



**UHPLC<sup>+</sup>**  
focused

*Dionex products are UHPLC compatible by design, establishing the new standard in conventional LC. Integrating hardware, software, and separation chemistry, Dionex offers the UHPLC to everyone—for all needs.*

*With four models of Rapid Separation pump systems, Dionex offers the most complete choice of 103 MPa (15,000 psi) pumps in the industry. Whatever your UHPLC challenge is, the family of UltiMate<sup>®</sup> 3000 Rapid Separation pumps always offers the right solution with its industry-leading flow-pressure footprint. With intelligently designed technology, all UltiMate 3000 Rapid Separation pumps provide value in terms of performance, reliability, and ease of use.*

### Rapid Separation Pump Systems for the Widest Range of UHPLC Applications

- SmartFlow<sup>®</sup> technology ensures optimal performance for any flow, pressure, or solvent composition.
- Automatic compressibility compensation, no manual solvent setting needed.
- Innovative SpinFlow mixing design perfectly balances gradient delay volume against mobile phase mixing efficiency.
- All pumps are equipped with an active rear-seal wash system.
- AutoQ<sup>™</sup> equipment qualification tests and predictive performance indicators.
- Self-diagnostics and preprogrammed test routines help identifying problems quickly.
- An on-line troubleshooting guide and advanced system status reports facilitate timely resolution of workflow interruptions.
- Easy front-panel access to all fluidic components for routine maintenance and quick replacement without disassembling the instrument.
- Unique dual-gradient Rapid Separation pump system provides ultrahigh speed and resolution of UHPLC with the benefits of advanced chromatographic techniques and without occupying additional bench space.

 **DIONEX**  
Passion. Power. Productivity.

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Thermo Scientific brand

**Thermo**  
SCIENTIFIC

## Performance and Reliability

The Rapid Separation pumps offer an industry-leading flow-pressure footprint of 103 MPa (15,000 psi) at up to 5 mL/min and 80 MPa (11,600 psi) at 8 mL/min. With its superior performance, it is the best choice for any ultrahigh-speed and ultrahigh-resolution applications but perfectly suitable for conventional analytical applications as well. The completely redesigned pump ensures highest flow precision and reliability even at the elevated backpressure range.

The unrivaled flow-pressure footprint covers the full range of HPLC, including conventional LC and UHPLC.

Several optional mixers are available to adapt the mixing performance to application requirements while keeping the gradient delay as small as possible.

## Versatile and Flexible

The UltiMate 3000 Rapid Separation pump family offers the right solution for a wide range of different applications.

The newly developed dual-gradient Rapid Separation pump now combines the best of two worlds: ultrahigh speed and ultrahigh performance from UHPLC with advanced chromatographic techniques.

## Application Areas

The Rapid Separation pumps are recommended for research as well as routine laboratories that require the whole range of chromatographic performance, from maximum resolution to maximum speed in just a single LC system.

Furthermore, it is the perfect choice for any method development, LC-MS application, and for high-throughput analyses using conventional LC and UHPLC methods.

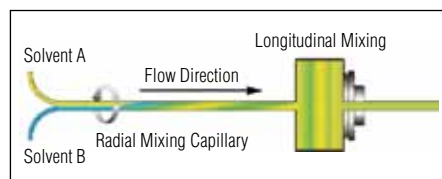


Figure 1. Innovative mixing design for exceptionally high mixing performance.

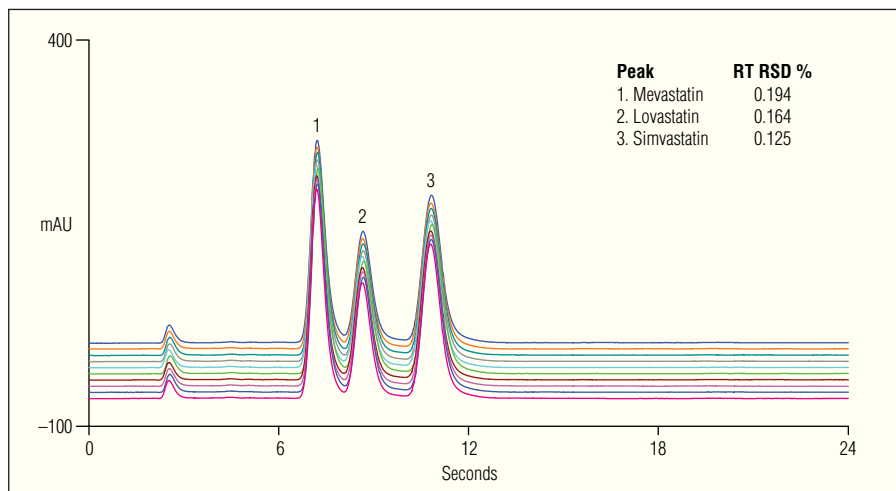


Figure 2. Retention time precision for a Rapid Separation application of Simvastatin at 3.35 mL/min and 74 MPa.

