# Thermo Scientific UltiMate 3000 RSLCnano UHPLC System

Comprehensive and versatile low flow UHPLC system for routine and advanced LC-MS applications

The Thermo Scientific<sup>™</sup> UltiMate<sup>™</sup> 3000 RSLCnano modular system offers precision, productivity and performance for all your low flow UHPLC needs.



Figure 1. Thermo Scientific<sup>™</sup> ProFlow<sup>™</sup> technology.



Figure 2. 10-port 2-position switching valve with Thermo Scientific™ nanoViper™ connections.



Figure 3. Thermo Scientific<sup>™</sup> Acclaim<sup>™</sup> PepMap<sup>™</sup> 75 cm × 75 µm column.



#### Versatile

- Standardized workflows for virtually all LC-MS applications
- No sample loss and high injection precision with unique µL pick-up mode
- Nano, capillary, and micro flow rates support routine and method development workflows, providing flexibility when optimizing for highest MS sensitivity or throughput
- Two low-dispersion, two-position snap-in switching valves allows to setup any column-switching application (Figure 2)
- Integrated ternary micro pump enables sample pre-concentration and multidimensional workflows
- Full compatibility with the state-of-the-art Thermo Scientific Mass Spectrometers
- 75 cm × 75 µm fused silica nanoViper columns give higher peak capacity for nano LC separations (Figure 3)

## Reliable

- Thermo Scientific ProFlow technology (Figure 1) results in unsurpassed retention time precision for nano separations, even for long gradients
- Fast and effortless LC-MS system start-up and operation
- Thermo Scientific nanoViper fingertight UHPLC connections for ease-of-use and system setup within minutes
- Two-column setup with uninterrupted flow on sepration column and nanospray increases LC-MS robustness



	SPECIFICATIONS
Thermo Scientific UltiMate 300	0 RSLCnano System
Recommended flow range	50 nL/min–50 $\mu$ L/min (controlled with dedicated flow meters); 50–2500 $\mu$ L/min with ternary micro pump (only in NCS-3500RS)
Pressure range	With nano ProFlow flow meter: 860 bar (12,500 psi) With capillary flow meter: 800 bar (11,600 psi) With micro flow meter: 800 bar (11,600 psi)
System delay volume	<350 nL in pre-concentration configuration
Retention time RSD	$\leq$ 0.2% RSD or < 0.1 SD whichever is greater with a 30 min gradient
Safety features	System wellness monitoring, leak sensors, active rear-seal wash system, excess pressure monitoring, emergency shut-down
pH range	2–10
Wetted parts	MP35N, titanium, PEEK, UHMW-PE, PTFE, FEP, sapphire, ZrO <sub>2</sub> , Al <sub>2</sub> O <sub>3</sub> , fused silica, SST, PCTFE, perfluoro elastomer (FFKM)
NCS-3500RS - Binary High Pres NCP-3200RS - Binary HPG Pum	ssure Gradient (HPG) Pump with Ternary Micro Pump and Column Compartment p
Binary High Pressure Gradient (H	IPG) Pump
Flow rate range and maximum pressure	Nano ProFlow flow meter: 0–1,500 nL/min (recommended: 50–1,500 nL/min) 900 bar (13,050 psi) at full flow range
	Capillary flow meter: 0–15 μL/min (recommended: 0.5–10 μL/min) 800 bar (11,600 psi) at nominal flow rate 5 μL/min
	Micro flow meter: 0–50 μL/min (recommended: 5–50 μL/min) 800 bar (11,600 psi) at nominal flow rate 25 μL/min
Gradient delay volume	< 25 nL
Number of solvent channels	2
Wetted parts HPG	MP35N, titanium, PEEK, UHMW-PE, PTFE, FEP, ZrO <sub>2</sub> , Al <sub>2</sub> O <sub>3</sub> , fused silica, sapphire, PCTFE, SST
Ternary Micro Pump (Only in NO	CS-3500RS)
Micro pump (low pressure gradient)	Flow rate range: $0-2500 \ \mu$ L/min; recommended $5-2500 \ \mu$ L/min; gradient formation is recommended from 50 $\mu$ L/min
Maximum pressure	620 bar (9,000 psi)
Number of solvent channels	3
Delay volume	220 µL
Proportioning accuracy/precision	±1.0% of full scale/<0.3% SD
Wetted parts	Titanium, PEEK, UHMW-PE, PTFE, FEP, $ZrO_2$ , $Al_2O_3$ , perfluoro elastomer (FFKM)
Column Compartment (Only in I	NCS-3500RS)
Temperature range	Room temperature + 7 $^{\circ}$ C up to 75 $^{\circ}$ C
Temperature accuracy/precision	$\pm 0.5$ °C (at 50 °C setpoint)/ $\pm 0.1$ °C
Temperature stability	$\pm 0.1$ °C (at 50 °C setpoint)
Heat-up time	From 35 $^\circ\mathrm{C}$ to 65 $^\circ\mathrm{C}$ in 12 min at an ambient temperature of 25 $^\circ\mathrm{C}$
Switching valves	Up to two valves 6-port 2-position (port-to-port volume: 91 nL, maximum pressure: 860 bar (12,500 psi)) 10-port, 2-position (port-to-port volume: 114 nL, maximum pressure: 860 bar (12,500 psi))
Capacity	Maximum available width for column plus fittings: 350 mm; coiled fused silica columns
Features	Humidity sensor (column compartment), leak sensor, gas leak sensor, active rear-seal wash system, excess pressure monitoring
NCS-3500RS/NCP-3200RS Feat	tures and Dimensions
GLP features	Column tracking
Dimensions	NCS-3500RS (h × w × d): $36 \times 42 \times 51$ cm (14.2 × 16.5 × 20 in.) NCP-3200RS (h × w × d): $21 \times 42 \times 51$ cm (8.3 × 16.5 × 20 in.)
Weight	NCS-3500RS: 32 kg (70.6 lb); NCP-3200RS: 17.5 kg (38.6 lb)
Power requirements (automatic voltage selection)	100–120 V, 60 Hz 200–240 V, 50 Hz; max 300 VA
PC connection	USB 2.0; USB hub with three integrated sockets
I/O interfaces	Two digital inputs and two programmable outputs
Additional communication port	15-pin D-Sub port for connection of a solvent rack or degasser

