SHIMADZU
Excellence in Science

S-LC-B19

AI-enabled

Nexera All-Round LC



Nexera All-Round LC

Analytical Intelligence ANALYTICAL INTELLIGENCE

Key Features

- Automated support functions utilizing digital technology, such as M2M, IoT, and Artificial Intelligence (AI), that enable higher productivity and maximum reliability.
- Allows a system to monitor and diagnose itself, handle any issues during data acquisition without user input, and automatically behave as if it were operated by an expert.
- Supports the acquisition of high quality, reproducible data regardless of an operator's skill level for both routine and demanding applications.



System Configuration

UV-Vis Detector
SPD-40/40V

Photodiode Array (PDA) Detector
SPD-M40

Baseline stability and linearity have been improved, and stability remains even under fluctuating temperatures. The PDA detector is equipped with a UV cut-off filter to improve the quantitation accuracy of photodegradable compounds. The cell and lamp are traceable via individual IDs.

Solvent Delivery Pump
LC-40D

The parallel double plunger model reduce gradient delay volume and enables an ultra-fast high-pressure Binary gradient. Quaternary low-pressure gradient with 4 mobile phases, mobile phase blending function can also be provided.



Degassing Unit
DGU-403/405 or DGU-20A5R

3-channel and 5-channel types available.

System Controller
CBM-40 Lite

CBM-40 Lite is the electronic circuit board-only system controller. It is embedded in the solvent delivery unit/pump. In the case of error occur, the solvent delivery unit LEDs will be used to inform them. No data storage.

Column Oven
CTO-40S/40C

The circulation oven has a slim 130 mm model, CTO-40S (maximum temperature: 85°C) and a standard 260 mm model, CTO-40C (maximum temperature: 100°C). Both are able to accommodate at least one 300 mm column and have connection ports for CMD or mixer ID recognition. Active preheater tubing is available as an option.

Autosampler
SIL-40

The autosampler achieves ultra-low carryover of less than 0.0005% (under specified conditions). Its ultra-fast injection cycle and auto pretreatment functions also contribute to more efficient analysis. The optional dual-injection system consists of two separate injection ports and flow lines, enabling different analyses to be carried out simultaneously.

A New Benchmark of **Intelligence**

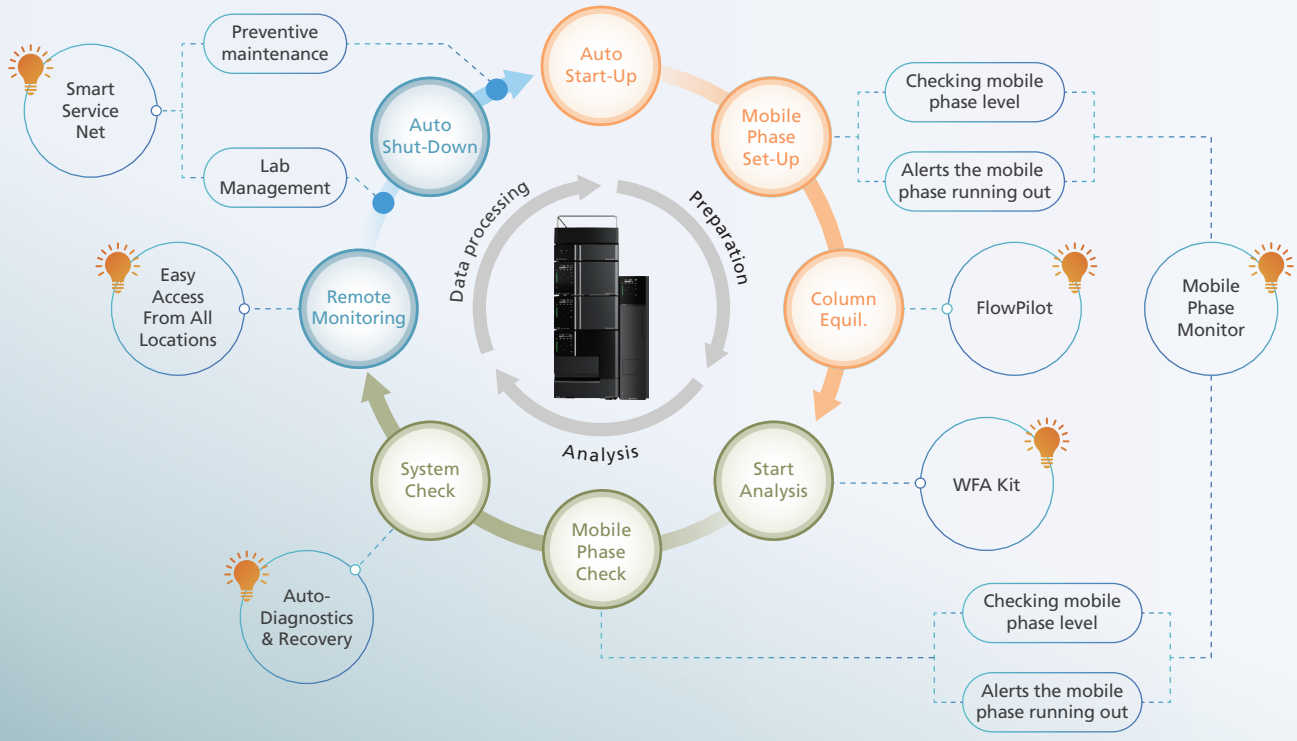
Maximizing Reliability, Minimizing Down Time



Fully Unattended Operation from Startup to Shutdown

The Nexera can be set to start up at a specified time, so that it can complete auto-purge, equilibration and baseline checks in advance, and be ready for analysis as soon as you arrive at the lab. Moreover, the system can be set up in advance to run without user intervention all the way from startup through analysis to shutdown.

User can view the status and predicted analysis completion time for multiple systems from any location via a smart device. None of these features requires any special software.

