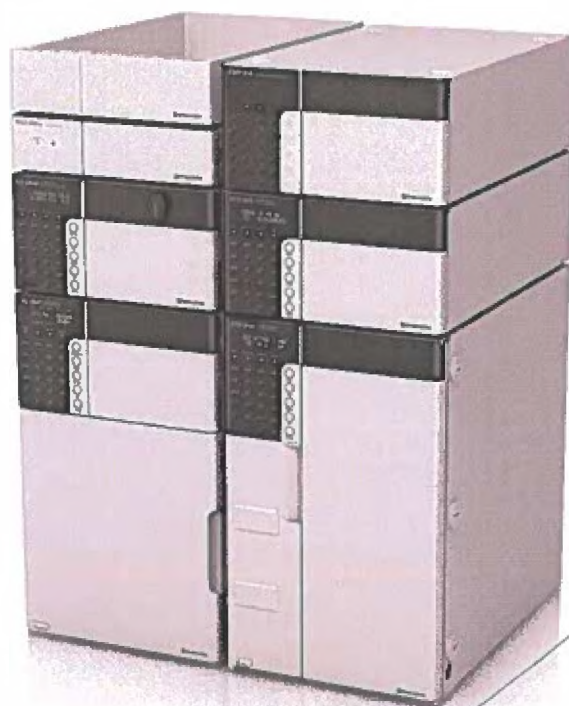


High-Performance Liquid Chromatograph

# Prominence Specifications



# Specifications

## Solvent Delivery Units LC-20AD / 20AT / 20AB



	LC-20AD (228-45000-XX)	LC-20AT (228-45001-XX)	LC-20AB (228-45002-XX)
Solvent delivery method	Parallel-type double plunger		
Plunger capacity	10 $\mu$ L	Primary side: 47 $\mu$ L Secondary side: 23 $\mu$ L	10 $\mu$ L
Maximum discharge pressure	40 MPa		
Flow rate setting range	0.0001 to 10.0000 mL/min	0.001 to 10.000 mL/min	0.0001 to 10.0000 mL/min
Flow rate accuracy	No more than $\pm 1\%$ or $\pm 2 \mu$ L/min, whichever is greater (0.01 to 2 mL/min)	No more than $\pm 2\%$ or $\pm 2 \mu$ L/min, whichever is greater (0.01 to 5 mL/min)	No more than $\pm 1\%$ or $\pm 2 \mu$ L/min, whichever is greater (0.01 to 2 mL/min)
Flow rate precision	No more than 0.06% RSD or 0.02 min SD, whichever is greater		
Gradient type	High-pressure mixing/low pressure mixing		High-pressure mixing
Mixing-concentration precision	0.1% RSD max.		
Constant-pressure solvent delivery	Supported		Not 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 to 35°C		
Dimensions, weight	W260 x D420 x H140 mm, 10 kg	W260 x D420 x H140 mm, 11 kg	W260 x D420 x H140 mm, 13 kg
Power requirements	AC 110 V, 230 V, 150 VA, 50/60 Hz		AC 110 V, 230 V, 180 VA, 50/60 Hz

## Inert Solvent Delivery Unit LC-20Ai



	LC-20Ai (228-45293-XX)
Solvent delivery method	Serial-type double plunger
Plunger capacity	Primary side: 48 $\mu$ L Secondary side: 24 $\mu$ L
Maximum discharge pressure	Water: 30 MPa (0.001 to 5.000 mL/min), 22 MPa (5.001 to 10.000 mL/min) Organic solvent: 22 MPa (0.001 to 10.000 mL/min)
Flow rate setting range	0.001 to 10.000 mL/min
Flow rate accuracy	No more than $\pm 2\%$ or $\pm 2 \mu$ L/min, whichever greater (0.1 to 5 mL/min, 1.0 to 20 MPa, Water)
Flow rate precision	No more than 0.06% RSD or 0.02 min SD, whichever greater
Gradient type	High-pressure mixing
Constant-pressure solvent delivery	Supported
Plunger rinsing mechanism	Manual rinsing or automatic rinsing using optional product
Safety measures	Liquid leakage sensor, high-pressure limits, shield plate
Operating temperature range	4 to 35°C
Dimensions, weight	W260 x D420 x H140 mm, 11 kg
Power requirements	AC 100 V, 150 VA, 50/60 Hz

