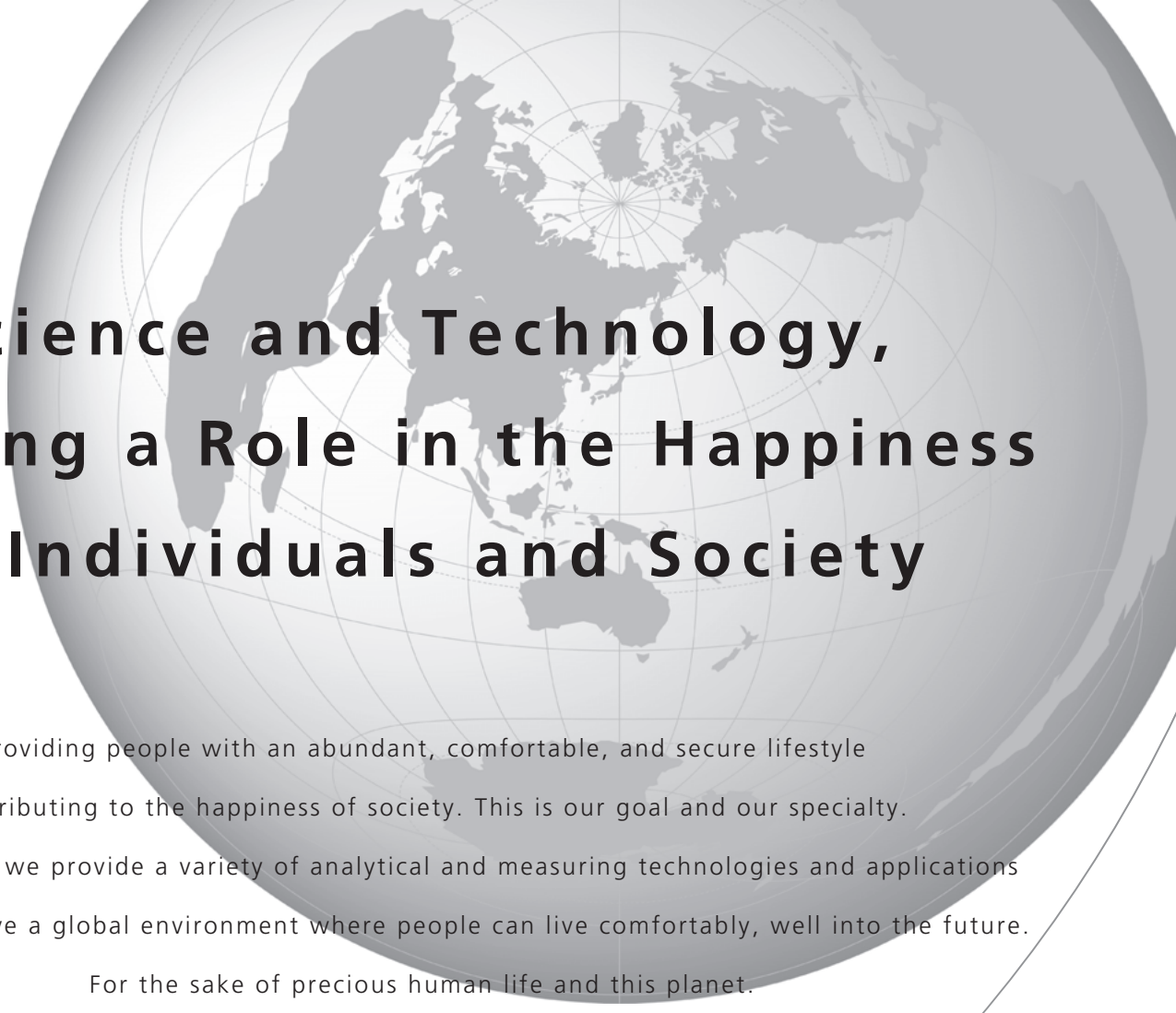
SHIMADZU
Excellence in Science

C10G-E045

Shimadzu Analytical and Measuring Instruments



Science and Technology, Playing a Role in the Happiness of Individuals and Society

Providing people with an abundant, comfortable, and secure lifestyle

Contributing to the happiness of society. This is our goal and our specialty.

At Shimadzu, we provide a variety of analytical and measuring technologies and applications

so as to achieve a global environment where people can live comfortably, well into the future.

For the sake of precious human life and this planet.

Ever onwards, making strides without slackening our pace.

– Global Strings –

These multiple intersecting curves represent the span of the globe.
At Shimadzu, we extend our products and services globally, with the goal of supporting the activities of our customers throughout the world.

Shimadzu Scientific Instruments and Equipment

Supporting the Needs of the Times

Relentlessly accelerating pace of the global economy means that the demands we all face are continuously evolving.
As a leading manufacturer of broad range analytical instruments, Shimadzu undertakes development of new instruments and technologies, provides comprehensive service support, and maintains a flexible attitude in order to keep up with changing customers' demands.

Contents

*Some products may not be for sale, depending on the region. Check with your sales representative.

Evaluation Instruments for Pharmaceutical Products

Support instruments for pharmaceutical sciences research and development

Support from Drug Discovery to Quality Control

Shimadzu offers extensive support for proteomics, genomics, metabolomics and other life science research products as well as chromatograph, mass spectrometer, and properties testing instrument.
Shimadzu provides instruments for analysis and services for quality control, including IQ/OQ and supports for regulatory, to meet today's demands for safe pharmaceutical manufacture.

Field		Applications and Objectives	Shimadzu Products
Discovery		Basic drug discovery and research	MALDI-TOFMS, LCMS, GCMS, Imaging mass microscope, MultiNA
Low-Molecular Weight Pharmaceuticals	Drug Discovery and Chemistry (Synthesis and Purification)	Drug discovery and chemical research	Preparative HPLC, Particle size analyzers
		Synthesis	HPLC, LCMS
		Impurities analysis	Co-Sense, LCMS-IT-TOF, ICP
	CMC (Development, Formulation, Manufacturing QA/QC)	Analytical method development	HPLC, GC
		Pharmaceutical formulation investigation	Thermal analyzers, Particle size analyzers
		Impurities analysis	Co-Sense, LCMS-IT-TOF, Headspace GC (GCMS)
		Elution tests	HPLC, UV
Biopharmaceuticals	Drug Discovery	Structural analysis	MALDI-TOFMS, HPLC, LCMS-IT-TOF
		Culture solution analysis	UF-Amino Station
	CMC (Development, Formulation, Manufacturing QA/QC)	Analytical method development	HPLC, Protein sequencing systems, Aggregation analysis system
Pharmacokinetics, Metabolomics, Safety		PK/TK ADME	HPLC, LCMS, Imaging mass microscope
Manufacturing		Cleaning validation	TOC, UV, HPLC, LCMS

- Discovery
- Pharmaceuticals (Low-molecular, Bio)
- Pharmacokinetics, Metabolomics, Safety
- Manufacturing

HPLC (Nexera X2) →P.18
Ultra High Performance Liquid Chromatograph

LCMS-8050 →P.29
High Performance Liquid Chromatograph Mass Spectrometer

LC-20AP Gradient Analysis/Preparative System →P.21
Prominence Preparative System

i-Series →P.17
High-Performance Liquid Chromatograph

TOC-L →P.46
Total Organic Carbon Analyzer

Aggregates Sizer →P.55
Aggregation Analysis System for Biopharmaceuticals

Evaluation Instruments for Foods

Test instruments for food and materials

The Science of Food...

Food products must taste good but they also require unceasing efforts to maintain safety and reliability. Inspection, analysis and evaluation instruments play a major role in this process.
Shimadzu instruments assist in satisfying the sophisticated and strict food safety requirements at all manufacturing and inspection stages.

Field	Application and Evaluation	Shimadzu Products
Food Safety Quality Control (General Foods)	Residual pesticides	HPLC, LCMS, GC, GCMS
	Veterinary drugs	HPLC, LCMS
	Mycotoxins	HPLC, LCMS
	Foreign substances and odor	FTIR, EDX, GC, GCMS
	Hazardous metals	AA, EDX, ICP, HPLC, UV
	Additives	HPLC, LCMS, GC, GCMS, UV, FTIR, AA, EDX, ICP
	Production origin and product variety	MultiNA, ICP, ICP-MS
	Microbial	MultiNA, MALDI-TOFMS
	Total organic carbon	TOC
	Packaging	GC, GCMS
Food Development (Functional Foods and Supplements)	Food texture, taste	Particle size Analyzer, Thermal analyzers, Moisture analyzers
	Flavor	GC, GCMS
	Functionality	HPLC, LCMS, GC, GCMS
	Therapeutic efficacy	Brain-function imaging systems

Food Safety and Quality Control (General Foods)
Food Development (Functional Foods and Supplements)

LCMS-8050 →P.29
High Performance Liquid Chromatograph Mass Spectrometer

TOC-L →P.46
Total Organic Carbon Analyzer

GCMS-TQ8040 →P.34
Gas Chromatograph Mass Spectrometer

LABNIRS →P.45
Functional Near-Infrared Spectroscopy System for Research

Instruments for Life Science Research

Delivering new technology for life science

Toward Discovery of Novel Life Sciences

Shimadzu continually provides leading-edge instrument to support genetic and protein research. For example, Shimadzu mass spectrometers for the identification of proteins boast world-leading analytic capacity and provide a total system to support research from the pretreatment stage. Shimadzu aims to further develop current technologies to contribute to disease diagnosis and other next-generation medical treatments by identifying abnormalities in the marker proteins contained in minute samples of blood.

Field	Applications and Objectives	Shimadzu Products
Genomics	Genotyping	MultiNA, Ampdirect Plus
	Marker discovery	MultiNA, Ampdirect Plus
	Analysis of nucleic acid compounds	MALDI-TOFMS, LCMS, TMSPC, SPM
	Genetic examination of foods	MultiNA, BioSpec-nano
	Microbial and viral examinations	MultiNA, Ampdirect Plus
Proteomics	Protein expression analysis	MALDI-TOFMS, LCMS-IT-TOF, nano-LC, AccuSpot
	Post-translational modifications analysis	MALDI-TOFMS, LCMS-IT-TOF, Trace-level oligosaccharide rapid analysis system, nano-lC, AccuSpot, Cell-free protein synthesis reagent kit
	Structural analysis	FTIR
	Peptide mapping	LCMS
	N-terminal amino acid sequencing analysis	Protein sequencing systems
	Marker discovery	MALDI-TOFMS, Stable isotope labeling kit
Metabolomics	Marker discovery	GCMS, LCMS-IT-TOF
	Metabolite analysis	GCMS, HPLC (Nexera)
Imaging	*In vitro* imaging	MALDI-TOFMS, iMScope, CHIP
	Optical brain-function imaging	fNIRS

■ Genomics
■ Proteomics
■ Metabolomics
■ Imaging

MultiNA →P.44
Microchip Electrophoresis System

MALDI-7090 →P.41
Matrix-Assisted Laser Desorption/Ionization Time-Of-Flight Mass Spectrometer

LCMS-IT-TOF →P.32
High Performance Liquid Chromatograph Ion-trap Time-of-flight Mass Spectrometer

iMScope TRIO →P.33
Imaging Mass Microscope

PPSQ-31B/33B →P.43
Protein Sequencing System

BioSpec-nano →P.44
Life Science Spectrophotometer

LABNIRS →P.45
Functional Near-Infrared Spectroscopy System for Research

Evaluation Instruments for Renewable Energy Applications

Evaluation instruments for renewable enegy

Renewable Energy for Building a Sustainable Society

Shimadzu offers solutions that contribute to next-generation energy technologies for achieving a sustainable society. These technologies include biorefineries to produce fuel or chemical raw materials from microalgae, artificial photosynthesis to create hydrogen or organic matter from sunlight, water, and carbon dioxide using a photocatalytic reaction based on the photosynthesis system of plants, and zero carbon dioxide emission fuel cells or hydrogen electric generation.

Field	Manufacturing Process and Components	Shimadzu Products
Algal Biomass	Monitoring quantities of algae cells and generated organic matter	TOC, UV
	Analysis of generated oils/fats and hydrocarbons	GCMS, LCMS, HPLC
	Cell surface hardness and particle size distribution	SPM, SALD
	Qualitative-quantitative analysis of purified substances	GCMS, LCMS, HPLC
Photocatalysts and Artificial Photosynthesis	Evaluation of heterogeneous photocatalysts	UV, XRD, XPS, FTIR, SPM
	Evaluation of homogeneous photocatalysts	UV, LCMS, FTIR, QYM-01
	Evaluation of reaction products	GC, HPLC
	Isotopic evaluation of reaction mechanisms	GCMS
Energy Carriers (hydrogen energy)	Analysis of impurities in hydrogen	GC, GCMS
	Evaluation of synthetic or reforming catalysts	UV, XRD, XPS, FTIR, SPM
Fuel Cells (Solid PEFC)	Catalyst layers	EDX, FTIR, XPS
	Supported carbons	XRD, Particle size analyzers
	Membrane electrode assemblies (MEA)	EPMA
	Electrolytes	Thermal analyzers, SPM
	Electrolyte membrane degradation components in generated water	Ion chromatograph, LCMS

Solar Cells (PV)
Rechargeable Lithium Ion Batteries (LIB)

UV-2600 →P.8
UV-VIS Spectrophotometers

XRD-6100 OneSight →P.13
X-Ray Diffractometer with Wide-Range and High-Speed Detector

EDX-7000 →P.14
Energy Dispersive X-ray Fluorescence Spectrometer

SPM-8000FM →P.16
High-Resolution Scanning Probe Microscope

LCMS-8050 →P.29
Triple Quadrupole Mass High Speed Liquid Chromatograph Mass Spectrometer

GCMS-QP2010 Ultra →P.34
Gas Chromatograph Mass Spectrometer

Tracera →P.37
High Sensitivity Gas Chromatograph System

UV-VIS Spectrophotometer

UV-1280

New

Ample measurement functions are provided in the compact body, and the data can be transferred to a PC via a USB flash drive!
UV/VIS spectroscopic analysis can be covered using a single unit.

Easy to Operate
- Measurement and instrument validation operations are simple, thanks to the easy-to-read LCD and buttons.

A Wealth of Measurement Modes
- The instrument is fully equipped with the programs needed for UV/VIS spectroscopic analysis. This includes everything from photometric measurements to DNA/protein quantitation and high level multi-component quantitation.
- Can accommodate a variety of applications, thanks to a wealth of accessories compatible with other Shimadzu UV spectrophotometers.

Data Storage on USB Flash Drives
- Data from the unit can be saved directly to a USB flash drive.
- Data that has been stored on a USB flash drive can be directly viewed using commercially available spreadsheet software.

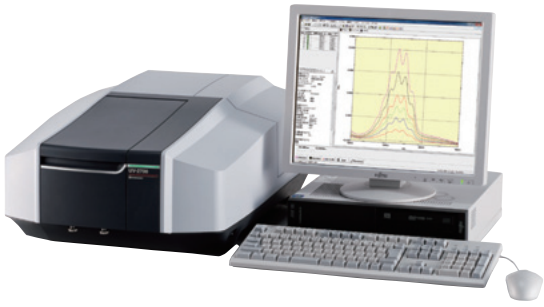
Simplified Management and Maintenance Tasks
- The checks for eight JIS performance indices can be performed automatically or semi-automatically.
- Usage times for D2/WI lamps are recorded. This makes it easy to check when it is time to replace lamps.

Safe Measurement
- Combined monitor double-beam system for the D2/WI lamps.
- Though the unit is small, it provides high stability.

Measurement wavelength range	190 to 1,100 nm
Spectral bandwidth	5 nm
Photometric mode	Monitor double beam
Stray light	0.005 % max.
Data storage	USB flash drive
Installed software	Photometric, spectrum, quantitation, kinetics, time scan, multi-component quantitation, DNA/protein quantitation, instrument validation

UV-VIS Spectrophotometers

UV-2600/2700



UV-2700

The UV-2600 is a single monochromator type that provides high cost efficiency, while the UV-2700 is a double monochromator type. These compact UV-Vis spectrophotometers feature miniaturized optical systems, a width of only 450 mm, and the smallest installation space requirements in their class. Low stray light has been achieved by adopting a Lo-Ray-Ligh grade diffraction grating, enabling high-level absorbance measurements up to 8-Abs with the UV-2700. In addition, with the UV-2600, the measurement range can be extended from 220 nm to 1,400 nm by installing the ISR-2600Plus Integrating Sphere Attachment. Newly-developed validation software is provided as standard.

Measurement wavelength range	185 to 900 nm (220 nm to 1,400 nm with the UV-2600 when the ISR-2600Plus is used)
Spectral bandwidth	0.1 to 5 nm
Stray light	UV-2600: 0.005% max. UV-2700: 0.00002% max.

UV-VIS Spectrophotometer

UV-1800

The UV-1800 uses the Czerny-Turner mounting for its monochromator, and boasts the highest resolution in its class*, a bright optical system, and a compact design. Available as either a stand-alone instrument or a PC-controlled instrument, the UV-1800 is compatible with a USB flash drive which enables users to save measurement data to the highly versatile USB flash drive and perform data analysis and printing using a PC.

*As of March 2007, according to Shimadzu survey

Spectral bandwidth	1 nm (190 to 1,100 nm)
Dimensions	450 (W) × 490 (D) × 270 (H) mm

UV-VIS-NIR Spectrophotometer

UV-3600 Plus

Not only is the main spectrophotometer unit equipped with 3 detectors – photomultiplier tube (PMT), InGaAs, and PbS detectors, but the multi-purpose large-sample compartment and the integrating sphere attachment have also been equipped with these three detectors. Thanks to the InGaAs detector, which covers the range of wavelengths in the region of the switchover between PMT and Pbs detectors, where with existing instruments there was a drop in sensitivity, superior sensitivity has been achieved over the entire measurement wavelength range.
Highly accurate absolute reflectance measurement is possible with an ASR series absolute reflectance measurement attachment, which assures the precision of measurements. Additionally, a thermoelectrically temperature-controlled cell holder or supermicro cell holder can be installed to accommodate a broader range of applications.

Measurement wavelength range	185 to 3,300 nm
Noise	0.00005 Abs max. (500 nm) 0.00008 Abs max. (900 nm) 0.00003 Abs max. (1,500 nm) Slit width 2 nm, RMS value at 1 second response
Stray light	0.00008 % max. (220 nm, NaI) 0.00005 % max. (340 nm, NaNO2)
Monochromator	2 × 2 grating type double monochromator

UV-VIS-NIR Spectrophotometers

SolidSpec-3700/3700DUV

Shimadzu's SolidSpec-3700/3700DUV is a top-of-the-line spectrophotometer with high sensitivity, deep UV measurement and a large sample compartment. The SolidSpec-3700/3700DUV responds to the requirements in optical, semiconductor and FPD applications by incorporating an integrating sphere and three detectors – photomultiplier (UV-VIS), InGaAs (NIR), and cooled PbS (NIR). The sample compartment accommodating large samples up to 700 × 560 × 40 mm and innovative three-dimensional optical system (patent pending) allow transmission and reflection measurements of horizontally loaded large samples. SolidSpec-3700DUV's wavelength range is from 175 nm (from 165 nm with optional direct detection unit) to 3,300 nm.

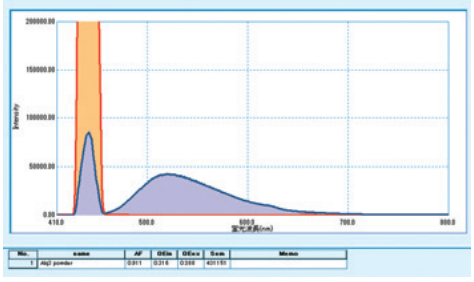
Spectrofluorophotometer

RF-6000 *New*

Achieves S/N ratios over 1000 (RMS) or over 350 (peak-to-peak), measures long wavelengths up to 900 nm, and scans at ultra fast 60,000 nm/min. Xenon lamp life has also been extended to 2000 hours. Instrument performance can be diagnosed easily using the validation function.
Standard functionality such as high-speed 3D measurement, automatic spectral correction, and quantum yield/quantum efficiency measurement functions allow it to be used for a wide variety of applications.
LabSolutions RF ensures that the extensive available functionality can be operated easily.

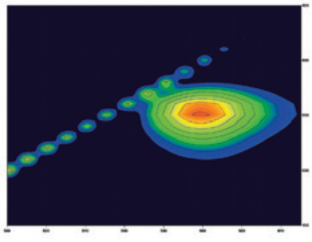
Fluorescence Quantum Efficiency Measurement

A Spectralon integrating sphere was used to measure the fluorescence quantum efficiency of the light-emitting layer of a solid-state semiconductor material (tris(8-hydroxyquinolinato)aluminum) used in an organic light-emitting device. LabSolutions RF software allowed quantum efficiency to be determined easily using intuitive operations.



High-Speed 3D Fluorescence Spectra Measurement

A 3D fluorescence spectrum of DNA was measured by making the DNA fluoresce using fluorescent dye-labeled probes. In combination with the 60,000 nm/min maximum measurement speed, the system can measure all regions of the 3D fluorescence spectrum very quickly.



Light source / lamp life	150 W xenon lamp with 2000 hr life
Measurement wavelength range	200 to 900 nm and 0 order
Resolution	1.0 nm
Sensitivity	The Raman peak S-N ratio for distilled water is over 350 (P-P) or over 1,000 (RMS).
Wavelength scan speed	Max. 60,000 nm / min

Fourier Transform Infrared Spectrophotometer

IRTracer-100

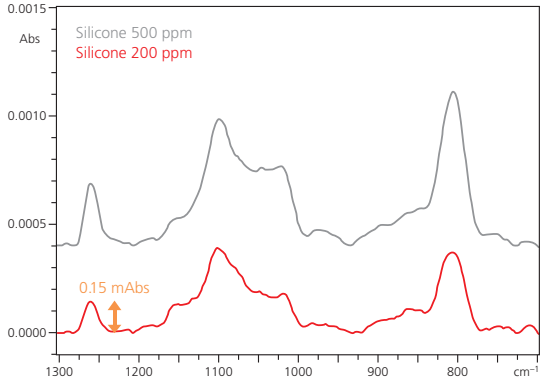
New Levels of Performance and Quality Created by Excellent Sensitivity, Speed and Resolution

Excellent Sensitivity, Speed and Resolution
Quickly and easily obtain high-quality data for any kind of sample.
Quickly analyze data with user-friendly LabSolutions IR software.
High-speed generation of analysis reports.

