

Analytical, Preparative Supercritical Fluid Chromatograph and Supercritical Fluid Extraction System

# Nexera UC Nexera UC Prep

Specifications



## System Controller



CBM-40	
Monitor	LabSolutions™, Web monitor
Connectable unit	Solvent delivery unit: max. 4, Autosampler: 1, Column oven: max. 4, Detector: max 2, etc.
Number of connectable units	8 (Using option: 12)
Event input/output	Input: 1, output: 2
Analog board	Up to one channel (option)
Communication	Ethernet
Dimensions, weight	W 260 × D 500 × H 72 mm, 5 kg
Operating temperature range	4 to 35°C
Power supply	100 to 240 V AC, 50 VA, 50/60 Hz

## Solvent Delivery Pumps



LC-40D XR

	LC-40D	LC-40D XR	LC-40D XS	LC-40D X3
Pumping method	Parallel-type double plunger (approx. 10 µL/1 stroke)			
Allowable maximum pressure	44 MPa	70 MPa	105 MPa	130 MPa
Flow rate settings range	0.0001 to 5.0000 mL/min (1.0 to 44 MPa) 5.0001 to 10.0000 mL/min (1.0 to 22 MPa)	0.0001 to 3.0000 mL/min (1.0 to 70 MPa) 3.0001 to 5.0000 mL/min (1.0 to 44 MPa) 5.0001 to 10.0000 mL/min (1.0 to 22 MPa)	0.0001 to 3.0000 mL/min (1.0 to 105 MPa) 3.0001 to 5.0000 mL/min (1.0 to 80 MPa) 5.0001 to 10.0000 mL/min (1.0 to 22 MPa)	0.0001 to 3.0000 mL/min (1.0 to 130 MPa) 3.0001 to 5.0000 mL/min (1.0 to 80 MPa) 5.0001 to 10.0000 mL/min (1.0 to 22 MPa)
Flow rate accuracy	≤ ± 1% or ± 2 µL/min, whichever greater (under specified conditions)		≤ ± 1% (under specified conditions)	
Flow rate precision	≤ 0.06% RSD or 0.02 minSD, whichever greater			
Gradient mode	High-pressure gradient (2 or 3 solvents), Quaternary low-pressure gradient			
Gradient range of set concentrations	0 to 100% (0.1% step)			
Gradient concentration accuracy	± 0.5% (under specified conditions)			
Wetted materials	SUS316L, Hastelloy® C, PEEK, PTFE, Sapphire, Ruby	SUS316L, Hastelloy C, PEEK, PE, Sapphire, Ruby		
Available pH range	1 to 14			
Automatic rinsing kit	Option	Standard equipment		
Degassing unit	1 unit connectable			
Dimensions	W 260 × D 500 × H 140 mm			
Weight	10 kg		12 kg	
Operating temperature range	4 to 35°C			
Power supply	100 to 240 V AC, 150 VA, 50/60 Hz			



LC-20AR



LC-20AP

	LC-20AR	LC-20AP
Pumping method	Parallel-type double plunger	
Plunger capacity	47 µL	250 µL
Flow rate setting range	0.001 to 5 mL/min (1.0 to 50 MPa) 5.001 to 20 mL/min (1.0 to 25 MPa)	0.01 to 100 mL/min (1.0 to 42 MPa) 100.01 to 150 mL/min (1.0 to 30 MPa)
Flow rate accuracy	No more than ±1% or ±10 µL/min, whichever is greater (0.1 to 5.0 mL/min)	No more than ±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
Constant pressure solvent delivery	Supported	
Plunger rinsing mechanism	Syringe or rinsing pump (228-39625-41)	
Dimensions	W 260 × D 500 × H 140 mm	W 260 × D 500 × H 210 mm
Weight	16 kg	19 kg
Operating temperature range	4 to 35°C	
Power supply	100 to 240 V AC, 150 VA, 50/60 Hz	100 to 240 V AC, 400 VA, 50/60 Hz

## Degassing Units



DGU-403

	DGU-403	DGU-405
Number of degassed solvents	3	5
Degassed flow line capacity	400 µL/1 line	
Dimensions, weight	W 260 × D 500 × H 72 mm, 4 kg	
Operating temperature range	4 to 35°C	
Power supply	Supplied from solvent delivery unit	