## Preparative Solvent Delivery Units LC-20AR / 20AP



LC-20AR



LC-20AP

	LC-20AR (228-45275-XX)	LC-20AP (228-45150-XX)
Solvent delivery method	Parallel-type double plunger	
Plunger capacity	47 $\mu$ L	250 $\mu$ L
Maximum discharge pressure	49 MPa	42 MPa
Flow rate setting range	0.001 to 20.00 mL/min	0.01 to 100.00 mL/min (to 42 MPa) 100.01 to 150.00 mL/min (to 30 MPa) 0.01 to 50.00 mL/min (low-gradient unit)
Flow rate accuracy	No more than $\pm 1\%$ or $\pm 10 \mu$ L, whichever is greater (0.1 to 5.0 mL/min)	$\pm 1\%$ (1 mL/min, 10 MPa)
Flow rate precision	No more than 0.08 %RSD or 0.02 min SD, whichever is greater	No more than 0.1 %RSD or 0.02 min SD, whichever is greater
Gradient type	High-pressure mixing	High-pressure mixing / low-pressure mixing
Constant-pressure solvent delivery	Supported	
Plunger rinsing mechanism	Using syringe or rinsing pump (228-39625-41)	
Safety measures	Liquid leakage sensor, high-pressure / low-pressure limits	
Operating temperature range	4 to 35°C	
Dimensions, weight	W260 x D500 x H140 mm, 16 kg	W260 x D500 x H210 mm, 19 kg
Power requirements	AC 110 V, 230 V, 150 VA, 50/60 Hz	AC 110 V, 230 V, 400 VA, 50/60 Hz

## Degassing Units DGU-20A3R / 20A5R



	DGU-20A3R (228-45018-XX)	DGU-20A5R (228-45019-XX)
Number of degassed solvents	3	5
Degassed flow-line capacity	400 µL	
Operating temperature range	4 to 35°C	
Dimensions, weight	W260 × D421 × H72 mm, 3.9 kg	W260 × D421 × H72 mm, 4 kg
Power requirements	Supplied from LC 20AD / 20AT / 20AB / 20AR / 20AP	

## Versatile Autosamplers SIL-10AF / 10AP Bio-inert Autosampler SIL-10Ai



	SIL-10AF (228-45056-XX)	SIL-10AP (228-45057-XX)	SIL-10Ai (228-45075-XX)
Injection method	Loop injection, variable injection volume		
Injection-volume setting range	1 to 50 µL (standard) 1 to 400 µL (option) 1 to 2,000 µL (option) 1 to 5,000 µL (option)	1 to 5,000 µL (standard) 1 to 400 µL (option) 1 to 2,000 µL (option)	1 to 50 µL (standard) 1 to 250 µL (option)
Number of samples processed	100 with 1.5 mL vials (60 with optional cooler) 80 with 4 mL vials (50 with optional cooler) 25 with 13 mL vials (not applicable to SIL-10Ai) 192 with two 96-well microtiter plates		
Injection-volume accuracy	Not specified		
Injection-volume precision	RSD 0.5% max. (10 µL injection, standard mode)	RSD 1% max. (10 µL injection)	RSD 0.5% max. (10 µL injection, standard mode)
Sample carryover	Not specified		
Number of repeated injections	30 max. per sample		
Needle rinsing	Set freely before and after sample injection		
Sample cooler	Optional Sample Cooler S (228-45063-XX) or L (228-45064-XX)		Block-heating/cooling method 4 to 70°C
Operating pH range	pH 1 to pH 10		
Operating temperature range	4 to 35°C		
Dimensions, weight	Main unit: W260 × D420 × H280 mm, 19 kg		Syringe unit: W100 × D150 × H280 mm, 4 kg
Power requirements	AC 110 V, 230 V, 100 VA, 50/60 Hz		

\* SIL-10AF / 10AP / 10Ai can not control from CBM-20Alite.

