C4D Detector (Model EA125)
Contactless Conductivity Detector

C4D Detector

C4D Head (ET120) for CE or IC

- For capillary electrophoresis (CE) or ion chromatography (IC)
- Signal supplied as digital (RS232 serial) or analog voltage
- Compatible with Agilent, Beckmann, and Prince CE systems
- Compatible with 360 – 365 µm OD capillary tubing (with ET120 C4D Head)
- Can be supplied with alternative Microfluidic Platform headstage (ET121) for microchannel electrophoresis.

Description

Capacitively–coupled contactless conductivity detection (C4D) systems apply a high voltage AC waveform to a transmitter electrode adjacent to a tube or channel in which electrophoretic (or chromatographic) flow is occuring. The AC signal capitively couples into the sample, which conducts the signal to a second receiver electrode. The received, much attenuated, AC signal is demodulated to provide a DC signal which is dependent on the conductivity of the sample between the electrodes. This process occurs inside a headstage, which outputs a signal to the C4D Detector. The Detector removes signal offset, amplifies and filters the signal, and also generates the excitation waveform that is sent to the headstage.

The CE or IC capillary tube is passed through the C4D Head where the AC signal is applied and received.

Compatibility

The C4D Detector has an RS232 serial interface (which can also be used with most RS232/USB adaptors). Settings can be altered with supplied Windows software, or via user supplied software. The signal can can be collected from the analog signal output, or via the RS232 interface. Many commercial data acquisition systems and chromatography recording systems will be compatible.

Supplied with C4D Head (ET120) which will fit capillary tubing with an outside diameter of 360 – 365 µm, or optionally with Microfluidic Platform headstage for use with microfluidic channel chips.

Applications

- Ion Chromatography
- Capillary Electrophoresis
- Microfluidic Channel Electrophoesis (requires ET121 headstage)

For a list of chemical applications see over.

Specifications

Connector:	8 pin DIN socket
Headstage gain:	0.2 or 1.0 mV/nA
C4D Amp signal gain:	x1, x10, x100, x1000
Signalresolution:	16 bits, 0.0015% of range (Chart software) up to 24 bits (PowerChrom software)
Maximum input signal:	3 V
Excitation frequency:	50 — 1200 kHz
Excitation amplitude:	1 — 100 V AC p-p, sinusoidal
Offset resolution:	20 bit
Low pass filters:	10 Hz with PowerChrom software 10, 5, 2, 1 Hz, with Chart software
Output signals:	κ_{raw} 0 — 2 V; $\Delta\kappa$ 0 to ±3 V

Back panel connectors:	BNC (analog voltage) RJ45 (RS232 serial) RJ45 to DB9 adaptor included
Power requirements: (mains adaptor supplied)	12 V DC, ~5 W
Dimensions (h × w × d):	65 × 200 mm × 250mm (2.6 × 7.9 × 9.8")
Weight:	1.5 kg (3.3 lb)
C4D Head (ET120) Dimensions (h × w × d):	28.5 × 25.2 × 10.0 mm (1.1 × 1.0 × 0.39")
Operating temperature:	0 to 35 °C 0 to 90% humidity (non-condensing)
eDAQ reserves the right to alter these specifications at any time.	

WARRANTY: eDAQ Hardware units are supported by a one year warranty

Document Number: M-ER125-1207

Applications cont'd

Contactless conductivity detection can be used for virtually all charged species: inorganic anions and cations, as well as organic ions, such as carboxylic acids, amines, amino acids, peptides, proteins, DNA fragments, antibiotics and many other pharmaceutical compounds. Tagging or other modification of the analytes is usually NOT required, while limits of detection are often comparable to, or sometimes even better than UV-visible absorption techniques.

The C^4D Detector is based on a design originally conceived by Professor Peter Hauser and co-workers at the University of Basel. Application areas are described in the research papers below:

Determination of different classes of amines with capillary zone electrophoresis and contactless conductivity detection. Xiao Yang Gong, Peter C. Hauser, Electrophoresis, **27**, 468–473, 2006.

Determination of chlorhexidine digluconate and polyhexamethylene biguanide in eye drops by capillary electrophoresis with contactless conductivity detection. Eva M Abad-Villar, Susanne F. Etter; Michael A. Thiel, and Peter C. Hauser, Analytica Chimica Acta, **561**, 133-137, 2006

Evaluation of the detection of biomolecules in capillary electrophoresis by contactless conductivity measurement. Eva M. Abad-Villar, Pavel Kubán, Peter C. Hauser, Journal of Separation Science, **29**, 1031–1037, 2006.

Analysis of electroplating baths by capillary electrophoresis with high voltage contactless conductivity detection. Ling Zhang, Shokooh S Khaloo, Pavel Kubán, and Peter C Hauser, Measurement Science and Technology, **17**, 3317–3322, 2006.

Enantiomeric separation of underivatized small amines in conventional and on-chip capillary electrophoresis with contactless conductivity detection. Xiao Yang Gong, and Peter C. Hauser, Electrophoresis, **27**, 4375–4382, 2006.

Rapid electrophoretic separations in short capillaries using contactless conductivity detection and a sequential injection analysis manifold for hydrodynamic sample loading. Andreas Wuersig, Pavel Kubá, Shokooh S. Khaloo and Peter C. Hauser, The Analyst, **131**, 944–949, 2006.

Detection of Human Immunoglobulin in Microchip and Conventional Capillary Electrophoresis with Contactless Conductivity Measurements. Eva M. Abad-Villar, Jatisai Tanyanyiwa, M. Teresa Fernández-Abedul, Agustín Costa-Garcí, and Peter C. Hauser, Analytical Chemistry, **76**, 1282–1288, 2004.

Determination of major inorganic ions in blood serum and urine by capillary electrophoresis with contactless conductivity detection. Qi Jin Wan, Pavel Kubán, Jatisai Tanyanyiwa, Andrea Rainelli, and Peter C. Hauser, Analytica Chimica Acta, **525**, 11–16, 2004.

Contactless conductivity detection of selected organic ions in on-chip electrophoresis. Jatisai Tanyanyiwa, Eva M. Abad-Villar, Peter C. Hauser, Electrophoresis, **25**, 903–908, 2004.

Application of a contactless conductivity detector to the determination of inorganic ions in ion chromatography. Pavel Kubán, Marcel A. Müri and Peter C. Hauser, The Analyst, **129**, 82–86, 2004.

On-site simultaneous determination of anions and cations in drainage water using a flow injection-capillary electrophoresis system with contactless conductivity detection. Pavel Kubán, Miriam Reinhardt, Beat Müller and Peter C. Hauser, Journal of Environmental Monitoring, **6**, 169–174, 2004.

High-voltage contactless conductivity detection of underivatized amino acids in capillary electrophoresis. Jatisai Tanyanyiwa, Karin Schweizer, and Peter C. Hauser, Electrophoresis, **24**, 2119–2124, 2003.

Improved capacitively coupled conductivity detector for capillary electrophoresis. Jatisai Tanyanyiwa, Benedikt Galliker, Maria A. Schwarz and Peter C. Hauser, The Analyst, **127**, 214–218, 2002.

High-voltage contactless conductivity detection of metal ions in capillary electrophoresis. Jatisai Tanyanyiwa, and Peter C. Hauser, Electrophoresis, **23**, 3781–3786, 2002.