High Sensitivity

Achieves an S/N ratio of 60,000:1, 1.5 times better than existing models

Trace quantities of silicone oil contained in paraffin oil were measured using the IRTracer-100 and a single-reflection ATR accessory.
Even the very faint peak (1260 cm^{-1}) from the silicone, with a mere 0.00015 Abs, was measured with a high SN ratio.

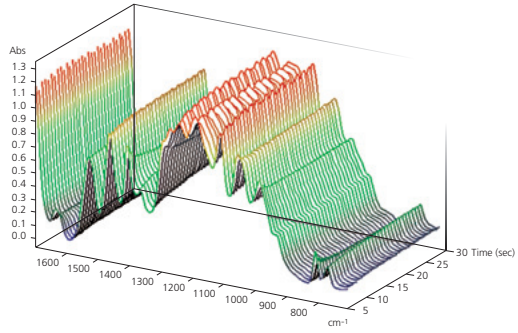


Remarks:
•Difference spectrum obtained by subtracting the paraffin spectrum
•Measured with a resolution of 4 cm^{-1}, using the DLATGS detector

High Speed

Achieves a speed of 20 spectra/sec, approximately 20 times better than existing models

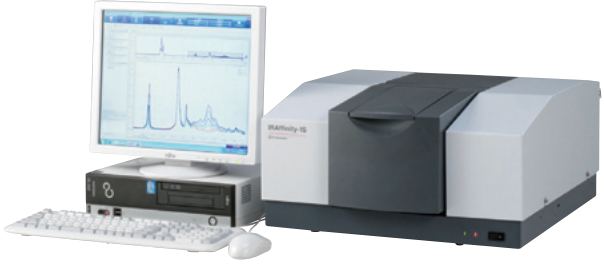
The rapid scan function allows a maximum of 20 spectra per second to be obtained. This makes the IRTracer-100 suitable for fast reactions that occur within a few seconds and for kinetic studies occurring in less than one second.



Interferometer	Michelson interferometer (30° incident angle) Equipped with Advanced Dynamic Alignment system Sealed interferometer with automatic dehumidifier
Measurement Wavenumber Range	Standard: 7,800 to 350 cm^{-1}; Option: 12,500 to 240 cm^{-1}
Resolution	0.25, 0.5, 1, 2, 4, 8, 16 cm^{-1}
SN Ratio	60,000:1 or higher (Standard: 4 cm^{-1} resolution, 1 min scan, around 2,200 cm^{-1}, peak-to-peak)
Mirror Speed	Standard: 2, 2.8, 5, 9 mm/sec Options: 10, 20, 30, 40 mm/sec (rapid scan)

Fourier Transform Infrared Spectrophotometer

IRAffinity-1S

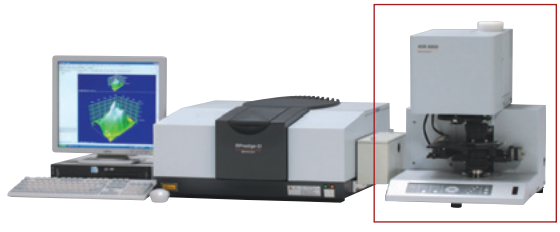


This compact FTIR spectrophotometer is designed in a stylish enclosure. A dynamic alignment mechanism ensures that the optimum interference state is maintained at all times, and easy maintenance is enabled by a built-in auto-drier. Highly functional software designed with the emphasis on operation ease enables data processing and analysis to be executed with ease.

S/N ratio	30,000: 1
Interferometer	Michelson interferometer featuring dynamic alignment
Resolution	0.5 cm^{-1}, 1 cm^{-1}, 2 cm^{-1}, 4 cm^{-1}, 8 cm^{-1}, 16 cm^{-1}
Wavenumber range	7,800 to 350 cm^{-1}

Infrared Microscope

AIM-8800



The highly efficient reflecting objective mirrors and an optimal optical system featuring aspherical mirrors ensure high sensitivity. Stage movements, aperture settings, and focusing can be controlled from a PC screen for exceptional ease of use.

Optics	15 × Cassegrain objective 15 × Cassegrain condenser mirrors
Wavenumber range	Type1: 5000 to 720 cm^{-1} Type1: 5000 to 650 cm^{-1}
Control via PC	Measurement mode selection, XY stage operation, auto centering, auto focusing, aperture setting, etc.

Atomic Absorption Spectrophotometer

AA-7000F/7000G

AA-7000 Full System

AA-7000 Series instruments are highly advanced atomic absorption spectrophotometers. The optical double-beam system enhances sensitivity and stability to achieve a top-class minimum limit of detection. Two types of background correction methods (D_2, SR) are available. Dual Atomizer System offers automatic flame/furnace switching. AA-7000 has the smallest installation footprint in the class and are first instruments in the world fitted with a vibration sensor to improve safety. The system can be expanded to suit the requirements and can be configured to achieve the sensitivity required.

Measurement wavelength range	185 to 900 nm
Background correction method	D_2 or SR method selectable
Accuracy management	QA/QC functions
Photometric mode	Optical double-beam photometric system
Atomizer	Dual atomizer (automatic flame/furnace switching)
Hollow-cathode lamp	Six lamps, automatic setup

Atomic Absorption Spectrophotometer

AA-6200

The AA-6200 is a completely PC-controlled Atomic Absorption Spectrophotometer featuring easy-to-use Windows XP software with the Wizard function, double-beam optics, and D_2 background correction. The AA-6200 uses the least linear bench space of any Atomic Absorption Spectrophotometer in the world.

Measurement wavelength range	190 to 900 nm
Background correction method	D_2-Lamp method
Atomizer	Flame only
Hollow-cathode lamp	Two lamps, automatic setup

Multitype ICP Emission Spectrometer

New

ICPE-9800 Series

BEST for all laboratories

Due to their high detection sensitivity down to ppb levels, ability to analyze a broad 5 to 6-digit range of concentrations, and ability to measure multiple elements simultaneously, ICP emission spectrometers are used in a broad range of fields, such as environmental testing, pharmaceuticals, foods, chemicals, and metals.
The next-generation ICPE-9800 series offers the superior accuracy necessary to simultaneously and quickly analyze multiple elements regardless of their concentration levels and they also feature user-friendly software that makes analysis easy.

Reduces Gas Consumption Costs

Eco Mode

The Eco mode can be used to reduce the argon gas consumption rate and high-frequency wave output during standby to about half the level used during measurements.

Mini-Torch System

By using a mini-torch, the system consumes about half the argon of the previous model.

Vacuum Spectrometer

Due to the vacuum spectrometer used, there is no need to continue purging the spectrometer with high-purity argon or nitrogen gas, as is required with standard purged type spectrometers.

Supports Using Argon Gas with 99.95 % Purity

The system is guaranteed for use with 99.95 % purity argon gas, which means less expensive industrial grade argon gas (99.99 %) can be used.
Without the need for expensive high-purity (minimum 99.999 %) argon gas required for conventional ICP systems, the ICPE-9800 can significantly reduce costs.

Simplified Data Analysis Process

The ICPEsolution software included in the system makes full use of the ICPE-9800's multitype performance so that problems with measurement samples can be evaluated from various angles.
An assistant function automates the evaluation process so that accurate measurements can be obtained easily.

Light source	Axial view (ICPE-9810) or axial and radial view (ICPE-9820), mini-torch
Spectrometer / detector	Echelle semiconductor detector (CCD)
Measurement wavelength range	167 to 800 nm
High-frequency power supply	27 MHz, 1.6 kW max.

Twin Sequential ICP Emission Spectrometer

ICPS-8100

An ICP Emission Spectrometer boasting high speed and high resolution.
The twin sequential monochromators enhance the speed to yield semi-quantitative values in approximately three minutes for the qualitative analysis of 72 elements.
The analysis of metal, rare earths, and soils require high wavelength resolution.
ICPS-8100 achieves unparalleled ultra-high resolution of 0.0045 nm.
Batch analysis from ppb to percent levels offers easy analysis from principal components to trace elements.

No. 1 monochromator, No. 2 monochromator	Focal distance 1 m
Measurement wavelength range	160 to 850 nm
Resolution	0.0045 nm
High frequency power supply	27.12 MHz 1.8 kW max.

Sequential Plasma Spectrometer

ICPS-7510

A vacuum sequential plasma spectrometer that ensures high resolution over a wide wavelength range and features ease of operation, high stability, and a wide range of applications. The profile curve checking software, which is provided as standard, includes a program for checking the reliability of a particular analytical line, such as influence of matrix effects. A wide variety of options includes Automatic Sampler, UAG-1 Ultrasonic nebulizer, and various nebulizers and torches.

Optical Emission Spectrometer

PDA-8000

This instrument is capable of high sensitivity quantitative analysis of iron and steel, copper, aluminum alloys and other solid metals, as well as impurities and other elements, thanks to a high resolution monochromator and discharge energy stabilized excitation unit. Excellent operability is achieved with software that enhances instrument monitoring and maintenance support functionality. In addition, this is an energy saving model that significantly reduces energy consumption.

Optical Emission Spectrometer

PDA-7000 Series

PDA-7000

Emission spectrometry enables rapid and accurate simultaneous determination of many elements in metals. This technique has been adopted as a standard method for metals analysis. The Shimadzu PDA series is a high-performance optical emission spectrometer, utilizing the PDA (Pulse Distribution Analysis) method as standard, which enhances the accuracy and reliability of analyses. The PDA method, combined with excellent hardware quality, makes the PDA series suitable for any application in metals analysis. It enhances analysis productivity in quality control and process control in the ferrous and non-ferrous metals industries.

Focal length	600 mm
Grating	2,400 grooves/mm
Reciprocal dispersion	1st order : 0.69 nm/mm 2nd order : 0.34 nm/mm
Effective wavelength range	121-589 nm

X-Ray and Surface Analysis Apparatus

X-Ray Diffractometers

X-Ray Diffractometer with Wide-Range and High-Speed Detector

XRD-6100 OneSight/7000S OneSight/7000L OneSight

XRD-6100 OneSight

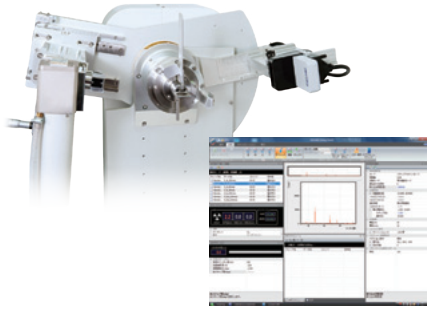
XRD-7000S OneSight / XRD-7000L OneSight

These X-ray diffractometers are equipped with the OneSight wide-range and high-speed detector, which makes possible high-speed and high-sensitivity measurements. The measurement window of the software has also been completely revised, so operability is greatly enhanced. A door lock mechanism is activated whenever X-rays are emitted, thus contributing toward the enhanced safety of the unit. The system can accommodate a broad variety of applications, ranging from fundamental ones, such as qualitative and quantitative analyses, to applications such as crystalline structure analysis, which can be accomplished using optional software. The XRD-6100 OneSight is a compact and simplified model, which is equipped with a vertical type, high-precision goniometer. The XRD-7000S OneSight and 7000L OneSight are equipped with a horizontal-sample-type goniometer, which allows extremely large samples to be accommodated.

	XRD-6100 OneSight	XRD-7000S OneSight / 7000L OneSight
X-ray generator	2 kW or 3 kW, controlled by computer	
Goniometer	θ-2θ linkage, θ, 2θ independent	
Detector	Wide-range and high-speed detector	
Operational range	2θ: -6° to 163°	θs: -6° to 82°, θd: -6° to 132°

Wide-Range and High-Speed Detector for XRD-6100/7000

OneSight



This is an optional detector that can be installed in an existing XRD-6100/7000. This is a wide-range detector comprising 1,280 channels of semiconductor elements. An intensity that is more than 100 times greater than existing scintillation detectors can be achieved, thus allowing high-speed measurement. Moreover, by taking advantage of the wide-range angle measurement, the unit can offer the "One-Shot Mode," which performs analysis while the goniometer is in a fixed position. Ease-of-use has also been improved using the software that provides for measurements with OneSight.

Number of channels	1,280
Strip width	50 µm
Active area	64 (W) × 8 (L) mm
Dimensions	71 (W) × 24 (D) × 100 (H) mm

Energy Dispersive X-ray Fluorescence Spectrometer

EDX-7000/8000

Equipped with an electronically cooled high-performance semiconductor detector, the EDX-7000/8000 is designed for reduced running costs and ease of maintenance while providing better sensitivity, throughput, and resolution than conventional models. A wealth of optional functions is available, including a vacuum measurement unit, which is effective for light element analysis, and a turret unit, which is effective for consecutive analyses. Two software programs are included as standard. PCEDX-Navi allows easy operation, and PCEDX-Pro is for general analysis applications. As an analysis option, the instrument can also be equipped with the screening functions achieved with the EDX-LE. From management applications involving compliance with RoHS/ELV directives and other environmental regulations to research applications involving the high-level needs of general sample analysis, the EDX-7000/8000 can be applied broadly, whatever the industry.

	EDX-7000	EDX-8000
Elements to be determined	$_{11}$Na to $_{92}$U	$_{6}$C to $_{92}$U
Sample chamber dimensions	300 (W) × 275 (D) × approx. 100 (H) mm max. (Assuming no rounded corners)	
Primary filters	5 types (6 including the open position); automatic replacement	
Software	Simple analysis software (PCEDX-Navi) General analysis software (PCEDX-Pro)	
Options	Vacuum measurement unit, helium purge unit, turret unit, screening analysis kits	Vacuum measurement unit turret unit; screening analysis kits

Note: Options are not included.

Multi-Channel X-Ray Fluorescence Spectrometer

MXF-2400

The MXF-2400 features a compact design and ease of operation.
A maximum of up to 36 elements can be simultaneously determined (depends on configuration).

Elements to be determined	$_{5}$B, $_{6}$C, $_{7}$N, $_{8}$O to $_{92}$U
Converging system	Curved crystal
X-ray tube	4 kW with a thin window

Energy Dispersive X-ray Fluorescence Spectrometer for RoHS/ELV screening

EDX-LE

The software for this system is loaded with the optimal functions for screening, including automatic calibration curve selection and automatic reduction of measurement time, and the hardware includes a large sample chamber, capable of analyzing a variety of samples. In addition, an electronically cooled detector has been adopted, so instrument maintenance is kept to a minimum. Utilizing optional analysis kits, the EDX-LE can also accommodate screening analysis of halogen compounds and antimony that are subject to regulations. Furthermore, in combination with the optional Additional Function Kit, the instrument can also be used for applications besides screening, such as qualitative analysis, film thickness analysis, and steel grade determinations utilizing general analysis software.

	EDX-LE
Elements to be determined	$_{13}$Al to $_{92}$U
Sample chamber dimensions	370 (W) × 320 (D) × approx. 155 (H) mm max.
Primary filters	5 types (6 including the open position); automatic replacement
Software	Screening software
Options	Halogen Screening Analysis Kit RoHS, Halogen, Antimony Screening Analysis Kit Additional Function Kit

Note: Options are not included.

Sequential X-Ray Fluorescence Spectrometer

XRF-1800

The XRF-1800 provides local analysis and 250 mm mapping capabilities as standard features, enabling reliable analysis of a local area, only a 0.5 mm in diameter in the wavelength dispersive method. More than a 30% sensitivity improvement compared with a conventional 3 kW X-ray tube is achieved through the use of a 4 kW X-ray tube with a thin window.

Elements to be determined	$_{8}$O ~ $_{92}$U with LiF, PET, Ge and TAP analyzing crystal $_{4}$Be~$_{7}$N with optional analyzing crystal
X-ray tube	4 kW with a thin window
250 µm Mapping resolution as standard	

Electron Probe Microanalyzer

EPMA-8050G

New

Debut of the Grand EPMA

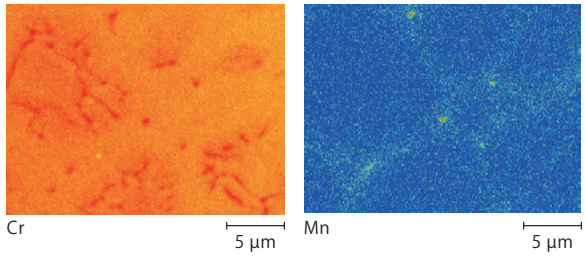
Shimadzu's FE-EPMA system features a cutting-edge FE electron optical system that provides the ultimate in advanced analytical resolution. This provides unprecedented spatial resolution for SEM observation with beam current higher than 3 µA. In combination with Shimadzu's traditionally high performance X-ray spectrometers, this advanced FE electron optical system can provide both maximum resolution and maximum sensitivity at the same time.

Features

- Includes cutting-edge FE electron optical system
- Up to five high-sensitivity 4-inch spectrometers can be included.
- Includes 4-interval high-sensitivity BSE detector
- Windows-compatible operating system
- Intelligent vacuum evacuation system
- Includes easy mode analysis function for the automation system
- Dual stigmator included standard

Elements analyzed	4Be (optional) and 5B to 92U
X-ray spectrometer	Max. five high-sensitivity spectrometers
Max. sample size	100 mm square × 50 mm thick
X-ray take-off angle	52.5 deg.
Mapping resolution	20 nm (10 kV to 10 nA)
Secondary electron resolution	3 nm

Ultra High Resolution Mapping
The beam can be emitted at a maximum current over 3 µA.



Mapping Analysis of Trace Elements in Stainless Steel
Left: Clearly shows distribution of phases with slightly differing concentrations of Cr.
Right: Distribution of Mn concentrations less than 0.1 % are visible.

Electron Probe Microanalyzer

EPMA-1720/1720H

The Electron Probe Microanalyzer (EPMA) allows highly sensitive analysis of elements in micron-scale regions on the sample. The fully digital control system offers revolutionary observation and analysis operations using only the mouse and keyboard. It can also be operated from a networked PC. EPMA-1720H incorporates a high-performance CeB6 filament that allows EPMA analysis of sub-micron regions.

Secondary-Electron Image Resolution	6 nm (EPMA-1720)	5 nm (EPMA-1720H)
Analyte Elements Range	4Be to 92U	
Number of X-Ray Spectrometers	2 to 5 channels	
X-Ray Take-Off Angle	52.5°	

Fully Automatic Combination Imaging X-Ray Photoelectron Spectrometer

KRATOS ULTRA2 (AXIS Supra)

New

This surface analyzer features higher performance and the ability to control all operations via a computer, while maintaining the same system configuration freedom as before. The high-speed real-time XPS imaging using a spherical mirror analyzer achieves spatial resolution of 1 µm that clearly shows the chemical distribution in micro areas. An ample selection of options ensures the system can be used for a wide variety of applications, such as in-situ testing without exposure to air or high-energy XPS measurements.

Imaging resolution	1 µm
Sensitivity	(monochrome X-rays, 0.48 eV FWHM Ag3d) Macro analysis: 400 kcps, 27 µm dia. analysis: 8 kcps
Options	Mg/Al X-ray source, UV light source for UPS, FE Auger electron gun, air-sensitive sample transporter, sample heating/cooling unit, catalyst reaction cell, Ar gas cluster ion gun, Ag monochrome X-ray source, etc.

KRATOS XPS Imaging Spectrometer

KRATOS NOVA

The Micro XPS instrument significantly automates the stages from introducing the sample to starting analysis. The analysis position can be rapidly assigned to any point on the 110 µm-diameter sample platen from a CCD camera image or realtime photoelectron image. The revolutionary, patented charge neutralization method produces high-resolution spectra with no damage to the sample, thereby allowing micro analysis of organic matter that was conventionally difficult.

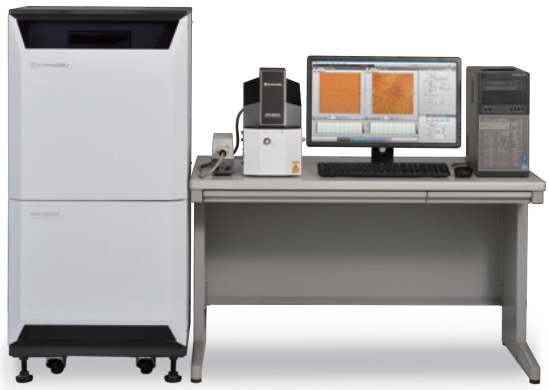
Image resolution	3 µm max.
Sensitivity	(monochrome X-rays, 0.48 eV FWHM) Macro analysis: 250 kcps 15 µm dia. analysis: 0.8 kcps

High-Resolution Scanning Probe Microscope

SPM-8000FM

HR-SPM

See the Nano World Come to Life



The HR-SPM is a next-generation scanning probe microscope that employs a frequency detection method. Existing SPMs (scanning probe microscopes) and AFMs (atomic force microscopes) generally employ an AM (amplitude modulation) method. In principle however, the FM (frequency modulation) method is a high-sensitivity measurement method, which enables imaging at even higher levels of resolution. Not only does it enable ultra-high-resolution observation of atmospheric or liquid-based targets, but now, for the first time, observation of hydration/solvation of the solid-liquid interface is made possible.

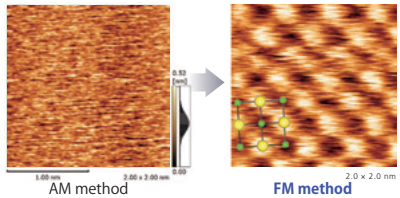
Features of HR-SPM

- Employs FM method.
- Noise within air or liquids has been reduced to 1/20 of that of existing units
- The performance of vacuum SPM has been matched successfully within air and liquids.