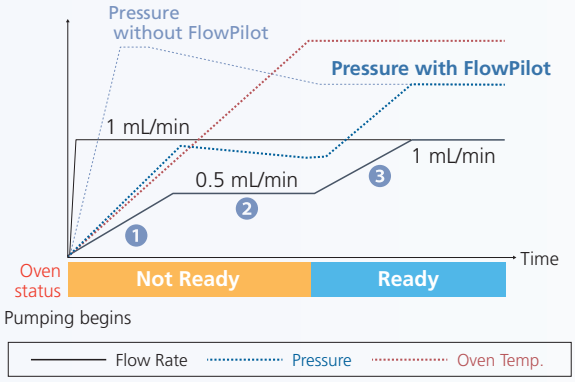


Flow Pilot

FlowPilot Protects Columns

ANALYTICAL INTELLIGENCE

HPLC columns can be damaged by sudden pump starts and stops or extreme gradient changes. The Nexera automatically uses FlowPilot (Smart Flow Control) to increase the flow rate gradually to the set point. There is no need to create startup protocols for each analysis.

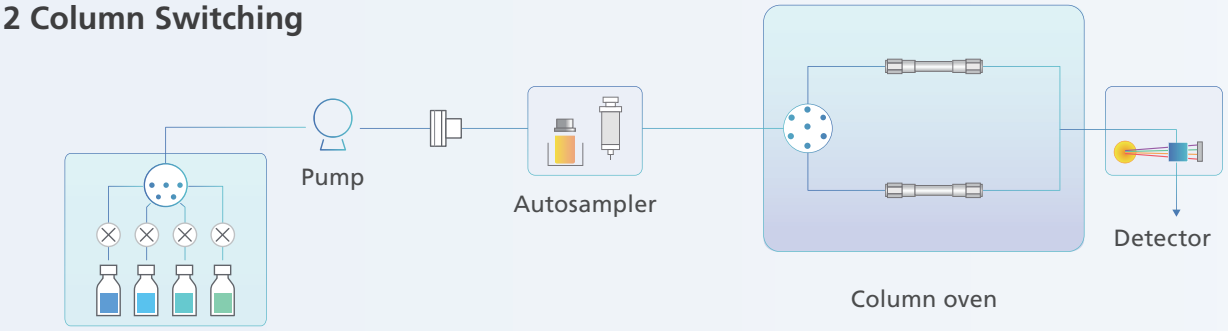


FlowPilot

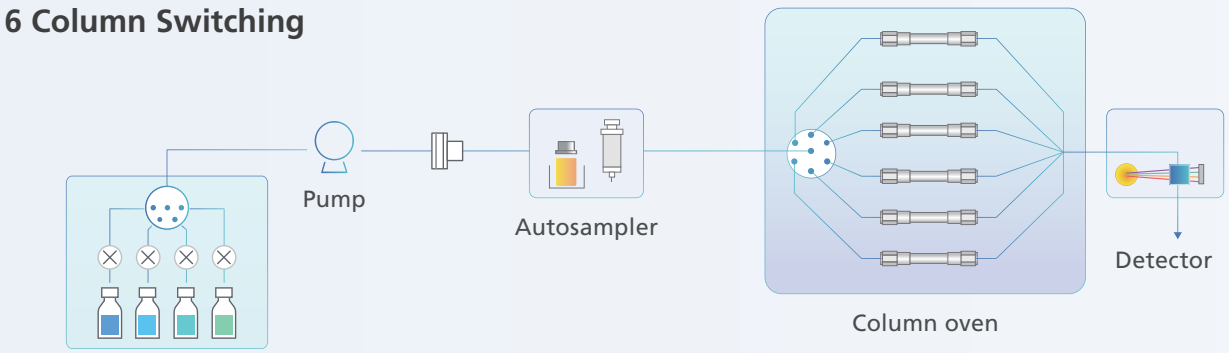
The pump controls the flow rate according to oven temparature. The flow rate is gradually increased up to half of the set value.(①) The flow rate is kept constant until the oven is ready.(②) The flow rate is gradually increased up to the set value.(③)

Work-From-Anywhere, WFA Kit (Optional)

2 Column Switching

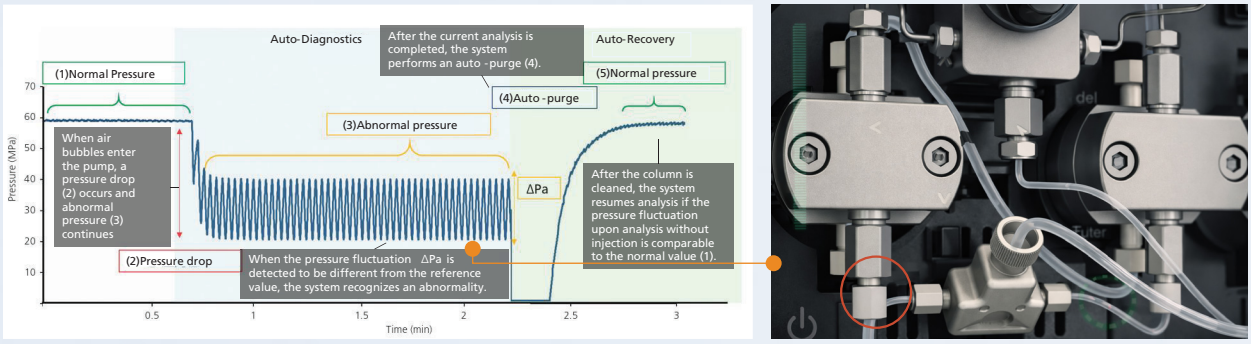


6 Column Switching



Auto-Diagnostics and Recovery

Air bubbles can form in the mobile phase and cause problems if entered the pump. The Nexera can monitor baseline change and pressure fluctuations to check for abnormalities. When it detects an unusual fluctuation, it can automatically pause the analysis, purge the flow path, and restart analysis once it has recovered to normal pressure.



Auto-Diagnostics for Trapped Bubbles:

If an air bubble trapped in the pump head, it causes an abrupt drop in pressure, after which pulsations will occur. This can be detected using Shimadzu's proprietary Auto-Diagnostics and Recovery algorithm which assesses these distinctive pressure fluctuations caused by trapped bubbles to distinguish them from any expected changes in pressure.