## Autosamplers



SIL-40C XR

	SIL-40 SIL-40C	SIL-40 XR SIL-40C XR	SIL-40C XS	SIL-40C X3
Injection method	Total-volume Injection (standard, only for HPLC), loop injection (optional)			
Allowable maximum pressure	44 MPa	80 MPa	105 MPa	130 MPa
Injection volume	0.1 to 100 µL	0.1 to 2000 µL (optional)		
Injection volume accuracy	≤ ± 1% (5 µL injection, n = 20)			
Linearity	≥ 0.9999			
Samples for processing	288 (microtiter plate, 96 well × 3 plates), 1152 (microtiter plate, 384 well × 3 plates), 252 (1 mL sample vial, 84 × 3 plates), 162 (1.5 mL sample vial, 54 × 3 plates), 84 (4 mL sample vial, 28 × 3 plates), 36 (10 mL sample vial, 12 × 3 plates), 72 (1.5 mL micro tube, 24 × 3 plates)			
Injection volume reproducibility	RSD ≤ 1.0% (0.5 to 0.9 µL), RSD ≤ 0.5% (1.0 to 1.9 µL), RSD ≤ 0.25% (2.0 to 4.9 µL), RSD ≤ 0.15% (More than 5.0 µL), RSD < 0.5% (typically, 0.5 µL), RSD < 0.25% (typically, 1.0 µL)			
Carryover	≤ 0.0025% (without rinse) ≤ 0.0005% (with rinse, typically) (under specified conditions)	≤ 0.0015% (without rinse) ≤ 0.0003% (with rinse, typically) (under specified conditions)		
Dip rinsing outside the needle and injection port rinsing	Standard equipment			
Pumping rinse outside the needle	Option	Standard equipment		
Internal rinsing (3 dil)	Option			Standard equipment
Sample cooler	SIL-40: None SIL-40C: Standard equipment (Air-circulation temperature control type)	SIL-40 XR: None SIL-40C XR: Standard equipment (Air-circulation temperature control type)	Standard equipment (Air-circulation temperature control type)	
Sample cooler temperature setting range	4 to 45°C (Room temperature needs to be less than 30°C and humidity needs to be less than 70% to set 4°C)			
Sample cooler temperature accuracy	± 2°C (sensor position ± 0.5°C)			
Wetted material	SUS316L, DLC, PEEK, GFP, PTFE, FEP, ETFE, sapphire, ceramics, PPS, FFKM			
Available pH range	1 to 14			
Dimensions	W 260 × D 500 × H 280 mm (SIL-40C/40C XR/40C XS/40C X3: Protrusion adds 140 mm to the depth)			
Weight	SIL-40: 17 kg SIL-40C: 24 kg	SIL-40 XR: 17 kg SIL-40C XR: 24 kg	24 kg	
Operating temperature range	4 to 35°C			
Power supply	Cooler model	100 to 240 V AC, 400 VA, 50/60 Hz		
	Non cooler model	100 to 240 V AC, 150 VA, 50/60 Hz		—

## Column Oven



	CTO-40C
Temperature control type	Forced air circulation
Cooling Method	Electronic cooling
Temperature control range	Room temperature –10 to 100°C
Temperature accuracy	± 0.5°C
Temperature precision	± 0.05°C
Containable column size and number	Up to 250 mm L. column × 6 or 300 mm L. column × 3
Dimensions	W 260 × D 500 × H 415 mm
Weight	21 kg
Operating temperature range	4 to 35°C
Power supply	100 to 120 / 220 to 240 V AC (Automatic switching), 400 VA, 50/60 Hz

