![SHIMADZU logo]

SHIMADZU

Excellence in Science

Shimadzu Analytical and Measuring Instruments

2022

Excellence in Science

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.

Contents

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

Instruments for Pharmaceutical Sciences Research, Development and QC

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, Molecular imaging instrument, Imaging mass microscope, MultiNA
Low-Molecular Weight Pharmaceuticals	Drug Discovery and Chemistry (Synthesis and Purification)	Drug discovery and chemical research	Preparative HPLC, Particle size analyzer, Balances
		Synthesis	HPLC, LCMS
		Impurities analysis	Co-Sense, ICP
	CMC (Development, Formulation, Manufacturing QA/QC)	Analytical method development	HPLC, GC, Material testing machine, X-ray CT/inspection system, Balances
		Pharmaceutical formulation investigation	Thermal analyzers, Particle size analyzer, Material testing machine, X-ray CT system
		Impurities analysis	Co-Sense, Headspace GC (GCMS)
		Elution tests	HPLC, UV
Biopharmaceuticals	Drug Discovery	Structural analysis	MALDI-TOF MS, HPLC
		Culture solution analysis	HPLC
	CMC (Development, Formulation, Manufacturing QA/QC)	Analytical method development	HPLC, Protein sequencing systems, Aggregation analysis system, Balances
Pharmacokinetics, Metabolomics, Safety		PK/TK ADME	HPLC, LCMS, Molecular imaging instrument, Imaging mass microscope
Manufacturing		Quality control	Balances
		Cleaning validation	TOC, UV, HPLC, LCMS

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

Nexera series →P.8
Ultra High Performance Liquid Chromatograph

LCMS-8060NX →P.18
Liquid Chromatograph Triple Quadrupole Mass Spectrometer

Nexera Prep →P.12
Preparative Purification Liquid Chromatograph

Headspace Analysis System →P.27
GC and GC-MS Application System

TOC-L →P.44
Total Organic Carbon Analyzer

Aggregates Sizer →P.60
Aggregation Analysis System for Biopharmaceuticals

Analytical and Testing Instruments for Food, Beverages and Drinking Water

Support for Food Safety and Development

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, Balances
	Veterinary drugs	HPLC, LCMS, Balances
	Mycotoxins	HPLC, LCMS, Balances
	Foreign substances and odor	FTIR, EDX, X-ray CT/inspection system, GC, GCMS
	Hazardous metals	AA, EDX, ICP, HPLC, UV
	Additives	HPLC, LCMS, GC, GCMS, UV, FTIR, AA, EDX, ICP, Balances
	Production origin and product variety	MultiNA, ICP, ICP-MS
	Microbial	MultiNA, MALDI-TOF MS
	Total organic carbon	TOC
	Packaging	GC, GCMS, Material testing machine, UV, Balances
Food Development (Functional Foods and Supplements)	Food texture, taste	EZ Test, Particle size analyzer, Thermal analyzers, Moisture analyzers
	Flavor	GC, GCMS
	Functionality	HPLC, LCMS, GC, GCMS
	Therapeutic efficacy	Molecular imaging instrument

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

LCMS-8060NX →P.18
Liquid Chromatograph
Triple Quadrupole Mass Spectrometer

TOC-L →P.44
Total Organic Carbon Analyzer

GCMS-TQ8050 NX →P.24
Triple Quadrupole
Gas Chromatograph Mass Spectrometer

SALD-7500nano →P.60
Nano Particle Size Analyzer

AP Series →P.61
Analytical Balance

EZ-X Series →P.50
Compact Tabletop Tester

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
	Marker discovery	MultiNA
	Analysis of nucleic acid compounds	MALDI-TOF MS, LCMS, TMSPC, SPM
	Genetic examination of foods	MultiNA, BioSpec-nano
	Microbial and viral examinations	MultiNA
Proteomics	Protein expression analysis	MALDI-TOF MS, LC-MS/MS, nano-LC, AccuSpot
	Post-translational modifications analysis	MALDI-TOF MS, nano-LC, AccuSpot
	Structural analysis	LC-MS/MS
	N-terminal amino acid sequencing analysis	Protein sequencing system, MALDI-TOF MS
	Marker discovery	MALDI-TOF MS, LC-MS/MS, nano-LC, AccuSpot
Metabolomics	Marker discovery	GCMS, LC-MS/MS, Imaging mass microscope
	Metabolite analysis	GCMS, HPLC, LCMS
Imaging	In vitro imaging	MALDI-TOF MS, Imaging mass microscope, EPMA
	Optical brain-function imaging	LIGHTNIRS, LABNIRS

- Genomics
- Proteomics
- Metabolomics
- Imaging

iMScope QT →P.31
Imaging Mass Microscope

LCMS-9030 →P.19
Quadrupole Time-of-Flight Liquid Chromatograph Mass Spectrometer

MALDI-8030 →P.29
Matrix-Assisted Laser Desorption/Ionization Time-of-Flight Mass Spectrometer

MultiNA →P.37
Microchip Electrophoresis System

BioSpec-nano →P.37
Life Science Spectrophotometer

PPSQ-51A/53A →P.37
Protein Sequencer

LIGHTNIRS →P.38
Portable functional Near-Infrared Spectroscopy System for Research

Evaluation Instruments for Renewable Energy

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, Balances
	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, Balances
Photocatalysts and Artificial Photosynthesis	Evaluation of heterogeneous photocatalysts	UV, XRD, XPS, FTIR, SPM
	Evaluation of homogeneous photocatalysts	UV, LCMS, FTIR
	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, Balances
	Membrane electrode assemblies (MEA)	X-ray CT system, EPMA
	Electrolytes	Thermal analyzers, SPM, Micro hardness tester, Tensile tester, Fatigue tester
	Electrolyte membrane degradation components in generated water	Ion chromatograph, LCMS

■ Algal Biomass ■ Photocatalysts and Artificial Photosynthesis
■ Fuel Cells ■ Energy Carriers

UV-1900i →P.33
UV-VIS Spectrophotometer

XRD-6100 OneSight →P.41
X-Ray Diffractometer with Wide-Range and High-Speed Detector

EDX-7200 →P.39
Energy Dispersive X-ray Fluorescence Spectrometer

SPM-8100FM →P.43
High-Resolution Scanning Probe Microscope

LCMS-8060NX →P.18
Liquid Chromatograph Triple Quadrupole Mass Spectrometer

GCMS-QP2020 NX →P.25
Gas Chromatograph Mass Spectrometer

Nexis GC-2030 →P.14
Gas Chromatograph

Ultra High Performance Liquid Chromatograph

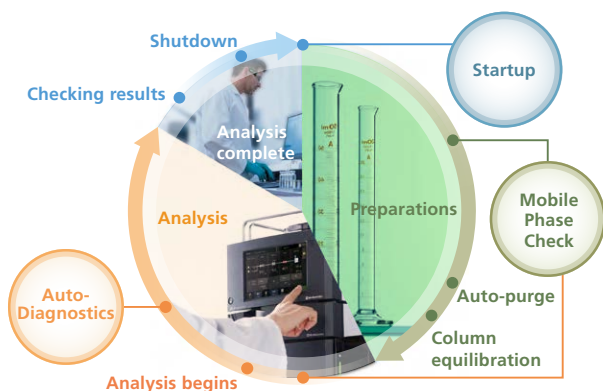# Nexera series

EXPERIENCE NEW BENCHMARKS

In response to the wide variety of customer demands for improving analytical workflow, Shimadzu is constantly introducing advancements in high-performance liquid chromatographs, with features such as superior reproducibility of retention times or for ultra-trace sample injection volumes, fast multianalyte analysis, low carryover, automatic sample pretreatment, high-sensitivity detection, and longer-lasting consumables. Using network technology based on the Internet of Things (IoT) and the cloud to automatically collect information about instruments within laboratories, it is now possible to not only monitor the operating status of instruments, but also ensure instruments can always be used in their optimal state. By merging and making further advancements to such state-of-the-art technologies, the Nexera series offers the unprecedented experience of analytical instruments thinking on their own to better support the analysis workflow of customers.

A New Benchmark of Intelligence

Nexera systems are equipped with startup, self-diagnostics/self-recovery, mobile phase monitoring, and other critical functionality for ensuring the system is always in optimal condition during analysis. That maximizes the ratio of operating hours during which the system is operated in good condition and automates the tedious processes which were previously performed by operators. Consequently, it contributes significantly to improving operating efficiency.

Fully Automated Process Flow Achieves Long-Term Data Reliability
Long-term reliable data acquisition is achieved by incorporating the operating know-how of expert analysts for the entire process flow, from instrument startup until analyses are finished. Systems also include many other functions for automatically eliminating factors that can cause problems.

Shutdown · Startup · Checking results · Analysis complete · Preparations · Mobile Phase Check · Analysis · Auto-purge · Auto-Diagnostics · Column equilibration · Analysis begins

Mobile Phase Level Monitor Prevents Running Out of Mobile Phase during Continuous Analysis

ANALYTICAL INTELLIGENCE

This monitor uses weight sensors (optional) to monitor the level of mobile phases, autosampler rinse solutions, or other solutions (up to 12 solutions) in real time. If the remaining solution level is less than required when starting an analysis, then a message is displayed to notify the operator. The operator is also notified if there is a risk of running out of the solution during an analysis. A smart device can be used to check the current level of each bottle, which makes it easier to decide in advance when to replenish bottles.

A New Benchmark of Efficiency

Functionality is included for maximizing throughput and increasing analytical process efficiency to the next level, such as functionality for ultra fast injection and low carryover. Also, IoT technology is used to ensure reliable instrument operation and contribute to laboratory asset management.

LC-MS Analysis Process Efficiency Improved by Ultra Fast Injection and Non-Stop Analysis of up to 17,000 Samples
The SIL-40 series offers about two times faster injection speeds than previous models. By using plate changers, up to about 17,000 samples can be analyzed continuously.* Plate changers provide powerful support for LC-MS high-throughput screening and analysis.

* When using three plate changers with 384-well plates

6.7 sec

0.00   0.25   0.50   0.75   1.00   1.25   min
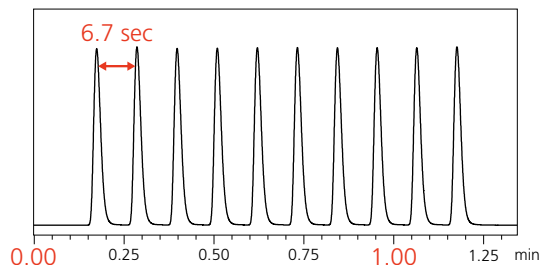
8 injections can be completed within 1 minute (Caffeine)

A New Benchmark of Design

Offers both exceptional LC performance and also space and power savings. Due to the broad product line, optimal solutions for satisfying customer objectives can be offered, while also maximizing utility from laboratory equipment.

reddot award 2019 winner

ANALYTICAL INTELLIGENCE
Automated support functions utilizing digital technology, such as M2M, IoT, and Artificial Intelligence (AI), that enable higher productivity and maximum reliability.

Liquid Chromatographs

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

Ultra High Speed LCMS System for Multiplex Analysis
Nexera MX
New

Nexera MX systems offer up to double the LCMS sample processing capacity. In addition to separating and detecting injected samples, LCMS analysis normally also requires various other processing steps, such as rinsing the column, equilibrating the column at the initial mobile phase concentration, rinsing the autosampler, injecting the next sample, and so on. Therefore, to increase analysis throughput, there has been a need for solutions that shorten the time required for the above non-data acquisition processes. The Nexera MX features the unique Nexera MX Dual Stream Technology (MX-DST) that can maximize LCMS data acquisition efficiency by alternating between two streams used to inject samples into the LCMS system.

Major component units	SCL-40, LC-40B XR×2, DGU-405, DGU-403, SIL-40C XR, Plate Changer, CTO-40C, Startup kit, LCMS-8060NX, LabSolutions LCMS/Insight, LabSolutions Connect MRM, and others

Ultra High Performance Liquid Chromatograph Nexera
Method Scouting System

Method-scouting systems combine the speed of analysis method and schedule generation with dedicated software with the reliability of robust column switching systems to provide strong support for method exploration. The method search including SFC analysis and simple method examination using integrated LC are also supported. In conjunction with LabSolutions DB/CS's multi-data reporting function, the system automatically outputs the optimal analysis conditions based on customer criteria in order of score. In addition, each chromatogram can be displayed in a list, and it is easy to confirm the optimum analytical conditions visually, and the time and effort required from the examination of analytical conditions to the confirmation of results can be greatly reduced.

Major component units	SCL-40, LC-40D X3×2, DGU-405×2, SIL-40C X3, CTO-40C, SPD-M40, LabSolutions LC, and others

Nexera Application System
Nexera 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-40, LC-40D, DGU-403, SIL-40C, CTO-40C, RID-20A, LabSolutions LC, LabSolutions GPC software, and others

Ultra High Performance Liquid Chromatograph for Online Dissolution Testing
Nexera FV

Nexera FV systems automate process steps ranging from dispensing and analyzing solutions eluted from dissolution testing systems to generating reports. Two analysis modes are available, either of which can be selected to significantly reduce the labor involved in dissolution testing. The fraction analysis mode supports high-speed sampling at five-minute intervals for formulations that dissolve quickly, whereas the direct analysis mode immediately analyzes the solutions eluted during the specified sampling interval, such as for analyzing sustained-release formulations with long sampling intervals. That means reliable dissolution testing results can be obtained quickly with systems configured based on Nexera series models, which have earned a reputation for speed, sensitivity, and stability. Because Nexera systems can also be used as a regular UHPLC system, the ability to use them for fast analysis can be expected to increase instrument uptime rates at sites using them for testing.

Major component units	CBM-40lite, LC-40D X3, DGU-405, SIL-30ACFV, CTO-40C, SPD-40, LabSolutions LC, and others

New **High Performance Liquid Chromatograph**

i-Series
LC-2050/LC-2060

Finally, an LC as Smart and Flexible as You.

Amid increasing calls for improved work efficiency and a more flexible working style, ideas of LC analysis are changing. The time has come for an HPLC that delivers rugged, reliable results with less frequent interaction by the analyst. The new, integrated i-Series LC system maintains the excellent performance of its predecessor while addressing the need for automation efficiency.

innovative
### Automation and Remote Operation/Monitoring Encourage a New Style of Work

Analytical Intelligence functions, such as FlowPilot and mobile phase monitoring, and LabSolutions Direct can provide an automated workflow together with remote operation and monitoring from instrument startup to analysis completion. Automated workflows incorporate the work-style habits of experienced analysts. The result is reliable data collected over extended periods.

intelligent
ACTO Method Migration Support Function

ANALYTICAL INTELLIGENCE

Considering Instrument Replacement and Method Migration

Migrating a test method (analytical conditions or method) from one instrument to another while obtaining the same chromatogram can be a challenging process. The i-Series is designed with the same internal system volumes as previous Shimadzu systems and competitor systems to ensure system compatibility and data reproducibility. An Analytical Condition Transfer and Optimization (ACTO) function also adjusts gradient start time automatically, so analysts can make adjustments to separations obtained by gradient analysis easily.
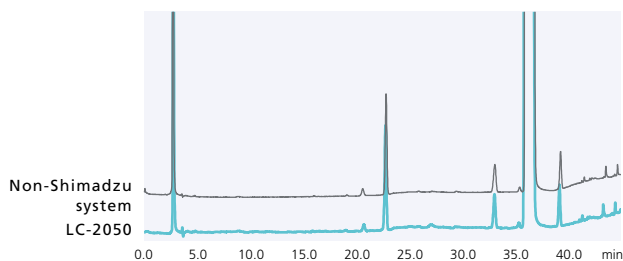
Migrating an analytical method from a non-Shimadzu system to the LC-2050

intuitive
Dual-Temperature Control with TC-Optics and Flow Cells
Excellent Baseline Stability

In addition to the temperature control function for flow cells, the i-Series employs new temperature control technology for detector optical systems, known as TC-Optics (Temperature Controlled Optics). This ensures a more stable baseline that is less susceptible to room temperature variation and increased precision during verification testing and quantitative testing of trace components.
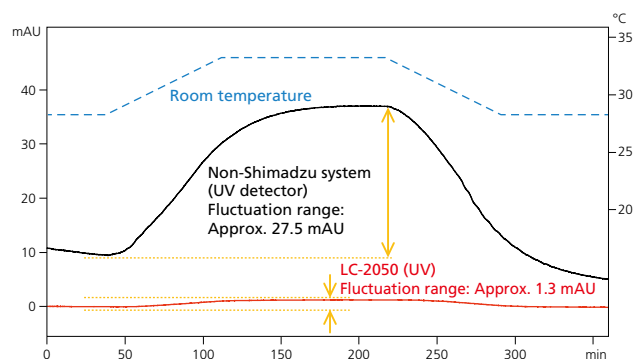
Maintenance Videos
Supporting the Replacement of Consumables

Reading a QR Code shown on the touch panel directs the user to a website with instructional videos on maintenance. This feature helps improve system availability and increases efficiency.

ANALYTICAL INTELLIGENCE
Automated support functions utilizing digital technology, such as M2M, IoT, and Artificial Intelligence (AI), that enable higher productivity and maximum reliability.

High Performance Liquid Chromatograph
i-Series Method Transfer System *New*

This system includes two streams respectively configured for UHPLC and HPLC volumes. Therefore, in addition to supporting a wide range of applications for various testing methods, it can also streamline the process of converting HPLC analytical/testing methods to high-speed UHPLC methods. That means analytical/testing methods established using a non-Shimadzu HPLC system can be migrated with excellent reproducibility, which can significantly reduce the amount of work involved in analytical method validation. ACTO functionality included in LabSolutions can not only be used to edit concentration gradient programs in existing methods but also move the injection timing based on the difference in internal volumes between systems. It can even convert existing HPLC methods to high-speed methods by simply loading the HPLC method.

High Performance Liquid Chromatograph System
LC-2030C NT *New*

As HPLC becomes more commonplace, there is growing demand for instruments that cater to both novices and experts. The LC-2030C NT provides a simple touch-screen user interface and a workflow that requires no specialist training. The Shim-pack NT-ODS is a slide-in column that can be inserted in one motion, with no need for a wrench or other tools. The column is automatically connected into the ow path with no risk of human error. The dedicated Shim-pack NT-ODS is a monolithic-type column. The packing state of its separation medium is maintained over a long continuous analysis, whereas a particle-type column may deteriorate. The Shim-pack NT-ODS therefore provides long-term stability even over a large number of continuous injections.

Nexera Application System
Reducing Sugar Analysis System *New*

This analysis system uses post-column fluorescence derivatization detection. It can detect reducing sugars in samples with many contaminant components with high sensitivity and selectivity. The reducing sugar analysis system is configured with new Nexera series units, and uses features such as the FlowPilot function, which successively increases mobile phase flowrates in stages based on mobile phase level gauge and column oven temperature values, to ensure that typically expensive columns for reducing sugar analysis are used more reliably. In addition, the i-PeakFinder function enables easier chromatogram peak integration with higher reproducibility. Other functionality, such as the startup function, can also further improve the efficiency of customer analysis operations.

Major component units	CBM-40, LC-40D×2, DGU-403, SIL-40C, CTO-40C, RF-20Axs, CRB-40, LabSolutions LC, and others

Nexera Application System
Post Column Amino Acid Analysis System

This automatic amino acid analysis system uses OPA reagent-based post-column fluorescence derivatization detection. Therefore, it can detect amino acids with high sensitivity and selectivity. The post-column amino acid analysis system is configured with new Nexera series units that can cool samples reliably with condensation inhibited for samples that require cooling, which is common for amino acid analysis. It also offers increased injection volume accuracy over a wide range of volumes to ensure higher analytical reliability. i-PeakFinder enables easier chromatogram peak integration with higher reproducibility. That makes it ideal for use in a wide range of fields, such as foods and other natural substances or pharmaceuticals.

Major component units	CBM-40, LC-40D×2, LC-20AB, DGU-403×2, SIL-40C, CTO-40C, RF-20Axs, FCV-11AL(S), LabSolutions LC, and others

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

Nexera Application System
Organic Acid Analysis System

Shimadzu's unique post-column pH-buffered electroconductivity method is ideal for the selective and highly sensitive detection of organic acids. Compared to conventional methods, such as the UV short wavelength method or a simple conductivity method, this system improves quantitation reliability. Compared to the post-column VIS absorption detection methods using pH indicators, this system has higher sensitivity, better linearity, and is easier to use. Complex samples (which usually require troublesome pretreatment) can be analyzed after simple pretreatment techniques such as dilution and filtration.

Major component units	CBM-40, LC-40D×2, DGU-403, SIL-40C, CTO-40C, CDD-10Avp, LabSolutions LC, and others

Anion Suppressor Ion Chromatograph
HIC-ESP

The HIC-ESP is a new anion suppressor ion chromatograph with built-in electrodialytic suppressor, boasting the same low carryover and excellent injection precision characteristic of Shimadzu HPLCs to bring you highly-reliable results. The newly developed anion suppressor prevents peak spreading and achieves high sensitivity, providing stable functionality even over long periods of use. The HIC-ESP is suitable for applications in a wide range of fields including environmental science, medicine, chemistry and food science.

Major component units	CBM-40lite, LC-20ADsp, DGU-403, SIL-20A, CTO-40S, CDD-10Avp, LabSolutions LC, and others

Preparative Purification Liquid Chromatograph
Nexera Prep

These preparative purification LC systems offer expandability for collecting up to 3240 fractions in 10-mm diameter test tubes by linking up to six new LH-40 liquid handler or new FRC-40 fraction collector units, which require about 50 % less installation space than comparable competing products, and a column hub that can hold up to six columns and four flow channel selection valves. LH-40 liquid handlers can be used not only as a fraction collector, but also as an autosampler equipped with a liquid level detection function (optional) or for seamlessly checking purity by reinjecting fractions after fractionation (optional). That supports achieving even higher efficiencies for preparative purification operations.