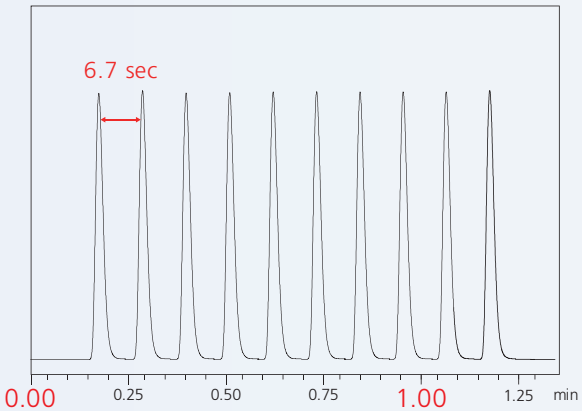


A New Benchmark of **Efficiency**

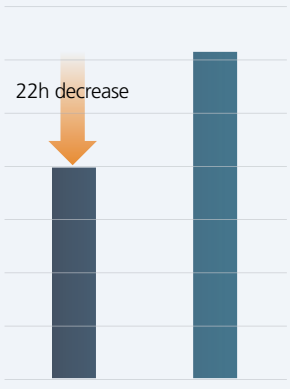
Automating Workflow, Maximizing Throughput

Analysis Cycle Time Less Than 10 Seconds

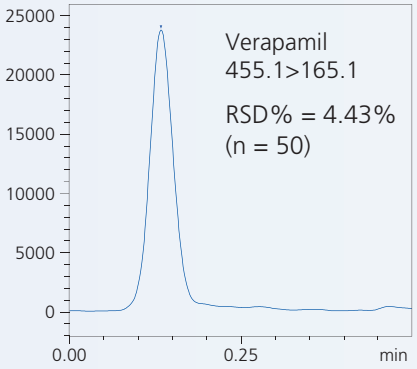
The SIL-40 autosampler can process the entire injection cycle time in as little as seven seconds, twice as fast as the previous model. In addition, continuous analysis can be carried out on up to 44 MTPs (using 3 PLATE CHANGERS). Together these features dramatically increase analysis throughput.



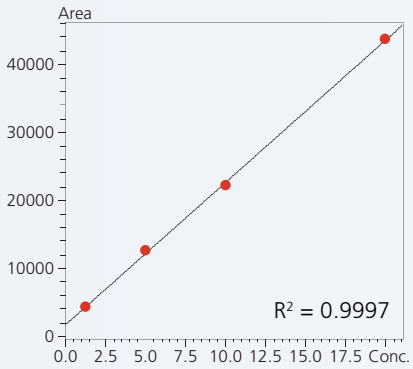
8 injections can be completed within 1 minute (Caffeine)



Pharmacokinetic analysis requires not only speed but also high reliability at low concentrations. With its ultra-fast injection and ultra-low carryover, the SIL-40 autosampler delivers high reproducibility and reliability, even during an ultra-fast 30-second analysis.



Verapamil in plasma (spiked 2.5 ppb)



Linearity

A New Benchmark of **Design**

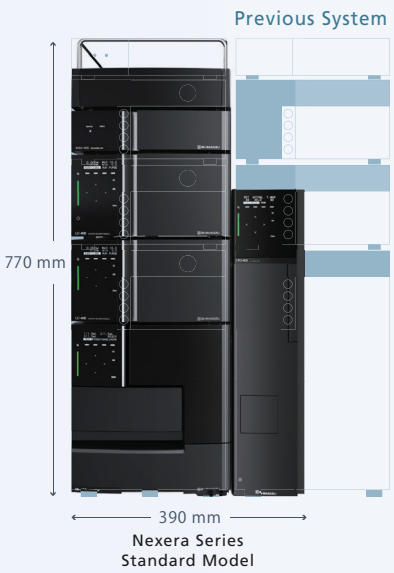
Compact and Inventive

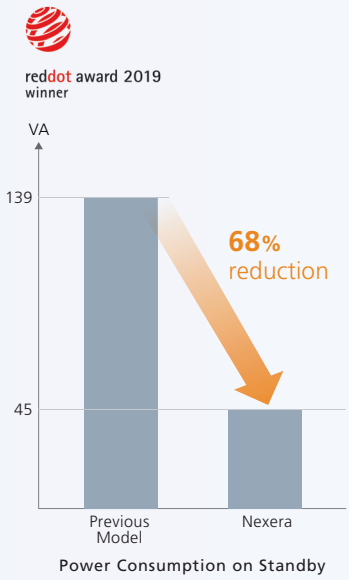
Space-Saving Design

The Nexera frees up bench space with a compact design two thirds the size of Shimadzu's previous model.

Energy-Saving Standby Mode

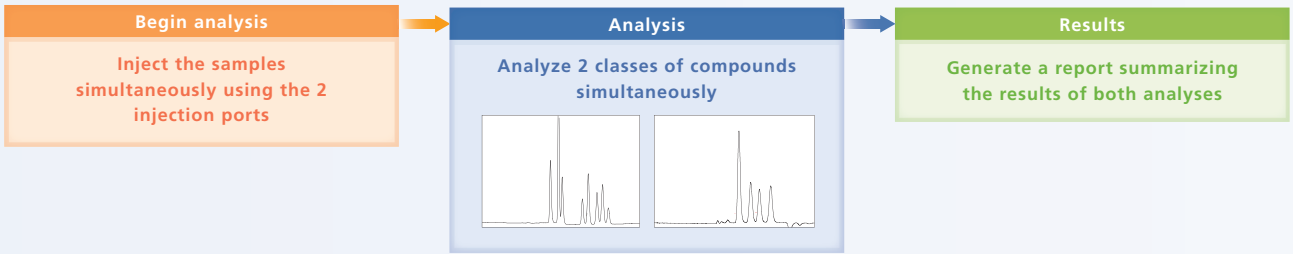
The Nexera uses over 80% less electricity when in standby mode, significantly reducing running costs and supporting an environmentally-friendly lab.





Dual Injection Enables Simultaneous Analysis

Injection ports for two separate flow paths can be installed, allowing two different types of analysis (such as analysis of amino acids, organic acids or vitamins) to be performed using one system.

