

# Thermo Scientific Dionex Integrion HPIC System

The Thermo Scientific™ Dionex™ Integrion™ HPIC™ System is a fast, simple and secure solution to provide the performance you need today while protecting your investment for tomorrow.



## Your Results, Faster

### Pump

The Dionex Integrion HPIC system pump features a variable flow, serial-piston design that delivers consistent flow rates with low pulsation, resulting in low detector noise.

By increasing the pressure tolerance of the pump up to 6000 psi, and allowing linear flow rates from 0.001 to 10 mL/min, the Dionex Integrion HPIC system can achieve substantially shorter run times, providing increased throughput and productivity.

## Integrated system

The integrated system performs all typical ion chromatography (IC) separations using conductivity or amperometric detection modes.

The integrated design of the Dionex Integrion HPIC system delivers high performance in a small footprint, saving critical bench space while ensuring convenient access to all components for upgrades or maintenance. The bottle tray holds a 2 L eluent bottle in the front compartment allowing easy viewing of eluent levels, and can hold additional bottles of up to 4 L in the rear compartment.

## Your Workflow, Simplified

### Consumable Tracking

The Dionex Integrion HPIC system enables tracking and monitoring of performance and usage across all consumables to enable proactive maintenance and replacement. Consumables tracking of electrolytic consumables is standard on all systems; tracking via radio frequency identification (RFID)\* is standard on models equipped with a column oven.

\* The wireless transmitter devices may not be authorized as required by the laws of your country; and these features will not be, offered for sale or lease, or sold or leased, until proper authorization is obtained. Please consult your local sales representative for details.

### Metrics

1. Date of First Install
2. Number of Injections
3. Number of Samples Concentrated
4. Total Volume of Injections
5. Total Volume Concentrated
6. Maximum Flow Rate Seen
7. Maximum Temperature Seen
8. Maximum Pressure Seen
9. Maximum Voltage Seen
10. Maximum Current Seen
11. Last Separator Column Paired With
12. Last Guard Column Paired With
13. Total Eluent Volume Seen
14. Total Voltage Hours Seen
15. Total Current Hours Seen
16. Eluent Types Exposed To
17. Weekly Flow Rate Data Array
18. Weekly Pump Pressure Data Array
19. Weekly Background Conductivity Data Array
20. Weekly Current Data Array
21. Weekly Voltage Data Array

### Consumables

- a. Guard Columns (GC)
- b. Separator Columns (SC)
- c. Concentrator Columns (CC)
- d. Trap Columns (TC)
- e. Constant Current Electrolytically Regenerated Suppressors (CCERS)
- f. Continuously Regenerated Trap Columns (CRTC)

- Information stays with the consumable, regardless of which system it is installed in
- Monitors up to 16 key performance metrics on each of up to 7 different consumables simultaneously
- Verifies consumable performance against product specifications and production quality assurance data
- Facilitates checks of inter-consumable compatibility

### Tablet

The Dionex Integrion HPIC system supports wireless tablet control, providing the ability to have full, detailed system control and status wherever you need it.

- Secured WiFi communication direct to the instrument with no broadcast data
- Control and monitor one instrument at a time, with instrument switching as easy connecting to a new wireless network
- Range up to 9 m (30 feet)

### Remote Monitoring

Optional remote monitoring and diagnostic software notifies operators, lab managers, or other personnel when maintenance is required. Alerts are sent to service engineers at Unity Lab Services when the system is not functioning correctly so that remote troubleshooting can be performed.

- Monitors only instrument performance, not sample data
- Features encrypted 128-bit SSL point-to-point communication
- Works with most commercially available antivirus and firewall software

## Simplified System Performance

### Eluent Generation

The eluent generator electrolytically generates high-purity eluents on-line, ensuring perfectly consistent performance day to day, lab to lab, and operator to operator. With eluent generation, gradient separations can be as easy as isocratic applications.

The eluent generator delivers eluent concentrations from 0.1–100 mM for KOH and MSA at typical application flow rates (1 mL/min or lower) and high pressures of up to 5000 psi. High purity eluents are generated from deionized (DI) water using the Thermo Scientific Dionex EGC Eluent Generator Cartridge and then polished of contaminants using one of the Thermo Scientific Dionex CR-TC Continuously Regenerating Trap Columns. Control, status, and diagnostics are provided with the Thermo Scientific™ Dionex™ Chromeleon™ Chromatography Data System (CDS) Software. Since the pump delivers only water and eluents are generated on-line, the lifetime of the pump pistons and seals extended, and piston contamination during seal wash is eliminated.

