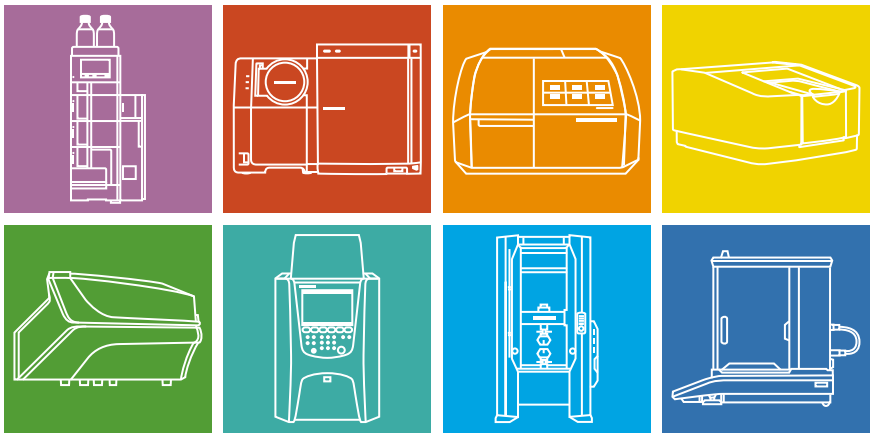
C10G-E050F

SHIMADZU
Excellence in Science

Shimadzu Analytical and Measuring Instruments



2024

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

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, 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, Imaging mass microscope
Manufacturing		Quality control	Balances
		Cleaning validation	TOC, UV, HPLC, LCMS

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

Nexera series →P. 8
Ultra High Performance Liquid Chromatograph

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Preparative Purification Liquid Chromatograph

Headspace Analysis System →P. 26
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

GCMS-TQ8050 NX →P. 25
Triple Quadrupole Gas Chromatograph Mass Spectrometer

TOC-L →P. 44
Total Organic Carbon Analyzer

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

AP Series →P. 61
Analytical Balance

EZ Test →P. 49
Table-Top Universal Testers

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. 30
Imaging Mass Microscope

LCMS-9050 →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. 32
Microchip Electrophoresis System

BioSpec-nano →P. 32
Life Science Spectrophotometer

PPSQ-51A/53A →P. 32
Protein Sequencer

LIGHTNIRS →P. 31
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, 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, XPS, FTIR, SPM
Fuel Cells (Solid PEFC)	Catalyst layers	EDX, FTIR, XPS
	Supported carbons	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

IRXross →P. 36
Fourier Transform Infrared Spectrophotometer

EDX-7200 →P. 41
Energy Dispersive X-ray Fluorescence Spectrometer

SPM-Nanoa →P. 43
Scanning Probe Microscope/ Atomic Force Microscope

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

GCMS-QP2050 →P. 24
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.

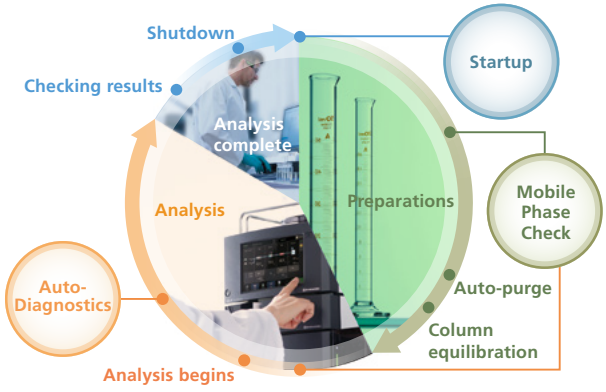
Product

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.



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.

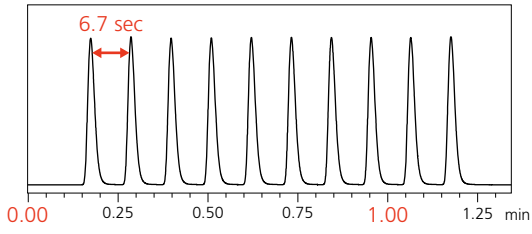
A New Benchmark of Efficiency

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



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

Brochure No. C196-E096

ANALYTICAL INTELLIGENCE

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

Ultra High Performance Liquid Chromatograph

Nexera XS inert

EXPERIENCE NEWFOUND CLARITY

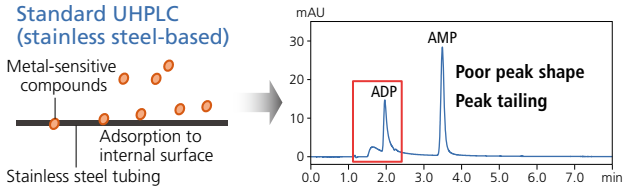
Acquiring highly reliable data with a standard UHPLC system that uses stainless steel parts can be difficult due to the adsorption of small and medium-sized metal-coordinating compounds such as oligonucleotides and compounds with phosphate groups to metal surfaces. Mobile phases with high salt concentrations and extreme pH levels can also lead to the corrosion of stainless steel parts. Nexera XS inert is a UHPLC system (resistant to 105 MPa) that uses non-metal materials in wetted flow lines. This reduces adsorption of metal-coordinating compounds in flow lines and improves peak shapes, thereby improving peak separation, sensitivity, and quantitative accuracy in LC and LC/MS analysis. The use of non-metal materials also eliminates the risk of flow line corrosion by mobile phases and resolves system durability issues. The optional pHM-40 pH monitor stores mobile phase pH data gathered in real-time as a data file for even greater data reliability and traceability.

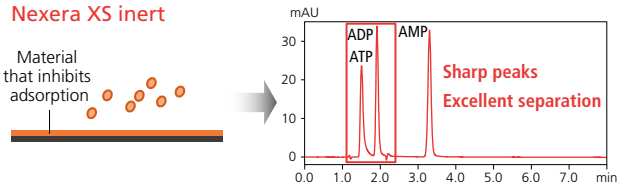
Major component units	SCL-40, LC-40D XSi, SIL-40C XSi, CTO-40S, SPD-M40, Low pressure gradient unit, pHM-40, LabSolutions LC, and others

Brochure No. **C190-E275**

Product

Assured Reliability and Reproducibility





High Performance Liquid Chromatograph

Nexera lite inert

Nexera lite inert is an HPLC system (up to 20 MPa with aqueous mobile phases) that produces reliable data for size exclusion chromatography and ion exchange chromatography even when running mobile phases with high concentration haloid salts and using methods with extreme mobile phase pH levels. HPLC systems with stainless steel parts must be cleaned immediately with pure water after running these types of mobile phases, but Nexera lite inert uses non-metal materials in wetted flow lines, thereby preventing rust-related issues and ensuring stable long-term operation. The use of non-metal materials in flow lines also prevents the adsorption of metal-coordinating compounds and helps improve peak shapes and peak separation. Nexera lite inert supports a wide variety of system configurations for high-pressure and low-pressure gradients, mobile phase blending, and other conditions.

Major component units	CBM-40lite, LC-40i, DGU-403, SIL-20AC (inert kit), CTO-40C, SPD-40, LabSolutions LC, and others

Brochure No. **C190-E292**

Ultra High Performance Liquid Chromatograph Nexera

Method Scouting System

Nexera Method Scouting System is constructed with the objective of automating and shortening the time required for the analysis method development process. With this system, data is automatically acquired using a maximum of 192 (16 times 12) method combinations based on 16 (4 times 4) mobile phase solvents and 12 columns. This enables a comprehensive investigation of analysis conditions while shortening the total time required for method searches. Using the mobile phase blending function to investigate mobile phase composition and FlowPilot to protect the column during automated equilibration significantly improve the efficiency and reliability of your analytical method development.

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

• Configuration also possible with Nexera XS inert

Brochure No. **C190-E216**

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

Brochure No. **C190-E092**

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

Brochure No. **C190-E214**

Ultra High Speed LCMS System for Multiplex Analysis

Nexera MX

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

Brochure No. **C190-E190**

Comprehensive Two-Dimensional Liquid Chromatograph

Nexera-e

Comprehensive 2D-LC methodology is a paradigm shift in liquid chromatography separation. By combining two independent separation modes orthogonally in combination with a dual-loop/dual-valve alternate switching design, the highest possible peak capacity is achieved. The new Nexera-e is the ideal solution for the separation and characterization of most challenging and complex samples. It enables comprehensive data collection by analyzing at an extremely low flow rate in the first dimension and ultra-high speed in the second dimension. The Nexera is equipped with the "Auto-Diagnostic" function, which monitors baseline changes and pressure fluctuations to check for abnormalities. When it detects an unusual fluctuation, it can automatically pause the analysis. This feature prevents the loss of valuable samples due to abnormal pumping. It provides exceptionally high separation not possible with conventional HPLC systems, so that target components can be accurately detected in complex samples, such as impurities in pharmaceuticals, enzyme digested substances from proteins, natural substances, including food extracts, and synthetic polymers.

Brochure No. **C190-E172**

Nexera Application System

Reducing Sugar Analysis System

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

Brochure No. **C190-E279**

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

Brochure No. **C197-E003**

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

Brochure No. **C193-E034**

Supercritical Fluid Extraction/Chromatography System

Nexera UC/s: SFC/UHPLC Switching System

By simply adding one UHPLC 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 UHPLC system for analyzing in the normal way, it can also be used for samples that are difficult to separate by UHPLC to evaluate analytical conditions for SFC analysis, which offers a different separation mode than UHPLC. 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

Brochure No. **C190-E288**

Semi-Preparative Supercritical Fluid Chromatography System

Nexera UC Prep

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

Brochure No. **C190-E288**

High Performance Liquid Chromatograph

i-Series

LC-2050/LC-2060

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

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

ANALYTICAL INTELLIGENCE

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.

Finally, an LC as Smart and Flexible as You.

Product

intuitive

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.

Brochure No. **C196-E098**

High Performance Liquid Chromatograph

i-Series Method Transfer System

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.

Brochure No. **C190-E269**

High Performance Liquid Chromatograph System

LC-2030C NT

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.

Brochure No. **C190-E259**

HPLC columns

Shim-pack Scepter series

CoreFocus

The Shim-pack Scepter series utilizes an organo-silica hybrid material for the packing material, offering superior performance and durability over a wider range of analytical conditions than conventional silica particle-type columns, and includes 8 different column chemistries for selectivity (including seven RP and one HILIC). It demonstrates its effectiveness in method development and allows for the selection of columns suitable for various applications. Additionally, with a wide range of particle sizes available, seamless method transfer between UHPLC, analytical HPLC, and preparative HPLC is possible. The column bodies are available in three types: the standard stainless-steel type, the metal-free type using PEEK, and the bioinert type with a special adsorption suppression treatment.