Major component units	CBM-40, LC-20AP×2, DGU-405×2, SPD-M40, LH-40, Column Hub, LabSolutions LC, and others

Supercritical Fluid Extraction/Chromatography System
Nexera UC/s: SFC/UHPLC Switching System

By simply adding one LC pump to an SFC system, this system can automatically switch between SFC and UHPLC analysis modes to measure the same sample with both separation modes. In addition to use as a conventional LC system for analyzing in the normal way, it can also be used for samples that are difficult to separate by LC to evaluate analytical conditions for SFC analysis, which offers a different separation mode than LC. This system can switch automatically between SFC analysis and UHPLC analysis and make measurements on a single sample in each separation mode. It enhances user-friendliness and operability by allowing the investigation of separation conditions and performing reverse-phase high-speed analysis in a single system. Shimadzu also provides a kit to upgrade from your current UHPLC system to the UHPLC/SFC switching system.

Major component units	LC-30AD SF, SFC-30A, CBM-40, LC-40D XR×2, DGU-405×2, SIL-40C XR, CTO-40C×2, SPD-M40, Upgrade Kit, LabSolutions Multi LC-PDA, and others

Semi-Preparative Supercritical Fluid Chromatography System

Nexera UC Prep

## Unparalleled performance, unparalleled flexibility

Nexera UC Prep is a preparative supercritical fluid chromatography system created by the combination of Nexera UC's superior fundamental technology and innovative new technology. By using our unique gas–liquid separation technology "LotusStream Separator", we can achieve a high recovery rate even for volatile components by suppressing a decrease in recovery rate due to the scattering of eluate during CO_2 vaporization. The dedicated software, which enables intuitive parameter settings, helps ensure preparation for the targeted, regardless of skill. This space-saving benchtop model includes a carbon dioxide pump that does not require an external chiller. While the system is compact and can be installed in any environment, it achieves both high recovery rate preparative processing and excellent operability, and promotes the efficiency of preparative processing.

Major component units	LC-40P SF, CO_2 Cooling Unit, SFC-40P, FRS-40, HEX-40, CBM-40, LC-20AP, LC-20AR, CTO-40C, SPD-M40, DGU-403, FCV-20AH2, LabSolutions LC, Prep Solution, and others

### High Recovery Rates: LotusStream Separator

In preparative SFC, one factor that results in lower recovery rates is increased scattering of the eluent when the CO_2 returns from a supercritical to a gaseous state. The Nexera UC Prep's patented gas–liquid separator, the LotusStream separator, successfully reduces sample dispersion and carryover, while also achieving high recovery rates. These high recovery rates can be obtained regardless of flow rate or modifier concentration, even for volatile compounds such as the fragrance linalool.
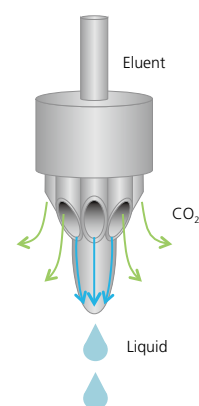
Decreases flow rate without increasing the pipe diameter by splitting flow through multiple channels. The CO_2 is discharged externally while the liquid travels along the column and drips directly into the collection vessel without dispersing or scattering the eluate.

Eluent

CO_2

Liquid

Columns for Ultra High Performance Liquid Chromatograph
Shim-pack Velox LC Columns

CoreFocus
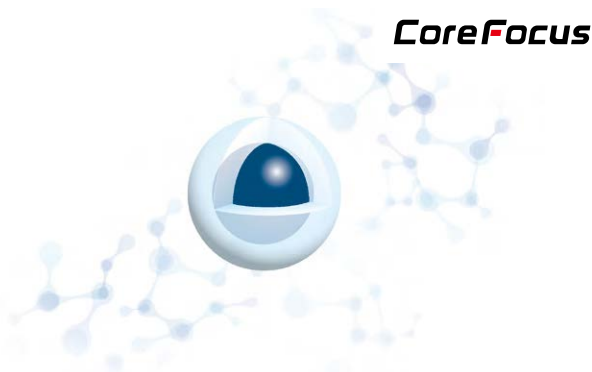
Designed to maximize performance of LC systems, Shimadzu's Shim-pack Velox columns with core shell technology enable you to achieve increased separations and faster analysis times on any LC platform. Whether developing a high efficiency LC separation method, transferring an existing method for increased throughput while maintaining resolution, or are trying to improve the resolution of a complex separation, Shim-pack Velox columns will satisfy your needs.

Stationary phase	C18, SP-C18, Biphenyl, PFPP, HILIC
Particle size	1.8 µm, 2.7 µm, 5.0 µm
Column I.D.	2.1 mm, 3.0 mm, 4.6 mm

Columns for Ultra High Performance Liquid Chromatograph
Shim-pack Arata LC Columns

CoreFocus

Even for LC columns that claim to be designed for basic compounds, adequate resolution often can not be obtained due to problems such as leading of highly polar basic compounds, peak shape deterioration of acidic compounds, or long equilibration time required for low ionic strength acidic mobile phase. All of these issues have been solved with Shim-pack Arata that was specifically designed to give unmatched peak shape for basic compounds.

Stationary phase	C18, Peptide C18
Particle size	2.2 µm, 5.0 µm
Column I.D.	2.0 mm, 3.0 mm, 4.6 mm

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

Gas Chromatograph

Nexis GC-2030

The Next Industry Standard

Nexis GC-2030, Shimadzu's high-end gas chromatograph, is a new-generation gas chromatograph that combines improved operability and easier maintenance with the world's highest levels* of performance for sensitivity and reproducibility. A color touch-panel interface with clear, intuitive graphics enables all users to monitor the instrument status and set parameters with ease. In addition, Nexis GC-2030 offers excellent usability with tool-free inlet maintenance and column installation and a built-in oven light. It also provides a variety of functions to ensure compliance with GLP/GMP and a self-diagnosis function.

* As of August 2020, according to a Shimadzu survey

Column temperature	Max. 450°C (Room temperature + 2°C)
Carrier gas control	Constant linear speed control, constant flow rate control, constant pressure control possible Pressure: Max. 970kPa, Flow-rate: 1,300mL/min
Sample injector	Split/splitless, direct, on-column, programmable temperature vaporizer
Detectors	FID, TCD, BID, FTD, FPD, ECD
Display	Color-touch panel

Tool-free Column Installation

ClickTek connectors make tool free column installation a snap. The click sensation felt when finished attaching the column provides a more reliable connection and ensures a better seal under all operating conditions. In addition, a light has been installed inside the oven to brightly illuminate the area at hand, easing the burden on the operator when attaching columns.

ClickTek Connector

Solutions for Switching between Methods and Saving Gas

The optional gas selector system can switch between up to four gas lines. It can reduce gas consumption by automatically switching to a substitute gas during idling. In addition, switching to a method that uses a substitute gas can be achieved in a short period of time using the automatic switching capability.

About **90%** reduction

Helium consumption (mL)

Without saver function

With carrier gas saver function/ gas selector

Alternative gas

He

Vaporization chamber

Normal mode

He

With saver function

He

Gas selector
Switching the gas used

AFC

One-touch Inlet Maintenance

The injection port can be opened or closed without tools by simply sliding the ClickTek lever. Replace the insert, slide the lever and feel the click for a leak-free install every time.

ClickTek Nut

LabSolutions Direct Accommodates Remote Work

LabSolutions Direct is a remote access tool used to control or monitor GC systems via a simple user interface on a commercially-available smartphone or tablet. Consequently, analyses can be performed while monitoring the status of instruments from locations away from the laboratory.

Sulfur Chemiluminescence Detection Gas Chromatograph
Nexis SCD-2030

This sulfur chemiluminescence detector (SCD) offers high reliability that has changed industry reliability levels. It features the industry's first horizontally-oriented redox cell, which improves oxidation-reduction reaction efficiency of samples by providing ample reaction space and reaction time within the cell. The patent-pending ultra-short flow path technology enables unstable components generated within the cell to move into the reaction bar very quickly, thereby achieving about 2.5 times higher sensitivity than previous products. The horizontal orientation also provides easier access to enable inner pyro tube replacement without disassembling the reactor. "Analytical Intelligence" technology fully automates process steps from gas and temperature control during system startup to sample conditioning.

Minimum Detection Sensitivity	0.3 pgS/sec
Stability	<3 %RSD (24 hrs)

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.

Column temperature	(Room temperature + 10°C) to 400°C
Carrier gas control	Digital setting of pressure, flow rate and split ratio by electronic flow controller (AFC) Constant control of column average linear velocity
Sample injector	Split/splitless injection unit (SPL)
Detectors	FID (Hydrogen flame ionization detector)
Minimum detected quantity	2.0 pgC/s (dodecane)
Display	30 characters × 16 lines, permits chromatogram display

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)

Auto Injector/Auto Sampler for GC/GC-MS
AOC Series   **New**

AOC-20s U   AOC-30i

The AOC-30i is a next-generation intelligent auto injector with Sampler Navigator functionality that is packed with injection expertise. The skip function uses vial-sensing technology to increase throughput and help improve data integrity. The 30-vial sample capacity is large enough to handle most workflows, but can be expanded to 150 vials in combination with an AOC-20s U auto sampler. Though the AOC-20i Plus offers exceptional cost-effectiveness for broad market appeal, it also features extensive functionality, such as co-injecting derivatizing agents.

	Auto Injector		Auto Sampler
	AOC-30i	AOC-20i Plus	AOC-20s U
Number of vials	30	6/12	150
Applicable models	Nexis GC-2030, GCMS-NX series	GC-2010/2014/2025, GCMS-QP/TQ series	All of GC, GCMS

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

GC Application System
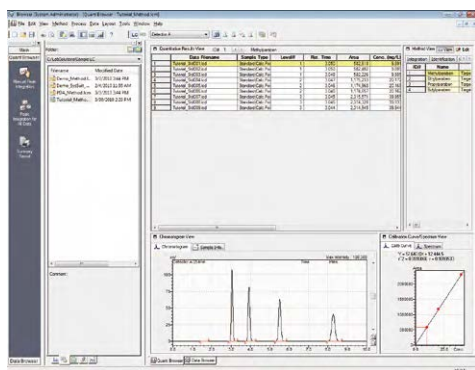## Headspace Analysis System

New

Nexis GC-2030 + HS-20 NX

With short transfer lines and patented isolation gas technology, HS-20 NX series headspace samplers reduce carryover to one-tenth the level of previous models and significantly increase laboratory productivity. The ability to overlap processing of up to 12 vials makes the samplers especially useful in fields that require high throughput. Featuring the world's only* electronically-cooled trap, the HS-20 NX Trap enables over ten times higher sensitivity than regular headspace analysis. The product line also includes an HS-20 Long Transfer Line (LT) model compatible with packed columns. The HS-10 is a low-cost entry model with stirring and overlapping functionality for outstanding cost-effectiveness.

* As of August 2021, according to a Shimadzu survey

	HS-20 NX series, HS-20 LT	HS-10
Applicable models	Nexis GC-2030, GC-2010 Plus/2010, GC-2014	
Number of vials	90	20
Vial stirring	5-stage	3-stage

GC Application System
Thermal Desorption System

Nexis GC-2030 + TD-30

The TD-30 series was developed to offer solutions optimized for gas and material analysis applications. With no cold points along the sample path, it enables trace analysis of high-boiling-point components required for analyzing emission gases. The practical retrapping function supports a wide range of boiling points to reduce the risk of analytical losses when measuring atmospheric air or work environments. Functionality for automatically adding internal standard substances enables higher reproducibility than manual injection. An optional barcode reader can read barcodes printed on tubes. The series includes a TD-30 model with a 60-sample loading capacity and a TD-30R model with a 120-sample capacity and functionality for retrapping and adding internal standard substances. The series supports a wide variety of analysis applications, from R&D to quality control.

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.
Nexis GC-2030, GC-2014 and GC-2025 can be controlled.

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

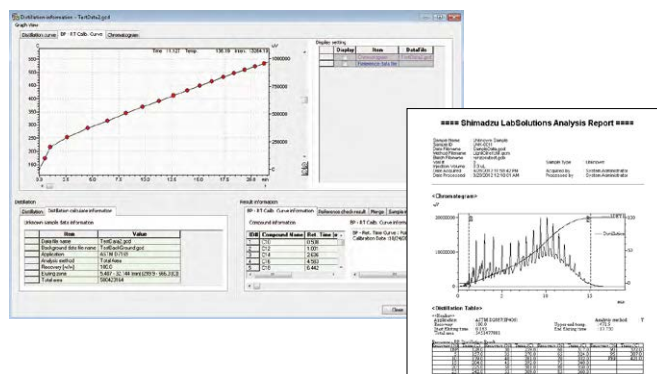Note: GC-2025 control is supported from Ver. 5.51 or later and Ver. 6.10 or later.

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	Nexis GC-2030 AF (with WBI or OCI) or GC-2014AF + LabSolutions + Simulated Distillation GC Analysis Software (Select injection unit and column according to the target sample.)

Analysis Data System
LabSolutions CS/DB

LabSolutions CS Network System

Client PC | Laboratory or office | iPad | LabSolutions server

Acquisition controller PC

LC | GC | LCMS | ICPMS | UV | FTIR | RF | PPSQ | TOC | AG | Thermal analyzer | Balance | Agilent LC, GC | Thermo LC, GC

GCMS | AA | Powder & particle size analyzer | ICP | EDX

The multi-instrument data registration license enables centralized user management and integrated management of data from these instrument

CBM-201m | Other Vender LC, GC

Enables loading of data

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.

LabSolutions
Multi-Data Report
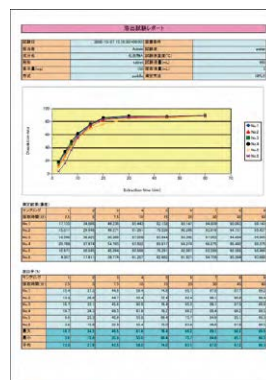
Multi-Data Report is an optional product that can be used together with LabSolutions CS/DB in order to create comprehensive reports that bring together all of the analysis data acquired from a multiple number of instruments. From the standpoint of data integrity, its use can be effective, since the reports can be used for audit trails and digital signatures. Reports combining data from a variety of different instruments connected to the system, including HPLC or GC, MS, FTIR, UV, or electronic balance can be created.

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

Mass Spectrometry Systems

Liquid Chromatograph Triple Quadrupole Mass Spectrometer

LCMS-8060NX

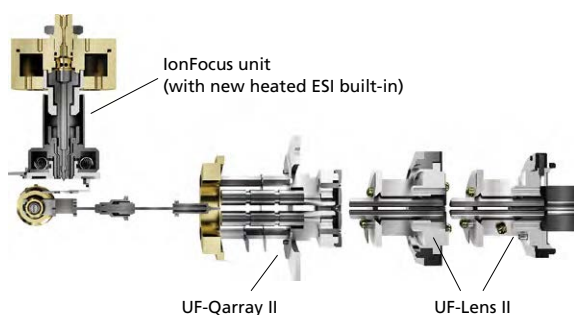# Enhanced performance
Sensitivity and Robustness

The LCMS-8060NX is a triple quadrupole mass spectrometer with world-class sensitivity and detection speeds. It boasts increased robustness and ease of use as well as Analytical Intelligence functions to maximize your laboratory's output.

Mass range	m/z 2 to 2,000
Resolution	R < 0.7 u (FWHM)
Scan speed	Max. 30,000 u/sec
Positive–negative ion polarity switching time	5 msec
MRM measurement speed	Max. 555 ch/sec

Note: LC units are not included with this product.

ANALYTICAL INTELLIGENCE

World-Class Sensitivity and Speed

The LCMS-8060NX improves the desolvation efficiency through increasing the ESI heat transfer efficiency and the maximum gas flow rate. Optimum ionization conditions can be set for a wider range of compounds, enabling even higher sensitivity in analysis.
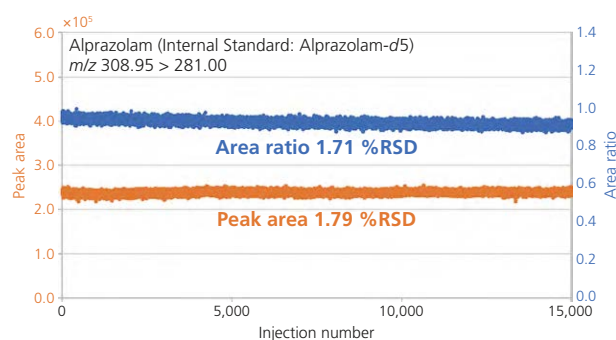
IonFocus unit
(with new heated ESI built-in)

UF-Qarray II   UF-Lens II

High Robustness Minimizes Downtime

The newly-developed IonFocus unit introduces ions into the mass spectrometer with greater efficiency while expelling unneeded neutral particles, reducing matrix effects and contamination inside the instrument. The new ion guide UF-Qarray II and the UF-Lens II increase the robustness of the instrument while maintaining a high ion transmission rate.

Excellent Ease-of-Use for Greater Workflow Efficiency

New parameters enable high sensitivity without manual optimization, while features such as automated start-up and shutdown (with LabSolutions Connect MRM) allow unattended operation. Combining the MS with the Nexera series UHPLC provides multiple Analytical Intelligence functions to further increase the efficiency of your overall work-flow.

ANALYTICAL INTELLIGENCE
Automated support functions utilizing digital technology, such as M2M, IoT, and Artificial Intelligence (AI), that enable higher productivity and maximum reliability.

Increased Desolvation Efficiency for Higher Sensitivity

A new heat-assisted design improves the desolvation efficiency and dramatically enhances the sensitivity for challenging molecules such as steroid hormones.

ESI heater: Improved heat transfer efficiency

Heating gas: Increased maximum flow rate
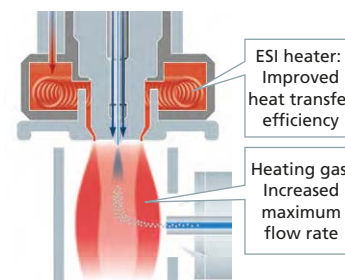
Superior Robustness

The excellent robustness of the LCMS-8060NX can be seen most clearly during consecutive analyses of samples of biological origin that tend to contaminate instruments. We performed consecutive analyses of human blood plasma spiked with alprazolam on the LCMS-8060NX and plotted the resulting area values and area ratios (internal standard material: alprazolam-d5). To evaluate the robustness under even more demanding conditions, we performed a total of 15,000 consecutive analyses without using valves to remove impurities. As shown in the data below, the results were extremely stable, with an area value reproducibility of 1.79 %RSD and an area ratio reproducibility of 1.71 %RSD.

Alprazolam (Internal Standard: Alprazolam-d5)
m/z 308.95 > 281.00

Area ratio 1.71 %RSD

Peak area 1.79 %RSD

Results from Consecutive Analyses of Alprazolam-Spiked Human Blood Plasma

Quadrupole Time-of-Flight
Liquid Chromatograph Mass Spectrometer

LCMS-9030

The LCMS-9030 quadrupole time-of-flight (Q-TOF) mass spectrometer integrates the world's fastest and most sensitive quadrupole technology with unique TOF architecture. A product of Shimadzu's engineering DNA, the LCMS-9030 enhances the most important features of Q-TOF instrumentation - mass accuracy, sensitivity, and speed - to address qualitative and quantitative challenges with genuine confidence and ease.

Mass range	Quadrupole mass range: m/z 10 to 2,000 (resolving mode) TOF mass range: m/z 10 to 40,000
Resolution (TOF)	ESI positive : 30,000 FWHM at m/z 1,972 ESI negative: 30,000 FWHM at m/z 1,626
Mass accuracy	<1 ppm at m/z 622.5662
Maximum acquisition rate	100 Hz

Note: LC units are not included with this product.

iF DESIGN AWARD 2019
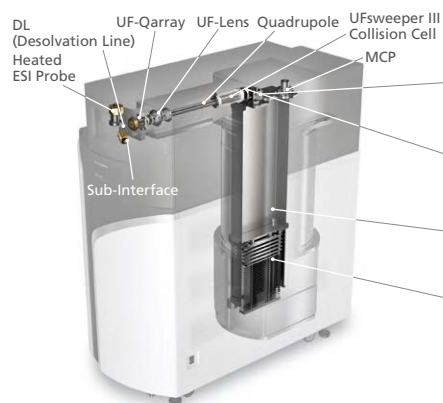
UFgrating
Shimadzu's world-class manufacturing capability has enabled the ion acceleration electrode to be made with substantial mechanical strength. This grating is able to withstand the high voltages needed for ultrafast ion pulsing.

UFaccumulation
Ion accumulation in the collision cell, synchronized perfectly with short cycles of data acquisition, maximizes sensitivity.

UF-FlightTube
Mass accuracy needs mass stability. Shimadzu's temperature-controlled UF-FlightTube requires less frequent calibration, enabling you to run more samples.

iRef*TOF*
A computationally ideal electrostatic field has become a reality. Meticulously manufactured plate electrodes are stacked to create a reflectron which turns ions with no compromise in resolution or sensitivity.

DL (Desolvation Line) · Heated ESI Probe · UF-Qarray · UF-Lens · Quadrupole · UFsweeper III Collision Cell · MCP · Sub-Interface

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Liquid Chromatograph Triple Quadrupole Mass Spectrometer
LCMS-8050

UFMS
ULTRA FAST MASS SPECTROMETRY

Thanks to a heated ESI probe and the UFsweeper III collision cell, the LCMS-8050 achieves a level of sensitivity 30 times that of the LCMS-8030. The UF Technology, the ultrafast measurement technology built into the LCMS-2020 has further evolved, so measurements can now be performed even faster, without sacrificing data quality. At the same time, more compounds can now be measured in simultaneous qualitative and quantitative analysis. The system can be used in a wide range of fields for a variety of applications, such as quantitative analysis which requires high sensitivity, multicomponent simultaneous analysis, and screening.

Mass range	m/z 2 to 2,000
Resolution	R < 0.7 u (FWHM)
Scan speed	Max. 30,000 u/sec
Positive-negative ion polarity switching time	5 msec
MRM measurement speed	Max. 555 ch/sec

Note: LC units are not included with this product.

