



**2nd Presentation Block:
Analytical Systems**

Analytical System

- **Modular Analytical HPLC system** includes **PDA Detector** or **UV-VIS Detector**, **Autosampler for 96 vials**, **Isocratic Pump** with flow rate up to 10 ml/min which works together with **Gradient Box** with degasser as **Gradient Pump** and **Column Oven** with heating/cooling. Communication is via USB, RS232 or LAN.



ECS05 Gradient Analytical System



Solvent Delivery

Pumps

1) ECP2010, ECP2010H

This pump suited for analytical applications with a flow rate of 0.02-10.00 ml/min is produced in two variants - low pressure (ECP2010, 40 MPa) and high pressure (ECP2010H, 60 MPa).

There are many improvements which make this pump more reliable, safe and precise. Also, maintenance is now easier - e. g. pistons exchange is easier because of new construction; new learning algorithm for **pulsation suppression**; leakage sensor etc.

All pumps are delivered with GFP (PTFE) seals a default, recommended optimal seals are UHMW-PE seals, ask for more information.



Pumps

2) ECP2011, ECP2011P, ECP2011S, ECP2011SP

Single piston pump ECP2011 with a flow rate of 0.02-10.00 ml/min are produced in four variants:

	Pressure sensor	Ethernet (LAN) port
ECP2011	✗	✓
ECP2011P	✓	✓
ECP2011S	✗	✗
ECP2011SP	✓	✗

The price of the ECP2011S and ECP2011SP versions is lower and more advantageous for a customer who does not need an Ethernet port.





Boxes

- **Boxes** is suited for handling liquids in ECOM gradient systems. All types accommodate a container for solvent bottles, then, depending on the type of the box, some also accommodates **four-way gradient valve**, built-in **high-efficiency on-line degasser** or **built-in PC**.
- **Degasser's** unique design assures reliable operation and the highest level of continuous performance available **without the need for helium degassing**. Up to four solvent lines may be degassed simultaneously by one unit. One additional channel is reserved for degassing of gradient valve output.
- **Four-way gradient valve** is controlled from the pump ECP2010 and 2010H and gradient box ECB2004 must be ordered with the pump. Pumps have new sophisticated electronics which allows achieving precise **low-pressure gradient**, i.e. 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 isocratic mode. Gradient profile can be defined from computer or pump.
- **Box equipped with built-in PC** saves space on a laboratory desk.
- Up to **6 mobile phase reservoirs** LCT 02 (1L) may be put into the box.

Boxes



ECB2007 Anal./Semiprep. Gradient Box without degasser



ECB2004B Analytical Gradient Box

Gradient

- **Analytical isocratic** pump works together with **Gradient Boxes** also as **gradient pump**.
- **ECB2004B, ECB2004BP (ECB2007, ECB2007PC) Gradient Boxes with Degasser (without Degasser)** are equipped with **four way gradient mixing valve** and must be ordered together with the pump.
- The ECP2010 pump in combination with a gradient box can also be used in semi-preparative analysis. In cooperation with Masaryk University and Mr. Šmejkal, this combination of pump and gradient box lasted over more than 50 million revolutions.



Sample Injection

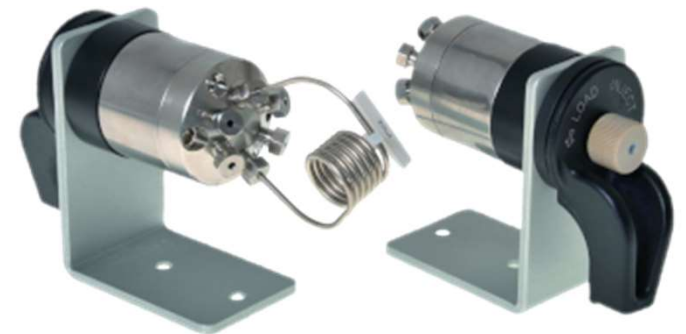
Autosampler

- Autosampler L3320 (40 MPa) and L3320H (60 MPa) is an automatic autosampler for 96 vials (optional: 96-hole panel for 1.5ml vials or 384-hole panel), ensuring excellent accuracy and linearity of sample injection. Inovated needle design significantly reduces sample residue contamination. μ l pick-up mode achieves zero sample loss.
- The autosampler is designed as **standalone unit**.
- User friendly unit offers control through computer and show information about actual status on unit display. Automated selfchecking simplifies the usage of autosampler, there is no need of calibration or needle position setting.
- Rheodyne valve secures reliable operation of the device.
- The unit is supported in software **Clarity**.



Analytical/Semipreparative Injection Valve

- Stainless steel two-position valve with needle injection port on the front side.
- **No-Flow-Interruption** technology reduces pressure spikes during position switching to a minimum. It has a built-in position sensor for starting data acquisition precisely at the point of injection.
- The stator of the valve is made of stainless steel and features the Nitronic 60 coating on its working face which not only protects the contact surface from wear but also improves the abrasion of the stator and rotor.
- The needle port can be used with standard microliter syringes (e.g. Hamilton) or plastic type blunt syringes (with PST3 needle point style) with 0.7mm needles.
- The valve is standardly delivered with polymeric Valcon H rotor seal.





