

CROMATOGRAFIA IONICA

Analytical Technology: la scelta sicura!

Via S. Domenico Savio, 16 - 20861 Brugherio (MB) Tel. +39 039 87 00 26 - Fax +39 039 28 71 442 e-mail: antec@antec.it website: www.antec.it



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ION CHROMATOGRAPHY SYSTEM S 150 SERIES

- ♦ ANION & CATION ANALYSIS
- ENVIRONMENTAL ANALYSIS

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♦ WATER ANALYSIS

ION CHROMATOGRAPHY

lon Chromatography is an analytical separation technique based on ionic interactions. Dissolved in a mobile phase, analyte ions (e.g. Chloride, Nitrate) compete with eluent ions (e.g. CO_3^{2-}/HCO_3^{-}) to be adsorbed on the charged surface of the stationary phase.

Depending on the analytes electrical charge this technique is classified in cation and anion exchange.



Extended Water Application (Anions)





IC Applications

The field of application for lon Chromatography is versatile. This technique found its way into routine and research applications:

- Parameters
 - Anions
 - Cations
 - Organic acids
 - Transition metals
 - Amines
- Typical Applications
 - Drinking water
 - Tap water
 - Sea water
 - Waste water
 - Rain water
 - Ultra-trace determinition in electronic and power plants
 - Quality control and analysis of impurities
 - Elemental analysis (Wickbold & Schoeninger)





Water analysis for water treament plants



Cooling water control for power plants



Ground water analysis for quality control

ION CHROMATOGRAPHY SYSTEM S 150

Complete Family of IC Systems

The *lon Chromatography System S 150* is a family of modular systems which can be customized to any application needs for the determination of a multitude of ions.

S 1130 Pump System The *Sykam S 1130 HPLC Pump System* is a very flexible and powerful HPLC solvent delivery system.

The possible configurations include an Isocratic or Quaternary Gradient Pump.

S 5300 Sample Injector

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



SYKAM AUTO-SUPPRESSOR

The *Sykam Auto-Suppressor* is a robust chemical suppression system to increase the sensitivity of the anion analysis by reducing the background conductivity of the eluent.

Trouble-Free Operation

The *Sykam Auto-Suppressor's* membrane is protected by a *Pressure Safety Valve*, which opens when the pressure of the eluent flow is becoming too high. No annoying and expensive exchange of the membrane is needed!

The membrane pump is maintenance free in its

operation and the proper function is monitored by a built-in pressure sensor.

The closed suppression circuit provides continuous operation over a long time without the need of regeneration solutions. The capacity of the *lon Exchange Buffer Chamber* can be increased with an *ENDURANCE* upgrade.

When the chamber's capacity is reached it can be easily regenerated without effort and need not to be replaced.





Working Principle

Conductivity detection of anions in Ion Chromatography requires reduction of background conductivity to increase the detection sensitivity.

The eluent buffer (e.g. Na_2CO_3 / $NaHCO_3$) used to perform anion chromatography disturbs the analyte measurement (e.g. Chloride, Nitrate, Sulfate).

The *Sykam Auto-Suppressor* substitutes counter cations of the eluent (e.g. Na⁺) with hydrogen cations. This transfers the eluent anion (e.g. CO_3^{2-}) in a low conductive form and reduces the background conductivity.

The analyte anions will not be interfered by this process. Their hydrogen forms (e.g. hydrochloric acid) are still dissociated.

The Sykam Auto-Suppressor combines:

- an Ion Exchange Buffer Chamber, filled with a durable and customer regenerative cation exchanger
- a transfer solution to transport hydrogen cations to the mobile phase and buffer cations to the resin
- and a membrane capillary that allows the transfer of hydrogen- and eluent cations







SYKAM ION CHROMATOGRAPHY SYSTEMS







MANUAL ANION IC SYSTEM S 151-M / G

The Manual Anion Ion Chromatograph S 151-M

is an economic solution for low sample throughput.

The S 151-M features the anion membrane suppressor for the sensitive detection of anions. It can be upgraded to an automatic system at any time.





