

# RESEARCH HPLC SYSTEM S 600

The **Sykam RESEARCH HPLC System S 600** is intended for the ambitious analyst. The system configuration is highly variable and several upgrade options make this system suitable for the whole range of analytical applications.

## ■ S 1130 HPLC Pump System

The **Sykam S 1130 HPLC Pump System** is a very flexible and powerful HPLC solvent delivery system. Its modular setup makes the **S 1130** one of the most versatile pump systems on the market. The possible configurations include an Isocratic, Quaternary Gradient Pump or a Binary High-Pressure Gradient Pump.

## ■ Stepper Motor

The **S 1130** is driven by a high-power stepper motor. The stepper motor has a much better resolution in the low-flow range than a conventional DC motor.

## ■ Active Mixer

The **S 1130** low pressure and high pressure gradient module has an active mixer to achieve highly precise and accurate gradient results.

## ■ Lubrication

The **S 1130** camshaft is constantly lubricated within a sealed chamber to guarantee long lifetime and low maintenance.

## ■ Dual-Piston Pumphead

The **S 1130** pumps use a dual-piston pumphead for low pulsation. Together with electronic pressure compensation the **S 1130** pumps are suitable for all analytical tasks in HPLC and GPC.

## ■ Optional: Piston Backflushing

The **S 1130's** pump head incorporates an optional active piston backflushing system; this system is interchangeable with old Sykam pumps and does not require an additional motor.