Stationary phases	C18-120, C18-300, HD-C18-80, C8-120, C4-300, Phenyl, PFPP, Diol
Particle diameter	1.9 µm, 3.0 µm, 5.0 µm
Column I. D.	2.1 mm, 3.0 mm, 4.6 mm

Brochure No. **C190-E221**

Packed Columns for Supercritical Fluid Chromatography

Shim-pack UC series

CoreFocus

When conducting analysis with the Nexera UC supercritical fluid chromatography system, because diffusion of the sample band in the mobile phase is high compared to liquid chromatography, separation behavior changes significantly depending on the types of columns used. The Shim-pack UC series was designed to meet diverse research and development needs with 20 types of stationary phases and sizes. It enables a wider range of analysis than other companies' SFC columns and, in addition, there are 12 types of stationary phases with preparative sizes. Column scouting is effective by using a set of 6 columns, each providing a different separation selectivity.

Stationary phases	C18, Sil, Diol, Polybutylene terephthalate, Poly(4-vinylpyridine), Penta bromobenzyl, etc. (20 types in total) Above is the contents of a 6 columns set.
Particle diameter	3.0 µm, 5.0 µm
Column I. D.	2.1 mm, 3.0 mm, 4.6 mm, 10 mm, 20 mm

Brochure No. **C190-E251**

Gas Chromatograph

Nexis GC-2030

This high-end Shimadzu GC model provides the world's highest level* of sensitivity and analysis repeatability. It is equipped with a large color touch panel as well as ClickTek, which enables tool-free maintenance of the injection port/columns, thereby improving usability. Multiple units of the latest electronic flow controllers can be installed simultaneously, and a single GC can be configured with multiple pretreatment units and analysis lines, thereby maximizing analysis throughput in laboratories.

* 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. 970 kPa, Flow rate: 1,300 mL/min
Sample injector	Split/splitless, direct, on-column, programmable temperature vaporizer
Detectors	FID, TCD, BID, FTD, FPD, ECD
Display	Color touch panel

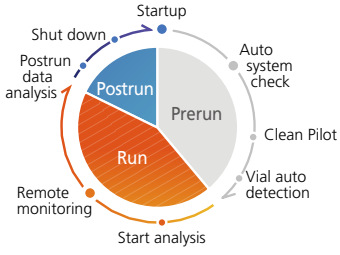
Brochure No. **C184-E043**

Nexis GC-2030 Brevis GC-2050

DESIGN AWARD 2024

Automation of Analysis and Simplification of Maintenance

With Remote Display and LabSolutions Direct, GC systems can be accessed from anywhere with a smart device or a PC, simplifying the analytical workflow. With Shimadzu's proprietary ClickTek, during maintenance of the injection port and column installation, the parts click into place manually, without the use of tools. In addition, the installed oven light fully illuminates the area at hand, increasing the efficiency of tasks inside the oven.



ClickTek Nut lever

Column connecter

New Gas Chromatograph

Brevis GC-2050

"Smaller, simpler, and easier to use — without compromising performance." That's the demand from analysts. And that's why Shimadzu developed the Brevis GC-2050. This new space-saving GC delivers uncompromising analytical performance in a modern yet rugged design, easily meeting the analysis needs of laboratories in a range of industries.

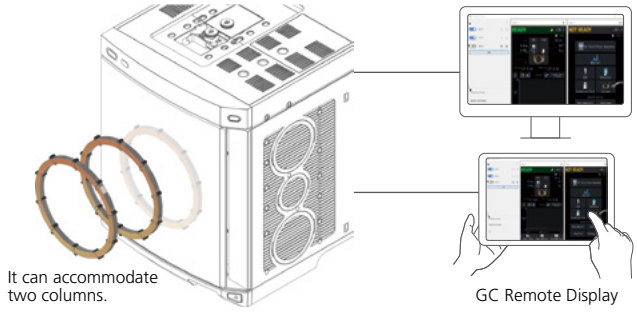
Column temperature	Max. 450 °C (Room temperature + 4 °C)
Carrier gas control	Constant linear speed control, constant flow rate control, constant pressure control possible Pressure: Max. 970 kPa, Flow rate: 1,300 mL/min
Sample injector	Split/splitless Support for other sample injection units will be added sequentially.
Detectors	FID, FPD, ECD Support for other detectors will be added.
Display	Color touch panel, capable of displaying chromatograms

Brochure No. **C184-E050**

Brevis — Compact without Compromise

Thanks to its power saving design, the instrument provides a 30 % reduction in power consumption in comparison to conventional Shimadzu models. Despite its compact size, the Brevis GC-2050 does not require special columns, and two ordinary capillary columns can be used. Even if the Brevis GC-2050 does not have a monitor, the GC Remote Display* on your smart device or PC can be used to check instrument status, manage daily maintenance procedures, watch videos, etc.

* Also scheduled for compatibility with the Nexis GC-2030



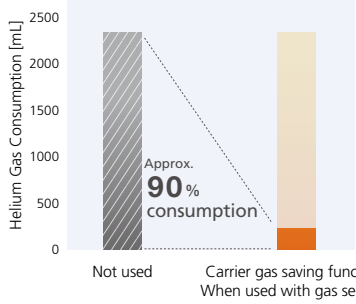
It can accommodate two columns.

GC Remote Display

Immediate Support for Gas Savings and Operation with Alternative Carrier Gases

The amount of helium gas used can be reduced by combining the carrier gas saving function with a gas selector* that automatically switches to an alternative gas during standby. In addition, both the Nexis and Brevis feature an integrated hydrogen sensor*, so potential leaks can be detected at an early stage, heightening the safety of hydrogen gas operations.

* Gas selector and hydrogen sensor are options.



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)

Brochure No. **C184-E048**

Auto Injector/Auto Sampler for GC/GC-MS

AOC Series

AOC-20s U AOC-30i

reddot winner 2022

DESIGN AWARD 2022

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

Brochure No. **AOC-30 series C180-E096**
AOC-20i/20s C189-E021

GC Application System

Headspace Analysis System

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.

* As of August 2021, according to a Shimadzu survey

Applicable models	Nexis GC-2030, GC-2010 Plus/2010, GC-2014
Number of vials	90
Vial stirring	5-stage

Brochure No. **C180-E094**

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.)

Brochure No. **C184-E030**

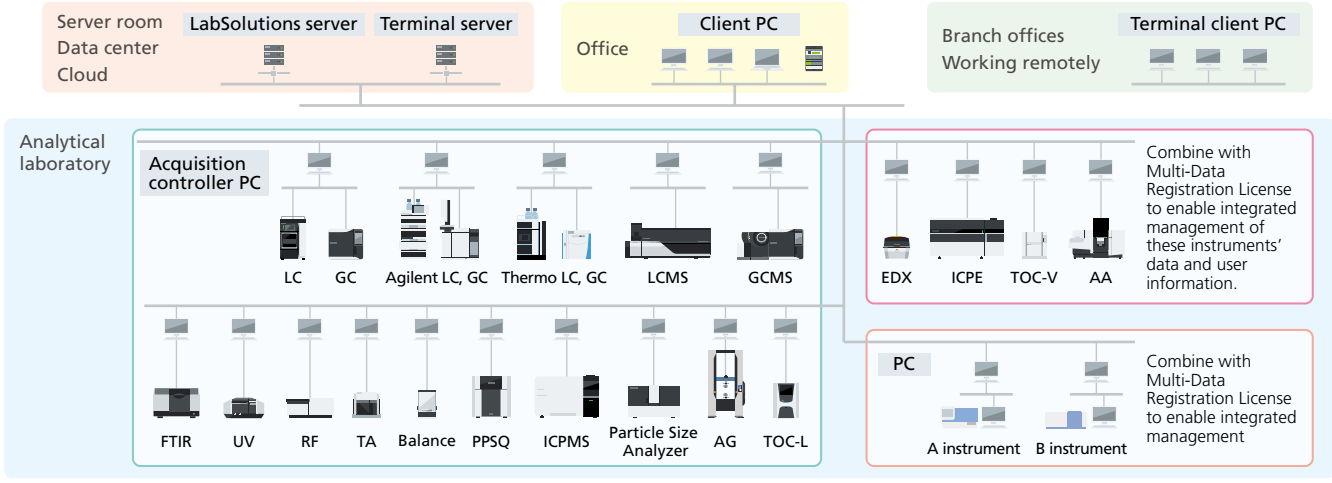
Analytical Network Data System

LabSolutions

LabSolutions features an innovative operating environment and provides complete data management to ensure secure information in networked laboratories.

The LabSolutions series of integrated workstation software controls a wide variety of analytical instruments and performs data management. Software is sometimes complex, but the LabSolutions series offers superior ease of use and a highly reliable system environment with solutions for a variety of issues encountered in the analytical laboratory.

Brochure No. **C191-E018**



Provides Flexible Support for Diversifying Laboratory Operations

LabSolutions LC/GC is a file-based standalone system for simultaneous instrument control and data analysis of up to four HPLC and GC units from a single PC. LabSolutions LC/GC offers integrated control over data acquisition, analysis, and reporting, providing an intuitive operating environment that is easy to master. LabSolutions Direct facilitates the control and monitoring of HPLC and GC units from personal smartphones and tablet PCs, allowing you to check the status of instruments during analysis while out of the laboratory.

LabSolutions DB and CS use databases to enable centralized management of various analytical data and conform to ER/ES Regulations. In particular, they offer powerful support for ensuring data integrity, such as by preventing data tampering, and compliance with regulatory requirements.

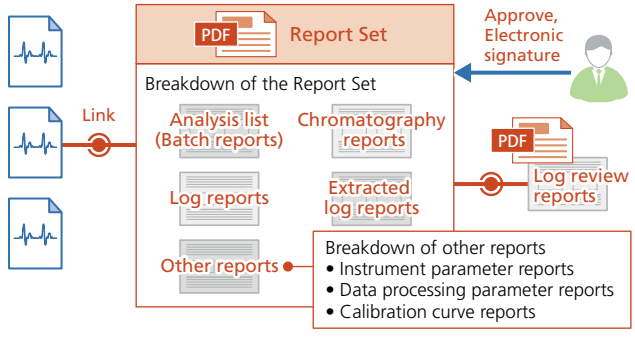
LabSolutions DB offers these regulatory compliance features in a standalone system for even a single instrument.

LabSolutions CS is a network system that uses a database on a server to enable centralized management of various analytical data. It can be used to remotely control HPLC, GC, LCMS, and GCMS units from respective client computers and analyze data from multiple models. It can also directly control Agilent Technologies and Thermo Fisher Scientific brand HPLC and GC units and load data from non-Shimadzu instruments. By linking to various cloud (IaaS) or host systems, it can also support various remote function that achieve more efficient operation by accommodating increasingly diverse laboratory needs.

