

ICS-2100 Ion Chromatography System



The ICS-2100 system is the first Reagent-Free™ ion chromatography system with electrolytic sample preparation (RFIC-ESP™ system) and eluent generation (RFIC-EG™ system) capabilities designed to perform all types of electrolytically generated isocratic and gradient IC separations using conductivity detection. Microbore 2 mm columns as well as standard bore 4 mm columns are fully supported. The ICS-2100 RFIC-ESP system now provides automation for many sample preparation techniques with multiple valving configurations and support for electrolytic sample preparation devices. The ICS-2100 system provides high performance with unequalled ease-of-use when coupled with an AutoSuppression® device, such as the SRS® 300 suppressor. Chromeleon® software provides full control and digital data collection from a PC using simple USB connectivity.

Versatility

- This integrated system performs all types of IC separations using conductivity detection.
- RFIC-EG system technology converts deionized water into high-purity eluents on-line.
- RFIC-ESP system accessories enable control of electrolytic sample preparation devices such as water purifiers and sample conditioners.
- Sample preparation capabilities extend the range of the instrument into areas, such as on-line filtration, matrix elimination, neutralization, and ultratrace analysis.
- The dual-piston pump design reduces pulsations, allowing high-sensitivity detection and excellent flow-rate accuracy and precision.
- Flexible flow rates support 2, 3, 4, and 5 mm column formats.
- The streamlined design with its 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.



Passion. Power. Productivity.

Reagent-Free IC Systems

- Electrolytic eluent and regenerant production minimizes time, labor, operation costs, and eluent preparation errors.
- The eluent generator delivers sodium, potassium, and lithium hydroxide and carbonate/bicarbonate eluents for anion separations and methanesulfonic acid eluents for cation separations.
- Eluent generation provides the utmost in reliable, reproducible eluent concentrations from a supply of deionized water. Gradient elution becomes routine. EG-produced hydroxide eluents offer the lowest conductivity backgrounds possible.

Automated Sample Preparation

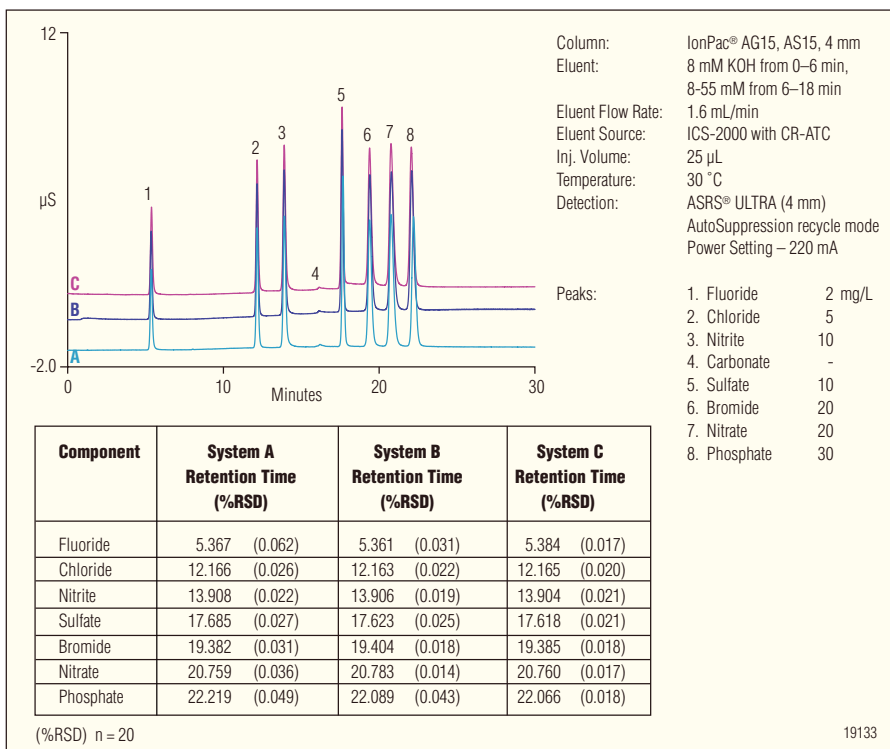
- Optional valving supports matrix elimination, sample concentration, and on-line filtration.
- Auxiliary power port supports electrolytic sample preparation devices.