**MADE IN GERMANY**

## ■ One Pump — Three Configurations

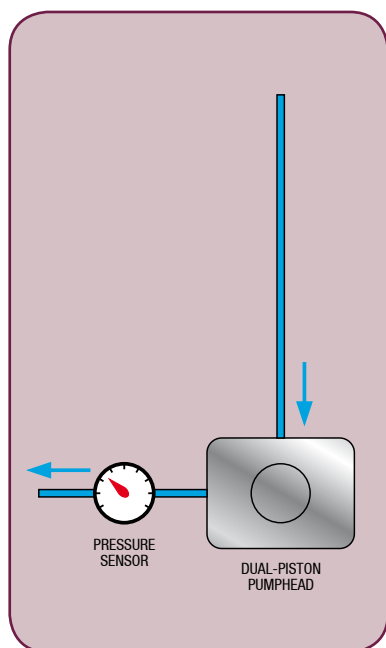


Figure: S 1130 Isocratic Flowchart

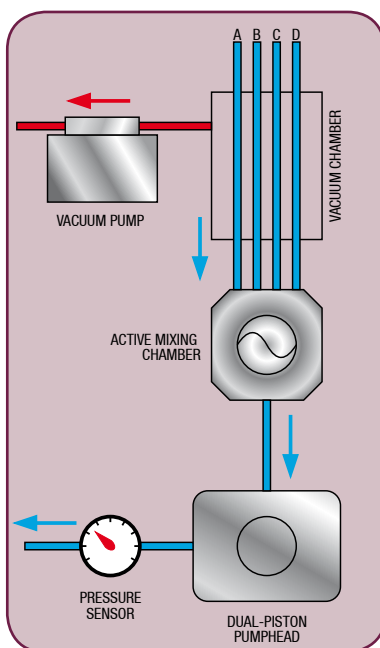


Figure: S 1130G LP Gradient Flowchart

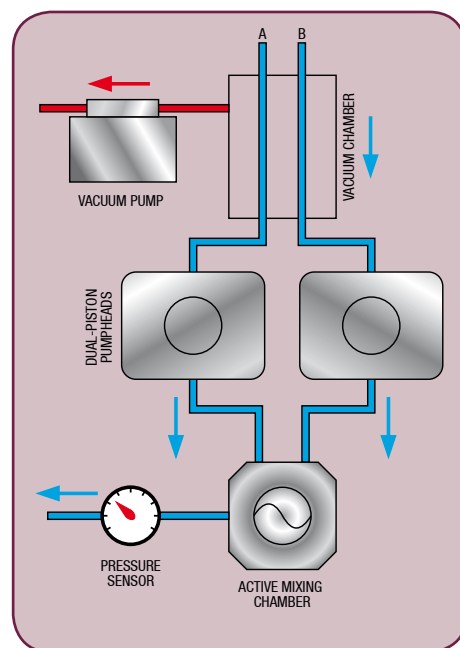


Figure: S 1132 HP Gradient Flowchart

## ■ Technical Specifications

<b>Wetted Materials:</b>	Stainless Steel / PEEK*, Teflon AF®, PVDF, Ceramics, Sapphire, Ruby
<b>Flow Rate:</b>	Programmable Micro: 0.001 - 4.000 ml/min Analytical: 0.001 - 10.000 ml/min Semi-Preparative: 0.1 - 40.000 ml/min
<b>Flow Accuracy:</b>	± 1.0 % 1.000 ml / min
<b>Flow Precision:</b>	± 0.1 % RSD 1.000 ml/min
<b>Pressure Range:</b>	0 – 40 MPa (0 – 6000 PSI) Semi-Preparative: 20 MPa (up to 20.000 ml/min); 10 MPa (up to 40.000 ml/min)
<b>Pressure Pulsation:</b>	typical < 0.1 MPa or < 1.0 %
<b>Compressibility Compensation:</b>	user-adjustable for different solvents
<b>Dimensions: (W x H x D)</b>	396 x 165 x 478 mm
<b>Power Supply:</b>	100 - 250 ~V (47 - 63 Hz)

\* depending on configuration

## ■ S 1130G Quaternary Gradient Pump

<b>Vacuum Degassing:</b>	<i>optional:</i> < 20% dissolved gases remaining in water @ 1.000 ml/min
<b>Gradient Range:</b>	0.0 – 100.0 %, 4 channels
<b>Gradient Accuracy:</b>	< 0.50 %
<b>Gradient Mixing:</b>	Active
<b>Mixer Volume:</b>	adjustable: 10 – 500 µl

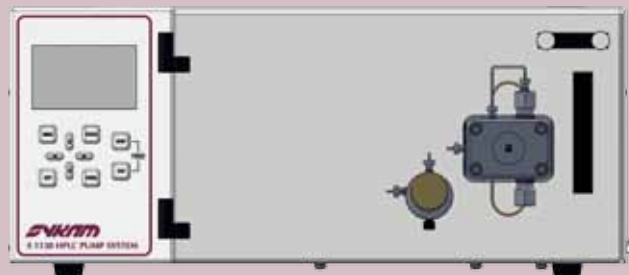
## ■ S 1132 Binary Gradient Pump

<b>Vacuum Degassing:</b>	<i>optional:</i> < 20% dissolved gases remaining in water @ 1.000 ml/min
<b>Gradient Range:</b>	0.0 – 100.0 %, 2 channels
<b>Gradient Accuracy:</b>	< 0.50 %
<b>Gradient Mixing:</b>	Active
<b>Mixer Volume:</b>	adjustable: 10 – 500 µl

## ■ S 1130 Configurations

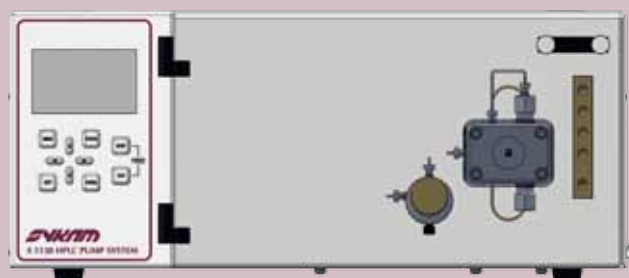
### ■ S 1130 Isocratic HPLC Pump

The **S 1130 Isocratic Pump** is a robust, low-pulsation solvent delivery system. The pumphead is easily accessible from the front panel to make routine maintenance, like changing pump seals, easy and fast. The system is available with Micro, Analytical or Semi-Preparative pumphead in Stainless Steel or PEEK.



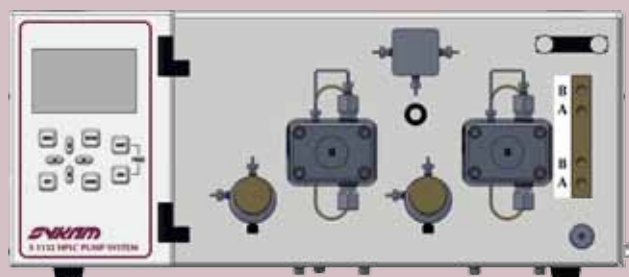
### ■ S 1130G Low-Pressure Quaternary Gradient Pump

The **S 1130G Low-Pressure Quaternary Gradient Pump** incorporates an active low pressure mixer with adjustable mixing volume. The mixing chamber volume can be freely adjusted. An optional integrated vacuum degasser removes dissolved gases in the eluents and prevents air bubbles in the system. The system is available with Micro, Analytical or Semi-Preparative pumphead in Stainless Steel or PEEK.



