Mode

Constant pressure, maximum flow in ml/min,run time from 1 - 999 minutes, delay time from 1 - 999 minutes, time ramp for soft-start, time ramp for soft-stop.

High-Pressure Gradient

Two S 1122 could be combined with a S 8200 High Pressure Mixer to form a High Pressure Gradient system.

TECHNICAL SPECIFICATIONS

Delivery Method:	Dual-Piston Pump
Operation Mode:	Constant Flow / Constant Pressure
Flow Rate	
Micro:	0.02 to 4.00 ml/min
Analytical:	0.05 to 9.95 ml/min
Preparative:	0.2 to 40 ml/min
Max. Pressure:	40 MPa (400 bar, 6000 PSI)
Flow Precision:	< 0.1 %
Flow Accuracy:	< 1.0 %
External Control:	analoge signal control & digital control (RS-232)
Display:	2x20 character LCD
Dimensions:	297 x 198 x 495 mm
Power:	110/220 V, 50/60 Hz

ORDER INFORMATION

Cat.-No.	*Description*
10 10 046	S1122, analytical, Steel
10 10 047	S1122, analytical, PEEK
10 10 048	S1122, micro, Steel
10 10 049	S1122, micro, PEEK
10 10 050	S1122, praparative, Steel
10 10 051	S1122, preparative, PEEK
10 80 004	S 8200 High Pressure Mixer

SYKAM S 2100 SOLVENT DELIVERY SYSTEM

The HPLC Pump S 2100 is a compact eluent dosing system, upgradable from a high performance isocratic pump to a quaternary gradient pump with outstanding features:

- menu programmable through large graphical display
- basic system: isocratic pump with three interchangable pump heads
- materials for the pump head: standard stainless steel, optional PEEK, Titan or PVDF
- Quaternary gradient operation
- gradient programmable in 0.1% steps for each gradient A, B, C and D
- graphical display of the gradient curves
- integrated dynamic mixer with variable mixer speed
- mixing sequence programmable
- 8 free programmable relay switching functions for auxiliary instruments
- Upgradable with integrated 4-channel degasser
- Diagnostic features storage of the pressure profile for a gradient run and display of unregularities during unattended automatic operations, e.g. pressure increase or pressure drop during one run

TECHNICAL SPECIFICATIONS

Delivery Method:	Dual-Piston Pump	Flow Precision:	< 0.1 %
Operation Mode:	Constant Flow / Constant Pressure	Flow Accuracy:	< 1.0 %
		External Control:	analoge signal control & digital control (RS-232)
Flow Rate			
Micro:	0.01 to 4.00 ml/min		
Analytical:	0.01 to 10 ml/min	Display:	240x120-dot LCD
Preparative:	0.2 to 40 ml/min	Dimensions:	310 x 210 x 450 mm
Max. Pressure:	40 MPa (400 bar, 6000 PSI)	Power:	110/220 V, 50/60 Hz
		Weight:	~16 kg

Optional: Integrated Vacuum Degasser

ORDER INFORMATION

Cat.-No.	*Description*
10 10 067	S2100 Solvent Delivery System, analytical, Steel
10 10 070	S2100 Solvent Delivery System, analytical, PEEK
10 10 071	S2100 Solvent Delivery System, micro, Steel
10 10 072	S2100 Solvent Delivery System, micro, PEEK
10 10 073	S2100 Solvent Delivery System, preparative, Steel
10 10 074	S2100 Solvent Delivery System, preparative, PEEK
10 10 069	*Option:* 4-Channel Vacuum Degasser

