



Liquid Chromatography techniques combined with electrochemical detection (ED) provide highly sensitive and selective analyses for a wide range of biological and pharmaceutical compounds. The UltiMate® 3000 system for ED is optimized for the Coulochem® III detector to provide the ultimate in sensitivity through minimizing background currents and pump noise, resulting in the best limits of detection. For monitoring biological processes, such as in neuroscience, this enables greater spatial and temporal resolution. These capabilities extend well beyond neuroscience to cardiovascular and cancer research to natural products where high sensitivity and selectivity are critical.

The UltiMate 3000 system is a turnkey solution for measurement of femtogram levels of oxidizable or reducible compounds. This system provides full capabilities for analysis of many compounds including neurotransmitters, drugs and metabolites, natural products and genotoxins. The robustness and reliability of the system offers you the confidence and capability to achieve ultrasensitive results and maximum performance with minimum effort and downtime.

- *The solution for analysis of neurotransmitters, thiols, and drug metabolites in biological systems*
- *A completely biocompatible flow path minimizes interference and assures exceptionally low backgrounds, and minimizes degradation of labile analytes*
- *Precision autosampler delivers high-performance analyses with zero sample carryover and accurate sampling from low-volume samples with minimal waste*
- *The system is designed for reliable operation and increased system longevity*
- *Advanced system control and monitoring using the Dionex Chromeleon® Chromatography Data System software*

Now sold under the
Thermo Scientific brand

Thermo
SCIENTIFIC

 **DIONEX**

Passion. Power. Productivity.

Coulochem III Electrochemical Detector

The Coulochem III detector is the standard in electrochemical detection, achieving the highest possible sensitivity from standard bore to microbore chromatography. The advanced features of the Coulochem III platform provide performance and reliability in a detector that is convenient to use. Unsurpassed selectivity and ruggedness can be achieved using serial coulometric cells. Amperometric cells provide great flexibility for a wide range of analytes and for use with microbore chromatography. The widest variety of electrochemical cells are available; choose the optimum cell design that meets your assay needs. All cells use our unique, maintenance-free solid state reference electrode for reliable, trouble-free operation.

Biocompatible Isocratic Pump

The inert flow path of the pump is ideally suited for use with electrochemical detection. The dual micro-pump design incorporates isokinetic Smartflow™ technology to provide constant, zero-pulsation delivery at flow rate ranges from 50 μL to 2.5 mL/min (Figure 1).

Biocompatible Analytical Sampler with Sample Thermostatting

The autosampler uses an in-line, split-loop injection principle, where the needle itself is part of the sample loop (Figures 2 and 3). Using this split-loop injection principle permits injection of maximum sample volume from low-volume samples. This sampler is ideal for precolumn derivatization of neuroactive amino acids and other compounds. Fast injection cycle times increase sample throughput. Adjustable temperature control of the sample compartment protects precious samples while waiting for analysis.

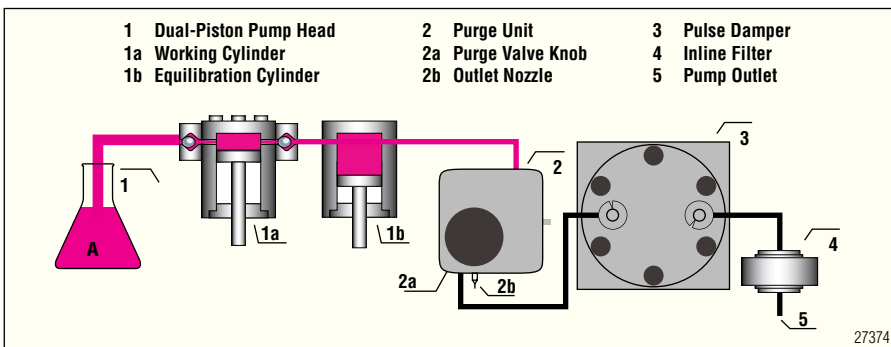


Figure 1. Schematic of ISO-3100BM Isocratic Pump.