## Autosamplers SIL-20A / 20AC / 20AHT / 20ACHT



	SIL-20A (228-45006-XX)	SIL-20AHT (228-45119-XX)	SIL-20AC (228-45007-XX)	SIL-20ACHT (228-45120-XX)
Injection method	Total-volume sample injection, variable injection volume			
Maximum operating pressure	20 MPa	35 MPa	20 MPa	35 MPa
Injection-volume setting range	0.1 to 100 µL (standard), 0.1 to 2,000 µL (option)			
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 (specified conditions)			
Injection-volume precision	RSD 0.3% max. (specified conditions, typically 0.2% RSD max)			
Sample Carryover	0.005% max. (specified conditions, typically 0.0025% 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 to 40°C	
Operating pH range	pH 1 to pH 14			
Operating temperature range	4 to 35°C			
Dimensions, weight	W260 × D500 × H415 mm, 27 kg		W260 × D500 × 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	

\* Prominence UFLC system uses SIL-20AHT UFLC version (228-45132-XX) or SIL-20ACHT UFLC version (228-45133-XX), which has outlet piping optimized for UFLC in standard SIL-20A or SIL-20AC.

Prominence Specifications

## Rack Changer II



Rack Changer II (228-45164-XX)	
Compatible plates	96-well MTP, 96-well DWP, 384-well MTP, 384-well DWP, 1.5 mL vial plate (54 vials)
Number of processed plates	12
Sample cooler	Block cooling/heating, used together with dehumidifying function, 4 to 40°C
Operating temperature range	4 to 35°C
Dimensions, weight	W425 x D500 x H415 mm, 32 kg
Power requirements	AC 110 V, 230 V, 350 VA, 50/60 Hz

## System Controllers CBM-20A / 20Alite



CBM-20A

	CBM-20A (228-45012-XX)	CBM-20Alite (228-45011-3B)
Connectable units	Solvent delivery units: 4 max., Autosamplers: 1, Column ovens: 1, Detectors: 2 max., Fraction collectors: 1, Sub-controllers: 2 max.	Solvent delivery units: 4 max., Autosamplers (SIL-10AF/10AP/10A): 1, Column ovens: 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 one analysis (at 500-ms sampling rate, available only with LCsolution)	
Event I/O	4 inputs, 4 outputs	2 inputs, 2 outputs
Analog boards	Up to 2 boards can be mounted	Mounting not supported.
Operating temperature range	4 to 35°C	
Dimensions, weight	W260 x D470 x H140 mm, 5.5 kg	W120 x D100 x H20 mm, 0.5 kg
Power requirements	AC 110 V, 230 V, 100 VA, 50/60 Hz	Supplied from unit

## Column Oven CTO-30A



CTO-30A (228-45160-XX)	
Type	Block heating system
Temperature setting range	4 to 150°C in 1°C steps
Temperature control precision	± 0.05°C (room temperature 25°C)
Temperature control range	5°C above room temperature to 150°C
Column size and capacity	150 mL ≈ 4.6 mm I.D. column × 2
Devices that can be accommodated	Gradient Mixer, High-Pressure Flow Switching Valves (2), Post Column Cooler etc
Functions	Linear temperature programs supported
Safety measures	Solvent sensor, liquid-leakage sensor, temperature fuse, temperature upper limit
Operating temperature range	4 to 35°C
Dimensions, weight	W260 x D500 x H210 mm, 10 kg
Power requirements	AC 110 V, 230 V, 300 VA, 50/60 Hz

## Column Ovens CTO-20A / 20AC



	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 to 85°C	
Temperature control precision	0.1°C max. (typically 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	
Storable devices	2 manual injectors, gradient mixer, 2 high-pressure flow line selection valves, etc	
Time program	Linear temperature programs supported	
Safety measures	Solvent sensor, temperature fuse, temperature upper limit	
Operating temperature range	4 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, 600 VA, 50/60 Hz	