Liquid Chromatograph Triple Quadrupole Mass Spectrometer
LCMS-8045

UFMS
ULTRA FAST MASS SPECTROMETRY

Equipped with a heated ESI probe, the LCMS-8045 has the highest sensitivity in its class. The heated ESI probe, high-temperature heating block, desolvation line (DL) and drying gas, all act to promote desolvation and prevent contamination due to the penetration of liquid droplets into the MS unit. This improves the robustness, so reliable and high-accuracy data can be obtained over the long term. The LCMS-8045 also achieves the world's fastest scan speed (30,000 u/sec) and polarity switching speed (5 msec). These enable ultra-high-speed, high-sensitivity analysis. The excellent cost performance of this system is demonstrated in food safety, environmental analysis, and other routine quantitative analyses. In addition, it can be upgraded to the LCMS-8060.

Mass range	m/z 2 to 2,000
Resolution	R < 0.7 u (FWHM)
Scan speed	Max. 30,000 u/sec
Positive-negative ion polarity switching time	5 msec
MRM measurement speed	Max. 555 ch/sec

Note: LC units are not included with this product.

Chromatography Systems · Mass Spectrometry Systems · Spectroscopy Systems · Life Science Systems · X-ray and Surface Analysis Systems · Environmental Measurement Systems · Material Testing and Non-Destructive Inspection Systems · Physical Properties Measurement Systems

Liquid Chromatograph Triple Quadrupole Mass Spectrometer
LCMS-8040

High-Performance Liquid Chromatograph Mass Spectrometer
LCMS-2020

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. 15,000 u/sec
Positive-negative ionization switching time	15 msec
MRM measurement speed	Max. 555 ch/sec

Note: Product does not include LC Units.

LCMS-2020 is optimized for the Prominence UFLC/UFLCxʀ 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: This Product does not include LC units.

Supporting Micro Flowrate Range Liquid Chromatograph Mass Spectrometer System
Nexera Mikros

Option for LCMS-8060/8050
LDTD Ion Source

The Nexera Mikros is a micro LC/MS system that achieves a degree of sensitivity that is more than 10 times that of previous models. Moreover, thanks to features such as the UF-Link mechanism, which provides for the one-touch connection of analytical columns to the mass spectrometer, almost anyone can simply and securely perform high sensitivity analyses. Such things enhance usability. This system provides a solution for the issues faced by previous LC/MS or nano LC/MS, such as sensitivity, robustness, ease-of-use, and throughput.

| Major component units	LCMS-8060NX, Mikro-ESI 8060, CBM-40lite, DGU-403, LC-Mikros, CTO-Mikros, SIL-40C XR, LabSolutions Insight, and others

The LDTD* ion source provides for ultra high speed analysis. After a sample is dispensed and dried on a specialized plate (96 holes), the sample is volatilized by laser irradiation and ionized with the corona discharge of atmospheric pressure chemical ionization (APCI). This system makes possible ultra high speed analyses that take only 4 seconds per well, without using chromatography. It is expected to be widely used for pharmacokinetic screening in the pharmaceutical industry, where the demand for high-throughput multi-analyte analysis is high, and for screening inspections in the forensic medicine, clinical, and foodstuffs fields, which require rapid analysis using simplified sample preparation. When combined with an LCMS-8060/8050, highly reliable, ultra high speed analyses become a reality.

* LDTD: Laser Diode Thermal Desorption
Note: LC and LCMS units and a PC are not included with this product.

Workstation Software for LCMS-9030/8060/8050/8045/8040/2020 Systems
LabSolutions LCMS

Window for Editing Methods
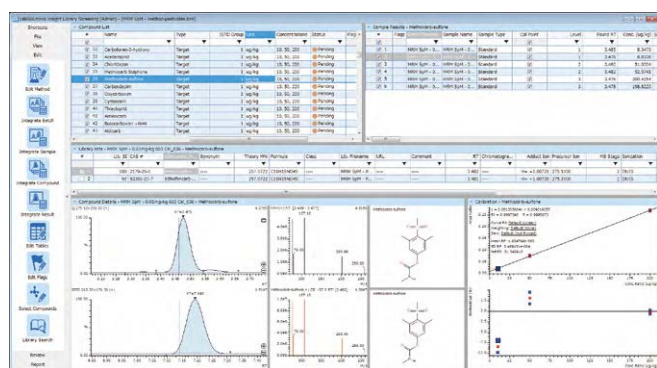
Quick-Batch Function
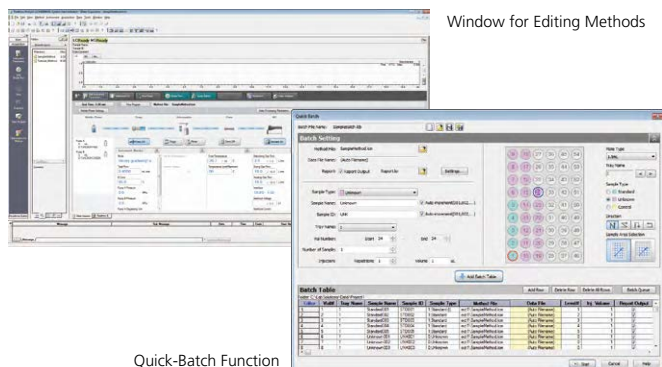
LabSolutions LCMS is used for LCMS-9030/8060/8050/8045/8040/2020 system control, data acquisition, and data analysis. In addition to simultaneous LC control, data acquisition, and data analysis, it also supports sophisticated application functionality, such as for co-injection and expansion to a method scouting system. It can also be used to freely specify various measurement parameter settings for analysis that meets a diversity of needs, from routine qualitative and quantitative analysis to unique customized analysis applications. The intuitive LCMS user interface includes a window for editing methods that shows the control panel in graphical form and a Quick-Batch function. That ensures the desired data can be obtained using simple operations.

Note: LCMS-2010 series, LCMS-QP8000 series, and LCMS-IT-TOF systems are not supported, but data processing is supported for LCMS-2010 systems.
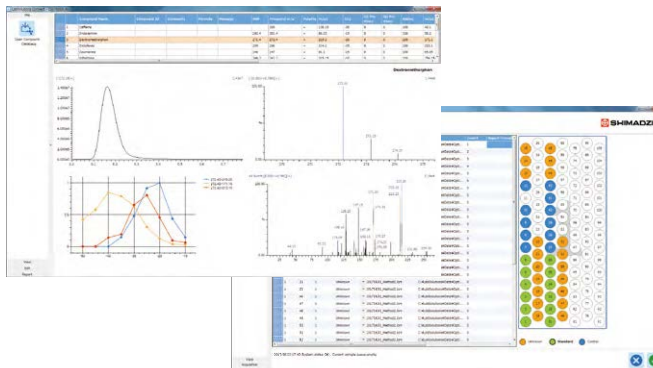
Multi-analyte Quantitation Support Software
LabSolutions Insight

This software performs the data analysis of the multi-analyte quantitation for the LCMS-8060/8050/8045/8040 and GCMS-TQ/QP series, and produces a coordinated display of the quantitation results, ordered according to the individual compounds targeted or the individual measurement data. Here, direct revision of peaks and re-quantitation can be performed. Using color-coded flags, operators can display only the results they wish to check from those for multiple analytes. This function improves the visibility of quantitative results. With the QC chart function, operators can check on fluctuations in retention times between sample data sets for each compound, which makes it easy to assess the condition of standard samples and the instruments. Adding a license allows multi-analyte data to be analyzed from a client PC connected to a network. Measurement, data analysis, and confirmations can be performed respectively on separate PCs, which dramatically improves productivity.

LC/MS/MS Screening Software
LabSolutions Insight Library Screening

This optional software for LabSolutions Insight uses the MTS* method to search for MS, MS/MS spectra of known compounds in the library, and spectra of the actual sample, and then displays both the qualitative results and the quantitation results. In the search results window, structural formulas and spectra are displayed, making it easy to determine whether are not the compound of interest has been identified. Library searches for MRM can also be performed in addition to searches for MS/MS spectra, which is a useful feature for confirming compounds. Moreover, the search results can be printed at the same time as the quantitation results. Since all of the functions of LabSolutions Insight can also be used, qualification and quantitation can be performed simultaneously.

* MTS: Multi-Targeted Screening

Analysis Software for LCMS-8060/8050/8045/8040
LabSolutions Connect

Triple quadrupole mass spectrometers are used for the quantitative analysis of compounds in a great variety of industrial fields, and the number of compounds being targeted for analyses is on the increase. For this reason, there are increasing demands for making analytical work faster and easier with (1) Optimized MRM transitions, which is important for multi-component quantitative analysis using LC/MS/MS, and (2) Automated optimization of interface parameters necessary for achieving highly sensitive analysis. With LabSolutions Connect, it is possible to select either the Standard mode, in which optimization of MRM transitions and collision energy (CE) is mainly performed, or the Advanced mode, which has increased sensitivity as its purpose. A vast amount of optimization results is managed in a database, and as necessary, analytical parameters are called up from the database, to be reflected in, and to be used to create analytical method files/batch files. Additionally, quantitative analysis of the analytical data can be carried out in this software, thus creating a seamless workflow.
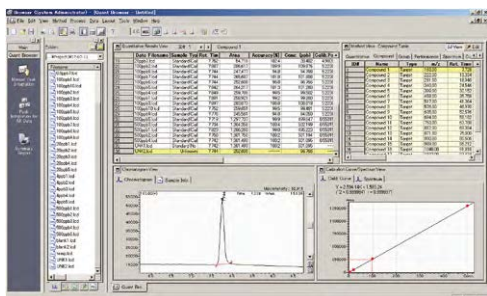
Note: LabSolutions LCMS and LabSolutions Insight are required separately.

Optional Software for LabSolutions Insight
LabSolutions Insight Explore

This software supports everything from qualitative analysis to quantitative analysis of accurate mass spectrometry data. In addition to quantitative data processing for multiple analytes, it also enables highly precise library searches, structural analysis, formula prediction, and multiply-charged ion analysis based on high-resolution and high-accuracy mass spectrometer data. It includes a variety of functionality, such as "Analyze" functionality for predicting the composition of unknown compounds or searching for the molecular or structural formula based on accurate mass data, or "Assign" functionality for predicting the fragmentation patterns of molecular structures or calculating the attribution of respective fragments to specific spectral peaks. All of the extensive functionality works together seamlessly to minimize the effort involved in analyzing data from accurate mass spectrometry.

Open Access Software for LC and LCMS
Open Solution

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.

For LCMS-8060/8050/8045/8040/8030
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	836 components
Veterinary Drugs	129 compounds
Water Quality Analysis	76 compounds
Rapid Toxicology Screening	231 compounds
Primary Metabolites	198 compounds
Lipid Mediators	214 compounds
Cell Culture Profilling	125 components
D/L Amino Acids	22 amino acids
Mycotoxins	27 mycotoxins
Short Chain Fatty Acids	22 components
Forensic Toxicology Database	more than 2,500 compounds
Aminoglycoside Antibiotics	13 aminoglycosides
Restricted Chemicals in Textiles	105 compounds
Bile Acids	49 bile acids
Modified Nucleosides	4 components

Automatic LCMS Pretreatment System
CLAM-2030

CLAM-2030
Automatic LCMS Pretreatment System

The CLAM-2030 samples blood, urine and other biological samples directly from collection tubes, and performs everything automatically, from deproteinizing and other pretreatment to LCMS analysis. This leads to a revolution in workflow for routine processes in the monitoring of pharmaceutical agents and metabolites in biological samples, and research into drug intoxication. It can be connected to the LCMS-8040/8045/8050/8060 system.

Pretreatment method	Liquid volume treated	Max. 350 µL
	Pretreatment processes	Sample and reagent dispensing, mixing, suction filtration, and heating *Up to 20 processes
	Pretreatment method	Each sample processed successively in parallel
	Number of placeable vials	Filter vial: 60, Sample vial: 60, Reagent vial: 20

Note 1: LC and LCMS units are not included with this product.
Note 2: For Research Use Only. Not for use in diagnostic procedures.

New

Kit for Direct Probe Ionization Mass Spectrometer

DPiMS QT

The DPiMS QT can be connected to a quadrupole time-of-flight mass spectrometer for quick and easy measurement without pretreatment. The DPiMS QT performs high-resolution mass spectrometry by ionizing a very small sample attached to the probe and introducing it into the MS section. The DPiMS QT unit can be easily switched with the ESI unit and can be combined with LCMS. Qualitative analysis and primary screening with the DPiMS QT can reduce the number of samples required for quantitative analysis.

Measures a Wide Variety of Samples
- Body fluids, such as blood or urine
- Tissue sections, such as from laboratory animals or foods
- Plant materials, such as vegetables and fruits
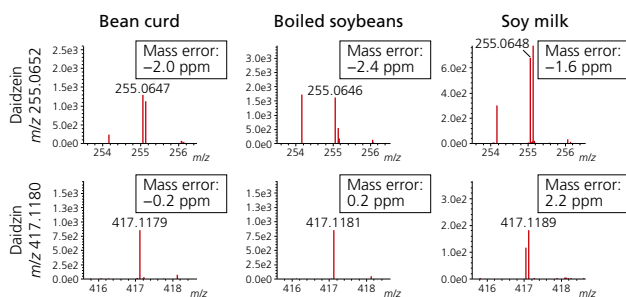
Applicable for a Wide Variety of Objectives
- Detecting biological components
- Detecting materials for chemical products
- Detecting drugs, poisons, etc.

DPiMS QT + LCMS-9030

Detection Result of Soy Isoflavones in Foods

The time required for isoflavones detection was short, about 5 minutes for pretreatment and about 30 seconds for measurement.

	Bean curd	Boiled soybeans	Soy milk
Daidzein m/z 255.0652	Mass error: −2.0 ppm, 255.0647	Mass error: −2.4 ppm, 255.0646	Mass error: −1.6 ppm, 255.0648
Daidzin m/z 417.1180	Mass error: −0.2 ppm, 417.1179	Mass error: 0.2 ppm, 417.1181	Mass error: 2.2 ppm, 417.1189

Switching to LCMS is Easy

Only about 15 seconds are required to remove the DPiMS QT unit and replaced with an ESI unit. That means samples can be measured using the same ionization principle and standard substance for data comparisons.

15 seconds

DPiMS QT   Q-TOF LC/MS
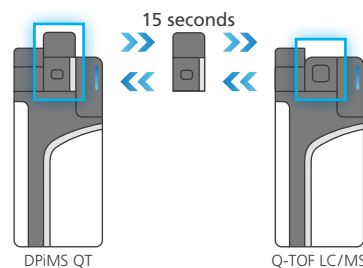
Probe Electrospray Ionization Mass Spectrometer
DPiMS-2020

Before performing measurements using a mass spectrometer, solvents and columns need to be prepared and the approximate concentration of the sample needs to be considered. However, when performing measurements using the DPiMS-2020, the only thing that needs to be done as preparation is to place a small amount of the chemical, foodstuff, or biological sample on the plate. Simply select the probe control and mass spectrometric conditions on the window of the dedicated software PESI MS Solution and click the button to start measurement. Measurement results can be acquired in approximately two minutes. Analysis of the results is performed using LabSolutions LCMS, the analytical data processing system.

Mass range	m/z 10 to 2,000
Mass resolution	R = 2M
Sensitivity	100 ppb reserpine, S/N > 3

Kit for Direct Probe Ionization Mass Spectrometer
DPiMS-8060

DPiMS-8060 + LCMS-8060

A triple quadrupole mass spectrometer with a DPiMS-8060 kit installed can acquire trace sample quantities using a probe and analyze component masses in the MS unit. The kit can also be used with an LCMS system, by installing it in an LCMS-8045/8050/8060 system for easy switching between PESI TQ and ESI units. Its ability to quickly detect drugs or metabolites in blood or tissue samples with only extremely simple pretreatment makes it ideal for simple screening applications.

PESI TQ controller	Controller unit for PESI TQ unit (equipped with LCMS-8045/8050/8060)
PESI TQ unit	Probe voltage: ±5 kV max. Probe drive cycle: 0.75 to 3 Hz
Mass range	m/z 10 to 2,000

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

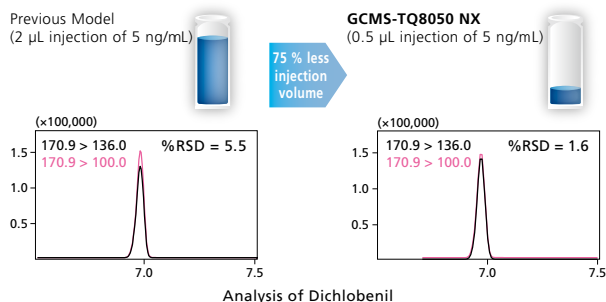**Triple Quadrupole Gas Chromatograph Mass Spectrometer**

GCMS-TQ8050 NX

Ultra High-Sensitivity Triple Quadrupole GC-MS System for Pioneering New Fields

The GCMS-TQ8050 NX features a new highly efficient detector and three noise reduction technologies that enable previously unachievable femtogram-level quantitative analysis of ultra trace quantities. The system also enables quantitative analysis for a variety of new applications, such as utilizing the dramatically high sensitivity for reducing the maintenance frequency and cost of long-term use, for example, or the high mass resolution to achieve even higher separation from contaminants.
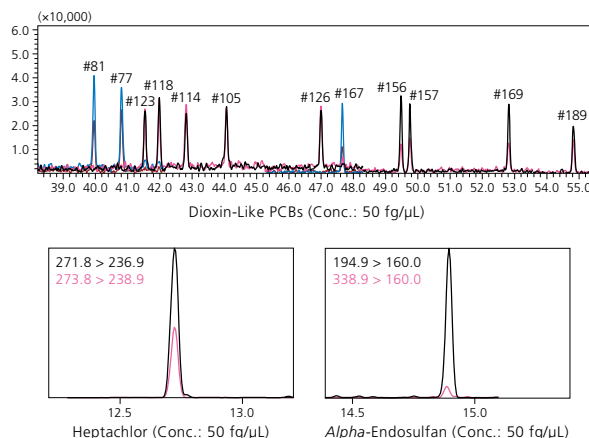
High-Sensitivity Detection of Ultra Trace Ion Quantities

The ability to detect ultra trace quantities of ions means high quantitative accuracy can be achieved even from trace sample quantities. Therefore, injection volumes can be reduced during analysis to reduce the analytical loads on the insert, column, ion source, and other parts, and also further reduce maintenance frequency.

Previous Model
(2 μL injection of 5 ng/mL)

75 % less injection volume

GCMS-TQ8050 NX
(0.5 μL injection of 5 ng/mL)

(×100,000)
170.9 > 136.0
170.9 > 100.0
%RSD = 5.5

(×100,000)
170.9 > 136.0
170.9 > 100.0
%RSD = 1.6

Analysis of Dichlobenil

Even Supports Analyzing Environmental Pollutants that Require Trace Analysis

(×10,000)
#81 #77 #118 #123 #114 #105 #126 #167 #156 #157 #169 #189

Dioxin-Like PCBs (Conc.: 50 fg/μL)

271.8 > 236.9
273.8 > 238.9

194.9 > 160.0
338.9 > 160.0

Heptachlor (Conc.: 50 fg/μL)

Alpha-Endosulfan (Conc.: 50 fg/μL)

Triple Quadrupole Gas Chromatograph Mass Spectrometer
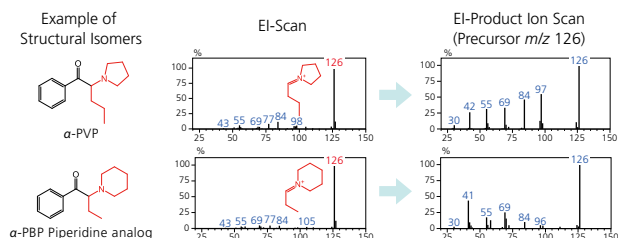
GCMS-TQ8040 NX

Smart Performance that Boosts Routine Analytical Work

Smart performance offers simultaneous high-sensitivity analysis of multiple components, smart productivity achieves outstanding productivity with thorough efficiency improvements, and smart operation provides support for easy method creation and data analysis. In combination, these three types of "smart" features provide a universal triple quadrupole GC-MS system that offers high performance for a wide variety of applications.
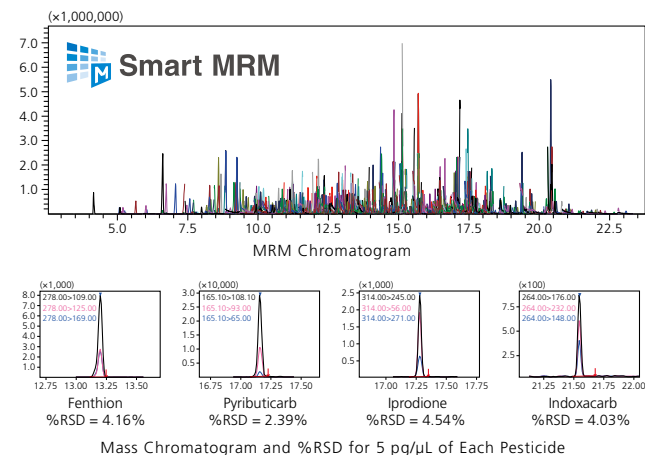
Qualitative Analytical Using GC-MS/MS

GC-MS/MS allows users to freely select ions cleaved by electron ionization (EI), and then cleave precursor ions via collision induced dissociation (CID), which enables a detailed analysis of partial structures. A product ion scan can be used to easily discriminate between structural isomers and positional isomers, which are hard to identify from EI mass spectra obtained with a single GC-MS system. That makes product ion scans ideal for predicting partial structures.