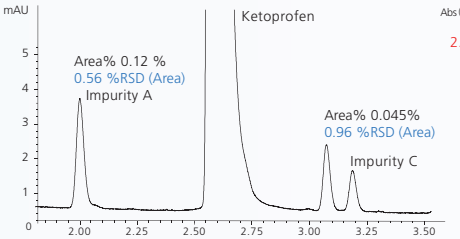


Dual Injection

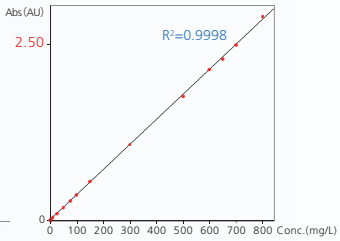
A second injection port and injection valve have been added. As a result, the sample can be injected independently into two analysis flow lines with a single needle, enabling the consolidation of a two-system analysis within a single system.

High-Sensitivity Impurity Analysis

The SPD-M40 detector achieves an extremely high level of sensitivity and linearity (up to 2.5 AU). This allows quantitation of very lowconcentration impurities even in high-concentration samples. The UV cut-off filter installed in the detector prevents sample degradation due to UV light, helping to maintain good linearity at low concentrations.



Example: Ketoprofen analysis reveals impurities of area% < 0.2%



Detector linearity for ketoprofen

Reduced Stray Light and Improved Measurement Circuits

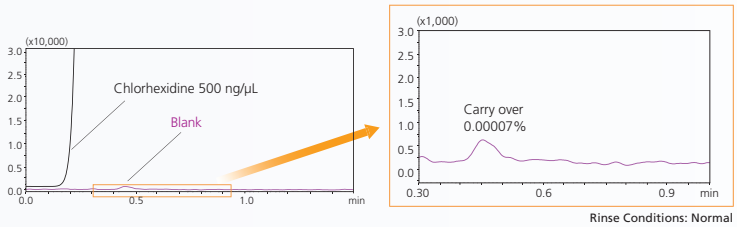
With the SPD-M40, the measurement circuits have been improved, and the amount of stray light in the optical system, a cause for linearity errors, has been reduced (to less than 1/3 of the usual amount). As a result, the absorbance linearity has been improved to at least 2.5 AU.

Ultra-low Carryover

The Nexera boasts ultra-low carryover, even on a high-sensitivity LC/MS/MS. This reduces time spent on rinsing, resulting in a shorter overall analysis time.

Elimination of Dead Volume

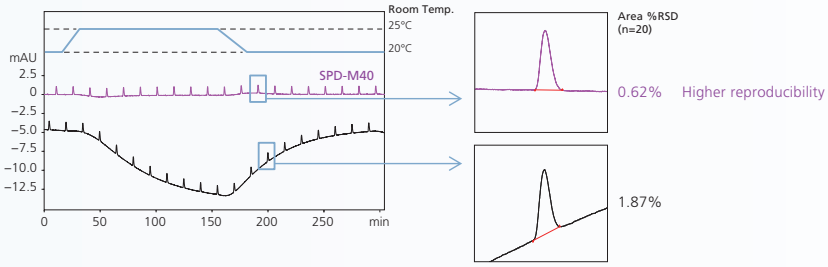
Dead volume in the flow line will lead to carryover from sample residue. In the SIL-40 series, the sample loop and needle are connected linearly, eliminating dead volume, and reducing carryover.



After analysis of Chlorhexidine, the carryover to a blank solution is negligible.

Stable Baseline

Baseline fluctuations can affect peak area calculation, reducing the accuracy of quantitative results. The SPD-M40 photodiode array detector's "Advanced TC-Optics" function adjusts the temperature of the flow cell, lamp, and optical system to lessen the impact of external temperature changes. Noise and drift have also been reduced by 40% compared to the previous model.



Advanced TC-Optics (SPD-M40)

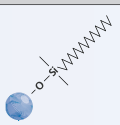
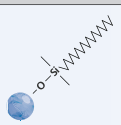
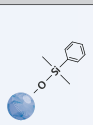
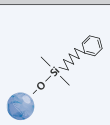
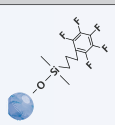
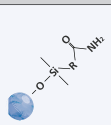
Dead volume in the flow line will lead to carryover from sample residue. In the SIL-40 series, the sample loop and needle are connected linearly, eliminating dead volume, and reducing carryover.

Faster Analysis Without Sacrificing Precision

It is important to use the most appropriate column in your LC system to achieve the highest efficiency and most accurate chromatograms. The Shim-pack series consists of a range of columns designed with the increased capabilities of the Nexera in mind. The superior ruggedness of Shim-pack columns ensures a long lifetime even with demanding sample matrices.

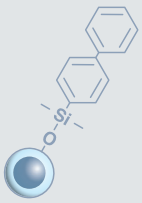
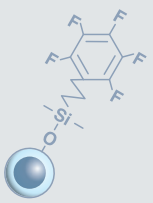
Shim-pack GIST Series

High Inert & Highly Stable Fully Porous Silica Column SeriesExcellent peak shape and stability achieved by using uniquely modified high purity fully porous silica particlesExcellent lot to lot reproducibility

	Shim-pack GIST							
	Reversed Phase						HILIC	
	C18	C18-AQ	C8	Phenyl	Pneyl-Hexyl	PFPP	Amide	NH2
Chemistry								
Bonded Phase	Octadecyl groups	Octadecyl groups	Octyl groups	Phenyl groups	Phenyl-Hexyl groups	Pentafluoro-phenylpropyl groups	Carbamoyl groups	Aminopropyl groups
Features	Ultra-high inertness and high stability	Excellent retentivity of highly polar compounds	Ultra-high inertness and high stability	Extremly strong π-π interactions	Alternative selectivity to C18 columns	Excellent retentivity of highly polar base	First choice HILIC column	Sugar analysis
Particle Size (µm)	2, 3, 5	1.9, 3, 5	2, 3, 5	2, 3, 5	3, 5	3, 5	1.9, 3, 5	3, 5
Pore Size (nm)	10	10	10	10	10	10	10	10
Surface Area (m^2/g)	350	350	350	350	350	350	350	350
Carbon Loading (%)	14	13	8	10	9	10	15	7
End Cap	Yes	Yes	Yes	No	Yes	Yes	No	No
pH Range	1-10	1-10	1-10	2-7.5	1-10	2-7.5	2-8.5	2-7.5
USP Code	L1	L1	L7	L11	L11	L43	L68	L8

Shim-pack Velox

The superficially porous particle (SPP) technology allows for optimum separation and analysis times.
The range of column types available enables you to choose the most appropriate column for each application.