Simple and Precise Control

- Control for the SRS and Atlas[®] electrolytic suppressors is built in. These AutoSuppression devices eliminate the need to manually prepare acid or base regenerants. Electrolytic suppression reduces background conductivity and provides high signal-to-noise ratios.
- Full control and digital data collection are available with the Windows[®]-based Chromeleon Chromatography Data System software using a USB high-speed communication protocol.
- Chromeleon eWorkflows preload all instrument parameters for fast and easy operation and data analysis.
- Chromeleon software includes an electronic logbook of nearly unlimited user-selectable operational parameters.

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 provides an operating range to 15,000 μS full scale with autoranging to provide accurate detection of major and minor constituents in a single run. Single-range analog signal output is also standard.
- Column heater provides day-to-day consistency, ensuring reproducibility and stability. Preheating of the eluent prior to the column maintains 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, metal-free PEEK[™] components throughout the system ensure compatibility and metal contamination-free chromatography.



Reagent-Free IC systems produce 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 lab to lab.

Convenient

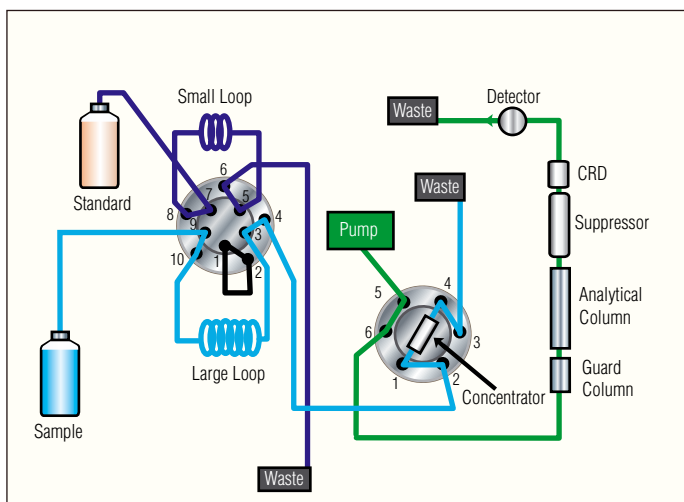
- Versatile eluent organizer tray. Accommodates 1-, 2-, or 4-L eluent bottles.
- Electrically actuated six-port Rheodyne PEEK injection valve.
- Ergonomically placed injection port for easy manual sampling.
- Eluent valve for positive shut-off of eluent flow prior to the pump for easy servicing.
- Easy-access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

Key Features

- Automated eluent generation
- LCD front panel control
- Dual-piston pump
- Column heater
- Electrolytic suppression
- Digital conductivity detection
- Vacuum degas (option)
- Optional 6- or 10-port valve
- Optional RFIC-ESP water purifier
- USB connectivity, plug-n-play
- Electronic logbook and trending through virtual channels



All components are easily accessed through the front chromatography panel.



In RFIC-ESP systems, the optional water polisher also serves as a sample preparation pump, facilitating preconcentration or matrix elimination applications.

ICS-2100 IC SYSTEM SPECIFICATIONS

Analytical Pump and Fluidics

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

Pump Operating Pressure

0–35 MPa (0–5000 psi)

Flow Rate Range:

0.00–5.00 mL/min in 0.01 mL/min increments without changing pump heads

Flow Precision:

<0.1%, typically

Flow Accuracy:

<0.1%, typically

Pressure Ripple:

<1% at 13.8 MPa (2000 psi) and 1.0 mL/min

Eluent On-Off Valve:

Standard

Piston Seal Wash:

Dual-pump head, wash can be continuous when connected to rinse solution supply

Pressure Alarm Limits:

Upper limit 0–35 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:

Optional, automatic control

Eluent Bottles:

Polypropylene, up to 4 L volume

Eluent Bottle Pressure:

Not required

Injection Valve:

6-port, 2-position Rheodyne valve, electrically activated

Columns Supported:

2, 3, 4, and 5 mm i.d., maximum length 250 mm analytical column with 50 mm guard column

Column Heater (Standard)

Operating Temperature Range:

30 to 60 °C (86 to 140 °F); minimum 5 °C above ambient; settable range is equal to working range

Temperature Stability:

±0.5 °C at sensor

Temperature Accuracy:

±0.5 °C at sensor, at 40 °C

Eluent Generation (Standard)

Eluent Types

KOH, LiOH, NaOH
K₂CO₃, K₂CO₃/KHCO₃
MSA

Gradient Profiles

Option; combination of unlimited number of linear, convex and concave positive and negative gradient profiles

Concentration Increments

0.01 mM

Concentration Range

0.1–100 mM (depending on eluent used)

Flow Rate

0.1–3.0 mL/min

Maximum Operating Pressure

21 MPa (3000 psi)

Maximum Solvent Concentration

Anions: 25% methanol
Cations: no solvents

Auxiliary Power Supply (Standard)

Current:

Constant, 0–200 mA at up to 35 V

Alarms:

Overvoltage and overcurrent alarms; linked to pump flow to protect devices from power on at zero flow

Auxiliary Valve (Optional)

Available Valves:

6- or 10- port, 2-position high-pressure rheodyne valves, fully inert PEEK construction, electrically activated

Eluent Regeneration (Optional)

Eluent Regeneration Support:

With optional kit

Eluents:

Carbonate and carbonate/bicarbonate up to 20 mM
MSA up to 34 mM

Flow Rates:

0.01–2.00 mL/min

Continuous Operation (4 L of Eluent):

Up to 28 days or 2000 samples

Always On, Always Ready Capable:

Standard feature

Remains Fully Calibrated for Extended Periods (≤28 days):

Standard feature. results are traceable to a single calibration

System Wellness:

Consumables usage monitoring for predictive maintenance

Maximum Operating Pressure:

21 MPa (3000 psi)

Operating Temperature Range:

4–40 °C

Suppressors and Control

Chemical Suppression:

2 mm and 4 mm anion and cation, membrane suppression bed types

Displacement Chemical Regeneration:

2 mm and 4 mm anion and cation, membrane suppression bed types

Electrolytic Suppression—Self-Regenerating:

2 mm and 4 mm anion and cation, membrane and MonoDisk™ suppression bed types available

Electrolytic Suppression—Self-Regenerating with External Water Mode:

2 mm and 4 mm anion and cation. Both membrane and MonoDisk suppression bed types available

Current Control Range:

SRS:
4 mm, 0–300 mA in 1 mA increments
2 mm, 0–100 mA in 1 mA increments
AES®: 0–150 mA in 1 mA increments
CMD: 0–500 mA in 1 mA increments
SRN: 0–500 mA in 1 mA increments

Salt Converter:

Available in 2 and 4 mm versions

AMMS-ICE:

Available in 2 and 4 mm versions

Carbonic Acid Removal for Anions:

ASRS® 300 with CRD 200 for hydroxide eluents
ASRS 300 with CRD 300 for carbonate eluents

ICS-2100 IC SYSTEM SPECIFICATIONS (CONT'D)

Non-Suppressed Chromatography:
Supported

Suppressor Wear Parts:
None; peristaltic pump and inline filters not required

Suppression Capacity:
Anion SRS 300 (4 mm): 200 µeq/min
Cation SRS 300 (4 mm): 110 µeq/min
Anion SRS 300 (2 mm): 50 µeq/min
Cation SRS 300 (2 mm): 37.5 µeq/min
Anion MMS™ 300 (4 mm): 150 µeq/min
Cation MMS 300 (4 mm): 150 µeq/min
Anion MMS 300 (2 mm): 37.5 µeq/min
Cation MMS 300 (2 mm): 37.5 µeq/min
Anion AES: 25 µeq/min
Cation AES: 25 µeq/min

Void Volumes:
SRS 300 (4 mm): <50 µL
SRS 300 (2 mm): <15 µL
MMS 300 (4 mm): <50 µL
MMS 300 (2 mm): <15 µL
AMMS-ICE 300 (4 mm): <50 µL
AMMS-ICE 300 (2 mm): <15 µL
Anion AES: <35 µL
Cation AES: <35 µL

Conductivity Detector Electronics and Flow Cell

Type:
Microprocessor-controlled digital signal processor

Cell Drive:
8 kHz square wave

Linearity:
1% up to 1 mS

Resolution:
0.00238 nS/cm

Full-Scale Output Ranges:
Digital signal range 0–15000 µS
Analog signal range 0–15000 µS