Example of Structural Isomers

α-PVP

α-PBP Piperidine analog

EI-Scan

EI-Product Ion Scan
(Precursor m/z 126)

Simultaneous Analysis of 439 Pesticide Components by Smart MRM Scan

(×1,000,000)

Smart MRM

MRM Chromatogram

(×1,000)
278.00>109.00
278.00>125.00
278.00>169.00

Fenthion
%RSD = 4.16%

(×10,000)
165.10>108.10
165.10>93.00
165.10>65.00

Pyributicarb
%RSD = 2.39%

(×1,000)
314.00>245.00
314.00>56.00
314.00>271.00

Iprodione
%RSD = 4.54%

(×100)
264.00>176.00
264.00>232.00
264.00>148.00

Indoxacarb
%RSD = 4.03%

Mass Chromatogram and %RSD for 5 pg/μL of Each Pesticide

Gas Chromatograph Mass Spectrometer

GCMS-QP2020 NX

## Smart Solutions for Maximizing the Potential of Laboratories

GC-MS systems, which are used in all sorts of fields, have now become a general purpose tool for analysis. Consequently, customers are increasingly demanding GC-MS systems that offer higher performance for the cost and enable a better work-life balance for operators. The GCMS-QP2020 NX maximizes the potential of laboratories by offering efficiency improvements for various aspects of analytical work.

Active Time Management

Active time management helps visualize how much time was spent on maintenance, switching between systems, or performing analyses, for example, to help manage the instrument downtime more appropriately. By automating tasks previously performed by users, it enables more efficient system operation.

Automatic System Startup/Shutdown

Automatic Tuning Decision-Making
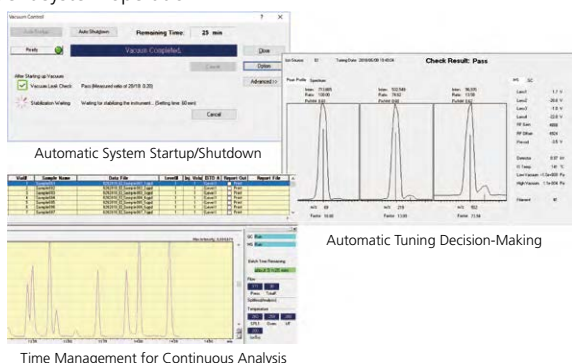
Time Management for Continuous Analysis

Smart EI/CI Ion Source

The newly developed Smart EI/CI ion source can be used to acquire CI data without exchanging ion sources or losing the general applicability of EI sensitivity. With the EI mode, even if identification is difficult using a mass spectral library, molecular weight information can be collected from the CI mode data, which is especially useful for predicting unknown compounds.
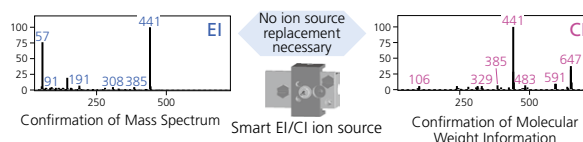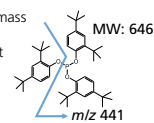

Confirmation of Mass Spectrum   Smart EI/CI ion source   Confirmation of Molecular Weight Information
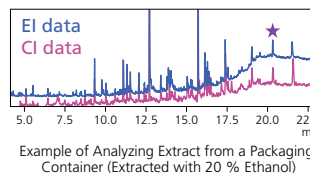
Example of Analyzing Extract from a Packaging Container (Extracted with 20 % Ethanol)

Based on the EI mass spectrum and CI molecular weight information, the substance is presumed to be tris(2,4-di-*tert*-butylphenyl) phosphite, used as an oxidation inhibitor.

MW: 646
m/z 441

Gas Chromatograph Mass Spectrometer
GCMS-QP2010 SE

The GCMS-QP2010 SE is a high cost-performance model featuring both a variety of functions and ease of operation. In addition to high level performance, the user friendly design ensures that anyone can quickly and easily acquire highly reliable data, with ease of operation and maintenance in every situation.

Mass range	*m/z* 1.5 to 1,000
Measurable FWHM	0.5 to 2.0 u
EI scan S/N	1 pg octafluoronaphthalene *m/z* 272 S/N ≥ 600 (helium gas)
High-speed scan rate	10,000 u/sec

Workstation for GC-MS
## GCMS Insight Software Package
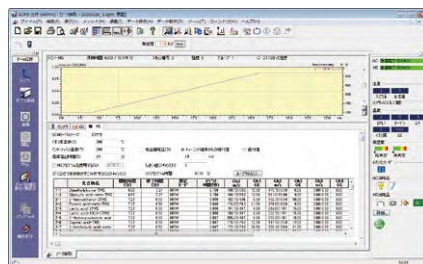
GCMSsolution Ver. 4

LabSolutions Insight

GCMS Insight is workstation software for GC-MS and GC-MS/MS systems, combining GCMSsolution and LabSolutions Insight into a single package. This software dramatically improves the efficiency of the analysis process, thanks to a user interface that can be operated intuitively even by novices; automatic method creation and data analysis functions that make multi-analyte and multicomponent analysis easier; and reliable qualitative analysis functions using retention indices. In GC-MS analysis, a number of GC and MS parameters need to be optimized during data acquisition. The GCMSsolution automatic method creation function (Smart MRM/SIM), and automatic adjustment function for retention times (AART) make it possible to create optimal analytical methods automatically. Furthermore, during data analysis, it is necessary to identify unknown components contained in samples, and to quantitatively determine over several hundreds of components quickly. LabSolutions Insight displays the chromatograms for each sample in sequence, making it easy to confirm peak detection results and whether criteria are exceeded. In addition, it displays quantitative results for each sample as a group. Thanks to the flagging function, peaks that deviate from the criteria are color-coded, making them instantly visually discernable. This dramatically reduces the number of peaks that need checking, so the process of quantitation can proceed efficiently.

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

Database for GC-MS and GC-MS/MS
## Smart Database Series
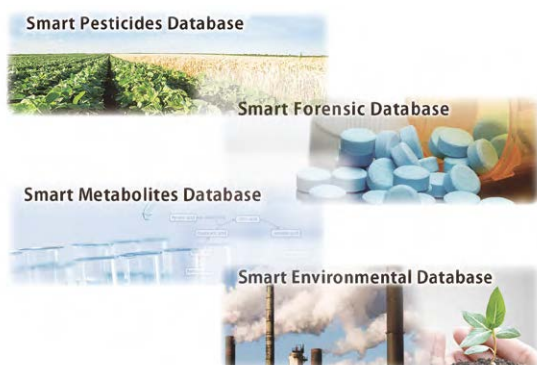
A great deal of effort is required to create MRM methods, including the optimization of transitions and collision energies, and the configuration of retention times using standard samples. With the Smart Database, compound information, transitions, and collision energies are preregistered. Methods configured with the optimal measurement times can be created automatically using the automatic adjustment of retention time (AART) and Smart MRM functions.

Description	No. of compounds registered
For residual pesticide analysis Smart Pesticides Database	MRM: 530 SIM: 530
For forensic toxicological substance analysis Smart Forensic Database	MRM: 486
For metabolite analysis Smart Metabolites Database	Scan: 651 MRM: 525
For environmental analysis Smart Environmental Database	MRM: 527

Note: Smart Forensic Database and Smart Environmental Database are for the GCMS-TQ series. They cannot be used with the GCMS-QP series.

Database for GC-MS and GC-MS/MS
Quick-DB Series
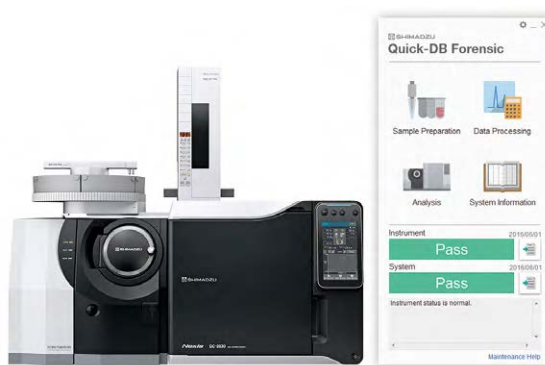
Quick-DB is a screening database that enables easy quantitation without using standard samples. The database contains not only optimized MRM transitions and other analytical conditions, but also data analysis conditions including retention indices and calibration curve information acquired using the internal standard method. Thanks to the automatic method creation function (Smart MRM/SIM), it allows analytical methods to be created easily, and quantitative values to be calculated without using standard samples.

Description	No. of compounds registered
Quick-DB Residual Pesticides Database	MRM: 491 Scan/SIM: 474
Quick-DB Forensic Forensic Toxicology Database	MRM: 68

Note: Quick-DB Forensic is for the GCMS-TQ series. They cannot be used with the GCMS-QP series.

Thermal Desorption System
TD-30 Series

GCMS-TQ8040 + TD-30R

Thermal desorption systems heat samples in a sample tube and then concentrate the thermally desorbed gases before injection into a GC or GC-MS system. They are commonly used to measure volatile organic compounds (VOCs) in the atmosphere or measure trace components that are generated from plastic or other samples. It is now possible to target a wide variety of components, from low boiling point to high boiling point. The lineup includes the TD-30, which can hold a maximum of 60 samples, and the TD-30R, which can hold 120 samples and supports re-acquisition and the addition of internal standard substances.

System configuration example	GCMS-TQ8040 + GCMSsolution + TD-30/30R
Number of samples	TD-30: 60, TD-30R: 120
Tube desorption temperature	Room temperature +15°C to 430°C (Accuracy ± 1°C)
Trap method	Cold trap (cooled with Peltier element)

• A system can be constructed with the GCMS-TQ series and GCMS-QP series. Contact your Shimadzu representative for further details.

Screening System for Phthalate Esters
Py-Screener Ver. 2   New

This system is designed for screening for phthalate esters in polymers. The use of phthalate esters is restricted in toys and food packaging and so on. They are expected to be regulated as restricted substances under the RoHS (II) Directive. The system supports a series of procedures from sample preparation to data acquisition, analysis, and maintenance. It consists of special software, special standard samples, and a sampling toolkit. It provides an environment in which even novices can operate it easily.

System configuration example	GCMS-QP2020 + GCMSsolution + LabSolutions Insight + Py-Screener + EGA/PY-3030D Multi-Shot Pyrolyzer (Frontier Laboratories)

GC-MS Application System
Off-Flavor Analyzer

This analysis system can reliably identify the substances responsible for off-flavor problems. To resolve off-flavor issues, the substances causing the odor must be identified. In order to accurately identify them however, expertise and experience are required to know what components are responsible for the off-flavor problems, to discriminate the quality of their odors and to use odor thresholds for those discriminations. The system provides a database of the major odor-causing substances, as well as sensory information (odor qualities and odor thresholds), for use in combination with GC-MS. It provides the total solution needed for off-flavor analysis.

System configuration example	GCMS-QP2020, GCMS-QP2010 Ultra, GCMS-TQ series multifunctional autosampler (AOC-6000 Plus or AOC-5000 Plus) Sniffing port: OP275 Pro II (GL Sciences) Multimode inlet: OPTIC-4

GC-MS Application System
AOC-6000 Plus Multifunctional Autosampler System

The AOC-6000 supports multiple sample injection methods including liquid sample injection, headspace (HS) injection and 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. New functions for managing syringe and fiber usage history support accurate analysis.

System configuration	GCMS-TQ8040 + GCMSsolution + AOC-6000 Plus
Sample capacity	162 2 mL vials (54 × 3) per tray 45 10/20 mL vials (54 × 3) per tray (Up to 2 trays can be loaded)
Syringe heating temperature	35 to 150 °C (1 °C steps)

GC-MS 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
Pressure range	7 to 700 kPa
Total flow range	5 to 500 mL/min (helium)

GC and GC-MS Application System
Headspace Analysis System *New*

GCMS-QP2020 NX + HS-20 NX Trap

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. The trap model includes functionality for concentrating components with an electronically-cooled trap and also enabling the measurement of trace components. By using highly heat-resistant septa, even ultra-trace substances extracted from pharmaceutical packaging or containers can be measured, which has been attracting attention in recent years.

System configuration	GCMS-QP2020 NX + GCMSsolution + HS-20 NX 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-TQ series, QP series, GC-2030, GC-2010 Plus, GC-2014.

GC and GC-MS Application System
Pyrolysis System

This system performs pyrolysis for polymer compounds at 500°C or higher, and analyze the pyrolysates obtained via GC and GC-MS. Since these pyrolysates reflect the structure of the original polymer compounds, they can be used to identify the polymers, and for higher-order structural analysis. Search software using a pyrolysis library also assists in the identification process.

System configuration example	GCMS-QP2020 + GCMSsolution + EGA/PY-3030D Multi-Shot Pyrolyzer (Frontier Laboratories)

• A system can be constructed with the GCMS-TQ series, QP series, and GC-2030/2010 Plus. Contact your Shimadzu representative for further details.

GC-MS Differential Split Flow Turbo Molecular Pump System
Comprehensive GC-MS (GC×GC-MS) System

The comprehensive GC-MS (GC×GC-MS) 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-TQ series, QP series were 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.

Multi-Dimensional GC/GC-MS System
MDGC/GCMS-2010 Series

This system performs separation using two columns that have different characteristics. It has a mechanism in which the components that are insufficiently separated in the first column they pass through are introduced ("heart-cut") to a second, different column. This enables analysis with a level of separation that cannot be attained in conventional single-column analysis. This is effective for the analysis of samples containing a very large number of compounds, such as petroleum products and perfumes.

Applicable detectors	GC-MS, FID, FPD, TCD, ECD, FTD
Sample injector	AOC-20i, HS-20, TD-20, AOC-5000 Plus

• A GC + GC-MS system can be used as an independent GC or GC-MS system.
• The analytical conditions can be configured easily using the dedicated MDGCsolution software.

MALDI Digital Ion Trap Mass Spectrometer
MALDImini-1

Despite its light and compact shape, The MALDImini-1 is capable of achieving MS^3 analysis, making it suitable for a large number of applications. With its simple configuration and compact size, it is possible to install the MALDImini-1 in places where mass analysis devices could not previously be used. The vacuum pumps are entirely contained within the device. The MALDImini-1 can be installed anywhere where there is an AC 100-120V power supply. By combining a MALDI ion source with Digital Ion Trap (DIT) technology, it is possible to carry out high-sensitivity MS^n analysis even on micro-quantity samples.

Mass range	m/z 650 to 70,000
MS/MS mass range	m/z 350 to 5,000
Mass resolution	> 4,000 FWHM
MS^n	$1 \leq n \leq 3$

Dual-Polarity Benchtop Linear MALDI-TOF Mass Spectrometer
MALDI-8030   New

The MALDI-8030 expands on the successful benchtop format of the existing MALDI-8020 MALDI-TOF mass spectrometer, to offer positive-ion and negative-ion analysis in the same footprint as the MALDI-8020. Instrument performance will mirror that of the MALDI-8020, with the performance specifications of the MALDI-8020 extended to cater for compounds best suited to analysis in negative ion mode. The benchtop system will offer a compact footprint, small enough for installation in any lab. The versatile system will be applicable to a wide range of analytes, including proteins, peptides, oligonucleotides, lipids, glycans, polymers and small molecules.

Mass range	m/z 1 to 500,000
Mass resolution	> 5,000 FWHM
Mass accuracy	< 20 ppm (internal standard), < 150 ppm (external standard)
Laser	Solid-state laser (355 nm) Pulse rate: 50, 100, 200 Hz (variable)

Benchtop Linear MALDI-TOF Mass Spectrometer
MALDI-8020

The MALDI-8020 is a compact, desktop-type linear mode MALDI-TOF instrument that can be placed on a laboratory table. It provides all of the functionality of its predecessor, AXIMA Assurance. Designed to have a small footprint, so it can fit even into narrow spaces (width of main unit 60 cm), and to be lightweight (weight of main unit 86 kg), it nonetheless achieves superior resolution and sensitivity. Moreover, longevity has been enhanced due to adoption of a solid-state laser, and it is equipped with TrueClean, an automatic ion source cleaning function. As a result, downtime is reduced to a minimum and maintenance costs can be reduced. It is readily capable of delivering the performance needed for measurements for QC and profiling applications that target peptides, proteins, polymers, oligonucleic acids, etc.

Mass range	m/z 1 to 500,000
Mass resolution	> 5,000 FWHM
Mass accuracy	< 20 ppm (internal standard), < 150 ppm (external standard)
Laser	Solid-state laser (355 nm) Pulse rate: 50, 100, 200 Hz (variable)

MALDI-TOF 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)

* ASDF: Axial Spatial Distribution Focussing

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

Matrix-Assisted Laser Desorption/Ionization
Time-of-Flight Mass Spectrometer
AXIMA Performance

The AXIMA Performance is 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. Shimadzu's proprietary (patented) curved-field reflectron (CFR) enables true high-energy CID-MS/MS with a laboratory frame collision energy of 20 keV. It is an extremely versatile and powerful system, integrating workflows for a diverse range of analytical needs. LC-MALDI software allowing confident identification of off-line separated complex mixtures via automated MS/MS.

Mass range	Linear mode	1 to 500,000 Da
	Reflectron mode	1 to 80,000 Da
Mass resolution	Linear mode	5,000
	Reflectron mode	20,000
MS/MS function		CID/PSD
Mass accuracy	Reflectron mode	5 ppm (internal standard)

Matrix-Assisted Laser Desorption/Ionization
Time-of-Flight Mass Spectrometer
AXIMA Confidence / AXIMA Assurance

AXIMA Assurance

This high-sensitivity, high-throughput mass spectrometer provides strong support for proteomics research. The AXIMA Confidence achieves a mass resolution of 15,000, and is capable of high-sensitivity analysis thanks to high performance laser beam focusing. It is equipped with Shimadzu's proprietary (patented) curved-field reflectron (CFR), so it can obtain PSD MS/MS spectra seamlessly from the low molecular weight region to the high molecular weight region, with a single measurement. AXIMA Assurance is the sister instrument to the AXIMA Confidence, and is exclusively for linear mode.

		AXIMA Confidence	AXIMA Assurance
Mass range	Linear mode	1 to 500,000 Da	1 to 500,000 Da
	Reflectron mode	1 to 80,000 Da	–
Mass resolution	Linear mode	5,000	5,000
	Reflectron mode	15,000	–
MS/MS function		Available (PSD)	–

AXIMA Application System
AXIMA for Microorganism 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.

Inductively Coupled Plasma Mass Spectrometer
ICPMS-2030

With its newly developed collision cell and optimized internal structure, the ICPMS-2030 provides superior sensitivity. At the same time, thanks to the adoption of its proprietary mini-torch unit and provision of an Eco mode, the quantity of argon gas needed for analyses has been greatly reduced to the industry's lowest levels. As a result, low running costs are assured. The Development Assistant function of the software automatically sets the optimal analysis conditions for quantitative analysis. Then, after measurements are complete, the Diagnosis Assistant function automatically checks the validity of the necessary data. While reducing the burden on the user, the efficiency of analyses is enhanced and the reliability of the data can be increased. It complies with FDA 21 CFR Part 11.

Plasma ion source	Sample spray chamber	Cyclone chamber (electronically cooled)
	Plasma torch	Mini torch
	Nebulizer	Coaxial
High-frequency power supply unit		27 MHz, max. 1.4 kW
Mass spectrometer unit	Mass spectrometer	Quadrupole mass spectrometer
	Mass number range	5 to 260
	Collision cell	Octopole collision cell

Imaging Mass Microscope

iMScope QT

Next-Generation Mass Spectrometry Imaging Created by iMScope QT

Inheriting the concept of a mass spectrometer equipped with an optical microscope from the iMScope series, the iMScope QT is also Shimadzu's flagship model for MS imaging with a Q-TOF MS. The iMScope QT boasts not only fusion with morphology studies but also excellent speed, sensitivity, and spatial resolution, clearing the way to next-generation mass spectrometry imaging.

• Combined Analysis
Fusion of MS images with optical microscope observations.

• Quantification and Distribution
Obtain qualitative and quantitative information from LC-MS as well as position information from mass spectrometry imaging with a single instrument.

• High Resolution, Speed and Accuracy
Acquisition of accurate, high-speed, high-resolution MS images together with efficient data analysis.