## UV-VIS Detectors / Photodiode Array Detector



SPD-40V



SPD-M40

	SPD-40	SPD-40V	SPD-M40
Light source	Deuterium (D <sub>2</sub> ) lamp	Deuterium (D <sub>2</sub> ) lamp, tungsten lamp	
Number of diode elements	None		1024
Wavelength range	190 to 700 nm	190 to 1000 nm	190 to 800 nm
Bandwidth	8 nm		—
Wavelength accuracy	≤ ± 1 nm		
Wavelength reproducibility	≤ ± 0.1 nm		
Slit width	—		1.2 nm, 8 nm
Spectral resolution	—		≤ ± 1.4 nm
Drift	≤ 0.1 × 10 <sup>-3</sup> of AU/h (under specified conditions)		≤ 0.4 × 10 <sup>-3</sup> of AU/h (under specified conditions)
Noise	Single wavelength mode: ≤ 4.0 × 10 <sup>-6</sup> AU, Dual wavelength mode: ≤ 10.0 × 10 <sup>-6</sup> AU (under specified conditions)		≤ 4.5 × 10 <sup>-6</sup> AU (under specified conditions)
Linearity	2.5 AU (under specified conditions)		
Standard flow cell	Optical path length: 10 mm, Cell volume: 12 µL, Pressure: 12 MPa Material of wetted parts: SUS316L, PFA, quartz, PEEK		
Sampling rate	Max. 100 Hz (Single wavelength mode)		Max. 100 Hz
Cell temperature control range	19 to 50°C, 1°C Step		
Optional flow cell	Maximum pressure cell (optical path length: 10 mm, cell volume: 12 µL)		
Available pH range	1 to 13 (Cell quartz might be damaged by a mobile phase of pH >10.)		
Dimensions [mm], weight	W 260 × D 500 × H 140, 11 kg		W 260 × D 500 × H 140, 10 kg
Operating temperature range	4 to 35°C		
Power supply	AC 100–240 V, 150 VA, 50/60 Hz		AC 100–240 V, 180 VA, 50/60 Hz

## FRC-40 sf Fraction Collector



### Holds up to 540 test tubes

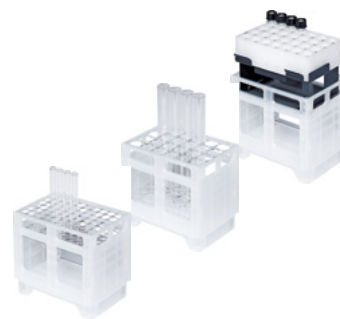
Supports not only a variety of test tubes and small volume sample vials, but also flasks and other large containers suitable for large-scale preparative work for processing liters of samples.

### Compatible with a variety of containers

Various racks can be used to reduce labor in transferring containers e.g. different capacities can be chosen based on the fraction volumes or the post-fractionation processing steps.

### Space-Saving Design

Even with its small installation footprint, the unit can hold up to nine standard MTP sample vial racks or test tube racks, which contributes to using laboratory space more effectively.



	FRC-40 sf
Fraction vials	96-well microplate / deep-well plate 1.5, 4.0 mL vials 10, 12, 16, 18, 25, or 35 mm diameter test tubes 250, 500, or 1,000 mL bottles
Operating temperature/Humidity range	4 to 32°C and 20 to 85 % RH
Dimensions, weight	W 390 × D 730 × H 560 mm (excluding protrusions), 30 kg
Power supply	100 to 240 V AC, 150 VA, 50/60 Hz

## Rack Changer



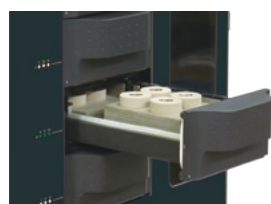
	Rack Changer II
Compatible plates	Extraction vessel 0.2 mL, 5 / 10 mL
Number of processed plates	12
Sample cooler	Block cooling/heating, used together with dehumidifying function, 4 to 40°C
Operating temperature range	4 to 35°C
Dimensions, weight	W 425 × D 500 × H 415 mm, 32 kg
Power supply	100 to 240 V AC, 350 VA, 50/60 Hz

# Nexera™ UC Dedicated Units

## Supercritical Fluid Extraction Unit



This unit operates at a maximum temperature of 80°C to allow faster and more complete extractions. Five types of extraction vessels: PEEK 5 mL, 0.2 mL (maximum pressure 20 MPa), SUS 10 mL, 5 mL and 0.2 mL can be chosen based on the sample and sample amount. This unit has the internal capacity to run up to four samples automatically; with the addition of an optional rack changer, it can accommodate unattended operation for up to 48 samples.