SPECIFICATIONS (cont'd)			
Autosampler (WPS-3000TPL RS)			
Injection volume range	0–20 $\mu L$ (recommended 20 nL–20 $\mu L$ with different nanoViper sample loops); upgrade kit for injection volumes up to 125 $\mu L$ available		
Sample capacity	$3 \times$ well plates (128 $\times$ 86 mm) 15 $\times$ 10 mL vials for reagents, diluents, and transport liquids*		
Sample formats	96 (deep) well plate, 384 (deep) well plate, sealed or open; 40 standard autosampler vials, 1.8 mL, sealed or open*		
Injection cycle time	<30 s for a 1 µL full-loop injection		
Maximum pressure	860 bar (12,500 psi)		
Injection methods	Full loop and partial loop injections, low-dispersion mode, $\mu L$ pick-up, user-defined programs		
Injection technique	Needle-in-needle with programmable needle wash		
Injection precision	<0.4% RSD for 1 µL full loop injection		
Injection linearity	Correlation coefficient > 0.9995, at 100 to 500 nL partial-loop injections, caffeine in water		
Carryover	<0.02% for caffeine with external wash		
Sample cooling	4–45 °C, or 22 °C below ambient		
Biocompatible version	Yes (upgrade kit available);		
Fraction collection	Yes, with sample cooling (WPS-3000TFC, extra parts required: nano/cap modification kit and 6-port 2-position C72 valve)		
Wetted parts	PEEK, SST, PAEK, PCTFE, PEEKsil™, fused silica		
Dimensions (h $\times$ w $\times$ d)	$36 \times 42 \times 51$ cm (14.2 × 16.5 × 20 in.)		
Weight	24 kg (53 lb)		
Power requirements (automatic voltage selection)	100–120 V, 60 Hz 200–240 V, 50 Hz		
PC connection	USB; USB hub with three integrated sockets		
I/O interfaces	Four digital inputs and four programmable outputs		
UV/Vis Detector (VWD-3400RS)			
Data collection rate	Up to 200 Hz (in single wavelength mode); 5 Hz in multichannel mode		
Maximum number of channels	4		
Lamps	Deuterium lamp, Tungsten lamp Temperature control for both lamps		
Drift	4.0 mAU/h		
Wavelength range	190–900 nm ±1 nm		
Noise	Typically < 0.05 mAU at 254 nm		
Wavelength accuracy	1 nm		
Flow cell volume	3 nL for nano LC; 45 nL for capillary LC; 180 nL for micro LC		
Dimensions (h $\times$ w $\times$ d)	$16 \times 42 \times 51$ cm (6.3 × 16.5 × 20 in.)		
Weight	15 kg (33 lb)		
Power Requirements (automatic voltage selection)	100–120 V, 60 Hz 200–240 V, 50 Hz		
PC connection	USB		
I/O and analog interfaces	Two digital inputs and two programmable outputs Two analog inputs available as an option via DAC plug-in module		
Solvent Rack with Degasser (SRD-	3400)		
Capacity	Sixteen 0.5 L reservoirs		
Degassing channels	4 (SRD-3400); 0 (SR-3000)		
Channel volume	670 µL		
Wetted materials	Teflon AF, PEEK, and Tefzel		
Status LEDs	Power, vacuum pump status, error (vacuum and/or leak)		
Power supply and communication	15-pin D-Sub (through UltiMate 3000 pumps) or external power supply		
Dimensions (h $\times$ w $\times$ d)	$10 \times 42 \times 51$ cm (3.9 × 16.5 × 20 in.)		
Weight	With internal degasser: 4.8 kg (10.6 lb)		