### ■ S 1132 High-Pressure Binary Gradient Pump

The **S 1132 High-Pressure Binary Gradient Pump** incorporates two pump systems with active high pressure mixer with adjustable chamber volume. An optional integrated vacuum degasser removes dissolved gases in the eluents and prevents air bubbles in the system. The system is available with Micro, Analytical or Semi-Preparative pumpheads in Stainless Steel or PEEK.



## ■ S 5300 Sample Injector System

The **Sykam S 5300 Sample Injector System** is a very flexible and powerful HPLC autosampler with excellent reproducibility and linearity properties. Variable vial racks and adaptors for microtiter plates as well as a multitude of firmware options make this system highly adaptable and suitable for any analytical application.

### ■ Robust Design

#### ■ Durable X/Y/Z-Sampling

The **S 5300 Sample Injector System** features a mechanically durable X/Y/Z-Sampling-Mechanic designed for long life operation. The self-lubricating bearings keep the routine maintenance at a minimum and avoid troubles caused by dusty environments.

High precision stepper motors drive the X/Y axis for accurate positioning. Microstepping mode enables a high resolution for the syringe dosing and vial positioning.

#### ■ Dual-Needle Design

The Dual-Needle design of the **S 5300 Sample Injector System** avoids system blockages due to septum particles injected into the system. The ventilation needle pierces the septum before the injection needle moves into the sample vial (see figure on the right).

As the more fragile injection needle does not need to pierce the vial septum, stronger vial caps or plastic vials can be used without problems.



#### ■ Accessibility

The injection valve with sample loop and injection port can be accessed directly from the instrument front without removing any protective covers. The dosing syringe can be accessed from the side of the instrument through a hinged glass panel. The exchange of the syringe can be done without the requirement of any tools.

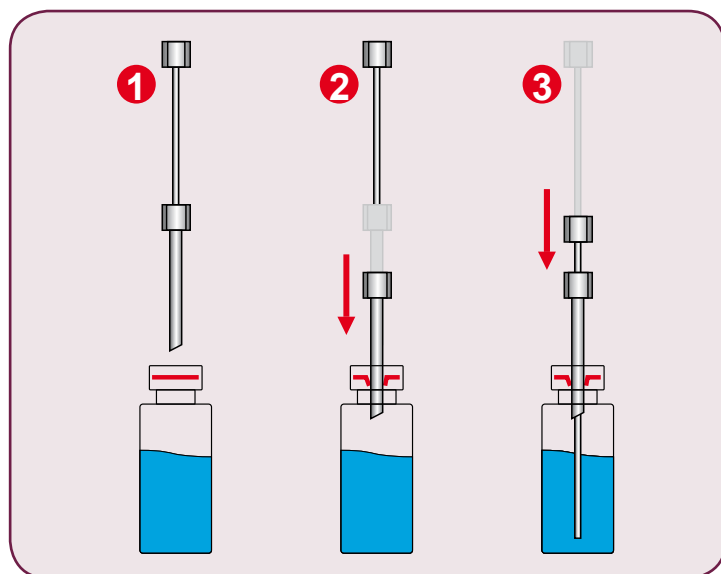


Figure: Dual-Needle Injection

## ■ Precision & Modularity

### ■ Performance

The **Sykam S 5300 Sample Injector System** offers multiple injection modes depending on application and sample needs. Besides fixed loop overfilling and variable volume injection the instrument offers a *Zero-Waste* injection mode for injecting very small sample amounts by moving the sample into the middle of the sample loop.

Linearity and injection precision can be optimized for any volume by different sample loops and syringe sizes.