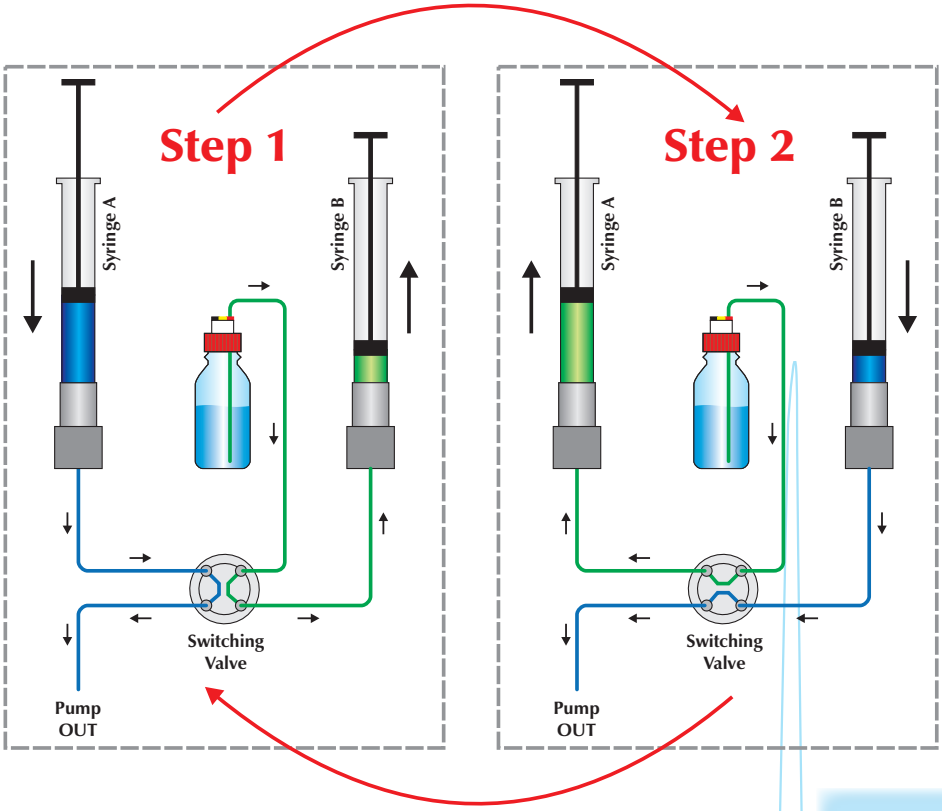
SYKAM S 1610 SYRINGE DOSING SYSTEM

The S 1610 Syringe Dosing System uses 2 exchangeable glass syringes which are driven by stepper motors. This design allows a continuous and almost pulsation-free delivery of liquids with high precision.

Working Principle

(see the diagram below)

While Syringe A delivers its volume to the system, Syringe B is filled from the reservoir through the switching valve with high speed. As soon as Syringe A is emptied, the valve switches to Syringe B, which immediately starts delivering its volume. Syringe A now starts with its filling cycle and the procedure is repeated again. To make sure that the delivering syringe is ready when the valve is switched, the filling syringe is driven with higher speed. In this way one syringe is always filled completely when the other ends its delivery cycle. The delivering syringe starts a little bit earlier - before the valve switches - to pre-compress the liquid for constant delivery.



ORDER INFORMATION

Cat.-No.	*Description*
10 11 001	S1610 Syringe Pump

TECHNICAL SPECIFICATIONS

Delivery Method:	Dual glass syringes	External Control:	analoge control
Syringe Volume:	100 µl to 10 ml	Display:	4-character
Flow Rate:	800 µl/min up to 80 ml/min (depending on syringe used)	Dimensions:	380 x 220 x 160 mm
		Power:	110/220 V, 50/60 Hz
Max. Pressure:	20 bar	Weight:	~8 kg

SYKAM S 7505/7510 VACUUM DEGASSER

The degassing of solvents is very important in liquid chromatography, as oxygen and other in the solvent dissolved gases affect the analysis for various reasons; through the volume contraction (gradient mixing), different pressure ratio (in front and behind the column) and caused by different temperatures, the dissolved gases are released in course of time. This will influence the reliability of the analysis (pump) as well as the detection efficiency (measuring cell). Therefore, dissolved gases have to be removed from the solvent.

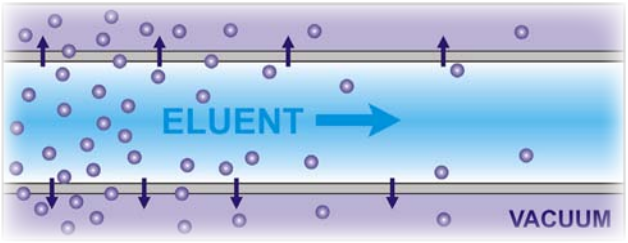
Operation Principle of the Degasser

In a vacuum chamber, the solvent to be degassed is distributed into several, parallel arranged, semi-permeable membrane chambers. When a high vacuum (more than -850 mbar) is applied, only the in the liquid dissolved gases are diffusing through the thin membrane. With a total solvent volume of 8 ml per degassing channel, the Sykam Degasser S 7510 achieves an extremely low remaining gas concentration of 0.5 to 5 ppm oxygen, depending on the degasser's flow rate (0 to 10 ml/min). With a given flow rate, the degassing quality can be further increased by coupling two or several membrane channels. The digital display of the actual vacuum in Milibar makes the Sykam Degasser S 7510 the first vacuum degasser on the market which functions can be checked and documented at any time.

On top of that, the actual vacuum run can be continuously registered via an analogue DC output (-1 V for 1000 mbar). Through in integrated logic, any leakage in the vacuum system is detected (run time of the vacuum pump for defined vacuum range) and is not only optically displayed by a controll LED but is also indicated through a relay contact closure for peripheral systems. For removing possibly existing solvent traces, the vacuum pump's waste gases can be directed via a fixable tube connection to the laboratory's ventilation. The Teflon membrane packages are exchangable, in case of damage.

ORDER INFORMATION

Cat.-No.	*Description*
10 71 001	S 7510 Degasser, 2-Channel
10 71 002	S 7510 Degasser, 3-Channel
10 71 003	S 7510 Degasser, 4-Channel
10 71 004	S 7505 Degasser, 2-Channel
10 71 005	S 7505 Degasser, 3-Channel
10 71 006	S 7505 Degasser, 4-Channel



TECHNICAL SPECIFICATIONS

Degassing Method:	Applied Vacuum	Display:	4-character
Efficiency:	0.5ppm oxygen	Dimensions:	110 x 150 x 350 mm
Flow Rate:	max. 10 ml/min	Power:	110/220 V, 50/60 Hz
Volume/Channel:	8 ml	Weight:	5.6 kg

SYKAM S 7131 REAGENT ORGANIZER

The S 7131 Reagent Organizer is the optimal solution for storing your solvents. The integrated gas supply with pressure regulator let you store the eluent under inert-gas pressure, or for degassing purposes using Helium.
The organizer can hold up to four eluent bottles, which can be closed indivdually with the integrated valve bottle caps.
The S 7131 Reagent Organizer could be used with the S 2100 Solvent Delivery System.