Manual Isocratic Anion IC System S 151-M

Catalog No	Description	consisting of:
S003695	Manual Isocratic IC System	S 150 Ion Chromatography Module, including Column Oven;
	Anion Separation	S 1130 Isocratic Pump, analytical, Peek; including 1-Channel Degasser;
	without Data System and Separation Column	S 6120 Injection Valve, Peek;
		S 7150 Reagent Organizer, isocratic, including 1 bottle (1000 ml);; without gas regulator
		Auto-Suppressor Module;
		1-Channel Conductivity Detector

Manual Gradient Anion IC System S 151-G

Catalog No	Description	consisting of:
S004162	Manual Gradient IC System	S 150 Ion Chromatography Module, including Column Oven;
	Anion Separation	S 1130 Quaternary Gradient Pump, analytical, Peek; including 4-Channel Degasser;
	without Data System and Separation Column	S 6120 Injection Valve, Peek;
		S 7150 Reagent Organizer, isocratic, including 4 bottles (1000 ml); without gas regulator
		Auto-Suppressor Module;
		1-Channel Conductivity Detector

Catalog No	Description	Notes
S003582	Auto-Suppressor Module	S 8310 Autosuppressor Module (for update of Cation system to Anion determination)
S003583	Auto-Suppressor ENDURANCE Update	Capacity upgrade for Auto-Suppressor
S003585	Dual Channel Detector Upgrade	S 150 Ion Chromatography Module (2nd detector channel)
S003846	S 7155 Reagent Organizer with Gas Regulator	Analytical, incl. 4 bottles (1000 ml)
S000172	S 3250 UV/Vis Detector	Update for difficult sample matrices (e.g. high CI- concentrations)
S000203	S 3250 Flowcell	Analytical, PEEK
S005505	Integrated Switching Valve	S 150 Ion Chromatography Module (integrated S6000 series Switching Valve)
S007073	Suppressor for organic acids	built-in module



AUTOMATIC ANION IC SYSTEM S 151-A / AG

The *Automatic Anion IC System S 151-A/AG* is a modular system which can be customized to any application needs.





Automatic Isocratic Anion IC System S 151-A

Catalog No	Description	consisting of:
S004070	Automatic Isocratic IC System	S 150 Ion Chromatography Module, including Column Oven;
	Anion Separation	S 1130 Isocratic Pump, analytical, Peek; including 1-Channel Degasser;
	without Data System and Separation Column	S 5300 Automatic Sample Injector with S 6115 Peek Valve, variable volume Mode
		S 7150 Reagent Organizer, isocratic, including 1 bottle (1000 ml);; without gas regulator
		Auto-Suppressor Module;
		1-Channel Conductivity Detector

Automatic Gradient Anion IC System S 151-AG

Catalog No	Description	consisting of:
S004161	Automatic Gradient IC System	S 150 Ion Chromatography Module, including Column Oven;
	Anion Separation	S 1130 Quaternary Gradient Pump, analytical, Peek; including 4-Channel Degasser;
	without Data System and Separation Column	S 5300 Automatic Sample Injector with S 6115 Peek Valve, variable volume Mode
		S 7150 Reagent Organizer, isocratic, including 4 bottles (1000 ml);; without gas regulator
		Auto-Suppressor Module;
		1-Channel Conductivity Detector

Catalog No	Description	Notes
S003583	Auto-Suppressor ENDURANCE Update	Capacity upgrade for Auto-Suppressor
S003585	Dual Channel Detector Upgrade	S 150 Ion Chromatography Module (2nd detector channel)
S003846	S 7155 Reagent Organizer with Gas Regulator	Analytical, incl. 4 bottles (1000 ml)
S000172	S 3250 UV/Vis Detector	Update for difficult sample matrices (e.g. high CI- concentrations)
S000203	S 3250 Flowcell	Analytical, PEEK
S005505	Intergated Switching Valve	S 150 Ion Chromatography Module (integrated S6000 series Switching Valve)
S007073	Suppressor for organic acids	built-in module



MANUAL CATION IC SYSTEM S 152-M / G

The *Manual Cation IC System S 152-M/G* is an economic solution for low sample through-put.





Manual Isocratic Cation IC System S 152-M

Catalog No	Description	consisting of:
S004851	Manual Isocratic IC System	S 150 Ion Chromatography Module, including Column Oven;
	Cation Separation	S 1130 Isocratic Pump, analytical, Peek; including 1-Channel Degasser;
	without Data System and Separation Column	S 6120 Injection Valve, Peek;
	without Auto-Suppressor	S 7150 Reagent Organizer, isocratic, including 1 bottle (1000 ml); without gas regulator
		1-Channel Conductivity Detector

Manual Gradient Cation IC System S 152-G

Catalog No	Description	consisting of:
S005115	Manual Gradient IC System	S 150 Ion Chromatography Module, including Column Oven;
	Cation Separation	S 1130 Quaternary Gradient Pump, analytical, Peek; including 4-Channel Degasser;
	without Data System and Separation Column	S 6120 Injection Valve, Peek;
	wihtout Auto-Suppressor	S 7150 Reagent Organizer, isocratic, including 4 bottles (1000 ml); without gas regulator
		1-Channel Conductivity Detector