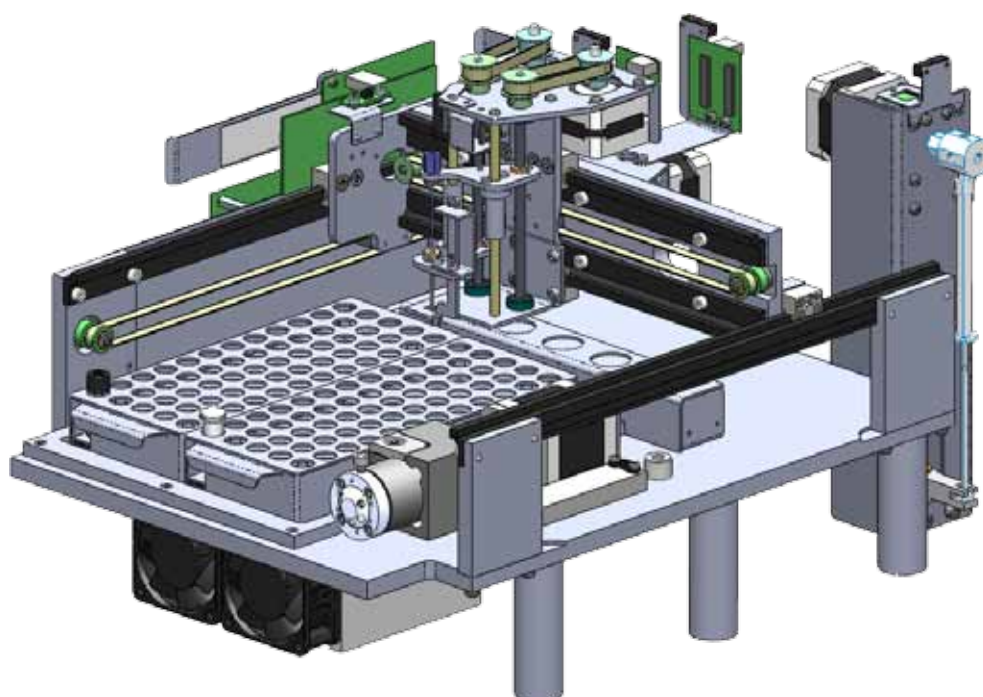
### ■ Modular Options

The modular nature of the **Sykam S 5300 Sample Injector System** offers the possibility to “*just buy what you need*”. Modular options include sample heating/cooling for any sensitive sample material and derivatization for automatized pre-column derivatization tasks from reagent derivatization to auto-

## ■ Technical Specifications

<b>Wetted Materials:</b>	Stainless Steel / PEEK*, PPS, PVDF
<b>Sample Capacity:</b>	120 (1.5 ml), 192 (microtiter plates)
<b>Injection Volume:</b>	Programmable 0.1 - 999.9 µl
<b>Sample Heating/Cooling:</b>	<i>optional</i> : +4 – +60 °C
<b>Injection Precision:</b>	< 0.5 % Variable Volume Injection (10 µl; typically ~0.25 %)
<b>Linearity:</b>	Correlation Factor > 0.999 (10 µl injection volume, 500 µl Syringe)
<b>Carry Over:</b>	< 0.05 % with wash program
<b>Dimensions:</b> (W x H x D)	396 x 275 x 478 mm
<b>Power Supply:</b>	100 - 250 ~V (47 - 63 Hz)

\* depending on configuration



## ■ S 3250 UV/Vis Variable Wavelength Detector

The **Sykam S 3250 UV/Vis Detector** is a variable wavelength UV/Vis detector for routine analysis and sophisticated research. The dual lamp design offers a wavelength range of 190 – 800 nm with a low baseline noise. The front-accessible flowcell can be easily exchanged, as well as the lamps which are accessible through a side panel in the instrument housing.

### ■ Integrated Wavelength Program

The **S 3250 UV/Vis Detector** features a wavelength program to change the selected wavelength over time. With this feature the optimum wavelength can be selected for each analyzed substance according to its retention time.

### ■ Integrated Peak Detector

The integrated Peak Detector works as a basic fraction collector. The peak detection level can be freely programmed for peak start and peak end to enhance the collection purity. An integrated 24V output for switching a solenoid valve is used for the fraction collection, which is automatically operated with a selectable time delay.

### ■ Optional – Dual-Wavelength

The **S 3250 UV/Vis Detector** is available with an optional second wavelength. This feature enhances the Wavelength Program feature that you can measure 2 different wavelengths at the same time. A second D/A converter output comes with this option to keep the system flexible to be used with any data acquisition software available.



### ■ Optional – Online-Scan

Another option for the **S 3250 UV/Vis Detector** is the Online Scan. With the Online Scan whole spectrum information can be gathered at a certain time. This scan information is stored internally and can be accessed at any time. The Online Scan is a good alternative to a full UV PDA detector.

