Thermo Scientific Dionex Inuvion ion chromatography system

Keywords

Ion chromatography, Inuvion, advanced, intuitive, simplified operation, smart, time saving, high-performance, consistency, improved reproducibility, function-driven, space-saving design

Introduction

The Thermo Scientific™ Dionex™ Inuvion™ ion chromatography system makes ion analysis simpler and more intuitive than ever before while delivering consistently excellent results. Reagent-free IC (RFIC™) saves time, simplifies operation, and ensures greater day-to-day consistency, while providing an additional option for method optimization using gradient separations enabled by eluent generation.

Ultra reliable day-to-day performance

- Advanced high-performance pump technology and electronics
- System self-diagnostics automatically detect any issues with hardware and consumables
- Thermostatted high-performance conductivity detector permits measurements that are unaffected by temperature variation for improved reproducibility
- Built-in vacuum degas provides in-line degassing of eluents, ensuring reproducibility and protection of eluents from contamination and decomposition
- Advanced digital input with operating range to 18,000 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
- Optional column heater provides day-to-day consistency, ensuring reproducibility and stability. Eluent preheating prior to the column maintains the column temperature set by the analyst
- Inert, non-metallic PEEK™ components throughout the system ensure compatibility with corrosive eluents and provide metal-contamination-free chromatography
- Thermo Scientific™ Chromeleon™ Chromatography Data System (CDS) software control includes automated configuration and setup wizards along with an electronic logbook to monitor nearly unlimited user selectable operational parameters
- Electronically actuated six-port Rheodyne PEEK injection valve for precise sampling

Simple, intuitive user experience

- Smart, function-driven design allows quick and safe access to everything on the instrument
- Space-saving design preserves valuable bench space
- Reagent-free IC (RFIC) electrolytically regenerated suppression increases the simplicity of ion chromatography by removing the need for regenerant chemicals, additional regenerant pumps, or regenerant pump maintenance
- RFIC eluent generation electrolytically generates high-purity eluents on-line, to ensure consistent performance day-to-day, lab-to-lab, and operator-to-operator. With eluent generation, gradient separations can be as easy as isocratic applications
- Automated sample preparation capabilities enable techniques such as on-line filtration, concentration, and matrix elimination
- Automatic eluent monitor helps operators ensure there is sufficient eluent for the analyses scheduled to be run, optimizing system uptime and throughput
- Built-in how-to videos reduce training time and simplify setup and operation
- Smart startup, standby, and shutdown routines ensure the system is quickly ready for the day's work without user intervention
- Streamlined e-panel quickly shows status during runs
- Clear, descriptive error codes enable faster problem resolution and first-time fixes

Easily configurable and upgradeable

- Versatile, adaptable platform lets you configure the system with several user-installable optional accessories to meet current and future needs
- Upgrade to RFIC with eluent generation to extend IC capabilities to easily and cost-effectively adapt to changing sample types and workflow requirements

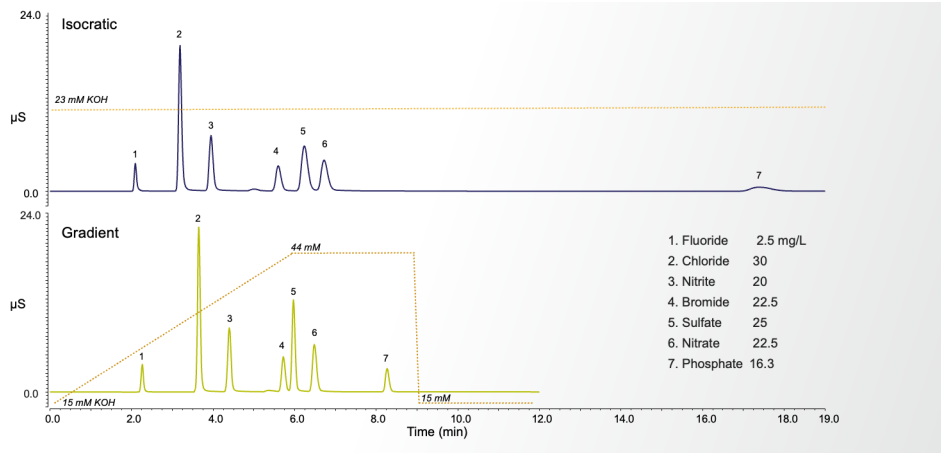

Figure 1.
Comparison of isocratic and gradient elution of an anion standard. Run length is reduced and later-eluting peaks sharpened using eluent generation to produce gradients without the need for two separate eluents or a proportioning pump.