\*Contact local sales representative for specific information

SPECIFICATIONS (cont'd)			
Software			
Stand-alone UltiMate 3000 RSLCnano system	Thermo Scientific <sup>™</sup> Chromeleon <sup>™</sup> 7.2 SR4 or later, Chromeleon 6.8 SR16 or later*		
UltiMate 3000 RSLCnano with Thermo Scientific MS detectors	Thermo Scientific Standard Instrument Integration (SII) 1.2 or later for Xcalibur™ and Chromeleon 7.2 SR4 or later; Chromeleon 7.2 SR4 or later*		
UltiMate 3000 RSLCnano with Bruker MS detectors	DCMSLink <sup>™</sup> based on Chromeleon 6.8 SR16 or later for Bruker Compass <sup>™</sup> /HyStar <sup>™</sup> *		

\*Contact local sales representative for more details about instrument control

## **Ordering Information**

In the U.S., call (800) 346-6390 or contact the Thermo Fisher Scientific Regional Office nearest you. Outside the U.S., order through your local Thermo Fisher Scientific office or distributor. Refer to the following part numbers:

Description	Part number
NCS-3500RS Nano LC Pump with ProFlow Flow Meter and	
Column Compartment	5041.0010A
NCS-3500RS Nano LC Pump with Capillary Flow Meter and Column Compartment	5041.0020
NCP-3200RS Nano LC Pump with ProFlow Flow Meter	5041.0030A
Capillary Flow Meter for NCS-3500RS, NCP-3200RS	6041.7902A
Micro Flow Meter for NCS-3500RS, NCP-3200RS	6041.7903A
WPS-3000TPL RS Thermostatted Pulled-loop Well Plate Autosar	npler 5826.0020
WPS-3000TFC Thermostatted Fraction Collector	5824.0020
PAEK Modification Kit for Biocompatible Autosampler	6821.0045
Upgrade Nano/Cap Kit for Fraction Collector WPS-3000TFC	6825.0030
WPS-3000 Switching Valve, 6-port 2-position, 0.25 mm bore (860 bar/12,500 psi)	6826.0011
125 µL loop/250 µL Syringe Upgrade Kit	6820.0031
VWD-3400RS Variable Wavelength Detector (Without Flow Cell)	5074.0010
Flow Cell for VWD-3000 Series (3 nL/45 nL/180 nL)	6074.0270/6074.0280 /6074.0290
SRD-3400 Solvent Rack with Four Degasser Channels	5035.9245
SR-3000 UltiMate 3000 Solvent Rack without Degasser	5035.9200
ProFlow Flow Meter (Nano)	6041.7850
Upgrade Kit for ProFlow Flow Meter	6041.3003
Direct Injection Nano LC Kit	6720.0300
Direct Injection Capillary LC Kit	6720.0305
Pre-concentration Nano LC Kit	6720.0310
Pre-concentration Capillary LC Kit	6720.0315
Pre-concentration Monolithic LC Kit	6720.0320
2D Salt Plug Kit	6720.0325
Automated off-line RP-RP Peptide Separation Kit	6720.0340
Automated off-line SCX-RP Peptide Separation Kit	6720.0330
Tandem Nano LC Kit	6720.0335
MS Connection Kit	6720.0345
EASY-Spray Connection Kit	6720.0395



#### www.thermofisher.com/nanoLCMS

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