ORDER INFORMATION

Cat.-No.	*Description*
10 70 009	S7131 Reagent Organizer

TECHNICAL SPECIFICATIONS

Gas Pressure:	0 to 7 bar	Dimensions:	480 x 310 x 350 mm
Eluent Supply:	1 to 4 solvent bottles	Weight:	~7 kg

SYKAM S 7121 REAGENT ORGANIZER

The S 7121 Reagent Organizer is the optimal solution for storing your solvents. The integrated gas supply with pressure regulator let you store the eluent under inert-gas pressure, or for degassing purposes using Helium.
The organizer can hold up to three eluent bottles, which can be closed indivdually with the integrated valve bottle caps.
The S 7121 Reagent Organizer could be used with the S 1122 Pump.

ORDER INFORMATION

Cat.-No.	*Description*
10 70 007	S7121 Reagent Organizer

TECHNICAL SPECIFICATIONS

Gas Pressure:	0 to 7 bar	Dimensions:	380 x 330 x 350 mm
Eluent Supply:	1 to 3 solvent bottles	Weight:	~3 kg

SYKAM S 3115 CONDUCTIVITY DETECTOR

With its microprocessor controlled signal processing, combined with a newly developed cell design, the Conductivity Detector S 3115 is one of the most sensitive instruments available for the determination of ions by Ion Chromatography.
The temperature of the micro cell is kept extremely constant, and this cell convining by its fast response time and long time stability, no matter if run in combination with suppression reaction or in direct mode with electronic suppression of the background conductivity.
The S 3115 Conductivity Detector's outstanding features are high background suppression, baseline stability, and signal linearity over a range of several decades. These characteristics become especially important when single column techniques are employed, e.g. for the determination of alkaline ions and alkaline earths.

TECHNICAL SPECIFICATIONS

Range:	0.05 to 10,000 µS		Signal Smoothing
Offset:	0 to 20% fullscale	External Control:	analoge control; RS-232
Risetime:	0 to 10 seconds	Display:	2x20-character LCD
Cell Volume:	0.2 µl	Dimensions:	330 x 220 x 160 mm
Cell Temperature:	up to 85°C	Power:	110/220 V, 50/60 Hz
Functions:	Autozero, Reverse, Digital	Weight:	~8 kg

ORDER INFORMATION

Cat.-No.	*Description*
10 30 003	S3115 Conductivity Detector
31 10 001	External temperated Flowcell
31 10 002	Integrated Flowcell

SYKAM S 3580 RI DETECTOR

The S 3580 Differential Refractive Index Detector series offers the sensitivity, stability and reproducebility required for optimal RI detection.
The thermal isolated optic with a countercurrent heat exchanger and with its programmable temperature control, results in an extremly stable baseline and an optimal Signal / Noise ratio.
The S 3580 series provide autopurge and autozero capabilities, as well as RS232 communication to acquire data directly without using any external signal interface. S 3580 detectors are available for:

- micro
- analytical
- semi-preparative mode

TECHNICAL SPECIFICATIONS

	Micro	Analytical	Semi-Preparative
Detection Method:		Deflection	
Refractive Index Range:		1.00 to 1.75	
Flow Rate:	0.2 to 3.0 ml/min	0.2 to 3.0 ml/min	1.0 to 50 ml/min
Flowcell Volume:	4 µl, 45°	9 µl, 45°	7 µl, 5°
Flowcell Pressure:	6 kg / cm²	6 kg / cm²	6 kg / cm²
Dead Volume:	6 µl	24 µl	88 or 353 µl
Linearity Range:	0 - 500 µRIU	0 - 1,000 µRIU	0 - 20,000 µRIU
Noise Level:	10 x 10^{-9} RIU	5 x 10^{-9} RIU	10 x 10^{-8} RIU
Drift (1.0 ml/min H_2O):	< 1 mV / hour	< 1 mV / hour	< 1 mV / hour
Integrator Output:		+/- 1 Volt	
Digital Interface:	RS-232; Purge; Autozero; Start; Stop; Data Out 1Hz, 10 Hz; Lock		
Digital Output:	TTL: Intensity Alarm		
Digital Input:	TTL: Purge, Autozero, Start/Marker		
Temperature Setting:	Ambient, 35 °C to 55°C in 1°C steps; Thermal Fuse @ 75°C		
Time Constant:	RAW (0.0 sec), Fast (0.4 sec), Medium (0.8 sec), Slow (1.2 sec)		
Dimensions:	220 x 350 x 155 mm		
Power Supply:	110/220 V; 50/60 Hz		

ORDER INFORMATION

Cat.-No.	*Description*
10 31 003	S3580 RI Detector

SYKAM S 3210 UV/VIS DETECTOR

Diode Array Technology, Photoconductor Optics and Dual Lamp Source.