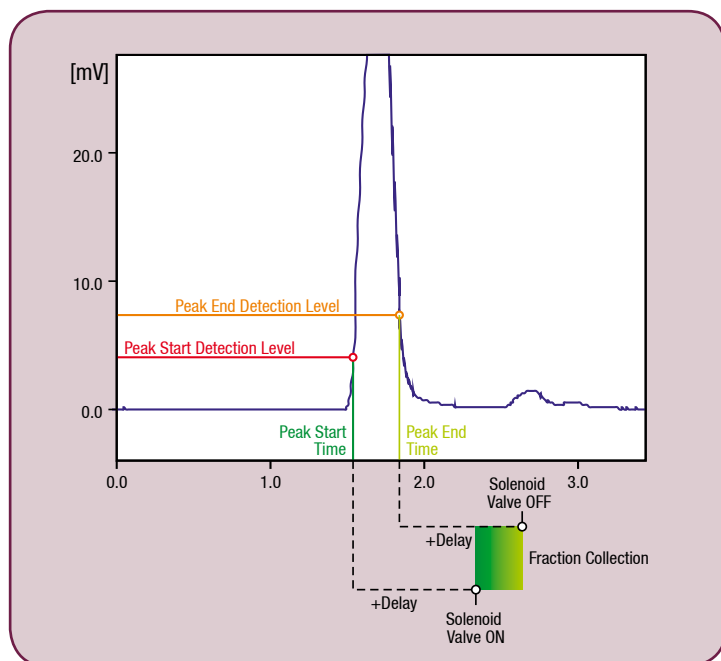


Figure: S 3250 Peak Detector

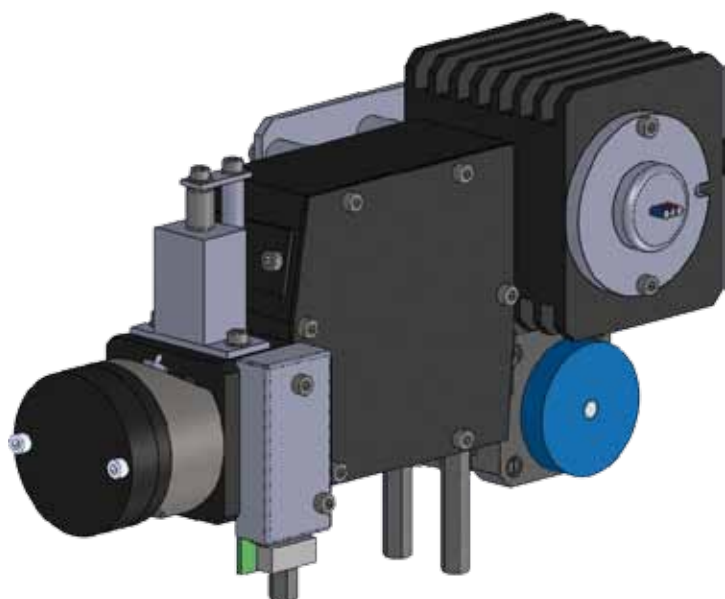


Figure: S 3250 Optical Module

## ■ Technical Specifications

<b>Wetted Materials:</b>	Stainless Steel / PEEK*
<b>Baseline Noise:</b>	$\pm 1 \times 10^{-5}$ AU (@240 nm, 2 sec. Risetime)
<b>Baseline Drift:</b>	$< 3 \times 10^{-4}$ AU/h
<b>Wavelength Range:</b>	190 – 800 nm
<b>Wavelength Accuracy:</b>	$\pm 2$ nm
<b>Linearity:</b>	$> 2.0$ AU
<b>Light Source</b>	Deuterium Lamp, Tungsten Lamp
<b>Wavelength Program:</b>	Programmable, 10 steps
<b>Analog Output:</b>	1x 1 V ( <i>optional</i> : 2x 1V)
<b>Control Features:</b>	Internal Peak Detector with +24 V solenoid switching output.
<b>Dimensions:</b> (W x H x D)	396 x 165 x 478 mm
<b>Power Supply:</b>	100 - 250 ~V (47 - 63 Hz)