### Detector options

The Dionex Integrion HPIC system can be configured with either a conductivity detector (CD) or an electrochemical detector (ED). Any of the detectors can be easily installed by the user.

- Control using Chromeleon CDS software or locally through TTL (Transistor Transistor Logic) inputs
- Electronics are integrated between cell and detector for greater stability
- Built-in electronics allow for easy calibration and diagnostics

### Conductivity Detector Features

- Microprocessor-controlled digital signal processing detects both high and low concentrations of analytes smoothly and without range changes
- Supports all IC and reagent-free ion chromatography™ (RFIC™) system applications with maximum range up to 15,000 µS/cm
- For easy calibration and diagnostics

### Electrochemical Detector Features

- Cell body design provides defined and consistent torque to cell gasket for consistent unit-to-unit response of working electrodes
- Uses microprocessor-controlled digital signal processing
- Supports DC amperometry, pulsed amperometry, or integrated pulsed amperometry detection modes
- Uses either pH-Ag/AgCl, Ag/AgCl, or Palladium Hydrogen (PdH) reference electrode; new one-piece PdH reference electrode provides consistency and reliability

### Thermal Control

#### Column Oven

The column oven provides precise temperature control over a wide temperature range with fast heat-up times.

- Supports all standard bore and microbore guard and separator column sizes, in addition to single and dual valve configurations
- Forced-air, in-line temperature control stabilizes operating conditions and reduces temperature gradients to ensure consistent separations
- Temperature is user-settable from 5 °C above ambient to 80 °C
- Configurable for microbore (2 mm i.d.), standard bore (4 mm i.d.), and 9 mm i.d. columns

#### Detector Compartment

The detector compartment provides a thermally controlled environment for superior electrolytic suppression and suppressor lifetime. In addition, the detector compartment is thermally stable for optimum conductivity and electrochemical detection consistency.

- Forced-air, Peltier temperature control stabilizes operating conditions and reduces temperature gradients during chromatography
- Temperature-controlled zone stabilizes operation of suppressors and detectors

Temperature is user-settable from 15 °C (or 20 °C below ambient) to 40 °C.

## SPECIFICATIONS

### Pump

Type	Dual-piston (in series), microprocessor controlled, constant 10 mm primary stroke length, variable speed Isokinetic with Eluent Precompression
Construction	Chemically inert, metal-free PEEK pump heads and flow path; compatible with aqueous eluents from pH 0–14 and reversed-phase solvents such as methanol and acetonitrile
Pressure Range	0–41 MPa (0–6000 psi)
Flow Rate Range	0.000–10.000 mL/min with ability to set flow increments at 0.001 mL/min
Flow Rate Precision	< ±0.1%
Flow Rate Accuracy	< ±0.1%
Pressure Ripple	< 1% at 1.0 mL/min, typical
Vacuum Degasser	Integrated, optional
Piston Seal Wash	Optional, automatic operation
Eluent On/Off Valve	Electrically actuated, standard
Leak Sensor	Optical, standard

### Eluent Generator

Eluent Types	Up to two eluent generator cartridges KOH, LiOH, NaOH; Carbonate; Carbonate/Bicarbonate; MSA
Eluent Concentration Range	0.1–100 mM
Flow Rates	0.1–3 mL/min 1.0 mL/min eluent concentration is limited
Maximum Operating Pressure	Dionex EGC 500 cartridge: 35 MPa (5000 psi)
Maximum Solvent Concentration	Cations: 0% Anions (hydroxide): 25% methanol (KOH, NaOH and LiOH cartridges); Anions (carbonate/bicarbonate): None
Gradient Profiles	Standard - any combination of linear, convex and concave positive and negative gradient profiles

### Column Compartment

Injection Valves	Up to two high-pressure valves, either 6- or 10-port
Columns Supported	Up to two 1-9 mm i.d., maximum length 250 mm analytical column with 50 mm guard column
Constant Temperature Zone	Optional Temp. Range: 30 to 80 °C (86 to 176 °F); minimum 5 °C above ambient Temperature Accuracy: ±0.5 °C at 30 °C Temperature Stability: ±0.2 °C (at 30 °C) Time to Equilibration (ambient to ambient plus 20 °C): 20 minutes