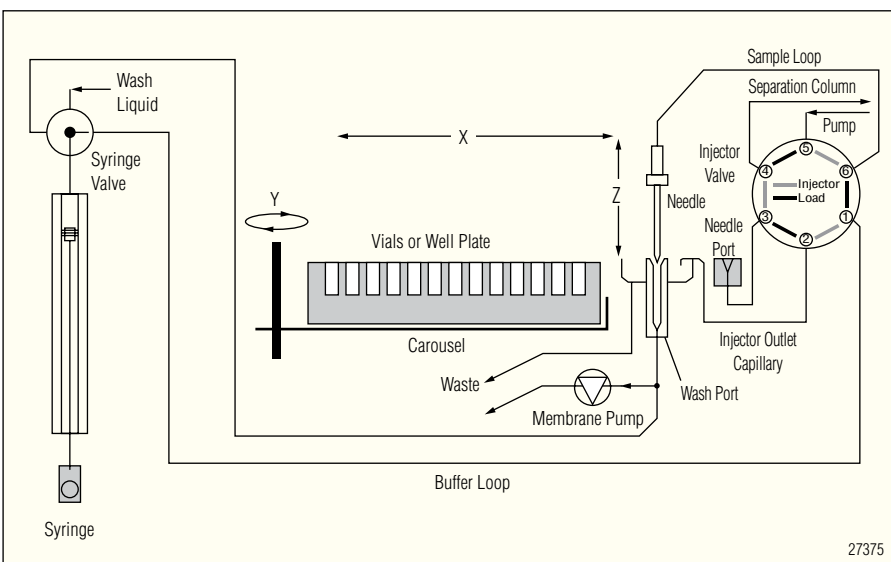


Figure 2. Operational schematic of WPS-3000 TBSL Sampler.



Figure 3. Sample tray variety for the UltiMate 3000 WPS autosampler series.

Chromeleon Chromatography Data System

Using the Chromeleon Chromatography Data System software simplifies system control and provides powerful data analysis and versatile reporting. Automated monitoring of the UltiMate 3000 system helps to eliminate downtime and ensure reliable operation. Through USB connectivity to Chromeleon, digital data flow from the Coulochem III detector has a wide dynamic range, even when large concentration differences are being measured in the sample, thereby eliminating the need for in-process gain changes.

The universal instrument control capabilities of the Chromeleon software permit you to automate a complete suite of chromatography instrumentation through a single user interface. This eliminates the need for training on multiple platforms.

Integrated System Solution

To achieve results with the highest level of sensitivity, choosing an integrated system optimized for electrochemistry is paramount. A Dionex system for ED provides:

- Assurance of maximum performance
- A team of technical resources to fully support your product
- Success for your analyses

Typical Results

This system is optimized to provide high sensitivity results with samples collected from microdialysis experiments, as shown in Figure 4. Neuroactive amino acids can easily be analyzed from microdialysis samples using the automated precolumn derivatization method shown in Figure 5.

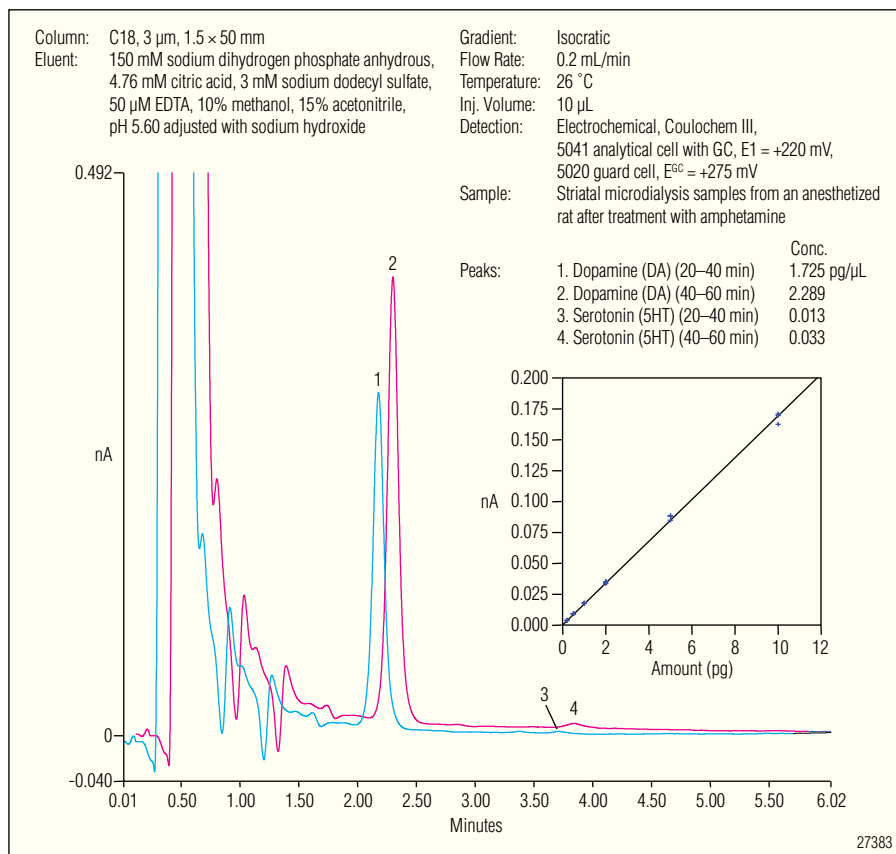


Figure 4. Microdialysis sample from 20 min collection after amphetamine treatment.

