C196-E070C

SHIMADZU
Excellence in Science

Ultra Fast Liquid Chromatograph

Prominence UFLC / UFLCXR

Prominence UFLC / UFLCXR

Shimadzu
Ultra Fast Liquid Chromatograph

The Prominence UFLC Series is an ultra-high-speed LC that achieves both ultra-high-speed analysis and ultra-high separation, based on high analysis precision and reliability.
In addition to shortening analysis times, thereby heightening analysis efficiency and conserving solvent, this instrument supports reliable separation and detection of trace materials in a variety of fields. Applications include the evaluation of trace residual agricultural chemicals to ensure the safety of foods, and the evaluation of trace impurities to further improve product quality in the areas of pharmacology and chemistry.

UFLC Quality…ultra-high-speed analysis by Shimadzu
This new LC boasts excellent basic performance and data quality, as well as attention to analysis system versatility and operability, delivering the optimal benefits to a range of laboratory situations.

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ULTRA FAST LIQUID CHROMATOGRAPH

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ULTRA FAST LIQUID CHROMATOGRAPH

UFLC Quality
The Shimadzu Prominence UFLC series
Opening up new worlds and expanding possibilities
through ultra fast liquid chromatography.

Aiming for Faster Separation with Uncompromising Quality

Prominence UFLC System

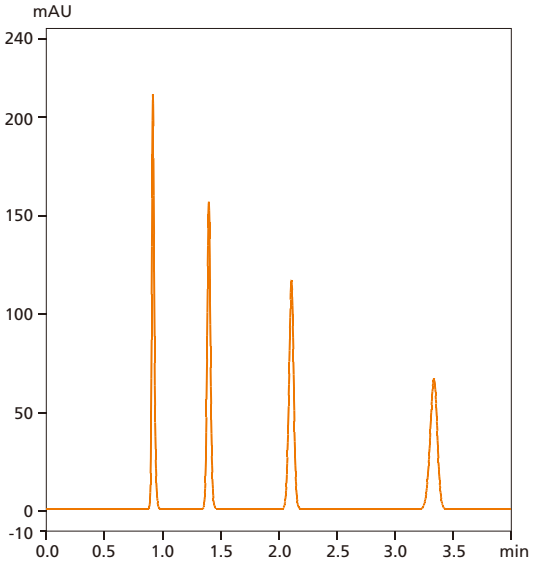
The times call for ultra-high-speed LC. Adopting ultra-high-speed LC for a range of analysis work can provide a variety of benefits. However, it is not enough to simply reduce analysis times. It is also important to maintain basic precision in LC analysis, including retention time repeatability, injection repeatability via an autosampler, and carryover and detector sensitivity. Furthermore, in selecting equipment, high-speed analysis means little without system durability and operability.
The Prominence UFLC is the optimal system for any laboratory striving for truly high-throughput analysis.

Unquestionable Fidelity - Both Repeatability and Speed

Maximizing Data Reliability

For precise equipment control, required by analytical validation processes and quality control tests, and for minimizing the risk of a system malfunction interrupting an analysis, the most important factor is the 6-port valve on the autosampler. The Prominence UFLC uses Shimadzu's own proprietary high-precision 6-port valve, which achieves 0.3% or less (RSD) area repeatability in 100,000 cycle endurance tests*[1].
In addition, for LC-MS analyses where reduction of sample carryover has currently gained a great deal of attention, Prominence UFLC successfully reduces carryover based on the principle of inhibiting the adsorption of samples in the first place.
*[1] Based on Shimadzu endurance test parameters.

<Repeatability for 4 Alkyl Phenones After Finishing 100,000 Cycle Endurance Test>



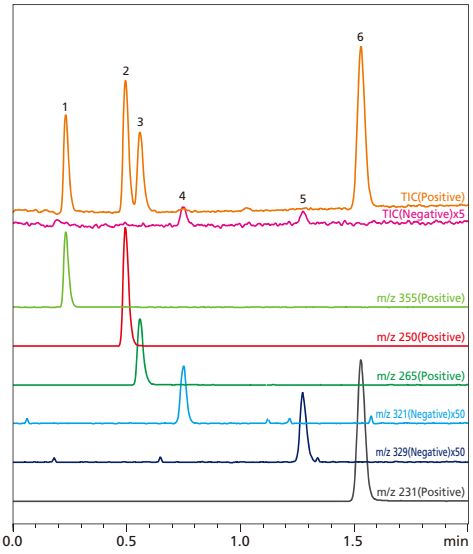
Peaks	Retention Time		Area	
	Average	%RSD	Average	%RSD
Acetophenone	0.916	0.089	312,670	0.059
Propiophenone	1.398	0.058	315,739	0.045
Butyrophenone	2.111	0.030	336,428	0.063
Valerophenone	3.341	0.031	296,609	0.040