Report Set Functionality Improves Data Reliability and Increases Operating Efficiency

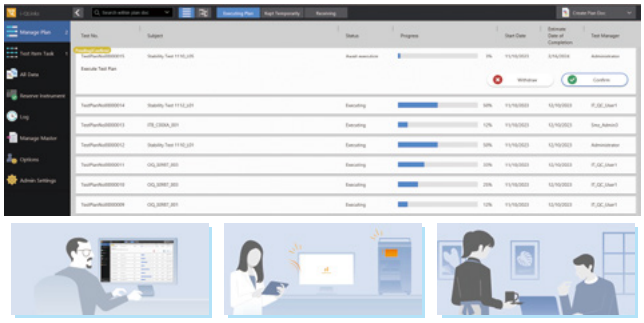
Report set is unique LabSolutions functionality that prepares a PDF file (report set) that combines analytical information, results, and conditions from a series of analyses (batch analyses) with a log of all operations, from beginning to end, performed during corresponding analytical operations. Creating the report set links the results from a series of analyses to prevent alterations or tampering and allows the information, operation log, and analytical results related to the analyses to be reviewed as a single report. By prespecifying log events that need to be reviewed, the report set functionality can automatically extract all corresponding log events for more efficiently complying with increasingly strict regulatory requirements. The functionality also supports saving a record of checking analytical results or log events and using electronic signatures to achieve paperless operations and improve efficiency.

Brochure No. **C191-E047**



Test Information Management System

LabSolutions i-QLinks



Switching to Digital Technology Helps Prevent Human Errors

Integrated System Increases Productivity

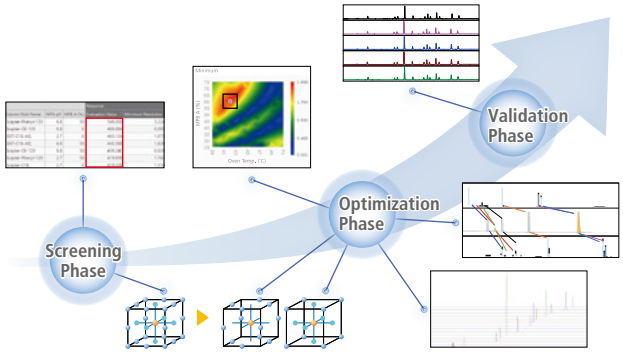
Achieves Flexible Work Styles

LabSolutions i-QLinks is a web-based system that enables integrated management of various analytical laboratory quality testing operations, such as creating test plans or test procedures, loading test results from HPLC systems or other analytical instruments, automatically creating test reports from loaded test results, and managing the progress of quality tests. LabSolutions i-QLinks can be used via a browser interface, without having to install any software on the personal computers of individual users. Working in seamless coordination with LabSolutions CS software, it can create analysis sequences based on test information in i-QLinks, automatically forward data acquired by analytical instruments, and create test reports. That enables all test information, ranging from test parameters and analysis sequences to raw test data, to be managed centrally in one location for compliance with data integrity requirements. Such features ensure the reliability of quality testing operations and can dramatically increase work efficiency.

Brochure No. **C191-E000**

Solution for Method Development and Analytical Quality by Design

LabSolutions MD

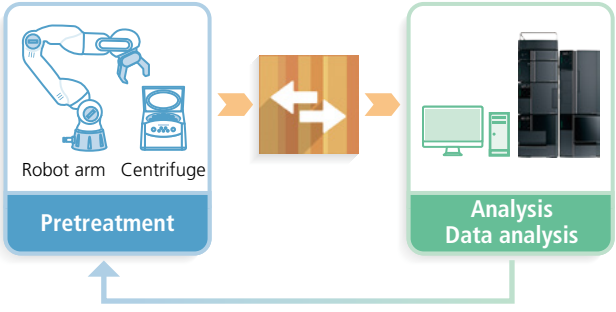


Based on Analytical Quality by Design (AQbD), a method for evaluating and verifying analytical methods by clarifying the development process and rationale, LabSolutions MD streamlines the method development workflow from data acquisition using the experimental design method to visualization using the design space, enabling the development of optimal analytical methods even by non-expert users. This software efficiently develops highly reliable analysis methods by configuring mobile phases, columns, and other parameters using an analysis function that automatically generates analysis schedules with the experimental design method and a data analysis function that plots a design space and predicted chromatogram.

Brochure No. **C190-E278, C190-E308**

LabSolutions External Control Software

LabSolutions Sync



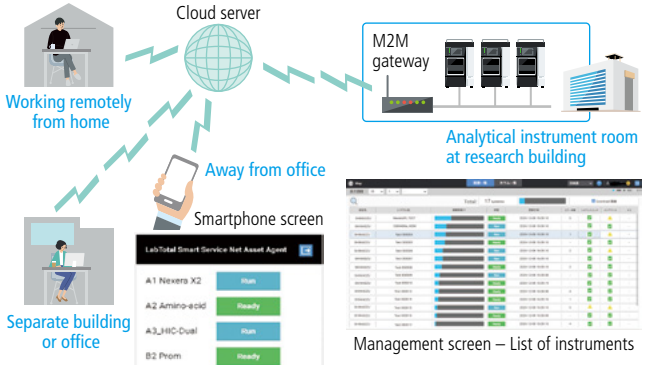
LabSolutions Sync synchronizes third-party software for pretreatment units with LabSolutions Realtime Batch and status information, enabling automation of systems, including pretreatment units. As a result, the entire laboratory workflow can be automated, leading to overall labor savings and cost reductions. This program synchronizes with batch files output by third-party software for pretreatment units, and implements LabSolutions batch analyses automatically. In addition, Shimadzu LC or LC-MS systems can be shut down automatically and the status of each instrument is also synchronized, enabling detailed system synchronization.

Compatible models	LC: CBM-20A, CBM-40, SCL-40, i-Series, LH-40, FRC-40 LC-MS: LCMS-2020, LCMS-2050

Brochure No. **C191-E053**

Remote Maintenance

LabTotal Smart Service Net



Smart Service Net is a system for quickly and efficiently managing laboratory instruments by using IoT technology to gather information about the operating status of HPLC systems in analytical laboratories in a cloud server. It can be used to remotely monitor the operating status of instruments throughout the entire laboratory in order to check the operating status of instruments or the status of active errors. Laboratory status information can be confirmed at any time, either from a computer or smart device, without having to install any specialized software. If an error occurs, Smart Service Net automatically sends a notification to the registered email address, which is also helpful for working remotely.

Liquid Chromatograph Mass Spectrometer

LCMS-2050

SIMPLY EFFORTLESS

The LCMS-2050 is a single quadrupole liquid chromatograph mass spectrometer (LC-MS) that is easy to use, high in basic performance, and compact. The LabSolutions LCMS workstation for the LCMS-2050 delivers streamlined instrument control and sophisticated data analysis using Analytical Intelligence.

Mass range	*m/z* 2 to 2,000
Resolution	0.7 u
Scan speed	Max. 5,000 u/sec
Positive–negative ion polarity switching time	10 ms

Note: LC units are not included with this product.

Brochure No. **C146-E442**

reddot winner 2023

ANALYTICAL INTELLIGENCE

Product

Seamless integration with LC by design

Nexera series

LCMS-2050

We pursued ease of use as an LC detector in all aspects of the instrument design, instrument control, and analysis data. As with other LC detectors, It can be integrated into any Shimadzu LC architecture, whether it is a high-throughput analytical system, a preparative LC with fraction collection, or even a legacy model. And it as simple to use as other LC detectors. Only the simplest of acquisition parameters are required to obtain reliable and sensitive detection.

Superior detection for added confidence

The LCMS-2050 provides the fastest performance, with a scan speed of 15,000 u/sec and a positive/negative ion switching speed of 10 msec. The LCMS-2050 is equipped with the newly developed Heated Dual Ion Source (Heated DUIS) as the standard configuration. This hybrid source combines the benefits of electrospray ionization (ESI) and atmospheric pressure chemical ionization (APCI), two orthogonal techniques widely used in mass spectrometry.

Streamlined operation for cost efficiency

Equipped with eco-friendly functions, it reduces energy by 43 % compared to the LCMS-2020. The system not only limits running costs during analysis, but contributes to realizing a carbon-free society by limiting CO_2 emissions.

Liquid Chromatograph Triple Quadrupole Mass Spectrometer

LCMS-8060NX

Enhanced performance

Sensitivity and Robustness

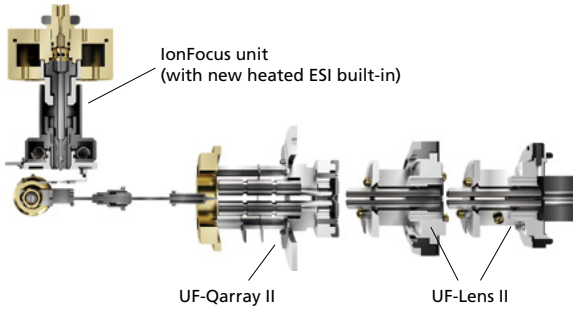
The LCMS-8060NX is a triple quadrupole mass spectrometer with world-class sensitivity and detection speeds. It boasts increased robustness and ease of use as well as Analytical Intelligence functions to maximize your laboratory's output.

ANALYTICAL INTELLIGENCE

Product

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.



ANALYTICAL INTELLIGENCE

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

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.

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.

Brochure No. **C146-E410**

Liquid Chromatograph Triple Quadrupole Mass Spectrometer

LCMS-8050

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.

Brochure No. **C146-E232**

Liquid Chromatograph Triple Quadrupole Mass Spectrometer

LCMS-8045

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 scan speed (30,000 u/sec) and polarity switching speed (5 msec). These enable ultra-high-speed, high-sensitivity analysis.

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.

Brochure No. **C146-E321**

Quadrupole Time-of-Flight Liquid Chromatograph Mass Spectrometer

LCMS-9050

The LCMS-9050 quadrupole time-of-flight mass spectrometer inherits the world-class mass accuracy and stability of the LCMS-9030 while incorporating newly developed UFstabilization technology for simultaneous positive ion/negative ion analysis with high mass accuracy at even higher speeds. Ease of use is evident throughout the system from mass calibration to maintenance, allowing the LCMS-9050 to be used easily in any scenario that requires accurate mass spectrometry.

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 : 45,000 FWHM at *m/z* 1,972 ESI negative: 45,000 FWHM at *m/z* 1,626
Mass accuracy	Unipolarity Analysis (MS mode): <1ppm at m/z 622.5662 Polarity switching analysis (MS mode): <5ppm at *m/z* 922.3547 switching speed 800 msec
Maximum acquisition rate	MS/MS mode up to 200 Hz (200 MS/MS spectra per second)

Note: LC units are not included with this product.