Ionization method	MALDI or LDI
Laser type	Laser-diode-excited Nd: YAG laser
Laser repetition frequency	Max. 20 kHz
Laser diamete	Min. ≤ 5 µm, Max. ≥ 100 µm

▍Measurement Results for the Cerebellum with 5 µm Spatial Resolution

The region in the red frame below (cerebellum) was measured with a resolution of 5 µm. High-resolution MS imaging and morphological observations with the optical microscope support cutting-edge research.
- Sample: mouse cerebellum
- Matrix: 9-AA
- Measurement region: 662 × 595 (393,890 pixels)
- Measurement time: around 2.2 hours

| Optical microscope image | *m/z* 885.55 | *m/z* 888.57 | *m/z* 888.63 |
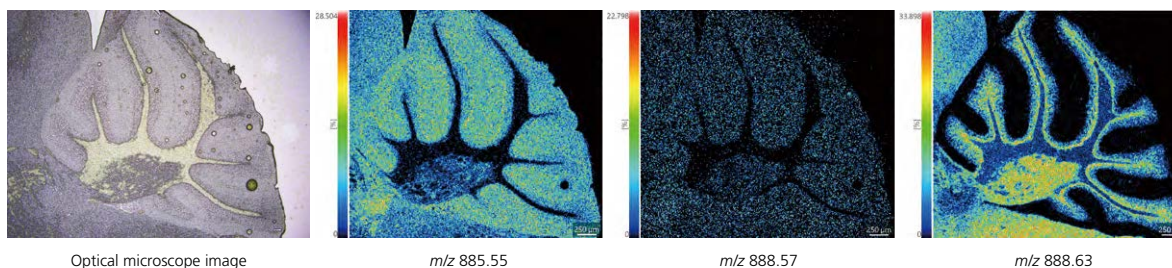
▍Measurement Results for Whole Brain Sections in Negative Mode

The sections of the mouse brain (17 mm × 9.4 mm) were measured at high resolution with a 15 µm pitch (702,624 pixels). The high-resolution analysis of these large brain sections was completed in around 6 hours, enabling testing to proceed efficiently.
- Sample: Whole mouse brain
- Matrix: 9-AA
- Measurement region: 1126 × 624 (702,624 pixels)
- Measurement time: around 6 hours
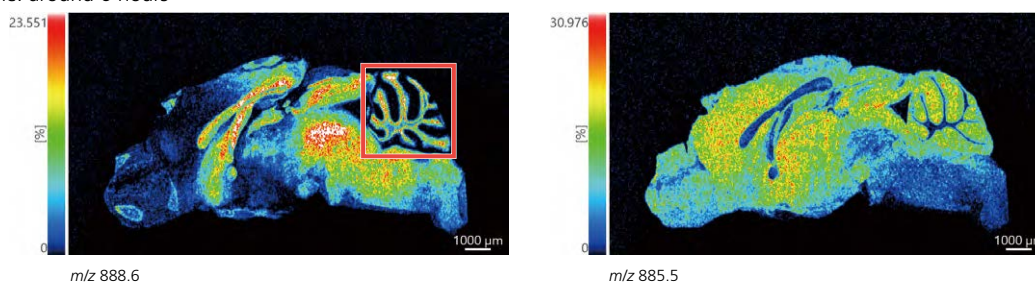
m/z 888.6   *m/z* 885.5

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems
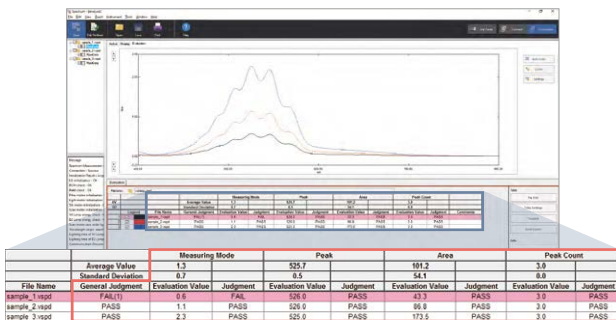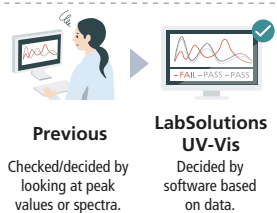
UV-VIS Spectrophotometer
UV-i Selection

Can we achieve customer working practice reforms for spectrophotometer measurement operations? That was the question that inspired the UV-i Selection and LabSolutions UV-Vis products. Three Kinds of Value Provided by Analytical Intelligence;
- *intelligence* - Improved Quality Control Productivity and Operators Freed from Repetitive Tasks
- *informatics* - Improved Productivity of Data Analysis Operations and Stronger Data Management
- *innovation* - Improved Administrative Productivity for High-Throughput Measurements

intelligence

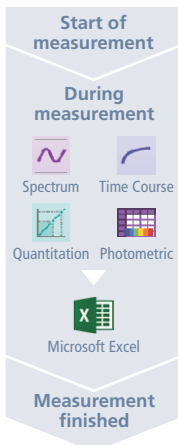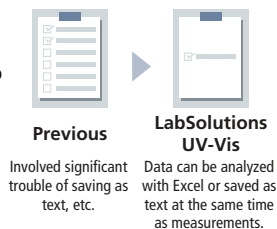**Spectral Evaluation Functions**
If spectra satisfy all evaluation criteria in accordance with the customized evaluation method, then an overall pass/fail result of "Pass" is output. Multiple evaluation criteria can be configured.
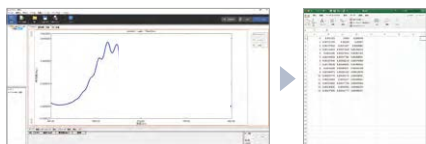
Previous
Checked/decided by looking at peak values or spectra.

LabSolutions UV-Vis
Decided by software based on data.

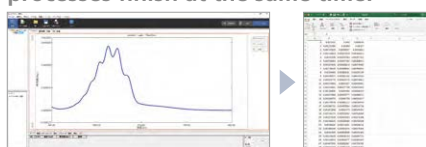

informatics

Excel Real-Time Transfer Functions
During measurements, this function transfers spectral and time-course data to Excel software in real time (requires separate Microsoft Excel software). That enables data analysis without the trouble of having to first save the data as a text file.

Previous
Involved significant trouble of saving as text, etc.

LabSolutions UV-Vis
Data can be analyzed with Excel or saved as text at the same time as measurements.

Start of measurement

During measurement

Spectrum Time Course

Quantitation Photometric

Microsoft Excel

Measurement finished

During measurement, data is transferred to Excel in real time.

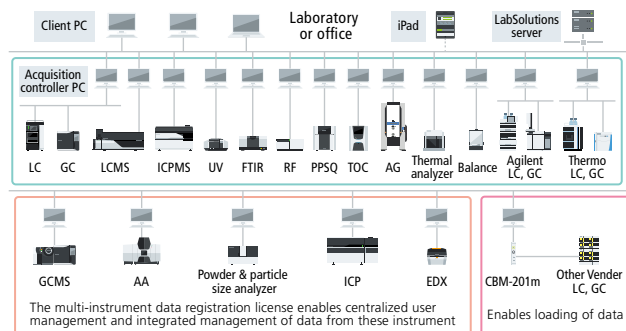**Data transfer and measurement processes finish at the same time.**

A Reliable Partner

informatics

Compliance with Data Integrity Requirements
The system enables full compliance with data integrity requirements, not only for chromatography equipment, but also UV-VIS spectrophotometers and other spectral analysis instruments. LabSolutions CS/DB UV-Vis provides compliance for regulations concerning electronic record keeping and electronic signatures required by FDA 21 CFR Part 11 and other regulations stipulated by Japan's Ministry of Health, Labour and Welfare (ER/ES regulations). Additionally, since the software supports laboratory networking, analytical results from a broad variety of analytical instruments used in the laboratory, including LC, LCMS, GC, GCMS, ICPMS, FTIR, RF, EDX, TOC, PPSQ and so on, can be managed centrally from a server.

The multi-instrument data registration license enables centralized user management and integrated management of data from these instrument

Enables loading of data

innovation

Autosampler Used for Continuous Analysis of Up to 360 Samples
If used in combination with an ASX series autosampler for automatic analysis, up to 360 samples can be automatically analyzed continuously. Furthermore, the spectral evaluation function can be used to navigate the entire process from measurement to data analysis.

Previous
100 samples per day

LabSolutions UV-Vis
[Automatic Analysis]
360 samples before noon
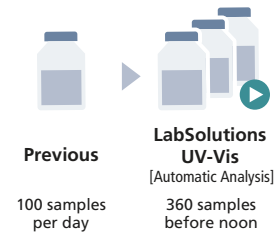
UV Automatic Analysis System
ASX-560 + UV-1900i + Sipper Unit

UV-VIS Spectrophotometer
UV-1900i

reddot award 2019 winner

The UV-1900i is a double-beam UV-Vis spectrophotometer using Shimadzu's original Lo-Ray-Ligh diffraction grating technology. Low stray light levels and high reproducibility (photometric repeatability) ensure quantitative analysis can be performed accurately for either low or high concentrations. In addition to high performance, it also offers ultra-fast scanning for acquiring highly accurate spectra in just a few seconds. It also supports network connectivity. It is possible to check the acquired data even from a room with no equipment installed. (Additional expansion memory required). In addition to stand-alone operation using a color touch panel, PC control using LabSolutions UV-Vis software is also possible.

Measurement wavelength range	190 to 1,100 nm
Spectral bandwidth	1 nm
Wavelength scanning speed	29,000 nm/min maximum speed
Stray light	Less than 0.02% (220 nm, NaI and 340 nm, $NaNO_2$)

UV-VIS Spectrophotometer
UV-2600i/2700i

The UV-2600i is a single monochromator, while the UV-2700i is a double monochromator. These compact UV-Vis spectrophotometers feature miniaturized optical systems, a width of only 450mm, 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-2700i. In addition, the measurement range can be extended from 220 nm to 1,400 nm by installing the ISR-2600Plus Integrating Sphere Attachment with the UV-2600i. LabSolutions UV-Vis software and validation software are provided as standard.

Measurement wavelength range	185 to 900 nm (220 nm to 1,400 nm with the UV-2600i when the ISR-2600Plus is used)
Spectral bandwidth	0.1 to 5 nm
Stray light	UV-2600i: 0.005% max. (220 nm, NaI and 340 nm, $NaNO_2$) UV-2700i: 0.00002% max. (340/370 nm, $NaNO_2$)

UV-VIS-NIR Spectrophotometer
UV-3600i Plus

Three detectors of a photomultiplier tube (PMT), InGaAs, and PbS, are equipped not only with the main unit, but also with the multipurpose large-sample compartment and the integrating sphere attachment. It achieved high sensitivity over the entire measurement wavelength range. The ASR series absolute reflectance measuring devices enables high-precision absolute reflectance measurement, and the ISR-1503/1503F large integrating sphere with an inner diameter of 150 mm enables measurement of transparency of plastics and solar reflectance of coating films. 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
Spectral bandwidth	0.1 to 8 nm (UV/VIS), 0.2 to 32 nm (NIR)
Stray light	0.00008% or less (220 nm, NaI) 0.00005% or less (340 nm, $NaNO_2$)

UV-VIS-NIR Spectrophotometer
SolidSpec-3700i/3700i DUV

This system equipped with an integrating sphere as standard. Equipped with three detectors, a photomultiplier tube (PMT), InGaAs, and cooled PbS, it has achieved the world's highest level of sensitivity, especially in the near infrared region. A large sample compartment can measure a wide variety of samples (A sample of up to 700 × 560 mm can be set horizontally for measurement.). With the optional Auto XY stage, multi-point automatic measurement of up to 310 × 310 mm samples with nitrogen purge is possible. LabSolutions UV-Vis software is included as standard. The DUV model is deep ultraviolet (From 175 nm).

Measurement wavelength range	3700i: 240 to 2,600 nm (When using the direct light receiving unit: 190 to 3,300 nm) 3700i DUV: 175 to 2,600 nm (When using the direct light receiving unit: 165 to 3,300 nm)
Spectral bandwidth	0.1 to 8 nm (UV/VIS), 0.2 to 32 nm (NIR)
Stray light	0.00008% or less (220 nm, NaI)

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

Spectroscopy Systems

UV-VIS Spectrophotometer
UV-1280

In addition to spectral measurements and quantitative analyses, photometrics, DNA/protein quantitation, and high-level multi-component quantitation can also be performed. This means that it is fully equipped with all of the measurement functions required of a UV-VIS spectrophotometer, thus making it an "All-in-One UV" instrument. By configuring the D_2/WI lamp with a monitor double beam system, more than sufficient stability can be obtained despite its small size. Equipped as standard with instrument validation, which facilitates maintenance inspections for the instrument.

Wavelength range	190 to 1,100 nm
Spectral bandwidth	5 nm
Photometric mode	Monitor double beam
Stray light	0.05 % max.
Data storage	USB flash drive
Installed software	Photometric, spectrum, quantitation, kinetics, time scan, multi-component quantitation, DNA/protein quantitation, instrument validation

Photoreaction Evaluation System
Lightway

Lightway is the world's first* photoreaction evaluation system designed for the photochemistry field. It provides support for evaluating photoreaction quantum yield rates. By streamlining previous experiment process steps, it enables results to be obtained even more quickly. In addition, the software includes navigation functionality that allows even inexperienced users to operate the system easily. It eliminates the need to adjust the chemical actinometer, which minimizes operator variability and helps ensure accurate measurement results.

* As of May 2020, according to a Shimadzu survey

Wavelength range	250 to 800 nm
Spectral bandwidth	15.0 nm
Photometric interval	0.1 sec. to 60 min.
Photometric range	Absorbance: 0 to 1.5 Abs

Fourier Transform Infrared Spectrophotometer
IRSpirit

reddot award 2018 winner

IRSpirit is a compact Fourier Transform Infrared Spectrophotometer that travels where it's needed. It gracefully accommodates available bench space and the sample compartment is easily accessible with the system facing forward or sideways. In addition, IRSpirit is equipped with the widest sample compartment in its class, to easily accommodate both Shimadzu and third-party accessories. IRSpirit also offers the highest S/N ratio (30,000:1) in its class using the technology inherited from the high-end model. Furthermore, a newly developed dedicated IR Pilot program offers 23 standard application programs to simplify analysis for all users.

Interferometer	Michelson interferometer (30° incident angle) Equipped with Dynamic Alignment system Sealed interferometer with desiccant
Wavenumber range	7,800 to 350 cm^{-1}
Highest resolution	0.9 cm^{-1}

Fourier Transform Infrared Spectrophotometer Plastic Analysis System
Plastic Analyzer   New

When analyzing plastics, libraries are used to qualify their material properties. However, infrared spectra of plastics that have been denatured (have deteriorated) due to heat or UV rays differ in shape from standard spectra, and qualifying them can sometimes be difficult. To address this, the Plastic Analyzer includes a deterioration library, so highly accurate qualification can be performed reflecting the state of deterioration.

Contents	IRSpirit Fourier transform infrared spectrophotometer QATR-S single-reflection ATR attachment Plastic Analyzer method package • UV-Damaged Plastics Library • Thermal-Damaged Plastics Library • Macro Program for IR Pilot/Parameter File

Fourier Transform Infrared Spectrophotometer
IRTracer-100

This system achieves excellent sensitivity with an S/N ratio of 60,000:1, high resolution at 0.25 cm^{-1}, and high-speed scanning capable of 20 spectra/second. The performance of medium and higher end models is supported by high reliability including advanced dynamic alignment and an interferometer with a dehumidifier. This is compatible with applications active in a variety of circumstances, with a library of approximately 12,000 spectra and data analysis programs for contaminant analysis, and time course and rapid scan programs for reaction tracking.

Interferometer	Michelson interferometer (30° incident angle) Equipped with Advanced Dynamic Alignment system Sealed interferometer with automatic dehumidifier
Wavenumber range	7,800 to 350 cm^{-1} (standard), 12,500 to 240 cm^{-1} (optional)
Highest resolution	0.25 cm^{-1}

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.

Interferometer	Michelson interferometer (30° incident angle) Equipped with Advanced Dynamic Alignment system Sealed interferometer with automatic dehumidifier
Wavenumber range	7,800 to 350 cm^{-1}
Highest resolution	0.5 cm^{-1}

AIM-9000 Infrared Microscope
Automatic Micro Analysis System

reddot award 2018 winner

Shimadzu's proprietary wide-field camera supports variable digital zooming as well as observation of large areas up to 10 × 13 mm. Furthermore, by sharing positional information with the microscope camera, it achieves a digital zoom function capable of zooming to a magnification of about 330× for observing extremely small areas as small as 30 × 40 μm. The analyst simply clicks one button and the software automatically recognizes the contaminant. It even determines the optimal aperture size and angle in only one second. The automatically determined measurement positions can either be measured without editing or the analyst can add or delete measurement positions. Sample images are stored into the measured spectra automatically. The contaminante analysis program-the functionality for automatically qualifying contaminants is included as a standard feature in LabSolutions IR software.

Measurement mode	Transmission, reflection, ATR
Wavenumber range	5,000 to 700 cm^{-1} (narrow band) 5,000 to 650 cm^{-1} (middle band) 4,600 to 400 cm^{-1} (TGS)

Spectrofluorophotometer
RF-6000

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. When linked with the LabSolutions Network System, compliance with Part 11 can be achieved, adding to safety and ease of mind.

Scanning wavelength range	200 to 900 nm and 0 order
Resolution	1.0 nm or less (Emission)
Wavelength slewing speed	60,000 nm/min.

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

Atomic Absorption Spectrophotometer
AA-7000 Series

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 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

Multitype ICP Emission Spectrometer
ICPE-9800 Series

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.

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.

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.

Diffraction grating of monochromator unit	Concave radius of curvature: 1000 mm
Wavelength range	120 to 550 nm, 120 to 700 nm
Readout unit	Time-resolution photometry (PDA processing, total integral processing)
Number of light receptors	64 channels max.

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.

Diffraction grating of monochromator unit	Concave radius of curvature: 600 mm
Wavelength range	121 to 589 nm
Readout unit	Time-resolution PDA photometry
Number of light receptors	64 channels max.

Spectrophotometer for Life Science
BioSpec-nano

Capable of performing quantitation and purity checking of nucleic acids, quantitation of proteins, and photometric measurements. Simply drop 1 to 2 µL of the sample onto the measurement window and press the instrument's Start button (or click the Start Measurement button in the software window), and all steps in the process, from setting the optical path length, measurement, up until the task of wiping off the sample from the measurement window, are all carried out automatically. Troublesome work of moving arm up and down and wiping the sample from the measurement window now unnecessary. Moreover, when using the specialized software, all it takes to perform a measurement, output a report, export data, or carry out other common tasks is to click buttons on the toolbar.

Optical path length	0.2 mm, 0.7 mm (switched manually)
Sample volume	Optical path length 0.2 mm: 1 µL or more, Optical path length 0.7 mm: 2 µL or more
Wavelength range	220 to 800 nm
Wavelength accuracy	±1 nm

MCE-202 Microchip Electrophoresis System for DNA/RNA Analysis
MultiNA

This system is used to analyze the size of DNA/RNA samples, with convenient analytical operability. It achieves analysis costs on par with agarose gel electrophoresis, and can perform fully automatic analyses of up to 108 samples. Using optimized reagent kits (four types for DNA analysis and one type for RNA analysis), the system achieves a high resolution and high sensitivity. It can significantly improve the workflow for mutation checks in genome editing, and genotype determination.

Detection method	Fluorescence detection using a fluorescence intercalator
Maximum number of samples	108
Size range	25 to 500 bp (DNA-500 kit) 100 to 1,000 bp (DNA-1000 kit) 100 to 2,500 bp (DNA-2500 kit) 100 to 12,000 bp (DNA-12000 kit) 28S rRNA (5.0 knt) or below (RNA kit)
Analysis processing speed	Analysis results obtained and displayed in as short as approx. 80 seconds

Protein Sequencer
PPSQ-51A/53A

PPSQ-53A Gradient System

The PPSQ is an instrument for determining the amino acid sequences of proteins and peptides, which combines an Edman reaction section with a high performance liquid chromatograph (HPLC).
There are 2 types: the PPSQ-51A, which is equipped with one reactor, and the PPSQ-53A, which is equipped with three reactors. On the PPSQ-53A, the continuous analysis of the amino acid sequences of multiple samples can be performed one after another.
In the Edman reaction section, amino acids are cleaved in order from the N-terminal of a protein by repeatedly performing Edman degradation, and are derivatized. As a result, stable PTH-amino acids are produced. The PTH-amino acids are injected online into the HPLC, and analysis is performed. The HPLC data is saved on the PC, and data processing software is used to process the chromatograms. Then, amino acid sequence estimation software is used to identify the amino acids and estimate the sequences.

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

Cell Culture Media Analysis Platform
C2MAP System

The C2MAP system measures component changes in a culture supernatant as culturing progresses using LC/MS/MS. It can be used in a wide range of applications, from basic research of cell cultures including pluripotent stem cells (iPS cells and ES cells), mesenchymal stem cells, and antibody-producing cells, to scaling up culture volumes, and actual process development.

Automated Process from Pretreatment for the Culture Supernatant Analysis to Measurement
Seamless analysis and management can be performed for from the pretreatment unit to the LC/MS/MS measurement.

Supports a Wide Range of Measurement Compounds and Culture Supernatant Samples
A total of 95 components can be simultaneously analyzed at high speed, including major basal culture media components for animal cells, and secreted metabolites.

Easy Confirmation of Component Variations in Culture Media
Temporal changes in the components obtained can be displayed as trend graphs. The results under multiple experimental conditions can be overlaid in the display, enabling comparative analysis.

Automated Picking and Collecting of Cell Colonies
CELL PICKER

New

The CELL PICKER system automates the pickup and removal of cell colonies using a pipetter. Easy-to-operate software simplifies the cell pickup process. Cell pickup can be made even easier by connecting AUTO CHANGER, new optional equipment designed with automation in mind.

Stress-Free Operations
Unstable and delicate procedures during cell pickup are automated, so the operator can focus on the cell selection process. The software is simple to operate.

Ensuring Traceability
Procedural control and standardization are ensured by methods (procedural conditions). In addition, images of the cells can be recorded automatically before and after pickup.

Portable functional Near-Infrared Spectroscopy System for Research
LIGHTNIRS

Two kinds of head holders that fit the whole head closely are adopted, enabling the optimal measurement regions to be selected to suit the conditions for measurement. The measurement methods are equivalent to LABNIRS, and the data analysis software is compatible with LABNIRS data. It enables multipurpose measurements related to a variety of cognition issues, motion, somatic sensation, and vision.

Measured item	Variations from the initial values of oxygenated hemoglobin (Oxy-Hb), deoxygenated hemoglobin (Deoxy-Hb), and total hemoglobin (Total-Hb)
Number of measurement channels	8 pairs (max. 22 channels)

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)

New

Energy Dispersive X-ray Fluorescence Spectrometer

EDX-7200

The EDX-7200 is a flagship model of the EDX series in pursuit of high sensitivity, high speed and high precision. This model supports new regulations and directives for consumer and environmental compliance, such as RoHS/ELV, REACH, and TSCA with full exclusive screening analysis kits. The EDX-7200 is equipped with a high-resolution SDD detector to achieve a higher count rate and detection efficiency.

High Speed
— Throughput Increased by Up to a Factor of 30 —

Equipped with a high-speed circuit that increase the count rate by up to 30 times compared to the former model (EDX-720). Improved algorithms and improved performance also help to reduce measurement times.

Comparison of Lead Profiles in Copper Alloys

Comparison of Chromium Profiles in Copper Alloys
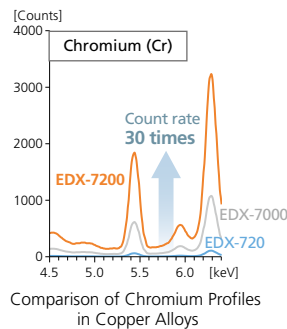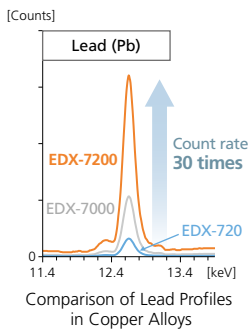
High Sensitivity
— Improves Lower Detection Limit by Up to 6 Times —

In metals analysis, the lower detection limit of trace elements in main components has been improved.