- Diode Array Technology for wavelength change without any mechanical moving parts.
- Online scan of wavelength and collection of spectra data without stopping the flow or interrupting the running analysis (optional).
- Dual lamp (deuterium/tungsten) for a spectral range of 190 - 720 nm.
- Integrated peak detector with programmable delay time.
- Integrated soolvent recycling system (3-way solenoid valve optionally).
- External START, external AUTOZERO via TTL-signal.
- Serial interface (RS232C) for external control.
- Programmable change of wavelength (up to 10 steps).
- Full DAD operation mode with ChromStar software (optional).

TECHNICAL SPECIFICATIONS

Optic System:	256-Diode Array	Features:	Peak Detector w. Valve Control, Wavelength Scan optional
Wavelength:	190 to 720 nm		
Bandwidth:	2 nm per Diode		
Range:	0.0005 to 2.0 AU	Display:	2x20 Character LCD
Drift:	<3.0x10^{-4} AU/hour	Dimensions:	355 x 225 x 160 mm
Noise:	<5.0x10^{-4} AU	Power:	110/220 V, 50/60 Hz
External Control:	RS232	Weight:	~9 kg

ORDER INFORMATION

Cat.-No.	*Description*
10 31 001	S3210 UV/Vis Detector
10 31 005	S3210S UV/Vis Detector w. Scan Option
10 31 006	S3210 UV/Vis Diode-Array Detector
10 32 002	Analytical Flowcell, Steel
10 32 003	Analytical Flowcell, PEEK
10 32 004	Micro Flowcell, Steel
10 32 005	Preparative Flowcell, Steel
10 32 006	Preparative Flowcell, PEEK

SYKAM S 3240 UV/VIS DETECTOR

Diode Array Technology, Photoconductor Optics and Dual Lamp Source.

- Diode Array Technology for wavelength change without any mechanical moving parts.
- 4-Channel measurement with separated analog output (0 - 1000 mV)
- Online scan of wavelength and collection of spectra data without stopping the flow or interrupting the running analysis.
- Dual lamp (deuterium/tungsten) for a spectral range of 190 - 720 nm.
- Integrated peak detector with programmable delay time.
- Integrated soolvent recycling system (3-way solenoid valve optionally).
- External START, external AUTOZERO via TTL-signal.
- Serial interface (RS232C) for external control.
- Programmable change of wavelength (up to 10 steps).
- Full DAD operation mode with ChromStar software (optional).

TECHNICAL SPECIFICATIONS

Optic System:	256-Diode Array	Features:	Peak Detector w. Valve Control, Wavelength Scan optional
Wavelength:	190 to 720 nm		
Bandwidth:	2 nm per Diode		
Range:	0.0005 to 2.0 AU	Display:	2x20 Character LCD
Drift:	<3.0x10^{-4} AU/hour	Dimensions:	355 x 225 x 160 mm
Noise:	<5.0x10^{-4} AU	Power:	110/220 V, 50/60 Hz
External Control:	RS232	Weight:	~9 kg

ORDER INFORMATION

Cat.-No.	*Description*
10 31 002	S3240 Multi-Channel UV/Vis Detector
10 31 007	S3240 Diode-Array Detector
10 32 002	Analytical Flowcell, Steel
10 32 003	Analytical Flowcell, PEEK
10 32 004	Micro Flowcell, Steel
10 32 005	Preparative Flowcell, Steel
10 32 006	Preparative Flowcell, PEEK

SYKAM RF-20A FLUORESCENCE DETECTOR

The excellent basic performance of the Prominence series is further enhanced by the RF-20A fluorescence detectors, which offer world-class sensitivity, excellent ease of maintenance, and validation support functions. They support a wide range of applications from conventional analysis to high-performance analysis.

Utilizing a newly designed optical system, the RF-20A offers world-class levels of sensitivity. A water Raman S/N ratio of at least 1200 makes these detectors powerful tools for analyses demanding the detection of trace-level components.

TECHNICAL SPECIFICATIONS

Light Source:	High Precision Xenon Lamp	Accuracy:	±2 nm
Monochromators:	Concave, blazed holographic grating monochromators	Reproducibility:	±0.2 nm
		Detector:	Photomultiplier
Wavelength:	0, 200 nm to 650 nm (200-900 nm optional)	Cell Volume:	12 µl
		Cell Pressure:	~2 MPa
Bandwidth:	20 nm	Cell Material:	SUS316, Quartz, PTFE

ORDER INFORMATION

Cat.-No.	*Description*
10 90 089	RF-20A Fluorescence Detector

SYKAM S 5200 AUTOSAMPLER

The system can be upgraded at any time from the basic version for fixed volume injection with sample loop overfilling, up to variable volume injection mode for variable volumes from 1 - 100 µl (optional up to 500 µl) without changing the sample loop.