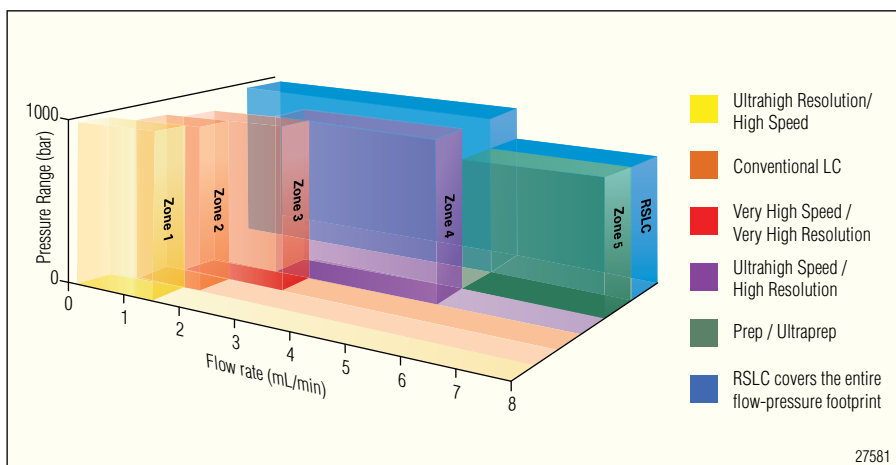


Figure 3. Industry-leading flow-pressure footprint of the Rapid Separation pumps.

## UltiMate 3000 Series: The Binary Rapid Separation Pump



### Features

- Unrivaled flow-pressure footprint of 103 MPa at up to 5 mL/min and 80 MPa at 8 mL/min.
- Fast separations, with gradient delay volumes between 35  $\mu$ L for MS front end configuration and 200  $\mu$ L in the default configuration.

- Innovative SpinFlow mixing design for exceptional high mixing performance at low gradient delay for fast separations.
- Active rear-seal wash for maximum seal lifetime, and reduced instrument down time.
- Suitable for all applications using sub-3  $\mu$ m and sub-2  $\mu$ m particle size columns.
- Improved robustness and lifetime through completely redesigned mechanics.

## The UltiMate 3000 Series: Dual-Gradient Rapid Separation Pump



The dual-gradient Rapid Separation pump is the first pump of its kind that combines the ultrahigh speed and resolution of RSLC with advanced chromatographic techniques, such as tandem, parallel, and 2D-LC.

It is ideally suitable for laboratories that require both high sample throughput and chromatographic resolution.

### Features

- Two ternary gradient Rapid Separation pumps in a single instrument enclosure.
- Unique SpinFlow mixing design for exceptional high mixing performance at low gradient delay for fast separations.
- Set up two different applications on a dual-gradient Rapid Separation system with different solvents and columns, and switch between them without any need for replumbing.
- Achieve up to 100% higher sample throughput, without changing existing methods, by running samples in a tandem UHPLC (off-line column regeneration) or parallel UHPLC (simultaneous operation of two columns) mode.
- Suitable for all application using sub-3  $\mu\text{m}$  and sub-2  $\mu\text{m}$  particle size columns.
- Control all dual-gradient systems with the Chromeleon<sup>®</sup> Chromatography Data System software including control of two gradients in parallel, and wizards to assist method setup.