## Column Oven CTO-10ASvp



	CTO-10ASvp (228-45059-XX)
Type	Block heating
Cooling method	Electronic cooling
Temperature setting range	4 to 80°C
Temperature control precision	±0.1°C
Temperature control range	-15 to 60°C, room temperature
Applicable columns	25 cm (2 columns max.)
Function	Change of temperature setting
Safety features	Leak sensor, temperature fuse, temperature upper limit
Dimensions, weight	W130 × D420 × H415 mm, 12 kg
Power requirements	AC 110 V, 230 V, 120 VA, 50/60 Hz

## Photodiode Array Detector SPD-M30A



	SPD-M30A (228-45186-XX)
Light source	Deuterium (D <sub>2</sub> ) lamp
Number of diode elements	1024
Wavelength range	190 to 700 nm
Slit width	1 nm, 8 nm
Wavelength accuracy	± 1 nm
Noise	0.4 × 10 <sup>-3</sup> AU (under specified conditions)
Drift	0.5 × 10 <sup>-3</sup> AU/h (under specified conditions)
Linearity	2.0 AU (ASTM standard)
Cell	Standard cell: Optical path length: 10 mm, Capacity: 1 µL, Pressure: 8 MPa Optional high sensitivity cell: Optical path length: 85 mm, Capacity: 9 µL, Pressure: 8 MPa
Functions	Contour output, spectrum library, MAX plotting
Safety measures	Liquid leakage sensor
Operating temperature range	4 to 35°C
Dimensions, weight	W260 × D500 × H140 mm, 12 kg
Power requirements	AC 110 V, 230 V, 150 VA, 50/60 Hz

## UV-VIS Detectors SPD-20A / 20AV Photodiode Array Detector SPD-M20A



SPD-20A



SPD-M20A

	SPD-20A (228-45003-XX)	SPD-20AV (228-45004-XX)	SPD-M20A (228-45005-XX)
Light source	Deuterium (D <sub>2</sub> ) lamp	Deuterium (D <sub>2</sub> ) lamp	tungsten (W) lamp
Number of diode elements	None	None	512
Wavelength range	190 to 700 nm	190 to 900 nm	190 to 800 nm
Bandwidth, slit width	8 nm		1.2 nm (high-resolution mode), 8 nm (high-sensitivity mode)
Wavelength accuracy	± 1 nm max		
Wavelength precision	± 0.1 nm max		
Noise	0.5 × 10 <sup>-3</sup> AU (under specified conditions)		0.6 × 10 <sup>-3</sup> AU (under specified conditions)
Drift	1 × 10 <sup>-3</sup> AU/h (under specified conditions)		5 × 10 <sup>-3</sup> AU/h (under specified conditions)
Linearity	2.5 AU (ASTM standard)		
Functions	Dual-wavelength detection in the range 190 to 370 nm and upwards of 371 nm, ratio chromatogram output, wavelength scanning		Contour output, spectrum library, MAX plotting
Cell	Optical wavelength: 10 mm, Capacity: 12 µL, Pressure: 12 MPa		Optical wavelength: 10 mm, Capacity: 10 µL, Pressure: 12 MPa
Cell temperature control range	5°C above room temperature to 50°C		
Web control			Parameter setting, log management, management of consumable parts, etc.
Buffer memory	Refer to the information on the CBM-20A/20A Lite		
Operating temperature range	4 to 35°C		
Dimensions, weight	W260 × D420 × H140 mm, 13 kg		W260 × D420 × H140 mm, 12 kg
Power requirements	AC 110 V, 230 V, 160 VA, 50/60 Hz		AC 110 V, 230 V, 150 VA, 50/60 Hz

\* Prominence UFLC and Prominence UFLC<sub>XR</sub> system use SPD-20A UFLC version (228-45130-XX) which has a semi-micro temperature-controlled flow cell installed for optimization of fast analysis. (Standard type temperature-controlled flow cell is optional for SPD-20A UFLC version.)