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.

* As of June 2018, according to a Shimadzu survey

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.

Brochure No. **C146-E365**

New

Quadrupole Time-of-Flight Liquid Chromatograph Mass Spectrometer

OAD-TOF system

Radicalize Your Mass Spectrometer

to Solve Unanswered Questions

The OAD-TOF system is a Q-TOF LCMS that realizes OAD (Oxygen Attachment Dissociation), Shimadzu's proprietary fragmentation technology. It allows the analysis of the position of carbon–carbon double bonds in lipids and other organic compounds.

Neutral radical fragmentation

The OAD-TOF system can measure fragment ions that cannot be obtained by conventional collision-induced dissociation (CID), where ions are fragmented by collision with an inert gas such as argon or nitrogen.

Simple, reliable results

The OAD-TOF system can easily switch between OAD and CID for analysis. The high mass accuracy achieved with the LCMS-9050 remains unchanged even with OAD.

Endless possibilities to meet diverse needs

The OAD-TOF system can be used in combination with various options such as DPiMS and Nexera UC compatible with the LCMS-9050. Each optional unit can also be easily combined or replaced with an OAD-TOF system.

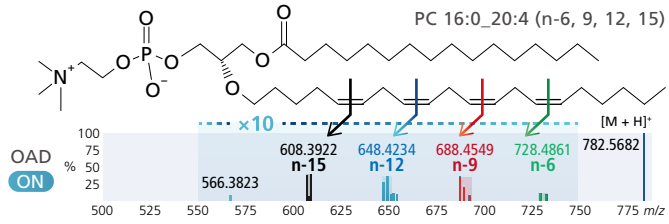
Radical generation method	Microwave plasma
Radical source gas	Water vapor (< 1 cc/min), hydrogen gas (<1 cc/min)
Dissociation method	OAD/CID (Switching depends on the measurement method)
Radicals	Hydrogen radicals, oxygen radicals, hydroxyl radicals, etc.
CID gas	Argon

Brochure No. **C146-E481**

Product

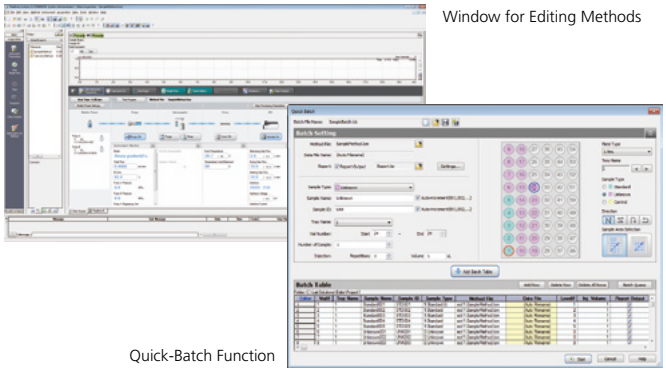
What is OAD?

CID preferentially dissociates weak chemical bonds. In the case of lipids, CID can determine the basic structure of lipids and polar groups, and the carbon composition of side chains (number of carbons and double bonds). With OAD, on the other hand, oxygen radicals react specifically with the double bonds between carbons, causing dissociation. By measuring fragment ions specific to the double bond, the position of the double bond can be determined.



Workstation Software for LCMS Systems

LabSolutions LCMS

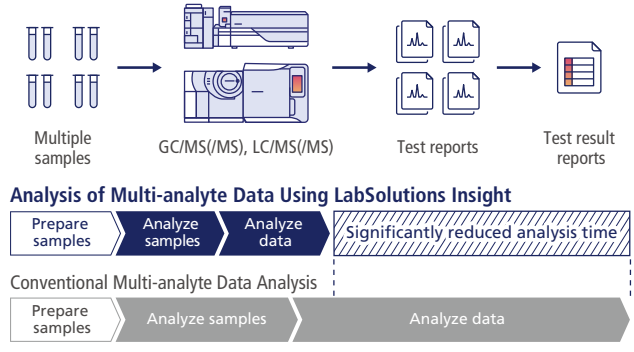


LabSolutions LCMS is used for LCMS-9050/9030/8060NX/8050/8045/2050 system control, data acquisition, and data analysis. In addition to simultaneous LC control, data acquisition, and data analysis, it also supports sophisticated application functionality, such as for co-injection and expansion to a method 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

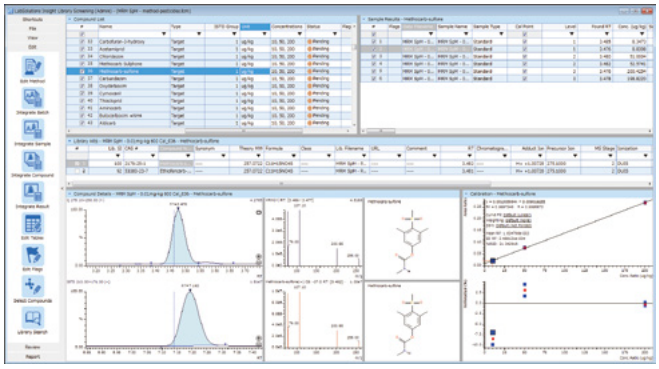


LabSolutions Insight provides tools to streamline data review and focus on the chromatograms that need critical attention. LabSolutions Insight automatically applies your peak detection criteria to data and flags any deviations, allowing you to analyze data more efficiently. Reduce your data review bottleneck with Insight's customizable review screens and automated QA/QC flagging. Combined with Shimadzu's ultra-high-speed acquisition, a complete solution is offered to the high-throughput mass spectrometry laboratory. By using LabSolutions Insight with Shimadzu's GC/MS(/MS) and LC/MS(/MS), the time needed to acquire and analyze data can be significantly shortened and quality data can be easily created. Furthermore, LabSolutions Insight can be equipped with a wide range of options, such as compound identification workflows, peak detection using AI, and special software that enables compliance with environmental regulations.

Brochure No. **C146-E346**

Optional Software for LabSolutions Insight LC/MS/MS

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

Brochure No. **C146-E419**

Optional Software for LabSolutions Insight LC/MS/MS

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.

Software for Oligonucleotide Characterization

LabSolutions Insight Biologics

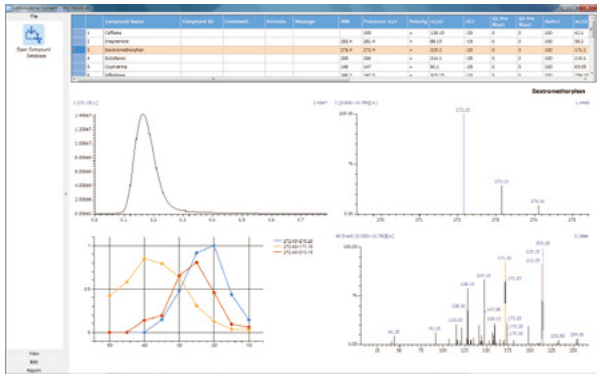
New

LabSolutions Insight Biologics is a dedicated software platform for oligonucleotide characterization using the LCMS-9030 or LCMS-9050 quadrupole time-of-flight type (Q-TOF) mass spectrometer. Biologics provides an easy method to input sequence information, configure target modifications, and set data analysis parameters. Using sequence information, Biologics comprehensively identifies chain length differences, nucleotide gaps, modifications, conversions, adducts, and other impurities. In the window for setting the oligonucleotide sequences, the structural formula of the sequence that was entered is displayed in real time, enabling quick and easy verification of the information. The software includes a coverage display which indicates fragment spectral assignments. The coverage display switches to match the items to be checked. Reports can also be output.

Brochure No. **C146-E475**

Analysis Software for LCMS-8060NX/8050/8045

LabSolutions Connect MRM



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.

Open Access Software for LC and LCMS

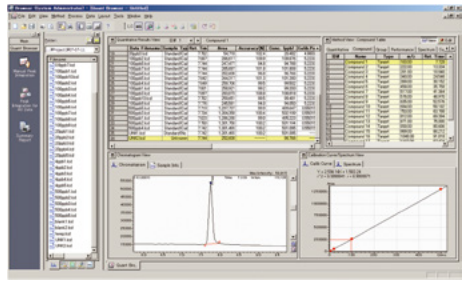
Open Solution

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. 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. From displaying a summary of chromatograms and spectra for checking data to creating reports, Open Solution enables simple operations to be performed via Data Browser. It also includes functionality for scaling up from analytical to preparative flowrates. In addition to automatically generating preparative parameter settings based on analytical results, it can also recognize impurity peaks and indicate whether to start preparative separation in three color-coded stages. Checking preparative separation results in Data Browser makes it easy to quickly determine the fractions where specific chromatogram peaks are included.

Note: LCMS-9030/9050, LCMS-2010 series, LCMS-QP8000 series, and LCMS-IT-TOF systems are not supported.

For LabSolutions LCMS

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.

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	144 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
PFAS in Drinking Water	52 compounds
Glycosaminoglycans	6 glycosaminoglycans
Reactive Sulfur Profiling	17 sulfur-containing metabolites
Steroid Hormones	20 components
Sugars and Sugar Nucleotides	34 compounds

Brochure No. **C10G-E094**

LC/MS, GC/MS Data Analysis Software

Multi-omics Analysis Package

The Multi-omics Analysis Package is metabolic engineering software that can automatically generate metabolic maps and perform a variety of data analysis based on the vast amounts of mass spectrometry data generated in fields such as metabolomics, proteomics, and flux analysis. In conjunction with the various method packages and databases offered by Shimadzu for metabolomic analysis, the Multi-omics Analysis Package can help increase the efficiency of metabolomic data analysis work. It makes it easy to use volcano plots for comparing two groups, principal component analysis (PCA) for comparing multiple groups, hierarchical clustering analysis (HCA), and box plots. Linked PCA, HCA, and box plot results can be displayed in the same window to conveniently identify significant compounds. The metabolic map can be enlarged to confirm where identified compounds are located on the map and to support confirming and interpreting the data. The intuitive visualization of data provides powerful support for drug discovery, functionally enhanced foods, bioengineering, and other life science research applications.

Brochure No. **C146-E385**

Supporting Micro Flowrate Range Liquid Chromatograph Mass Spectrometer System

Nexera Mikros

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

Brochure No. **C146-E350**

Kit for Direct Probe Ionization Mass Spectrometer

DPiMS QT

DPiMS QT + LCMS-9030

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.

DPiMS QT controller	Control of the DPiMS QT unit (Installed in the mass spectrometer)
DPiMS QT unit	Probe voltage: ±5 kV max. (set voltage) Probe stroke: 46.30 mm max.