Observation mode	Contact, dynamic (AM method and FM method), lateral force (LFM)
Resolution	Horizontal: 0.2 nm; Vertical: 0.01 nm
AFM head	Displacement detection system: Light source, optical lever, detector Light source: Laser diode (ON/OFF) Irradiates a cantilever continuously even while replacing samples Detector: Photodetector

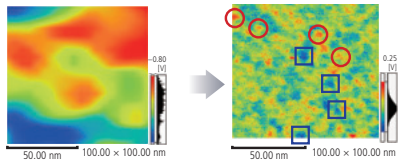
Differences Compared with Existing SPM/AFM

Atomic Resolution Observation in Liquids



KPFM Observation* of Atmospheric Pt Catalyst Particles

* KPFM : Keivin Probe Force Microscope



Scanning Probe Microscope

SPM-9700

This microscope enables high-magnification observations of the three-dimensional structure and local properties of samples. With a wealth of functions and expandability, this instrument is capable of meeting a variety of demands. Thanks to a revolutionary software interface, all operations are straightforward, from observation through to analysis.

Observation Modes	Standard: Contact, Dynamic, Phase, Lateral Force (LFM), Force Modulation Optional: Magnetic Force (MFM), Current, Surface Potential (KFM)
Resolution	X, Y: 0.2 nm, Z: 0.01 nm
SPM Head	Displacement detection system: Light source / Optical lever / detector Light source: Laser diode (ON/OFF) Irradiates cantilever continuously, even while replacing samples. Detector: Photodetector

Environment-Control Scanning Probe Microscope

WET-SPM Series

Permits SPM observations in a controlled environment.
The environment-controlled chamber with a large viewport and twin gloves permits all types of pretreatment in a fully controlled environment. It offers in-situ SPM observations of changes to a sample due to fluctuations in factors such as temperature, humidity, pressure, light quantity, and concentration. (Japan and US Patented)

Glove ports	2 (both arms)
Pumps	Rotary pump, turbomolecular pump (option)
Vibration isolation	Internal air-spring damper

High-Performance Liquid Chromatograph New

i-Series

Computer-Less Laboratory Realized to Free Operators from the Laboratory

In addition to the reliability and stability afforded by the proven core capabilities of the i-Series, its remote monitoring functions which employ smart devices, and its ICM, which allows all necessary operations from setup of the samples to the start of analysis to be performed on the instrument itself, have eliminated the troublesome analysis operations that needed to be made on a computer in the laboratory, achieving a computer-less laboratory.

innovative –Realization of Advanced Laboratory

- ICM (Interactive Communication Mode) to free operators from the laboratory
- Remote monitoring regardless of operating environment
- Maximum reliability and stability
  - · Dual temp-control with TC-Optics and flow cells unaffected by room temperature fluctuation
  - · Excellent micro injection volume reproducibility of 1 µL or less
  - · Ultrafast injection cycle reduces analysis times

Intuitive –Achieving Easier Operation

- Unified graphical user interface between system and workstation
- Create analytical sequences on visualized vial positions: Quick batch function

intelligent –Smart Features Increase Work Efficiency

- Automation of a number of routine analysis procedures
- Migrate existing methods from either Shimadzu or non-Shimadzu systems

Prominence-i

Nexera-i

Prominence-i

The Prominence-i is an all-in-one LC system that can be operated intuitively regardless of the level of the operator's experience. This feature of course builds upon its reliable and stable core features. Information such as the real-time display of the chromatogram for the ongoing analysis or the current status of the instrument can be viewed at a glance. A navigation function allows for monitoring the usage frequency of consumables and assists with replacement procedures. This reduces the time for maintenance needed for the instrument and increases the operation rate. Additionally, due to the optimum system capacity, analysis method files used on existing HPLC systems can be transferred smoothly. It is well suited as a specialized analyzer for routine tasks such as checking synthetic materials or performing quantitative tests in accordance with pharmacopoeia.

Nexera-i

The Nexera-i is a simple, all-in-one UHPLC system that raises the productivity of the laboratory to the maximum by reducing the time needed to develop analysis methods, and by simplifying the work needed to transfer already proven method files.
Up to 1,536 samples can set up at once, so CMC related analyses that require many samples, or a wide variety of other analyses, such as dissolution tests, pharmacokinetics, and toxicant tests can be speedily accomplished, thus reducing the time needed. Moreover, the automatic shutdown function of the i-Series has resulted in a reduction of more than 95 % (compared with Shimadzu existing systems) in the power consumption of the instrument when in the standby state, contributing to reducing the environmental impact.

Ultra High Performance Liquid Chromatograph

Nexera X2

Ultra High Performance Liquid Chromatograph

Maximizing the Potential of UHPLC/HPLC Analysis

The Nexera X2 is a completely new UHPLC system that not only offers maximum speed, sensitivity, resolution, stability, and reliable performance, but also features revolutionary ***i***-PDeA* separation technology and an ***i***-DReC** function that extends the dynamic range, so that both concentrated and trace components can be quantitated simultaneously.

Intelligence

The new SPD-M30A photodiode array detector enables complete separation of even unseparated peaks using the i-PDeA* function. This also enables peak integration that is difficult because of overlapping peaks and detection of minute peaks hidden in the main component peak.
We can propose various new applications by combining ***i***-PDeA* with ***i***-DReC**, a new analysis technique that dramatically expands the dynamic range.

Sensitivity

The SPD-M30A features a newly designed detector cell as well as other optical units. The capillary cell (option) has an optical path length of 85 mm and enhances the intensity of the signal. It achieves one of the world's lowest noise levels, less than 0.4 × 10^{-5} AU, thus facilitating even higher-sensitivity analysis.

Resolution

Thanks to the SPD-M30A's low-dispersion cell (SR-Cell), the Nexera X2 has been reborn as a low-dispersion system. This achieves outstanding spectral resolution and improves the reliability of data provided by ***i***-PDeA*.

Stability

The SPD-M30A is mounted with a new temperature control function, TC-Optics (Temperature Controlled Optics). This reduces the time taken for the system to stabilize until analysis can be started after the instrument is started up, and stabilizes the baseline against minute fluctuations in room temperature during analysis.

* Intelligent Peak Deconvolution Analysis, patent pending
** Intelligent Dynamic Range Extension Calculator, patent pending

Ultra High Performance Liquid Chromatograph Method Scouting System

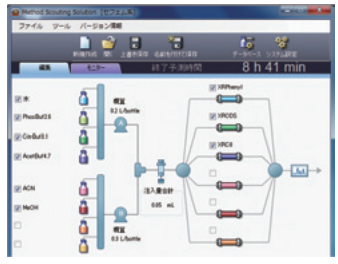
Nexera Method Scouting

This system was constructed with the goal of automating the analysis method development process and shortening the time required. Thanks to automatic data acquisition utilizing up to 96 method combinations based on 16 types of mobile phase solvents and 6 types of columns, the system reduces the total time required for method searches while enabling the comprehensive investigation of analysis conditions.
This new Nexera application system significantly heightens the efficiency and speed of the method development process in a wide range of fields including pharmaceutical CMC and drug development/synthesis.

Major component units	CBM-20Alite, LC-30AD × 2, DGU-20A5 × 2, SIL-30AC, CTO-20AC, FCV-34AH, SPD-M20A, Startup Kit, LabSolutions LC, etc.

Method Scouting Solution: Supporting Fast, Secure Operation

Method scouting results are important data for determining analysis conditions, so obtaining highly reliable data is essential. Method Scouting Solution provides the data required for analysis via a graphical user interface, as well as automated controls conforming to laboratory operations configured in the system settings, thereby providing data reliably.



Display of the required amounts of mobile phases and samples, and the estimated completion time

Method scouting uses a variety of mobile phase and column combinations. Method Scouting Solution calculates the required amounts of these mobile phases and samples in advance, and provides this data to avoid shortages. Furthermore, upper pressure limits are automatically controlled based on column pressure resistance data registered in the column database, thereby avoiding degradation of precious columns.
In addition, the system provides estimates of completion time, with consideration to the time required between analyses for processes such as mobile phase auto-purging and column equilibration. As a result, scouting can be configured to suit your work schedule.

New **Supercritical Fluid Extraction/Chromatograph System**

Nexera UC

Unified Chromatography

Nexera UC On-Line SFE-SFC-MS System

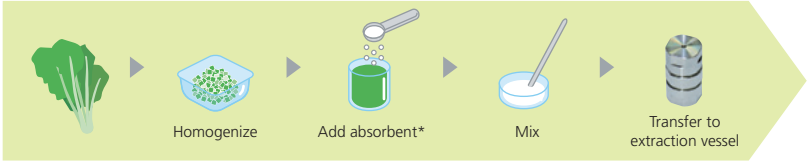
Unified Chromatography Offering Another Possibility or the Only Possibility

The Nexera UC online SFE-SFC system is a revolutionary new system that combines supercritical fluid extraction (SFE) with supercritical fluid chromatography (SFC). Automating the process of extracting and analyzing target components from solid samples means pretreatment times can be shortened and more accurate data can be obtained.

Directly Analyze Target Components in Complex Samples Automatically

Conventional sample preparation (QuEChERS method) required many steps involving adding reagents and separating by centrifuge, which took 35 minutes before analysis could start. In contrast, the Nexera UC does not require any complicated operations and analysis can be started in only five minutes. In addition, it can simultaneously analyze a wide range of pesticide components, including those normally analyzed using GC or GC/MS/MS systems and those normally analyzed using LC or LC/MS/MS systems, and with a wide range of polarities, from hydrophobic to hydrophilic.

Nexera UC …Only **5 minutes** of operations required before analysis **5 min**



Extraction and Analysis by SFE-SFC-MS

* "Miyazaki Hydro-Protect" Patented in Japan No. 3645552

SFC-LC/MS/MS System

Nexera UC UFMS System

New

The Nexera UC UFMS uses a supercritical fluid to enable high-speed high-separation analysis. A low-volume SFC-30A supercritical fluid back pressure regulator unit injects the entire volume eluted from the column directly into the mass spectrometer to achieve high-sensitivity analysis.
It is ideal for the simultaneous analysis of residual pesticides, for analyzing fatty acids or phospholipids that have many analogues, or for analyzing synthetic chemicals.

Major component units (standard system)	CBM-20A, LC-20ADXR×2, DGU-20A5R, SIL-30AC, CTO-20AC, LC-30AD$_{SF}$, SFC-30A, LCMS-8050, LabSolutions LCMS, etc.

Supercritical Fluid Chromatograph

Nexera UC Chiral Screening System

New

Selecting analytical conditions for chiral compounds requires using trial and error to determine the optimal combination of analytical column and mobile phase for the intended type of analysis, which requires significant time and effort for method development.
In contrast, the Nexera UC chiral screening system is especially well suited for determining the separation parameters for chiral compounds. It acquires data by automatically changing modifier parameters for up to 12 columns. A mobile phase blending function allows mixing four types of modifiers in any ratio desired to analyze samples using a variety of separation parameters.

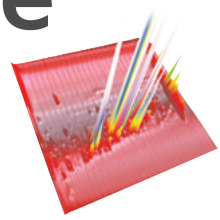
Major component units (standard system)	CBM-20A, LC-30AD, low-volume LPGE unit, DGU-20A5R, DGU-20A3R, SIL-30AC, CTO-20AC×2, LC-30AD$_{SF}$, SPD-M20A, SFC-30A, LabSolutions LC, etc.

Comprehensive Two-Dimensional Liquid Chromatograph

Nexera-e

New

New Separation Method for Complex Samples

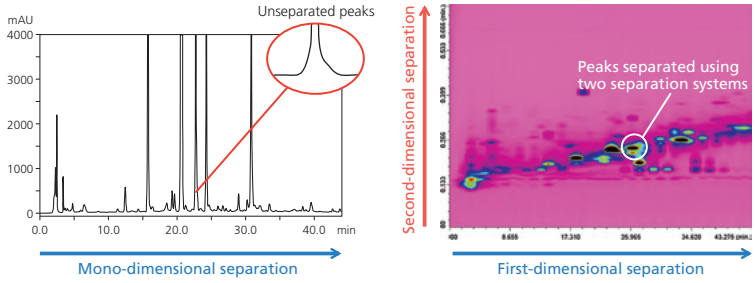


By combining two independent separation modes orthogonally, the comprehensive 2D-LC analysis provided by the Nexera-e offers another new possibility for liquid chromatography.
It provides exceptionally high separation not possible with conventional HPLC systems, so that target components can be accurately detected in complex samples, such as impurities in pharmaceuticals, enzyme digested substances from proteins, natural substances including food extracts, or synthetic polymers.

Achieves High Separation Not Possible with Conventional 1D LC

The Nexera-e includes a LC-30AD solvent delivery unit that offers the highest pressure capacity and delivery stability levels in the world,* which makes it possible to select from a wide range of separation parameters for both first and second dimensions. Consequently, it can achieve comprehensive analysis of each sample component, which was difficult with a mono-dimensional separation system.

* As of November 2012, according to a Shimadzu survey



Whereas a mono-dimensional separation system can result in overlapping peaks for some components, as shown to the left, using two-dimensional separation processes can separate peaks as shown on the right.
Also, the 1D LC resulted in identifying 74 peaks, but with the Nexera-e system, over 200 peaks were detected in the same amount of analysis time.

Comparison of Separation of Hot Water Extract of Radix Puerariae (kudzu) by Nexera-e and Conventional 1D LC

LC/MS Frontend Ultra High Performance Liquid Chromatograph

Nexera MP System

The Nexera MP is the optimal UHPLC for LC-MS analysis in pharmacokinetics and synthesis areas in the drug discovery process. The SIL-30AC$_{MP}$ Multiplate Autosampler, adopted by the Nexera MP, features the world's best*) trace quantity injection repeatability values, the world's fastest*) injection speeds, and ultralow carryover, thereby encapsulating the performance needed for LC-MS analysis. A system for high speed, high accuracy analysis of multiple analytes can be constructed by combining the Nexera MP with a ultra high performance mass spectrometer such as the triple quadrupole LCMS-8030, or the single quadrupole LCMS-2020.

Note: As of May 2011, according to Shimadzu survey

Ultra High Performance Liquid Chromatograph

Nexera XR

The Nexera XR series of ultra high performance liquid chromatographs achieves both high speed and high resolution, based on high analysis precision and reliability. In addition to conserving solvents and improving analysis productivity through shorter analysis times, this system supports the reliable separation and detection of microscopic quantities of substances in a variety of fields. Examples include the evaluation of trace impurities in order to further improve product quality in pharmaceutical and chemical fields, and the evaluation of microscopic quantities of residual pesticides to ensure the safety of foods.

Automated Purification LC System

Crude2Pure

Single Recovery System

In purifying target compounds from extracts of natural products and synthetic substances using preparative LC system, obtaining the target compound in a powder form from the fraction is an important process. Until now, the purification and powderization of targeted compounds obtained using preparative LC system has required a great deal of effort, and it has in many cases been difficult to obtain a highly pure powder as the result. The Crude2Pure system is the world's first to employ breakthrough automatic purification and powderization technology to effectively eliminate components derived from the mobile phase included in the fractionated liquid and water. It thus allows highly pure powder containing the targeted component to be obtained in a short amount of time. We feel confident that this system is a viable solution wherever fractionation, purification, and powderization processes play an important role. It is suitable for organic synthesis and the measurement of compounds in natural products in fields such as the pharmaceutical industry, science, foodstuffs, as well as public research facilities.

Major component units (Single recovery system)	CBM-20A × 2, LC-20AP × 4, FCV-230AL × 5, SIL-10AP, trapping module, recovery controller, recovery station, VP option box, FCV-14AH × 2, etc.

High-Sensitivity Impurity Quantification System

Co-Sense for Impurities

By combining online trap concentration technology with two-dimensional separation, the Co-Sense for Impurities system achieves reliable separation of trace compounds, as well as high sensitivity analysis with excellent repeatability, using absorbance or other conventional detectors. The system is capable of approximately 10 to 20 times higher sensitivity in comparison to conventional HPLC. In addition, analysis operations, and system rinsing and other maintenance operations are simple, thanks to the special control software adopting a graphical user interface. In comparison to conventional LC-MS, Co-Sense for Impurities provides more stable sensitivity, and reduced running costs at and subsequent to system introduction, thereby demonstrating its power in the routine analysis of trace compounds for quality control.

Major component units	CBM-20A, LC-20AD × 2, LC-20AB, LC-20AP, DGU-20A5, SIL-20ACHT, CTO-20AC, SPD-20A, SPD-20A UFLC, LabSolutions LC, etc.

Prominence Preparative System

LC-20AP Gradient Analysis/Preparative System

In a preparative system, scaling up from the analysis scale to the preparative scale is an important element in achieving greater fractionation accuracy and efficiency. The LC-20AP preparative solvent delivery unit offers excellent basic performance across a wide range from the analytical to large-volume preparative scale, which permits effective scaling up. The system is a powerful tool for testing purity by analyzing fractions. The LC-20AP also contributes to energy savings. This is a preparative system that supports a wide range of applications from fractionating natural substances to impurity analysis. The extensive product range permits configuration of a variety of systems to match the preparative scale.

Major component units	CBM-20A, LC-20AP × 2, FCV-230AL, SIL-10AP, manual injector, column holder, SPD-M20A, FRC-10A, LabSolutions LC, etc.

Prominence Preparative System

Recycling Semi-Preparative System

Recycling preparative purification is a method that repeatedly reintroduces the sample eluted from the column back into the column to improve separation. It can be applied to the preparative purification of a wide range of compounds. The LC-6AD recycling semi-preparative system and LC-20AP recycling preparative system support recycling preparative purification across a wide range of synthetic scales, from semi-preparative scale to large-volume fractionation at the laboratory scale. The dedicated Recycle-Assist software offers an intuitive operation environment to support all types of recycling preparative work procedures.

Major component units (Fully automatic LC-6AD)	CBM-20A, LC-6AD, FCV-12AH, SIL-10AP, column holder SLIM, SPD-20A, FRC-10A, Recycle-Assist, etc.

High Performance Liquid Chromatograph

Prominence

This network-compatible modular HPLC offers the performance and functionality demanded in today's age, including Web control, fast sample-injection operations, high detector sensitivity, and full automation. It allows control, monitoring, and maintenance not only from a LC workstation but from any networked client PC running Microsoft Internet Explorer via the CBM-20A. Precise solvent delivery in the low flow rate range and near-zero sample carryover performances make the Prominence an ideal front-end for LC-MS.

Nanoflow Liquid Chromatograph

Prominence nano

Prominence nano is a new nano-flow liquid chromatograph capable of high-sensitivity analysis required in the field of proteomics, where proteins are exhaustively analyzed. With outstanding flow rate precision, even at nano-level flow rates, it offers excellent retention time repeatability, which is especially useful when used as a front end HPLC unit for LC-MS.

Major component units	System Controller: CBM-20A, CBM-20Alite Solvent Delivery Unit: LC-20AD, LC-20AT, LC-20AB Auto Sampler: SIL-20A, SIL-20AC Column Oven: CTO-20A, CTO-20AC Photodiode Array Detector: SPD-20A, SPD-20AV, SPD-M20A

Online Enzymatic Digestion HPLC for Protein Analysis

Perfinity iDP

The Perfinity iDP (Integrated Digestion Platform) is a new platform for protein analysis. This platform completely automates the flow of operations from the enzymatic digestion of proteins through to reverse phase HPLC column separation and LC/MS detection. Adoption of a highly efficient trypsin column greatly reduces the digestion time to a mere one to four minutes, and on-line automatic analysis achieves high reproducibility and reliability. Dedicated software completely supports selection of methods and flow of operations from setup through to sample analysis. On-line interfacing to a mass spectrometer also expands the applicability of this platform.

* Perfinity and Perfinity iDP are registered trademarks of Perfinity Biosciences, Inc.

Major component units	CBM-20A, LC-20ADXR × 2, LC-20AD, DGU-20A5R, SIL-20ACHT UFLC, CTO-20AC, SPD-20A, LabSolutions LC, Perfinity iDP Startup Kit, etc.

LC/MS High-Speed Amino Acid Analysis System

UF-Amino Station

The batch analysis of amino acids (38 components), which are components of living organisms, conventionally requires at least two hours, but this system performs it in a mere nine minutes. By adopting a liquid chromatograph mass spectrometer, highly reliable analyses are provided, even for samples containing complicated matrices. In addition, prelabel derivatization reactions are automated, which reduces the labor involved in pretreatment, and improves analysis reliability. The special AmiNavi™ software supports continuous operability from analysis preparations to the confirmation of quantitative results.

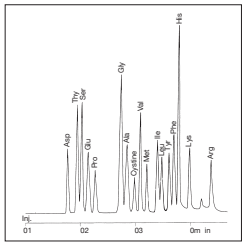
* AmiNavi is a registered trademark of Ajinomoto Co., Inc.

Major component units	CBM-20Alite, LC-20AT, DGU-20A5R, CTO-20AC, FCV-32AH, SPD-20A UFLC, SIL-20ACPT, UF-Amino Station start-up kit, LCMS-2020, LabSolutions LCMS, etc.

Prominence Application System

Amino Acid Analysis System

Post-column fluorescence detection with OPA (ortho-phthalaldehyde) as a derivatizing reagent provides better sensitivity for the analysis of amino acids than the traditional ninhydrin method.
N-acetylcysteine, an odorless solid, is used as a thiol agent (Japanese Patent No. 1567849). This method is easier to use than the conventional mercaptoethanol method, and provides the highly sensitive detection of amino acids such as proline.



Prominence Application System

Reducing Sugar Analysis System

Selectively detects reducing sugars with high sensitivity, using Shimadzu's unique post-column fluorescence detection technology (patented), which uses arginine as a reaction reagent. This system is ideal for analyzing reagents with high impurity levels or, by changing the reagent, analyzing non-reducing sugars.

Instruments Included in the Example Shown	CBM-20Alite, LC-20AB, LC-20AD, DGU-20A5, SIL-20AC, CTO-20AC, CRB-6A, RF-20AXS, LCsolution, and others.