Electronic Noise:
±0.1 nS when background conductivity is 0–150 µS/cm
±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, 30 to 55 °C

Temperature Stability:
<0.01 °C

Cell Electrodes:
Passivated 316 stainless steel.
Compatible with MSA

Cell Body:
Chemically inert polymeric material

Cell Volume:
<1 µL

Heat Exchanger:
Inert, tortuous path for low axial dispersion

Maximum Cell Operating Pressure:
10 MPa (1500 psi)

Autosampler

Automation Using Autosampler:
Dionex AS40, AS-DV, AS, AS-HV, or third-party autosamplers

Sequential/Simultaneous Injection
Depending on autosampler capabilities

Automated Dilution:
Available with AS Autosampler

Dilution Factor, AS Autosampler:
1:1 to 1:1000

Dilution Time, AS Autosampler:
15 seconds with sample overlap

Inline Sample Degassing:
Optional with CRD 300/200

Inline Filtration:
Yes, AS40 and AS-DV Autosamplers or inline filter

High Automation Flexibility:
Conditionals using Chromeleon and Autodilution License

System Software

- Chromeleon Chromatography Data System software, supports Windows XP or Vista
- Automated Procedure Wizards
 - System Wellness and Predictive Performance
 - Data trending plots (numerical device parameters)
 - Virtual Column Simulator (evaluation mode standard, isocratic and gradient optional)
 - Application templates
 - Multivendor automation support of 3rd party instruments (fully controls over 300 instruments)

from more than 30 manufacturers, including GC, HPLC, and MS) 3-D software for photodiode arrays, mass spectrometers, and electrochemical detectors (optional)

- Customizable system control panels
- System status Virtual Channels
- Power failure protection
- Sequential injection
- System trigger commands and conditionals
- Daily audit trail
- Sample audit trail
- Multiple network control and network failure protection (optional)
- System calibration storage (factory, present, and previous; completely user selectable)
- Customized reporting (unlimited report workbooks)
- Automated system qualification (detailed, comprehensive qualification reports)

Physical Specifications

Power Requirements:
100–240 V ac, 50-60 Hz autoranging

Operating Temperature:
4–40 °C (40–104 °F); cold-room-compatible (4 °C) 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 outputs, two TTL outputs, four programmable inputs

USB Communication Protocol:
One USB input; one built-in two-output USB hub

Leak Detection:
Built-in, optical sensor

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

Weight:
24.5 kg (54 lb)

ORDERING INFORMATION

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

ICS-2100 Ion Chromatography System with Software and PC

An ICS-2100/Chromeleon Windows Workstation bundled package includes: an ICS-2100 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 Computer (with Windows XP), and USB dongle. Comes with two Class 1 Timebases controlling one Dionex IC system. Consumables must be ordered separately.

ICS-2100 Ion Chromatography System with Full EG, Chromeleon, and Windows XP Workstation, without Degas.....	069656
ICS-2100 Ion Chromatography System with Full EG, Chromeleon, Windows XP Workstation and Degas.....	069657
ICS-2100 Ion Chromatography System with Full EG and Chromeleon, without Degas or PC.....	069658
ICS-2100 Ion Chromatography System with Full EG, Chromeleon, and Degas, without PC	069659
AutoDilution License	069725

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Dionex Corporation

1228 Titan Way
P.O. Box 3603
Sunnyvale, CA
94088-3603
(408) 737-0700

North America

U.S./Canada (847) 295-7500

South America

Brazil (55) 11 3731 5140

Europe

Austria (43) 1 616 51 25 Benelux (31) 20 683 9768; (32) 3 353 4294
Denmark (45) 36 36 90 90 France (33) 1 39 30 01 10 Germany (49) 6126 991 0
Ireland (353) 1 644 0064 Italy (39) 02 51 62 1267 Sweden (46) 8 473 3380
Switzerland (41) 62 205 9966 United Kingdom (44) 1276 691722

Asia Pacific

Australia (61) 2 9420 5233 China (852) 2428 3282 India (91) 22 2764 2735
Japan (81) 6 6885 1213 Korea (82) 2 2653 2580 Singapore (65) 6289 1190
Taiwan (886) 2 8751 6655

www.dionex.com



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