(5 µL injection, n=6)

Ultra-High-Speed Analysis in Combination with LCMS

A new level of informative data, unobtainable with conventional LC detectors, can be obtained by combining this system with the LCMS-2020, a mass spectrometer compatible with ultra-high-speed analysis. The LCMS-2020 offers ultra-fast positive/negative ionization switching (UFswitching), the outstanding sensitivity of the newly developed ion optical Qarray (UFsensitivity), and ultra fast-scanning speeds (UFscanning). It provides highly reliable data even with ultra-high-speed analysis of peak widths on the order of seconds. When bioactive substances are noted in natural products, precision LCMS-IT-TOF mass MS^n measurements easily provide highly accurate molecular mass data and structural data from fragment ions, without isolation or refinement. Even here, the Prominence UFLC series functions as an effective tool, performing as a front end LC capable of ultra-high-speed separation analysis.

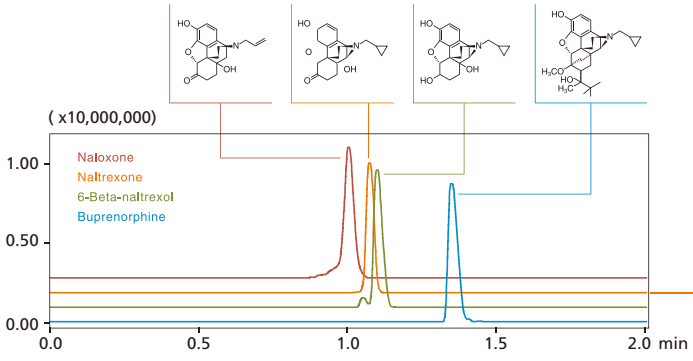
<Ultra-High-Speed Analysis of 6 Pharmaceutical Ingredients>

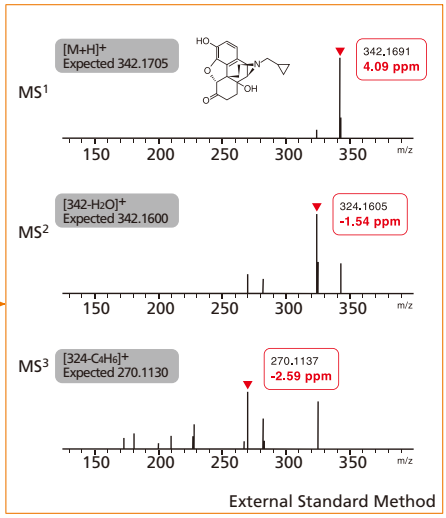


Detection	: ESI-Positive mode; LCMS-2020
Column	: Shim-pack XR-ODS (30 mmL. x 3.0 mmI.D.)
Mobile phase	: A) 0.1 % aqueous solution of formic acid B) Acetonitrile B.Conc.: 20 % (0 min.) → 35 % (2.0 min.)
Flow rate	: 0.5 mL/min.
Temperature	: 50°C
Injection volume	: 1 µL
Observed analysis column pressure	: 14 MPa

Peaks
1 : Yohimbine, $[M+H]^+$ m/z 355
2 : Alprenolol, $[M+H]^+$ m/z 250
3 : Tetracaine, $[M+H]^+$ m/z 265
4 : Chloramphenicol, $[M-H]^-$ m/z 321
5 : Furosemide, $[M-H]^-$ m/z 329
6 : Isopropylantipyrine, $[M+H]^+$ m/z 231

<Analysis of Opioid Antagonist and Its Metabolites>





Detection	: LCMS-IT-TOF
Column	: Shim-pack XR-ODS (30 mmL. x 2.0 mmI.D.)
Mobile phase	: A) 0.1 % Formic Acid Aqueous solution B) 0.1 % Formic Acid Methanol solution B.Conc.: 4 % (0 min.) → 100 % (0.5 min.) → 4 % (0.51-2 min.)
Flow rate	: 0.5 mL/min.
Column temp.	: 50°C
Injection volume	: 5 µL
Analytical column pressure (Measured value)	: 17 MPa

