

Thermo Scientific Dionex UltiMate 3000 Well Plate Autosampler

The Benchmark in LC Liquid Handling

Thermo Scientific™ Dionex™ UltiMate™ 3000 products are UHPLC compatible by design, establishing the new standard in conventional LC. Integrating hardware, software, and separation chemistry, we offer UHPLC to everyone—for all needs.



UHPLC⁺
focused

Versatile and Flexible

The UltiMate 3000 Autosamplers ensure reliable, precise, and accurate injections from nL to mL sample volumes, supporting pressure up to 125 MPa (18,130 psi) for UHPLC and HPLC applications. They manage flow ranges from nano/capillary to micro and from analytical to semipreparative scale.

Beyond the unique UHPLC autosamplers, dedicated autosamplers are available for biochromatographic separations, electrochemical detection, as well as fractionation in the μ L and mL volume range (Table 1).

A large variety of tray formats are supported by all UltiMate 3000 autosamplers. This provides tremendous flexibility for sampling and fractionation, as well as automated sample preparation steps.

All autosamplers provide a uniform fluidic design making the fluidics easy to upgrade.

Precise and Reliable

Fast high-precision syringe drives offer excellent injection accuracy and precision within the in-line split-loop (flow-through) and pulled-loop autosampler series. This also allows easy and robust method transfer between UltiMate 3000 systems.

High-quality autosampler components, intelligent mechanical and electronic design, and rigorous quality assurance testing guarantee durable and reliable operation. Automated equipment qualification tests and predictive performance indicators simplify installation, qualification, and performance verification. Easy front-panel access and a clean and intuitive fluidic design ensure optimum ease of use and effortless maintenance.

Unique and Elaborate

The flow-through autosamplers achieve injection cycle times < 15 s for 5 μ L for maximum sample throughput, even with ultrahigh-speed UHPLC applications.

The Thermo Scientific Dionex Viper™-based autosampler fluidics eliminate dead volume which contributes to carryover and loss of separation efficiency.

Sample injection and fractionation for automated off-line multidimensional and multistep liquid chromatography becomes easy using the unique needle-in-needle pulled-loop autosampler with a second valve incorporated.



UHPLC

Nano/Cap Injections

In-line Split-Loop

Low Carryover

Pulled-Loop

Viper Fluidics

Future-Proof UHPLC Autosamplers

With various UHPLC autosampler versions to choose from, we provide a future-proof autosampler platform for small molecule and biomolecule analyses. Autosamplers for UHPLC and conventional applications with up to 125 MPa (18,130 psi) at analytical and micro flow rates and 90 MPa (13,050 psi) at nano/cap flow rates ensure extraordinary application flexibility and maximum sample throughput for ultrahigh speed and ultrahigh resolution LC, LC-MS and LC-MS/MS analyses.

XRS

The 125 MPa (18,130 psi) in-line split-loop (flow-through) UHPLC autosampler has been optimized for low extra-column volume and carryover for maximum peak resolution and reliable results in MS.

RS/BioRS

The 103 MPa (15,000 psi) in-line split-loop (flow-through) UHPLC Rapid Separation (RS) autosampler ensures unrivaled injection performance in the conventional and ultra-high pressure range at analytical and micro flow rates. It is also available as a biocompatible version with corrosive-resistant sample flow path.

NC

The 90 MPa (13,050 psi) needle-in-needle, pulled-loop RSLCnano autosampler allows handling of nL samples at nano/cap flow rates and UHPLC pressures.

SD

The in-line split-loop (SL) (flow-through) analytical autosampler combines state-of-the-art LC with UHPLC compatibility. It supports pressures up to 62 MPa (9000 psi) at analytical and micro flow rates.

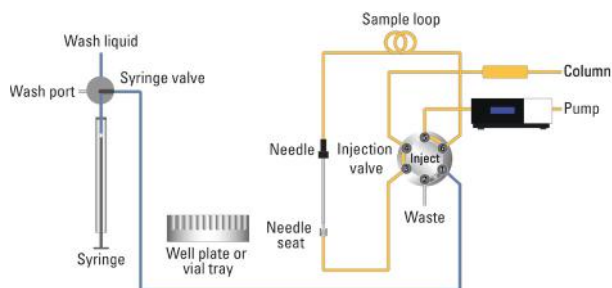


Figure 1. In-line split-loop injection principle (wash port not shown).

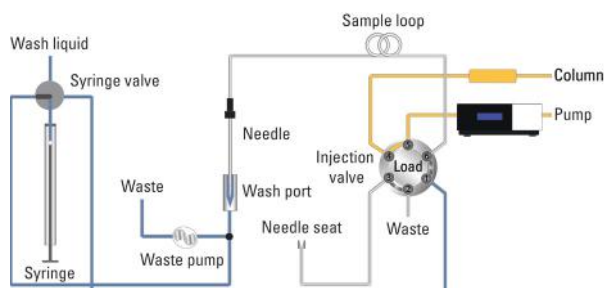


Figure 2. External wash operation of UltiMate 3000 in-line split-loop autosamplers.

In-line Split-loop (Flow-through) Autosamplers

Within in-line split-loop (flow-through) autosamplers, the sample loop, needle, and needle seat are integral parts of the high pressure fluidic path (Figure 1). The autosampler aspirates only the sample volume injected onto the column. The needle and sample loop are constantly rinsed with mobile phase, achieving the lowest carryover.

In-line split-loop injections are highly accurate and precise, and are adjustable over a wide injection volume range.

The sample loop bypass mode reduces system gradient delay volume and enables overlapping sample aspiration for maximum sample throughput.

- High injection volume flexibility
- Near zero-carry-over
- No sample loss
- Low sample dispersion
- Excellent injection precision and linearity
- Very short cycle times
- Highest versatility and productivity
- Biocompatible flow path (WPS-3000TBRS Autosampler)

Low Carryover for Every Injection

Carryover is of concern in all cases where high and low concentration samples are processed in the same sequence (for example, analysis of environmental samples) or when injecting compounds which tend to stick within the fluidics. The UltiMate 3000 well plate autosamplers feature an active needle wash (Figure 2).

This removes analytes from the outer needle surface and demonstrates carryover < 0.004% for in-line split-loop (flow-through) autosamplers (typically < 0.01% for pulled-loop autosamplers), even for sticky compounds, such as chlorhexidine or beclomethasone (Figure 3).