Guide of the Lower Detection Limit (300 sec) for Lead in Metals [ppm]

	EDX-7200	EDX-7000	EDX-720
Copper alloy	9.9	17.1	35.5
Solder	3.9	8.4	24.8
Aluminum alloy	0.7	1.1	3.3

Note: The detection limit is an example and not a guaranteed value.

Elements to be determined	$_{11}$Na 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)

Integrated EDX–FTIR Analysis Software

EDXIR-Analysis

The integrated EDX–FTIR analysis software, EDXIR-Analysis is especially for qualitative analysis, utilizing data acquired with energy dispersive X-ray fluorescence spectrometers (EDX) and Fourier transform infrared spectrophotometers (FTIR). This software provides identification results and degrees of matching by performing an integrated analysis of data acquired with FTIR, which is ideal for the identification and qualitative analysis of organic compounds, and data acquired with EDX, which is ideal for the analysis of the elements contained in metals and inorganic compounds. It can also perform either EDX or FTIR analysis separately. Shimadzu's proprietary library (containing 485 data as standard), created through cooperation with waterworks agencies and food product manufacturers, is used for the data analysis. Additional data as well as image files and document files in PDF format can be registered in the library. It is also effective for linked storage with a variety of data as digital files.

EDX profile   FTIR spectrum

Loading the acquired data

Integrated data analysis   Data comparison

Integrated Analysis for Contaminant Analysis and Data Comparisons for Confirmation Tests

The examples here show an integrated analysis of black rubber contaminant data acquired and a data comparison for a polyvinyl chloride (PVC) examination object and the standard product. From the integrated data analysis results, it is evident that the black rubber contaminant is acrylonitrile-butadiene rubber (NBR), which contains calcium carbonate and zinc stearate. In addition, from the data comparison, the degree of matching between the PVC examination object and the standard product is 0.8506. Lead (Pb) and acrylic were detected from the EDX and FTIR data, which were not detected in the standard product. Accordingly, it is surmised that the examination object contains components different to those in the standard product.

Integrated Data Analysis Results for a Black Rubber Contaminant

Data Comparison Results for a PVC Examination Object and the Standard Product

Energy Dispersive X-ray Fluorescence Spectrometer
EDX-8100

Equipped with an electronically cooled high-performance semiconductor detector, the EDX-8100 is designed for reduced running costs and ease of maintenance while providing better sensitivity, throughput, and resolution than conventional models. The EDX-8100 is a model that accommodates light elements and allows for helium purge. 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. 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-8100 can be applied broadly, whatever the industry.

Elements to be determined	$_6$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

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.

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 to $_{92}$U with LiF, PET, Ge and TAP analyzing crystal $_4$Be to $_7$N with optional analyzing crystal
X-ray tube	4 kW with a thin window
250 µm Mapping resolution as standard	

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

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

Electron Probe Microanalyzer
EPMA-8050G

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.

Elements analyzed	$_4$Be (optional) and $_5$B to $_{92}$U
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

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	$_4$Be to $_{92}$U	
Number of X-ray Spectrometers	2 to 5 channels	
X-ray Take-Off Angle	52.5°	

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface
Analysis Systems

Environmental
Measurement Systems

Material Testing and
Non-Destructive Inspection
Systems

Physical Properties
Measurement Systems

Imaging X-ray Photoelectron Spectrometer
AXIS Supra+

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.

Imaging X-ray Photoelectron Spectrometer
KRATOS AXIS 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

New

Scanning Probe Microscope/ Atomic Force Microscope

SPM-Nanoa
Leading you into the nano world.

The SPM-Nanoa is a middle-range SPM that adopts a low-noise, high-sensitivity detection optical system equivalent to the high-end SPM-8100FM, further advancing automation of operations and high throughput. That means you can observe what you want to observe in more detail, more easily, and more quickly. Consequently, SPM-Nanoa microscopes provide powerful assistance for everything from observing the shape of micro areas to measuring their physical properties.

Features

- **Automatic Observation**
  Adjusts laser beam, adjusts parameter settings during observation and performs image processing automatically
- **Extensive Functionality**
  Capture sharp images with optical microscopy to SPM microscopy modes
- **Saves Time**
 Various support functionality achieves fast observation

Observation mode	Standard: contact, dynamic, phase, lateral force (LFM), force modulation Optional: lateral force (MFM), surface potential (KPFM), current, piezoelectric force (PFM), STM
Resolution	Horizontal: 0.2 nm, Vertical: 0.01 nm
SPM 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

Visualization of Nano-scale Elastic Modulus and Adsorption

The elastic modulus can be evaluated quantitatively by applying a theoretical model for calculating elastic modulus to the force curve obtained by measuring the micro-forces acting between the probe and sample. The force distribution can also be visualized in the vertical direction for nano-scale three-dimensional mechanical analysis.

■ Mapping the Physical Properties of Polymer Films

| Surface Shape | Elastic Modulus | Adhesion |
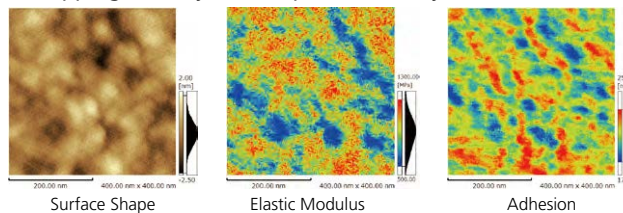
Mapping polymer film surface properties clearly showed how elastic modulus and adhesive forces were distributed in patches several tens of nanometers in size.

(Sample source: MORESCO Corporation)

High-Resolution Scanning Probe Microscope

SPM-8100FM

HR-SPM

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 the HR-SPM

- Uses the FM method
- Noise in air and liquids is reduced to 1/20 that of existing methods.
- Achieves the performance level of a vacuum-type SPM, even in air and liquids.
- Enables measurement of the local structure at the solid-liquid interface.
- HT scanner extends observation area and shortens observation times.
- Dual monitors and signal indication function provide significant improvement in flexibility.

| Observation mode	contact, dynamic (AM method and FM method), lateral force (LFM)
Resolution	Horizontal: 0.2 nm, Vertical: 0.01 nm
SPM 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

AM method

FM method
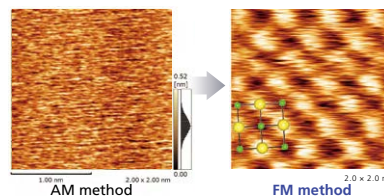
KPFM Observation* of Atmospheric Pt Catalyst Particles

* KPFM: Kelvin Probe Force Microscope

AM method

FM method
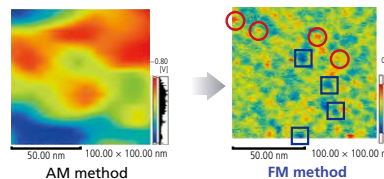
Scanning Probe Microscope

SPM-9700HT

This microscope can observe the three-dimensional image or local properties of samples at high magnifications. It enables high-resolution observation, and can measure a variety of samples in air and in liquids. Due to the newly developed high response speed HT scanner and the optimized control system design and software, it is now possible to acquire image data at more than five times the speed of Shimadzu's previous models.

This supports the improvement of total throughput via significant reductions in measurement time. The system is ideal for measurements involving a large number of samples or for routine observations.

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
AFM head	Displacement detection system: Light source, optical lever, detector Light source: Laser diode (ON/OFF) Irradiates cantilever continuously, even while replacing samples. Detector: Photodetector

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

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 is certified as Shimadzu's Eco-Products Plus. Reduced power consumption by 36 % compared with conventional Shimadzu's products.

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

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)

TOC-LCSH/CSN standalone model   TOC-LCPH/CPN PC-controlled model

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)

Approx 340 mm

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

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$_{WP}$

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
Measured items	TC, IC, TOC, NPOC
Measurement range	TC 0 – 3,500 mg/L, IC 0 – 3,500 mg/L

On-Line TOC Analyzer
ON-LINE TOC-V$_{CSH}$

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.	

New On-Line TOC Analyzers for Pure Water

eTOC Series

Demands for highly purified water and its quality control are getting stronger in many industries, such as pharmaceutical, medical device, food/beverage, chemical, precision machinery, and semiconductor. eTOC has been designed to satisfy this demand. It has very high sensitivity and low detection limits, reaching 0.1 µg/L, making it perfectly suitable for ultra-pure water measurement.

Measurement Items	TOC, conductivity (or specific resistance), temperature
Measurement Principle	UV oxidation-conductivity method
Measurement Range	TOC: 0 to 2000 µg/L Conductivity: 0.023 to 206 µS/cm (without temperature correction) Temp.: 10 to 50 °C
Detection Limit	TOC: 0.1 µg/L
Dimensions, Weight	W270 × D140 × H180 mm, 2.88 kg

### World-First* TOC Analyzer using Mercury-free Excimer Lamp

Excimer lamps emit high-energy 172 nm wavelength light by inducing a dielectric barrier discharge within a xenon gas. The eTOC is the first TOC analyzer in the world to use a mercury-free excimer lamp. The eTOC also features new "Active-Path" technology for transferring energy from the lamp to the sample. It efficiently irradiates the sample inside the lamp with ultraviolet light to reliably oxidize organic matter. This new Shimadzu technology achieves both high measurement performance and high environmental performance.
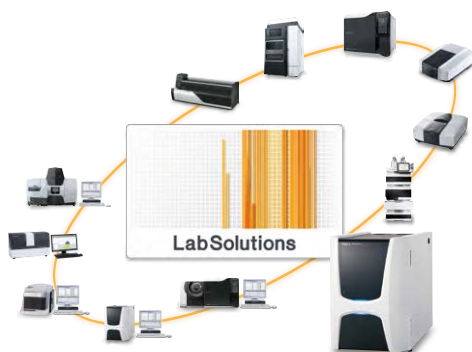
* According to August 2020 Shimadzu survey

TOC-1000e

New Technology — Active-Path

Lamp (filled with Xe gas)   Flow channel   Exterior blocks UV light

ON   Sample

OFF
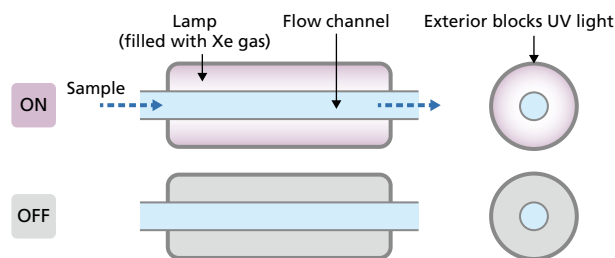
Software for TOC-L
LabSolutions TOC   **New**

LabSolutions

While keeping the operation feeling that has been popular in the previous product TOC-Control L, security functions have been enhanced with full support for LabSolutions CS. LabSolutions TOC uses LabSolutions CS, a world-proven data management software, to centrally manage measurement results and audit trails with a common database and user ID across a variety of devices, including LCs and GCs. Lab administrators don't have to manage devices individually. LabSolutions TOC is equipped with a "Report Set function" that creates a report that links measurement data with related audit trails. By simply and securely reviewing measurement data, it also improves work efficiency.

On-Line Total Organic Carbon Analyzer
TOC-4200 Series

TOC-4200

On-line TOC analyzer with 680 °C combustion oxidation and non-dispersive infrared gas detection (NDIR) method. The measurement range is wide, from 0 to 20,000 mg C/L f.s., and can optionally be used for high-sensitivity measurement of 0 to 1 mg C/L f.s. The reliable oxidizing power of the high-temperature combustion furnace, the NDIR detector that is not affected by interference components, and the fast measurement of the minimum 4 minutes cycle are effective not only for the final effluent but also for upstream monitoring.

Measurement Principle	680°C combustion catalytic oxidation / non-dispersive infrared gas detection (NDIR) method
Measurement Items (*Optional)	NPOC, TC, TOC (TC-IC)* TOC (NPOC+POC)*
Measurement Range	0–5 to 0–1,000 mgC/L f.s. (0 to 20,000 mgC/L f.s. with dilution function)
Measurement Cycle	4 minutes minimum (Using NPOC)
Repeatability	Within ±2% f.s.

## Transportable Gas Analyzers

NOA-7100
CGT-7100

The portable all-in-one gas analyzer can be used for various purposes a variety of uses in various locations. All pretreatment parts required for measurement, such as the pump, filter, and electric cooler, are built-in. Gas concentration can be measured by simply introducing sample gas. The NOA-7100 supports NO_X measurements for applications ranging from exhaust gas measurement of combustion equipment to combustion and denitrification research.

Output Measurement Data to USB Flash Drives

Measurement data is stored in the built-in memory of the analyzer. Data can be retrieved in CSV file format using USB flash drives. Measurement data can be retrieved via Wi-Fi connection or LAN cable connection.

Measurement Values and Charts Can be Displayed Wirelessly on PCs or Smart Devices

It is capable of wireless data transmission via Wi-Fi, so measurement values and charts can be displayed wirelessly on PCs or smart devices, and measurement data can be exported using a USB flash drive.
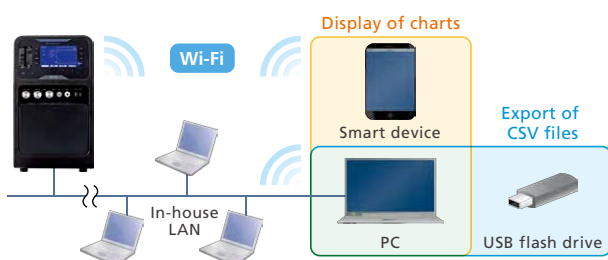
100 mL/min Small Flow Measurement is Available

Measurements can be performed on sample gases with flowrates as low as 100 mL/min. (NOA-7100: Type 2, CGT-7100: Type 3)

NOA-7100	Measurement components	Measurement range	Main application
Type 1	NO_X, O_2	NO_X : 0 to 25/50/100/250/500/ 1,000/2,500/4,000 ppm O_2 : 0 to 5/10/25 vol%	Combustion equipment test / Research
Type 2 (Small flow measurement)	NO_X, NO, NO_2	0 to 100/250/500/1,000/2,500/ 4,000 ppm	Catalyst research

| CGT-7100	Measurement components	Measurement range	Main application
Type 1	CO, CO_2	CO : 0 to 1,000/5,000 ppm CO_2 : 0 to 5/15 vol%	Combustion equipment test / Research
Type 2	CO, CH_4	CO : 0 to 5 vol% CH_4 : 0 to 20 vol%	Fuel cell research
Type 3 (Small flow measurement)	CO, CO_2	CO : 0 to 10/20 vol% CO_2 : 0 to 10/20 vol%	Catalyst research

All-in-One Measurement

NOA-7100

Save Space, Easy Maintenance

Consumables such as filters and the absorber are located at the front of the instrument to facilitate replacement. Gas switching, flow rate adjustment, and gas connection are controlled on the front of the instrument to facilitate operation.
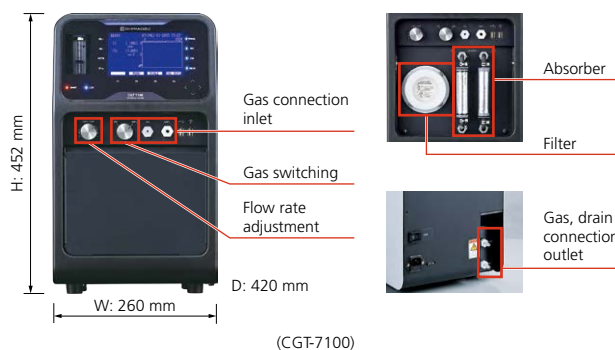
(CGT-7100)

Pretreatment unit for portable gas analyzers
CFP-8000

The CFP-8000 is pretreatment unit that is used with CGT-7100 or NOA-7100. When performing continuous gas analysis, dust and moisture must be removed from the gas before sending to the analyzer. This essential preprocessing can be performed by this one device, and two lines of cleaned measurement gas can be used simultaneously. Light-weight and compact, the CFP-8000 is the perfect preprocessor for use with portable analyzers.

CFP-8000

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

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 NO_X, 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 NO_X, 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.

Continuous Gas Analyzer in Flue Gas
NSA-308

This analyzer measures four or five components in exhaust gases from combustion equipment. Two types are available, for measurement of four components: NO_X, SO_2, CO, and O_2, and for measurement of these four components plus CO_2 for a total of five components. The analyzer adopts a high-performance, high-functionality ratio infrared analyzer and a magnetic wind oximeter, to achieve simple and highly reliable sampling.

Measurement method	Non-dispersive infrared ray absorption method (ratio photometry) O_2: Magnetic wind method
Measurement range	It differs depending on the components measured, so inquire for details.

Flue Gas Nitrogen Oxide and Oxygen Analyzer
NOA-3030

This high performance chemiluminescence system features a space-saving design and easy maintenance. Ideal for monitoring cogeneration system exhaust gases. Chemiluminescence enables highly accurate NO_X measurements with minimal interference.

Measurement method	NO_X: Atmospheric pressure chemiluminescence method O_2: Magnetic wind method
Measurement range	NO_X: Ranges from 0-to-50 to 0-to-2,500 ppm O_2: 0 to 25 vol% (Optional: 0 to 10 vol%)

Flue Gas Nitrogen Oxide and Oxygen Analyzer
NOA-308Dx

Chemiluminescence provides high sensitivity and superior zero point stability. Includes various functionality, such as automatic calibration, remote calibration, calculation processes, and alarms.

Measurement method	NO_X: Atmospheric pressure chemiluminescence method O_2: Magnetic wind method
Measurement range	NO_X: Ranges from 0-to-10 to 0-to-2,500 ppm O_2: 0 to 10/25 vol%

Flue Gas CO and O_2 Analyzer for Preventing Dioxin Emissions from Waste Incinerators
COA-3030

This analyzer is specialized for monitoring waste incinerator compliance with waste processing laws and regulations and guidelines for preventing dioxin emissions. A ratio type infrared gas analyzer is used to measure CO and a magnetic wind type analyzer for O_2.

Measurement method	CO: Non-dispersive infrared ray absorption method (ratio photometry) O_2: Magnetic wind method
Measurement range	CO: 0 to 200/1,000 ppm O_2: 25 vol%

AUTOGRAPH Precision Universal Testers

AGX-V Series

Industry's highest level of new precision universal testing machine

A motor-driven precision universal testing machine with high performance, operability and safety. By expanding the guaranteed precision range to 1/2000 of full scale, a wide range of test forces can be measured with a single load cell. The autotuning function was further enhanced and strain control performance was improved. By registering the jig space using the new intelligent crosshead function, jig space can be changed via a smart controller or dedicated software, which prevents collisions between the jigs due to operating errors.

Aggregation of Cutting-Edge Functions

The sampling speed has been improved to 10 kHz, which is twice as fast as the conventional product, enabling the test force to be collected 10,000 times per second. For tests using the strain control method specified in ISO 6892, the control cycle was increased by 10 times to improve responsiveness.

True Safety for Both the Operator and the Machine

A new self-diagnostic function to check the status of equipment has been introduced. The device automatically records the usage time and operation log, and automatically notifies you when parts need to be replaced. In addition, a variety of functions are included as standard, including a function to prevent collisions between jigs due to misoperation.

Operability that Takes the Shortest Path to Results

The controller is equipped with a touch panel LCD, which displays the optimal buttons and information for the situation. It shows a variety of operations and informational displays, including jig space adjustments prior to testing and confirmation of measurement values during tests. A universal interface standardized with the software has been adopted to support all kinds of testing by high operability and visibility.

AGX-10kNVD	AGX-50kNVD	AGX-100kNV	AGX-600kNV

Capacity	Table-top model 10 N to 50 kN, floor model 20 kN to 600 kN		
Testing speed	AGX-10kNVD AGX-20/50kNVD AGX-20/50kNV, AGX-100kNV AGX-250/300kNV AGX-500/600kNV	0.0005 to 3,000 mm/min 0.0005 to 1,500 mm/min 0.00005 to 1,500 mm/min 0.00005 to 720 mm/min 0.00005 to 540 mm/min	
Test force measurement accuracy	High-accuracy type	10 N to 300 kN	Accurate to within ±0.5 % of indicated test force (for forces ranging from 1/1000 to 1/100 of the load cell capacity rating) Accurate to within ±0.3 % of indicated test force (for forces ranging from 1/100 to 1/1 of the load cell capacity rating)
		500 kN, 600 kN	Accurate to within ±0.5 % of indicated test force (for forces ranging from 1/500 to 1/1 of the load cell capacity rating)
	Wide ranging type	50 N to 300 kN	Accurate to within ±1 % of indicated test force (for forces ranging from 1/2000 to 1/1000 of the load cell capacity rating) Accurate to within ±0.5 % of indicated test force (for forces ranging from 1/1000 to 1/100 of the load cell capacity rating) Accurate to within ±0.3 % of indicated test force (for forces ranging from 1/100 to 1/1 of the load cell capacity rating)
	Standard-accuracy type (Select one.)	10 N to 300 kN	Accurate to within ±1 % of indicated test force (for forces ranging from 1/1000 to 1/1 of the load cell capacity rating)
		500 kN to 600 kN	Accurate to within ±1 % of indicated test force (for forces ranging from 1/500 to 1/1 of the load cell capacity rating)

AUTOGRAPH Table-Top Precision Universal Tester
AGS-X Series

Combining all necessary functions in a compact design, this high-performance, cost-efficient testing machine has been developed for low-capacity strength evaluations. Increase testing efficiency using dedicated data processing software (TRAPEZIUM LITE X).

Load capacity	1 N to 10 kN (11 types)
Test speed	0.001 to 1,000 mm/min (Stepless)
Test force accuracy	Within ±0.5 % of display test force (for 1/1 to 1/500 of load cell capacity)

Compact Tabletop Tester
EZ-X Series

EZ-LX/EZ-LX HS   EZ-SX

This easy-to-use, compact, stylish frame incorporates enhanced functions, enabling tests to be carried out with good efficiency.