Peaks
1: Naloxone
2: Naltrexone
3: 6-Beta-naltrexol
4: Burenorphine

Aiming for Better Separation and Higher Sensitivity

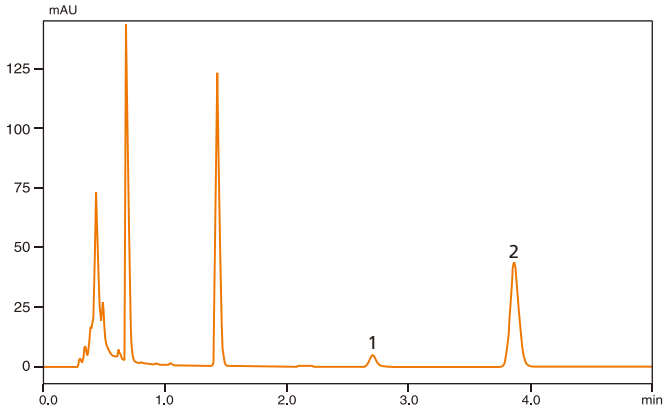
Prominence UFLCXR System

Wouldn't it be great if a system could offer improved separation for peaks that are difficult to separate under current analysis conditions, and with even shorter analysis times?
These sorts of requirements are becoming more common as laboratories, seek speedy action for everyday analysis results.
The Prominence UFLCXR is an ultra-high-speed LC system developed with just such demands in mind.
With a high 60 MPa withstand pressure, the Prominence UFLCXR is compatible with longer columns and a variety of analysis conditions.

Applicable to a wider range of applications

Through the use of a longer column, mobile phase containing methanol, analysis under a slightly lower room temperature and other easy-to-prepare conditions, Prominence UFLCXR provides enhanced resolution. Furthermore, the analytical methods you currently use can easily be transferred to high-speed, high-resolution conditions.

<Analysis of food additives with a mobile phase containing methanol>



High-speed analysis can be performed, even when using mobile phase that contains methanol, by using a Shim-pack XR-ODS Ⅱ column optimized for ultra-high-pressure durability up to 66 MPa on the Prominence UFLCXR. Column pressure would be approximately 43 MPa using a 3 mm inner diameter, 75 mm length column at a 1 mL/min flow rate.

Detection	: UV 250 nm; SPD-20A UFLC
Column	: Shim-pack XR-ODS Ⅱ (75 mmL. x 3 mmI.D.)
Mobile phase	: 40 mmol/L (sodium) acetate buffer pH4.0 / Methanol = 4 / 1 (v/v)
Flow rate	: 1.0 mL/min.
Sample	: Soft drink
Temperature	: 40°C
Injection vol.	: 4 µL

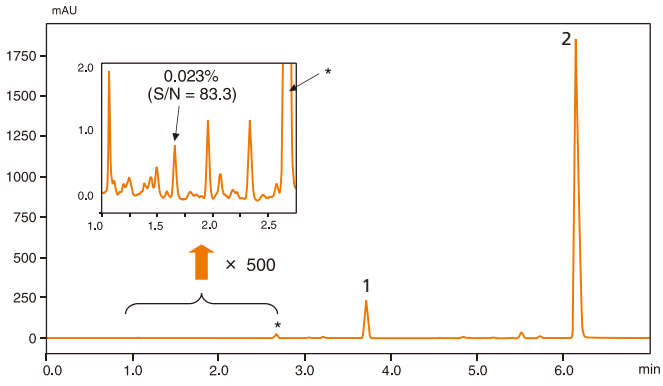
Peakes
1. Aspartame
2. Benzoic acid

For higher resolution and higher sensitivity

The balance between an appropriately small particle-sized column media and the length of a column is an important factor to improving column performance. For true high-resolution analysis, a number of conditions must be met. These include finding a balance between increased column pressure and a smaller particle size; developing a system durable enough to handle the pressure; using a detector with high sensitivity and a wide dynamic range; and optimizing the flow path for minimal diffusion.