Rack changer: max. 48 samples

Extraction vessels

SFE-30A	
Number of processable samples	4
Extraction vessel volume	PEEK: 5 mL, 0.2 mL SUS: 10 mL, 5 mL, 0.2 mL
Maximum operation pressure	40 MPa
Temperature control range	10°C above room temperature to 80°C
Operating temperature range	15 to 28°C
Dimensions, weight	W 260 × D 500 × H 415 mm, 30.4 kg
Power supply	100 to 240 V AC, 450 VA, 50/60 Hz

## CO<sub>2</sub> Solvent Delivery Unit



LC-30ADsf	
Solvent delivery method	Micro-volume double plunger pump
Plunger capacity	10 µL
Flow-rate setting range	0.0001 to 5.0000 mL/min
Maximum pumping pressure	66 MPa (0.0001 to 3.0000 mL/min), 44 MPa (3.0001 to 5.0000 mL/min)
Flow-rate accuracy	Less than ±1% or ±2 µL/min, whichever is the greater (1 to 40 MPa, under specified conditions) Less than ±2% or ±2 µL/min, whichever is the greater (40 to 60 MPa, under specified conditions)
Flow-rate precision	Less than 0.06%RSD or 0.02 minSD whichever is the greater
Pump head cooling system	Refrigerant circulation method
Pressure limits function	Upper and lower limits
Plunger rinsing mechanism	Equipped with an automatic rinsing kit
Operating temperature range	15 to 28°C
Dimensions, weight	W 260 × D 500 × H 280 mm (Protrusion adds 90 mm to the depth), 25.5 kg
Power supply	100 to 240 V AC, 600 VA, 50/60 Hz

## Supercritical Fluid Back Pressure Regulator Unit



SFC-30A	
Pressure setting range	1 to 40 MPa (0.01 MPa step)
Pressure control accuracy	Typical (3 mL/min, 100% CO <sub>2</sub> , 10 MPa): 0.02 MPa Maximum (5 mL/min, 100% CO <sub>2</sub> , 20 MPa): 0.1 MPa
Maximum setting pressure	40 MPa
Temperature control range	0 to 70°C (1°C step)
Safety measures	Thermo sensor, Thermal fuse, Leak sensor, BPR cover sensor
Operating temperature range	15 to 28°C
Dimensions, weight	W 260 × D 500 × H 140 mm, 12 kg
Power supply	100 to 240 V AC, 300 VA, 50/60 Hz

# Nexera UC Prep Application Systems

## Stacked Fraction System

This system is optimized for large volume fractionation involving repeated injection of samples which may contain several compounds.



## Multi-Fraction System

This system is suitable for preparative tasks involving samples with many peaks detected, such as impurities in pharmaceutical compounds.



## Analytical Fraction System

This system is intended for analytical scale fractionation only requiring fraction volumes of several mL to recover up to 20 mg of material.



### Key Features

		Stacked Fraction System	Multi-Fraction System	Analytical Fraction System
Flow rate range		10.0 to 150.0 mL/min		0.0001 to 5.0 mL/min
Supported columns		I.D.: 10 to 30 mm Length: up to 250 mm		I.D.: 2.0 to 4.6 mm Length: up to 250 mm
Injection unit		No. of samples processed: 1 Max. injection volume: 2 mL (optional: 20 mL)	No. of samples processed: 252 (with 1 mL sample vial plate) 162 (1.5 mL sample vial plate) 84 (4 mL sample vial plate) 36 (10 mL sample vial plate) 72 (microtube plate) 288 (96-well microplate) 1,152 (384-well microplate) 288 (96-well deep-well plate) 1,152 (384-well deep-well plate)	Max. injection volume: 5 µL (optional: 50 µL)
Collection	Supported containers	Bottles (screw-top: GL45) 1000 mL × 10, 2000 mL × 5	30 mL sample vial × 54 250 mL sample bottle × 20 500/1,000 mL sample bottle × 12 Test tube O.D. 18 mm × 216 Test tube O.D. 35 mm × 54	1.5 mL sample vial × 486 4 mL sample vial × 252 Test tube O.D. 10 mm × 540 Test tube O.D. 18 mm × 216 96-well microplate/deep-well plate × 9 (864 well)
	Quantity			
	Method	Valve switching (10 collection + 1 waste or 5 collection + 5 waste)	Open-bed with X-Y arm	
Volume recovered per analysis (approx.)		Up to 1 g (for 30 mm I.D. column)		Up to 20 mg (for 4.6 mm I.D. column)
Sample temperature control range		No temperature control	4 to 45°C	4 to 40°C
Support functions		Dedicated preparative software, stacked injection, parameter changing during analysis		Dedicated preparative software, parameter changing during analysis