With the next upgrading step, the S 5200 can be used for fully automatic sample processing fro pre-column derivatization. In the derivatisating mode, up to three independent reagents can be added to a specified sample volume, mixed with sample and programmed with independent reaction times. In addition, the sample can be diluted with more than 100 times (depending on sample volume and syringe volume).

For temperature sensitive samples, the sample tray can be cooled or heated with the optional cooling system.

For chemical inert operation, the instrument can be delivered for fully metal-free sample handling (completely equipped with PEEK and FEP materials, including sample needle).

A wide range of sample racks and sample vials can be used for operation from 1 µl up to 5000 µl or by using micro titer plates.

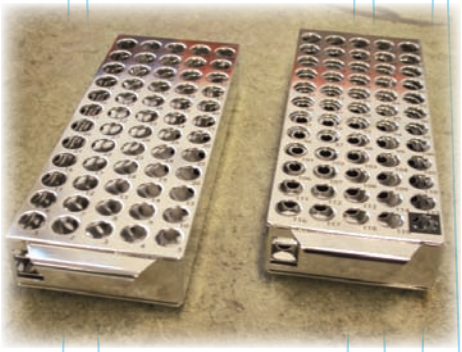
Simple operation through large alphanumeric display

ORDER INFORMATION

Cat.-No.	*Description*
10 50 001	S5200 Autosampler, Fix Volume
10 51 001	*Update:* Variable Volume
10 51 002	*Update:* Derivatisation
10 51 003	*Option:* Heating/Cooling
10 51 004	*Option:* Inert Version (PEEK)
10 51 005	*Option:* Preparative Version
22 20 011	*Option:* Wellplate Adapter

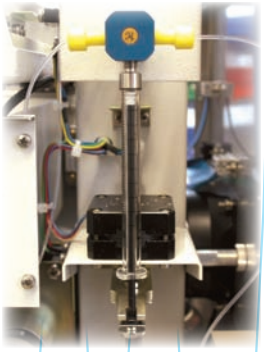
TECHNICAL SPECIFICATIONS

Sampling System:	X-Y-Z-Operation; stepper motor driven syringe	Memory Effect:	<0.01%
Sample Capacity:	120 vials in 2 racks á 60	Wash Program:	freely programmable
Sample Loop:	standard: 20µl	External Control:	analoge control & RS-232
Material:	Stainless Steel or PEEK	Display:	4-character
Reproducibility:	Fix Volume: < 0.5% Variable Volume: <1.0%	Dimensions:	415 x 300 x 445 mm
		Power:	110/220 V, 50/60 Hz
		Weight:	20 kg



Sample Racks
(up to 120 vials)

Micro Titer Plates



Exchangeable
Syringe

SYKAM S 4011 COLUMN THERMO CONTROLLER

Not only the optimization of separations but also a constant temperature of the separation column plays a very important role in the reproducibility of the retention times. The Column Thermo Controller S 4011 was especially developed in order to overcome these kind of problems. With the help of the built-in Peltier elements, it is ossible to keep the temperature of the columns between +5° C and +70° C independent of the ambient temperature.
A precise column cooling system for programmable fluorescence detection and for the optimization of later eluting components is of great advantage. Especially separations which are very temperature dependent, like gradient elution of polycyclic aromatic hydrocarbons, greatly profit by this instrument.
The integrated Peltier elements provide exact temperature control. Therefore, fast temperature changes are possible, which are needed for temperature gradients.
Furthermore, the Column Thermo Controller S 4011 can not only be used for heating, but also for cooling below ambient temperature.

Gas Sensor Safety Feature

At the inside of the column chamber a gas sensor is installed for detecting flammable gases. Should there be a leakage during operation, the yellow LED will indicate the leakage and the oven is automatically switched off.

ORDER INFORMATION

Cat.-No.	*Description*
10 40 007	S4011 Column Thermo Controller

TECHNICAL SPECIFICATIONS

Temp. Element:	Integrated Peltier Elements
Chamber Size:	35 x 35 x 300 mm
Temp. Range:	+5° C to +70° C
Temp. Accuracy:	±0.5° C
Temp. Constancy:	±0.1° C
Temp. Selection:	1° C steps
External Control:	analoge control
Display:	2-digit 7-segment
Safety Features:	Gas Sensor f. flammable gases, overheat protection
Dimensions:	Controller: 220x150x345mm Oven: 135x180x510mm
Power:	110/220 V, 50/60 Hz
Weight:	Controller: 6.3 kg Oven: 9.4 kg

Column Chamber with Gas Sensor

SYKAM S 433 AMINO ACID ANALYZER

The innovative automatic Amino Acid Analyzer S 433 combines the advantages of the classical ion exchange separation method with the modern technique of high performance liquid chromatography. The complete package of sophisticated instrumentation, a wide variety of prepacked and tested separation columns, combined with optimized ready-to-use buffer solutions and chemicals, creates the right answer for any routine or research problem in amino acid determination. More than 30 years experience in developing and operating sophisticated amino acid analyzers results in unmatched performance.

Multistep Separation

Only two or three buffer solutions have to be combined to form the best optimized buffer profile at any part of the separation program. No more compromises by the limitation to four or five buffer changes.