Brochure No. **C146-E440**

Kit for Direct Probe Ionization Mass Spectrometer

DPiMS-8060

DPiMS-8060 + LCMS-8060NX

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

Brochure No. **C146-E369**

Fully Automated Sample Preparation Module for LC-MS

CLAM-2040

Pave the way for the future of clinical research.

Operational improvements in LC-MS systems have made LC/MS an advantageous technique for clinical research, thanks to its specificity, its accuracy and its capability to analyze several targets simultaneously. The CLAM-2040 is an online automated sample preparation module that brings LC-MS smoothly into your laboratory. The CLAM-2040 accompanies you on most of the analytical workflow and improves your overall throughput by drastically reducing the sample preparation time. Simply place the blood tubes in position and the CLAM-2040 performs the next steps automatically, from sample extraction up to LC/MS analysis and data processing. It can be connected to the LCMS-9050/9030/8060NX/8060/8050/8045/8040 systems.

Volume in preparation vial	350 µL maximum
Preparation functions	Sample dispensing, reagent dispensing, shaking, suction filtration and heating *Up to 20 steps can be set in a protocol.
Sample handling	Multiple sample preparations overlap.
Onboard preparation vial capacity	Up to 60 filter vials and 60 collection vials

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

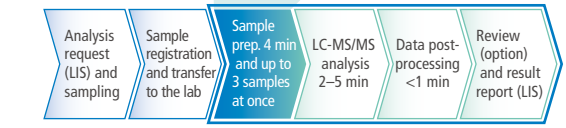
Brochure No. **C146-E469**

Product

Typical LC/MS analysis workflow in the clinical research laboratory.

One result every 12 to 60 min.

CLAM-2040 + LC/MS improved analysis workflow.



These steps are managed by the CLAM-2040 and LC-MS instrument.

One result every 2.6 min.

New

Gas Chromatograph Mass Spectrometer

GCMS-QP2050

Excellence Redefined

The business environments and needs involved in analysis work change on a continual basis. The next-generation GCMS-QP2050 gas chromatograph mass spectrometer, with its accumulation of impressive Shimadzu technology, will lead the way forward. New value is provided by hardware boasting astounding reliability and stability, and easy-to-operate software equipped with superior automated technology.

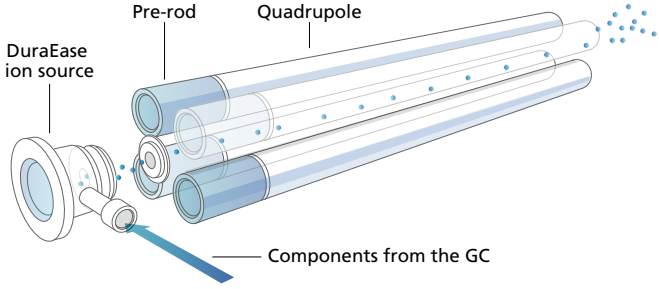
Mass range	*m/z* 1.5 to 1,090
Possible setting of FWHM	0.4 to 2.0 u
EI scan S/N	1 pg Octafluoronaphthalene *m/z* 272 S/N ≥ 1,500 S/N ≥ 5,000
High-speed scan rate	30,000 u/sec

Brochure No. **C146-E476**

Robust Engineering Minimizes Maintenance

Contamination-Resistant Ion Optical System

A contamination-resistant ion optical system in the GCMS-QP2050 keeps the frequency of maintenance to a minimum while also enabling highly reliable measurements to be performed for an extended period.



DuraEase Ion Source

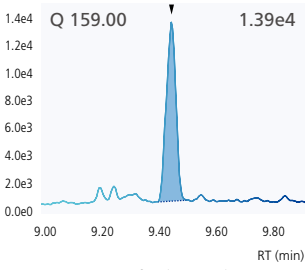
The structure of the next-generation DuraEase ion source is inert and achieves a uniform temperature distribution, resulting in high sensitivity and exceptional durability.

Long-Life Filament

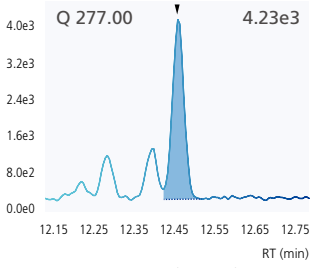
The newly developed long-life filament has an operating life at least five times longer than conventional filaments. There are no concerns about re-analysis or downtime due to sudden filament burnout.

Quadrupole Rods with Pre-Rod

The built-in pre-rod allows only the ions to efficiently pass through, limiting contamination of the quadrupole. In addition, because heating to prevent contamination is not required, it is maintenance-free.



Cadusafos (3 pg/µL)

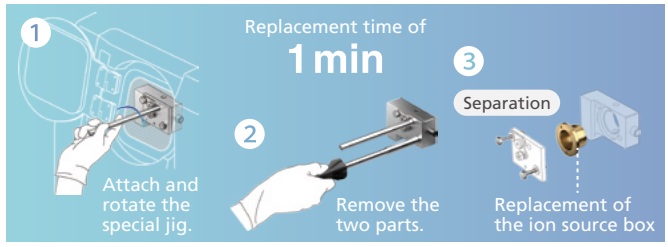


Fenitrothion (3 pg/µL)

Easy Maintenance

Ion Source Maintenance Takes Just One Minute

The DuraEase ion source completely re-imagines the conventional ion source to enable more convenient maintenance. The ion source is disposable and no cleaning is required, so maintenance is finished in just one minute.



Easy Startup and Shutdown from the Touch Panel

The vacuum system can be turned ON/OFF and Easy sTop can be performed from the GC touch panel. Operations from a personal computer are not required, so maintenance of the GC injection port, column, and ion source can proceed with ease.

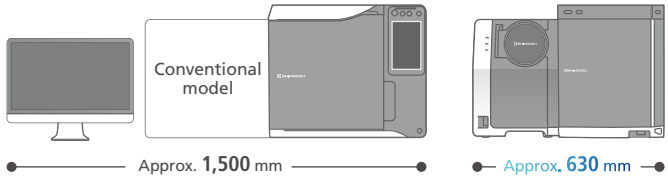
A Flexible Fit for Laboratories

Remote System Access

The system can be operated from a personal computer or tablet on the network via a LAN connection. Additionally, analysis and instrument status can be checked while away from the laboratory.

Compact Design Fits Anywhere

The GCMS-QP2050 saves on space. With remote access, there is no need to install a personal computer beside the instrument. This enables a flexible layout in the laboratory.



Triple Quadrupole Gas Chromatograph Mass Spectrometer

GCMS-TQ8050 NX

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.

Mass range	*m/z* 10 to 1,090
Mass resolution	0.4 to 3.0 u (FWHM)
EI scan S/N	1 pg Octafluoronaphthalene *m/z* 272 S/N ≥ 2,000 (helium gas)
Scan rate	20,000 u/second
Maximum MRM speed	800 MRM transitions/second

Brochure No. **C146-E363**

Triple Quadrupole Gas Chromatograph Mass Spectrometer

GCMS-TQ8040 NX

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.

Mass range	*m/z* 10 to 1,090
Mass resolution	0.4 to 3.0 u (FWHM)
EI scan S/N	1 pg Octafluoronaphthalene *m/z* 272 S/N ≥ 1,500 (helium gas)
Scan rate	20,000 u/second
Maximum MRM speed	800 MRM transitions/sec

Brochure No. **C146-E366**

Gas Chromatograph Mass Spectrometer

GCMS-QP2020 NX

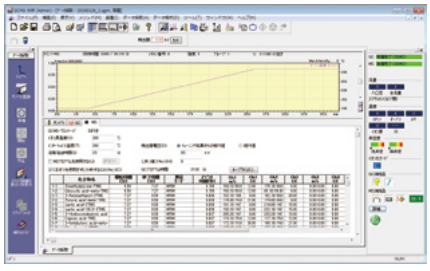
The GCMS-QP2020 NX not only boasts the best performance in its class, but also the highest efficiency. This new high-end single-quad GC-MS excels in both ease-of-use and robustness. The role of high-performance analytical instruments is expanding in areas as diverse as environmental pollution monitoring, forensics and material science. Whatever your field, the efficient and reliable GCMS-QP2020 NX is tailored to meet the needs of your laboratory.

Mass range	*m/z* 1.5 to 1,090
Measurable FWHM	0.4 to 2.0 u
EI scan S/N	1 pg octafluoronaphthalene ***m/z*** 272 S/N ≥ 2,000 (helium gas)
High-speed scan rate	20,000 u/sec

Brochure No. **C146-E367**

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.

Peak Integration Software for LabSolutions Insight

Peakintelligence for GCMS

New

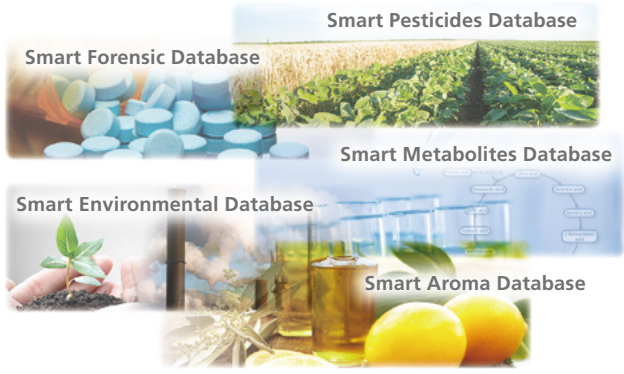
Peakintelligence for GCMS is a peak integration software equipped with new AI peak integration algorithms. AI algorithms trained with peak integration know-how provide peak integration on par with that of an experienced user, so configuring or adjusting parameters is not required. Even when processing chromatograms that previous algorithms couldn't handle, Peakintelligence can reliably detect peaks without adjusting any parameters. The software can significantly reduce the time required for conventional quantitative processing workflows because users only need to check the identification process results.

Note: LabSolutions Insight is required for operation.

Brochure No. **C146-E460**

Database for GC-MS and GC-MS/MS

Smart Database Series



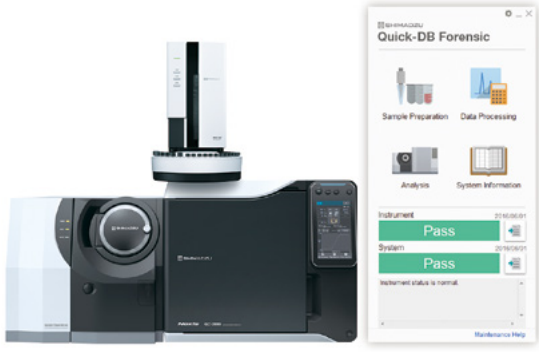
With the Smart Database, compound information, transitions, and collision energies are preregistered. Methods configured with the optimal measurement times can be created automatically using the automatic adjustment of retention time (AART) and Smart MRM functions.