		EZ-SX	EZ-LX	EZ-LX HS
Load capacity		500 N	5 kN	2 kN
Test speed		0.001 to 1,000 mm/min		0.001 to 2,000 mm/min
Return speed		1,500 mm/min		3,000 mm/min
Test force measurement accuracy	High-precision type	±0.5 % of indicated value (Range from 1/500 to 1/1 of the load cell capacity) Complies with JIS B7721 class 0.5, ISO 7500-1 class 0.5, EN 10002-2 grade 0.5, and ASTM E4		
	Standard precision type	±1 % of indicated value (Range from 1/500 to 1/1 of the load cell capacity) Complies with JIS B7721 class 1, ISO 7500-1 class 1, EN 10002-2 grade 1, and ASTM E4		

Non-Contact Digital Video Extensometer
TRViewX

The TRViewX non-contact digital video extensometer can accurately measure extension and width of films, which is difficult with contact extensometers, over a wide range without affecting the specimen. It is capable of measuring extension to an accuracy equivalent to JIS B7741 0.5 class.

Type	Optical non-contact, standard line mark tracking format
Gauge length	Any length within camera field of view
Camera field of view	55 to 800 mm
Measurement accuracy	The larger of ±1.5 μm or ±1.5 % of indicated value (for camera field of view 240 mm or less and constant temperature measurement)

Fully Automatic
Rubber Tensile Testing System

This system provides full automation, from measurement of specimen dimensions, supply to the testing machine, and fixing of chucks to measurement of extension between standard lines and data processing. The system can be used for continuous nighttime testing, which helps save labor costs.

|	
Load capacity	Max. 1 kN
Test speed	0.001 to 1,000 mm/min
Specimen storage method	Palette type (120 pcs)
Applicable standard	JIS K6251

Fully Automatic
Plastic Testing System

This is a fully automatic tensile and bending tester for plastics. It is capable of continuous operation from measurement of specimen dimensions, supply, and data processing.

|	
Load capacity	Max. 10 kN (tensile)/5 kN (bending)
Test speed	0.0005 to 1,000 mm/min
Specimen storage method	Palette type (120 pcs) or magazine type (150 pcs)

Automatic Extensometer
SIE-560A/560SA
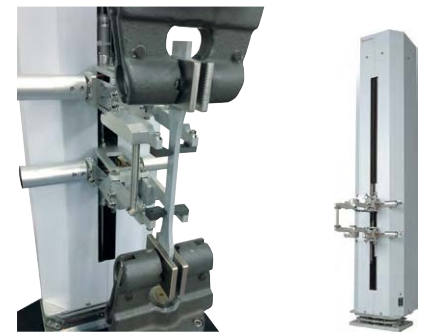
Provides high-precision measurement of the extension of metals, plastics, etc. from the elastic range (very small displacement) to failure (large displacement). All operations, such as automatic fitting and removal of the extension arm onto the specimen, automatic setting of the distance between standard lines, etc., can be executed by the software.

Measurement range	Max. (560 - gauge length) (mm)
Measurement precision	560SA ± 1 μm, 0.5 % (JIS B7741 0.5 class) 560A ± 2.5 μm, 0.5 % (JIS B7741 1 class)
Gauge length	560SA 50 mm (variable with option) 560A 10 to 550 mm

Operation Software for Material Testing
TRAPEZIUM X-V
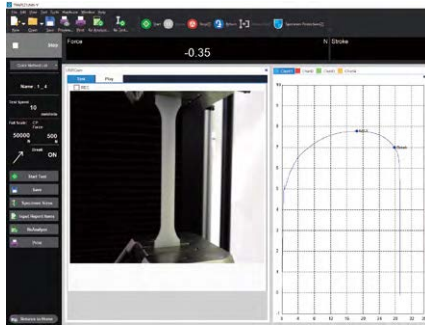
TRAPEZIUM X-V for Windows 10 provides a number of easy-to-use features, such as a data search function, condition setting through a visual wizard, and a quick condition list where you can select test conditions directly from the start-up screen. You can easily create a variety of test conditions, from simple test controls to controls with complicated patterns.

Software for Autograph
LabSolutions AG *New*

The Autograph precision universal testing machines are now compatible with the latest in data integrity. Connecting TRAPEZIUM X-V to the LabSolutions system, which provides ER/ES regulatory compliance, enables confident, reliable data management. In addition to Autograph data, consolidated management is available for LC, GC, and UV data.
• Compatible with the AGX-V, AG-X, AGS-X and EZ-X
• Compatible with single software and control software

Compact Thermostatic Chamber for Autograph
TCE-N300A *New*

The thermostatic chamber controls the temperature in the testing space, enabling tensile, bending, and compression tests under a variety of temperature conditions. You can discover new characteristics of materials by reproduceing real-world temperature environments. The temperature can be set, and the temperature data from the thermostatic chamber can be recorded, using TRAPEZIUM X-V software.

Temperature usage range	−70 to +300 °C
Temperature increase rate	25 minutes from room temperature to 300 °C
Temperature decrease rate	25 minutes from room temperature to −70 °C

Hydraulic Universal Testing Machines
UH-X Series and UH-FX Series

UH-500kNX

UH-F500kNX

The operability and visibility of the computer-controlled hydraulic servo type universal testing machine (UH-X) and the high-performance universal testing machine (UH-FX), equipped with front opening type hydraulic grips, have been greatly improved by the adoption of a large color touch panel. Equipped with a semi autotuning function that automatically adjusts the control parameters, stress control and strain control (ISO 6892 compliant) can be easily carried out without the need for a preliminary test. The UH-Xh and UH-FXh models feature a new hybrid hydraulic oil source that reduces the required quantity of hydraulic oil, thereby achieving a major reduction in electrical power (about 50 %).

	UH-X Series	UH-FX Series
Load capacity	200, 300, 500, 1,000, 2,000, 3,000, 4,000 kN (7 types)	300, 500, 1,000, 2,000, 3,000, 4,000 kN (6 types)
Capacity	6 stages	
Test control functions	Single, cycle, stress, strain, stroke 3 stage switching, concrete	Front-opening type hydraulic system

Note: Hybrid type and a type without an analog indicator are also available.

High-Rigidity Compression Testing Machine

A high stiffness compression testing machine is achieved with an integral loading frame structure by hollowing out an extremely thick steel plate. It is provided with a test force (displacement) control function ideal for evaluation of the strength of high-strength concrete, rocks, etc., and is capable of preventing explosive fracture during compression.

Load capacity	3,000, 5,000 kN

Concrete Compression Testing Machine
CCH-X/CCM-X Series

CCH-2000kNX

In recent years the importance of concrete quality control has increased. This testing machine can carry out concrete compression tests efficiently in accordance with JIS A 1108. With options it can also be used for concrete bending tests and concrete tensile tests.

Load capacity	CCH-X Series 2,000 kN, 3,000 kN, 5,000 kN (3 types)
	CCM-X Series 1,000 kN, 2,000 kN (2 types)

Concrete Compression Testing Machine
CONCRETO 2000X/3000X

CONCRETO 2000X

This compression testing machine can safely and efficiently perform tests at a high capacity without causing explosive fracture (failure of the specimen) on ultra-high-strength concrete, which is used as a structural material in high-rise buildings, etc. This one machine can be used for materials ranging from ultra-high-strength concrete to specimens that have been recently cast, mortar, etc.

Testing capacity	40 to 2,000 kN in 6 stages range (CONCRETO 2000X)
	60 to 3,000 kN in 6 stages range (CONCRETO 3000X)
Control method	Hydraulic servo type (with explosion-proof function)
Upper and lower plate diameter	220 mm

Micro Vickers Hardness Tester
HMV-G Series

This micro hardness tester features a built-in CCD camera for standardized automatic length measurement. Hardness can be measured simply and accurately with easy-to-use PC software. The lineup also includes fully automated (FA) machines equipped with an electrically driven revolver mechanism and electrically driven XYZ. A manual machine with an optical head and models with color cameras are also included in the lineup.

HMV-G31 Series
Standardized automatic length measurement function using a digital camera built into a novel G frame

HMV-G31-FA Series
High efficiency, completely automatic measurements using the electric XYZ stage and special software

HMV-G30 Series
Turn it ON and start measuring immediately. Active in educational fields.

Electric micrometer kit (option)

Test force range	9.8 mN to 19.6 N
Reading method	Automatic (G31), Manual (G30)
Maximum number of indenters and object lenses installed	S: Indenters 1, Object lenses 2 D: Indenters 2, Object lenses 4
With electrically driven revolver	HMV-G31ST, HMV-G31DT, HMV-G31-XY, HMV-G31-FA

Dynamic Ultra Micro Hardness Tester
DUH-211/210S

This tester can be used for measuring the surface properties (hardness and elastic modulus) metal materials, thin films, DLC films, surface treated layers such as alumite, plastics, and rubbers. Measurement can be carried out with test forces as low as 0.1 mN (resolution 0.2 µN).

Test force range	0.1 to 1,961 mN (0.01 to 200 gf)
Indentation depth range	0 to 10 µm
Minimum display	0.0001 µm
Testing mode	3 types (211 model), 7 types (211S model)

Micro Compression Tester
MCT Series

With length measurement kit (option)

This is a strength evaluation tester for micro parts and micro particles generated in powder processing. It is capable of carrying out not only compression tests, but also loading and unloading tests, repeated tests, and various other load patterns, with excellent operability and functionality.

	MCT-510	MCT-511	MCT-210	MCT-211
Loading method	Electromagnetic loading method			
Test force range (mN)	9.8 to 4903		9.8 to 1961	
Displacement measurement range (µm)	0 to 100	0 to 10	0 to 100	0 to 10

Capillary Rheometer Flowtester
CFT-500EX/100EX

This device evaluates viscosity properties from the relationship to temperature, pressure, and flow velocity, etc., for flowable materials. It demonstrates its power in research and development, production processes, and quality control for various flowable materials such as thermoplastic resins, thermosetting resins, toner, composite materials, ceramics and rubbers.

Extrusion force	CFT-500EX: 0.4903 to 49.03 MPa (0.4903 MPa step) CFT-100EX: 0.098 to 9.807 MPa (0.098 MPa step)
Test temperature	(Room temperature + 20) to 400 °C
Test type	Constant temperature tests, constant velocity rising temperature tests

Mooney Viscometer
SMV-301/301RT

This device evaluates the Mooney viscosity and vulcanization properties of rubbers. Operation is simple using the color LCD touch panel, and basic performance, such as temperature recovery properties, is excellent. A stress-relieving function is also provided based on ISO/ASTM standards (SMV-301RT). It can also be operated using PC software.

Applicable standard	JIS K6300-1, ISO 289-1 to -4, ASTM D1646
Mooney viscosity measurement range	0 to 200.0 M
Temperature control range	70 to 200 °C

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

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Servopulser Fatigue and Endurance Testing Machine
EHF-E Series

This is the standard electrohydraulic servo fatigue testing machine, offering outstanding stable performance. It is capable of carrying out tests ranging from static tests to fatigue tests.

Maximum test force	Dynamic, ±10, ±20, ±50, ±100, ±200 kN
Max. amplitude	±25 mm, ±50 mm
Waveform	Sine, triangular, rectangular, ramp, and haversine waves
Control mode	Test force, stroke

Note: Select the control device from two options: the 4830 (V), and the 4890 (M).

Servopulser Overhead Actuator Type Fatigue and Endurance Testing Machine
EHF-U Series

This is a multi-functional fatigue testing machine suitable for specimens, structures and full-sized parts. It is an overhead actuator type with a broad test space, so it is ideal for various types of environmental tests, such as those in corrosion tanks or constant temperature tanks.

Maximum test force	Dynamic, ±50, ±100, ±200 kN
Main unit format	Overhead actuator type, testing table with T groove
Waveform	Sine, triangular, rectangular, ramp, and haversine waves
Control mode	Test force, stroke

Note: Select the control device from two options: the 4830 (V), and the 4890 (M).

Servopulser Table-Top Fatigue and Endurance Testing Machine
EHF-L Series

This revolutionary fully digital servo controlled multi-functional materials testing machine opens up a new era in fatigue testing systems. It provides excellence in all aspects, including precision, reliability, and expandability, through its fully digital control achieved by bringing together the latest technologies.

Maximum test force	Dynamic, ±5, ±10, ±20 kN
Max. amplitude	±25 mm, ±50 mm
Waveform	Sine, triangular, rectangular, ramp, and haversine waves

Note: Select the control device from two options: the 4830 (V), and the 4890 (M).

Compact Hydraulic Vibrator Force Simulator
EHF-JF Series

This is a ±20 kN ±100 mm vibrator weighing only about 25 kg. It is a light and compact easy-to-handle hydraulic vibrator that can evaluate durability by applying repeated loads to products such as automotive parts, furniture and structures.

Dynamic test force	±5 kN, ±10 kN, ±20 kN, ±30 kN (4 types)
Effective stroke	±50, ±100, ±150 mm (selective)

Electromagnetic Force Fatigue and Endurance Testing System
Servopulser EMT Series

EMT-1kN   EMT-5kN

High-speed repeated load tests can be carried out with a maximum velocity of 2 m/s, and maximum stroke of ±50 mm, using clean and quiet electromagnetic force as the driving power, without the use of oil. The test space is large so environmental tests can also be carried out using the constant temperature tank (option).

	EMT-1kNV-30	EMT-1kNV-50
Maximum test force	±1 kN (static and dynamic tests)	
Stroke	±30 mm	±50 mm
Max. speed	1 m/s	2 m/s
Max. frequency	200 Hz	

	EMT-5kNV-30	EMT-5kNV-50
Maximum test force	Dynamic: ±5 kN, Static: ±3.5 kN	
Stroke	±30 mm	±50 mm
Max. speed	1 m/s	
Max. frequency	200 Hz	100 Hz

Electric Motor Driven Actuator
NJ-SERVO

This is a ±10 kN±100 mm electrical powered vibrator that can save about 75 % of the power. The drive source is a motor, so cooling water for a hydraulic oil source is not required. The durability of full-size parts such as automotive parts can be evaluated by applying repeated loads.

Static/dynamic test force	±1 kN, ±5 kN, ±10 kN, ±20 kN, ±30 kN
Effective stroke	±100 mm (±150 mm)

Electromagnetic Force Micro Tester
Micro-Servo MMT Series

Achieves test forces in the order of grams and high-speed repeated loads at the micro level through its use of an electromagnetic servo actuator. It is optimal for evaluation of the dynamic strength of items such as micro materials and miniature parts.

	MMT-11NV-2	-101NV-10	-250NV-10
Test force capacity	±10 N	±100 N	±250 N
Stroke	±2 mm	±10 mm	
Max. frequency	60 Hz	100 Hz	
Power requirements	AC100 V		

Servopulser Control Unit
4830

Using the touch-panel operation, measurement and control of tests ranging from static tests to dynamic tests can be simply carried out. Up to four testing machines can be operated simultaneously. Functions such as data acquisition and programmed loads can be expanded using USB connection software (option).

Test waveforms	Sine, triangular, rectangular, etc.
Amplifier	Test force, stroke
Control mode	Test force, stroke, virtual transducer
Power requirements	Single-phase 100 V, 300 VA

Note: A wide range of software is available.
　　　Contact Shimadzu for details.

Ultrasonic Fatigue Testing System
USF-2000A

This machine uses ultrasonic vibrations to evaluate the fatigue strength of materials in the order of gigacycles over a short period of time. The condition settings and monitoring can be carried out from the included computer.

Test frequency [Note 1]	20 kHz ± 500 Hz
Test stress [Note 2]	180 to 900 MPa (in the case of a steel circular taper specimen)
Stress ratio	−1

Note 1: The test frequency is determined from the resonance frequency of the sample.
Note 2: Stress values depend on sample shape and physical property values.
Note 3: An air compressor is included. A displacement measuring device is an option.

High-Speed Impact Testing Machines
HITS-X Series

With the increasing demand for safety and reliability, evaluation of the dynamic strength (impact properties) of materials and parts is becoming more and more important. This machine can obtain data, such as the maximum test force, energy, and displacement, up to a maximum velocity of 72 km/h (20 m/s). A tensile load type (HITS-TX) and a punching type (HITS-PX) are available.

Impact test force	10 kN
Speed setting range	1 to 20 m/s
Piston stroke	300 mm
Controller	Controller 4870 (dedicated controller for high-speed impact testing)
Software	TRAPEZIUM HITS high-speed impact testing software

Note 1: The PC and printer are not included, so they must be ordered separately.
Note 2: A constant temperature tank can be added as an option.

Servopulser Vibration Testing Machine
EHV Series
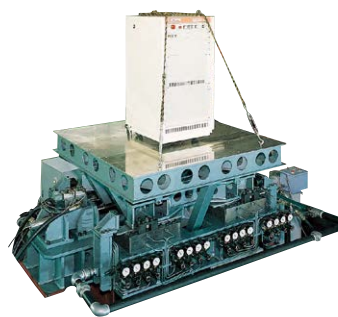
This machine performs vibration tests on structures, equipment, transport packages, etc. Vibration directions include horizontal and vertical. Large capacity and large stroke can be obtained with the electro-hydraulic servo system.

Vibration method	Electro-hydraulic servo method
Vibration force	Horizontal 50 kN, vertical 40 kN
Stroke	±50 mm
Vibration direction	Horizontal, vertical
Control mode	Peak values of displacement and acceleration

30 MN Large Structural Testing Machine

This is a 30 MN testing machine, the largest in Japan. It is used for checking the strength properties of either complete actual structures or portions thereof with respect to self-weight, imposed loading, or external loads such as earthquake, wind, and snow, in particular the deformation and ultimate strength, in order to verify the safety of the structure.

Note: The capacity and performance, etc., of the testing machine can be changed in accordance with discussions.

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

Dimensional X-ray CT System

XDimensus 300

The XDimensus 300 is a dimensional X-ray CT system capable of measuring samples in 3D. In addition to the external surface form of objects, it is capable of measuring the internal form (in locations where probes and lasers cannot reach). It brings added value that could not be provided by conventional measurement systems, by enabling dimensional measurement and observation and analysis of internal structure and defects using CT images.

Target object	Resins and light metals
Maximum sample size	300 mm dia. × H: 210 mm, max. 10 kg max.
Field of view	300 mm dia. max.
Accuracy (sphere distance error)	±(3.8 + L/50) μm

Highest Level of Measurement Accuracy in Its Class*
An ultra-high accuracy rotating table as well as a high-accuracy CT stage with excellent stability such as a granite stage frame have been adopted. In addition, an instrument internal temperature adjustment function is provided in order to maintain stable measurement accuracy.
**Compact External Appearance with a Maximum Measurement Field of View of 300 mm in Diameter**
With a compact size of width 2.2 m, depth 1.6 m, and height 2 m, the maximum measurement field of view of 300 mm in diameter can be maintained.
Easy and Rapid CT Scanning
The system supports setting of the ideal CT scan conditions, so even an operator unfamiliar with CT systems can rapidly take CT images.

* Based on Shimadzu's evaluation of sphere distance error
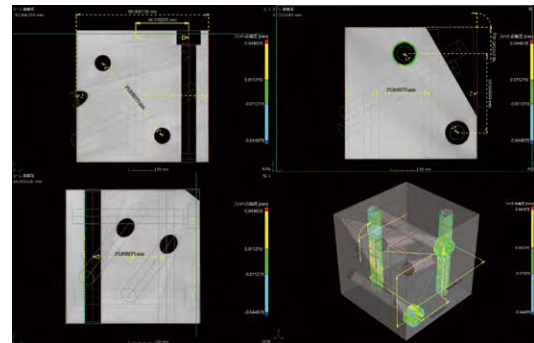
Dimensional measurement

Microfocus X-ray CT System

inspeXio SMX-225CT Series

This is a high-performance microfocus X-ray CT system equipped with a Shimadzu microfocus X-ray generator and high-sensitivity X-ray detector. Using the intuitive user interface, anyone can easily observe the 3D structure of the interior of samples. With its wide CT stage and new detector, larger samples can be inspected. A model with a large high-resolution flat panel detector mounted has been added, so even higher resolution and higher contrast CT images can be achieved.
It is suitable for observation of the internal structure of a wide range of samples such as aluminum die castings, electronic parts, and GFRP/CFRP composite materials.

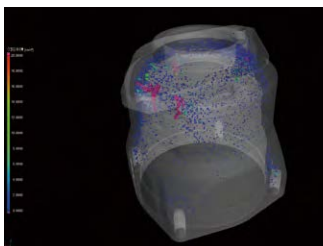|	inspeXio SMX-225CT FPD HR Plus	inspeXio SMX-225CT FPD Plus
Target object	Aluminum die castings, electronic circuit boards, electronic parts, composite materials, etc.	
Maximum sample size	400 mm dia. × H: 300 mm max. 12 kg max.	350 mm dia. × H: 300 mm max. 9 kg max.
X-ray detector	16-inch flat panel detector	8-inch flat panel detector
Field of view	400 mm dia. max.	250 mm dia. max.

inspeXio SMX-225CT FPD HR Plus

Aluminum Die Cast Defect Analysis

Analysis of CFRTP Fiber Orientation (supplied by Ehime University)

Principle of System

Exterior camera
X-ray detector
X-ray generator
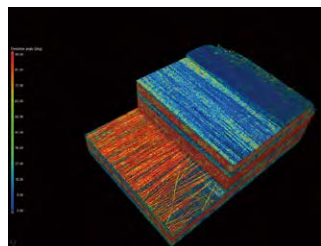CT stage

The target object (sample) is placed between the X-ray generator and X-ray detector. The target object is rotated 360 degrees, and X-ray fluoroscopic data is collected from various angles, and cross-sectional images are calculated.

Microfocus X-ray Inspection System

Xslicer SMX-6010

Xslicer SMX-6010 is a planer X-ray inspection system, featuring a micro-focus X-ray generator and a 3 megapixel flat panel detector. It delivers high-accuracy images with a wide dynamic range that enable detailed observations of internal structures and defects. In addition, the system switches smoothly between fluoroscopy and Computed Tomography (CT), enabling a variety of observations matched to the shape of the sample. This supports the inspection of various samples ranging from electronic parts with improved miniaturization to mounted boards with advances in high-density multilayer design.