Cooled Reagent Storage

All buffer solutions, as well as the Ninhydrine reagent are All buffer solutions, as well as the Ninhydrine reagent are stored under inert gas pressure in a refrigerated cabinet to avoid oxidation and air contamination independent of the ambient environment.

Integrated Autosampler

with a capacity of 120 vials in a cooled sample tray. Volumes from 1µl to 100 µl can be injected without any loss of sample. The injected volume is adjusted by a high precision syringe, driven by a stepper motor with a resolution of 17 steps per µl. A programmable wash program will flush the entire injection system to avoid cross contamination of the sample.

Integrated Vacuum Degasser

avoids the interruption of the buffer pump by air bubbles without the need of bubble traps with varying volumes, causing changes in retention times of the different amino acids.

Separation Column Oven

integrated solid state column oven with fast heating and cooling capability with a temperature range from +5°C to +85°C independent of the ambient temperature. Up to twelve programmable temperature steps can be used during one separation program.

High-Temperature Reactor

with a programmable temperature range from ambient to 185°C with a coiled capillary for the color reaction of the amino acid-ninhydrine complex. Automatic flushing of the reactor coil with a washing solution after each run prevents the blockage of the capillary.

Integrated Reagent Dosing Pump

for Ninhydrine delivery and flushing of the reaction coil after each run. Programmable flow rate from 0.01 to 2.0 ml/min.

Complete Inert Design

All materials coming into contact with the buffer solutions All materials coming into contact with the buffer solutions and reagents are made of inert materials as PEEK, PTFE, PVDF etc. Therefore, there is no need for using special non-corrosive buffer compositions or reagents.

Integrated Dual-Channel Photometer

for the amino acid detection at 440 nm and 570 nm wavelengths.Summing option for both channels, for single channel integration of all amino acids.

Consumables

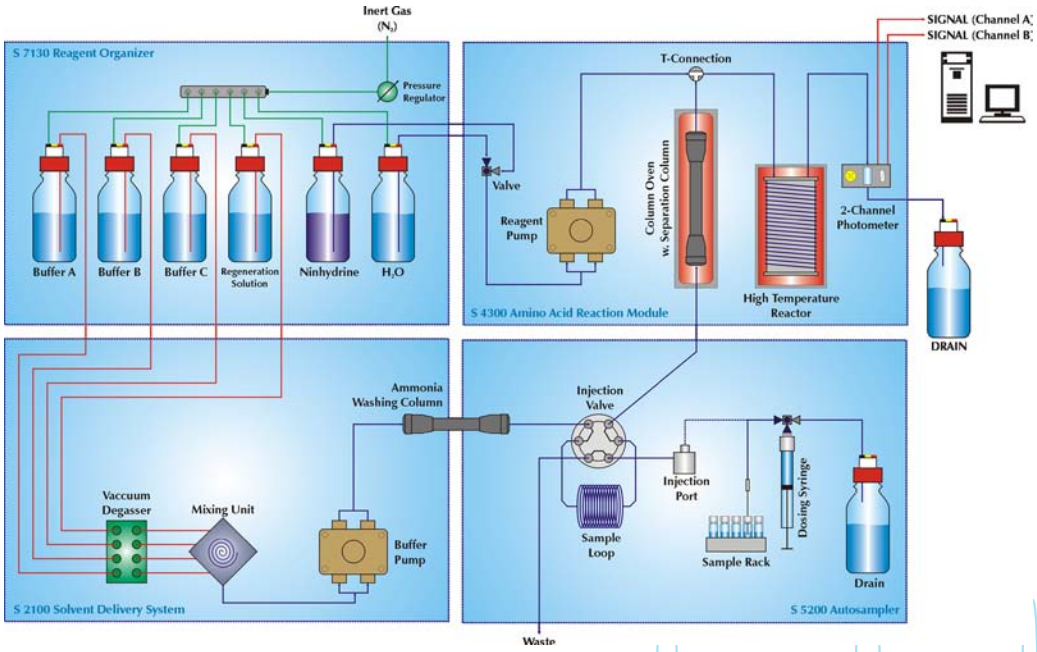
ready-to-use Buffer Solutions, newly formulated

Ninhydrine Reagent with long-term stability and Separation Columns. All consumables are ready-to-use, tested, and certified to guarantee the highes quality standard.

Optional Application

- Post column derivatisation with OPA (needs an optional Fluorescence Detector)
- Carbohydrate determination for reducing sugars with Cu-bicinchoninate post-column derivatisation (except the separation column, no additional extras are needed)
- Polyamine determination with Ninhydrine or OPA postcolumn derivatisation.