Dionex Inuvion specifications

Specification	Value
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
Flow precision	<0.1%, typically
Flow accuracy	<0.1%, typically, at 13.8 MPa (2000 psi) and 1.0 mL/min
Pressure ripple	<1%
Eluent on-off valve	Standard
Leak sensor	Optical, standard
Piston seal wash (optional)	Pump head wash can be operated in continuous or intermittent mode when connected to rinse solution supply
Pressure alarm limits	Upper and lower limit pressure alarms can be set
Vacuum degas	Standard, user adjustable vacuum level

Specifications *(continued)*

Specification	Value
Analytical pump and fluidics *(continued)*	
Eluent bottles	Standard 2 L polypropylene bottle; allows various sizes
Eluent bottle pressure regulator (optional)	Supported by digital controlled regulator with display
Injection valve	6-port, 2-position Rheodyne valve, electronically activated
Columns supported	2, 3, 4, and 5 mm ID; maximum length 250 mm analytical column with 50 mm guard column
Eluent generator	
Eluent types	KOH, MSA, or K_2CO_3
Eluent concentration range	0.1–100 mM (up to 15 mM for K2CO3)
Flow rates	0.10–3.00 mL/min when a Thermo Scientific™ Dionex™ EGC is installed
Maximum operating pressure	Dionex EGC cartridges: 35 MPa (5000 psi)
Gradient profiles	Up to 9 time-defined gradient steps
Column heater (optional)	
Operating temperature range	10 to 60 °C (50 to 140 °F); settable within the software; minimum working range is 5 °C above ambient temperature
Temperature accuracy	±0.5 °C at sensor, at calibration points (35, 45 °C)
Suppressors and control	
Chemical and electrolytic suppression	2 mm and 4 mm anion and cation suppressor types
Suppressor regeneration mode	Electrolytic Suppressor – Recycle or external water mode Chemical Suppressor – external regenerant
Current control range	Thermo Scientific™ Dionex™ DRS™ 600 Electrolytically Regenerated Suppressor: 0–500 mA (4 mm) and 0–150 mA (2 mm) in 1 mA increments Thermo Scientific™ Dionex™ ERD™ 500 Electrolytically Regenerated Desalter: 0–500 mA (4 mm) and 0–150 mA (2 mm) in 1 mA increments
Salt converter	Thermo Scientific™ Dionex™ SC-CERS 500 available in 2 and 4 mm versions
Carbonic acid removal for anions	Thermo Scientific™ Dionex™ CRD 200 Carbonate Removal Device for use with hydroxide eluents or Dionex CRD 300 for use with carbonate eluents
Non-suppressed chromatography	Yes, supported
Suppressor wear parts	Chemical Suppression: optional regenerant pump Electrolytic Suppression: none
Dynamic suppression capacity	Anions: • Thermo Scientific™ Dionex™ ADRS 600 (4 mm): 200 µeq/min • Dionex ADRS 600 (2 mm): 50 µeq/min • Thermo Scientific™ Dionex™ AERS 500e (4 mm): 200 µeq/min • Dionex AERS 500e (2 mm): 50 µeq/min • Thermo Scientific™ Dionex™ AERS 500 Carbonate (4 mm): 30 µeq/min • Dionex AERS 500 Carbonate (2 mm): 7.5 µeq/min • Thermo Scientific™ Dionex™ ACRS 500 (4 mm): 150 µeq/min • Dionex ACRS 500 (2 mm): 75 µeq/min Cations: • Thermo Scientific™ Dionex™ CDRS 600 (4 mm): 100 µeq/min • Dionex CDRS 600 (2 mm): 35 µeq/min • Thermo Scientific™ Dionex™ CERS 500e (4 mm): 100 µeq/min • Dionex CERS 500e (2 mm): 35 µeq/min • Thermo Scientific™ Dionex™ CCRS 500 (4 mm): 75 µeq/min • Dionex CCRS 500 (2 mm): 37.5 µeq/min
Void volumes	• <50 µL for 4mm Dionex DRS 600, ERS 500e, ERS 500 Carbonate, and CRS 500 suppressors • <15 µL for 2mm Dionex DRS 600, ERS 500e, ERS 500 Carbonate, and CRS 500 suppressors