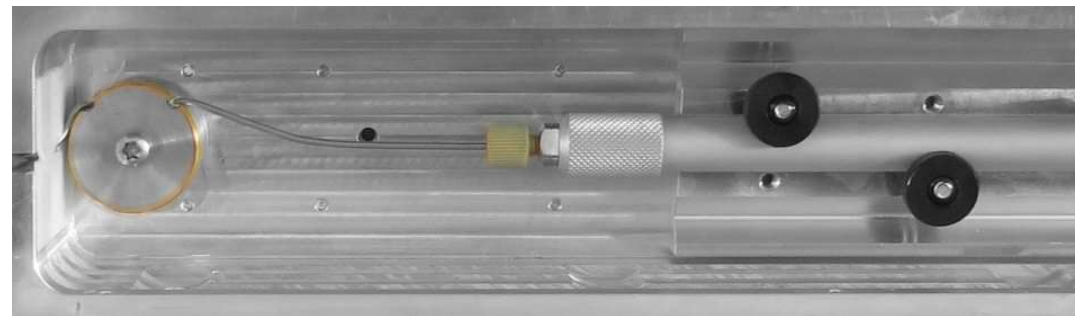
Column Ovens

- ECOM offers two types of Column ovens – peltier heating/cooling column oven ECO2080 (0-80 °C) or heating only column oven ECO2099 (up to 99 °C) with a big compartment room which can accommodate up to 3 columns with length up to 25 cm. The unit is controlled via keypad, RS232 or LAN Interface.
- Device is supported by ECOMAC and Clarity software.



Heat Exchangers

- Heat exchangers are suited for column ovens ECO20XX and are produced in different sizes for different maximal flow rate.
- Use of a heat exchanger before the column is the most effective method for fast and even stabilization of temperature in column.





Detection

Analytical Detectors

1) ECD2600 (800) UV Detector

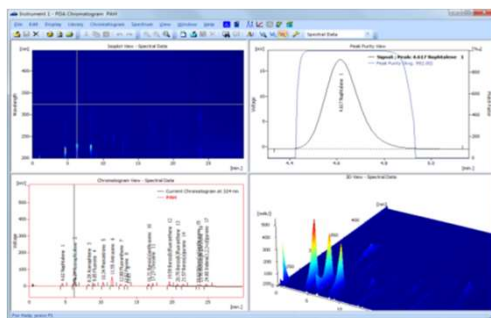
- These detectors have continuously variable wavelength in the range of **190-600 nm** respective **190 – 800 nm** and noise level is **$\pm 5 \cdot 10^{-6}$ AU**.
- The detector performs automatic wavelength calibration after the lamp has been switched on. High standard deuterium lamp in a special socket enables easy exchange.
- **Output signal** is available in both digital **and analogue** form. Detector could be controlled, programmed and used together with **Clarity** or **ECOMAC** software via **RS232** or **Ethernet** interface.



Analytical Detectors

1) ECDA2800 UV Detector

- ECDA2800 is an **analytical diode array detector** (DAD) which allows measuring absorbance of eight wavelengths simultaneously in one cell just as measuring of whole spectrum (scan).
- This unit is used in liquid chromatography **to verify analyzed samples** by means of eight wavelengths or scanned spectra.



Differences between ECD and ECDA Detectors



	ECD	ECDA
Wavelength range	190-600 (800) nm	200-800 nm
Spectral halfwidth	6 nm	10 nm
Noise	5×10^{-6} AU	3×10^{-6} AU
Time constant	20 – 10 000 ms	10 – 10 000 ms
Analog output	1x configurable	4x configurable
Communication	Ethernet (LAN), RS232	Ethernet (LAN), RS232, USB




ECD2600 and EC2800 detectors are also made in EX and CE versions.




Analytical Cells

- In the following slides there is an overview of the analytical cells ECOM produces.
- **All of our cells can also be made in the OEM version or directly adjusted to the customer's requirements.**





CELLS FOR ECD DETECTORS

	Part Number	Cell	Max. working pressure	Pressure (testing)	Tightening torque	Accessories
	ADA5000X	Analytical Cell AC10 (l=10 mm, 1/16", UNF10-32)	5MPa	8MPa	4cNm	
	ADA6000X	Analytical Cell AC02 (l=2.0 mm, 1/16", UNF10-32)	5MPa	8MPa	4cNm	
	ADA7000X	Analytical Cell AC05 (l=5 mm, 1/16", UNF10-32)	5MPa	8MPa	4cNm	

EX CELLS FOR ECD DETECTORS

	Part Number	Cell	Max. working pressure	Pressure (testing)	Tightening torque	Accessories
	ADAEX410X	EX Cell ECD				

CELLS FOR ECDA DETECTORS

	Part Number	Cell	Max. working pressure	Pressure (testing)	Tightening torque	Accessories
	ANW5000X	Analytical Cell AD10 (l=10 mm, 1/16", UNF10-32)	5MPa	8MPa	4cNm	
	ANW6000X	Analytical Cell AD02 (l=2 mm, 1/16", UNF10-32)	5MPa	8MPa	4cNm	
	ANW7000X	Analytical Cell AD05 (l=5 mm, 1/16", UNF10-32)	5MPa	8MPa	4cNm	
	ANW700SX	Analytical Cell AD05 (l=5 mm, 1/16", UNF10-32 sapphire glass)	10MPa	15MPa	4cNm	



Special

Column Regeneration

- The ECP2011 pump serie is used by our customers in many cases for column regeneration.
- Completely new concept of electronic control and drive of the ECP2011 pump allows using it as standalone unit, as well as in PC controlled systems.



CE (Capillary Electrophoresis)

- Modifications of the ECD2600 and ECD2800 - ECD2600 CE and ECD2800 CE detectors were specifically created for capillary electrophoresis.
- Newly developed cell enables easy installation of quartz capillaries and minimizes interference by ambient light as well as mechanical shocks. The light is brought into the cell using optical fiber, which is focused in the center of quartz capillary for electrophoresis.

ITP (Isotachopheresis)

- Also EX detectors are used for detection within the ITP (isotachopheresis) when the cell is part of the ITP system.





Thank you for your attention!

If you have any questions, please do not hesitate to ask us or
contact us!