# Nexera UC Prep Dedicated Units

## CO<sub>2</sub> Solvent Delivery Unit / CO<sub>2</sub> Cooling Unit



### CO<sub>2</sub> Solvent Delivery Unit

		LC-40P sf
Pump type		Parallel double-plunger reciprocating
Solvent delivery method		Constant flow rate delivery
Constant flow rate delivery	Flow rate setting range	0.0 to 150.0 mL/min
	Max. solvent delivery pressure	44 MPa (0.01 to 100.00 mL/min) 33 MPa (100.01 to 150.00 mL/min)
	Flow rate accuracy	±2 % (20 mL/min and 100 mL/min, when liquefied carbon dioxide is pumped at 15 MPa, and room temperature constant between 24 to 28°C.)
Pump head	Cooling method	Refrigerant recirculation (using 60 % aqueous ethylene glycol solution)
	Temperature accuracy	±5°C
	Temperature precision	2°C
Pressure limiter function		Upper/lower limit values
Line filter		2 µm
Time Programs		Ten flow rate, event, and loop (repeats program) files with total of 320 steps
Pressure display accuracy		Within ±2 % or ±0.5 MPa, whichever is greater
Plunger rinse flow channels		Automatic rinsing kit included standard
Operating temperature/humidity range		4 to 32°C and 20 to 85 % RH
Dimensions		W 260 × D 600 × H 210 mm, excluding protrusions
Weight		28 kg
Power supply		100 to 240 V AC, 400 VA, 50/60 Hz

### CO<sub>2</sub> Cooling Unit

		SFC-40P
Cooling method		Compressor-type recirculation
Refrigerant		R407C
Operating temperature/humidity range		4 to 32°C and 20 to 85 % RH
Dimensions		W 260 × D 600 × H 280 mm, excluding protrusions
Weight		39 kg
Power supply		100 V AC, 1.3 kVA, 50/60 Hz

## Supercritical Fluid Back Pressure Regulator Unit



		SFC-40P
Pressure setting range		1 to 40 MPa (0.01 MPa step)
Pressure control precision		0.3 MPa
Pressure capacity		40 MPa
Temperature control range		0 to 70°C (1°C steps)
Operating temperature/humidity range		4 to 32°C and 20 to 85 % RH
Dimensions		W 260 × D 500 × H 140 mm, excluding protrusions
Weight		17 kg
Power supply		100 to 240 V AC, 900 VA, 50/60 Hz

## Heat Exchanger



		HEX-40
Pressure capacity		40 MPa
Temperature setting range		0 to 70°C (1°C steps)
Operating temperature/humidity range		4 to 32°C and 20 to 85 % RH
Dimensions		W 260 × D 500 × H 70 mm, excluding protrusions
Weight		8 kg
Power supply		100 to 240 V AC, 600 VA, 50/60 Hz

## Supercritical Fluid Extraction Unit



SFE-40P	
Number of processable samples	4
Extraction vessel volume	PEEK: 5 mL, 0.2 mL SUS: 10 mL, 5 mL, 0.2 mL
Maximum operation pressure	40 MPa
Temperature control range	10°C above room temperature to 80°C
Operating temperature/humidity range	Temperature setting up to 70°C: 4 to 32°C Temperature setting up to 80°C: 10 to 32°C Humidity: 40 to 70 % (No condensation)
Dimensions	W 260 × D 500 × H 415 mm
Weight	30 kg
Power supply	100 to 240 V AC, 450 VA, 50/60 Hz

## Sampler & Fraction Collector



### Sample injection as well as fraction recovery

This single unit can perform everything from sample injection to fraction recovery.

### Supports a wide range of injection volumes

Switch easily between different sample loops and syringes to change the injection volume.

### Two fractionation modes available

Choose either a mode for supporting up to 10 fractions or one for 5 fractions and recovery between all peaks.

FRS-40	
Pressure capacity	Injection system: 44 MPa Recovery system: 8 MPa
Number of samples	1
Number of fractions	4 (option: 10 max.)
Injection method	Loop injection
Injection volume range	0.1 µL to 2,000 µL
Operating temperature/humidity range	4 to 32°C and 20 to 85 % RH
Dimensions	W 390 × D 710 × H 410 mm, excluding protrusions
Weight	39 kg
Power supply	100 to 240 V AC, 150 VA, 50/60 Hz

## Shim-pack™ UC series

Packed Columns for Supercritical Fluid Chromatography



The Shim-pack UC series columns offer a wide variety of stationary phases for separating all sorts of compounds using the unique characteristics of supercritical fluid chromatography (SFC). The series includes 20 kinds of packing materials and a wide range of particle and column sizes that can be selected based on the analyte.

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