Description	No. of compounds registered	Brochure No.
For residual pesticide analysis Smart Pesticides Database	MRM: 530 SIM: 530	C146-E332
For forensic toxicological substance analysis Smart Forensic Database	MRM: 486	C146-E353
For metabolite analysis Smart Metabolites Database	Scan/SIM: 627 MRM: 540	C146-E456
For environmental analysis Smart Environmental Database	MRM: 527	C146-E284
For aroma analysis Smart Aroma Database	Scan/SIM: 506 MRM: 487	C146-E452

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	Brochure No.
Quick-DB Residual Pesticides Database	MRM: 491 Scan/SIM: 474	C146-E307
Quick-DB Forensic Forensic Toxicology Database	MRM: 68	C146-E319

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

GC and GC-MS Application System

Headspace Analysis System

GCMS-QP2050 + 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 example	GCMS-QP2050 + LabSolutions GCMS + 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

Brochure No. **C180-E094**

Thermal Desorption System

TD-30 Series

GCMS-QP2050 + 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-QP2050 + LabSolutions GCMS + 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.

Brochure No. **C146-E349**

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-QP series, GCMS-TQ series Multifunctional autosampler: AOC-6000 Plus or AOC-5000 Plus Sniffing port: PHASER (GL Science B.V.) Multimode inlet: OPTIC-4 (GL Science B.V.)

Brochure No. **C146-E292**

GC-MS Application System

AOC-6000 Plus Multifunctional Autosampler System

The AOC-6000 Plus 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 example	GCMS-QP2050 + LabSolutions GCMS + 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)

Brochure No. **C146-E396**

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-6000 for automatic insert replacement to further enhance productivity for multi-sample analysis.

System configuration example	GCMS-TQ8040 NX + GCMSsolution + OPTIC-4
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)

Brochure No. **C146-E185**

Screening System for Phthalate Esters

Py-Screener Ver. 2

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 NX + GCMSsolution + LabSolutions Insight + Py-Screener + EGA/PY-3030D Multi-Shot Pyrolyzer (Frontier Laboratories)

Brochure No. **C146-E438**

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 NX + 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.

Brochure No. **C146-E184**

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

- 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.

Brochure No. **C184-E015**

MALDI Digital Ion Trap Mass Spectrometer

MALDImini-1

DESIGN AWARD 2021

reddot winner 2021
best of the best

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	$1 \leq n \leq 3$

Brochure No. **C146-E395**

Benchtop Linear MALDI-TOF Mass Spectrometer

MALDI-8020 / MALDI-8030

MALDI-8030

The MALDI-8020/8030 are compact (width of main unit 60 cm) and lightweight table-top linear mode MALDI-TOF instruments that achieve superior resolution and sensitivity. With its dual-polarity ion source, the MALDI-8030 is applicable for compounds best suited to analysis in negative ion mode. This versatile system can be used for a wide range of analytes, including proteins, peptides, oligonucleotides, lipids, glycans, polymers and small molecules.

	MALDI-8020	MALDI-8030
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)	
Ionic polarity	Positive	Positive / Negative
Weight	86 kg	92 kg
Brochure No.	**MO432**	**MO473**

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

AXIMA Series

AXIMA Performance

AXIMA Assurance

The AXIMA Series comprises floor-standing MALDI-MS systems for general-purpose analysis. The AXIMA Performance is a 20 keV high-energy CID-MS/MS equipped with Shimadzu's proprietary CFR* (patented) technology, which enables reliable MS/MS measurements of proteins and other biomolecules. The AXIMA Confidence boasts high performance at a reasonable cost with a mass resolution of 15,000 and allows PSD MS/MS spectrum measurements. The AXIMA Assurance is exclusively for linear mode.

* CFR: Curved Field Reflectron

		Performance	Confidence	Assurance
Linear mode	Mass range	1 to 500,000 Da		
	Mass resolution	5,000		
Reflectron mode	Mass range	1 to 80,000 Da		–
	Mass resolution	20,000	15,000	–
MS/MS function		CID/PSD	PSD	–
Brochure No.		**MO300**	**MO305**	**MO304**

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.

Imaging Application Solution for MALDI-8020, MALDI-8030

Benchtop MALDI-TOF Imaging Starter Kit

The MALDI-TOF Imaging Starter Kit provides a complete MALDI imaging application solution for existing Shimadzu MALDI-8020 and MALDI-8030 benchtop MALDI-TOF instruments, expanding the already versatile capabilities of these systems. The kit contains everything a user needs to begin imaging experiments on their MALDI-8020 or MALDI-8030, including custom ITO-coated glass slides, a new custom glass slide holder, the MALDI Solutions Imaging license enabling MALDI Imaging acquisitions, and IonView imaging viewing software.

Brochure No. **MO491**

Imaging Mass Microscope

iMScope QT

reddot winner 2021

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. It has the spatial resolution of 5 µm, three times the mass resolution and five times the imaging image acquisition speed of conventional models.

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

Brochure No. **C146-E415**

Automatic Sprayer / Matrix Vapor Deposition System for MALDI Imaging

iMLayer AERO / iMLayer

iMLayer AERO

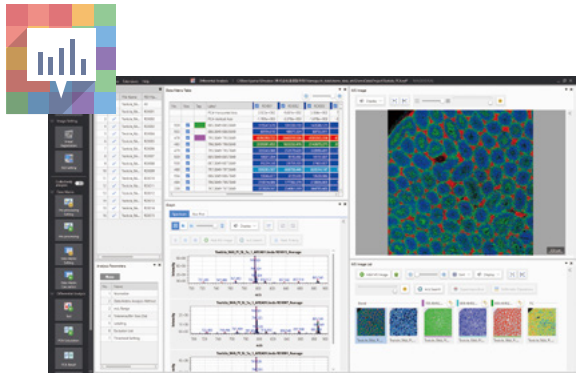
iMLayer

With mass spectrometry imaging (MSI), suitable pretreatment is important. High-quality MSI analysis results are obtained from a combination of the spray method and the vapor deposition method. The iMLayer AERO incorporates a sample stage that moves at a controlled rate while maintaining the same distance from the spray nozzle, enabling stable matrix spraying. Over multiple strokes, the sample becomes laminated with fine matrix crystals, enabling high sensitivity and high spatial resolution. In addition, a two-step vapor deposition method has been developed, which provides high spatial resolution (5 to 10 µm) and high sensitivity, thanks to a combination of iMLayer AERO (spray method) and iMLayer (vapor deposition method). This unique experiment can only be implemented using Shimadzu sample preparation solutions.

	iMLayer AERO	iMLayer
Matrix coating method	Spray method	Vapor deposition method
Coating thickness measurement mode	–	○
Brochure No.	**C146-E414**	**C146-E262**

Mass Spectrometry Imaging Data Analysis Software

IMAGEREVEAL MS



Mass spectrometry imaging involves selecting essential information from a vast amount of data. IMAGEREVEAL MS software can analyze MSI image data automatically with just a few simple settings. The "Collective Analysis" function enables differential analysis and image analysis in as few as three steps. Five analysis modes support multiple ways to analyze data. The software includes the "IMDX Converter" data conversion tool to read general-purpose formats and analyze data from other manufacturers' mass spectrometers.

	Basic license	Imaging license	Screening license	Full license
Basic analysis	○	○	○	○
Quantitative analysis	○	○	–	○
Differential/Image analysis	–	○	–	○
Screening (quantitative)	–	–	○	○

Brochure No. **C146-E400**

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)

Brochure No. **C297-E103**

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)

Brochure No. **C297-E097**

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.

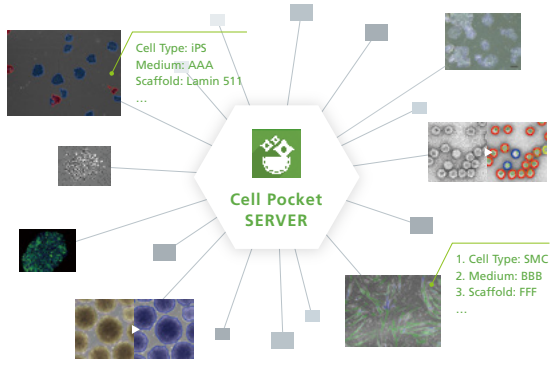
- Seamless analysis and management can be performed for from the pretreatment unit to the LC/MS/MS measurement.
- A total of 95 components can be simultaneously analyzed at high speed, including major basal culture media components for animal cells, and secreted metabolites.
- Temporal changes in the components obtained can be displayed as trend graphs.
- The results under multiple experimental conditions can be overlaid in the display, enabling comparative analysis.

Brochure No. **C297-E120**

Web Application Supporting Cell Observation

Cell Pocket

New



Cell Pocket is a web application that makes cell image analysis and management incredibly easy. The web application is paired with deep learning to offer quick and easy gathering, analysis, and sharing of lab member data whether from the office or the laboratory.

Quantify the visual state of cells from various aspects

- Deep learning technology can offer the quantification of cell status.
- Easy quantifying and graphing with customizable analysis recipes.

Centralized management of all data from cell observation work

- Easy to gather various cell culture information such as culture conditions, image data, and analyzed data.
- Can be used by up to 20 users.
- Centralized management facilitates sharing data and knowledge among members.

User interface specialized for cell culture management

- Cell image data can be easily linked to culture conditions.
- The user interface for culture management is simple and easy to understand and supports a user's cell analysis work.

Brochure No. **C297-E139**

Automated Picking and Collecting Tool of Cell Colonies

CELL PICKER

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.

Brochure No. **C297-E127**

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

Brochure No. **C297-E062**

Protein Sequencer

PPSQ-51A/53A

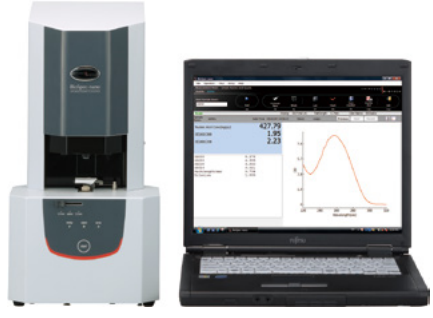
PPSQ-53A Gradient System

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.