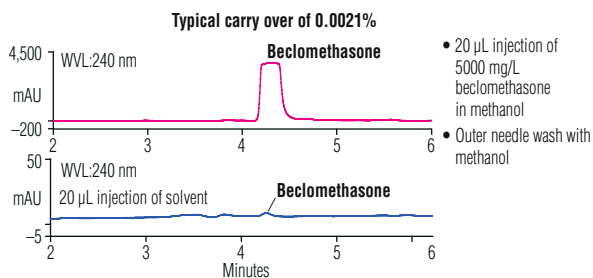


Figure 3. In-line split-loop autosampler: carryover example using beclomethasone.

Dedicated Autosampler Solutions

In addition to the UHPLC autosamplers, we also offer dedicated autosamplers for special applications such as semipreparative separations, electrochemical detection, biocompatible analyses, and fractionation and re-injection.

SL – Semiprep

The in-line split-loop (flow-through) semipreparative autosampler is designed for all semipreparative LC tasks with injection volumes of up to 2.5 mL and pressures up to 62 MPa (9000 psi).

SL – ECD

The in-line split-loop (flow-through) analytical autosampler for electrochemical detection ensures low baseline noise and high detection sensitivity with optimized autosampler fluidics and a PEEK sample loop.

NC – Bio, PL – Bio

Biocompatible needle-in-needle, pulled-loop autosamplers provide metal-free flow paths for routine use with aggressive mobile phases and buffers (salt and/or pH extremes), as well as for metal-sensitive biomolecule analyses at nano, capillary, micro and analytical flow rates with pressures up to 35 MPa (5000 psi).

FC – Standard, FC – Bio

The needle-in-needle, pulled-loop analytical autosamplers with a fractionation valve enables injection, fractionation, and re-injection of samples in a single instrument and therefore provide the means for multi-dimensional LC (bio-) separations.



Biocompatible
 Electrochemical Detection
 In-line Split-Loop
 Fraction Collection
Pulled-Loop
Semipreparative LC

Pulled-Loop Autosamplers

In pulled-loop autosamplers, the needle is not an integral part of the high pressure fluidic path (Figure 4). Therefore, all autosampler parts in contact with the sample can be made of inert material. High injection precisions are achieved in full-loop injections at a fixed-sample loop volume. Variable injection volumes are accessible in partial-loop injection mode.

- Lowest injection volumes—down to the nL range
- Biocompatible flow paths

- Microliter pick-up—virtually zero sample loss for pulled-loop injections
- Excellent injection precision even at low volume injections—precisions of < 1%, can easily be achieved at 20 nL
- Optional fractionation capabilities

The pulled-loop autosamplers are most suited for precise injections of minute volumes, e.g., in nano LC with virtually zero sample loss. Maximum sample integrity for metal-sensitive analytes is assured.

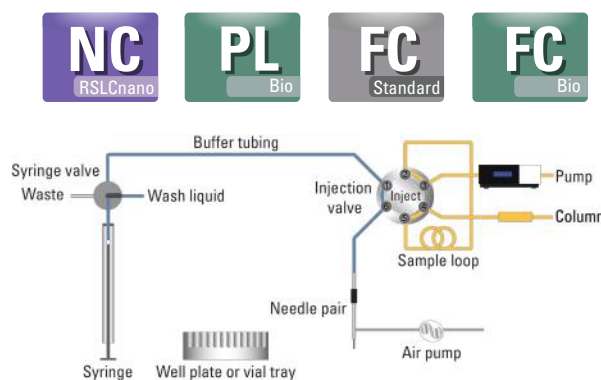


Figure 4. Pulled-loop injection principle (wash port not shown).

Viper and nanoViper Autosampler Fluidics

Autosamplers have many connections in the sample-containing flow paths, for example, the sample loop connected to the injection valve. Due to the design of conventional fitting systems these connections might create additional dead volume and have detrimental effects on autosampler performance, e.g. carryover, as well as peak shape and peak resolution.

All of our UHPLC autosamplers are equipped with the Thermo Scientific Dionex Viper or nanoViper™ Fingertight Fitting System.



Viper fitting systems directly seal at the tip of the capillary and its counterpart, e.g. the sample loop and injection valve, thus eliminating any source of dead volume within this connection by design.

The Viper and nanoViper Fingertight Fitting systems make each fluidic connection within the autosampler more robust and reproducible than any other conventional fitting system.



Figure 5. The Viper Fingertight Fitting System for secure connections within the WPS-3000TXRS autosampler.

Table 1. UltiMate 3000 Autosampler Classes

Autosampler Class	Thermo Scientific Dionex Autosampler Configuration	Max. Operating Pressure (MPa/psi)	Recommended Injection Volume Range (µL)	Autosampler Configuration
	WPS-3000 TXRS Rapid Separation Autosampler	125/18,130	0.2–25 1–100	Default configuration With optional 100 µL Viper sample loop/syringe
	WPS-3000(T)RS Rapid Separation Autosampler	103/15,000	1–100 0.2–25 1.5–250 1.5–500	Default configuration With optional 25 µL Viper sample loop With optional 250 µL Viper Injection volume kit With optional 500 µL Viper injection volume kit
	WPS-3000TBRS Biocompatible Rapid Separation Autosampler	103/15,000	0.2–25 1–100 1.5–250 1.5–500	Default configuration With 100 µL Viper sample loop included With optional 250 µL Viper Injection volume kit With optional 500 µL Viper injection volume kit
	WPS-3000(T)SL Analytical Autosampler	62/9000	See WPS-3000(T)RS Autosampler	
	WPS-300TBSL Analytical Autosampler	35/5000	1–100	
	WPS-3000(T)SL Semipreparative Autosampler	62/9000	100–2500 10–1000	Default configuration With optional 1000 µL injection volume kit
	WPS-3000(T)PLRS RS Nano/Cap Rapid Separation Autosampler	90/13,050 (optional: biocompatible 35/5000)	0.02–1 0.02–5 0.02–20 0.1–125	Default configuration With optional 5 µL nanoViper sample loop With optional 20 µL nanoViper sample loop With optional 125 µL upgrade kit
	WPS-3000TBPL Biocompatible Analytical Autosampler	35/5000	0.1–50 0.25–250	Default configuration
	WPS-3000TFC Analytical Autosampler with Fractionation Valve	35/5000 (optional: 90/13,050)	0.1–50 0.25–250 0.02–1	Default configuration With different sample and buffer loop configuration (included) With optional modification kit for nano/cap applications
	WPS-3000TBFC Biocompatible Analytical Autosampler with Fractionation Valve	35/5000	See WPS-3000TFC Analytical Autosampler with fractionation valve	

High Sample Capacity and Flexibility

The Thermo Scientific Dionex UltiMate 3000 WPS Autosampler series supports a great variety of sample trays compatible with many sample formats including micro, analytical, semi-preparative, and preparative sample vials; normal and deep well plates; PCR plates; and even Eppendorf® tubes (Figure 6).