					
	SP-C18	C18	Biphenyl	PFPP	HILIC
USP classification	L1	L1	L11	L43	L3
Stationary phase	Sterically protected C18	C18	Biphenyl	Pentafluorophenyl propyl	None
Particle size (µm)	1.8, 2.7, 5	1.8, 2.7, 5	1.8, 2.7, 5	1.8, 2.7, 5	2.7

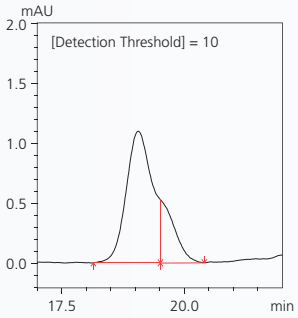
**To maximize column lifetime, columns with 1.8 µm particle size are recommended for use with a pressure under 80 MPa.*

LabSolutions Chromatography Software

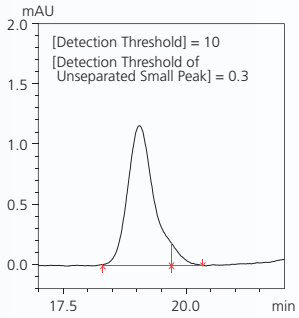
Extract the Smallest of Shoulder Peaks

The i-PeakFinder tool can automatically recognize peaks even in complex chromatograms with high noise, and accounts for baseline drift for higher integration accuracy. Adjustable parameters in i-PeakFinder, such as peak detection threshold, allow the user to detect smaller peaks.

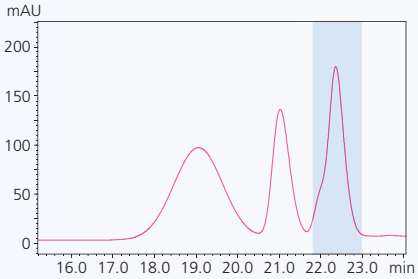
In addition, the i-PDeA II function can quantify peaks that cannot be completely separated by a column. Separate peaks by simply specifying the time and wavelength in LabSolutions.



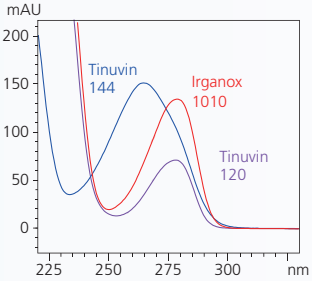
Shoulder peak detected automatically



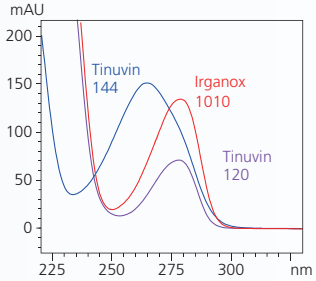
Smaller peak detected with parameter adjustment



The smaller peak is normally impossible to extract



i-PDeA II chromatogram identifies the two separate peaks

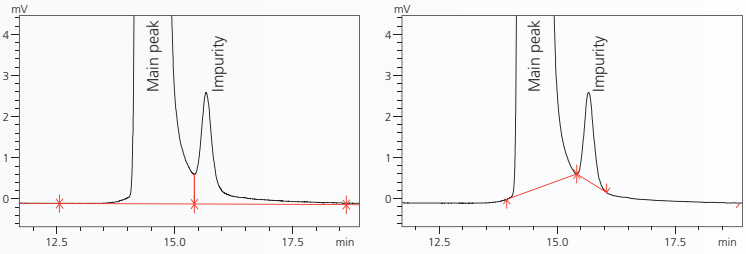


Spectrum analysis with i-PDeA II

Application Example: i-PDeA II

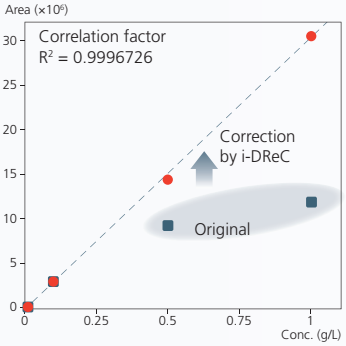
Consistent Peak Splitting

Manually setting the baseline for fused peaks is time-consuming, and the peaks may be split differently depending on the user. The i-PeakFinder has adjustable parameters for different analyses, allowing the consistent application of the best baseline in each situation.



Dynamic Range Extension Function for Accurate Calibration

i-DReC is a new analytical method that significantly extends the dynamic range. It enables the analysis of high-concentration compounds without diluting them, and ensures a correct calibration curve.



Application Example: i-DReC

Specifications

System Controllers



CBM-40

	CBM-40	CBM-40 Lite
Monitors	LabSolutions Web 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)	4 (Excluding built-in solvent delivery unit)
Event input/output	Input: 1, output: 2	
Analog board	Up to 1 channel (option)	—
Communication	Ethernet	
Reservoir tray	—	
Dimensions [mm], weight	W 260 × D 500 × H 72, 5 kg	—
Operating temperature range	4 to 35 ˚C	
Power supply	AC 100 to 240 V, 50 VA, 50/60 Hz	Supplied from solvent delivery unit

Solvent Delivery Pump



LC-40D

	LC-40D
Pumping method	Parallel-type double plunger (approx. 10 µL/1 stroke)
Allowable maximum pressure	44 MPa
Flow rate settings range	0.0001 – 5.0000 mL/min (1.0 – 44 MPa) 5.0001 – 10.0000 mL/min (1.0 – 22 MPa)
Flow rate accuracy	≤ ± 1% or ± 2 µL/min, whichever greater (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
Available pH range	1 to 14
Automatic rinsing kit	Option
Degassing unit	1 unit connectable
Dimensions [mm]	W 260 × D 500 × H 140
Weight	10 kg
Operating temperature range	4 to 35°C
Power supply	AC 100–240 V, 50/60 Hz, 150 VA