Specifications *(continued)*

Specification	Value
Conductivity detector electronics and flow cell	
Type	Microprocessor-controlled digital signal processor
Cell drive	128 kHz square wave
Linearity	$r^2 \geq 0.999\%$
Resolution	0.002 nS/cm
Full-scale output ranges	Digital signal range 0-18,000 µS/cm, with auto-ranging; analog signal range 0-18,000 µS/cm
Noise, wet	≤ 0.2 nS at 23 µS/cm background ≤ 0.1 nS at 1 µS/cm background
Temperature compensation	Variable, default set at 1.7%/°C at cell temperature
Temperature range	Ambient +7 °C, 30 to 60 °C
Cell electrodes	Passivated 316 stainless steel; compatible with methanesulfonic acid
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 (1,500 psi)
Data filter	Rise times from 0 to 10 s, Data Collection Rate 1 to 100 Hz, user selectable
Autosampler	
Automation using autosampler	Thermo Scientific™ Dionex™ AS-DV, AS-AP, AS-HV, or third-party autosamplers
Sequential/simultaneous injection	Yes, depending on autosampler capabilities
Automated dilution	Yes, available with Thermo Scientific™ Dionex™ AS-AP autosampler
Dilution factor, Dionex AS-AP autosampler	1:1 to 1:1000
Dilution time, Dionex AS-AP autosampler	15 s with sample overlap
Inline sample degassing	Yes, optional with Dionex CRD 300/200
Inline filtration	Yes, Dionex AS-DV autosampler or inline filter
High automation flexibility	Conditionals using Chromeleon CDS software and post-run features
Software	
Chromeleon CDS software, is supported on the following OS: • Windows 10 Enterprise and Pro • Windows 11 Enterprise and Pro	• Autoconfiguration • Automated procedure wizards • System wellness and predictive performance • Data trending plots (numerical device parameters) • Virtual column simulator (evaluation mode standard, isocratic and gradient optional) • Multi-vendor automation support of proprietary and 3rd party instruments (fully controls over 550 modules from more than 25 manufacturers, including GC, CE, HPLC, and MS) • Customizable system control panels • System status virtual channels • System trigger commands and conditionals • Data audit trail, system audit trail and instrument 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) • Dual sequence view in the studio

Specifications *(continued)*

Specification	Value
Physical specifications	
Power requirements	100–240 V AC, 50–60 Hz autoranging
Operating temperature	4–40 °C (40–104 °F)
Operating humidity range	20-80% relative, non-condensing
Control modes	Full control through Chromeleon CDS software; alternative control through TTL or relay closures; one relay output, two TTL outputs, two assignable TTL inputs
USB communication protocol	One USB input; three USB outputs
Product dimensions (h × w × d)	66.1 x 29.2 x 43.2 cm (26.0 x 11.5 x 17.0 in.)
Weight	16.2 kg (36 lb)

Ordering information

Description	Part No.
Dionex Inuvion ion chromatography system	22185-60104
Dionex Inuvion ion chromatography system with RFIC	22185-60108
Optional accessories	
Column heater	22185-62400
Integrated regenerant pump	22185-62702
Digital gas pressure regulator	22185-62706
6-port auxiliary valve	22185-62704
10-port auxiliary valve	22185-62703
Seal wash pump	22185-62701
Thermo Scientific™ Dionex™ IC PEEK Viper™ precision kit	B51000232
3-port low pressure valve	B51001290
Eluent monitor	2L: 22185-62707 4L: 22185-62708

Learn more at **thermofisher.com/inuvion**