Brochure No. **C297-E109**

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

Brochure No. **C101-E112**

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
Stray light	0.05 % max.
Installed software	Photometric, spectrum, quantitation, kinetics, time scan, multi-component quantitation, DNA/protein quantitation, instrument validation

Brochure No. **C101-E130**

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, $NaNO_2$)

Brochure No. **C101-E168**

UV-VIS Spectrophotometer

UV-1900i Automatic Analysis System

ASX-560 UV-1900i + Sipper Unit

Automatic UV-Vis analysis system contributes to operational efficiency. Automatic analysis application controls the CETAC ASX-280/560 autosamplers. The automatic analysis application allows the user to freely select the vial position and analysis sequence, as well as set measurement parameters, cleaning methods, and correction methods for each sample. It can automatically analyze up to 180 samples when using ASX-280 and up to 360 samples when using ASX-560. When combined with the spectrum evaluation function in LabSolutions UV-Vis, it is possible to automate from measurement to analysis and pass/fail decision.

Supported systems	This system is controlled by LabSolutions UV-Vis and is compatible with models equipped with Sipper/Syringe Sipper (refer to the following). UV-1800 / UV-1850 / UV-1900 series / UV-2600 series / UV-2700 series / UV-3600 Plus series CETAC Autosampler ASX-280 / ASX-560
Required accessory	Sipper 160 series or Syringe Sipper N / CN CETAC connect kit

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, $NaNO_2$)

Brochure No. **C101-E169**

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	0.0000 8% or less (220 nm, NaI) 0.0000 5% or less (340 nm, $NaNO_2$)

Brochure No. **C101-E171**

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)

Brochure No. **C101-E172**

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

Brochure No. **C101-E174**

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.

Brochure No. **C125-E009**

New

Fourier Transform Infrared Spectrophotometer

IRSpirit-X Series

This portable, compact Fourier Transform Infrared (FTIR) spectrophotometer is equipped with a sample compartment designed for two-sided access, making it possible to install even in narrow spaces, while accommodating conventional accessories with the maximum width in its class. It features 23 pre-packaged applications through the IR Pilot pre-built macro program and a Spectrum advisor function that assesses spectrum quality and suggests improvements, allowing anyone to easily conduct analysis. Despite its compact size, it incorporates technology inherited from higher-end models, achieving a best-in-class S/N ratio. Furthermore, with the IRSpirit-X series, components are covered by a 10-year warranty*. Three models are available: the reasonably priced IRSpirit-LX, the high-sensitivity IRSpirit-TX, and the IRSpirit-ZX, which has excellent moisture resistance.

* A 10-year warranty does not cover consumables, accessories other than the FTIR main unit, PCs and peripherals, instruction manuals, jigs, and labor charges for the second and subsequent years.

Space-Saving, Expandable

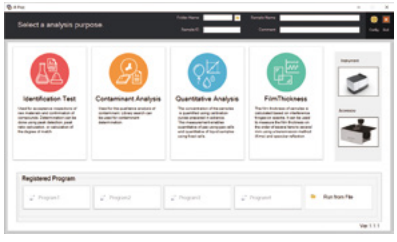
In spite of a body size smaller than a piece of A3 paper, the sample compartment width is the same as on higher-end models. This makes it compatible with many Shimadzu and 3rd party accessories. There is a growing need for systems that can fit in tight spaces, like glove boxes and multiuse facilities, and the IRSpirit-X is perfect for those situations. Even in narrow spaces, samples can be measured with the unit positioned vertically.

FTIR Made Easier

IR Pilot

ANALYTICAL INTELLIGENCE

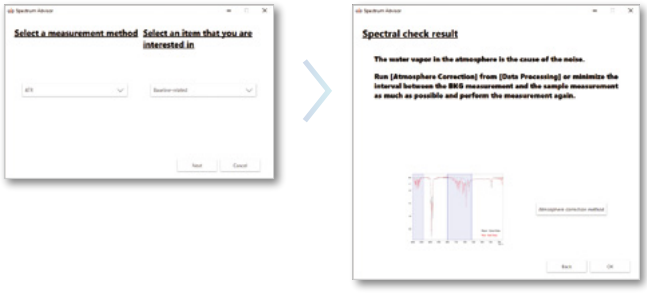
IR Pilot offers a total of 23 application programs as standard, making it easy for operators with minimal FTIR experience to analyze samples by simply selecting the analysis purpose and accessory. There is no need to set parameters. Once a workflow has been determined, it can be recorded, which means that for analyses with the same procedures, the sequence from measurement to data analysis and printing can be performed with a few clicks.



Spectrum Advisor Function

Corrective measures are proposed by comparing the measured spectrum to optimal spectrum examples. Troubleshooting advice is provided on scan parameters, accessories, and post-processing data. As a result, better quality data can be acquired.

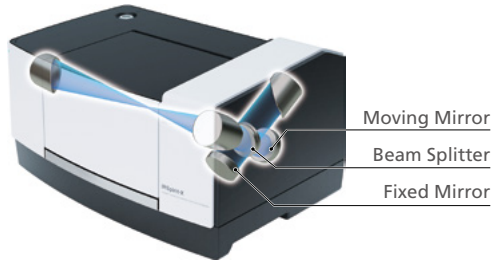
In addition, specialized programs, including an Identification Test Program and a Contaminant Analysis Program, are provided.



IRSpirit, Ready to Run

Reliability to Deploy with Confidence

IRSpirit-TX with KBr window plate offers the highest S/N ratio in its class using the technology inherited from higher-end models. And the robust optics are designed to ensure the system can be used reliably even under harsh temperature and humidity conditions. The IRSpirit-ZX is also available for use in harsher environments using a ZnSe beam splitter with high moisture resistance.



Simple Operation, Confident Results

Easy Macro

The "Easy Macro" function will create macros that are suitable for routine work, particularly when repetitive operations are used. The macro builder allows macros to be constructed by simply selecting and aligning operations from a list.

Integrated Data Analysis for Contaminants

Both EDX and FTIR models can be controlled with a single computer. The efficiency of time-consuming contaminant analysis can be improved by installing EDXIR-Analysis, an integrated EDX/FTIR analysis program, on the computer.

Interferometer	Michelson interferometer (30° incident angle) Equipped with Dynamic Alignment system Sealed interferometer with desiccant
Optical system	Single-beam optics
Detector	IRSpirit-TX, -ZX: DLATGS with temperature control IRSpirit-LX: $LiTaO_3$
Beam splitter	IRSpirit-LX, -TX: Germanium-coated KBr IRSpirit-ZX: Germanium-coated ZnSe
Light source	High-energy ceramic
Resolution	0.9, 2, 4, 8, 16 cm^{-1}
Sample compartment	Equipped with automatic accessory recognition mechanism 200(W) × 140(D) × 100(H) mm Center focus

Brochure No. C103-E418

Fourier Transform Infrared Spectrophotometer Plastic Analysis System

Plastic Analyzer

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

Brochure No. C103-E130

Microplastic Automatic Preparation Device

MAP-100

New

The analysis of microplastics requires multiple steps, including sample collection, digestion and filtration, and qualitative and quantitative (size, number of particles, mass or concentration) analysis. To accurately analyze microplastics in aqueous samples, an essential step is to isolate the particles from other components in the sample. This process normally involves digestion and separation steps. The MAP-100 automates the typical steps needed to isolate microplastics. This improves the reproducibility of the analytical workflow, enables lab technicians to focus on other tasks, and makes handling of reagents safer.

Applicable samples	Samples collected from rivers, oceans, lakes, and other environmental water (Incompatible with samples containing a lot of sand or mud from riverbeds, the ocean floor, or sandy beaches)
Extracted plastic size	Major axis 0.3 to 5 mm in length
Extracted plastic density	1.5 g/m^3 max.

Brochure No. C391-E116

Fourier Transform Infrared Spectrophotometer

IRXross

IR, Xross over

Performance × Operability

The IRXross creates a new concept for infrared spectroscopy. It offers the optimal solution for a new era with diverse application requirements.

Product

Interferometer	Michelson interferometer (30° incident angle) Equipped with Advanced Dynamic Alignment system
Wavenumber range	7,800 to 350 cm^{-1}
Highest resolution	0.25 cm^{-1}

Brochure No. C103-E135

High-End Sensitivity for Countless Applications

The IRXross is a mid-level FTIR model that achieves high-end level S/N. It enables best-in-class low noise with P–P values of 55,000:1 for one minute of integration. Using the IRXross with a single-reflection ATR attachment, an oil stain on paper was analyzed. The system can detect even the extremely weak 0.00023 absorbance signal with good sensitivity.

Complies Fully with Regulations

Either a KBr or KRS-5 window can be selected. The KRS-5 window maintains humidity resistance up to 90 %RH (for temperatures up to 30 °C) and is compliant with pharmacopoeia wavenumber range requirements (350 to 7,800 cm^{-1}).

Easy Navigation and Analysis with IR Pilot

ANALYTICAL INTELLIGENCE

A total of 23 macro application programs are included. Even operators unfamiliar with FTIR analysis can analyze samples easily by simply selecting the purpose of analysis and attachment used.

Shimadzu's Proprietary Software and Database Useful for Contaminant Analysis

ANALYTICAL INTELLIGENCE

Contaminant Analysis Program
This program is included as a standard feature in LabSolutions IR software.

Contaminant Library for LabSolutions IR (Optional)
This unique library was created by Shimadzu especially for analyzing contaminants in tap water and food products.

Thermal-Damaged Plastics Library (Optional)
Unlike previous libraries, this library includes information about plastics that have degraded due to oxidation by heating.

UV-Degraded Plastics Library (Optional)
Unlike previous libraries, this library includes information about plastics degraded by ultraviolet rays. It is also useful for analyzing microplastics.

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}

Brochure No. **C103-E091**

Infrared Microscope

AIMsight

IRXross + AIMsight

Shimadzu's proprietary wide-field camera (standard) 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 areas as small as 30 × 40 µm. In AMsolution software, 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. AMsolution also includes functionality for measuring lengths, including the lengths of objects in infrared microscope images. The contaminant analysis program for automatically qualifying contaminants is included as a standard feature in LabSolutions IR software.

Supported FTIR	IRTracer-100, IRXross, IRAffinity-1 series
Measurement wavenumber range	5,000 to 700 cm^{-1} (T2SL) 4,600 to 400 cm^{-1} (TGS)

Brochure No. **C103-E142**

Infrared/Raman Microscope

AIRsight

Product

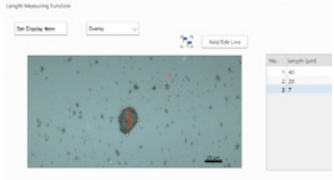
IRXross + AIRsight

Raman and FTIR microscopy in perfect harmony

The AIRsight infrared/Raman microscope combines two analytical techniques to provide complementary molecular information.

Length measurement function

AMsolution software now includes functionality for measuring lengths, including the lengths of objects in infrared Raman microscope images. Also, length measurement results can be output with a single button click.