Prominence Application System

Organic Acid Analysis System

This organic acid analysis system relies on Shimadzu's unique pH-buffered post-column method with electric conductivity detection to offer superior selectivity and sensitivity. The system uses ion exclusion chromatography to separate organic acids, then consecutively adds pH buffering reagent to the column eluate to keep the pH at a near-neutral level and the organic acids in a dissociation state. Electric conductivity is then used for detection. By combining ion exclusion chromatography, this method is suitable for the analysis of organic acids in samples containing large amounts of contaminant components (mainly lower fatty acids).

Major component units	CBM-20A, LC-20AD × 2, DGU-20A3R, SIL-20AC, CTO-20AC, CDD-10AVP, LabSolutions LC, etc.

High-Performance Liquid Chromatograph

Prominence Bioinert LC System

This is a bioinert-specification HPLC system that offers superb resistance to corrosion due to mobile phases containing halogen ions, such as sodium chloride that is used for the analysis and fractionation of biopolymers. As the sample does not contact any metal materials, this system is ideal for the analysis of components that may undergo a change in activity due to contact with metals. Using the range of high-sensitivity detectors that are well established for general HPLC permits the analysis of trace impurities. The system can be operated at ambient temperatures from 4°C, which supports the analysis of enzymes and physiologically active substances that can be deactivated by temperature.

Major component units	CBM-20A, LC-10Ai, DGU-20A5R, SIL-10Ai, CTO-20AC, FCV-10ALVP, SPD-20A, FRC-10A, LabSolutions LC, etc.

Prominence Application System

Prominence GPC System

By combining the superior solvent delivery and sample injection performance of the Prominence series with a temperature-controlled detector, this system achieves rapid baseline stabilization and outstanding reproducibility of analytical results, which results in providing highly reliable data.
Convenient features, such as an overlapping injection function and automated analysis workflow, help increase productivity for routine GPC measurements. The system is also able to recycle mobile phase from intervals where no components are eluted, which minimizes any environmental impact.

* Using a solvent recycle valve (optional).

Major component units	CBM-20A, LC-20AD, DGU-20A3R, SIL-10AHT, CTO-20A, RID-20A, LabSolutions LC, LabSolutions GPC software, etc.

Ion Chromatograph

Prominence HIC-NS/HIC-SP

A simple and high-performance ion chromatograph that utilizes non-suppressor technology. It is provided with a highly sensitive conductivity detector controlled by a built-in microprocessor and features temperature control in two stages. It can be upgraded from a simple system to a fully automated system just by adding the necessary components. Suited for the analysis of environmental pollutants.

Major component units	CBM-20A, LC-20ADSP, DGU-20A3R, SIL-10Ai, CTO-20AC(NS), CDD-10AVP(NS), SPD-20A(SP), HIC-20A Super(SP), LabSolutions LC and others.

Prominence Application System

Carbamate Pesticide Analysis System

Post-column fluorescence detection system that analyzes n-methyl carbamate pesticides in agricultural products. Shimadzu's unique reaction unit provides highly sensitive and highly precise analysis.

Instruments Included in the Example Shown	CBM-20A, LC-20AB, LC-20AD × 2 units, DGU-20A5, SIL-20AC, CTO-20AC, CRB-6A, RF-20AXS, LCsolution, and others.

Polymer Analysis System

SEC (GPC)-AccuSpot-AXIMA System

MALDI-TOF MS is commonly used for structural analysis and for evaluation of the physical properties of synthetic polymers. However, where multiple components are combined, mutual interference between the components inhibits ionization, resulting in detection of the major components only while the trace components are not detected at all. This problem can be overcome by SEC-MALDI-TOF MS, which pre-separates the multicomponent sample into components by size exclusion chromatography (SEC) before measurement by MALDI-TOF MS. This system conducts GPC separation, mixes the MALDI matrix solution, and spots the resulting solution onto the MALDI plate on-line. It permits highly sensitive detection of ultra-trace components in polymer materials and enhances the efficiency of analysis work.

Major component units	AXIMA Assurance, CBM-20Alite, LC-20AD, DGU-20A3, 8125 Manual Injector, CTO-20AC, SPD-20A, AccuSpot, LCsolution, etc.

Nexera Solvent Delivery Unit
LC-30AD

This solvent delivery unit achieves solvent delivery at a globally unprecedented 130 MPa. The LC-30AD provides excellent retention time repeatability thanks to stable solvent delivery on par with conventional analysis, with a flowrate precision of ±0.06%, even under ultra-high pressures. In addition, system capacity has been reduced thanks to a high efficiency, low capacity mixer (20 µL), based on micro reactor technology. If the optional reservoir switching valve is attached, the equipment can perform automatic mobile phase switching in method analysis and column rinsing.

Prominence UFLCXR Solvent Delivery Unit
LC-20ADXR

Retains the excellent basic functions developed in the LC-20AD, with modifications of the pressure sensor, drain valve, and plunger seal added to expand the maximum allowed pressure to 66 MPa for extra-resolution applications under such high pressure.

Pump type	Parallel-type double plunger
Flow-rate range	0.0001 to 3 mL/min (1.0 to 66 MPa) 3.0001 to 5 mL/min (1.0 to 44 MPa)

Prominence Series Solvent Delivery Unit
LC-20AD/20AB/20AT

LC-20AD

The LC-20AD is an isocratic solvent delivery unit that delivers optimal pumping performance. The automatic pulsation compensation mechanism and high-speed microplunger drive combine to achieve pulse-less liquid feed. Pumping performance in the microflow range below 50 µL/min is enhanced.
The LC-20AB is a binary high-pressure gradient solvent delivery unit incorporating two pumps.
The LC-20AT is a solvent delivery unit that maintains high performance while improving the ease of maintenance.

Pump type	20AD	Parallel double microplunger
	20AB	Parallel double microplunger (2 sets)
	20AT	Serial double microplunger
Flow rate range	20AD/20AB	0.0001 to 10,0000 mL/min
	20AT	0.001 to 10,000 mL/min

Prominence nano Solvent Delivery Unit
LC-20ADnano

The LC-20ADnano employs a new Reflux Flow Control system to offer stable solvent delivery and low solvent consumption, without splitting waste solvent after the two solvents are mixed in concentration gradient analysis.

Pump type	Reflux flow control
Flow rate range	1 to 5 nL/min (controlled independently) 0.01 to 5 µL/min (using Nano-Assist) 0.1 to 5 µL/min (using CBM-20A and LCsolution)

Preparative System for High Performance Liquid Chromatography
LC-20AP

This is a large volume laboratory preparative solvent delivery unit capable of solvent delivery at up to 150 mL/min. With a pressure resistance of 42 MPa, the LC-20AP can perform high resolution separation preparative purification of large quantities of compounds in a single step. In terms of solvent delivery performance in the analysis flowrate region, the system performs on par with analysis solvent delivery units with a flowrate accuracy of ±1% or less. The system is capable of high efficiency overall workflow, which is required for preparative purification, including examination of preparative conditions and preparative compound purity checks.

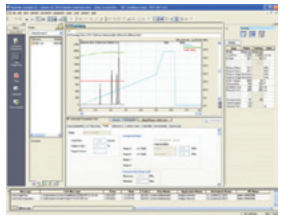
Solvent Delivery Unit for Semi-Preparative HPLC
LC-20AR

New

This solvent delivery unit is capable of flow rates for applications ranging from high-precision analysis to semi-preparative HPLC. It can provide a high retention time reproducibility from a low flow rate range to semi-preparative flow rate range (0.01 and 20 mL/min), leading to reliable results when scaling up or confirming purity. By using a recycling kit, it can also be used for recycling semi-preparative applications.

Pump type	Parallel-type double plunger
Flow rate range	0.001 to 20.00 mL/min

Integrated Chromatography Workstation
LabSolutions LC/GC



The LabSolutions series consists of next generation workstations designed to integrate LC and GC control, and to enhance network functionality.
Improvements have also been made to accommodate ultra-high speed analysis. These include shortened analysis times thanks to overlap injection functionality, and Quant/Data Browsers, which are capable of efficiently aggregating multi-sample data for confirmation and analysis. In addition, PDF output functionality is standard, to accommodate the paperless workplace.

Nexera Multiplate Autosampler
SIL-30ACMP

Building on the basic performance of the SIL-30AC, with its low carryover and excellent injection repeatability, the SIL-30ACMP multiplate-compatible autosampler can be loaded with 6 plates in 3 sample racks, enabling the continuous analysis of up to 2,304 samples (when 384-well plates are used), or 324 samples in 1.5 mL vials. Furthermore, since different plates can be loaded in the 3 sample racks, the system is flexible enough to simultaneously analyze multiple unknown samples using microplates, and control samples in 1.5 mL sample vials.

Injection method	Total volume injection, variable injection volume
Injection volume settings range	0.1 µL to 50 µL

Nexera Autosampler
SIL-30AC

This autosampler features a globally unprecedented 130 MPa pressure resistance. In addition to strengthened pressure resistance, the equipment achieves improved basic performance, including low carryover of 0.0015% (rinseless) or less. It is also equipped with 4-solent multi rinse functionality, and provides high reliability data in high sensitivity analyses thanks to carryover suppression across a full range of applications. Furthermore, with automatic pretreatment functionality, it is also capable of prelabel derivatization and the addition of internal standard substances.

Prominence Series Autosampler
SIL-20A(C)/20A(C)HT/20A(C)XR

A direct injection type autosampler that permits high-speed, multisample processing. Near-zero sample carryover is realized, which makes the SIL-20A/20AC ideal for high-sensitivity LC-MSMS analysis. Connecting the optional rack changer allows continuous analysis by replacing up to 12 MTP/DWP.

Injection method	Direct sample injection
Injection volume	0.1 to 100 µL (standard), 1 to 2,000 µL (option)
Sample temperature control	SIL-20A: none SIL-20AC: 4 to 40°C

Nexera Column Oven
CTO-30A

This is a compact block-heating type column oven that permits analysis to 150°C. The intelligent heat balance mechanism achieves uniform temperature control at ±0.05°C accuracy. High-temperature analysis at 150°C permits reverse-phase analysis without organic solvents to reduce the burden on the environment. A post-column cooler or high-pressure flow line switching valve can be installed to restrict baseline noise during high-temperature analysis.

Temperature control system	Block heating system
Temperature control range	(Room temperature + 5°C) to 150°C

Prominence Series Column Oven
CTO-20A/20AC

The CTO-20A/CTO-20AC are forced air circulation column ovens. A high-performance thermistor accurately regulates the temperature in the oven. Complex temperature programs can be set, including linear or stepwise heating and cooling. Optional sub-units can be contained in the unit, including manual injectors, a gradient mixer, and high-pressure flow line switching valves.

Heating and cooling type	Forced Air Circulation
Temperature-control range	CTO-20A: (room temperature + 10°C) to 85°C CTO-20AC: (room temperature – 10°C) to 85°C

Prominence Series System Controller
CBM-20A/20Alite

The CBM-20A/20Alite is a communication bus module offering data buffering functions. It permits remote control and Web control, by acting as the interface between the PC and each unit. The CBM-20Alite is a card-type controller to be installed inside the Prominence modules.

Controlled units	CBM-20A: 8 (expandable to 12) CBM-20Alite: 5
Inputs and outputs	CBM-20A: 4 inputs/4 outputs CBM-20Alite: 2 inputs/2 outputs

Prominence Series UV-VIS Detector
SPD-20A/20AV

These general-purpose UV-VIS detectors offer enhanced sensitivity and stability. Low noise, improved light-source compensation, and a temperature-controlled cell installed as standard achieve high sensitivity and stability. Stray light correction ensures an extremely broad linearity range.

Light source	SPD-20A: D_2 lamp SPD-20AV: D_2 lamp, W lamp
Measuring wavelength range	SPD-20A: 190 to 700 nm SPD-20AV: 190 to 900 nm

Photodiode Array Detector
SPD-M30A

The SPD-M30A adopts a newly designed capillary cell (SR-Cell). This suppresses peak dispersion within the cell, thus allowing an ultra-low dispersion system required for high separation in UHPLC to be built.
Also, the high-end photodiode array detector supports high-sensitivity analysis thanks to the SR-Cell that features improved signal level and the world lowest noise level of 0.4×10^{-5} AU or below. Moreover, use of outstanding stray light compensation technology and temperature control of the polychromator ensure reliable analysis.

Light source	D_2 lamp
Measuring wavelength range	190 to 700 nm

Prominence Series Photodiode Array Detector
SPD-M20A

The SPD-M20A photodiode array detector (PDA) achieves high sensitivity that rivals a conventional absorbance detector. Linearity and stability are enhanced by comprehensive light-source compensation, stray light correction functions and temperature-controlled cells provided as standard.

Light source	D_2 lamp, W lamp
Measuring wavelength range	190 to 800 nm

Prominence Series Spectrofluorometric Detectors
RF-20A/20Axs

RF-20A

The RF-20A and RF-20Axs offer world-leading levels of sensitivity thanks to a newly designed optical system. Fast sampling at 100 Hz supports UFLC. These detectors offer superb ease-of-maintenance, thanks to cell and lamp replacement at the front panel (that requires no positional adjustment), 2000-hour extra-long lamp life, and the VP functions.
RF-20Axs is the only detector in the world that offers a temperature-controlled cell with cooling functions. It offers excellent peak area reproducibility with respect to room temperature fluctuations and further enhances the reliability of the analysis data.

Refractive Index Detector
RID-20A

The RID-20A eliminates any influence caused by fluctuations in the temperature of the laboratory by employing dual temperature control for the optical systems, and establishes a superior stability of baseline. Additionally, its function to automatically check the lighting time and light intensity of the lamp enables compliance with the strict management standards of the pharmaceutical industry. Provides support for the validation procedures of the overall analysis system.

Range	Time of analysis: 0.01×10^{-6} to 500×10^{-6} RIU Time of fractionation: 1.0×10^{-6} to 5000×10^{-6} RIU
Maximum operating flow rate	20 mL/min (Optionally, 150 mL/min)

Evaporative Light Scattering Detector - Low Temperature
ELSD-LT II

The unique nebulizer and evaporation tube permit low-temperature operation. It is a powerful tool for the gradient analysis of compounds that cannot be analyzed by an absorbance detector.

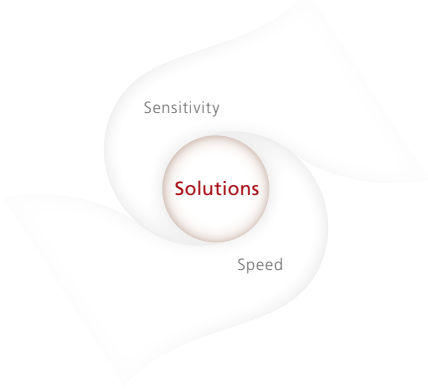
- Stable, low-temperature evaporation of the mobile phase achieves high sensitivity and stability.
- Detects almost all compounds in the sample.
- Superb solvent elimination under gradient elution and rapid separation conditions.

LCMS-8060 High Performance Liquid Chromatograph Mass Spectrometer

LCMS-8060 New

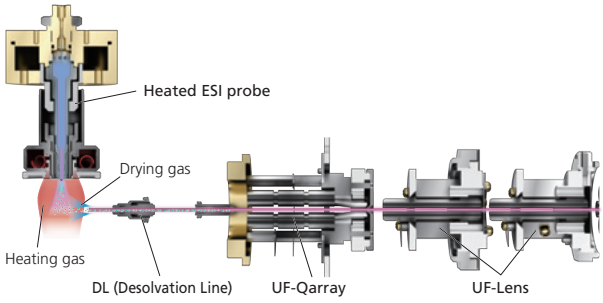
CHANGES EVERYTHING

The LCMS-8060 is the latest ultimate model in the UFMS series of triple quadrupole mass spectrometer systems, which feature Shimadzu's patented UF Technologies that achieve both the highest sensitivity and highest speed levels in the world.
The LCMS-8060 can help improve data quality and throughput in broad range of research fields, which will be transformative for LC/MS/MS analysis.



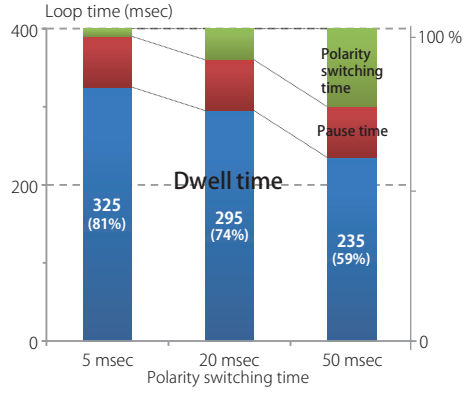
Sensitivity Highest Sensitivity

The system features the optimized ion guide that incorporates the newly developed UF-Qarray technology, which has improved the sensitivity by significantly increasing ion sampling efficiency and ion focusing capability. The revolutionary new UF-Qarray technology improves both sensitivity and robustness to maintain high sensitivity for a variety of measurement modes.



Speed Fastest Speed

The LCMS-8060 maintains the same high performance of the LCMS-8050 in terms of 5 msec high-speed polarity switching, 30,000 u/sec maximum scan speed, 555 ch/sec (max.) high-speed MRM measurement speed, which enables high speed analysis with minimal sensitivity losses.



Ratio of Dwell Time to Loop Time When Monitoring 65 MRMs at a 400 msec Loop Time

The figure above shows the dwell time as a ratio of loop time for polarity switching times of 5 msec, 20 msec, and 50 msec, given 65 MRMs monitored at a loop time of 400 msec.
It shows how the LCMS-8060 is able to spend most of the loop time to acquire data (dwell time). Therefore, it is able to load ample amounts of ions, even during high-speed analysis of multiple components, without causing a drop in signal, which ensures that reliable data can be obtained.

Solutions Fusion of Sensitivity and Speed

When the LCMS-8060 achieves the world's highest levels of sensitivity and speed at the same time, it will lead to revolutionary new applications. It enables the analysis of ultra trace components in biological samples, which have been difficult to detect until now, and helps improve measurement throughput and selectivity.

Triple Quadrupole Mass High Speed Liquid Chromatograph Mass Spectrometer

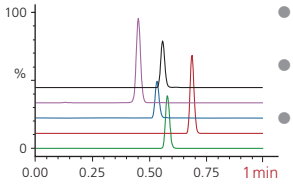
LCMS-8050

Speed and Sensitivity Beyond Comparison

Even higher sensitivity is achieved thanks to the newly designed heated ESI probe and UFsweeper III. With speeds that maximize the rapidity of UHPLC, and high-level sensitivity that makes trace analyses standard, the LCMS-8050 opens the way to unknown worlds.

Note: Product does not include LC Units.

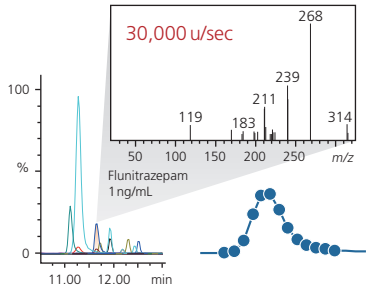
High-Sensitivity & High-Speed Positive/ Negative Ionization Switching in 5 msec



- Easily obtains over 20 points per peak with UHPLC.
- Achieves excellent reproducibility even at the lowest calibration level.
- Features a wider dynamic range than other available triple quads.

Compounds	Polarity	Dynamic Range (nmol/L)	Points/ peak	%RSD 0.6 nmol/L (n=4)
Resorufin	+	0.6–1000	21	4.30
1'-Hydroxy Bufuralol	+	0.6–1000	24	1.82
(+/−)-4'-Hydroxy Mephenytoin	+	0.6–1000	23	2.18
Oxidized Nifedipine	+	0.6–1000	23	5.07
Hydroxy Tolbutamide	−	0.6–1000	23	2.96

High-Sensitivity & High-Speed Scanning at 30,000 u/sec
High-Sensitivity & High-Speed MRM at 555 ch/sec



- Maintains a high-quality spectrum even at the world's fastest scanning speed of 30,000 u/sec.
- The 30,000 u/sec scanning speed provides for more sampling points.

13points
%RSD (n=3)
2.45%

Triple Quadrupole Mass High Speed Liquid Chromatograph Mass Spectrometer

LCMS-8040

The LCMS-8040 was designed to provide significantly higher sensitivity while maintaining the high speed offered by the LCMS-8030. Ultrafast MRM transition speeds, up to 555 MRMs per second (dwell times of 1 msec and pause times of 1 msec) are achieved. In addition, the LCMS-8040 features the world's fastest* polarity switching at 15 msec and high speed scanning rate of 15,000 u/sec. By incorporating newly improved ion optics UF-Lens™ and UFsweeper™ II collision cell technology, the LCMS-8040 provides higher multiple reaction monitoring (MRM) sensitivity. This higher sensitivity expands the potential range of LC/MS/MS applications.

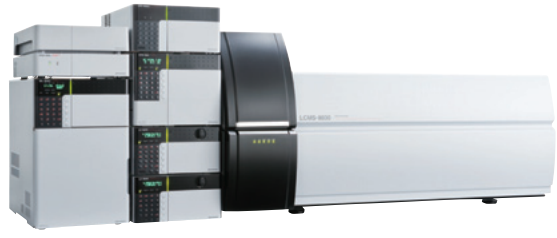
* Per survey result as of May 2012

Mass range	*m/z* 10 to 2000
Resolution	R < 0.7 FWHM
Scan speed	Max 15000 u/sec
Positive-negative ionization switching time	15 msec
MRM measurement speed	Max 555 ch/sec

Note: Product does not include LC Units.

High-Performance Liquid Chromatograph Mass Spectrometer

LCMS-8030



The LCMS-8030 is an ultra fast triple quadrupole mass spectrometer that was designed to acquire optimal quantitative data for a UHPLC peak in less than one second. Shimadzu's patented technologies increase the speed of positive-negative ionization switching and scan measurements, as well as MRM measurements. This rapid performance is useful in many fields of application, including the measurements of residual pesticides and impurities in foods, pollutants discharged into the environment, and concentrations of drugs in blood, as well as toxicological screening.