Degassing Unit



DGU-403

	DGU-403	DGU-405
Number of degassed solvents	3	5
Degassed flow line capacity	400 µL/1 line	
Number of connectable units	W 260 × D 500 × H 72, 4 kg	
Event input/output	4 to 35°C	
Analog board	Supplied from solvent delivery unit	

Specifications

Autosamplers



SIL-40C

		SIL-40/SIL-40C
Injection method		Total-volume Injection (standard), loop injection (optional)
Allowable maximum pressure		44 MPa
Injection volume		0.01 to 100 µL
		0.01 to 2000 µL (optional)
Injection volume accuracy		≤ ± 1% (5 µL injection, n = 20)
Linearity		≥ 0.9999
Injection cycle time		≤ 6.7 seconds (under specified conditions)
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)
Dip rinsing outside the needle and injection port rinsing		Standard equipment
Pumping rinse outside the needle		Option
Internal rinsing (3 dil)		Option
Sample cooler		SIL-40: None SIL-40C: 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 [mm], weight		W 260 × D 500 × H 280 (SIL-40C/40C XR/40C XS/40C X3: Protrusion adds 140 mm to the depth)
Operating temperature range		4 to 35°C
Power supply	Cooler model	AC 100–240 V, 400 VA, 50/60 Hz
	Non cooler model	AC 100–240 V,150 VA, 50/60 Hz

Column Oven



CTO-40C CTO-40S

	CTO-40C	CTO-40S
Temperature control type	Forced air circulation	
Cooling Method	Electronic cooling	
Temperature control range	Room temperature – 10°C to 100°C	Room temperature – 10°C to 85°C
Temperature accuracy	± 0.05°C	± 0.8°C
Temperature precision	± 0.05°C	± 0.1°C
Containable column size and number	Up to 250 mm L. column × 6 or 300 mm L. column × 3	Up to 100 mm L. column × 6 or 300 mm L. column × 3
Dimensions [mm], weight	W 260 × D 500 × H 415, 21 kg	W 130 × D 500 × H 553, 15 kg
Operating temperature range	4 to 35°C	
Power supply	AC 100–120 V / 220–240 V (Automatic switching), 400 VA, 50/60 Hz	AC 100–240 V, 300 VA, 50/60 Hz

Specifications

UV-VIS Detector



SPD-40V

	SPD-40	SPD-40V
Light source	Deuterium (D_2) lamp	Deuterium (D_2) lamp, tungsten lamp
Wavelength range	190 to 700 nm	190 to 1000 nm
Bandwidth	8 nm	
Wavelength accuracy	≤ ± 1 nm	
Wavelength reproducibility	≤ ± 0.1 nm	
Drift	≤ 0.1 × 10^{-3} of AU/h (under specified conditions)	
Noise	Single wavelength mode: ≤ 4.0 × 10^{-6} AU, Dual wavelength mode: ≤ 10.0 × 10^{-6} 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)	
Cell temperature control range	19 to 50°C, 1°C Step	
Optional flow cell	UHPLC cell (optical path length: 10 mm, cell volume: 8 µL, equipped with temperature control function) Semi-micro cell (optical path length: 5 mm, cell volume: 2.5 µL, equipped with temperature control function) Conventional cell (optical path length: 10 mm, cell volume: 12 µL, equipped with temperature control function) Inert cell (optical path length: 10 mm, cell volume: 12 µL, equipped with temperature control function) Preparative cell (optical path length: 0.1/0.2/0.5 mm, cell volume: 0.8/1.6/4.0 µL) Micro flow cell (optical path length: 3 mm, cell volume: 0.21 µL) 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	
Operating temperature range	4 to 35°C	
Power supply	AC 100–240 V, 150 VA, 50/60 Hz	

Photodiode Array Detector



SPD-M40

	SPD-M40
Light source	Deuterium (D_2) lamp, Tungsten lamp
Number of diode elements	1024
Wavelength range	190 to 800 nm
Wavelength accuracy	≤ ± 1 nm
Wavelength reproducibility	≤ ± 0.1 nm
Slit width	1.2 nm, 8 nm
Spectral resolution	≤ ± 1.4 nm
Drift	≤ 0.4 × 10^{-3} of AU/h (under specified conditions)
Noise	≤ 4.5 × 10^{-6} 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
Cell temperature control range	19 to 50°C, 1°C Step
Optional flow cell	UHPLC cell (optical path length: 10 mm, cell volume: 8 µL, equipped with temperature control function) Semi-micro cell (optical path length: 5 mm, cell volume: 2.5 µL, equipped with temperature control function) Conventional cell (optical path length: 10 mm, cell volume: 12 µL, equipped with temperature control function) Inert cell (optical path length: 10 mm, cell volume: 12 µL, equipped with temperature control function) Preparative cell (optical path length: 0.1/0.2/0.5 mm, cell volume: 0.8/1.6/4.0 µL, equipped) Micro flow cell (optical path length: 3 mm, cell volume: 0.21 µL) 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 pH >10.)
Dimensions [mm], weight	W 260 × D 500 × H 140, 10 kg
Operating temperature range	4 to 35°C
Power supply	AC 100–240 V, 180 VA, 50/60 Hz

Specifications

Capillary cell type Photodiode Array Detector



SPD-M30A

	SPD-M30A
Light source	Deuterium (D_2) lamp
Number of diode elements	1024
Wavelength range	190 to 700 nm
Wavelength accuracy	≤ ± 1 nm
Wavelength reproducibility	≤ ± 0.1 nm
Slit width	1 nm, 8 nm
Spectral resolution	≤ 1.4 nm
Drift	≤ 0.5 × 10^{-3} of AU/h (under specified conditions)
Noise	≤ 4.0 × 10^{-6} AU (under specified conditions)
Linearity	2.0 AU (under specified conditions)
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
Sampling rate	Max. 200 Hz
Dimensions [mm], weight	W 260 × D 500 × H 140, 12 kg
Operating temperature range	4 to 35°C
Power supply	AC 100–240 V, 150 VA, 50/60 Hz