- High sample vial capacity and flexibility.
- High sample throughput in high speed UHPLC and conventional HPLC.
- Reliable, unattended long-term operation.
- Maximum vial flexibility for all sample analysis and sample preparation tasks.



Figure 6. Sample format and tray variety for the UltiMate 3000 Autosampler Series.

Table 2. UltiMate 3000 Autosampler Sample Tray Formats

Sample Containments	Sample Tray ¹	Total Vials in Carousel (plus 15 × 10 mL vials)
Micro, cylindrical 0.3 mL vials	0.3 mL rack	3 × 72 = 216
Analytical, conical 1.1 mL vials	1.1 mL rack	3 × 40 = 120
Analytical, cylindrical 1.2 mL minivials	1.2 mL rack	3 × 72 = 216
Analytical, cylindrical 1.8 mL/2 mL vials	2 mL rack	3 × 40 = 120
Micro, conical 250 µL vial inserts		3 × 40 = 120
Semipreparative, cylindrical 4 mL vials	4 mL rack	3 × 22 = 66
Semipreparative, cylindrical 10 mL vials	10 mL rack	3 × 10 = 30
96 normal well plate 384 normal well plate	0.3, 1.1, 1.2, 2, or 10 mL rack	3 × 96 = 288 3 × 384 = 1152
24 deep well plate ³ 96 deep well plate 384 deep well plate	Deep well plate support rack	3 × 24 = 72 3 × 96 = 288 3 × 384 = 1152
0.5 mL Eppendorf tubes ²	0.5 mL Eppendorf tube rack	3 × 40 = 120
1.5 mL Eppendorf tubes ²	1.5 mL Eppendorf tube rack	3 × 40 = 120
Low well PCR plate (8–12 mm) with 384 wells	0.3, 1.1, 1.2, 2, or 10 mL rack + support rack (adapter) for low PCR-plates	3 × 384 = 1152

¹ Three sample trays can be used in any combination in the autosampler carousel.

² The in-line split-loop (flow-through) autosamplers (WPS-3000SL, WPS-3000RS and WPS-3000XRS series) support sampling from uncapped (open) Eppendorf tubes. The pulled-loop autosamplers (WPS-3000PL and WPS-3000FC series) support piercing Eppendorf tube caps which are marked or specified as pierceable.

³ With vial pusher adapter

Unique Thermal Control for All Sample Tray Formats

Peltier elements, in combination with circulating cooling liquid, are responsible for the UltiMate 3000 Autosampler's accurate, stable temperature control capabilities. Direct contact between the vial and the temperature regulated surface ensures that samples achieve the actual set point between 4 °C and 45 °C (max. 22 °C below ambient).

All thermostatted autosamplers guarantee optimal protection for thermally sensitive analytes. A built-in peristaltic pump automatically removes water that may accumulate as a result of condensation. Sample compartment heating can be used for sample derivatization.



Figure 7: Sample thermostating down to 4 °C ensures sample integrity.

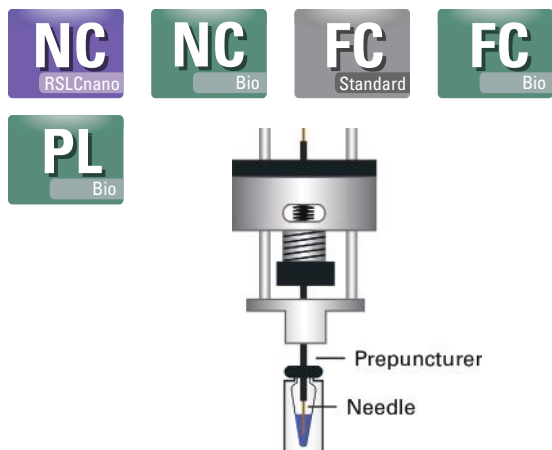


Figure 8. Needle-in-needle injection design.

Needle-in-Needle, Pulled-Loop Design for Flexible Sampling from Different Sample Tray Formats

The Thermo Scientific Dionex UltiMate 3000 Autosampler with pulled-loop injection design uses a needle-in-needle injection technique (Figure 8). The outer needle pierces the vial septum or well seal while the inner, biocompatible micro-needle (fused silica or PEEK) then moves into position to aspirate the sample. The injection system can be programmed to the optimum depth for each sample container format.

This technique provides robust operation for different sample tray formats.

- Supports minute injection volumes as low as 20 nL.
- Supports all applications from nano to analytical scale.

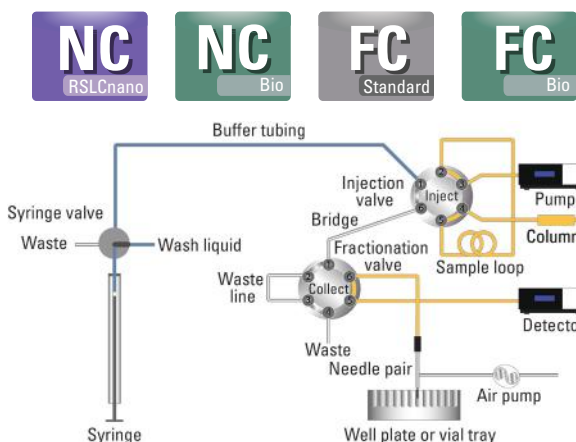


Figure 9. Flow diagram for automated injection, fractionation, and re-injection with a second integrated valve (WPS-3000T(B)FC).

Injection, Fractionation, and Re-Injection

Autosamplers supporting injection, fractionation, and re-injection in a single instrument are based on the pulled-loop injection principle.