S430 Amino Acid Analyzer



Amino Acid Analyzer Flowchart

Ready-Made Buffer Solutions, Reagents & Columns

ORDER INFORMATION

Cat.-No.	*Description*
11 20 001	S433 Amino Acid Analyzer without Data System
11 20 002DDS	S433 Amino Acid Analyzer with Clarity Amino
11 20 003	S430 Manual Amino Acid Analyzer without Data System
11 20 004DDS	S430 Manual Amino Acid Analyzer with Clarity Amino
10 41 002	S4300 Amino Acid Reaction Module

SYKAM S 135 ION CHROMATOGRAPHY SYSTEM

Ion Chromatography is one of the most important methods for the determination of alkaline, alkaline earth and transition metals, inorganic anions, sulfuric compounds of different oxidation levels, organic acids, and various tensides. Indeed, for aqueous solutions Ion Chromatography is one of the most sensitive methods for these substances, since in most cases the samples can be injected into the system without time consuming sample preparation. If required, e.g. for trace amounts, enrichment can be done within the chromatographic system.

The Sykam S 135 is a compact system with modular setup. Even the basic system is designed for most sensitive anion analysis employing suppression of eluent conductivity.

The column oven integrated into the system holds measuring cell, pre-column, separation column, and suppression columns, and thus guarantees accurate retention times and quantification with superior reproducibility.

The conductivity detector's outstanding features are high background suppression, baseline stability, and signal linearity over a range of several decades. These characteristics become especially important when single column techniques are employed, e.g. for the determination of alkaline ions and alkaline earths.

The chemically inert pump with its pump head made of PEEK meets all the requirements of Ion Chromatography. It has two serial pistons thus delivering with extremely low pulsation. This pump can even be used for HPLC, and by just adding a gradient module the system in fact can be easily upgraded for any HPLC application.

Depending on applicational needs or analytical problems, the Sykam Ion Chromatograph can be easily modified by integrating additional Sykam system components. E.g. there are:

- switching valves to select columns or eluents for rapid method change.
- the UV/Vis detector with variable wavelength for high sensitivity determination of nitrite, organic acids, or transition metals after PAR post-column reaction.
- the electrochemical detector for detection of sulfide/cyanide or carbohydrates.
- automatic concentration units for trace analysis.

ORDER INFORMATION

Cat.-No.	*Description*
11 11 002	S135 Ion Chromatography System
10 65 004	S4260 IC Suppression Module
10 30 003	S3115 Conductivity Detector

SYKAM DATA SYSTEM: CLARITY

Clarity is an advanced chromatography station designed to acquire and evaluate data from up to four chromatographs at a time. Clarity - a top product in its category - represents a universal solution for laboratories. It enables the user to acquire data from any commercially available chromatograph with standard analogue output.

Up to four chromatography systems, each of which can be equipped with up to four detectors, can be connected simultaneously. The chromatography station package includes an A/D converter (internal PCI card or external USB box) and the corresponding Clarity Software.

Support for GLP/ 21 CFR Part 11

In recent years, chromatography practice has brought about not only the necessity of efficiency in laboratory work, but also new demands relating to monitoring and security mechanisms, particularly in the field of data management. The Clarity supporting tools help you to comply with the requirements of GLP (Good Laboratory Practice) and FDA - 21 CFR Part 11.

Data Security

A system of access rights and passwords is set up within the station. This system allows to create a unique password protected profile for each user.The user profile then defines in detail the user's rights within the station (e.g. authority to effect changes in the methods of measurement) and may limit ones access to only certain connected instruments. Electronic signatures are also incorporated into the system so that a user may sign his or her data. This electronic signature is stored with the name and date and supplemented with a set phrase (e.g. measured by, approved by, etc.).

Audit Trail

Detailed logs and histories of modifications enable users to maintain an audit trail. Clarity documents all parameters describing the conditions and methods of data processing for the user. This allows for easy access to a complete profile of information regarding any prior modification's performance.

Qualification Tools

The Test IQ (Installation Qualification) is an integral component of the station. This test monitors that the software has been properly installed and the results can be accessed from a printed protocol.
Clarity Validator for OQ (Operational Qualification) is an optional package available for testing and validating the Clarity chromatography station.This is accomplished simply with the use of our chromatogram generator and a software utility.

U-PAD - External USB A/D Converter

The U-PAD is an external measuring unit for acquisition of data from detectors with standard analog output. U-PAD uses a USB communication channel, which allows direct connection from the PC. U-PAD represents an ideal solution for connecting chromatographs to a laptop computer. The unit contains two independent channels equipped with the latest 24-bit A/D converters, which attain higher effective resolution, particularly at higher integration frequencies and lower voltage ranges. The channels are isolated with symmetrical inputs.