Mass range	*m/z* 10 to *m/z* 2,000
Sensitivity	ESI: reserpine 1 pg, S/N > 200 (RMS) MRM measurement
Resolution	R < 0.7 FWHM
Scan speed	Max 15,000 u/sec
Positive-negative ionization switching time	15 msec
MRM measurement speed	500 ch/sec

Note: Product does not include LC units.

High-Performance Liquid Chromatograph Mass Spectrometer

LCMS-2020

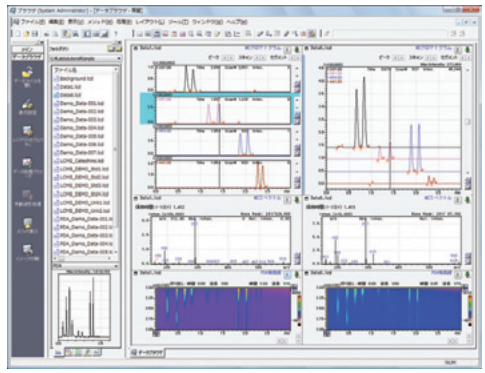
LCMS-2020 is optimized for the Prominence UFLC/UFLCXR Ultra Fast Liquid Chromatograph. Novel patent-pending technologies offer significantly enhanced scan speed and positive-negative ion polarity switching time, which are essential for UFLC, and simultaneously boost sensitivity. The instrument combines the excellent compound selectivity that is a feature of the mass spectrometer with significantly enhanced total productivity – from method development to analysis.
The LCMS-2020 plays a useful role in a range of fields, including the synthesis of compounds in the pharmaceutical and chemical industries.

Mass range	*m/z* 10 to *m/z* 2,000
Sensitivity	ESI: reserpine 1 pg, S/N > 150 (RMS) APCI: reserpine 1 pg, S/N > 100 (RMS)
Resolution	R=2 M
Scan speed	Max 15,000 u/sec
Positive-negative ion polarity switching time	15 msec

Note: Product does not include LC units.

Workstation for LCMS-8080/8040/8030/2020

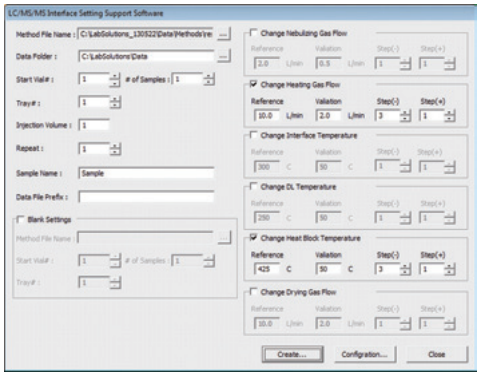
LabSolutions LCMS



LabSolutions LCMS Workstation Ver. 5, which controls the LCMS-2020 and performs data processing, also supports control of the Nexera. It has been enhanced with a Quant Browser function to perform multi-sample quantitation, and a Data Browser to perform qualitative processing of multiple data. The Data Browser performs peak detection and other analysis of multiple data, and also presents chromatograms and spectral comparisons in a single window. Furthermore, through coordination of LC and MS data, it demonstrates its effectiveness in impurity identification and compound checks. In addition, the already popular report functions are expanded to enable printing in a variety of output formats.

Optional Software for the LCMS-8050/8040/8030

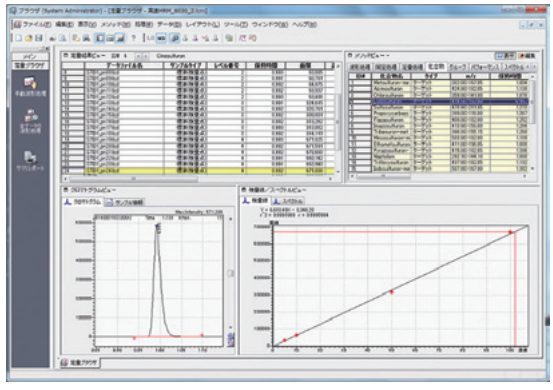
LC/MS/MS Interface Setting Support Software



Of the LC/MS/MS interface parameters, batch files that perform analysis while modifying the temperature of the heater and the gas flowrate are created automatically, and the data is acquired. As a result, the optimization of the interface parameters, which until now had been a complicated task, can be performed easily and comprehensively, thus reducing the workload and enhancing productivity when performing analyses. From the obtained data, the optimal heater temperature and gas flowrate can be selected, thus making it possible to perform even higher-sensitivity LC/MS/MS analysis.

For LCMS-8030

LC/MS/MS Method Packages



The MRM conditions must be optimized before performing quantitation by MRM. However, this imposes a greater burden on the operator as the number of compounds subjected to simultaneous analysis increases. Shimadzu offers the following method packages to reduce the operator's workload:

- Residual pesticides: 167 compounds
- Veterinary pharmaceuticals: 42 compounds
- Water quality analysis: 44 golf course pesticides, 32 pesticides targeted for water quality control

By allowing analysis to start without the cumbersome procedures to investigate the separation conditions for LC/MS/MS analysis and optimize the MS parameters for each compound, these method packages achieve more efficient multicomponent simultaneous analysis.

For LCMS-8050/8040/8030

LC/MS/MS MRM Library for Metabolic Enzymes in Yeast

New

Analyzing a large number of proteins require considering a massive number of MRM conditions. However, the amount of time required for method development can be reduced significantly using this MRM library, which includes a collection of MRM transitions that have already been considered. In addition, the method parameter list included in the library can be used to create new methods specifically for measuring only the desired components. With the MRM library, analytical processes can be performed smoothly without the need for complicated operations involved in selecting parameters or methods. This product includes MRM transitions for all 498 peptides trypsin-digested from 228 enzymes relevant to the primary metabolites of budding yeast. It is applicable for analyzing all enzymes related to primary metabolic pathways.

Open Access Software for LC and LCMS

Open Solution Analytical

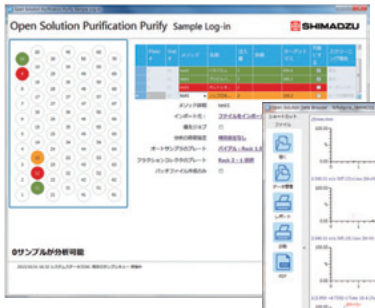
Supports LC and LCMS analysis in an open access environment. After logging in on the sample registration window, registration of samples and the analyses can be performed in one window. Moreover, data can be displayed using the Open Solution data browser simply by clicking the link in the e-mail that is sent after the analysis is complete. Once the data browser has been set up on the server PC, all members of a research team can view the data without installing software on their PC. In the data browser, peaks can be added or deleted for the chromatogram using simple operations. Also, since structural formulas and the like can be easily pasted into the window when creating reports, the degree of perfection for such reports is enhanced. When a multiple number of mobile phases and columns are being used, the cleaning of the flow path is executed automatically, so the system can be operated with great stability.

Note) This software is not compatible with the LCMS-2010 series, the LCMS-QP8000 series, or the LCMS-IT-TOF.

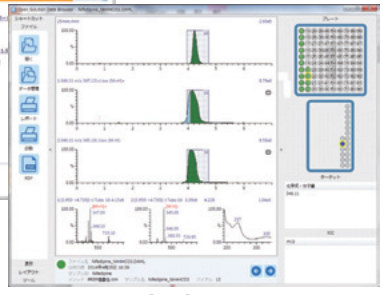
Open-Access Software for LC and LCMS

Open Solution Purification

New



Sample Registration



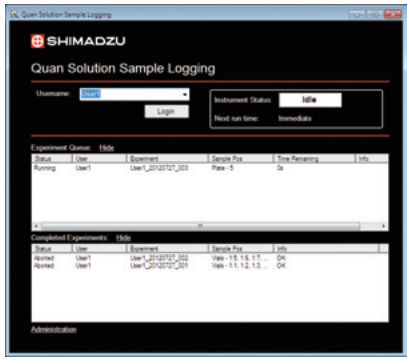
Data Browser

This provides support for optimizing and automating the process of scaling up analytical conditions required for compound purification by LCMS to preparative applications. It automatically generates optimized preparative LC gradient parameters based on decision criteria specified in advance in the software. If there is a problem for preparative LC, such as impurities located in proximity to the retention times of target compounds, samples are color-coded accordingly in the window for sample registration (green if "OK," yellow if caution is required, or red if unsuitable), to ensure that preparative purification can be performed efficiently. Preparative LC results can be accessed immediately via the Data Browser and is displayed associated with the sample, so that results can be judged at a glance. In fractionation results, the fraction corresponding to a specified region in the chromatogram is highlighted blue, so that it is easy to quickly determine the correspondence between fractions and peaks.

Note) Only supported by the LCMS-2020.

Open-Access Quantitation Software for LCMS-8080/8040/8030

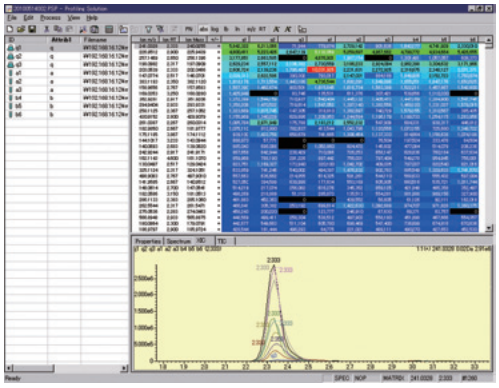
Quan Solution



All processes from starting analysis to outputting the analysis results report can be automated using simple operations according to screen prompts. It reduces the workload for routine operations. A mail with the report attached is sent when the analysis is complete, to allow the quantitation results to be checked in the office. Using method packages containing preset analysis conditions and compound information can further enhance the operational efficiency.

Profiling Data Processing Software for LCMS-IT-TOF

Profiling Solution Ver.1.1



This software performs automatic peak detection from multiple data files analyzed with LCMS-IT-TOF, arranges the peak retention times as necessary, and then presents the results in a table after such operations are complete. The creation of a table from measurement data is an important step that influences the success or failure of differential analyses of foods and chemical products, and metabolomics.
The original data can be referenced easily from the table, which enhances the reliability of the analysis. The table created can be analyzed using commercially available statistical analysis software, which means that a variety of methods can be utilized. This software is useful in the field of metabolomics, which utilizes LCMS-IT-TOF for high speed analysis, and in the field of impurity profiling analysis.

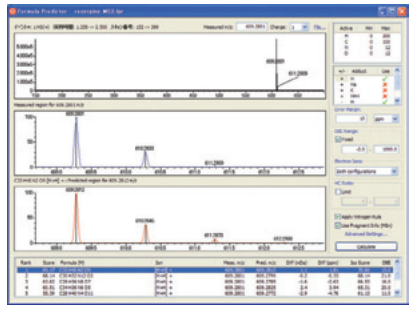
High Performance Liquid Chromatograph
Ion-trap Time-of-flight Mass Spectrometer

LCMS-IT-TOF

This unique, tandem mass spectrometer combines an ion trap with a time-of-flight (TOF) mass spectrometer. The ion trap offers MS^n capacity (MS/MS, MS/MS/MS, MS/MS/MS/MS, …) and the TOF provides high-resolution, highly accurate MS analysis capacity. Together, they offer the diverse analysis information required for effective structure analysis.

Mass range MS	*m/z* 50 to 5,000
Mass range MS^n	*m/z* 50 to 3,000
Resolution	R > 10,000 at *m/z* 1,000 (FWHM)
Precursor resolution	R > 1,000 at *m/z* 1,000

Formula Predictor
Software for LCMS-IT-TOF



This is LCMSsolution optional software for LCMS-IT-TOF. The software offers more than formula predictions from calculated exact masses. It enhances the reliability of the results by narrowing down the number of candidates by comparing the candidate isotope patterns with measured ion isotope patterns, and uses functions (patent-pending) to narrow down the number of candidates by determining whether MS^{n-1} candidates for univalent and multivalent ions contain the MS^n predicted structure.

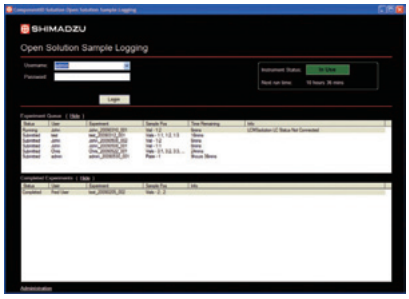
Metabolite Structural Analysis Software for LCMS-IT-TOF

MetID Solution

This is LCMSsolution optional software for LCMS-IT-TOF. MetID Solution compares the pre-metabolized control sample and post-metabolized target sample data to identify metabolites. Unique multivariate analysis functions are applied to metabolites not expected in the metabolic pathway to acquire comprehensive metabolite candidate information.

Open Access Software for LCMS-IT-TOF

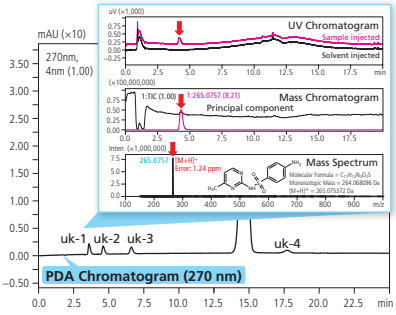
Open Solution ComponentID



Open Solution ComponentID is a software tool developed to meet the demand for open access to precision mass measurements using LCMS-IT-TOF, without the need to rely on expert operators. Analysis can be performed in just 3 steps. After measurements are completed, an estimated composition report is automatically sent to the email address of the logged-in user.

LCMS-IT-TOF Application System

Trap-Free 2D LC/MS Impurity Identification System



This convenient support tool converts from nonvolatile mobile phases to volatile mobile phases online. The optimal valve sequence is incorporated just by entering the retention time for the impurity peak observed in the first-dimension UV chromatogram. There are no concerns about misidentification, since only the impurity of interest is introduced to the MS system. The labor and time required to investigate volatile mobile phase conditions can be significantly reduced, which can play a role in enhancing the efficiency of impurity identification.

*This system consists of LC units, LCMS-IT-TOF, and a 2DLC+LCMS system start kit.

Imaging Mass Microscope

iMScope TRIO

New

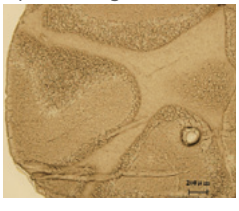
– Mass Microscopes Change "Observation" to "Analysis" –

This new type of analysis instrument combines morphological observation using a microscope with structural analysis using a mass spectrometer.
Microscopes allow observation of morphological images in great detail, whereas mass spectrometers produce images showing the distribution of the measured molecules. Overlaying the images obtained based on these two different principles and analyzing the resulting imaging mass spectrometer images increases the speed and accuracy of research.
Usage for LC-MS is also possible (optional).

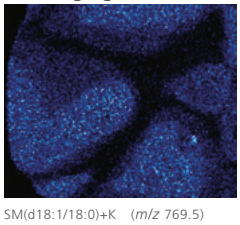
Ionization method	MALDI or LDI
Laser irradiation field size	Min. 5 µm or less in diameter, adjustable in 11 steps
Analysis speed	Six pixels per second (Ionization time 50 ms, mass range 500 to 1000 with single MS)
Microscope observation modes	Bright field observation in epi-illumination/trans-illumination modes, and epi-fluorescence observation

Visualization of Lipid Distribution of Mouse Cerebellum

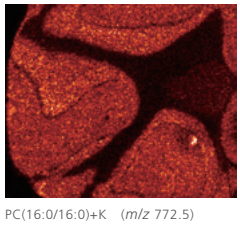
Optical Image



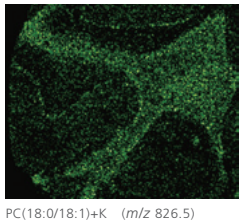
MS Imaging



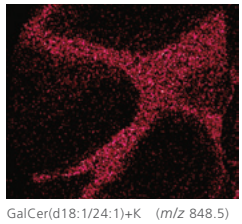
SM(d18:1/18:0)+K (*m/z* 769.5)



PC(16:0/16:0)+K (*m/z* 772.5)



PC(18:0/18:1)+K (*m/z* 826.5)



GalCer(d18:1/24:1)+K (*m/z* 848.5)

*Sales area: All areas excluding North America

Triple Quadrupole Gas Chromatograph Mass Spectrometer

GCMS-TQ8040

Smart Technologies Boost Routine Analyses

Although measurement using GC-MS/MS is effective for measuring even trace amounts of a great variety of the chemical substances that can be found within a diverse range of samples, many parameter settings need to be made and the appropriate method files need to be created.
On the GCMS-TQ8040, the creation of complicated method files is automated, so it is possible to simultaneously perform high-sensitivity analysis of multiple components, thus dramatically enhancing the productivity of the system.

Smart
Productivity
Operation
Performance

Smart Productivity

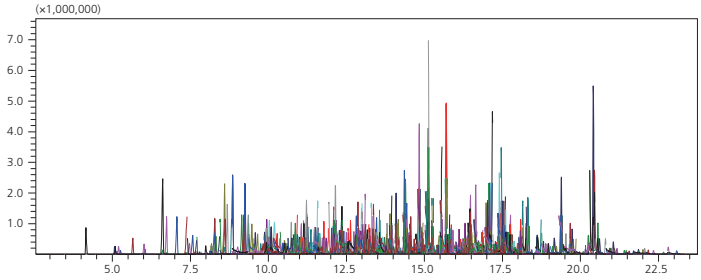
- Equipped with new firmware protocol
- Simultaneous high-sensitivity, high-precision analysis of a greater variety of compounds
- Twin Line MS system reduces the work required for changing columns

Smart Operation

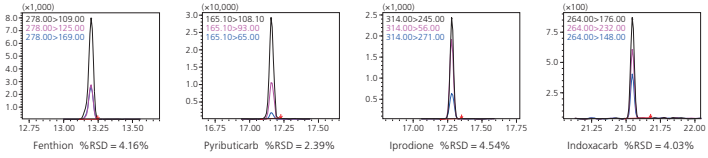
- Smart MRM offers automatic creation of optimal method.
- Automatic search of the optimum transition
- AART function provides automatic correction of retention time.

Smart Performance

- Superior sensitivity realized through implementation of patented high-sensitivity ion source technology
- Noise greatly reduced thanks to OFF-AXIS ion optical system
- Capable of high-sensitivity analysis even in single GC-MS mode



Simultaneous Analysis of 439 Components of Agricultural Chemicals (MRM)



Mass Chromatograms of 5 ppb for Each Agricultural Chemical and %RSD

Gas Chromatograph Mass Spectrometer

GCMS-QP2010 Ultra / SE

High-Speed Performance

- Achieves a maximum scan speed of 20,000 u/sec
- ASSP™ technology provides greater sensitivity
- Ultra-fast data acquisition rates ideal for comprehensive GC×GC and Fast-GC

Increased Productivity

- Analysis cycle time cut in half*
- Significantly reduced maintenance downtime*
- Easy exchange of columns for improved productivity*

Eco Friendly

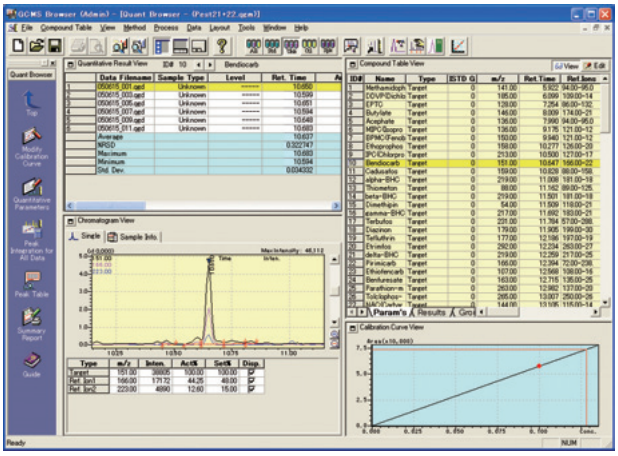
- 36% reduction in power consumption in analysis standby mode*
- 30% reduction in CO_2 factory emissions**

There is increasing public interest in the analysis of trace compounds that contribute to environmental pollution, affect human health and in research related to novel compounds. Reducing running costs and lessening the impact on the environment by increasing analytical efficiency and decreasing power consumption are universal goals. The GCMS-QP2010 Ultra was developed by engineers who accepted the challenge to meet these needs.

* Based on our specified conditions
** Compared with previous model

GCMS Workstation

GCMSsolution Ver. 4



Features the operating environment common to all Shimadzu chromatograph workstations. Allows easy GCMS operation similar to GC or HPLC. The latest version offers AART (Automatic Adjustment of Retention Time) to significantly reduce the effort required to correct the retention times for multicomponent simultaneous analysis after column maintenance is complete. GCMSsolution that has become easier to use and features higher performance offers library searching by retention index and Scan/SIM simultaneous measurement functions to contribute to improved analysis efficiency.

Gas Chromatograph - Mass Spectrometer System

Direct Injection System DI-2010 (option)

The direct inlet probe permits introduction of less volatile and/or thermally labile liquid or solid samples directly into the MS ion source without passing through the GC.

GCMS Thermal Desorption Autosampler

TD-20

Thermal desorption analysis is widely used for trace analysis of indoor air pollutants and gases generated from materials. Eliminates cold spots from the sample line and achieves low carryover.
The electronically cooled packed cold trap eliminates the need for refrigerant. Offers a sophisticated level of operation. Supports operation linked to GCMSsolution and electronic control of the carrier gas pressure and split ratio by AFC (Advanced Flow Controller).

Number of samples	48
Valve temperature	80 to 300°C
Sampling tube heating temperature	80 to 400°C

* Product does not include GCMS or PC set.

GCMS Application System

OPTIC-4 Multifunction Sample Injection System

The OPTIC-4 is a GC injection inlet that supports all GC-MS sample injection modes, including large-volume injection, injection port derivatization, thermal desorption, and difficult matrix introduction (DMI). It can be combined with the AOC-5000 Plus for automatic insert replacement to further enhance productivity for multi-sample analysis.