Prominence UFLCXR provides high-pressure endurance by utilizing the technological advancements and knowledge developed during the ongoing refinement of the Prominence series. Our aim has been to make high-speed analysis compatible with high resolution, not simply to perform high-speed analysis with a smaller particle-sized column. The Prominence UFLCXR achieves this goal.

<Evaluation of minute impurities in cefazolin>



A larger theoretical plate number is achieved with a 150 mm length Shim-pack XR-ODS Ⅱ column than with a commonly used 250 mm length, 5 m particle column. In addition, very minute peaks of minor impurities can be clearly separated and detected without missing peaks due to the wide dynamic range of the SPD-20A UV detector, as shown in the figure to the left.

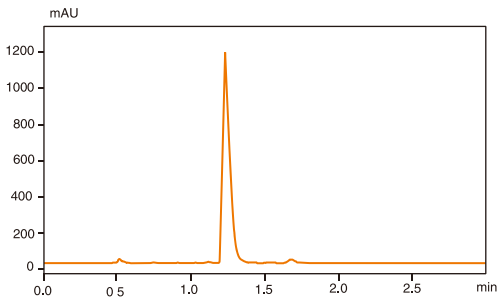
Detection : UV 245 nm; SPD-20A UFLC
Column : Shim-pack XR-ODS Ⅱ (150 mmL. x 3 mmI.D.)
Mobile phase : A) 20 mmol/L (Sodium) phosphate buffer pH2.5
B) Acetonitrile
B.Conc. 15% (0 min.)→30% (4 min.)→50% (9 min.)
Flow rate : 0.9 mL/min.
Temperature : 40°C
Injection vol. : 4 µL

Peaks
1. 5-Methyl-1,3,4-thiazole-2-thiol (major impurity)
2. Cefazolin (main peak)

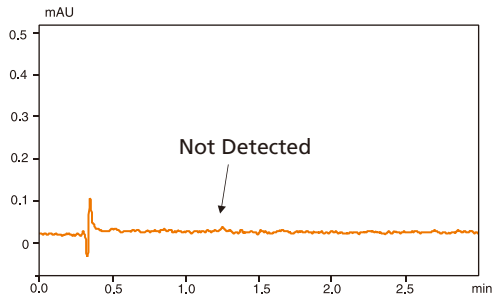
Outstanding basic performance supports highly precise analysis

Excellent reproducibility and minimal carryover, two fundamental performance features of an HPLC, are the most important factors among the specifications required for an analytical system. Shimadzu has surged ahead of other vendors in wrestling with these two issues through the development of a high-performance solvent delivery pump, an autosampler that delivers high reproducibility from a small injection volume, an injection mechanism for near-zero carryover, and other technological excellence. The Prominence UFLCXR proves this excellence by reconciling high performance and high resolution with sufficient performance for high-sensitivity analysis using both a UV detector and a liquid chromatograph mass spectrometer.

<Evaluation of carryover with a basic compound>



1.2 mg/mL of chlorhexidine chloride, 2 µL injection



Blank analysis just after the chlorhexidine chloride

Two high-pressure resisting models, the SIL-20AXR and SIL-20ACXR, have joined the SIL-20A(C) family of proven autosamplers.
As before, no carryover is detected, even with chlorhexidine, a typically adsorptive compound. Additionally, less than 0.3%RSD of injection reproducibility was achieved at a very low injection volume. The SIL-20A(C)XR autosampler truly combines outstanding hardware performance with high-pressure endurance.

Evaluation of reproducibility

Injection volume	Peak area	
	Average	%RSD
1 L	37596	0.148
2 L	75249	0.097
5 L	188382	0.026
10 L	375846	0.021

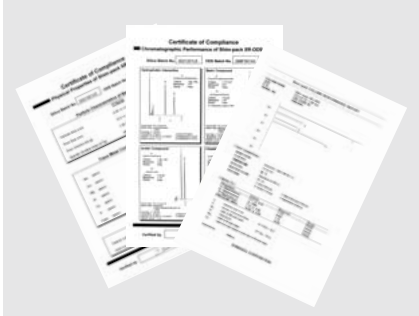
20mg/L of caffeine, n=6

Ultra-High-Speed, High-Separation Analysis Column

Quality certificates ensure column production uniformity for more confident method development

Three quality certificates are provided with the Shim-pack XR-ODS. They attest to excellent column production uniformity, thanks to quality controls based on the standard values described in these certificates.