## Conductivity Detector CDD-10Avp



	CDD-10Avp (228-45054-XX)
Temperature coefficient	25 nS cm <sup>-1</sup> /°C (background 285 μS cm <sup>-1</sup> , cell temperature: 43°C)
Cell volume	0.25 μL
Cell constant	25 μS cm <sup>-1</sup>
Material used in parts making contact with liquid	PEEK, SUS316
Maximum operating pressure	2.9 MPa (30 kgf/cm <sup>2</sup> )
Response	0.05 to 10 sec., 10 steps
Zero adjustment	Autozero, baseline shift
Operating temperature range	4 to 35°C
Dimensions, weight	W260 × D470 × H140 mm, 6.0 kg
Power requirements	AC 110 VA, 230 V, 250 VA, 50/60 Hz

## Fluorescence Detectors RF-20A / 20Axs



	RF-20A (228-45147-XX)	RF-20Axs (228-45148-XX)
Light source	Xenon lamp	Xenon lamp, low-pressure mercury lamp (to check wavelength accuracy)
Wavelength range	0, 200 to 650 nm	0, 200 to 750 nm
Spectral bandwidth	20 nm	
Wavelength accuracy	± 2 nm	
Wavelength reproducibility	± 0.2 nm	
S/N	Water Raman peak S/N 1200 min	Water Raman peak S/N 2000 min
Cell (capacity, pressure resistance, material)	12 μL, 2 MPa (approx. 20 kgf/cm <sup>2</sup> ); SUS316L, PTFE (fluororesin), quartz	
Cell Temperature input range	4 to 40°C, 1°C step	
Cell	(Room temperature - 10°C) to 40°C (2 mL/minute max. flow rate, 85°C max. oven temperature)	
Functions	Any two wavelengths between 200 and 650 nm	Any two wavelengths between 200 and 750 nm
Safety measures	0.5 s per wavelength	
Operational temperature range	4 to 35°C	
Dimension, weight	W260 × D420 × H210 mm, 16 kg	W260 × D420 × H210 mm, 18 kg
Power requirements	AC 110 V, 230 V, 400 VA, 50/60 Hz	

## Refractive Index Detector RID-20A



	RID-20A (228-45104-XX)
Refractive index range	1 to 1.75 RIU
Noise level	2.5 × 10 <sup>-4</sup> RIU max.
Drift	1 × 10 <sup>-4</sup> RIU/h max.
Range	A mode: 0.01 × 10 <sup>-4</sup> to 500 × 10 <sup>-4</sup> RIU, P and L modes: 1 × 10 <sup>-4</sup> to 5,000 × 10 <sup>-4</sup> RIU
Response	0.05 to 10 sec., 10 steps
Polarity switching	Supported
Zero adjustment	Auto zero, optical zero, fine zero
Maximum operating flow rate	20 mL/min (150 mL/min with option)
Temperature control of cell unit	30 to 60°C
Cell volume	9 μL
Cell withstand pressure	2 MPa (cell unit)
Operating temperature range	4 to 35°C
Dimensions, weight	W260 × D420 × H140 mm, 12 kg
Power requirements	AC 110 V, 230 V, 150 VA, 50/60 Hz

## Evaporative Light-Scattering Detector ELSD-LT II



ELSD-LT II (228-45115-XX)	
Nebulizing method	Siphon Splitting
Light source	LED
Detection	Photomultiplier Tube
Temperature setting range	Ambient to 80°C
Nebulizer gas	Nitrogen (N <sub>2</sub> ) or Air <sup>*1</sup>
Gas flow rate, gas pressure	Max. 3.0 L/min, Max. 450 kPa
Mobile phase flow rate	0.2 to 2.5 mL/min
Analog output	0 to 1 V
Operating temperature range	5 to 40°C
Operating humidity range	Max. 80% (5 to 31°C, room temperature) Max. 50% (31 to 40°C, room temperature)
Dimensions, weight	W250 × D550 × H450 mm, 20 kg
Power supply	AC 115 V, 230 V, 150 VA, 50/60 Hz

