DIONEX CORPORATION

UltiMate 3000

The Dionex UltiMate 3000 is a modular High-Performance Liquid Chromatography (HPLC) and UHPLC system designed for versatile, robust, and high-performance liquid chromatography separation across analytical, micro, and semi-preparative scales.

SPECIFICATIONS

General

Interfaces	USB 2.0 (Type-B for PC connection; integrated 3-port Type-A hub for system inter-module communication)
Display	2-line × 20-character LCD display with status LEDs per standard module

Physical

Power Supply	100–240 V AC, 50/60 Hz, automatic voltage selection
Operating Temperature	10 to 35 °C °C
Dimensions (W×H×D)	361 mm × 165 to 200 mm × 578 mm (typical per individual module, height varies) mm
Weight	10 - 22 kg (module dependent) kg

Solvent Delivery System (Pump)

Pump Configurations	Isocratic, Binary (HPG), Quaternary (LPG), or Dual-Gradient (DGP)
Flow Rate Range	0.001 to 10 mL/min (Analytical SD/RS), up to 100 mL/min (Semiprep), 10 nL/min to 50 µL/min (Nano/Capillary)
Flow Rate Accuracy	±0.1%
Flow Rate Precision	< 0.05% RSD
Maximum Operating Pressure	620 bar (SD series) / 1034 bar (RS series)
Composition Range	0 to 100% in 0.1% steps
Composition Precision	< 0.15% SD
System Delay Volume	Standard 400 µL (configurable down to 25 µL for capillary/nano)

Autosampler & Injection System

Injection Principle	Split-loop (in-needle)
Sample Capacity	Up to 384-well plates, up to 120 × 2 mL vials (configuration dependent)
Sample Thermostatting Temperature Range	4 °C to 45 °C (thermostatted WPS models)
Injection Cycle Time	< 15 s (with standard draw speed)
Carryover	< 0.004% (with external needle wash)

Column Compartment / Thermostat

Temperature Control Method	Thermoelectric (Peltier) heating and cooling
Temperature Range	5 °C to 80 °C (TCC-3000SD) / 5 °C to 110 °C (TCC-3000RS)
Temperature Stability	±0.1 °C
Temperature Accuracy	±0.5 °C
Pre-Column Heating	Passive or active pre-column eluent heaters supported

Detector Options & Performance

Supported Detector Types	Diode Array (DAD), Multi-Wavelength (MWD), Variable Wavelength (VWD), Fluorescence (FLD), Charged Aerosol (CAD), Refractive Index (RID)
Wavelength Range (DAD)	190 to 800 nm (DAD-3000), 190 to 1000 nm (DAD-3000RS)
Data Acquisition Rate	Up to 100 Hz (DAD-3000RS), up to 200 Hz (VWD-3400RS)
Wavelength Accuracy	±1 nm

System Fluidics & Materials

Wetted Materials	Stainless steel, PEEK, FEP, PTFE, sapphire, ruby, ceramic, titanium (configuration dependent)
pH Range Support	pH 1 to 13 (standard stainless steel), pH 1 to 14 (biocompatible systems)
Biocompatible Flow Path	Yes, available with BioRS / biocompatible configurations

Software & Control

Supported Chromatography Data Systems	Thermo Scientific Chromeleon CDS (native); driver integration available for third-party CDS
Compliance Capability	21 CFR Part 11 compliant when operated via Chromeleon CDS
GLP & Compliance Features	System wellness monitoring, qualification wizards, comprehensive audit trail, GLP history

Physical & Utility Requirements

Module Width	361 mm
Module Depth	578 mm
Module Height	165 mm (standard pump/detector), 200 mm (autosampler)
Leak Detection	Active optical leak sensors with individual module drainage channels

Environmental & Safety Compliance

Operating Humidity Range	20% to 80% relative humidity (non-condensing)
Overpressure Protection	Automatic pump shutdown upon exceeding user-defined or factory pressure limits

Fluidic Connections

Capillary Fitting System	Viper fingertight fitting system (zero-dead-volume, rated up to 1250 bar)

Pump Performance

Pumping Technology	SmartFlow technology for pulsation-free solvent delivery and automatic compressibility compensation
Mixing Technology	SpinFlow mixing design using interchangeable radial and longitudinal mixing chambers

Detector Specifications

Detector Flow Cell Technology	LightPipe flow cells (available for select detectors, offering minimized dispersion and long path lengths)

Maintenance & Diagnostics

System Diagnostic Features	System Wellness monitoring for active components, including piston seal wear and lamp lifetime tracking

Autosampler

Injection Volume Precision	< 0.25% RSD (typically < 0.15% at 20 µL)

Column Thermostat

Column Oven Temperature Control	Peltier heating and cooling
Column Identification	Radio-frequency identification (RFID) chip tracking

Pump

Piston Seal Wash	Active wash system (fully integrated/automated)

Interfaces

Digital I/O	2 digital inputs, 2 relay outputs (module-specific)

TECHNOLOGY

High-Performance Liquid Chromatography (HPLC) & UHPLC

APPLICATIONS

Liquid Chromatography Separation, Analytical and Preparative Chemistry, Pharmaceutical Analysis

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