- Certifies each batch with respect to the physical properties of the packing material
- Certifies each batch with respect to the retention and separation properties of the packing material
- Certifies the condition of the packing material for each column



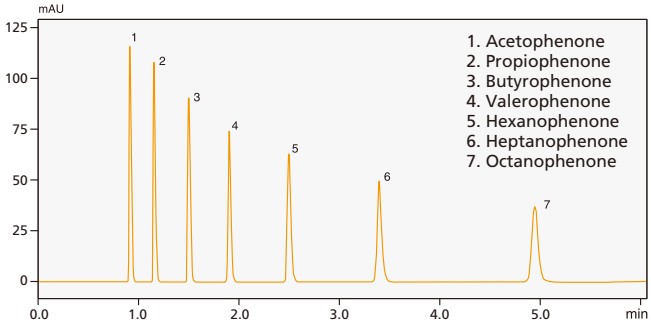
Shim-pack XR-ODS Column Quality Certificates

XR-ODS Ⅱ: The solution for your high-resolution application

The Shim-pack XR-ODS Ⅱ joins the XR-ODS family of columns, which includes the Shim-pack XR-ODS series that is focused on high-speed analysis under regular column pressure conditions, in order to accomplish high-speed and high-resolution analysis under a wide array of analytical conditions, including higher-resolution requirements with a longer column or using mobile phase containing methanol.

Shim-pack XR-ODS Ⅱ is the most suitable column choice for the Prominence UFLCXR system since it can be used in conditions up to 60 MPa column pressure. As with the Shim-pack XR-ODS series, Shimadzu strictly controls the quality of each column based on criteria specified on the certificate of compliance that comes with each column. This guarantees manufacturing uniformity.

<Analysis of 7 alkylphenones with a 150 mm column>
Greater column performance than with a 250 mm (5 µm) column
Theoretical plate number exceeds 28,000 (Octannophenone)



Detection : UV 245 nm; SPD-20A UFLC
Column : Shim-pack XR-ODS Ⅱ (150 mmL. x 3 mmI.D.)
Mobile phase : Water / Acetonitrile = 3/7 (v/v)
Flow rate : 1.3 mL/min.
Temperature : 40°C
Injection vol. : 4 µL

Shim-pack XR-ODS Ⅱ

Shim-Pack XR-ODS/XR-ODS Ⅱ Product Lineup

Shim-pack XR-ODS

Size	30 mm	50 mm	75 mm	100 mm
2.0 mmI.D.	228-41605-91	228-41605-92	228-41605-93	228-41605-94
3.0 mmI.D.	228-41606-91	228-41606-92	228-41606-93	228-41606-94
4.6 mmI.D.	228-41607-91	228-41607-92	228-41607-93	228-41607-94

Shim-pack XR-ODS Ⅱ

Size	30 mm	50 mm	75 mm	100 mm	150 mm
1.5 mmI.D.	228-59907-91	228-59907-92	228-59907-93	228-59907-94	228-59907-95
2.0 mmI.D.	—	228-41623-94	228-41623-91	228-41623-92	228-41623-93
3.0 mmI.D.	—	—	228-41624-91	228-41624-92	228-41624-93

Shim-pack XR-ODS/XR-ODS Ⅱ Specifications

	Shim-pack XR-ODS	Shim-pack XR-ODS Ⅱ
Particle size	2.2 µm	
Surfacce modification	Octadecyl group (monofunctional)	
Surfacce treatment	Endcapping	
Pore size	12nm(120A)	8nm(80A)
Maximum pressure	30MPa	60MPa
pH range	pH2.0 — pH7.5	
Maximum temperature	80°C Using mixture of water/acetonitrile or mixture of acetonitrile/acid-water pH 3.0 min.	