System configuration	GCMS-TQ8030 + GCMSsolution + OPTIC-4 + AOC-5000 Plus
Injection modes	Split/Splitless, large-volume, injection port derivatization, thermal desorption, thermal extraction, and difficult matrix introduction (DMI) injection modes
Max. operating temperature	600°C (35°C GC oven temperature)
Heating rate	1 to 60°C/sec
ressure range	7 to 700 kPa
Total flow range	5 to 500 mL/min (helium)

GC/GC-MS Application System

Headspace Analysis System

The headspace sampler holds samples at a fixed temperature, and introduces the volatile components that diffuse into the gaseous phase into GC or GC-MS. It is used for qualitative and quantitative analysis of odor components of foods, aroma components of chemicals, and toxic volatile components in environmental water.

System configuration	GCMS-TQ8030 + GCMSsolution + HS-20 series
Sample vial	20 mL or 10 mL (no adaptor required)
Number of samples	90
Sample temperature	300 °C max.

• Systems can also be configured with the GCMS-QP2010 Ultra, GC-2010 Plus, GC-2014, or GC-2025.

GC-MS Application System

AOC-6000 Sample Injection System

New

The AOC-6000 supports three sample injection methods, either liquid sample injection, headspace (HS) injection, or solid phase micro extraction (SPME). Consequently, it can be used for analyzing samples in wide range of formats.
Furthermore, it can automatically switch between sample injection methods, so that a combination of different sample injection methods can be used within a single sequence of operations.

System configuration	GCMS-TQ8040 + GCMSsolution + AOC-6000
Sample capacity	98 × 2 mL/tray 32 × 10 mL/20 mL tray (Up to 2 trays can be loaded)
Syringe heating temperature	35 to 150 °C (1 °C steps)

GCMS Application System
Pyrolysis System

GCMS-QP2010 Ultra + Pyrolyzer*

This system conducts GCMS analysis of the products of thermal decomposition of polymer compounds such as plastics, rubber, and resins at decomposition temperatures of 500°C and above. Allows PC control of evolved gas analysis, pyrolysis analysis, and double-shot pyrolysis analysis and various other modes.

* Manufactured by Frontier Laboratories Ltd.

Gas Chromatograph-Mass Spectrometer
Differential split flow turbo molecular pump system

Comprehensive GC-MS (GC×GC-MS) System

The Comprehensive GC/MS (GC×GCMSq) technique employs a modulator to link two capillary columns of complementary orthogonal phases. The technique requires a GC-MS system capable of very fast data collection to fully capture the very narrow, fast eluting compounds. Sensitivity is also an important requirement for many Comprehensive GC×GC applications. The GCMS-QP2010 Ultra was developed with this multi-dimensional technique in mind. Its best-in-class data collection speeds and superior sensitivity make it the top choice for Comprehensive Chromatography.

High Sensitivity Gas Chromatograph System

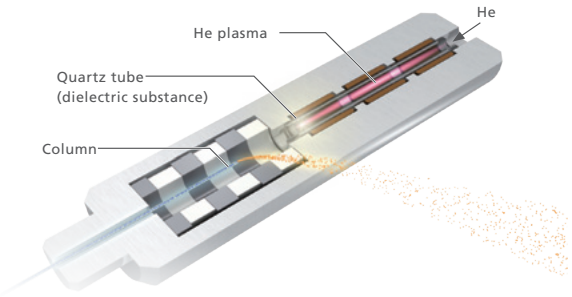
Tracera

The Age Is Shifting Towards Trace Analysis Gas Chromatograph Systems

Trace analysis to the sub-ppm level used to be difficult on conventional TCD and FID general-purpose detectors. However, this is now possible thanks to plasma-based detection technology. Tracera, capable of analyzing all kinds of components, covers a wide range of analytical applications on a single unit, and enables simple yet high-sensitivity analysis.

Innovative Plasma Technology for Visualizing Trace Analysis

Tracera is equipped with a barrier discharge ionization detector (BID) which uses ionization based on dielectric barrier electric discharge plasma. The BID generates helium plasma by applying a high voltage to a quartz glass tube. Compounds that elute from the column are ionized by the optical energy from the helium plasma, and then are detected by the collection electrode and output as peaks.

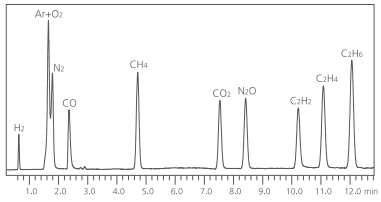


Barrier Discharge Ionization Detector (BID)

GC-2010 Plus + BID-2010 Plus + AOC-20i (optional)

High-Sensitivity Measurement of Inorganic Gas and Lower Hydrocarbons

With conventional analysis techniques, two or more detectors were required. With Tracera, however, mixtures of inorganic and lower hydrocarbon gases can be analyzed at high sensitivity by selecting an appropriate separation column.



5 ppm concentration each component in He, 1:5 split analysis, 1 mL sample volume

BID-2010 Plus Specifications

Temperature range	Up to 350 °C
Minimum detectable quantity*	1 pgC/s (dodecane, discharge gas flowrate 50 mL/min)
Dynamic range	10^5
Permitted gas	He (99.9999 vol.% or more purity)

• Calculated by the same method used for MDQ of the Shimadzu FID.

Energy Saving Capillary Gas Chromatograph

GC-2025

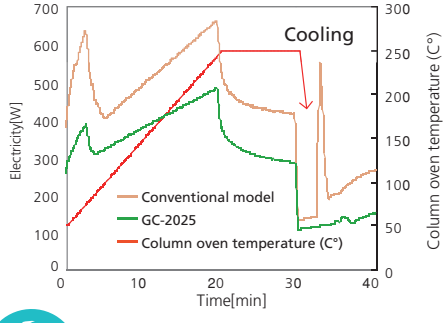
Shimadzu's new-generation GC-2025 capillary gas chromatograph minimizes environmental impact by reducing power and carrier gas consumption while retaining the performance capabilities required for capillary analysis.
The GC-2025 incorporates a digital flow controller that controls both the carrier and detector gases and a newly designed energy-saving column oven that features small volume and less heating loss, realizing a dramatic improvement in operability.
The compact GC-2025 is the gas chromatograph for environmentally friendly, high value performance.

Unique Technology for High Energy Savings

A compact design and efficient insulating materials inside the oven minimize the heat capacity and heat loss, thereby reducing electricity costs and realizing more environmentally friendly operation. Furthermore, the GC-2025 is equipped with an energy-saving heater, which results in a 30% (*) reduction in electricity consumption during temperature-programming analysis as compared to the GC-2010 Plus. In addition, automatic shut-down and startup functions reduce carrier gas and electricity consumption in the standby mode, further reducing operating costs.

(*) Power consumption varies according to site conditions, ambient temperature, etc.

■ Change in electricity consumption during temperature-programming analysis with conventional model and GC-2025



This product conforms to Shimadzu's Eco-labeled designation.

*Energy savings: 30% reduction as compared to the previous model

Capillary Gas Chromatograph

GC-2010 Plus Series

GC-2010 Plus

The GC-2010 Plus Series is ideal for enhancing analysis sensitivity and productivity. Excellent repeatability is assured by the optimized vaporization chamber and the electronic flow controller (AFC) that accurately controls the carrier gas up to the high-pressure, high-flowrate regions required for HPLC analysis.

Column Temperature	(Room temperature + 4°C) to 450°C
Carrieer Gas Control	Digital setting by electronic flow controller, Advanced Flow Controller (AFC)
Detector Gas Control	Digital setting by electronic pressure controller, Advanced Pressure Controller (APC)
Sample Injector	Split/Splitless, Direct, On-column/Programmable Temperature Vaporizer Injection
Detectors	FID, TCD, ECD, FPD, FTD (also called NPD or TSD)
Display	240 × 320 dot graphics display (30 characters × 16 lines)

Gas Chromatograph for versatile applications

GC-2014 Series

The GC-2014 offers good expandability by mounting multiple injection units and detectors, and accommodating both packed columns and capillary columns. A multipurpose, space-saving GC that features today's leading-edge technologies, the GC-2014 delivers high performance, including excellent reproducibility and a highly sensitive detection level, while the electronic flow controller and clear menu text make operation a breeze.

Column temperature	(Room temperature + 10°C) to 400°C
Carrier gas control	Digital setting by electronic flow controller (AFC)
Sample injector	Dual for packed, single for packed, split/splitless, direct injection
Detectors	FID, TCD, ECD, FPD, FTD
Display	240 × 320 dot graphics display (30 characters × 16 lines)

GC-2010AF (1st DET:FID)+GCMS-QP2010 Plus (2nd DET:MS) System

Switching method	Multi-Deans switching (Flow channel switching based on pressure difference)
Switching element	Switching element subjected to deactivation processing
Carrier gas control	Electronic control based on AFC
Switching gas control	Electronic control based on APC
Connectable columns	Capillary columns with an inner diameter of 0.1 to 0.53 mm (If the detector is a GCMS, the outlet flow rate must not exceed 15 mL/min.)
Column oven temperature	(Room temperature + 4°C) to 350°C
Temperature of connected heater	50°C to 350°C
Connectable detectors	GCMS, FID, FPD, TCD, ECD, FTD (Other detectors must be special ordered.)

Multi-Dimensional GC/GCMS system

MDGC/GCMS-2010

The MDGC/GCMS-2010 with MDGCsolution software simplifies the normally difficult separation and quantification of compounds in complex, multi-component samples.
This system enhances separation performance for trace components in multi-component samples and is designed for a variety of applications, such as research and quality control in the fields of petroleum analysis, fragrance components, fine chemicals, and environmental substances.
Multi-Deans switching technology significantly reduces the likelihood of fluctuations in the retention times of eluted components and provides outstanding retention time stability, even if switching is performed several times.
Since the internal surface has been subjected to deactivation processing, a superior level of peak reproducibility is attained, and analysis with a high level of quantitative accuracy is possible.
The pressure and flow rate of the carrier gas and switching gas are precisely controlled with an Advanced Flow Controller (AFC) and an Advanced Pressure Controller (APC). This ensures superior reproducibility of analytical conditions.
When not using the MDGC/GCMS-2010 as an MDGC system, changing the column and detector connections makes it possible to use the conventional GC and GCMS components as independent systems.

Auto Injector/Auto Sampler for GC/GC-MS

AOC-20i/AOC-20s

The AOC-20i Auto Injector can inject samples into a variety of injection ports, including split/splitless, direct (WBI), cool on column (OCI), or programmed temperature vaporization (PTV). In addition, ever- decreasing detection limits demand increased flexibility for different injection techniques, including large volume injection (LVI), solvent flush, and solvent flush with a second solvent. The AOC-20s provides sample transport to the AOC-20i Auto Injector using 1.5 ml and 4.0 ml vials.
The AOC-20i/AOC-20s is a powerful automation tool for GC laboratories that allows the users to take full advantage of the GC system's capabilities.

GC Application System

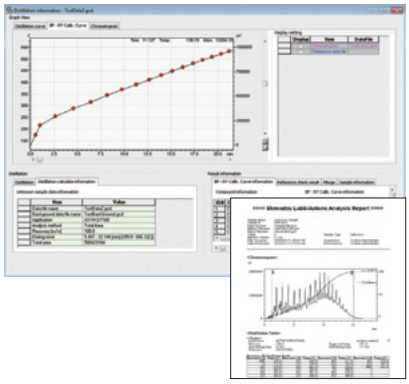
PONA Analysis System

Works with GCsolution to measure peak area%, weight%, volume% by carbon number or by type. Identification results can be observed while viewing the chromatogram on the monitor and easily manuplated by mouse operations.

Applicable samples	Naphtha, gasoline
Items calculable from quantitation results	Mol%, mean molecular weight, density, carbon number, hydrogen content, oxygen content, octane number, vapor pressure, distillation characteristics

GC Application System

Distillation Gas Chromatograph System



The boiling point distribution of petroleum fractions can be measured by simple operation from LabSolutions menus. This system supports various distillation GC standards such as ASTM and JIS.

- Analysis by total area method, internal standard method and external standard method
- Various conversion and calculation functions from distillation characteristics (ASTM D86, D1160 conversion, flash point calculations, NOACK calculations, Reid vapor pressure calculations, etc.)
- Multiple distillation characteristic result comparison, statistical calculation functions

System configuration examples	GC-2010 Plus AF (with WBI or OCI) or GC-2014AF + LabSolutions + Simulated Distillation GC Analysis Software (Select injection unit and column according to the target sample.)

Single Function GC

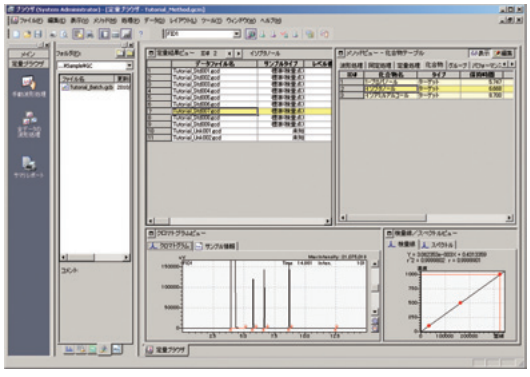
GC-8A Series

The GC best suited for routine analyses based on the design concept of providing the optimum condition using the best-suited columns and detectors, enhancing the efficiency of analysis.

Detector	TCD, FID, ECD, FPD
Digital temp	setting
Pr Series	Automatic repeated temperature programmable
P Series	Digital temperature programmable
I Series	Isothermal

Integrated Workstation

LabSolutions LC/GC



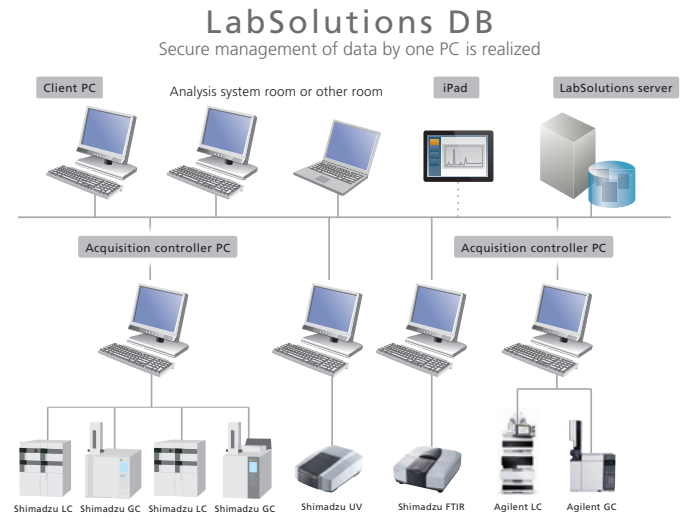
This next-generation workstation integrates GC and LC control, and provides users with stronger network functions. It features a Quantitation Browser that allows you to verify multiple data acquisition results and has substantial functions for automating processes from startup right through to shutdown, which results in improved operator ease and analytical productivity.
It is also provided with a PDF output function as well, which helps conserve paper.
GC-2010(Plus), GC-2014 and GC-2025[Note] can be controlled.

- Windows 7, LabSolutions LC/GC and CLASS-Agent Manager are pre-installed.
- PONAsolution and MDGCsolution are not supported so use GCsolution.

Note: GC-2025 control is supported from Ver. 5.51 or later and Ver. 6.10 or later.

Analysis Data System

LabSolutions CS/DB

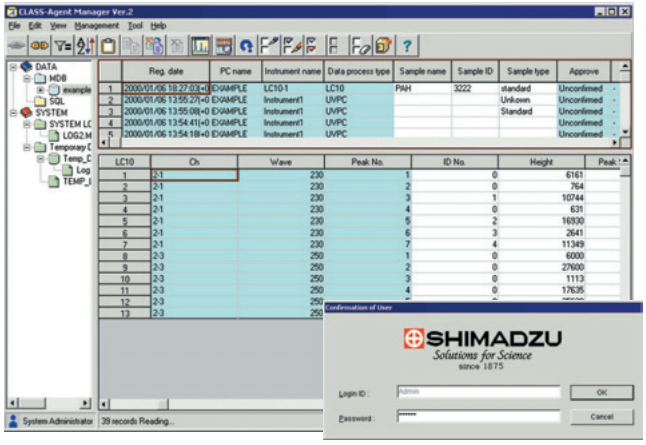


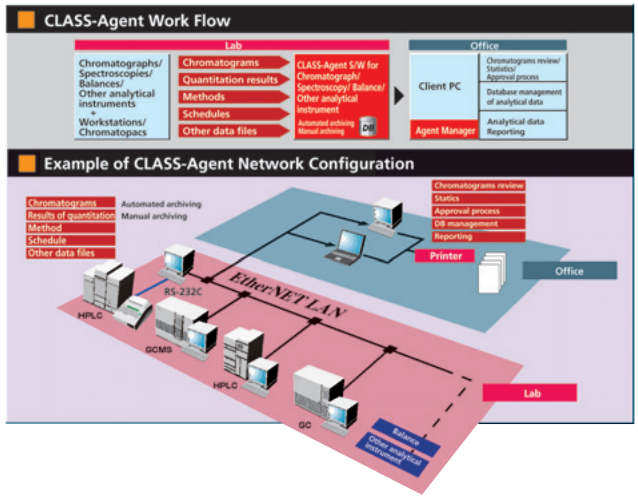
Note: The acquisition controller PC performs the analysis operations by controlling the analytical instruments.

LabSolutions DB is a product that integrates the analysis data management functions of LabSolutions LC/GC, and provides for compliance with regulations such as the Japanese Ministry of Health, Labour and Welfare's ER/ES guidelines. This product's configuration is ideal for those who wish to manage all their data on one PC.
With LabSolutions CS, all analysis data is managed in a database on the server computer, so the data can be loaded using any computer on the network. Additionally, even PCs that are not connected to instruments (client PCs), can be used to stipulate that analysis is to be performed, or be used for monitoring or controlling the instruments. Furthermore, the direct control of non-Shimadzu LC/GC systems can also be performed. Also, since the system is compatible with Windows terminal services, the functions of the client PC can be run on the server, thus eliminating the need for the LabSolutions software to be installed on the client PCs. Moreover, the system is compatible with XenApp by the Citrix Systems, Inc., thus assuring a high level of server management.

Network-compatible data management tool, providing full support for FDA 21 CFR Part 11

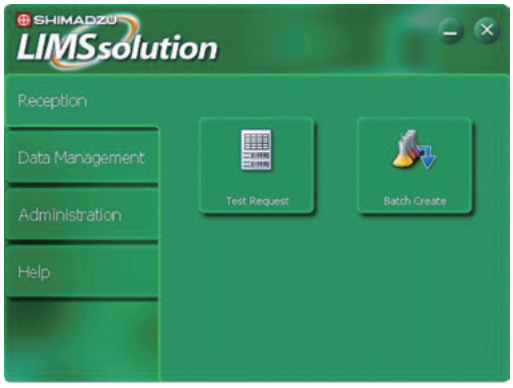
CLASS-Agent





The CLASS-Agent comprises an array of unique tools to manage various types of data from HPLC, GC, LC/MS, GC/MS, UV-VIS, FTIR and AA spectrophotometers, TOC analyzers, Thermal analyzers, electronic balances, and other analytical instruments.
The CLASS-Agent supports FDA 21 CFR Part 11 (Electronic Records and Electronic Signatures), and data security management and electronic signature functions are incorporated for data stored in the database. Data acquired by each analytical instrument are automatically transferred and stored in the database for quick and easy data retrieval.
All pertinent information associated with the data, such as the analytical method, original data acquisition date and time, operator's name, chromatograms, analytical report in pdf format, are stored together. Both machine-readable data and human-readable data are also stored for Part 11 compliance. Through a computer network, all analytical instrument data can be managed from a central location such as a network server, enabling the data to be easily accessed from client PCs.
The latest CLASS-Agent Version 2.2 reinforced supports for electronic record functions, security for electronic signatures and automatic signature insertion to report file (pdf format), which are desired for FDA 21 CFR Part 11 compliance.
Optional "CLASS-Agent Report" software enables report generation using spreadsheets by Microsoft Excel in a Part 11 compliant environment.

LIMSsolution



Shimadzu's LIMSsolution Ver. 1.0 differs from most conventional information management tools that make up Laboratory Information Management Systems (LIMS), which generally only collate and manage common numerical information. The system has been developed with an eye on size and cost efficiency, and is available as a mini-LIMS that has undergone optimization to be ideally suited as an information management tool that can be used directly in conjunction with analytical instruments.

Chromatopac

C-R8A

This compact instrument incorporates all the functions required for chromatography.

- Signals from two sources can be processed simultaneously. (Optional two-channel board is required.)
- Simplified operation through the liquid crystal display.

Life Science Instruments — Proteomics Instruments and Reagents

Matrix-Assisted Laser Desorption/Ionization Time-Of-Flight Mass Spectrometer

MALDI-7090

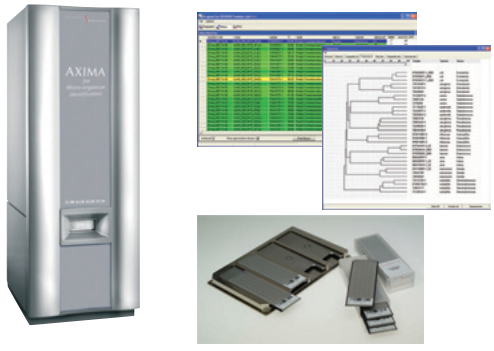
This high performance flagship model achieves high speed measurement (MS, MS/MS) at up to 2 kHz, and high MS/MS resolution (10,000) via ASDF*. Thanks to truly high energy CID-MS/MS, this system maximizes structural data for a variety of samples including biologically active substances and industrial materials.

In addition, this system can flexibly accommodate a wide range of needs with its unique functionality, including a laser beam diameter-changing mechanism suited to imaging mass analysis; a sample loader with a 10 plate capacity, providing strong support for LC-MALDI; and multi-user compatibility.

