systems

ICS-2000 Ion Chromatography System

The ICS-2000 system is the first totally integrated and preconfigured Reagent-Free™ Ion Chromatograph designed to perform all types of electrolytically generated isocratic and gradient IC separations using conductivity detection. The ICS-2000 is available with a dual-piston pump, LCD touch-pad front panel, Reagent-Free eluent generation, thermally controlled conductivity cell, column heater, and optional vacuum degas. When coupled with AutoSuppression®, the ICS-2000 system provides high performance with unequalled ease of use. Automation provides full control and digital data collection from a PC using USB, high-speed communication protocol.

Versatile

- Performs all types of IC separations using conductivity detection.
- Integrated, preconfigured, factory plumbed, and tested for immediate productivity.
- Reagent-Free technology converts deionized water into high-purity eluents on-line.
- Streamlined design with small footprint occupies minimal bench space.
- An LCD touch-pad front panel provides clear identification of key operating parameters permitting at-instrument control and monitoring.
- Dual-piston pump design reduces pulsations, allowing high-sensitivity detection and excellent flow-rate accuracy and precision.

Reagent-Free IC

- Isocratic and gradient electrolytic eluent generation is capable of delivering hydroxide eluents for anion separations and methane-sulfonic acid eluents for cation separations.
- Automated eluent generation minimizes time, labor, operation costs, and eluent preparation errors.

Simple and Precise Control

- Built-in control for the SRS® and Atlas® electrolytic suppressors. AutoSuppression with electrolytic suppression eliminates the need to hand-prepare acid or base regenerants. Electrolytic suppression reduces background conductivity and provides high signal-to-noise ratios.

DIONEX

IC | MS | HPLC | EXTRACTION | PROCESS | AUTOMATION

- Full control and digital data collection available with Windows® based Chromeleon® Chromatography Workstation Software using a USB high-speed communication protocol.
- Application templates preload all instrument parameters for fast and easy operation.
- Through Chromeleon software control—an electronic logbook provides monitoring of user-selectable operational parameters by creating virtual channels.

High Performance

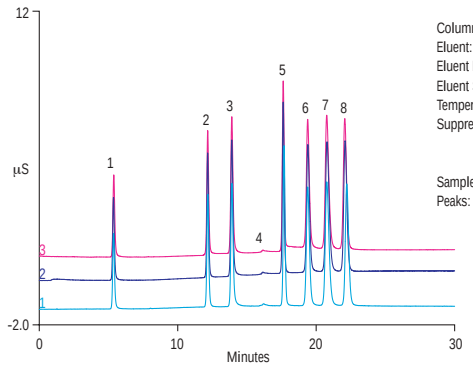
- For improved reproducibility, the heated and thermostated high-performance conductivity detection cell permits measurements that are unaffected by temperature variation.
- Advanced single-range digital output with operating range to 3200 µS full scale. Alternate mode permits single-range analog signal output.
- Column heater provides day-to-day consistency, ensuring reproducibility and stability. Preheating of the eluent prior to the column ensures the column temperature set by the user. A transparent cover allows viewing of the column without temperature disruption.
- Optional built-in vacuum degas provides in-line degassing of eluents ensuring, reproducibility and protection of eluents from contamination and decomposition. Control of the degas operation can be automated to sense when degassing is required.
- Inert, nonmetallic PEEK components throughout the system ensure compatibility and metal contamination-free chromatography.

Convenient

- Versatile eluent organizer tray accommodates 1-, 2-, or 4-liter eluent bottles.
- Electrically actuated six-port Rheodyne PEEK injection valve.
- Ergonomically placed injection port for easy manual sampling.
- Eluent valve provides positive shut-off of eluent flow prior to the pump for easy servicing.
- Easy-access door to chromatography components.
- Leak detection and management allow fast response to system leaks.
- TTL controls for external pump, injection valve, range selection, and signal offset for stand-alone operation.

Key Features

- Reagent-Free IC
- LCD front panel control
- Dual-piston pump
- Column heater
- Electrolytic suppression
- Digital conductivity detection
- Vacuum degas (Option)
- USB connectivity, plug-n-play
- Optical leak detector
- Electronic logbook and trending through virtual channels



Column:	IonPac® AG15 (4 x 50 mm), IonPac AS15 (4 x 250 mm)
Eluent:	8 mM KOH from 0–6 min, 8-55 mM from 6–18 min
Eluent Flow Rate:	1.6 mL/min
Eluent Source:	ICS-2000 with CR-ATC
Temperature:	30 °C
Suppressor:	ASRS® ULTRA (4 mm) Autosuppression® recycle mode Power Setting – 220 mA
Sample Loop:	25 µL
Peaks:	1. Fluoride 2 mg/L 2. Chloride 5 3. Nitrite 10 4. Carbonate - 5. Sulfate 10 6. Bromide 20 7. Nitrate 20 8. Phosphate 30

Component	System 1 Retention Time (%RSD)	System 2 Retention Time (%RSD)	System 3 Retention Time (%RSD)
Fluoride	5.367 (0.062)	5.361 (0.031)	5.384 (0.017)
Chloride	12.166 (0.026)	12.163 (0.022)	12.165 (0.020)
Nitrite	13.908 (0.022)	13.906 (0.019)	13.904 (0.021)
Sulfate	17.685 (0.027)	17.623 (0.025)	17.618 (0.021)
Bromide	19.382 (0.031)	19.404 (0.018)	19.385 (0.018)
Nitrate	20.759 (0.036)	20.783 (0.014)	20.760 (0.017)
Phosphate	22.219 (0.049)	22.089 (0.043)	22.066 (0.018)

(%RSD) n=20

Reagent-Free IC produces consistent lab-to-lab eluent concentrations for highly reproducible retention times and peak areas. Results are the same day-to-day, system-to-system, and labors-to-labors.