\* depending on configuration

## ■ Principle of Operation

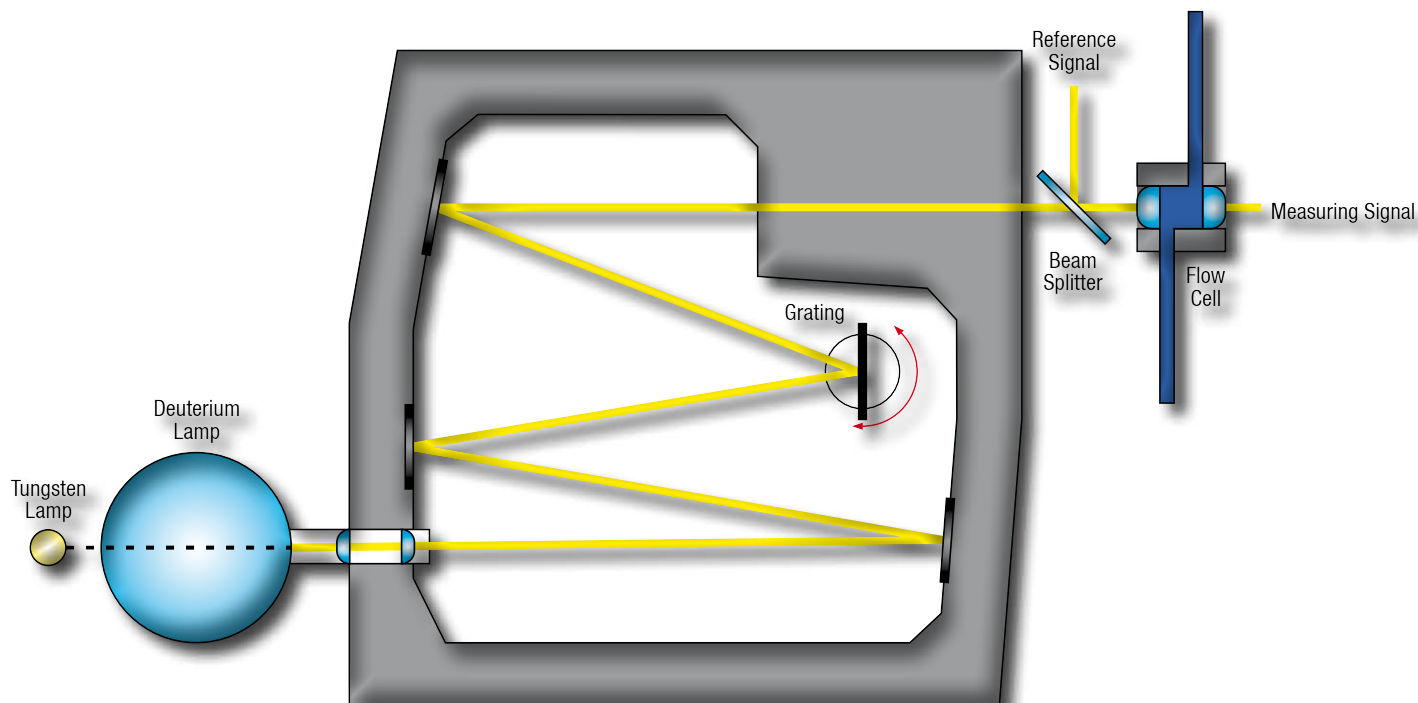


Figure: Principle of Operation

## ■ Order Information

### ■ RESEARCH Isocratic System S 601

Catalog No	Description
11 00 008	RESEARCH Isocratic System S 601-S – Analytical – SS* • S 1130 Isocratic HPLC Pump • S 5300 Sample Injector System • S 3250 UV/Vis Detector
20 20 061	<i>option: S 1130 – Active Piston Backflushing</i>
10 51 004	<i>option: S 5300 – Variable Volume upgrade</i>
10 51 005	<i>option: S 5300 – Derivatization upgrade (incl. 10 51 004)</i>
10 51 006	<i>option: S 5300 – Heating/Cooling upgrade</i>
10 31 009	<i>option: S 3250 – Dual-Wavelength upgrade</i>
10 31 010	<i>option: S 3250 – Scanning upgrade (incl. 10 31 009)</i>

Catalog No	Description
11 00 009	ROUTINE Isocratic System S 601-P – Analytical – PEEK* • S 1130 Isocratic HPLC Pump • S 5300 Sample Injector System • S 3250 UV/Vis Detector
20 20 061	<i>option: S 1130 – Active Piston Backflushing</i>
10 51 004	<i>option: S 5300 – Variable Volume upgrade</i>
10 51 005	<i>option: S 5300 – Derivatization upgrade (incl. 10 51 004)</i>
10 51 006	<i>option: S 5300 – Heating/Cooling upgrade</i>
10 31 009	<i>option: S 3250 – Dual-Wavelength upgrade</i>
10 31 010	<i>option: S 3250 – Scanning upgrade (incl. 10 31 009)</i>