### Detector Compartment

Constant Temperature Zone	Optional Temp. Range: 15 (or 20 °C below ambient) to 40 °C (59 to 104 °F) Temperature Accuracy: ±0.5 °C (at 15 °C) Temperature Stability: ±0.2 °C (at 15 °C) Time to Equilibration (ambient to ambient minus 20°C): 30 minutes
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### Suppression Modes

Chemical Suppression	2 mm and 4 mm, anion and cation, membrane suppression
Electrolytic Suppression Recycle Mode	2 mm and 4 mm, anion and cation, membrane suppression
Electrolytic Suppression External Water Mode	2 mm and 4 mm, anion and cation, membrane suppression
Non-Suppressed Conductivity	Supported - both anion and cation

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**SPECIFICATIONS (cont'd)**


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**Conductivity Detector**


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Electronics Type	Microprocessor controlled digital signal processing, autoranging
Cell Drive	8 kHz square wave
Linearity	1%
Resolution	0.00238 nS/cm
Output Range	Digital Signal Range: 0–15,000 $\mu$ S/cm Analog Signal Range: 0–15,000 $\mu$ S/cm
Noise, Wet	$\leq$ 0.2 nS at 23 $\mu$ S/cm background $\leq$ 0.1 nS at 1 $\mu$ S/cm background
Filter	Rise times 0 to 10 s, programmable
Sampling Rate	1 to 100 Hz, user settable or automatic
Cell Temperature	7 °C above ambient to 60 °C maximum
Cell Temperature Stability	< 0.001 °C
Cell Temperature Compensation	Default 1.7% per °C; programmable from 0–3% per °C
Flow Cell Maximum Pressure	10 MPa (1500 psi)
Flow Cell Volume	0.7 $\mu$ L
Cell Electrodes	Passivated 316 stainless steel. Compatible with MSA
Cell Body	Chemically inert polymeric material
Heat Exchanger	Inert, tortuous-path for low longitudinal dispersion

**Electrochemical Detector**


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Electronics Type	Microprocessor controlled digital signal processing
Electronic Noise, Wet	IPAD (Au electrode) < 50 pC at 10 mM KOH, DC Amperometry (GC) < 10 pA
Potential Range	-2.0 to 2.0 V in 0.001 V increments
Signal range (Digital and Analog)	Integrated Amperometry: 50 pC to 200 $\mu$ C DC Amperometry: 5 pA to 74 $\mu$ A
Filter	0–10 s response time, user settable
Control Mode	Local or remote control using relay closures or TTL, or control using Chromeleon CDS software via DC module
Cell Body	Titanium body. Compatible with 2–7 mm i.d. columns
Working Electrodes	Conventional: gold, glassy carbon, platinum, and silver Disposable: gold, platinum, carbon, and silver
Reference Electrode	pH-Ag/AgCl combination, one piece design PdH, one piece design
Autoranging	Yes
Analog Output	User selectable full scale of 10, 100, or 1000 mV
Cell Volume at Working Electrode	< 0.2 $\mu$ L
Maximum Cell Operating Pressure	0.7 MPa (100 psi)

**Internal Power Supplies**


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Internal Power supplies	Constant current (CC) power supplies Option 1: 1 channel CC [0 - 500 mA] Option 2: 2 channels CC [0 - 500 mA] Option 3: 1 channel CC [0 - 500 mA] & 2 channels CC [0 - 500 mA] Option 4: 1 channel CC [0 - 500 mA] & 4 channels CC [0 - 500 mA]
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## SPECIFICATIONS (cont'd)

### System Software

Software	Chromeleon CDS software, version 7.2 or higher
Automated Workflow Wizards	Standard feature
System Smart Startup and Shutdown	Standard feature
Automation Support of 3rd Party Instruments	Fully controls over 400 different instruments from more than 30 manufacturers, including GC, HPLC, and MS
Customizable System Control Panels	Standard feature
Signal Channels	Detector signals and pump pressure as standard
Data Trending Plots	All numerical device parameters
System Status Virtual Channels	Standard feature
Network Failure Protection	Standard feature for networked installations
System Trigger Commands and Conditionals	Standard feature
Daily Audit Trail	Standard feature
Sample Audit Trail	Standard feature
System Calibration Storage	Factory, present and previous. Completely user selectable.
Customized Reporting	Standard feature with unlimited report sheets
GLP Compliance	Optional

### 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 CDS 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)	62.5 × 30.0 × 55.9 cm (24.6 × 11.8 × 22 inches)
Weight	41 kg (90 lb)

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