Specifications

CBM-20A/20Alite System Controllers

	CBM-20A (228-45012-xx)	CBM-20Alite (228-45011-38)
Connectable units	Solvent delivery units: 4 max, Autosampler: 1, Column oven: 1, Detectors: 2 max, Fraction collector: 1 Sub-controllers: 2 max	Solvent delivery units: 4 max, Autosampler: 1, Column oven: 1, Detectors: 2 max
Number of connectable units	8 (expansion possible up to 12)	5 (including the unit incorporating the system controller)
Data buffering	Approx. 24 hours for an analysis (at 500 ms sampling rate; available only with LCsolution)	
Event I/O	4 inputs, 4 outputs	2 inputs, 2 outputs
Analog board	Up to 2 boards can be mounted.	Mounting not supported.
Operating temperature range	4°C to 35°C	
Dimensions, weight	W260 x D420 x H140 mm, 5.5 kg	W120 x D100 x H20 mm, 0.5 kg
Power requirements	AC 110 V, 230V, 100 VA, 50/60 Hz	Supplied from the unit

LC-20AD / 20AB Solvent Delivery Units

	LC-20AD (228-45000-xx)	LC-20AB (228-45002-xx)
Solvent delivery method	Parallel-type double plunger	Parallel-type double plunger (2 sets)
Plunger capacity	10 µL	
Maximum discharge pressure	40 MPa	
Flow-rate setting range	0.0001 to 10.0000 mL/min	
Flow-rate accuracy	No more than 1% or 2% µL/min, whichever greater (0.01 mL/min to 2 mL/min)	
Flow-rate precision	No more than 0.06% RSD or 0.02min SD, whichever is greater	
Typical pulsation	0.03 MPa (for water at 1.0 mL/min and 7 MPa)	
Gradient type	High-pressure mixing / Low-pressure mixing	
Gradient mixing accuracy	0.1% RSD max.	
Constant-pressure solvent delivery	Supported	
Plunger rinsing mechanism	Manual rinsing or automatic rinsing using optional product	
Safety measures	Liquid-leakage sensor, high-pressure/low-pressure limits	
Operating temperature range	4°C to 35°C	
Dimensions, weight	W260 x D420 x H140 mm, 10 kg	W260 x D420 x H140 mm, 13 kg
Power requirements	AC 110V, 230V, 150 VA, 50/60 Hz	AC 110V, 230V, 180 VA, 50/60 Hz

LC-20ADXR Solvent Delivery Unit

	LC-20ADXR (228-45137-xx)
Solvent delivery methods	Parallel-type double plunger
Plunger capacity	10 µL
Flow-rate setting range	0.0001 - 3.0000 mL/min (to 66 MPa) 3.0001 - 5.0000 mL/min (to 44 MPa)
Flow-rate accuracy	No more than 1% or 2 µL/min, whichever is greater (0.01 to 3 mL/min) *1 No more than 2% or 2 µL/min, whichever is greater (0.01 to 3 mL/min) *2 *1 (1.0 to 40 MPa, water, at constant room temperature from 20 to 30°C) *2 (40 to 60 MPa, water, at constant room temperature from 20 to 30°C)
Flow-rate precision	No more than 0.06% RSD or 0.02 min SD, whichever is greater
Typical pulsation	0.05 MPa max. (for water at 1.0 mL/min with 7 MPa)
Gradient type	High-pressure mixing
Gradient mixing accuracy	0.1% RSD max.
Constant-pressure solvent delivery	Supported
Plunger rinsing mechanism	Equipped with an automatic rinsing kit
Safety measures	Liquid-leakage sensor, high-pressure/low-pressure limits
Operating temperature range	4°C to 35°C
Dimensions, weight	W260 x D420 x H140 mm, 10 kg
Power requirements	AC 110 V, 230 V, 150 VA, 50/60 Hz

For gradient operation, use a gradient mixer with high-pressure specification such as the mixer 100 µL HP (228-35830-93)

DGU-20A3R Degassing Unit

	DGU-20A3 (228-45018-XX)
Number of degassed solvents	3
Degassed flow-line capacity	400 µL
Operating temperature range	4°C to 35°C
Dimensions, weight	W260 x D420 x H70 mm, 3.9 kg
Power requirements	Supplied from LC-20AD/LC-20AB/LC-20ADXR