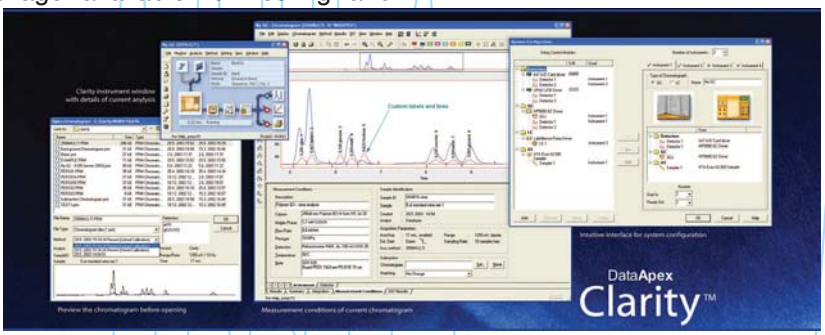
Software Features

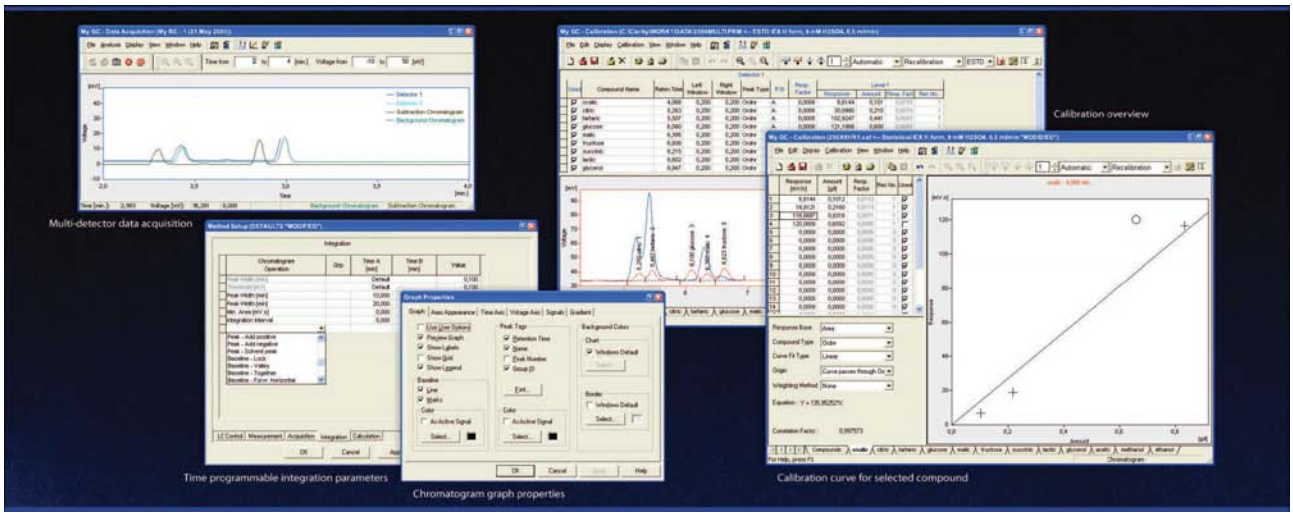
Algorithm for Detection of Peaks

Highly responsive algorithms enable users to detect hundreds of peaks in each chromatogram.
Data from the analysis can naturally be reprocessed without the necessity of repeating the analysis.

Integration

All integration parameters are saved in the integration table. Parameters such as Peak Width and Threshold are programmable in time.
There are a total of 27 integration parameters incorporated to ensure the optimal integration of peaks. Most of these parameters can be applied also with the mouse from icons on the toolbar.
Every change of basic integration parameters in the chromatogram window will force immediate reintegration.





Method

All parameters for data acquisition and peak integration, including baseline operations and link to the calibration file are saved in the template method. After creating of a chromatogram, a copy of the template method becomes a part of the chromatogram file.

Multi-Detector Measurement

Once a measurement has been completed within the framework of one instrument and more than one detector (up to four), signals are simultaneously displayed and accompanied by a legend identifying each signal and detector. Users may select the number of signals displayed according to preference.

Calibration

The Clarity Station uses linked calibration. Calibration curves are saved in a separate file, to which the template and chromatogram methods are referring.
After updating or modifying this calibration file, results in all chromatograms linked to this file will be automatically recalculated upon opening.
Although the calibration is linked, the current states of the calibration file and methods are stored in the chromatogram every time it is saved (using the commands Save, Print or Export).
The chromatogram with its former method settings and calibration curves may thus be opened from any prior saved state.

Calibration Calculations

Clarity offers the ability to calculate using external or internal standard methods.
There are six types of curves to fit calibration points with the option to include a zero point.
The station allows you to select automatic or manual (interactive) method of data transmission from the calibration standard into the calibration file. Groups of peaks may also be calibrated.

Method of Reference Peak

Use reference peaks and or customizable identification windows for individual peaks to enhance the accuracy of compound identification.

Editing and Calibration

Browsing and adjustment of calibration data is simple thanks to the consolidation of all compounds in a single global calibration table.

Print Protocols

The Clarity station supports printing of user defined protocols. Its configuration is saved in report style, which defines the content and form of the printout. Pick from the predefined report styles or adjust them and store for further use.
Different report styles can be predefined according to the dialog in which you are working.
You can review the printout on the screen in the print preview.
For printing protocols from multiple analyses users can either use batch processing of data or print a summary table.

ORDER INFORMATION

Cat.-No.	*Description*
32 02 001	Clarity Amino
32 02 004	Clarity 1-Instrument
32 02 005	Clarity Light
32 02 006	*add-on*: additional Instrument
32 02 007	U-PAD 2-Channel USB A/D Converter
32 02 008	*add-on*: AS Control Module
32 02 009	*add-on*: Instrument Control Module
32 02 010	*add-on*: DAD Module
32 02 011	Clarity Offline
32 02 012	*add-on*: SST Module

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