The second integrated valve in the analytical pulled-loop well plate autosampler with fractionation valve (Figure 9) or the optional 8-port injection valve in the RSLCnano autosampler (Figure 10) allow fractionation in additional sample vials located in the sample carousel. Fractions can then be re-injected on a second column, e.g. with different selectivity.

- Fractionation and re-injection support automated off-line multidimensional and multistep liquid chromatography for fractions in the mL to μ L volume range.
- The needle-in-needle design allows fractionation in (sealed) well plates and capped or uncapped vials.
- Optimized flow path and low delay volume assure high chromatographic resolution
- Automated re-injection of samples reduces manual handling steps and ensures the highest level of precision.
- Reduced bench space required – two instruments in one

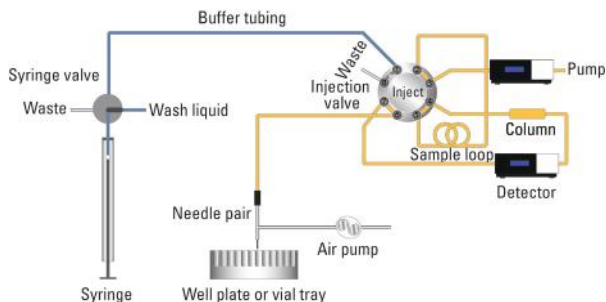


Figure 10. Flow diagram for automated injection, fractionation, and re-injection with the optional 8-port injection valve (microfraction collection option).

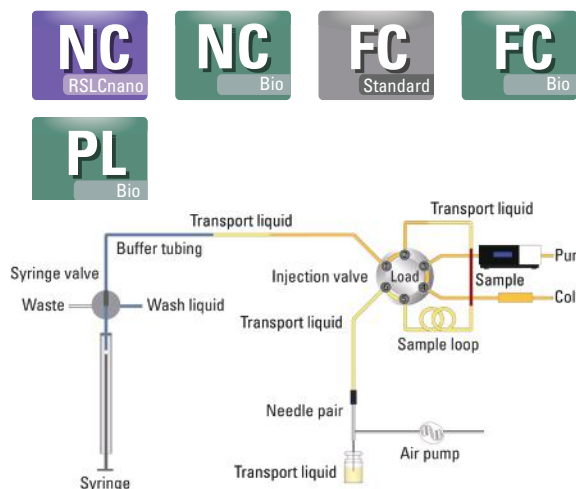


Figure 11. In microliter pickup the sample plug (shown in red) is transported into the loop, sandwiched by a plug of transport liquid (shown in yellow).

Microliter Pickup and Low Dispersion Mode

The unique pulled-loop design features of microliter pickup and low dispersion mode enables zero-sample-loss injections, extremely low sample consumption, and enhances peak resolution.

In microliter pickup mode a transport liquid is aspirated before and after the sample plug, thus only the sample injected onto the column is consumed (Figure 11). Valuable sample for other analyses is saved and the scale-down of sample preparation steps is facilitated.

In the low dispersion mode the valve is switched to the LOAD position at a certain time, so that the tailing part of the sample plug is cut off. This results in an optimized injection profile with significantly reduced peak tailing. The low-dispersion mode is available in full-loop and partial-loop mode.

Reliable peak identification and quantification is ensured through enhanced peak shapes and peak resolution.

Easy Method Transfer from System-to-System

Fast high-precision drives, the in-line split-loop (flow-through) injection principle and the compatibility of the Viper-based autosampler fluidics ensure reliable system-to-system and HPLC-to-UHPLC method transfer for the UltiMate 3000 XRS, RS, and SD systems.

- Consistent volumetric injection accuracy of typically better than 0.5% at 20, 50, and 90 μL for in-line split-loop (flow-through) autosamplers.
- Conventional methods are easily transferred from the UltiMate 3000 SD to the UltiMate 3000 RS system.
- Conventional methods running on HPLC columns are easily brought up to speed on the Thermo Scientific Dionex UltiMate 3000 RS system.
- Maximum injection volume accuracy and precision provide highly reproducible results.
- Injection cycle times < 15 s for 5 μL (in-line split-loop autosamplers) for maximum sample throughput even with ultrahigh speed UHPLC applications.
- Interchangeable fluidic parts like the Viper sample loop and needle seat capillary ensure trouble-free method transfer between all SD, RS and XRS well plate autosamplers.



Figure 12. Easy HPLC-to-UHPLC and system-to-system method transfer between the UltiMate 3000 XRS, RS, and SD product lines.

Reliability Features

Extensive autosampler self tests, user-scheduled diagnostic tests, and predictive performance indicators ensure instrument reliability, robust operation, and increase system uptime (Figure 13).

- All autosampler sensors are checked at startup and during sample processing.
- Autosampler diagnostic tests indicate even the smallest leaks caused by valve and needle seat wear.
- Counters monitor common wear parts like rotor seal, syringe, needle, and needle seat to easily schedule maintenance.

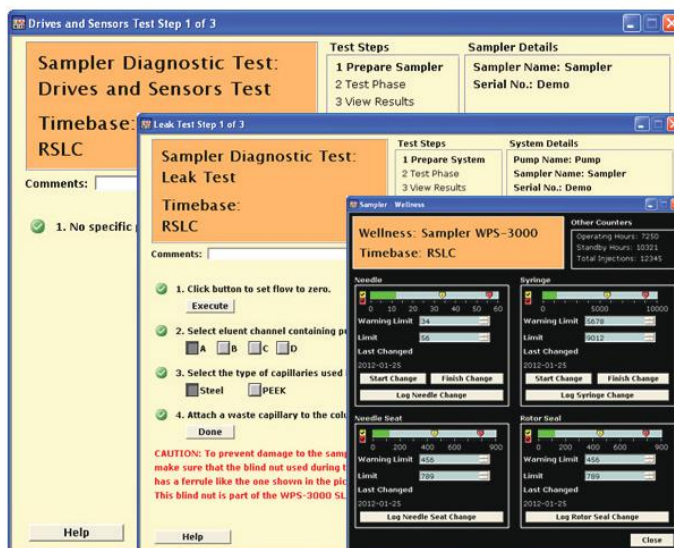


Figure 13. Autosampler diagnostic wizards and wellness panels in Thermo Scientific Dionex Chromeleon software.