Specifications

SIL-20AHT / 20ACHT UFLC version Autosamplers

	SIL-20AHT UFLC version (228-45132-xx)	SIL-20ACHT UFLC version (228-45133-xx)
Injection method	Total-volume sample injection, variable injection volume	
Maximum operating pressure	35MPa	
Injection-volume setting range	0.1 to 100 µL	
Number of processed samples	175 (1 mL vials) 105 (1.5 mL vials) 50 (4 mL vials) 192 (two 96-well MTP/DWP) 768 (two 384-well MTP/DWP) Also, ten 1.5 mL vials in addition to each of the above.	175 (1 mL vials) 70 (1.5 mL vials) 50 (4 mL vials) 192 (two 96-well MTP/DWP) 768 (two 384-well MTP/DWP) Also, ten 1.5 mL vials in addition to each of the above.
Injection-volume accuracy	1% max.	
Injection-volume precision	RSD : 0.3% max. (specified conditions), (typically 0.2% RSD max.)	
Cross-contamination	0.005% max. (naphthalene, chlorhexidine, typically 0.003% max.)	
Number of repeated injections	30 max. per sample	
Needle rinsing	Set freely before and after sample injection.	
Sample cooler	None	Block cooling/heating, used together with dehumidifying function, 4°C to 40°C
Operating pH range	pH1 to pH14	
Operating temperature range	4°C to 35°C	
Dimensions, weight	W260 x D500 x H415 mm, 27 kg	W260 x D500 x H415 mm, 30 kg
Power requirements	AC 110V, 230V, 100VA, 50/60 Hz	AC 110V, 230V, 300VA, 50/60 Hz

SIL-20AXR / 20ACXR Autosamplers

	SIL-20AXR (228-45135-xx)	SIL-20ACXR (228-45136-xx)
Injection method	Total-volume sample injection, variable injection volume	
Maximum operating pressure	66 MPa max.	
Injection-volume setting range	0.1 to 50 µL (standard), 0.1 to 100 µL (option)	
Number of processed samples	175 (1mL vials) 105 (1.5 mL vials) 50 (4 mL vials) 192 (two 96-well MTPs/DWPs) 768 (two 384-well MTPs/DWPs) Also, ten 1.5 mL vials in addition to each of the above.	175 (1mL vials) 70 (1.5 mL vials) 50 (4 mL vials) 192 (two 96-well MTPs/DWPs) 768 (two 384-well MTPs/DWPs) Also, ten 1.5 mL vials in addition to each of the above.
Injection-volume accuracy	1% max.	
Injection-volume precision	RSD : 0.3% max. (specified conditions), (typically 0.2% RSD max.)	
Cross-contamination	0.005% or less (under specified analytical conditions, typical value 0.0035% or less without needle rinsing)	
Number of repeated injections	30 max. per sample	
Needle rinsing	Set freely before and after sample injection	
Sample cooler	None	Block cooling/heating, used together with dehumidifying function, 4°C to 40°C
Operating pH range	pH 1 to pH 14	
Operating temperature range	4°C to 35°C	
Dimensions, weight	W260 x D500 x H415 mm, 27 kg	W260 x D500 x H415 mm, 30 kg
Power requirements	AC 110 V, 230 V, 100 VA, 50/60 Hz	AC 110 V, 230 V, 300 VA, 50/60 Hz

Rack Changer

	Rack Changer Ⅱ (228-45164-xx)
Compatible plates	96-well MTP, 96-well DWP, 384-well MTP, 384-well DWP, 1.5mL vial plate (54vials)
Number of processed plates	12
Sample cooler	Block cooling/heating, used together with dehumidifying function, 4°C to 40°C
Operating temperature range	4°C to 35°C
Dimensions, weight	W420 x D500 x H415 mm, 32 kg
Power requirements	AC 110V, 230V, 350 VA, 50/60 Hz

CTO-20A/20AC Column Ovens

	CTO-20A (228-45009-xx)	CTO-20AC (228-45010-xx)
Temperature control method	Forced-air circulation	
Cooling method	None	Electronic cooling
Temperature setting range	4°C to 85°C	
Temperature control precision	0.1°C max. (Typical value 0.04°C max.)	
Temperature control range	10°C above room temperature to 85°C	10°C below room temperature to 85°C
Storage capacity	W220 x D95 x H365 mm	
Accommodatable devices	Manual Injectors (2), Gradient Mixer, High-Pressure Flow Switching Valves (2), etc.	
Time program	Linear temperature programs supported	
Safety measures	Solvent sensor, temperature fuse, temperature upper limit	
Operating temperature range	4°C to 35°C	
Dimensions, weight	W260 x D420 x H415 mm, 20 kg	W260 x D420 x H415 mm, 23 kg
Power requirements	AC 110 V, 230 V, 500 VA, 50/60 Hz	