Catalog No	Description	Notes
S003582	Auto-Suppressor Module	S 8310 Autosuppressor Module (for update of Cation system to Anion determination)
S003583	Auto-Suppressor ENDURANCE Update	Capacity upgrade for Auto-Suppressor
S003585	Dual Channel Detector Upgrade	S 150 Ion Chromatography Module (2nd detector channel)
S003846	S 7155 Reagent Organizer with Gas Regulator	Analytical, incl. 4 bottles (1000 ml)
S000172	S 3250 UV/Vis Detector	Update for difficult sample matrices (e.g. high CI- concentrations)
S000203	S 3250 Flowcell	Analytical, PEEK
S005505	Intergated Switching Valve	S 150 Ion Chromatography Module (integrated S6000 series Switching Valve)
S007073	Suppressor for organic acids	built-in module



AUTOMATIC CATION IC SYSTEM S 152-A / AG

The *Automatic Cation IC System S 152-A/AG* is amodular system which can be upgraded to anion analysis.





Automatic Isocratic Cation IC System S 152-A

Catalog No	Description	consisting of:
S005452	Automatic Isocratic IC System	S 150 Ion Chromatography Module, including Column Oven;
	Cation Separation	S 1130 Isocratic Pump, analytical, Peek; including 1-Channel Degasser;
	without Data System and Separation Column	S 5300 Automatic Sample Injector with S 6115 Peek Valve, variable volume Mode
		S 7150 Reagent Organizer, isocratic, including 1 bottle (1000 ml); without gas regulator
		WITHOUT Auto-Suppressor Module;
		1-Channel Conductivity Detector

Automatic Gradient Cation IC System S 151-AG

Catalog No	Description	consisting of:
S004161	Automatic Gradient IC System	S 150 Ion Chromatography Module, including Column Oven;
	Cation Separation	S 1130 Quaternary Gradient Pump, analytical, Peek; including 4-Channel Degasser;
	without Data System and Separation Column	S 5300 Automatic Sample Injector with S 6115 Peek Valve, variable volume Mode
		S 7150 Reagent Organizer, isocratic, including 4 bottles (1000 ml); without gas regulator
		WITHOUT Auto-Suppressor Module;
		1-Channel Conductivity Detector

Catalog No	Description	Notes
S003582	Auto-Suppressor Module	S 8310 Autosuppressor Module (for update of Cation system to Anion determination)
S003583	Auto-Suppressor ENDURANCE Update	Capacity upgrade for Auto-Suppressor
S003585	Dual Channel Detector Upgrade	S 150 Ion Chromatography Module (2nd detector channel)
S003846	S 7155 Reagent Organizer with Gas Regulator	Analytical, incl. 4 bottles (1000 ml)
S000172	S 3250 UV/Vis Detector	Update for difficult sample matrices (e.g. high CI- concentrations)
S000203	S 3250 Flowcell	Analytical, PEEK
S005505	Intergated Switching Valve	S 150 Ion Chromatography Module (integrated S6000 series Switching Valve)
S007073	Suppressor for organic acids	built-in module



AUTOMATIC DUAL IC SYSTEM S 153-A/AG DUAL

The *Automatic Ion Chromatograph S 153-A/ AG Dual* is a modular system which enables the simultaneous analysis of anions and cations from a single injection.





Automatic Isocratic Dual IC System S 153-A

Catalog No	Description	consisting of:
S004671	Automatic Dual Isocratic IC System	S 150 Ion Chromatography Module, including Column Oven;
	Anion & Cation simultaneous Separation	2x S 1130 Isocratic Pump, analytical, Peek; including 1-Channel Degasser;
	without Data System and Separation Column	S 5300 Automatic Sample Injector with S 6165 Peek Valve, variable volume Mode
		S 7150 Reagent Organizer, isocratic, including 2 bottles (1000 ml); without gas regulator
		Auto-Suppressor Module;
		2-Channel Conductivity Detector

Automatic Gradient Dual IC System S 153-AG

Catalog No	Description	consisting of:
S004882	Automatic Dual Gradient IC System	S 150 Ion Chromatography Module, including Column Oven;
	Anion & Cation simultaneous Separation	1x S 1130 Quaternary Gradient Pump, analytical, Peek; including 4-Channel Degasser;
		1x S 1130 Isocratic Pump, analytical, Peek; including 1-Channel Degasser;
	without Data System and Separation Column	S 5300 Automatic Sample Injector with S 6165 Peek Valve, variable volume Mode
		S 7150 Reagent Organizer, isocratic, including 4 bottles (1000 ml); without gas regulator
		Auto-Suppressor Module;
		2-Channel Conductivity Detector