User-defined Sample Preparation and Injection Programs

Unique low-level autosampler commands enable users to define their own injection programs for a large variety of injection routines (Figure 14). Automated sample preparation like sample dilution and sample derivatization will be handled by the autosampler to save labor time and yield accurate and precise results. Up to eight reagent vials can be defined which provides a high level of flexibility for sample preparation.

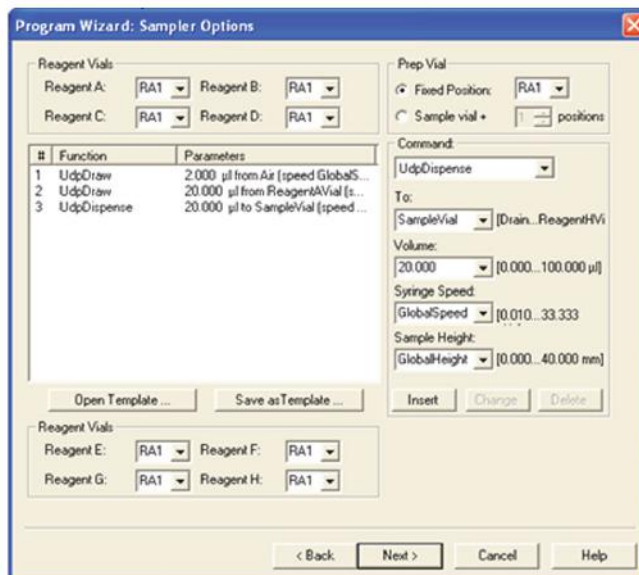


Figure 14. User-defined injection program setup in Chromeleon software.

XRS
1250 bar



Figure 15. The UltiMate 3000 XRS Autosampler is an essential part of the UltiMate 3000 XRS.

XRS Well Plate Autosampler

The UltiMate 3000 XRS Autosampler provides an optimized fluidic pathway with 100 μm i.d. Viper tubing for LC and LC/MS. With UHPLC pressures of up to 125 MPa (18,130 psi) it combines low gradient delay and extra column volume, and low carryover with excellent injection performance. This supports ultrahigh throughput and ultrahigh-resolution analyses. The WPS-3000TXRS Autosampler features all advantages of the in-line split-loop (flow-through) design for UHPLC, as well as HPLC performance.

- Fast cycle times < 20 s for 5 μL injections support high-throughput applications.
- Support of very long sub-2 μm particle columns applied for natural products screening, life sciences, and complex environmental and food and beverage sample analysis.
- Support of sub-1 μL injections on short UHPLC columns.
- Lowest autosampler gradient delay volume of only 42 μL supports ballistic gradients.

RS
1000 bar

RS
Bio

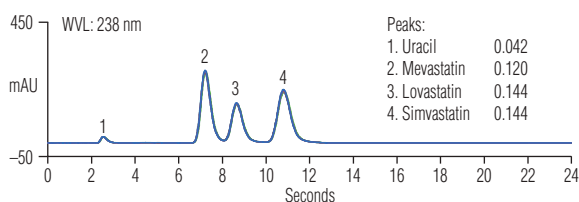


Figure 16. Excellent peak area precision < 0.31% RSD for ten consecutive 1 μL injections at 3.35 mL/min and 74 MPa.

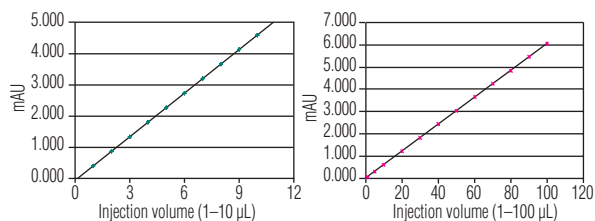


Figure 17. Excellent linearity performance at 1–10 μL (correlation coefficient of 0.999997, 0.13% RSD) and 1–100 μL (correlation coefficient of 0.999998, 0.10% RSD), three replicates per injection) demonstrate the flexibility of the UltiMate 3000 Rapid Separation Autosampler.

SD
620 bar

SL
ECD

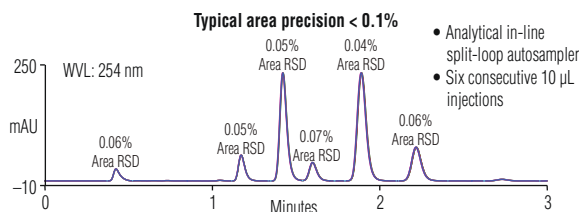


Figure 18. Typical peak area precision < 0.1% for six consecutive 10 μL injections using the in-line split-loop autosampler.

RS Well Plate Autosamplers

The UltiMate 3000 RS and BioRS Autosamplers provide the highest degree in flexibility. No matter if you are operating in the conventional HPLC pressure range or at UHPLC pressures up to 103 MPa (15,000 psi) the WPS-3000(T)RS autosamplers assure excellent injection performance for reliable results in both pressure domains.

- High injection volume flexibility is guaranteed due to a standard injection volume range of 1–100 μL (recommended range); for RS autosampler: standard, for BioRS autosampler: optional.
- Corrosion-resistant materials in the complete sample flow path reduce the risk of bioanalyte interaction with internal surfaces (BioRS Autosampler).

- Peak area precision is typically less than 0.15% for 5 μL injections in standard HPLC and 0.3% for a 1 μL injection in UHPLC mode.
- Excellent injector linearity ($r^2 > 0.9999$) is achieved in the 1-10 and 1-100 μL injection volume range.
- Fast cycle times < 15 s (RS autosampler) and < 20 s (BioRS autosampler) for 5 μL injections support high-throughput applications.
- The autosampler can easily be upgraded for micro injection volumes down to 0.2 μL (recommended range, RS autosampler only).

SL Analytical Well Plate Autosamplers

The UltiMate 3000 Standard In-line Split-loop (Flow-through) Analytical Autosamplers offers future-proof application flexibility and excellent injection performance. The WPS-3000(T)SL Analytical Autosampler is best suited for standard HPLC applications and due to its pressure capabilities of up to 62 MPa (9,000 psi)—is fully compatible with short fully porous UHPLC and fused core columns.

- High injection volume flexibility is guaranteed due to a standard injection volume range of 1–100 μL (recommended range).