Mass range	Linear mode	1 to 500,000 Da
	Reflectron mode	1 to 70,000 Da
Mass resolution	Linear mode	6,000
	Reflectron mode	25,000
	MS/MS	10,000
MS/MS function		CID/PSD
Mass accuracy	Reflectron mode	2 ppm (internal standard)

AXIMA Application System

AXIMA Microbial Identification System

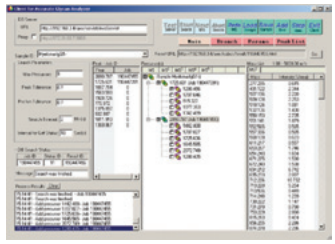


This system combines the AXIMA mass spectrometer, which is optimal for microbial identification, with microbial identification software. When microbes are analyzed directly with MALDI-TOFMS, a peak pattern (mass spectrum) is obtained, indicating the molecular weights of characteristic microbial proteins. By comparing the results to a database constructed using approximately 40,000 mass spectra, more than 1,900 different types of microbes can be identified. The microbes can be analyzed directly, without the need for gram staining, morphological determinations and other pretreatment required by conventional microbial identification methods (biochemical, culturing, and PCR). As a result, a microbial identification that would have taken several hours with conventional methods can be accomplished with this system in about 2 minutes, enabling high throughput analysis at a top speed of 1,000 samples per day. In addition, since pretreatment reagents are not required, running costs are reduced to about half that for existing methods.

Note) This system is not intended for use in clinical diagnoses. Use it only for research purposes.

AXIMA Application System

Trace-Level Oligosaccharide Rapid Analysis System



This system consists of the AXIMA Resonance, an oligosaccharide aggregate database*, a search software*, and a software interface for integrating the two. The system performs identification of oligosaccharides using MALDI-QITTOF, which is capable of high sensitivity oligosaccharide detection. The database compiled by the system consists of actual multistage spectra for oligosaccharides with known structures. Matching the spectra of measured unknown samples with the database enables simple identification of oligosaccharides, with high sensitivity and high accuracy. This system is capable of estimating structural isomers of oligosaccharides, which is impossible with structural analysis utilizing conventional methods and other mass spectrometry, and it does so quickly, with high sensitivity, and without requiring specialist knowledge.

The system can also be constructed by adding the search software and the software interface to an existing AXIMA Resonance.

* The database is copyrighted by the Japanese National Institute of Advanced Industrial Science and Technology (AIST), and the search software is a product of Mitsui Knowledge Industry, Co., Ltd.

AXIMA Performance - a highly flexible research-grade mass spectrometer

AXIMA Performance™

A high-performance MALDI-TOF mass spectrometer utilizing state-of-the-art high-energy MS/MS, delivering unparalleled flexibility, in a robust and reliable research-grade system.

- True high-energy MS/MS - CID with a laboratory frame collision energy of 20 KeV
- Optimal precursour ion selection resolution using revolutionary gating technology
- Outstanding sensitivity - uncompromised design, to ensure no MS/MS signal is discarded
- Low sample consumption - allowing many more MS/MS experiments to be performed on the same sample spot
- LC-MALDI software allowing confident identification of off-line separated complex mixtures via automated MS/MS

High-performance Mass Detection

AXIMA Assurance™

Linear MALDI-TOF mass spectrometer for reliable mass information

- An affordable, robust option for all laboratories requiring routine manual or automated analysis of a wide variety of sample classes
- High-sensitivity system using a variable repetition rate 50 Hz N_2 laser and a variety of target formats to meet all sample throughput requirements
- Ideally suited for high-throughput QA/QC application areas such as oligonucleotides/primers, synthetic peptides/proteins, polymer analysis, small molecules
- Intuitive software incorporating data-dependent workflows for achieving the maximum result with minimum user input, ideal for novice and expert users alike

Powerful MALDI-TOF performance for reliable mass information and MS/MS-derived structural detail

AXIMA Confidence™

The Axima Confidence™ is designed with the general analytical and life science laboratory in mind. Incorporating a variable repetition rate 50 Hz N_2 laser, the system provides rapid, high-quality MALDI mass spectra and an array of software tools for data processing and reporting.

- An affordable, robust option for all laboratories requiring routine manual or automated analysis of a wide variety of sample classes
- High-sensitivity system using a variable repetition rate 50 Hz N_2 laser and a variety of target formats to meet all sample throughput requirements
- Software packages specifically created for Proteomics, LC MALDI, Polymer analysis, tissue imaging/biomarker discovery, oligonucleotide/primer analysis

Matrix-Assisted Laser Desorption/Ionization Quadrupole Ion Trap Time-Of-Flight Mass Spectrometer

AXIMA Resonance™

This MALDI-QIT-TOF mass spectrometer provides powerful support for proteomics and sugar chain analysis.
It incorporates a quadrupole ion trap (QIT) for fmol-order MS^n measurements of the ions generated by MALDI.
These features provide structural information in addition to molecular weights, making MALDI-QIT-TOF MS widely used for proteomics, biochemistry, pharmaceuticals, medicine, synthetic chemistry, and structural analysis of organic compounds.

Reflectron mode	Mass range		100 to 12,000Da
	Mass resolution		8,000
	Mass accuracy	MS	3ppm (internal standard)
		MS/MS	10ppm (internal standard)
	Precursor Ion Selectivity		1,000 (MS^2)
	Sensitivity	MS, MS/MS	500amol
		MS^3	5fmol

Nano Spotter for MALDI-TOF MS

AccuSpot

The AccuSpot automates LC microfractionation, spotting and preparation for MS analysis.
With the AccuSpot system, LC eluent can be accurately and continuously spotted onto target plates.
This allows for automatic preparation of target plates for MALDI-TOF-MS measurements.
By using it in conjunction with Shimadzu's Two-Dimensional Micro LC System and Shimadzu AXIMA MALDI-TOF instruments, proteome analysis can be performed with a higher degree of precision and with greater sequence coverage.

Number of plates	Max. 9 Shimadzu or 18 ABI target plates
Spotting method	Non-contact spotting
Matrix solution flow rate	0.1 to 50μL/min.
Spotting modes	Continuous mode, Programmable time window mode

Automated Protein/Peptide Sequencing System

PPSQ-31B/33B

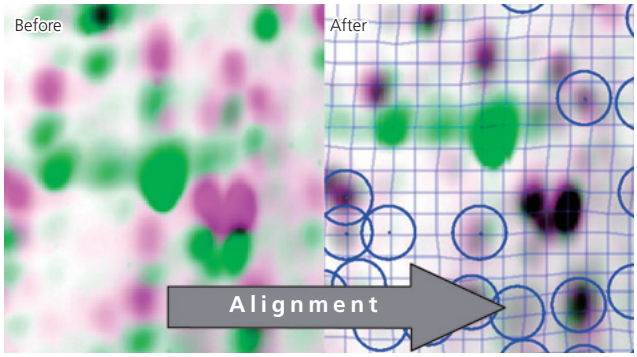
A fully PC-controlled protein sequencer, PPSQ-31B/33B systems are equipped with a specially designed, novel and precise reagent delivery system for the reproductive gas-phase Edman degradation cycles. The PPSQ-31B is a single-reactor system for high-value performance, while the PPSQ-33B is a triple-reactor system for 3-sample continuous operation. Both systems allow easy operation, easy interpretation, as well as high-value performance with high precision.

Protein N Terminal Synthesis Kit

Transdirect *insect cell*

This is a new cell-free protein synthesis kit derived from insect cell cultures. It achieves superior protein synthesis capacity to a rabbit reticulocyte system. The kit comes with optimized reaction buffers and expression vectors to allow optimal protein synthesis tests to be easily conducted.

Uses extracts derived from Sf21 insect cell culture.
Includes high-efficiency expression vectors.



Progenesis
Electrophoresis Gel Image Analysis Software

Two-dimensional electrophoresis gel image analysis software using the latest algorithms. Offers high-accuracy spot detection and gel alignment. Offers an easy-to-use environment with diverse analysis tools and automated analysis functions.

Progenesis SameSpots

Permits 100% accurate spot matching with simple operations. Able to match all gels to obtain quantitation results without missing values or matching errors.

Software alignment of gel distortion in pixel units.
Detects all gel spots with the same shape. Editing of any spot is reflected in all spots.

Note) A separate PC is required that meets the required specifications.

Progenesis SameSpots

Alignment corrects gel distortion according to the shade of the spot and superimposes the spots.
It permits differential analysis as if electrophoresis of multiple samples had been conducted on a single gel.
Supports dyeing methods including CBB dyeing, fluorescent dyeing, and 2D DIGE.

Before	E.coli mutant spots (green) E.coli wild type spots (pink)
After	Superimposed spots displayed black

Progenesis PG220/PG200

Software for comparison analysis of two-dimensional electrophoresis gels.

Warping function automatically corrects gel distortion and superimposes the spots.
Using the latest algorithms to evaluate the spot region, quantitative comparison of proteins, and highly accurate differential spot evaluation.

TotalLab TL120

One-dimensional electrophoresis gel image analysis software.

Life Science Spectrophotometer

BioSpec-nano

This is a dedicated spectrophotometer for checking the concentration and purity of nucleic acid samples. It analyzes 1 to 2 µL trace samples of nucleic acids. Simply drop the sample onto the window with a pipette and press the [Start] button on the instrument or click the [Start] button on the software screen to start automatic light path setting, measurement, and wiping of samples on the window.
It is not necessary to make vertical arm adjustments or wipe the widow with a cloth. Dedicated software simplifies operation. Just click buttons on the toolbar to conduct basic operations including measurement, report printing, and exporting data.

Light path	0.2 mm, 0.7 mm (manual switching)
Sample quantity	0.2 mm light path: 1 µL min.; 0.7 mm light path: 2 µL min.
Quantitation range (OD, converted to double-stranded DNA concentration)	0.2 mm light path: 1 to 75 OD, 50 to 3,700 ng/µL 0.7 mm light path: 0.3 to 21 OD, 15 to 1,000 ng/µL
Wavelength range	220 to 800 nm
Wavelength accuracy	±1 nm

A fully automated Microchip Electrophoresis System for DNA/RNA Analysis

MultiNA

A new electrophoresis analysis platform with Shimadzu's renowned microchip technology provides an alternative to agarose gel electrophoresis.

Lower analysis costs with a sophisticated reusable microchip
Greater speed with automatic operation of up to 120 analyses and 75 seconds/analysis cycle time
High-sensitivity detection with a LED-excited fluorescence detector, 10 times more sensitive than ethidium bromide staining
High resolution and high reproducibility ensured by lower and upper marker in the reagent kit
Outstanding ease of use with the control and viewer software

Note: MCE®-202 MultiNA is not available in the United States.

Nucleic Acid & Protein Spectrophotometer

BioSpec-mini

The BioSpec-mini is a dedicated life-science spectrophotometer designed to meet the growing requirement for compact spectrophotometers used for the quantitation of micro amounts of DNA, RNA, and protein.

- Easy operation and speedy quantitation with a large LCD
- Micro-amounts measurable with a 5 µL cell
- Installed with utility program
  Calculation of nucleic acid molecular weight and molar absorbance coefficient (e), and Tm estimation by the nearest base pair model are possible.

Tm Analyzer

TMSPC-8

(Requires spectrophotometer or other such system separately)
By combining this analyzer with a UV-Vis spectrophotometer, this system achieves high-throughput parallel Tm analysis of nucleic acids. Analyses from 100 µL are possible with the special 8-cell microcell. It includes all-in-one PC software.

Temp. Control Range	0.0°C to 110.0°C
Temp. Change Rate	±0.1°C to 5.0°C per minute (12 steps)
Temp. Control System	Heating/cooling by Peltier element
Compatible Models	BioSpec-1601, UV-1601, UV-1650PC, UV-1700, UV-1800, UV-2401PC/2501PC, UV-2450/2550, and UV-3600

DNA Amplification Reagent

Ampdirect® Plus

Ampdirect (PCR buffer) restricts the effects of PCR inhibitors such as proteins and sugars. Therefore, simply using Ampdirect as the buffer eliminates the need for DNA purification before PCR.

- Quick and easy PCR
- No DNA purification – ideal for PCR of trace samples without sample loss
- Restricts PCR inhibition by impurities in the sample to allow stable PCR.
- No DNA extraction kit or equipment required – restricts running costs

Functional Near-Infrared Spectroscopy System for Research

LABNIRS

Measurement using up to 40 sets, 142 channels (previously 16 sets, 52 channels) is achieved, and measurement of the brain over a wider range, higher-density measurement (2× conventional spatial resolution) and faster measurement (5× faster than conventional measurement) are now possible.
By measuring the oxygen state of the brain's surface using safe IR rays, the active regions of high-order brain functions, such as vision, hearing and motion, and the active state of these regions can be observed in real time.

Measurement items	Variation from initial values of oxygenated hemoglobin (Oxy-Hb), de-oxygenated hemoglobin (Deoxy-Hb), and total hemoglobin (Total-Hb)
Number of measured channels	LABNIRS 4 sets (10 channels) to 40 sets (142 channels)

TOC-L

TOTAL ORGANIC CARBON ANALYZER

The role of the TOC analyzer is to quickly and reliably measure all sorts of organic compounds in water. The most important feature of such an analyzer is its ability to efficiently oxidize not only easily-decomposed, low-molecular-weight organic compounds, but also hard-to-decompose insoluble and macromolecular organic compounds. A new series of Shimadzu TOC analyzers has been released, which delivers both high-efficiency detection of organic compounds via the 680°C combustion catalytic oxidation method, and high sensitivity capable of even pure water management.

		High-sensitivity model		Standard model	
Model		TOC-LCPH	TOC-LCSH	TOC-LCPN	TOC-LCSN
Operation method		PC-controlled	Standalone	PC-controlled	Standalone
Measurement method		680°C combustion catalytic oxidation – non-dispersive infrared detection (NDIR) method			
Measurement items		TO, IC, TOC, NPOC (Optional: POC, TN)			
Measurement range	TC	0 to 30,000 mg/L		0 to 30,000 mg/L	
	IC	0 to 35,000 mg/L		0 to 3,000 mg/L	
Detection limit		4 µg/L		50 µg/L	

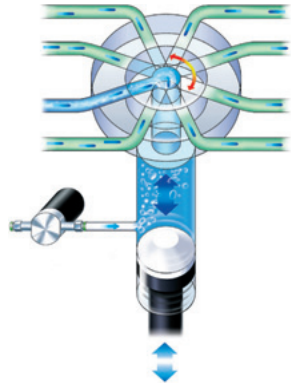
This product conforms to Shimadzu's Eco-labeled designation.
* Energy consumption has been reduced by 36% in comparison with conventional Shimadzu models.

Extremely wide measurement range, from 4 µL to 30,000 mg/L, applicable to everything from ultrapure water to highly-contaminated water (TOC-LCSH/CPH)

- Capable of TC, IC, TOC (=TC-IC), and NPOC measurements. In addition, installation of optional units enables POC (volatile organic carbon), TOC via POC and NPOC, and even TN (total nitrogen) measurements.
- The blank check function evaluates system blanks by measuring ultrapure water processed automatically within the instrument.
- The automatic dilution function enables measurements up to 30,000 mg/L.

Reliable Sample Injection System

- Automatic sample acidification and sparging
- The automatic dilution function reduces sample salinity, acidity, and alkalinity, significantly extending the period of use of catalysts and combustion tubes. (The effectiveness will differ depending on the samples and measurement conditions.)
- Even when an autosampler is used, stat or priority samples can be added at any time to the analysis schedule without interrupting operation by equipping the system with a sample collection tube for single-unit TOC analyzer measurements.



Multifunction sample pretreatment injector

Select from 4 Models to Suit your Application

- LCD and keyboard equipped standalone models and PC-controlled models
- High-sensitivity model with a detection limit of 4 µg/L, suitable for a variety of applications including pure water measurements, as well as a standard model designed with cost performance in mind

TOC-LCSH/CSN standalone model

TOC-LCPH/CPN PC-controlled model

A Wealth of Options to Further Expand Applications

- TN unit capable of total nitrogen measurements via thermal decomposition/ chemiluminescence
- Capable of measuring not only aqueous samples but also samples in solids, and gas samples
- Special-purpose combustion tubes/catalysts result in maintenance reductions when measuring seawater samples
- Accommodates smaller sample volumes. (Capable of automated 5 mL/3 NPOC measurements)

*Space savings:
Approximately 20% narrower in comparison with conventional Shimadzu models

Applicable in a Variety of Fields

Process Control
Effluent treatment process control
Processes
Ultrapure water recycling and re-purification processes

Quality Control
Water supply equipment
Electronic components
Aluminum foil
Raw materials

Investigations and Experimental Research
Global environment and eutrophication
River water, lakes and marshes, underground water, sea water, soil, sludge, sediments, etc.
Biodegradable plastics and cement secondary products

Water Quality Control
Tap water
Ultrapure water
Effluent (treated/untreated)
Pool water, spa water, boiler water, water from industrial processes

Pharmaceutical Manufacturing
Pharmaceutical water control
Evaluation of cleaning effectiveness (Cleaning validation)

Autosampler for TOC-L Series

ASI-L

ASI-L

Combination with the TOC-L series results in a fully automatic measurement system. Vials with three different capacities, 9 mL, 24 mL, and 40 mL, can be used.

- Vials with a septum can be used (24 mL and 40 mL vials).
- Can be equipped with a magnetic stirrer (optional).

Types and number of vials	9 mL × 93 vials 24 mL × 93 vials 40 mL × 68 vials

8-Port Sampler for TOC-L Series

OCT-L

OCT-L

Combination with the TOC-L series results in an automatic measurement system at an affordable price.
Settings are extremely simple, since special vials are not required. In addition, the effects of contamination can be reduced if measurements are performed as is using large-capacity collection bottles.

- Can be combined with commercially-available stirrers and water baths.

Units connected	Up to 2 units can be connected.
Number of vials	8 vials per unit Maximum of 16 vials (with 2 units)

TN (Total Nitrogen) Unit for TOC-L Series

TNM-L

Combination with the TOC-L series results in a simultaneous TOC and TN measurement system.
This system can also be used to meet regulations on effluent nitrogen and total volume.
The space-saving design enables installation above the TOC-L, meaning that installation space is not a problem when expanding.

Measurement method	Chemiluminescence method
Measurement item	TN (total nitrogen)
Measurement range	0 to 10,000 mg/L

Solid Sample Combustion Unit for TOC-L Series

SSM-5000A

SSM-5000A

When combined with the TOC-L series, TC, IC, and TOC measurements can be performed in soil, sludge, sedimentation, and other solid samples.
In addition, with GMP cleaning validation, the system can also be used to evaluate residues using the swab sampling/direct combustion carbon analysis method.

- Can also be connected to the TOC-V series

Combustion temperature	900°C
Measurement range	TC: 0.1 to 30 mgC IC: 0.1 to 20 mgC
Sample volume	1 g max.

Wet Oxidation TOC Analyzers

TOC-V$_{WS/WP}$ Series

Wet oxidation TOC Analyzers aim for high sensitivity with great oxidation performance by combining UV light, heat, and persulfate methods.

Ultra-high sensitivit	0.5 µg/L detection limit
Choice of Standalone or PC-controlled model. (Standalone model can be upgraded to PC-controlled model.)	
PC-controlled model supports FDA 21 CFR Part 11 compatibility	
Measured items	TC, IC, TOC, NPOC
Measurement range	TC 0 – 3,500 mg/L, IC 0 – 3,500 mg/L

Auto-sampler for TOC-V Series

ASI-V

ASI-V

Combining the ASI-V automatic sampler with a TOC-V series (except TOC-VE) creates a fully automatic analysis system.

Vial types	24 mL (× 93 vials), 40 mL (× 68 vials), 125 mL (× 24 vials), and optional 9 mL vial rack.

Sample sparging function with an optional external sparge kit.

8-Port Sampler for TOC-V Series

OCT-1

OCT-1

An innovative but inexpensive auto-sampler which can accept any sample container.

Connection up to 2 OCT-1 units.

Number of vials	8 or 16 (with 2 OCT-1 units)

On-Line TOC Analyzer

ON-LINE TOC-VCSH

High-sensitivity continuous monitoring of water samples such as pure water and tap water.

680°C combustion catalytic oxidation /NDIR method.

Measured items	NPOC, TC, IC, TOC (TC-IC), (Option: TN)
Measurement range	TC 0 – 25,000 mg/L, IC 0 – 30,000 mg/L
Measurement cycle	Approx. 5 – 999 minutes (for NPOC measurement)

Equipped with off-line measurement functions.

On-Line Total Organic Carbon Analyzer

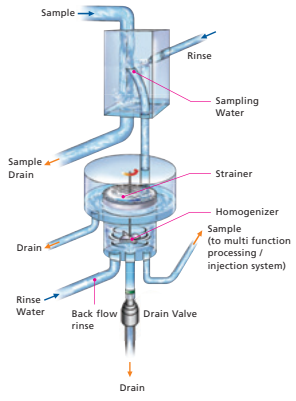
TOC-4200

Highly Advanced On-Line TOC Analyzer Excels in a Wide Range of Applications

Support for a Wide Range of Samples

- Select a sampling unit to match the sample
- Wide measurement range from 5 mgC/L full-scale to 20,000 mgC/L full-scale
  Supports for applications from recovered water of semiconductor manufacturing to heavily polluted pretreatment water
- High sensitivity measurements from 0 to 1 mgC/L (optional)
- Diverse TOC measurements (NPOC, TC-IC*, NPOC + POC* measurements), TN measurements*

*Optional



Multi-Stream Suspended Solids Sampling Unit

Calendar scheduling setup

Advanced Operability

- Color LCD touch screen
- Supports data-storage devices. Easy to store measured values or measurement conditions to a USB flash drive
- Calendar scheduling setup
- Compatible with various communication systems:
  Digital bus, Web-based monitoring*

*Optional

Measurement Principle	680℃ combustion catalytic oxidation
Measurement Items (*Optional)	NPOC, TC, TOC (TC-IC)* TOC (NPOC+POC)*
Measurement Range	0-5 to 0-1,000 mgC/Lf.s. (0 to 20,000 mgC/f.s. with dilution function)
Measurement Cycle	4 minuts min. (Using NPOC)
Repeatability	Within ±2% f.s.*

* With automatic settings

Transportable Gas Analyzers

7000 Series

NOA-7000

Analyzers of NOx, SO_2, CO, CO_2, CH_4, O_2 concentration in various combustion exhaust gases of boilers and industrial furnaces. The 7000 series is also used for research purposes.

