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Ultimate 3000 RS

The UltiMate[®] 3000 Rapid Separation Autosampler is the only UHPLC autosampler that robustly injects up to 500 μL at pressures up to 15,000 psi (103.4 MPa). This wide injection-volume flexibility makes the module suitable for both UHPLC and conventional HPLC applications. The in-line split-loop (or flow-through) injection design of the module provides highly accurate and precise delivery of the sample with ultralow carryover.

- Injection volume precision typically $<0.15\%$ RSD for 5 μL injections
- Superior injection linearity of $r^2 >0.9999$ (5–90 μL) due to high-precision drive mechanism
- Wide injection volume range from 1–100 μL (default configuration) for maximum injection flexibility
- Optional injection volume ranges of 0.2–25 μL , 1.5–200 μL , and 1.5–500 μL available
- Low gradient delay volume of 140 μL (default configuration) or 50 μL (with 25 μL sample loop)
- Volumetric accuracy better than $\pm 0.5\%$ for 20 μL injections for easy method transfer
- Supports well plates and short injection cycle times for high-throughput applications
- Sample thermostating for optimal protection of thermally-sensitive analytes (WPS-3000TRS)

The UltiMate 3000 Rapid Separation Autosampler offers minimal gradient delay and low extra column volume, which provide high efficiency separations and short chromatographic run times. It is strongly recommended for ultrahigh-pressure, high-throughput, and high-resolution applications, and is available in non-thermostatted

(WPS-3000RS) and thermostatted (WPS-3000TRS) versions.

Sample Capacity	216 × 0.3 mL vials, 120 × 1.1 mL conical vials, 216 × 1.2 mL vials, 120 × 1.8 mL/2.0 mL vials, 66 × 4 mL vials, 30 × 10 mL vials, 3 x 24 deep well plates, 96 and/or 384 normal or deep well plates, 3 x 40 0.5 mL and/or 1.5 mL Eppendorf tubes, and/or 3 x 384 low well PCR plates + 15 × 10 mL vials (depending on sample tray configuration)
Injection Methods	In-line split-loop injections, bypass mode, user-defined programs
Injection Volume Range (recommended)	0.01–100 µL (1–100 µL) Optional: 0.2–25 µL, 1.5–250 µL, 1.5–500 µL
Injection Volume Accuracy	±0.5% at 20 µL
Minimum Sample Required	1 µL out of 5 µL (250 µL conical vial)
Injection Volume Precision	<0.25% RSD at 5 µL (typically <0.15% RSD), caffeine in water
Linearity	Corr. coeff. >0.9999, RSD <0.5% at 5–90 µL, caffeine in water
Needle Wash	Active external
Carry over	< 0.004% for caffeine at 200 bar with external wash
Injection Cycle Time	<15 seconds for 5 µL
Sample Thermostatting	4–45 °C or 22 °C below ambient (thermostatted sampler versions)
Sample Temperature Accuracy	±2 °C
Power Requirements	100–120 V, 60 Hz 200–240 V, 50 Hz
Dimensions (h x w x d)	36 × 42 × 51 cm (14.2 × 16.5 × 20 in.);
PC Connection	USB
I/O Interfaces	4 digital inputs and 4 programmable outputs

The UltiMate[®] 3000 Rapid Separation Thermostatted Column Compartment TCC-3000RS operates at temperatures up to 110 °C with no compromise in precision or accuracy. Advantages of high column temperatures include reduced system backpressures and typically sharper peaks. Efficient precolumn heating and postcolumn cooling technology ensures the best chromatography under these challenging conditions.

- Wide temperature range from 5–110 °C with excellent accuracy and precision

- Precise temperature control, even under varying ambient conditions
- Optional column switching valves in SST and PEEK™ up to 1034 bar (15,000 psi)
- Fast and easy installation of precolumn heater and postcolumn coolers
- Postcolumn cooling ensures lowest detector noise and drift in ultrafast LC applications
- Fast heat-up/cool down times
- Increase your laboratory performance and productivity with x2 dual technology
- Column identification system for up to four columns

The TCC-3000RS is highly flexible and supports up to 12 LC columns (depending on column dimensions) to a length of up to 30 cm. It can easily be upgraded with up to two integrated column switching valves providing access to advanced column switching techniques. The TCC-3000RS meets the demands of ultrafast and conventional LC applications even at high column temperatures.