All components are easily accessed through the front chromatography panel.

ICS-2000 IC SYSTEM SPECIFICATIONS

Analytical Pump and Hydraulics

Type:
Serial dual reciprocating pistons, microprocessor-controlled constant stroke, variable speed

Construction:
Chemically inert, metal-free PEEK pump heads and flow paths compatible with aqueous eluents of pH 0–14 and reversed-phase solvents

Control Mode:
Full control through front panel or through Chromeleon software; alternative control through TTL or relay closures

Maximum Operating Pressure:
35 MPa (5000 psi)

Pressure Ripple:
<1.0 % from 0.4 to 2.0 mL/min at 1000–3000 psi

Flow-Rate Range:
0.05–5.0 mL/min in 0.01 increments. Typical operating range is 0.4–2.0 mL/min

Flow Precision:
<0.2%

Flow Accuracy:
<1.0 % of set value or ± 2 µL/min, whichever is greater

Piston Seal Wash:
Dual-pump head, wash can be continuous when connected to rinse solution supply

Pressure Alarm Limits:
Upper limit –35 MPa or 0–5000 psi in one unit (MPa or psi) increments; lower limit can be set up to one unit lower than upper limit

Vacuum Degas (Option):
Single channel, automatic

Conductivity Detector Electronics and Flow Cell

Type:
Microprocessor-controlled digital signal processor

Cell Drive:
8 kHz square wave

Linearity:
1% at 1 mS

Resolution:
0.1 nS

Full-Scale Output Ranges:
Digital signal range 0–3200 µS
Analog signal range 0–3000 µS

Electronic noise:
±0.1 nS when background conductivity is 0–150 µS
±2 nS when background conductivity is 151–3200 µS

Filter:
Rise times from 0 to 10 s, user selectable

Temperature Compensation:
Fixed at 1.7% per 1 °C at cell temperature

Temperature Range:
Ambient +7 °C to 55 °C

Temperature Stability:
≤0.01 °C

Cell Electrodes:
Passivated 316 stainless steel

Cell Body:
Chemically inert polymeric material

Cell Volume:
<1 µL

Heat Exchanger:
Low dispersion

Maximum Cell Operating Pressure:
2 MPa (300 psi)

Suppressor Control:
AES, 0–150 mA in 1 mA increments
SRS, 0–500 mA in 1 mA increments

Column Heater

Operating Temperature Range:
Ambient +5 °C to 60 °C

Temperature Stability:
To ±1 °C

Temperature Accuracy:
±2 °C at 40 °C using external validation thermometer

Eluent Generator

Minimum and Maximum Concentration:
0.1–100 mM

Flow rate:
0.1–3.0 mL/min

Maximum Operating Pressure:
21 MPa (3000 psi)

Maximum Solvent Concentration:
Anions: 25% methanol; Cations: no solvents

Physical Specifications

Power Requirements:
100–240 VAC, 50/60 Hz (power supply is autosensing, no voltage adjustment required)

Voltage Requirements:
90–265 VAC, 47–63 Hz

Operating Temperature:
4–40 °C (40–104 °F); cold-room-(4° C) compatible as long as system power remains on

Operating Humidity Range:
5–95% relative, noncondensing

Control Modes:
Full control through front panel and Chromeleon software; alternative control through TTL or relay closures; two relay out, two TTL out, four programmable inputs

USB Communication Protocol:
One input, built-in two-part USB hub

Leak Detection:
Built-in, optical sensor

Dimensions (h × w × d):
22.1 in × 8.8 in × 21 in
56.1 cm × 22.4 cm × 53.3 cm

Weight:
54 lbs
24.5 kg

Ordering Information

To order 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.

PART NUMBERS

ICS-2000 Ion Chromatography System with Software and PC

An ICS-2000/Chromeleon 6.5/Windows Workstation bundled package includes: an ICS-2000 with isocratic dual-piston pump, eluent generator to run Full EG, injection valve, column heater, heated conductivity cell, LCD touch-pad front panel, USB cable, Chromeleon version 6.50 PCS-2, Computer (with Windows XP or Windows 2000), and USB dongle. Comes with two Class 1 Timebases controlling one Dionex IC system. Consumables must be ordered separately.

ICS-2000 Ion Chromatography System without Degas, Full EG, Chromeleon 6.5, Windows XP Workstation 061087

ICS-2000 Ion Chromatography System with Degas, Full EG, Chromeleon 6.5, Windows XP Workstation 061086

ICS-2000 Ion Chromatography System without Degas, Full EG, Chromeleon 6.5, Windows 2000 Workstation 061089

ICS-2000 Ion Chromatography System with Degas, Full EG, Chromeleon 6.5, Windows 2000 Workstation 061088

DIONEX

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Printed on recycled and recyclable paper.

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* Designed, developed, and manufactured under an NSAI registered ISO 9001 Quality System.

LPN 1500 8M 2/03