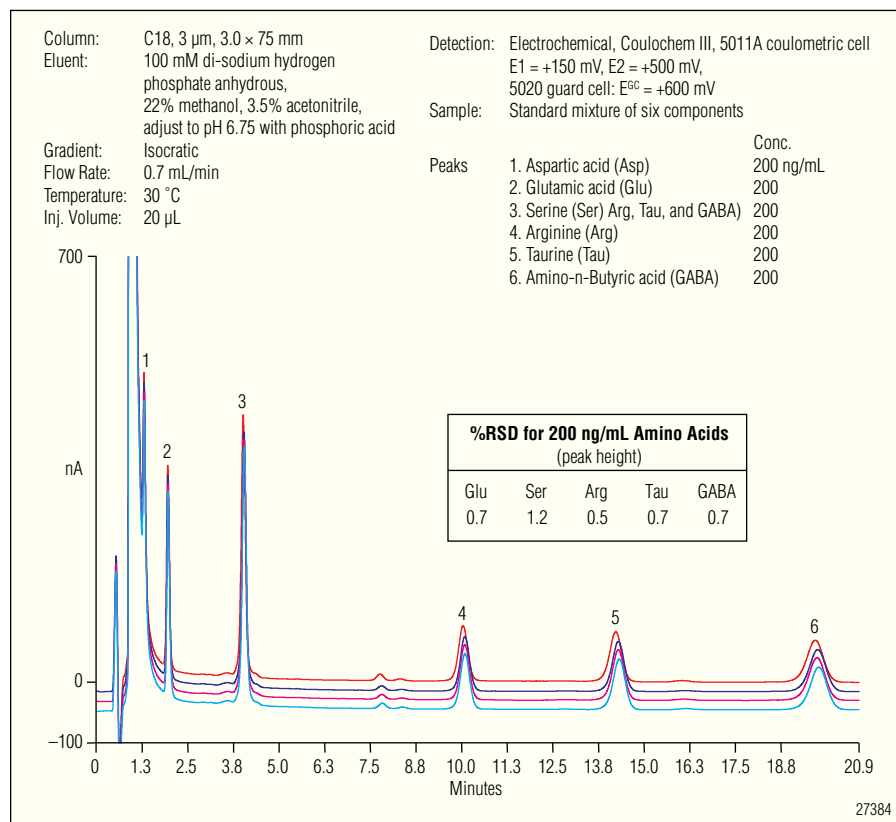


Figure 5. OPA/BME precolumn derivatization of amino acids mixture (200 ng/mL of Asp, Glu, Ser, Arg, Tau, and GABA).

SPECIFICATIONS: COULOCHEM III DETECTOR

Detector configuration:

DC potentiostat for 1 or 2 cells and potentiostat for guard cell and/or scan mode/pulse mode

Operating modes:

DC, pulse, scan (time line method can be attached to DC and pulse methods)

Potential range:

±2000 mV in 1 mV steps

Detector configuration:

10 pA to 1 mA in 1-2-5 sequence (DC mode)

Filter time constants:

0.2 to 10 sec in 1-2-5 sequence (DC mode)

Typical noise:

<750 fA (0.75 pA) with a 500 MΩ, 0.47 μF test load and a 2 sec filter (DC mode)

Signal output:

±100 mV, ±1 V

Output resolution:

24 bit bipolar

Guard cell potential:

±2000 mV in 1 mV steps

Event marker:

Triggered by front panel keypad, timed operation or RS-232C control

Autozero:

Triggered by front panel keypad, rear panel contact closures, timed operation or RS-232C control

Function keys:

Autozero, event marker, cell on/off, run/stop

RS-232C interface capability:

Full parametric instrument control of DC and pulse

Method storage:

Up to 25 methods (any combination of DC, scan, pulse and time line)

Power:

100–240 V AC, 50/60 Hz, 24 VA

Dimensions:

29 × 23 × 50 cm (h × w × d)

Detector weight:

14.8 lbs (6.7 kg) (detector only with DC and pulse/scan module)

Certifications:

UL, CUL, and CE

Other:

Active input for cell protection

SPECIFICATIONS: THERMAL ORGANIZER MODULE

Operating principle:

Analytical electrochemical cell (2), pre-cells, in-line filters, guard column, analytical column, manual sample injector (Rheodyne type; optional), connecting tubing, control cables

Temperature range:

Ambient +5 ° to 60 °C

Temperature stability:

<±0.5 °C

Warm-up time:

<30 min (typically)

Temperature accuracy:

±0.5 °C

Shielding:

Faradaic coating with grounding

Dimensions:

16 × 23 × 50 cm (h × w × d)