Spectrofluorometric Detector



RF-20A
RF-20Axs

	RF-20A	RF-20Axs
Light source	Xenon lamp	Xenon lamp; Low-pressure mercury lamp (to check wavelength accuracy)
Wavelength range	200 to 650 nm	200 to 750 nm
Spectral bandwidth	20 nm	
Wavelength accuracy	± 2 nm	
Wavelength precision	± 0.2 nm	
S/N	Water Raman peak S/N ≥1200; Low background S/N ≥9000	Water Raman peak S/N ≥2000; Low background S/N ≥12000
Range of cell temperature control	—	Room temperature – 10°C to 40°C, 1°C step
Cell		
Sampling rate	Standard conventional cell: volume 12 µL, maximum pressure 2 MPa; Optional semi-micro cell: volume 3 µL, maximum pressure 2 MPa	
Function	Max. 100 Hz (Single wavelength mode)	
Dimensions [mm], weight	Simultaneous measurement of four wavelengths, Wavelength scanning	
Operating temperature range	W 260 × D 500 × H 210, 16 kg	W 260 × D 500 × H 210, 18 kg
Power supply	4 to 35°C	
Power supply	AC 100–240 V, 400 VA, 50/60 Hz	

Specifications

Differential Refractive Index Detector



RID-20A

	RID-20A
Measurement range	1 to 1.75 RIU
Noise	≤ 2.5 × 10^{-9} RIU
Drift	≤ 1 × 10^{-7} RIU/h
Range	A mode: 0.01 × 10^{-6} to 500 × 10^{-6} RIU; P, L-mode: 1 × 10^{-6} to 5000 × 10^{-6} RIU
Response	0.05 to 10 sec, 10 steps
Polarity – Change	Available
Zero adjustment	Auto zero, Optical zero, Fine zero
Maximum flow rate	20 mL/min (150 mL/min in option)
Range of cell temperature control	30 to 60°C
Cell	Volume 9 µL, Maximum pressure 2 MPa
Sampling rate	Max. 50 Hz
Dimensions [mm], weight	W 260 × D 420 × H 140, 12 kg
Operating temperature range	4 to 35°C
Power supply	AC 100–240 V, 150 VA, 50/60 Hz

Conductivity Detector



CDD-10Avp

	CDD-10Avp
Cell volume	0.25 µL
Cell constant	25 µS·cm^{-1}
Material of wetted parts	PEEK, SUS316
Maximum use pressure	2.9 MPa (30 kgf/cm^2)
Response	0.05 to 10 s, 10 steps
Sampling rate	Max. 50 Hz
Zero adjustment	Auto-zero function, Baseline-shifting function
Dimensions [mm], weight	W 260 × D 420 × H 140, 6 kg
Operating temperature range	4 to 35°C
Power supply	AC 100–240 V, 250 VA, 50/60 Hz

Evaporative Light-Scattering Detector



ELSD-LT III

	ELSD-LT III
Nebulizing method	Siphon Splitting
Light source	High Power Laser
Detection element	Photodiode
Evaporation temperature set range	Room temperature – 100°C
Gas nebulizer	Nitrogen or air*
Gas consumption	3 L/min (max)
Mobile phase flow rate range	0.2 to 2.0 mL/min
Supply gas pressure	300 – 450 kPa (Standard setting: 350 kPa)
Connecting to HPLC system	USB/RS-232C → Connect to PC (No A/D board is required)
Dimensions [mm], weight	W 250 × D 530 × H 330, 15.5 kg
Operating temperature range	4 to 35°C
Operation humidity range	20 to 85%
Power supply	AC 100–240 V, 1.2 A, 50/60 Hz

**Requires a gas supply source, such as an air compressor, nitrogen generator and gas piping.*

- *Please use a regulator with filter (option) in order to remove small foreign matters in the gas.*
- *Please make sure that nitrogen or air doesn't contain oil, dust, or moisture when you use nitrogen generator and/or air compressor.*
- *Please use the instrument in a room with exhaust facilities.*

Optional Accessories

Solvent Delivery Unit

Part Name		P/N	Description
Low-pressure gradient unit		228-65016-58	Low-pressure gradient unit for LC-40D/40D XR/40D X3/40D X3
Reservoir selection valve		228-65017-58	Two-solvent switching unit to be incorporated in solvent delivery unit
FCV-11AL		228-65611-58	The mobile phase switching valve of 3 flow lines that connects to solvent delivery unit (external)
FCV-11ALS		228-65610-58	The mobile phase switching valve of 1 flow line that connects to solvent delivery unit (external)
Automatic rinsing kit		228-56201-41	Automatic rinsing kit for plunger seal cleaning
Mixer	Mixer MR 20 µL	228-72652-41	High-efficiency mixer for high-pressure gradient system (volume 20 µL)
	Mixer MR 40 µL	228-72652-42	High-efficiency mixer for high-pressure gradient system (volume 40 µL)
	Mixer MR 100 µL	228-72652-43	High-efficiency mixer for high-pressure gradient system (volume 100 µL)
	Mixer MR 180 µL	228-72652-44	High-efficiency mixer for high-pressure gradient system (volume 180 µL)
	Mixer MR 40 µL LPGE	228-60200-41	High-efficiency mixer for low-pressure gradient system (volume 40 µL)
	Mixer MR 300 µL LPGE	228-72653-42	High-efficiency mixer for low-pressure gradient system (volume 300 µL)