### ■ RESEARCH Binary System S 602

Catalog No	Description
11 02 006	RESEARCH Binary Gradient System S 602-S – Analytical – SS* • S 1132 Binary Gradient Pump • S 5300 Sample Injector System • S 3250 UV/Vis Detector
20 20 061	<i>option: S 1132 – Active Piston Backflushing (2x)</i>
10 10 098	<i>option: S 1132 – Vacuum Degasser</i>
20 21 003	<i>option: S 1132 – High Pressure Mixer</i>
10 51 004	<i>option: S 5300 – Variable Volume upgrade</i>
10 51 005	<i>option: S 5300 – Derivatization upgrade (incl. 10 51 004)</i>

Catalog No	Description
10 51 006	<i>option: S 5300 – Heating/Cooling upgrade</i>
10 31 009	<i>option: S 3250 – Dual-Wavelength upgrade</i>
10 31 010	<i>option: S 3250 – Scanning upgrade (incl. 10 31 009)</i>

Catalog No	Description
11 02 007	RESEARCH Binary Gradient System S 602-P – Analytical – PEEK* • S 1132 Binary Gradient Pump • S 5300 Sample Injector System • S 3250 UV/Vis Detector
20 20 061	<i>option: S 1132 – Active Piston Backflushing (2x)</i>
10 10 098	<i>option: S 1132 – Vacuum Degasser</i>
20 21 003	<i>option: S 1132 – High Pressure Mixer</i>
10 51 004	<i>option: S 5300 – Variable Volume upgrade</i>
10 51 005	<i>option: S 5300 – Derivatization upgrade (incl. 10 51 004)</i>
10 51 006	<i>option: S 5300 – Heating/Cooling upgrade</i>
10 31 009	<i>option: S 3250 – Dual-Wavelength upgrade</i>
10 31 010	<i>option: S 3250 – Scanning upgrade (incl. 10 31 009)</i>

### ■ RESEARCH Quaternary System S 604

Catalog No	Description
11 01 008	RESEARCH Quaternary Gradient System S 604-S – Analytical – SS* • S 1130G Quaternary Gradient Pump • S 5300 Sample Injector System • S 3250 UV/Vis Detector
20 20 061	<i>option: S 1130G – Active Piston Backflushing</i>
10 10 085	<i>option: S 1130G – Vacuum Degasser</i>
10 51 004	<i>option: S 5300 – Variable Volume upgrade</i>
10 51 005	<i>option: S 5300 – Derivatization upgrade (incl. 10 51 004)</i>
10 51 006	<i>option: S 5300 – Heating/Cooling upgrade</i>
10 31 009	<i>option: S 3250 – Dual-Wavelength upgrade</i>
10 31 010	<i>option: S 3250 – Scanning upgrade (incl. 10 31 009)</i>

Catalog No	Description
11 01 009	RESEARCH Quaternary System S 604-P – Analytical – PEEK* • S 1130G Quaternary Gradient Pump • S 5300 Sample Injector System • S 3250 UV/Vis Detector
20 20 061	<i>option: S 1130G – Active Piston Backflushing</i>
10 10 085	<i>option: S 1130G – Vacuum Degasser</i>
10 51 004	<i>option: S 5300 – Variable Volume upgrade</i>
10 51 005	<i>option: S 5300 – Derivatization upgrade (incl. 10 51 004)</i>
10 51 006	<i>option: S 5300 – Heating/Cooling upgrade</i>
10 31 009	<i>option: S 3250 – Dual-Wavelength upgrade</i>
10 31 010	<i>option: S 3250 – Scanning upgrade (incl. 10 31 009)</i>

#### Sykam GmbH

Systeme & Komponenten analytischer Meßtechnik

Gewerbering 15  
86922 Eresing  
Germany

Tel.: ++49 (8193) 93 82 - 0  
FAX: ++49 (8193) 93 82 - 20  
EMail: [Info@sykam.com](mailto:Info@sykam.com)  
Web: <http://www.sykam.com>



\* all systems are also available in Micro or Semi-Preparative configuration on request

All specifications are subject to  
change without notice.