- Peak area precision is typically less than 0.1% for 10 μL injections, increasing confidence in your results.
- Excellent injector linearity ($r^2 > 0.9999$) is achieved due to the combination of a high-precision drive mechanism and in-line split loop (flow-through) injection principle.
- The autosampler can easily be upgraded for micro injection volumes down to 0.2 μL .
- The SL autosampler is also available for electrochemical detection (ECD) with pressures up to 35 MPa.

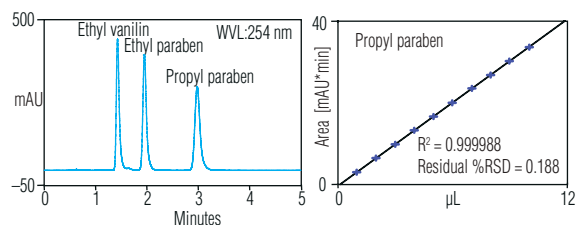


Figure 19. Injector linearity application example of an analytical in-line split-loop autosampler (three replicates per level).

Semipreparative Well Plate Autosampler

The Thermo Scientific Dionex UltiMate 3000 Semipreparative Autosamplers are designed for all semipreparative LC tasks where injections volumes in the mL range and low backpressure contribution from the autosampler are required (Figure 20).

- Large volume injections up to 2.5 mL
- The flow path has been designed to generate low backpressure even at flow rates up to 50 mL/min.
- Supports up to 66 × 4 mL, 30 × 10 mL vials, or 3 × 24 deep well plates plus 15 additional 10 mL vials for multiple large volume injections of the same sample.
- Supports analytical injections down to 10 µL volume when equipped with the optional 1000 µL sample loop and syringe.



Figure 20. The UltiMate 3000 Semipreparative Autosampler provides large volume injections up to 2.5 mL.

RSLCnano Well Plate Autosamplers

The Thermo Scientific Dionex UltiMate 3000 RSLCnano Well Plate Autosamplers fulfill all the special requirements of ultralow-flow chromatography with pressures up to 90 MPa (13,050 psi). Due to their flexibility they support ultrahigh pressure and high-resolution applications in the field of proteomics, metabolomics, and biopharmaceutical analysis.

- Ideally suited for all LC/MS applications using column i.d. formats of 1 mm or smaller.
- Wide-injection volume ranges from 20 nL to 1 µL (standard) and up to 125 µL (optional).
- Excellent injection precisions (typically <0.3% for 1 µL full loop injections and <1% for 20 nL partial-loop injection), independent of the sample format (Figure 21).
- Low-dispersion mode and µL-pickup routine.
- PAEK/PEEK® upgrade kit (35 MPa/5000 psi) is available for applications which require bio-inert flow paths.
- The microfraction collection option provides access to automated offline multi-dimensional LC applications with pressures up to 35 MPa (5000 psi).

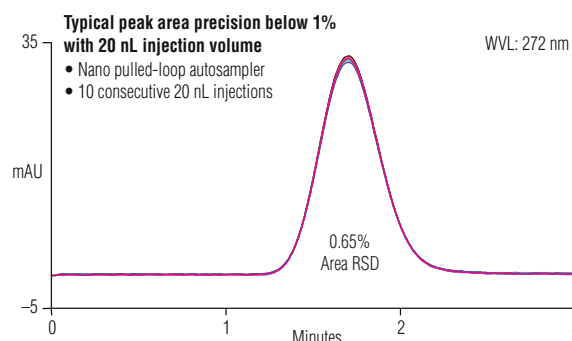


Figure 21. Typical 20 nL injection precision of < 1% (WPS-3000TBPL Nano/Cap autosampler)

Analytical Well Plate Autosamplers with Fractionation Valve

In combination with the extended fraction collection capabilities of the Dionex Chromeleon Chromatography Data System software, the Thermo Scientific Dionex Analytical Well Plate Autosampler with a fractionation valve enables fully automated injection, fractionation, and re-injection of samples. It is the ideal tool for biomolecule analysis, including protein and antibody fractionation and purification (Figure 22). It fully automates off-line multidimensional and multistep LC in analytical and micro flow rate ranges.

- Wide application flexibility, including automated off-line 2D-LC, multistep protein purification and analysis, sample derivatization, protein digestion, neutralization is provided.
- Fraction collection of flow rates up to 6 mL/min.
- A unique fractionation wizard facilitates easy method set-up for all fractionation tasks and multidimensional chromatography.
- The UltiMate 3000 LC system with dual gradient pumps and fractionation option allows fully automated purification and analysis, e.g., combining affinity with SEC or IEX columns.
- Nano/Cap modifications kit is available.
- The stainless steel and biocompatible PAEK/PEEK version support pressures up to 35 MPa (5000 psi).
- The optional 90 MPa (13,050 psi) SST valve supports UHPLC applications.

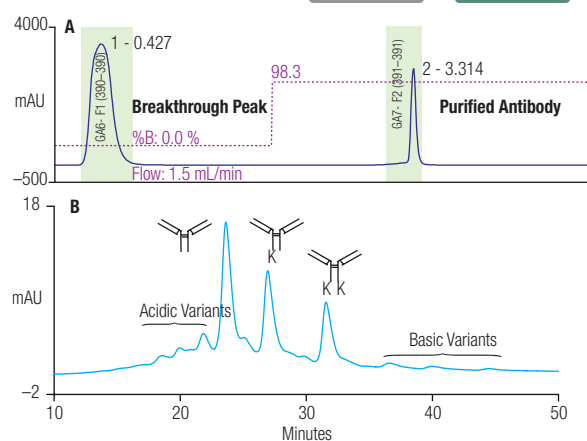


Figure 22. A) Automated monoclonal antibody purification on Protein A and B) isoform separation on a ProPac® WCX column.