Autosampler

Part Name		P/N	Description
Sample loop	50 µL	228-63132-44	Sample loop for 50 µL injection (standard configuration of SIL-40 XR/40C XR/40C X3)
	100 µL	228-63132-45	Sample loop for 100 µL injection (standard configuration of SIL-40/40C)
	500 µL	228-45405-45	Sample loop to increase the injection volume up to 500 µL (Connect sample loop 100 µL (228-63132-45))
	2000 µL	228-45405-46	Sample loop to increase the injection volume up to 2 mL (Connect sample loop 100 µL (228-63132-45))
Dual-injection kit		228-75668-41, -42	Tubing kits for dual injection (228-75668-41 is for CTO-40S and 228-72568-42 is for CTO-40C)
Sample loop for loop injection	5 µL	228-71759-42	Sample loop for loop injection mode (volume 5 µL)
	20 µL	228-71759-43	Sample loop for loop injection mode (volume 20 µL)
	50 µL	228-71759-44	Sample loop for loop injection mode (volume 50 µL)
Sample plate	1.5 mL	228-71762-46	Plate for 1.5 mL sample vial (54)
	1 mL	228-71762-42	Plate for 1 mL sample vial (84)
	4 mL	228-71762-43	Plate for 4 mL sample vial (28)
	10 mL	228-71762-44	Plate for 10 mL sample vial (12)
Identification labels	For 96-well microplates	228-71840-41	Identification label affixed to the 96-well microtiter plate (100 set)
	For 96-well deep-well plates	228-71840-42	Identification label affixed to the 96-well deep-well plate (100 set)
	For 384-well microplates	228-71840-43	Identification label affixed to the 384-well microtiter plate (100 set)
	For 384-well deep-well plates	228-71840-44	Identification label affixed to the 384-well deep-well plate (100 set)

Column Oven

Part Name		P/N	Description
Active pre-heater		228-72083-41	Pre-heater device for thermostating mobile phase before the column inlet
FCV kits	For CTO-40S	228-72438-41	This is a kit for attaching a flow line switching valve to CTO-40S
	For CTO-40C	228-72589-41	This is a kit for attaching a flow line switching valve to CTO-40C
Two FCV tubing kits	ID 0.3	228-72437-41	Tubing kit to connect the flow line switching valve and columns
	ID 0.1	228-72437-42	Tubing kit to connect the flow line switching valve and columns
Six FCV tubing kits	ID 0.3	228-72437-43	Tubing kit to connect the flow line switching valve and columns
	ID 0.1	228-72437-44	Tubing kit to connect the flow line switching valve and columns
Nexlock™ SS with fitting	ID 0.1 mm × 600 mm	228-62544-11	Finger-tight high-pressure fitting
	ID 0.3 mm × 600 mm	228-62544-22	Finger-tight high-pressure fitting

Optional Accessories

UV Detector / PDA Detector

Part Name	P/N	Description
UHPLC cell	228-64724-41 (PDA), -42 (UV)	Flow cell for high-speed analysis (volume 8 µL)
Semi-micro cell	228-64725-41 (PDA), -42 (UV)	Flow cell for semi-micro analysis (volume 2.5 µL)
Conventional cell	228-68250-41 (PDA), -42 (UV)	Flow cell with the same cell volume (12 µL) as standard cell of SPD-20A and SPD-M20A
Inert cell	228-64728-41 (PDA), -42 (UV)	Inert-type flow cell with metal-less wetted parts
Preparative cell	228-64727-41 (PDA), -42 (UV)	Preparative flow cell with variable optical path length
Micro flow cell	228-64737-41 (PDA), -42 (UV)	Flow cell for micro analysis (volume 0.21 µL)
Maximum pressure cell	228-64726-41 (PDA), -42 (UV)	High-pressure resisting flow cell for Nexera™ UC
Solvent recycle valve	228-56808-42 (UV)	Valve to recycle mobile phase by attaching to SPD-40/40V

Others

Part Name	P/N	Description
Mobile phase monitor (controller)	228-65525-58	MPM-40 controller to monitor remaining mobile phase in real-time. Up to six bottle holders can be connected (228-65526-58, set of two).
Power outlet unit 6P	228-65523-42 (socket type B) 228-65523-43 (socket type D) 228-65523-46 (socket type I) 228-65523-58 (socket type F)	Power tap to turn off the main power of the instrument completely at one time. Switches can be installed in front of the reservoir tray. It provides six outlets.
Power outlet unit 2PS	228-65524-46 (for China) 228-65524-58 (for other than China)	Outlet to supply power to main units that need to be connected to service outlets, such as SIL-10A and FRC-10A. It provides two outlets.
Tubing kit A, ID 0.3 for high-pressure GE	228-70254-41	Tubing kits for high-pressure gradient system. Column inlet tubing ID 0.3 mm.
Tubing kit B, ID 0.1 for high-pressure GE	228-70254-42	Tubing kits for high-pressure gradient system. Column inlet tubing ID 0.1 mm.
Tubing kit C, ID 0.3 for low-pressure GE	228-70254-43	Tubing kits for low-pressure gradient system. Column inlet tubing ID 0.3 mm.
Tubing kit D, ID 0.1 for low-pressure GE	228-70254-44	Tubing kits for low-pressure gradient system. Column inlet tubing ID 0.1 mm.
Cable kit A	228-70247-41	Optical link cable kit, 600 mm × 1 pc, 800 mm × 1 pc.
Cable kit B	228-70247-42	Optical link cable kit, 600 mm × 2 pcs, 800 mm × 1 pc.
Cable kit C	228-70247-43	Optical link cable kit, 600 mm × 3 pcs, 800 mm × 1 pc.
Cable kit D	228-70247-44	Optical link cable kit, 600 mm × 4 pcs, 800 mm × 1 pc.
Reservoir tray	228-65508-58	Reservoir tray for up to 8 bottles (1 L).
AD board	228-55519-41	Board for analog-digital conversion. It takes in detector signals as analog signals.
Optical cable connector expansion board	228-70481-41	The board to expand the number of optical cable connector channels to 12ch from 8ch (standard) by attaching to SCL-40/CBM-40.

Valve

Part Name	P/N	Description
FCV-DR	228-65602-58	Drive unit and control board for incorporating valve into CTOs (1 FCV valve is required separately).
FCV-0206	228-65603-58	2-position 6-port valve (Maximum pressure: 44 MPa).
FCV-0607	228-65604-58	6-position 7-port valve (Maximum pressure: 44 MPa).
FCV-0206H	228-65607-58	2-position 6-port valve (Maximum pressure: 80 MPa).
FCV-0607H	228-65608-58	6-position 7-port valve (Maximum pressure: 80 MPa).
FCV-0206H3	228-65624-58	2-position 6-port valve (Maximum pressure: 130 MPa).
FCV-0607H3	228-65625-58	6-position 7-port valve (Maximum pressure: 130 MPa).

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