SPD-20A UFLC UV-VIS Detector

	SPD-20A UFLC version (228-45130-xx)
Light source	Deuterium (D2) lamp
Wavelength range	190 to 700 nm
Bandwidth, slit width	8 nm
Wavelength accuracy	± 1 nm max.
Wavelength precision	± 0.1 nm max.
Noise	1.2 x 10^{-5} AU (with standard semi-micro cell, under specified conditions) < 0.5 x 10^{-5} AU (with conventional cell, under specified conditions) >*1
Drift	2 x 10^{-4} AU/h (with standard semi-micro cell, under specified conditions) <1 x 10^{-4} AU/h (with conventional cell, under specified conditions)>*1
Linearity	2.5 AU (with standard semi-micro cell, ASTM)
Functions	Dual-wavelength detection, ratio-chromatogram output, wavelength scanning
Cell	Standard semi-micro cell: Optical path length: 5 mm, Capacity: 2.5 µL, Withstand pressure: 12 MPa <Conventional cell: Optical path length: 10 mm, Capacity: 12 µL, Withstand pressure: 12 Mpa>*1
Cell temperature range	5°C above room temperature to 50°C
Operating temperature range	4°C to 35°C
Dimensions, weight	W260 x D420 x H140 mm, 13 kg
Power requirements	AC 110 V, 230 V, 150 AV, 50/60Hz

*1: Conventional cell is optional

LCMS-2020 MS Detector

		LCMS-2020 (225-13300-XX)
Unit	Mass range	m/z 10 to 2000
	Sensitivity	ESI positive ion 1pg Reserpine S/N ≧150 (RSM)
	Resolution	R=2M
	LC-compatible flow rates	ESI 0.001 to 2 mL/min
	Scan speed	15,000 u/sec max.
	Positive-negative ion switching time	15 msec
Software	Workstation	LCMSsolution Ver. 5 for LCMS-2020
	OS	Windows XP Professional, Windows Vista Business
	Controllable instruments	HPLC (Shimadzu Prominence series), LCMS-2020 main body and interfaces
	Multi Sequence mode function	Scan/SIM/Profile/Positive ion/Negative ion/CID switching in max. 64 methods and Simultaneous data acquisition are possible.
	Autotuning	Optimization for sensitivity and resolution in both positive and negative ionization modes
Installation Conditions	Temperature	18°C to 28°C
	Humidity	40% to 70% (no condensation)
	Dimensions	W350 x D726 x H553 mm
	Weight	77.5 kg (MS)
	Power requirements	MS unit: AC 200V,10A, 50/60Hz
	Gas	Nitrogen gas: consumption rate 21.5 L/minute max.

LCMS-IT-TOF MS Detector

		LCMS-IT-TOF (225-07100-XX)
Unit	Mass range MS	m/z 10 to m/z 2000
	Sensitivity MS^n	m/z 50 - 3000
	Resolution	R > 10,000 at m/z 1,000 (FWHM)
	Precursor resolution	R > 1,000 at m/z 1,000
	Positive ion sensitivity	5 pg reserpine MS/MS m/z 609→471 S/N ≧50 (N:0 - peak)
	Negative ion sensitivity	20pg p -nitrophenol MS m/z S/N ≧20 (N:0 - peak)
	Mass Accuracy	20ppm at m/z 1,000 5ppm at m/z 1,000 Internal Standard Method
	LC-compatible flow rates	ESI 0.001 to 1 mL/min
Software	Workstation	LCMSsolution Ver. 5 for LCMS-IT-TOF
	OS	Windows XP Professional
	Controllable instruments	HPLC (Shimadzu Prominence series), LCMS-IT-TOF main body and interfaces
	Measurement mode	MS and MS^n, n: Max. 10, Manual/Auto MS^n measurement
	Tuning	Automated or manual tuning
Installation Conditions	Temperature	18°C to 28°C
	Humidity	40% to 70% (no condensation)
	Dimensions	W1685 x D685 x H570 mm
	Weight	280 kg (MS)
	Power requirements	MS unit: AC 200V,10A, 50/60Hz
	Gas	Nitrogen gas: consumption rate 21.5 µL/minute max. Argon gas: consumption rate 5 µmL/minute max.

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