- Innovative system design capable of real-time data display or trends in concentration on a large backlit LCD screen.
- Built-in functions such as air-leak correction and averaging.
- Continuous data storage by IC memory card for more than 10 days at 30-second intervals.

Model	NOA-7000	CGT-7000	SOA-7000
Description	NOx-O_2 Chemiluminescence Gas Monitor	CO/CO_2/CH_4 Infrared Gas Monitor	SO_2 Infrared Gas Monitor
Range	NOx: 0-25/50/100/250/500/1000/2500/4000 ppm O_2: 0-5/10/25 vol%	CO: from 0-100 ppm to 0-100 vol% CO_2: from 0-1000 ppm to 0-100 vol% CH_4: from 0-200 ppm to 0-100 vol% O_2: 0-5/10/25 vol% (option)	SO_2: 0-100 ppm to 0-1 vol% O_2: 0-5/10/25 vol% (option)
Repeatability	within +/-0.5% of full scale	within +/-0.5%	within +/-0.5% of full scale

Sample Pretreatment Unit for 7000 Series

CFP-8000

CFP-8000

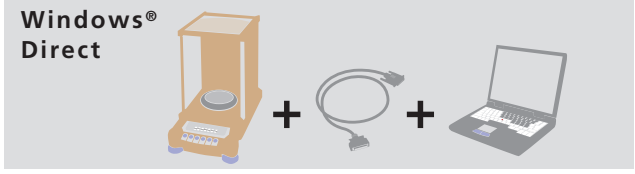
This unit is for use when the sample gas contains a high level of moisture, dust, mist, and other corrosive components. It is also effective when used with continuous sampling monitors to reduce maintenance frequency.

Flue Gas Multi-Component Gas Concentration Analyzer

NSA-3080

The NSA-3080 employs a micro-computerized, multi-component, Ratio-NDIR gas analyzer for the measurement of NOx, SO_2, and CO or CO_2. An O_2 detector is also incorporated to allow measurement of a total of the five components simultaneously.

Application	Measurement of NOx, SO_2, CO, CO_2, and O_2 concentrations in exhaust gases from various boilers, industrial plants (petroleum refinery, steel, cement, etc.), incinerators, and thermal treatment furnaces.



Unpack and get ready!

Shimadzu's Unique Features

UniBloc Balances

Shimadzu introduced one-piece force cell technology commercially for precision balances in 1989. Today's UniBloc is created by high-precision wire electrical discharge machining applied to a block of aluminum alloy, and replaces the conventional electromagnetic balance sensor assembly. UniBloc's compact, uniform structure ensures stable temperature characteristics, excellent response time and stable corner-load performance. The UniBloc design permits a consistency of production that assures reliability and a long operational life.
The updated UniBloc technology expands the UniBloc family balance lineup, which now ranges from semi-micro with a minimum display of 0.01 mg to precision platform balances up to 52 kg in capacity.

Windows® Direct

Shimadzu's unique Windows® Direct function provides the handiest data transmission to a computer. An RS-232C cable is all you need to add. No software installation is required. With the print key, the weighed result is sent to the cursor position of any application on Windows®. Auto print functions can also be combined with Windows® Direct for automatic data collection.

Analytical Balances

AU Series

These balances are capable of speedy measurements, with a high-speed 3 second display. They are equipped with automatic calibration for room temperature changes, and clock-CAL for calibration at pre-set times, and are capable of direct data readout to Excel and other applications.

Dual Range Semi-Micro Balances AUW-D Series

Model	Capacity	Minimum Display
AUW120D	42 g/120 g	0.01 mg/0.1 mg
AUW220D	82 g/220 g	0.01 mg/0.1 mg

Analytical Balances AUW Series
(equipped with clock-CAL and fully automatic calibration functionality)

Model	Capacity	Minimum Display
AUW120	120 g	0.1 mg
AUW220	220 g	0.1 mg
AUW320	320 g	0.1 mg

Analytical Balances AUW Series
(equipped with fully automatic calibration functionality)

Model	Capacity	Minimum Display
AUX120	120 g	0.1 mg
AUX220	220 g	0.1 mg
AUX320	320 g	0.1 mg

Analytical Balances AUY Series (popular, all-purpose model)

Model	Capacity	Minimum Display
AUY120	120 g	0.1 mg
AUY220	220 g	0.1 mg

Analytical Balances

ATX Series (with built-in calibration weight) / ATY Series

These are equipped with the same "UniBloc" technology found in high-end Shimadzu models although they are low cost instruments. They features highly stable performance, and are capable of highly reliable weight measurements even with extended use.

ATX Series (with built-in calibration weight)

Model	Capacity	Minimum Display
ATX84	82 g	0.1 mg
ATX124	120 g	0.1 mg
ATX224	220 g	0.1 mg

ATY Series

Model	Capacity	Minimum Display
ATY64	62 g	0.1 mg
ATY124	120 g	0.1 mg
ATY224	220 g	0.1 mg

Static Remover, 2-Way Ionizer

STABLO®-EX

NEW Shimadzu's unique 2-WAY ionizer
Hand-held / On stand

Static removal method	AC corona discharge
Static removal range	Approx. 5 to 50 cm from discharge electrode (Fan ON)
Ozone concentration	0.04 ppm (measured 2 cm from discharge electrode, Fan ON)
Discharge electrode material	SUS304, service life 10,000 hours
Weight	Approx. 540 g (ionizer unit approx. 110 g, stand approx. 430 g)

Electronic Balances

UW/UX Series

UW6200H

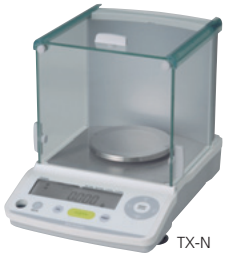
Shimadzu's newest top-loading balance series provides the supreme combination of performance and innovative features. The weighed result is displayed instantly and stands still. Excellent durability also meets repeated use in production sites. Choice of auto print modes and Shimadzu's unique WindowsDirect function enhance productivity without optional software. Check-weighing modes for quality control purposes and a back light display are also useful features in factory use. Measurement administration is also given good consideration.
A calibration report can be automatically output to meet international standards. The UW is equipped with built-in calibration weight and PSC, and Clock-CAL fully automatic calibration functions as standard.
Specific gravity measurement software is already installed and an optional measurement kit allows more efficient measurements.

UW Series

Model	Capacity	Minimum display	PSC	Clock-CAL	GLP/GMP/ISO calibration report	Windows Direct
UW220H	220 g	0.001 g	•	•	•	•
UW420H	420 g	0.001 g	•	•	•	•
UW620H	620 g	0.001 g	•	•	•	•
UW820H	820 g	0.001 g	•	•	•	•
UW1020H	1,020 g	0.001 g	•	•	•	•
UW2200H	2,200 g	0.01 g	•	•	•	•
UW4200H	4,200 g	0.01 g	•	•	•	•
UW6200H	6,200 g	0.01 g	•	•	•	•
UW420S	420 g	0.01 g	•	•	•	•
UW820S	820 g	0.01 g	•	•	•	•
UW4200S	4,200 g	0.1 g	•	•	•	•
UW8200S	8,200 g	0.1 g	•	•	•	•

UX Series

Model	Capacity	Minimum display	PSC	Clock-CAL	GLP/GMP/ISO calibration report	Windows Direct
UX220H	220 g	0.001 g			•	•
UX420H	420 g	0.001 g			•	•
UX620H	620 g	0.001 g			•	•
UX820H	820 g	0.001 g			•	•
UX1020H	1,020 g	0.001 g			•	•
UX2200H	2,200 g	0.01 g			•	•
UX4200H	4,200 g	0.01 g			•	•
UX6200H	6,200 g	0.01 g			•	•
UW420S	420 g	0.01 g			•	•
UX820S	820 g	0.01 g			•	•
UX4200S	4,200 g	0.1 g			•	•
UX8200S	8,200 g	0.1 g			•	•



TX-N

TXB

TW Series

Model	Capacity	Minimum display	Windows Direct
TW223L	220 g	0.001 g	
TW323L	320 g	0.001 g	
TW423L	420 g	0.001 g	

TX Series

Model	Capacity	Minimum display	Windows Direct
TX223L	220 g	0.001 g	•
TX323L	320 g	0.001 g	•
TX423L	420 g	0.001 g	•
TX2202L	2,200 g	0.01 g	•
TX3202L	3,200 g	0.01 g	•
TX4202L	4,200 g	0.01 g	•

TXB Series

Model	Capacity	Minimum display	Windows Direct
TXB222L	220 g	0.01 g	•
TXB422L	420 g	0.01 g	•
TXB622L	620 g	0.01 g	•
TXB2201L	2,200 g	0.1 g	•
TXB4201L	4,200 g	0.1 g	•
TXB6201L	6,200 g	0.1 g	•
TXB621L	620 g	0.1 g	•
TXB6200L	6,200 g	0.1 g	•

Electronic Balances

TW/TX/TXB Series

The beginning of the new standard: TX/TXB has everything you need. We changed key layout for easy operation, making operation as easy as using a cell phone. One-touch operation enables easy adjustments for optimum stability. It is equipped with WindowsDirect, which enables direct transport of data to a PC, requiring only a PC cable. And this product has various functions, including an Expanded Piece Counting function, Illuminated display, anti-theft options, and more.

Portable Electronic Balances

ELB Series

Handy low-cost balances, but with no compromise in accuracy.
A reliable strain-gauge load cell brings resolution up to 30,000.

Model	Capacity	Minimumdisplay	Rechargeablebattery (option)	Dry battery operation (standard)
ELB120	120 g	0.01 g	N/A	•
ELB200	200 g	0.01 g	N/A	•
ELB300	300 g	0.01 g	N/A	•
ELB600	600 g	0.05 g	N/A	•
ELB600S	600 g	0.1 g	N/A	•
ELB1200	1,200 g	0.1 g	N/A	•
ELB2000	2,000 g	0.1 g	N/A	•
ELB3000	3,000 g	0.1 g	N/A	•
ELB6000S	6,000 g	1 g	N/A	•
ELB12K	12 kg	1 g	N/A	•

Precision Platform Balances

BW-K/BX-K Series

Large-capacity balances with fine readability offer various possibilities for industries: weighing precious materials in bulk, efficient but precise compounding, confirming small parts not missing in a large assembly, etc. UniBloc technology gives fast response, display stability and endurance, all of which are essential for large-capacity industrial balances. Auto print, WindowsDirect and various productivity functions are ready for use as standard features. The BW-K has a large-size built-in calibration weight to ensure utmost accuracy.

Model	Capacity	Minimum display	Built-in calibration weight	GLP/GMP/ISO calibration report	Windows Direct
BW12KH	12 kg	0.1 g	•	•	•
BW22KH	22 kg	0.1 g	•	•	•
BW32KH	32 kg	0.1 g	•	•	•
BW32KS	32 kg	1 g	•	•	•
BW52KS	52 kg	1 g	•	•	•
BX12KH	12 kg	0.1 g		•	•
BX22KH	22 kg	0.1 g		•	•
BX32KH	32 kg	0.1 g		•	•
BX32KS	32 kg	1 g		•	•
BX52KS	52 kg	1 g		•	•

High-Precision Electro-Magnetic Barances

BL Series

Compact and affordable, they achieve high accuracy using the same electro-magnetic system as in analytical balances. The BL3200HL model is equipped with a back light display.

Model	Capacity	Minimum display	Description
BL-220H	220 g	0.001 g	
BL-320H	320 g	0.001 g	
BL-320S	320 g	0.01 g	
BL-620S	620 g	0.01 g	Display backlight
BL-2200H	2,200 g	0.01 g	
BL-3200H	3,200 g	0.01 g	
BL-3200S	3,200 g	0.1 g	

Unibloc Moisture Analyzer

MOC63u

A new type of moisture analyzer has been introduced.
This electronic moisture analyzer is capable of performing reliable moisture content measurements quickly and easily.
Simply load the sample on the pan and shut the cover to start measuring.
The system can accommodate a wide range of samples, thereby contributing to heightened work efficiency.

Weighing capacity	60 g
Minimum indication	0.001 g / 0.01%
External output	RS-232C interface USB interface DATA I/O interface

Electronic Moisture Balance

MOC-120H

Reliable moisture measurement backed by UniBloc technology

Thanks to the large sample pan backed by the unique continuous auto-taring mechanism, the MOC-120H delivers perfect accuracy, even to customers with high sample volumes and large quantities. Regardless of your application, the wide selection of measuring modes offers the best solution to achieve fast and accurate results. Best suitable for research laboratories, delivery inspection and in-process control.

Weighing capacity	120 g
Minimum indication	0.001 g / 0.01%

Differential Scanning Calorimeter

DSC-60 Plus Series

Addressing All Needs for DSC Applications

The DSC is an indispensable thermal analyzer for materials characterization in R&D and quality control applications in the areas of polymers, pharmaceuticals, foods, etc. It offers high sensitivity and easy operation required for the development of high-performance, highly functional new materials.

All Temperature Ranges Measured at High Sensitivity

The new detector in the DSC-60 Plus series and heating furnace unit achieve a stable baseline across the entire measured temperature range (-140 °C to 600 °C) as well as top-class calorimetric sensitivity for a DSC. It also features a wide dynamic range of ±150 mW.

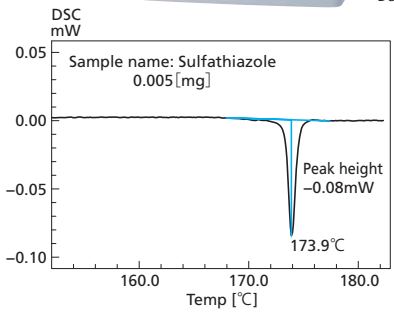
Various Measurements Achieved by Simple Operation

The liquid-nitrogen cooling chamber permits easy measurements at even below room temperature without having to install special accessories. The sample loading temperature function enables quick sample change during sequential analysis without moisture condensation.

Complies with Analytical Laboratory Regulations

The DSC complies with various regulatory guidelines involving analytical laboratories, such as the PIC/S GMP guidelines, and electronic record/electronic signature (ER/ES) regulations, including the US FDA 21 CFR Part 11. In addition, it is compatible with other analytical instruments and connected network systems.

DSC-60 Plus



High-Sensitivity Measurements of Trace Samples (pharmaceutical)

- Also included in the lineup is the DSC-60A Plus which has a built-in compact autosampler which allows automated measurement, analysis and printing of reports for up to 24 loaded samples in a single operation.

Temperature range	-140 to 600 °C (Liquid nitrogen used below room temperature)
Calorimetric measurement range	±150 mW
Baseline noise	0.5 µW max. (rms, when held at 150 °C using blank)

Simultaneous TG/DTA Instrument

DTG-60/60H

This device simultaneously performs differential thermal analysis and thermogravimetric analysis using a differential top-pan balance.The weighing range has been widely increased (a 2-fold or more increase in comparison with current Shimadzu products) while a stable baseline has also been achieved. Moreover, a Shimadzu-developed flow line construction enables testing with various atmospheric gases. (Note that certain reaction gases cannot be used.)

Temperature range	Room temperature to 1,100°C
Maximum sample	1 g (including tare)
Measuring range	TG±500 mg, DTA±1,000 µV

Auto Simultaneous TG/DTA Instrument

DTG-60A/60AH

The DTG-60A/60AH is a new automatic DTG which defines new standards in autosampler technology. The built-in automatic sampler can easily be operated and programmed, compared to the complicated operation and setup of conventional autosamplers. Up to 24 samples can be set up for analysis and additional sample trays can be used to quickly reload the autosampler, providing more than 24 hours of fully automatic analysis at one time.

Temperature range	Room temperature to 1,100°C
Maximum sample	1 g (including tare)
Measuring range	TG±500 mg, DTA±1,000 µV

Thermomechanical Analyzer

TMA-60/60H

This analyzer can handle a wide variety of samples and measurement methods and a large temperature range to perform thorough measurement of the mechanical properties of materials. A high-precision digital sensor allows displacement measurement with a low drift in a wide range.

Temperature range	Ambient to 1,000°C/1,500°C from -140°C with an optional adapter
Measurement range	Displacement : ±5 mm Load : ±5 N
Sample size	ø8 × 20 mm, 5 × 1 × 20 mm (60 type)

Thermogravimetric Analyzers

TGA-50/50H/51/51H

Our TGA units have been designed to provide excellent performance for all aspects related to analysis, from vibration resistance and stability to noise level and fluctuations due to ambient temperature. These units can even clearly detect mass fluctuations as small as the several mg order (10 µg for 51-model units). High-temperature H models are available for ceramic, catalyst, and other high-temperature applications.
The 51-model units are macro-type analyzers.

Temperature range	Room Temp. to 1,000°C/Room Temp. to 1,500°C (H-models)
Measurement range	±20 mg, ±200 mg,(only ±2,000 mg(51-models)only
Maximum sample weight	1 g(tare weigtht)/ 10 g(tare weight for 51 models)

Differential Thermal Analyzer

DTA-50

This is a DTA unit that utilizes a dumbbell type detector. The DTA-50 has a temperature controller, gas flow rate adjuster, transmission interface, and many other features built into a slim 17.3 cm-wide body. The DTA-50 also offers high-temperature DSC performance.

Temperature range	Room temp.to 1,500°C
Measurement range	±0.2 to ±1,000 µV (from a minimum of ±0.2 mW)
Heating speed	0 to ±50°C/min.

Thermal Analyzer Workstation

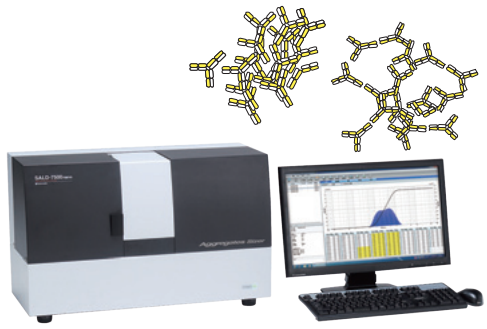
TA-60WS

The TA-60WS uses 32-bit application software that is fully compatible with Windows XP. Up to four thermal analyzers can be connected to the workstation, which is equipped with multi-channel, multi-task functions that make it possible to make measurements while simultaneously performing analysis.

The workstation takes full advantage of the outstanding functions of Windows XP.
Thermal analysis data can be transmitted quickly through Internet E-mail.
The software is OLE compatible, making it easy to prepare reports using analysis data.
The TA-60WS can also be connected to 50-Series thermal analyzers.

Aggregation Analysis System for Biopharmaceuticals

Aggregates Sizer



This system is for fast quantitative evaluation of SVP (sub-visible particle) aggregates from 100 nm to 10 µm in size, which may be contained in biopharmaceuticals.
"Aggregates" are collections of particles, and "sizer" refers to particle analyzers and dimensional measuring instruments. This system evaluates the existence of aggregates, for which there are concerns about shock disease and other side effects, in terms of concentration (µg/mL). It can be used for quality control and to enhance efficiency in the development of biopharmaceuticals.

Particle size distribution measurement range	7 nm to 800 µm
Concentration display range	40 nm to 20 µm
Batch cell	Sample volume: 5 mL Capable of measurement while applying a mechanical stimulus
Disposable cell	Sample volume: 0.4 mL

Nano Particle Size Analyzer

SALD-7500nano

This groundbreaking measurement system achieves 10 times the sensitivity of previous models, and further, continuously measures changes in particle size distributions at one second intervals, in the range between 7 nm and 800 µm. In addition, unique options are available to accommodate the measurement of even high concentration samples (up to 20 wt%) and trace quantity samples (down to 15 µL). It can be applied to cutting-edge measurements in new domains including nanotechnology, the life sciences, and fine bubbles (microscopic bubbles).

Measurement range	7 nm to 800 µm
Light source	Blue-violet semiconductor laser (405 nm wavelength)
Detector elements	84
Options	Batch cell, multifunction sampler, high-concentration measurement unit

Laser Diffraction Particle Size Analyzer

SALD-3101

The sampler is equipped with a powerful pump that ensures the reliable circulation of coarse and high-density particles, making the SALD-3101 suitable for the particle distribution analysis of soil and sand. It is ideal for research into environmental problems and measures for disaster prevention.

Measurement range	0.05 to 3,000 µm
Light source	Red semiconductor laser (wavelength: 690 nm)

Single Nano Particle Size Analyzer

IG-1000 Plus

The IG-1000 Plus uses Shimadzu's revolutionary Induced Grating (IG) particle size measurement technology. This method exploits dielectrophoresis instead of scattered light. Numerous particles form a diffraction grating and the particle sizes are measured from the rate of diffusion and decay of the diffraction grating. Even in the single nano region, adequate signals are obtained to achieve highly sensitive measurements with excellent repeatability.
It offers approximately 10 times the sensitivity of the previous model IG-1000.

Measurement range	0.5 to 200 nm
Measuring time	30 sec
Batch cell method, sample flow rate	250 to 300 µL

Laser Diffraction Particle Size Analyzer

SALD-2300

This is the new standard model in the SALD series. It offers new functions to evaluate changes in particle size distribution with respect to concentration or time (due to dispersion, agglomeration, or dissolution), while maintaining data continuity and compatibility with the SALD-2000, 2100, and 2200 instruments, which boast the best sales record in Japan. It supports a particle concentration range from 0.1 ppm to 20% and can perform a series of measurements of 200 data points at 1 second minimum intervals.

Measurement range	17 nm to 2,500 µm
Light source	Red semiconductor laser
Number of detector elements	84 elements
Options	Multifunctional variable-volume sampler, batch cell, high-concentration sample measurement system, cyclone injection type dry measurement unit

Shimadzu Corporation

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