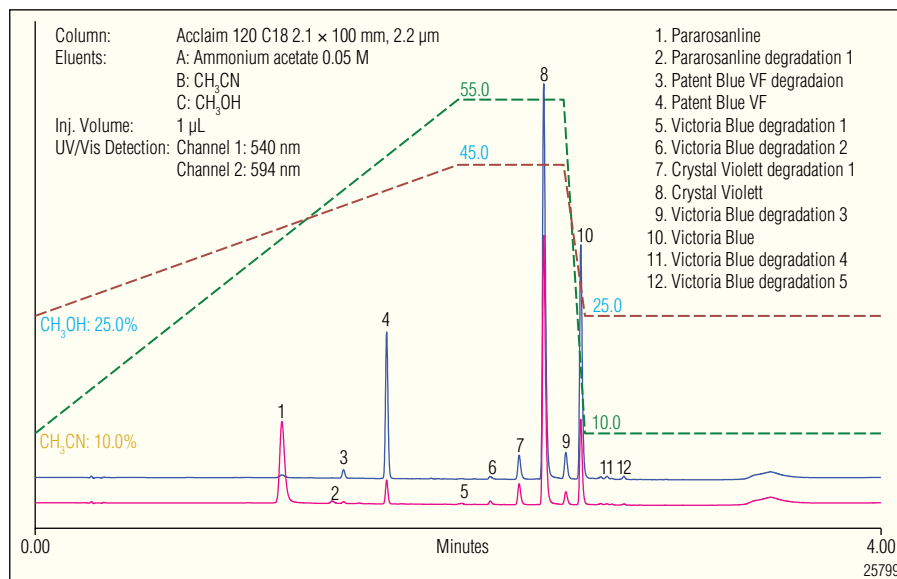


Figure 4. Ternary gradient separation of ink under Rapid Separation conditions. This separation is 6 x faster than the conventional forensic LC method.

## The UltiMate 3000 Series: Quaternary Rapid Separation Pump



The quaternary Rapid Separation pump provides the highest degree of flexibility in solvent proportioning for RSLC applications. This pump is recommended for a wide range of research and routine applications, and for method development.

### Features

- Delivers up to four solvents for convenient method development, system flushing, and preparation of isocratic and gradient solvent mixtures.
- Reliable vacuum degassing—a four-channel micromembrane degasser, equipped with vacuum level monitoring, is built into the pump.
- Suitable for all applications using sub-3  $\mu\text{m}$  and sub-2  $\mu\text{m}$  particle size columns.
- Unique SpinFlow mixing design for exceptional high mixing performance at low-gradient delay for fast separations.
- Active rear-seal wash for maximum seal lifetime, and reduced instrument down time.

## ULTIMATE 3000 RSLC PUMP SPECIFICATIONS

	Binary Rapid Separation Pump HPG-3200RS	Quaternary Rapid Separation Pump LPG-3400RS	Dual-Gradient Rapid Separation Pump DGP-3600RS
Operating principle	Serial dual-piston		
Flow range (settable range)	0.05–8 mL/min (0.001–8 mL/min)	0.1–8 mL/min (0.001–8 mL/min)	
Flow accuracy	±0.1%		
Flow precision	<0.05% RSD or <0.01 min SD, whichever is greater		
Pressure range	2–103.4 MPa (15,000 psi) up to 5 mL/min, 2–80 MPa (11,600 psi) up to 8 mL/min		
Pulsation	Typically: <2 bar or <1% whichever is greater		
Gradient formation	High-pressure proportioning	Low-pressure proportioning	
Proportioning accuracy	±0.2% (of full scale)	±0.5% (of full scale)	
Proportioning precision	<0.15% SD		
Number of eluent lines	2	4	6 (2 × 3)
Gradient delay volume	200 µL (35–1500 µL with optional mixer kits)	690 µL (325–1790 µL with optional mixer kits)	
Version with Solvent Selector Valve	HPG-3400RS		
Solvent degassing	External (optional)	Built-in, 4 channels	External (optional)
Dimensions	(h × w × d): 16 × 42 × 51 cm (6.3 × 16.5 × 20 in.)		
GLP Features	Full support of Automatic Equipment Qualification (AutoQ™), Qualification Status and System Wellness Monitoring. All system parameters are logged in the Chromeleon Audit Trail		
I/O Interfaces	2 digital inputs, 2 relay outputs		
Communications	USB for PC connection; USB hub with 3 sockets integrated; 15-pin D-Sub connector for solvent rack/degasser connection		
Power Requirements	100–120 V, 60 Hz; 200–240 V, 50 Hz		

## ORDERING INFORMATION

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:

### UltiMate 3000 Rapid Separation Pumps

Binary Rapid Separation Pump HPG-3200RS .....	5040.0026
Binary Rapid Separation Pump with solvent selector valves HPG-3400RS .....	5040.0046
Quaternary Rapid Separation Pump LPG-3400RS .....	5040.0036
Dual-Gradient Rapid Separation Pump DPG-3600RS .....	5040.0066

### UltiMate 3000 Solvent Racks

Solvent Rack (without degasser) SR-3000 .....	5035.9200
Solvent Rack with 6 degasser channels SRD-3600 .....	5035.9230
Solvent Rack with 4 degasser channels SRD-3400 .....	5035.9245
Solvent Rack with 2 degasser channels SRD-3200 .....	5035.9250

*Optional Mixer Kits are available upon request. For more UltiMate 3000 pump Systems and Solvent Racks, see the Dionex Product Catalog, LC Pumps and LC Solvent Tray/Degasser section.*

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