Target object	Electronic parts, mounting boards, etc.
Maximum sample size	W: 470 × D: 420 × H: 100 mm, max. 5 kg max.
Fluoroscopic field of view size	0.75 (vertical) × 1.3 mm (horizontal) to 21 (vertical) × 38 mm (horizontal)
CT field of view size	3 to 30 mm (given 45° laminographic angle) 3 to 14 mm (given 60° laminographic angle)

Switch Smoothly between Fluoroscopy and CT

There is no need to install a separate unit for CT imaging. The CT imaging scan conditions are easy to configure just by selecting the scan mode, scan angle, and scan region. A region of interest in the fluoroscopic image can be observed immediately with a CT scan.
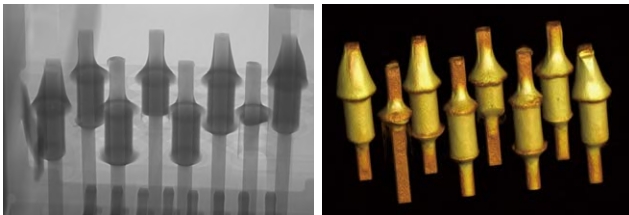
Fluoroscopic image of LAN connector

VR image of LAN connector

Principal and Effect of CT Imaging

X-ray fluoroscopic images are captured by tilting the flat panel detector and rotating it 360 degrees. The resulting fluoroscopic images are then combined by a reconstruction process to create cross-sectional images. In fluoroscopic images, features in the depth (or thickness) direction overlap. As a result, it is not possible to differentiate between the front and back side of a double-sided surface mounted circuit board, for example. However, with X-ray CT images, each layer of the board can be observed.
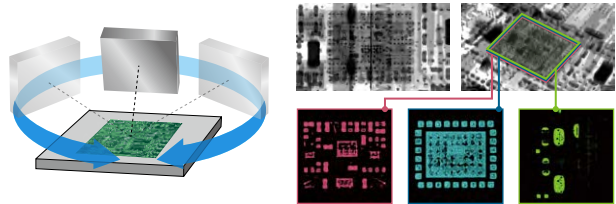
Microfocus X-ray Inspection System

Xslicer SMX-1010/1020

The Xslicer SMX-1010/1020 is a vertical emission X-ray system equipped with 90 kV microfocus X-ray generator and a high-resolution flat panel detector. Image quality has been significantly improved over the previous model (SMX-1000 Plus), and Shimadzu's renowned operability has advanced even further. In addition to operability improvements, the stage movement speed and detector acquisition speed have also increased, significantly shortening inspection times. The inspection process is now more efficient. The workflow has also been simplified for the CT unit (optionally available), and operability has been improved. With the Xslicer SMX-1010/1020, everything from X-ray fluoroscopic inspections of surface mounted circuit boards, sensors, and harnesses to 3D defect analysis using CT can be accomplished with a single unit.

Target object	Electronic parts, mounting boards, resin, etc.
Maximum sample size	W: 350 × D: 450 × H: 100 mm, max. 5 kg max.
Fluoroscopy FOV (on carbon plate)	SMX-1010: 1.9 mm (vertical) × 2.2 mm (horizontal) to 38 mm (vertical) × 43 mm (horizontal) SMX-1020: 2.2 mm (vertical) × 3.8 mm (horizontal) to 42 mm (vertical) × 76 mm (horizontal)

New HDR Processing Function

Shimadzu's unique, proprietary image processing technique/algorithm allows fluoroscopic images with a higher dynamic range. Regions that are both easy and difficult to penetrate can be observed at the same time, which shortens inspection times.
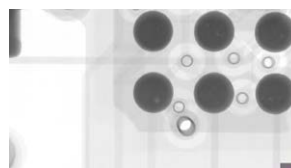
Without HDR Processing
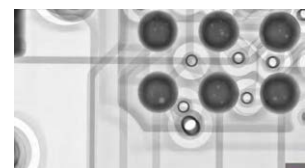
With HDR Processing

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

Differential Scanning Calorimeters

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
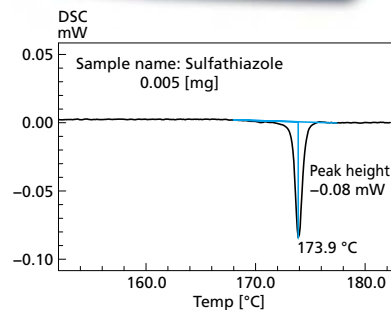
High-Sensitivity Measurements of Trace Samples (pharmaceutical)

• 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)

TG-DTA Simultaneous Measuring Instruments

DTG-60/60H/60A/60AH

DTG-60A

This simultaneous TG-DTA (thermogravimetry/differential thermal analysis) measuring instrument features a differential type top loading balance with a Roberval mechanism, and a plugin type high-sensitivity thermocouple. It can measure samples up to 1 g. It also provides improved DTA sensitivity at high temperatures. With the auto DTG models (60A/60AH) that incorporates a autosampler, it is possible to place about one day's worth of samples. They are also capable of automatically measuring both empty cells and samples.

Temperature range	Room temperature to 1,100 °C (DTG-60/60A) Room temperature to 1,500 °C (DTG-60H/60AH)
Measurable range (weight)	±500 mg
Measurable range (differential thermal)	±1,000 μV
Number of settable samples	24 per sample tray (DTG-60A/60AH)

Thermomechanical Analyzers

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	8 dia. × 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, ±2,000 mg (51 models only)
Maximum sample weight	1 g (tare weight) 10 g (tare weight for 51 models)

Workstation Software for Thermal Analyzers
LabSolutions TA
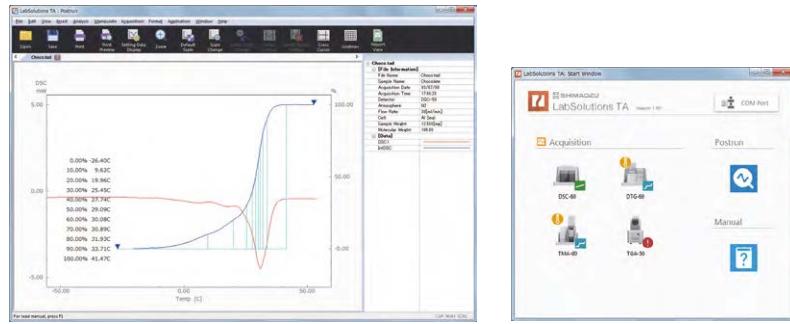
Features an updated design and extensive immediately understandable functionality. Consequently, the entire series of operations, from measurement to data analysis and outputting reports, can be performed intuitively. Compatible with LabSolutions networks.

Convenient Operability
Large icons for frequently used functions are arranged above graphs. Mouse wheel and dragging operations can be used to easily scroll vertically/horizontally or enlarge/reduce the graph.

Improved Productivity
Corrections and data analysis can be performed automatically using the template function. If specified before taking measurements using the acquisition program, data analysis and report preparation can be performed automatically.

Improved Data Reliability
Sophisticated security and user management functionality are provided to ensure data reliability and enable compliance with FDA 21 CFR Part 11, PIC/S GMP, and other ER/ES regulations.
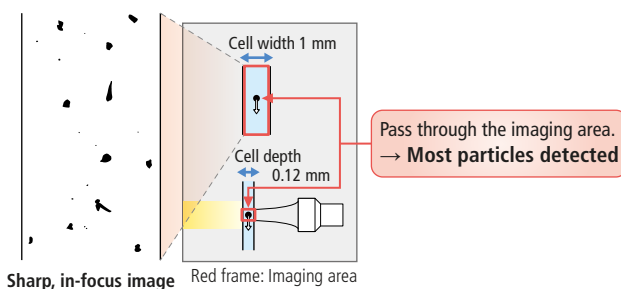
● Compatible with Windows 7 and 10

Dynamic Particle Image Analysis System
iSpect DIA-10

The iSpect DIA-10 combines the particle measurement and image analysis technology that Shimadzu has developed over many years, and can perform particle image analysis, particle shape analysis, particle size distribution measurement, foreign matter detection, and number concentration measurement in as little as 2 minutes with one measurement. Offers functions such as particle counting, particle size measurement, and particle shape measurement in a single system.
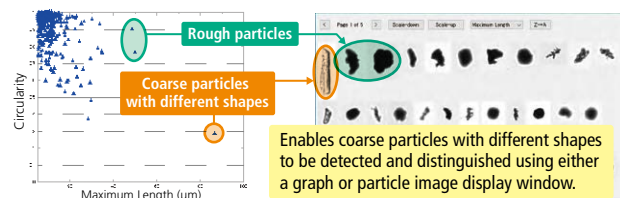
Microcell Method Improves Image Acquisition Efficiency

The microcell method, which increases image acquisition efficiency by passing particles through a narrow imaging area, results in fewer particles passing outside the imaging area (outside the area toward the left or right) and less blurring than the conventional method. Because most particles can be observed, it enables highly reliable particle detection and provides highly reproducible particle count concentration values.

Cell width 1 mm
Cell depth 0.12 mm
Pass through the imaging area.
→ **Most particles detected**

Sharp, in-focus image   Red frame: Imaging area

Detection of Coarse Particles in LIB Cathode Material

This is an example of measuring powder used in LIB cathode material. It shows the system is able to detect trace quantities of coarse particles in the powder material, which can prevent decreased lithium-ion battery performance and safety.

Rough particles
Coarse particles with different shapes
Circularity
Maximum Length (µm)

Enables coarse particles with different shapes to be detected and distinguished using either a graph or particle image display window.

Particle size measurement range	5 to 100 µm
Particle count concentration reproducibility	CV ≤ 5 %
Measurement items	Equivalent circular area diameter, equivalent circular perimeter diameter, maximum length, length perpendicular to maximum length, vertical Feret diameter, horizontal Feret diameter, particle perimeter, envelope perimeter, circularity, aspect ratio, horizontal rectangular envelope aspect ratio, particle area, and mean brightness

Chromatography Systems

Mass Spectrometry Systems
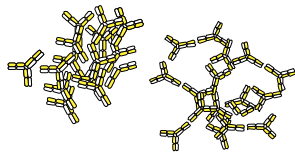
Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

Aggregation Analysis System for Biopharmaceuticals
Aggregates Sizer

Protein aggregates of 100 nm to 10 µm in size which are contained in biopharmaceuticals and are concerned about severe side effects such as shock symptoms can be quantitatively evaluated as the number concentration (number/mL). Furthermore, by applying mechanical stress at a constant temperature (20 to 42 °C), the aggregation process can be shortened and the throughput of protein screening can be greatly enhanced. It can be used for efficiency improvement and quality control of development of antibody drugs, vaccines, clinical testing agents, etc.

Measurement range	40 nm + 20 µm
Measurement temperature	20 to 42 °C (constant temperature)
Batch cell	Sample amount: 5 mL mechanical stimulus can be applied while measuring
Micro cell	Sample amount: 125 µL

Nano Particle Size Analyzer
SALD-7500nano

Delivering 10 times the sensitivity of previous models, this innovative analyzer is capable of continuously measuring changes in particle size and particle size distribution at one-second intervals, within a range spanning 7 nm to 800 µm. In addition, unique options that accommodate the measurement of even high-concentration samples (up to 20 wt%) and trace quantity samples (down to 15 µL) are available. Due to its leading-edge measurement capabilities, the analyzer will likely be used for many applications in new areas, including nanotechnology, the life sciences, and fine bubbles (microscopic bubbles).

| Measurement range	7 nm to 800 µm
Light source	Violet semiconductor laser (405 nm wavelength)
Detection elements	84 elements
Options	Batch cell, multifunction sampler, high-concentration measurement system

Laser Diffraction Particle Size Analyzer
SALD-2300

The new standard in the SALD series. While maintaining continuity and compatibility with respect to the data of the SALD-2000/2100/2200, which were popular, widely distributed models, this instrument is equipped with many new functions useful for evaluating changes (dispersion, aggregation, dissolution) in particle size distribution relative to the concentration or time. 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
Detection elements	84 elements
Options	Multifunctional variable-volume sampler, batch cell, high-concentration sample measurement system, cyclone injection type dry measurement unit

Software for SALD-2300
LabSolutions SALD
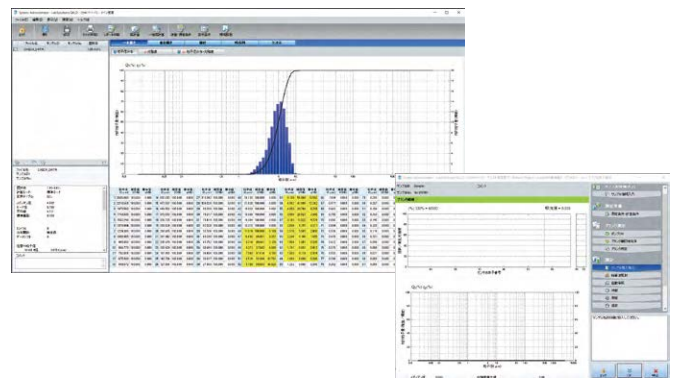
LabSolutions SALD is dedicated software of LabSolutions Manager DB/CS. The SALD-2300 laser diffraction particle size analyzer is now compatible with data integrity requirements. Connecting LabSolutions SALD to the LabSolutions system, with its proven compatibility with ER/ES regulations, enables confident, reliable data management. In addition to SALD data, consolidated management is available for LC, GC, and UV data.
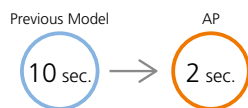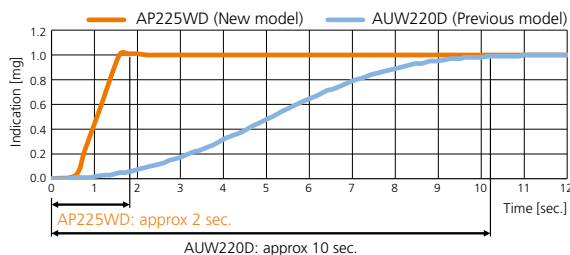
Analytical Balances
AP Series

AP225W-AD

New AP W-AD Series
with Automatic Door

Provides High-Speed Response and High Stability
New automatic door functionality makes
weighing operations even more convenient

Smart Automatic Door* Improves Work Efficiency

The AP W-AD series features automatic doors. That means operators can continue working without setting down samples or spatulas, which can help shorten overall measurement times.

Touchless Sensors* Enable Hygienic Operation

It enables non-contact weighing operations without touching any operating keys. With the multi-function mode setting specified, a total of four different functions can be executed depending on how long hands are held over the left and right touchless sensors. That is perfect for ensuring safety by not contacting the unit when handling toxic substances and enables the balance to be operated smoothly while wearing gloves.

Checking the status of function settings by holding hands over both touchless sensors

Equipped Standard with a STABLO-AP Ionizer*

This ionizer eliminates the influence of static electricity to achieve reliable measurements without requiring tedious steps.
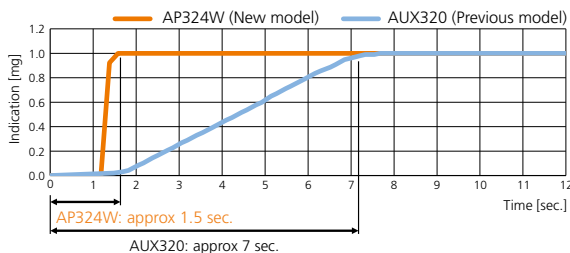
Fast Response with UniBloc AP Technology

The response time is reduced to about 1/5 the time of previous models.

Response During Trace Measurements with the 0.01 mg Model
(Equivalent to 1 mg / With Conditions Set by Shimadzu)

AP225WD: approx 2 sec.
AUW220D: approx 10 sec.

Previous Model → AP
10 sec. → 2 sec.

Response During Trace Measurements with the 0.1 mg Model
(Equivalent to 1 mg / With Conditions Set by Shimadzu)

AP324W: approx 1.5 sec.
AUX320: approx 7 sec.

Previous Model → AP
7 sec. → 1.5 sec.

W-AD Series (with built-in calibration weight) New

Model	Capacity	Minimum Display
AP135W-AD	135 g	0.01 mg
AP225W-AD	220 g	0.01 mg
AP125WD-AD	120 g/52 g	0.1 mg/0.01 mg
AP225WD-AD	220 g/102 g	0.1 mg/0.01 mg
AP224W-AD	220 g	0.1 mg
AP324W-AD	320 g	0.1 mg

W Series (with built-in calibration weight)

Model	Capacity	Minimum Display
AP135W	135 g	0.01 mg
AP225W	220 g	0.01 mg
AP125WD	120 g/52 g	0.1 mg/0.01 mg
AP225WD	220 g/102 g	0.1 mg/0.01 mg
AP124W	120 g	0.1 mg
AP224W	220 g	0.1 mg
AP324W	320 g	0.1 mg

X Series (with built-in calibration weight)

Model	Capacity	Minimum Display
AP124X	120 g	0.1 mg
AP224X	220 g	0.1 mg
AP324X	320 g	0.1 mg

Y Series

Model	Capacity	Minimum Display
AP124Y	120 g	0.1 mg
AP224Y	220 g	0.1 mg
AP324Y	320 g	0.1 mg

* Smart Automatic Door, Touchless Sensors and equipped standard with a STABLO-AP Ionizer are only available in the AP W-AD series.

Chromatography Systems
Mass Spectrometry Systems
Spectroscopy Systems
Life Science Systems
X-ray and Surface Analysis Systems
Environmental Measurement Systems
Material Testing and Non-Destructive Inspection Systems
Physical Properties Measurement Systems

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.

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
AUW120	120 g	0.1 mg
AUW220	220 g	0.1 mg
AUW320	320 g	0.1 mg
AUX120	120 g	0.1 mg
AUX220	220 g	0.1 mg
AUX320	320 g	0.1 mg
AUY120	120 g	0.1 mg
AUY220	220 g	0.1 mg

Analytical Balances
AT-R Series

Even though they are low-cost models, the AT-R Series equipped with the same "UniBloc" technology found in high-end Shimadzu models. They feature highly stable performance, and are capable of highly reliable weight measurements even with extended use. Also equipped with a "smart setting" that can freely switch between responsiveness and stability during measurement, and two interfaces, RS-232C (D-sub 9P plug) and USB device (Type B). The connectivity of external devices such as PCs has been further improved.

Model	Capacity	Minimum Display
ATX84R	82 g	0.1 mg
ATX124R	120 g	0.1 mg
ATX224R	220 g	0.1 mg
ATX324R	320 g	0.1 mg
ATY64R	62 g	0.1 mg
ATY124R	120 g	0.1 mg
ATY224R	220 g	0.1 mg
ATY324R	320 g	0.1 mg

Electronic Balances
UP Series

This is a top-loading balance with the world's fastest class reaction speed. With a cutting-edge digital control technology, their response time when measuring trace quantities has been shortened to approximately 1 second (1/9 of the conventional level), and it greatly increases the weighing operation efficiency. In addition, it uses a highly durable weight sensor "UniBlock" that has passed 1 million endurance tests (10 times the test standard under the Measurement Act), making it safe to use in various weighing situations. Models with a capacity of 2200 g or more are equipped with a newly designed "UP-Wind Break" as standard to reduce the effects of wind from air conditioners, etc. In addition, by attaching an optional animal bucket set and setting the main body to animal measurement mode, it can be used as an animal balance.

UP6202X

Bucket for small animals

UP-X Series (with built-in calibration weight)

Model	Capacity	Minimum Display
UP223X	220 g	0.001 g
UP423X	420 g	0.001 g
UP623X	620 g	0.001 g
UP823X	820 g	0.001 g
UP1023X	1,020 g	0.001 g
UP2202X	2,200 g	0.01 g
UP4202X	4,200 g	0.01 g
UP6202X	6,200 g	0.01 g
UP422X	420 g	0.01 g
UP822X	820 g	0.01 g
UP4201X	4,200 g	0.1 g
UP8201X	8,200 g	0.1 g

UP-Y Series

Model	Capacity	Minimum Display
UP223Y	220 g	0.001 g
UP423Y	420 g	0.001 g
UP623Y	620 g	0.001 g
UP823Y	820 g	0.001 g
UP1023Y	1,020 g	0.001 g
UP2202Y	2,200 g	0.01 g
UP4202Y	4,200 g	0.01 g
UP6202Y	6,200 g	0.01 g
UP422Y	420 g	0.01 g
UP822Y	820 g	0.01 g
UP4201Y	4,200 g	0.1 g
UP8201Y	8,200 g	0.1 g

Electronic Balances
TW-N/TX-N/TXB Series

TW-N/TX-N Series   TXB Series

One-touch operation enables easy adjustments for optimum stability. The product has various functions, including an Expanded Piece Counting function, Illuminated display, anti-theft options, and more.

Model	Capacity	Minimum display	Built-in calibration weight
TW223N	220 g	0.001 g	•
TW323N	320 g	0.001 g	•
TW423N	420 g	0.001 g	•
TX223N	220 g	0.001 g	
TX323N	320 g	0.001 g	
TX423N	420 g	0.001 g	
TX2202N	2,200 g	0.01 g	
TX3202N	3,200 g	0.01 g	
TX4202N	4,200 g	0.01 g	
TXB422L	420 g	0.01 g	
TXB622L	620 g	0.01 g	
TXB4201L	4,200 g	0.1 g	
TXB6201L	6,200 g	0.1 g	

Precision Platform Balances
BW-K/BX-K Series

Animal Balances

The BW-K/BX-K series are capable of measuring heavy objects and can be suspended for measurement by attaching optional hardware. Can be used as an animal balance by attaching a small plate or medium plate.

Model	Capacity	Minimum display	Built-in calibration weight
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	

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

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%

Static Remover (Ionizer)
STABLO-AP

A high-voltage alternating current corona discharge is used to quickly remove static charge without wind within one second. Using an alternating current allows equal quantities of positive and negative ions to be emitted from a single probe. That means ionized samples can be kept electrostatically stable for long periods without applying an opposite charge. Because no wind is necessary for ion emission, there is no risk of scattering powder samples. It can be secured in a stand that is included standard, freely carried in a hand, or installed in an AP series analytical balance.

Static removal range	Approx. 50 to 400 mm from discharge electrode
Ozone concentration	0.06 ppm or less (at 150 mm from the outlet)
Weight	Approx. 710 g (Main unit: Approx. 395 g, Stand: Approx. 315 g)

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

▶

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