Catalog No	Description	Notes
S003583	Auto-Suppressor ENDURANCE Update	Capacity upgrade for Auto-Suppressor
S003585	Dual Channel Detector Upgrade	S 150 Ion Chromatography Module (2nd detector channel)
S003846	S 7155 Reagent Organizer with Gas Regulator	Analytical, incl. 4 bottles (1000 ml)
S000172	S 3250 UV/Vis Detector	Update for difficult sample matrices (e.g. high CI- concentrations)
S000203	S 3250 Flowcell	Analytical, PEEK
S005505	Intergated Switching Valve	S 150 Ion Chromatography Module (integrated S6000 series Switching Valve)
S007073	Suppressor for organic acids	built-in module



IC SYSTEM UPGRADE: POST COLUMN DERIVATIZATION



ORDER INFORMATION

IC System Upgrade: Post Column Derivatization

Catalog No	Description	consisting of:
S004671	IC System Upgrade: Post Column Derivatization	S 1130 Isocratic Pump, analytical, Peek; including 1-Channel Degasser;
	for determination of metal ions and other specific	S 3212 LED Detector, with analytical Flowcell (PEEK); 525 nm
	ions via post-column derivatization	Reactor Coil with T-Piece



TECHNICAL SPECIFICATIONS

S 150 Ion Chromatography Module

Wetted Materials:	PEEK, PPS, PTFE, Stainless Steel ¹
Dimensions:	396 x 165 x 478 mm
(W x H x D)	
Power Supply:	100 - 250 ~V (47 - 63 Hz)
¹ Flowcell only	

Column Oven

Temperature Range:	+30°C to +100°C ¹
Temperature Accuracy:	< 0.1 °C
Switching Valve:	optional: any S 6000 Series Valve

¹ Temperature range at 20°C ambient

Conductivity Detector

Measuring Range:	0 to 20,000 µS/cm
Flowcell Volume:	0.76 µl
Auto-Suppressor	

Auto-Suppressor

Pump System:	Membrane Pump
Safety Systems:	- Pressure Sensor
	- Pressure Safety Valve

S 1130 Pump System

Wetted Materials:	PEEK, Teflon AF [®] , PVDF, Ceramics,
	Sapphire
Flow Rate:	Programmable
	Analytical: 0.001 - 10.000 ml/min
Flow Accuracy:	± 1.0 % 1.000 ml / min
Flow Precision:	± 0.1 % RSD 1.000 ml/min
Pressure Range:	0 - 40 MPa (0 - 6000 PSI)
Pressure	typical < 0.1 MPa or < 1.0 %
Pulsation:	
Compressibility	user-adjustable for different solvents
Compensation:	
Vacuum Degassing:	optional: < 20% dissolved gases remain-
	ing in water @ 1.000 ml/min
Dimensions:	396 x 165 x 478 mm
(W x H x D)	
Power Supply:	100 - 250 ~V (47 - 63 Hz)

S 5300 Sample Injector System

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

S 1130 Quaternary Gradient Pump System

Netted Materials:	PEEK, Teflon AF [®] , PVDF, Ceramics,
	Sapphire
Flow Rate:	Programmable
	Analytical: 0.001 - 10.000 ml/min
low Accuracy:	± 1.0 % 1.000 ml / min
low Precision:	± 0.1 % RSD 1.000 ml/min
Pressure Range:	0 - 40 MPa (0 - 6000 PSI)
Pressure	typical < 0.1 MPa or < 1.0 %
Pulsation:	
Compressibility	user-adjustable for different solvents
Compensation:	
lacuum Degassing:	optional: < 20% dissolved gases remain-
	ing in water @ 1.000 ml/min
Gradient Range:	0.0 - 100.0 %, 4 channels
Gradient Accuracy:	< 0.50 %
Gradient Mixing:	Active
Mixer Volume:	adjustable: 100 – 500 µl
Dimensions:	396 x 165 x 478 mm
W x H x D)	
Power Supply:	100 - 250 ~V (47 - 63 Hz)





SYKAM PRODUCTS

S 500 Series HPLC Systems S 600 Series HPLC Systems



S 435/436 Amino Acid Analyzer



Sykam OEM Modules





S 6000 Valve Series



S 6800 LP Valve Series





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

 Web:
 http://www.sykam.com

Distribuito da: Analytical Technology Srl Via San Domenico Savio 16 20861 Brugherio MB Tel. 039870026 www.antec.it





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Version 2.0 - February 2017



Analytical Technology la scelta sicura!

Via S. Domenico Savio, 16 - 20861 Brugherio (MB) Tel. +39 039 87 00 26 - Fax +39 039 28 71 442 e-mail: antec@antec.it website: www.antec.it

CI2018