\*1 Requires gas supply source, such as a gas line, nitrogen generator, or air compressor

Note

- An optional pressure regulator with filter is required to remove microscopic materials in gas.
- When using a nitrogen generator or an air compressor, please be careful that moisture, oil, dust, etc. should not be contained in nitrogen or air.
- Please use it in the room where exhaust equipment is available

## Fraction Collector FRC-10A



FRC-10A (228-45070-XX)	
Drive system	Arm-movement X-Y system
Maximum number of fractions	16 to 144 (depending on the type of rack used)
Collection method	Solenoid valve (fraction-collector head with valve) or direct through nozzle (fraction-collector head)
Maximum flow rate	150 mL/min
Fraction modes	Basic mode (using initial parameters), and Time-Program mode (14 different functions available)
Cooling function	Possible with Sample Cooler L (228-45064-XX)
Ambient temperature range	4 to 35°C
Dimensions, weight	W260 × D470 × H280 mm, 15 kg
Power requirements	AC 110 V, 230 V, 100 VA, 50/60 Hz

## Flow-Line Selection Valves FCV Series



FCV-12AH



FCV-20AH / 20AHs



FCV-14AH



FCV-13AL



FCV-11AL



FCV-15AL



FCV-230AL

\* This image is with 4 port option kit

	FCV-12AH FCV-12AHs	FCV-32AH	FCV-20AHs	FCV-14AH FCV-14AHs	FCV-34AH	FCV-20AHs	FCV-13AL	FCV-11AL FCV-14ALS	FCV-15AL	FCV-230AL
Valve type	2-position valve, 6-port			6-position valve, 7-port			3-way solenoid valves			
Solvent pH usage range	1 to 10	1 to 14	1 to 10	1 to 10	1 to 14	1 to 10	2 to 12	1 to 14		
Maximum pressure	34.3 MPa (12AH) 19.6 MPa (12AHs)	130 MPa	34.3 MPa	34.3 MPa (14AH) 19.6 MPa (14AHs)	100 MPa	34.3 MPa	—			
Dimensions (mm)	W110 × D250 × H110		W110 × D270 × H150	W110 × D250 × H110	W57 × D161 × H44	W110 × D270 × H150	W110 × D250 × H110			
Weight	4.0 kg		5.0 kg	4.0 kg	850 g	5.0 kg	4.0 kg	2.0 kg	4.0 kg	2.7 kg

\* 1 An Option Box VP or a Sub-controller VP is required for control of the FCV-12AH/13AL/14AH. This does not apply to the FCV-12AH/14AH when it is connected to the CTO-20A/20AC. Two FCV-12AH units and a total of two FCV-13AL or FCV-14AH units can be controlled from the SCL-10A<sub>VP</sub>.

\* 2 When using FCV-11AL/14ALS/15AL units for solvent selection, only one of these units can be controlled from the SCL-10A<sub>VP</sub> or a solvent delivery unit. The SCL-10A<sub>VP</sub> and Option Box VP or Sub-controller VP is required to use two of these units simultaneously.



Shimadzu Corporation

[www.shimadzu.com/an/](http://www.shimadzu.com/an/)

**For Research Use Only. Not for use in diagnostic procedures.**

This publication may contain references to products that are not available in your country. Please contact us to check the availability of these products in your country.

Company names, products/service names and logos used in this publication are trademarks and trade names of Shimadzu Corporation, its subsidiaries or its affiliates, whether or not they are used with trademark symbol "TM" or "®".

Third-party trademarks and trade names may be used in this publication to refer to either the entities or their products/services, whether or not they are used with trademark symbol "TM" or "®".

Shimadzu disclaims any proprietary interest in trademarks and trade names other than its own.

Shimadzu does not assume any responsibility or liability for any damage, whether direct or indirect, relating to the use of this publication.

© Shimadzu Corporation, 2017  
Printed in Japan 3655-05602-20ANS