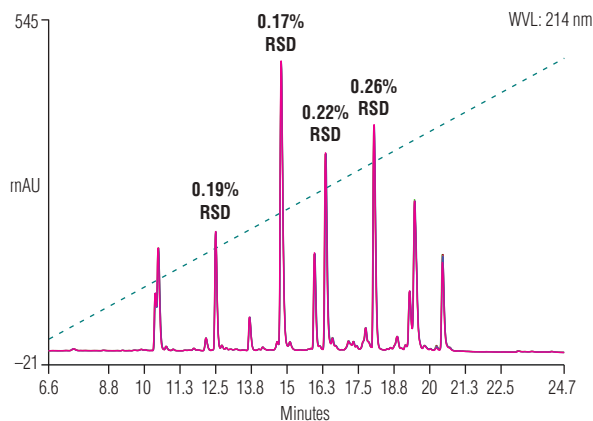


Figure 23. Peak area precision of a lysozyme digest for five consecutive 10 µL partial loop injections (WPS-3000TBL Biocompatible Analytical Autosampler).

Biocompatible Analytical Well Plate Autosampler

The Thermo Scientific Dionex UltiMate 3000 Biocompatible Analytical Well Plate Autosampler perfectly matches the requirements for injections of complex samples containing biomolecules, such as recombinant proteins or monoclonal antibodies.

- Inert PEEK flow paths allow routine use of aggressive mobile phases, buffers (salt and/or pH extremes), and metal-sensitive biomolecules.
- A wide injection volume range from 0.1 to 250 µL allows for maximum injection flexibility.
- High-peak-area precision is guaranteed by an excellent injection precision of < 0.3% RSD—even in partial loop mode (Figure 23).
- Low-dispersion full-loop and partial-loop injections result in an optimized injection profile with significantly reduced peak tailing.

ULTIMATE 3000 WELL PLATE

Autosampler class				
	WPS-3000TXRS	WPS-3000(T)RS	WPS-3000TBRS	WPS-3000(T)SL Analytical
Injection methods	In-line split-loop (flow-through) injections, bypass mode, user-defined columns			
Fractionation modes	n.a.			
Injection volume (recommended)	0.001–25 µL (0.2–25 µL) Optional: 0.1–100 µL	0.01–100 µL (1–100 µL) Optional: 0.2–25 µL, 1.5–250 µL, 1.5–500 µL	0.01–25 µL (0.2–25 µL) Optional: 1–100 µL, 1.5–250 µL, 1.5–500 µL	0.01–100 µL (1–100 µL) Optional: 0.2–25 µL, 1.5–250 µL, 1.5–500 µL
Injection volume accuracy	Typically ±0.5% at 20 µL			Typically ±0.5% at 50 and 90 µL
Minimum sample required	1 µL out of 5 µL (250 µL conical vial)			
Injection volume precision	<0.25% RSD at 2 µL (typically <0.15% RSD) caffeine in water	<0.25% RSD at 5 µL (typically <0.15% RSD) caffeine in water	<0.30% RSD at 2 µL (typically <0.15% RSD) caffeine in water	<0.25% RSD at 5 µL (typically <0.15% RSD) caffeine in water
Linearity	Corr. coeff. >0.9999, RSD <0.5% at 1–20 µL, caffeine in water	Corr. coeff. >0.9999, RSD <0.5% at 5–90 µL, caffeine in water	Corr. coeff. >0.9999, RSD <0.5% at 1–20 µL, caffeine in water	Corr. coeff. >0.9999, RSD <0.5% at 5–90 µL, caffeine in water
Carryover	<0.004% for caffeine with external wash at 20 MPa			<0.004% for caffeine with
Injection cycle time	<20 s for 5 µL	<15 s for 5 µL	<20 s for 5 µL	<15 s for 5 µL
Wetted parts	PEEK, stainless steel, PCTFE, Fused Silica, Vespel®	PEEK, stainless steel, PCTFE, Fused Silica	Titanium, PEEK, MP35N, PCTFE, Fused Silica	PEEK, stainless steel,







COMMON ULTIMATE 3000 WELL PLATE AUTOSAMPLER SPECIFICATIONS

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 × 24 deep well plates, 96 and/or 384 normal or deep well plates, 3 × 40 0.5 mL and/or 1.5 mL Eppendorf tubes*, and/or 3 × 384 low well PCR plates + 15 × 10 mL vials (depending on sample tray configuration; also for fractionation in (un-)capped vials, WPS-3000T(B)FC)
Needle wash	Active external needle wash
Sample thermostating	4–45 °C or 22 °C below ambient (thermostatted autosampler versions)
Sample temperature accuracy	± 2 °C (thermostatted autosampler versions)**
GLP Features	Full support of Thermo Scientific Dionex Automatic Equipment Qualification (AutoQ™), Qualification Status and System Wellness Monitoring. All system parameters are logged in the Chromeleon Audit Trail.
Communications	All functions controllable via USB; integrated USB hub with three USB 1.1 ports
I/O Interface	4 digital inputs, 4 programmable relay outputs
Emission sound pressure level	Typically < 65 dB(A) in 1-m-distance
Dimensions (h x w x d)	36 × 42 × 51 cm (14.2 × 16.5 × 20 in.)
Power requirements	100–120 V, 60 Hz; 200–240 V, 50 Hz
Weight	19 kg (42 lb), without cooling, 24 kg (53 lb) with cooling; WPS-3000T(B)FC: 25 kg (55 lb)

* The in-line split-loop (flow-through) autosamplers (WPS 3000SL, WPS-3000RS, and WPS-3000XRS series) support sampling from uncapped (open) Eppendorf tubes. The pulled-loop autosamplers (WPS-3000PL and WPS-3000FC series) support piercing Eppendorf tube caps which are marked or specified as pierceable.