No. of switching valves	Optional, up to 2
Recommended eluent pre-heater volume	2 µL (0.005": i.d.)
Temperature range	5 °C to 110 °C (max. 18 °C below ambient)
Temperature accuracy	±0.5 °C
Temperature stability/precision	±0.1 °C
Heat-Up/cool-down time	Typically: 15 min from 20 °C to 50 °C/ 15 min from 50 °C to 20 °C

The Dual-Gradient Rapid Separation Pump is the first pump that combines the ultrahigh-speed and resolution of RSLC with x2 dual technology. Advanced chromatographic techniques such as parallel, tandem, and 2-dimensional LC become realistic, practical options, even at ultrahigh speed. Use the pump to operate conventional or ultrahigh-speed applications, increase sample throughput, achieve higher chromatographic resolutions, or automate sample preparation steps such as analyte enrichment or matrix elimination. Ultrahigh-resolution columns using sub-3 µm and sub-2 µm particle size are the preferred format for this pump, but all conventional HPLC columns are fully supported.

- The Dual-Gradient Pump incorporates two ternary gradient pumps in the footprint of a single LC system
- Control of x2 dual systems with Chromeleon® software ensures ease-of-use, documentation of all instrument settings, and automated startup and shut-down routines.
- Accommodate two different applications on an x2 dual system with different solvents and columns, and switch between applications without replumbing the system.
- Exceptionally wide flow-pressure footprint with flows from 100 µL/min to 8 mL/min and pressures up to 15,000 psi (103.4 MPa), with a flow accuracy of ±0.1%.

- Accurate, precise retention times thanks to the high flow and proportioning precision with ternary low-pressure gradient proportioning.
- Dionex's mixing concept perfectly balances gradient delay volume against mobile phase mixing efficiency. Adapting the mixing volume to the application requirements takes just a matter of seconds.

Operating Principle	Serial dual-piston
Flow Range (Settable Range)	0.05–8 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 (290–15,000 psi) up to 5 mL/min, 2–80 MPa (290–11,600 psi) up to 8 mL/min
Pulsation Gradient Formation	Typically: <2 bar or <1% whichever is greater
Proportioning Accuracy	±0.5%
Proportioning Precision	<0.15% SD
Number of Eluent Lines	6 (2 × 3)
Gradient Delay Volume	690 µL by default (325–1790 µL with optional mixer kits)
Solvent Degassing	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.
I/O Interfaces	All system parameters are logged in the Chromeleon Audit Trail 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.

The UltiMate® 3000 Solvent Racks SRD-3200, SRD-3400, and SRD-3600 incorporate a low-volume (670 µL), chemically-inert degasser with two, four, or six channels. They support pumps without built-in degassers, such as the Dual-Gradient Analytical Pump with six channels, and high-pressure gradient pumps with two or four channels.

- Highest degassing efficiency, ensures stable baseline
- Securely organizes up to nine 1 L eluent bottles on top of your UltiMate 3000 system

tower

- Conserves valuable bench space
- Optimum resistance to the most commonly used HPLC solvents and buffer solutions
- Vacuum/leak sensors to ensure continued, safe operation

Eluent Bottle Capacity (all versions)	Nine 1 L bottles, or four 2.5 L bottles, or two 5 L bottles and two 1 L bottles
Degassing Channels	None, two, four, or six analytical degasser channels
Degassing Channel Tubing	Teflon AF
Channel Volume	670 μ L
Maximum Flow Rate/Channel	14 mL/min
Optimal Flow Rate/Channel	\leq 3.6 mL/min (for isocratic or gradient formed 50:50 methanol/water blends)
Wetted Materials	Teflon [®] AF, PEEK [™] , and Tefzel [®]
Status LEDs	Power, vacuum pump status, error (vacuum and/or leak)
Communication	15-pin D-SUB (through UltiMate 3000 pumps)
Power Supply	15-pin D-SUB (through UltiMate 3000 pumps) or external power supply
Power Consumption	30 V ac max
Dimensions (h x w x d)	10 x 42 x 51 cm (3.9 x 16.5 x 20 in.)
Weight	With internal degasser: 4.8 kg (10.6 lb)



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