Weight:

3.2 kg

SPECIFICATIONS: WPS-3000TBSL SAMPLER

Injection method:

Inline split-loop

Maximum operating pressure:

<345 Mpa

Minimum sample required:

1 µL out of 5 µL (with 250 µL conical vial)

Injection volume:

0.01–100 µL

Sample thermostating range:

4–45 °C or 22 °C below ambient

Sample temp. accuracy:

±2 °C

Wetted parts:

Valve and capillaries–PEEK

Sample needle – SSt

Needle wash:

Active external needle wash

Vial capacity:

120 × 1.8 mL or 2.0 mL vials

120 × 1.1 mL vials (conical)

120 × 0.5 or 1.5 mL Eppendorf vials

216 × 1.2 or 0.3 mL vials

30 × 10 mL vials

66 × 4 mL vials

+ 15 × 10 mL vials

Well plate:

3 × 96 or 3 × 384 normal or deep well plates

+ 15 × 10 mL vials

Safety features:

Leak sensor, sample container detection, internal monitoring of all mechanical operation, monitoring of the function and cooling performance by three temperature sensors

Dimensions:

36 × 42 × 51 cm (h × w × d)

Weight:

22.7 kg

Power requirements:

100–120 V AC, 60 Hz; 200–240 V, 50 Hz; max. 150 VA

Environmental conditions:

Range of use: indoor use; temperature: 10 to 35 °C (50 to 95 °F); air humidity: 80% relative humidity, non-condensing; overvoltage category: II; pollution degree: 2

SPECIFICATIONS: ISO-3100BM ISOCRATIC PUMP

Operating principle:

Serial dual-micro piston pump

Compressibility compensation:

Fully automated, independent of the composition of the mobile phase

Flow rate range, recommended:

50–2,500 µL/min

Flow rate range, settable:

1–2,500 µL/min

Flow rate accuracy:

±0.5%

Flow rate precision:

<0.05% RSD or <0.01 min SD, whichever is greater

Pressure range:

2–41 MPa

Pressure ripple:

Typically <0.1% or <0.02 MPa, whichever is greater

Number of solvents:

1

Weight:

12.8 kg

Dimensions:

16 × 42 × 51 cm (h × w × d)

Communications:

All functions controllable via USB (USB 2.0) integrated USB hub with three USB ports (USB 2.0)

I/O interfaces:

2 digital inputs, 2 relay outputs 15-pin D-sub port for connection of a solvent rack or degasser

Safety features:

Leak sensor, active rear seal wash system, excess pressure monitoring

User input/display:

LCD indicating system parameters, standby button, 3 LEDs (power, connected, and status) for status monitoring, 4 function keys for operation during initial installation and maintenance

GLP features:

In Chromeleon: Support of automatic equipment qualification (AutoQ) and system wellness monitoring. All system parameters are logged in the audit trail.

Wetted parts:

Titanium, zirconium oxide (ZrO₂), ruby, sapphire, aluminum oxide (Al₂O₃), PEEK™, PTFE, ECTFE, FEP, UHMW polyethylene, Teflon

Power requirements:

100–120V AC, 60 Hz; 200–240V, 50 Hz; max. 150 VA

Environmental conditions:

Range of use: Indoor use; temperature: 10 to 35 °C (50 to 95 °F); air humidity: 80% relative humidity, noncondensing; overvoltage category: II; pollution degree: 2

ORDERING INFORMATION

In the U.S., call (800) 346-6390 or contact the Dionex Regional Office nearest you. Outside the U.S., order through your local Dionex office or distributor. Refer to the following part numbers:

UltiMate 3000 High Sensitivity HPLC Electrochemical System

Coulochem III Detector w/DC Mode & Accessories	70-9143
ISO-3100BM Biocompatible Isocratic Micro Pump	5042.0011
WPS-3000TBSL Analytical Autosampler	5827.0020
Chromeleon CHM-1 Chromatography Software	5960.0067
Thermal Organizer Module	70-9121TA
Solvent Rack SR-3000	5035.9200

Coulomeric EC Cells and Accessories

Model 5011A Improved High Sensitivity Cell, Dual Channel	70-5560
Model 5010A Improved Standard Analytical Cell, Dual Channel	70-5561
Model 5014B Microdialysis Cell, Dual Channel	70-0520B
Model 5020 Guard Cell	55-0417
Model 5021A Conditioning Cell, Single Channel	70-6068

Amperometric EC Cells and Accessories

Model 5041 Enhanced Amperometric Cell w/ Glassy Carbon Target and Accessories	70-4131
Model 5040 Cell with Platinum Target	70-1074
Model 5040 Cell with Boron-Doped Diamond Electrode	70-7900

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LPN 2530-01 5M 10/10
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