** At a setpoint of 10 °C at ambient temperatures of ≤25 °C and ≤50% relative humidity.

AUTOSAMPLER SPECIFICATIONS

					
WPS-3000(T)SL Semipreparative	WPS-3000TBSL Analytical	WPS-3000(T)PL RS NanoCap	WPS-3000TBPL Analytical	WPS-3000TFC	WPS-3000TBFC
Full-loop and partial-loop injections, low dispersion mode, microliter pickup, user-defined programs					
		optional	n.a.	Time slices, peak signal, manual and external trigger	
0.01–2500 µL (100–2000 µL) Optional: 10–1000 µL	0.01–100 µL (1–100 µL)	0.001–20 µL (20 nL–20 µL)	0.01–250 µL (0.1–250 µL)		
Typically ± 1% at 2000 µL	Typically ± 0.5% at 50 and 90 µL	n.a.			
n.a.	1 µL out of 5 µL (250 µL conical vial)	1 µL out of 1 µL (microliter pickup)			
<0.3% RSD at 100 µL (typically <0.15% RSD) caffeine in water	<0.25% RSD at 5 µL (typically <0.15% RSD) caffeine in water	< 0.4% RSD at 1 µL in full-loop and < 1% RSD at 200 nL partial-loop mode, caffeine in water	< 0.25% RSD at 5 µL in full-loop and < 0.3% RSD at 5 µL and 20 µL partial-loop mode, caffeine in water		
Corr. coeff. >0.9995, RSD <1% at 100–2000 µL caffeine in water	Corr. coeff. >0.9999, RSD <0.5% at 5–90 µL, caffeine in water	Corr. coeff. > 0.9995, at 100–500 nL, partial-loop injection, caffeine in water	Corr. coeff. >0.9999, RSD <0.5% at 5–30 µL, caffeine in water		
external wash at 7.5 MPa		< 0.02% for caffeine with external wash			
<20 s for 100 µL	<15 s for 5 µL	< 30 s for 1 µL full-loop injection	< 60 s for 5 µL full-loop injection, < 90s for 5 µL partial-loop injection		
PCTFE, Fused Silica		PEEK, stainless steel, PAEK, PCTFE, PEEKsil™, Fused Silica	PEEK, PAEK, PCTFE	PEEK, PAEK, PCTFE stainless steel	PEEK, PAEK, PCTFE

Fully Controlled by Various Software Packages

All autosamplers are controlled by a variety of software programs.

Chromeleon Software

No other data system comes close to providing the capabilities and the usability of Chromeleon Chromatography Data System (CDS) software—it's Simply Intelligent™. The software is designed to take users from samples to results in the shortest possible time. Sequence set-up, processing, and result calculations can all be performed quickly, easily, and without training. It controls IC, LC and GC instruments from a wide range of manufacturers.

Other Software Integration

Chromeleon software has the capability to integrate full instrument control for the complete range of UltiMate 3000 LC modules with other software. Thermo Scientific Dionex DCMSLink™ provides the integration with Xcalibur™, Analyst®, and HyStar™ mass spectrometry software. Additionally, UltiMate 3000 instrument interfaces are available for Thermo Scientific Atlas™ and Empower™ 3 chromatography data acquisition software. These solutions provide Chromeleon's advanced instrument control capabilities in the user's familiar software environment.

Enjoy Industry-Leading Support

Thermo Fisher Scientific Customer Support Centers are located in the United States, Europe, and Asia. These state-of-the-art laboratories are equipped with the full line of Thermo Scientific instrumentation and software capabilities. Support Centers provide accessible locations for advanced training and enhanced application development capabilities. Users can visit these laboratories or sign up to learn new skills in addressing challenging applications, receive training and support, and discover new, innovative HPLC, GC, and IC solutions.

ORDERING INFORMATION

Part No.	Well Plate Autosamplers
5843.0020	WPS-3000TXRS Rapid Separation Thermostatted Autosampler with Extended Pressure Range
5840.0020	WPS-3000TRS Rapid Separation Thermostatted Autosampler
5840.0010	WPS-3000RS Rapid Separation Autosampler
5841.0020	WPS-3000TBRS Biocompatible Rapid Separation Thermostatted Autosampler
5822.0020	WPS-3000TSL Analytical Thermostatted Autosampler
5822.0010	WPS-3000SL Analytical Autosampler
5827.0020	WPS-3000TBSL Analytical Thermostatted Autosampler for Electrochemical Detection
5822.0028	WPS-3000TSL Semipreparative Thermostatted Autosampler
5822.0018	WPS-3000SL Semipreparative Autosampler
5826.0020	WPS-3000TPL RS Rapid Separation Thermostatted Nano/Capillary Autosampler
5826.0010	WPS-3000PL RS Rapid Separation Nano/Capillary Autosampler
5823.0020	WPS-3000TBPL Biocompatible Analytical Thermostatted Autosampler
5824.0020	WPS-3000TFC Analytical Thermostatted Autosampler with Fractionation Valve
5825.0020	WPS-3000TBFC Biocompatible Analytical Thermostatted Autosampler with Fractionation Valve

Autosampler Accessories

6820.4091	Sample tray for 72 cylindrical 0.3 mL vials
6820.4087	Sample tray for 40 conical 1.1 mL vials
6820.4090	Sample tray for 72 cylindrical 1.2 mL vials
6820.4070	Sample tray for 40 cylindrical 1.8/2 mL vials
6820.4084	Sample tray for 22 cylindrical 4 mL vials
6820.4086	Sample tray for 10 cylindrical 10 mL vials
6820.4079	Sample support rack for deep well plates, 34–46 mm
6820.4083	Sample support rack for deep well plates, 30–36 mm
6820.4088	Support rack (adapter) for low well PCR plates, 8–12 mm
6820.4096	Sample tray for 0.5 mL Eppendorf tubes
6820.4094	Sample tray for 1.5 mL Eppendorf tubes
6820.4097	Sample Tray for 72 Micro Dialysis 0.3 mL Vials
6820.2402	Vial Pusher Adapter
6820.1427	Transparent front cover
6820.2452	Sample loop, 25 µL, Viper WPS-3000TXRS, WPS-3000(T)RS and WPS-3000(T)SL Analytical
6841.2451	Sample loop, 100 µL, Viper, WPS-3000TXRS, WPS-3000(T)RS and WPS-3000(T)SL Analytical
6841.2452	Sample Loop, 25 µL, Viper, WPS-3000TBRS
6822.0002	Syringe, 100 µL
6822.2442	Injection volume kit, 250 µL, Viper, WPS-3000(T)RS and WPS-3000(T)SL Analytical
6841.2442	Injection volume kit, 250 µL, Viper, WPS-3000TBRS
6822.2443	Injection volume kit, 500 µL, Viper, WPS-3000(T)RS and WPS-3000(T)SL Analytical
6841.2443	Injection volume kit, 500 µL, Viper, WPS-3000TBRS
6822.2436	Injection volume kit, 1000 µL, WPS-3000(T)SL Semipreparative
6826.0011	Injection valve upgrade, 90 MPa/13,050 psi, SST, WPS-3000TFC
6821.0045	PAEK/PEEK Upgrade Kit, WPS-3000(T)PL RS Nano/Cap

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