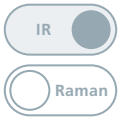


Same position

Both FTIR and Raman spectra can be measured without moving samples

Because samples do not need to be moved, both infrared and Raman spectra can be measured from the same position in an extremely small area. That means information about both organic and inorganic substances can be obtained from the same position, which can significantly improve the accuracy of qualitative analysis.

Smart software



One software to measure and analyze both FTIR and Raman spectra

You can easily switch between infrared and Raman measurements with a click. In addition, infrared and Raman spectra can be superimposed and displayed, and various analyses can be performed.

Single system

Obtain organic and inorganic information with one instrument

Infrared microscopes can analyze organic substances, but have difficulty obtaining information for many inorganic substances. On the other hand, Raman microscopes can obtain information about inorganic substances such as titanium oxide and carbon, in addition to organic substances. A single AIRsight unit can analyze mixtures of both organic and inorganic substances.

Supported FTIR	IRXross, IRTracer-100, IRAffinity-1 series
Infrared measurement wavenumber range	5,000 to 700 cm^{-1} (T2SL) 4,600 to 400 cm^{-1} (TGS)
Raman measurement wavenumber range	4,000 to 150 cm^{-1} (532 nm) 3,200 to 150 cm^{-1} (785 nm)

Note: To use this product, a Fourier transform infrared (FTIR) spectrophotometer needs to be connected.

Brochure No. **C103-E139**

Atomic Absorption Spectrophotometer

AA-7800 Series

Infinite Possibilities.

The AA-7800 Series is versatile enough for a variety of analytical applications (Any Application), safe and easy to use even for beginners (Any User), and offers continuous analysis using autosamplers and remote data analysis via network connections to increase the flexibility of an operator's work style (Any Location).

Wavelength range	185 to 900 nm
Bandwidth	6-step automatic switching
Optics	Flame: Optical double-beam Furnace: High-throughput single beam
Background correction method	D_2 or SR method selectable

Brochure No. C122-E064

Product

Any Application

Systems can be modified based on how it is used.

The AA-7800 can be upgraded from a flame-only system to a dual atomizer system even after delivery, allowing the system to evolve in response to changes in customers' usage. Dual atomizer systems are available in two types: manual atomizer switching with excellent versatility and automatic atomizer switching with excellent operation and faster analysis.

Flame Analysis System

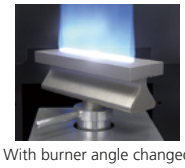
Dual Atomizer System
(Selectable manual or automatic)

Automatically switches between eight hollow cathode lamps

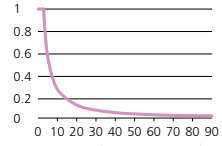
The lamp housing includes functionality for automatically switching between eight hollow cathode lamps installed in a turret and simultaneously illuminating any two of the lamps.

Flame analysis offers superior general applicability —Changing the burner angle—

Elements present in high concentrations can be measured in the flame analysis mode by adjusting the burner angle to decrease absorbance. That enables measurement of up to about 20 times higher element concentrations, which helps minimize dilution errors and the effects of measurement element contamination from containers or reagents.



With burner angle changed



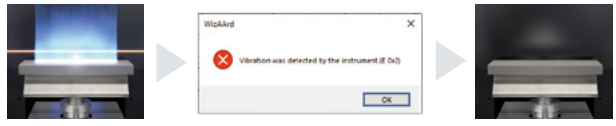
Burner angle (horizontal axis) and relative sensitivity (vertical axis)

Any User

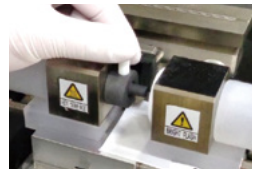
Safety technology for flame AA systems

With its high level of safety, even AA beginners can use the instrument without worry. Safety functions include automatic flame extinguishing by vibration sensor and excessive gas pressure detection of acetylene.

■ Automatic flame extinguishing function by vibration detection sensor



Simple and easy-to-use furnace system



Furnace measurements require replacing the graphite tube. Thanks to the simple furnace structure, even first-time users can replace the tube easily using a specialized positioning jig. It is also easy to differentiate between using different graphite tubes for given measurement applications.

■ GFA-TV Graphite Furnace Camera (Optional)

The camera can be used to confirm the sample injection position or sample drying status, which is helpful when evaluating or optimizing the temperature program. The sharp image clearly shows the status inside the graphite tube.

GFA-TV

Checking the sample injection position

Checking the drying status

Any Location

World's smallest* dual system

The dual atomizer system is a compact size with a width of 940 mm. In addition, a single autosampler can be used for both flame and furnace measurements.

* As of May 2022, according to a Shimadzu survey

During Flame Measurements

During Furnace Measurements

LabSolutions CS supports laboratory network connectivity

By adding a WizAArd Agent connection kit (optional), you can connect to the LabSolutions CS network. LabSolutions CS manages all analytical data in a database on a network server, so that the data can be loaded and analyzed on any computer connected to the network.

Note: An additional software license is required for analyzing data on a computer not connected to the AA system.

New ICP Mass Spectrometer

ICPMS-2040/2050

An Era Without Compromise

The ICPMS-2040/2050 Series systems have achieved a harmonious blend of environmental-friendliness and analytical performance through its advanced proprietary Mini-Torch system. Without the need for any special options, it reduces measurement time, contributing to the optimization of your workflow efficiency. Moreover, the software comes with various functions, options, and maintenance information that minimize operator intervention, revolutionizing the way you work.

Plasma Ion Source	Spray chamber	Cyclone chamber (Thermoelectric cooling)
	Plasma torch	Mini torch
	Nebulizer	High Efficiency Concentric nebulizer
RF Power Supply Unit		27 MHz, Max 1.6 kW
Mass Spectrometer	Mass analyzer	Quadruple type mass spectrometer
	Mass range	5 to 260 u
	Cell	ICPMS-2040: Octopole collision cell ICPMS-2050: Octapole collision/reaction cell

Brochure No. C113-E031

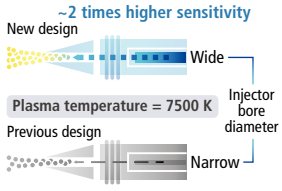
iF DESIGN AWARD 2024

Product

Eco Friendly yet Competent

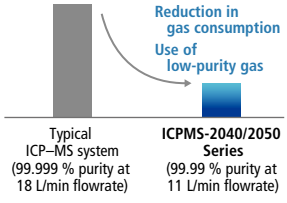
Redeveloped High Sensitivity Mini-Torch

Optimizing the torch design keeps argon gas consumption low and decreases sample flow rate into the plasma, improving sample ionization efficiency. The new design roughly doubles sensitivity compared to previous models.



Low Argon Gas Consumption

Shimadzu's mini-torch system consumes 11 L/min of argon, two-thirds the amount used by typical plasma torches. The ICPMS-2040/2050 Series systems allow for the use of low-cost, low-purity (99.95 %) argon gas to reliably generate a robust plasma.



Argon Gas Cost Reduction

Reaction Mode (ICPMS-2050)

In addition to the collision mode, the ICPMS-2050 also includes the reaction mode for more sensitive measurements. Both doubly charged ions not eliminated by the collision mode and polyatomic ions can be reduced.

Fast at No Additional Cost

The improved gas controller features high-speed cell gas purging. Combined with ProActive Rinsing, measurement times can be significantly shortened without any additional accessories or cost.

High-Speed Cell Gas Purging

The redesigned gas controller shortens cell gas introduction and exhaust times.

ProActive Rinsing

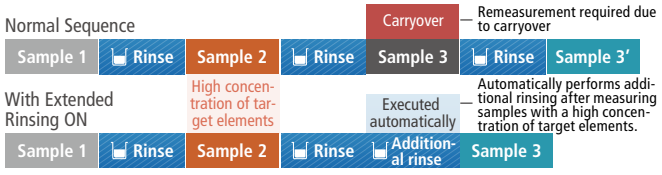
While measuring multiple samples, the rinsing sequence can be started early by sending the autosampler probe to rinse while collecting data using sample already in the suction line. This greatly reduces measurement time and conserves sample.

Minimal Operation Required

Extended Rinsing —Automatically Minimizes Carryover—

ANALYTICAL INTELLIGENCE

The extended rinsing function automatically performs an additional rinse sequence when a target element exceeds a predetermined upper limit. A second rinse solution can be used in the additional rinsing sequence to improve rinsing effectiveness. Consequently, carryover is eliminated to ensure high-quality data.



Preset Methods

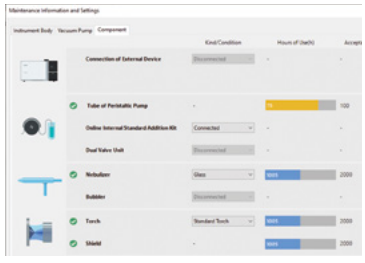
Preset analytical methods come configured with optimized settings, such as plasma conditions, target elements, mass information, and internal standards, for common ICP-MS applications. The ICPMS-2040/2050 Series systems can therefore be used immediately after installation with minimal training.

LabSolutions ICPMS Ver. 2

Instrument Status Window

The instrument status window displays information about the instrument and accessories in a comprehensive and easy-to-understand layout. A warning indicator is displayed if an error occurs or if a part is due for maintenance or replacement.

Simple and Descriptive Maintenance Window



ANALYTICAL INTELLIGENCE

The maintenance information/setting window clearly indicates operation times of key components and automatically alerts users when it is time to maintain and/or replace parts.

Connecting to LabSolutions DB/CS

Connect to LabSolutions DB (standalone) or LabSolutions CS (network) for complete data integrity.

ANALYTICAL INTELLIGENCE

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

Multitype ICP Emission Spectrometer

ICPE-9800 Series

The ICPE-9800 series is a Multitype ICP Emission Spectrometer that can be used in various fields such as environmental testing, pharmaceuticals, foods, chemicals, and metals. Acquisition for All Wavelengths, Automatic Wavelength Selection and a Diagnosis Assistant ensure the reliability of measurements with the most appropriate method at all times. The vertical torch orientation and both axial and radial views allow simultaneous analysis of trace to high-concentration samples without concern for contamination (ICPE-9820). The Mini Torch, Eco Mode and Vacuum spectrometer significantly reduce running costs.

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.

Brochure No. **C113-E019**

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.

Brochure No. **C112-E013**

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.

Brochure No. **C112-E011**

Multi-Channel X-ray Fluorescence Spectrometer

MXF-2400

The MXF-2400 features a compact design and ease of operation. The latest hardware designed to fully utilize the principle of X-ray fluorescence spectrometry and the data processing unit that uses various software programs to permit automatic management of analysis data combine to provide high analytical productivity both in R&D and production control. Up to 36 elements can be simultaneously determined by the fixed monochromator and up to 48 elements can be determined sequentially by the optional scanning monochromator. High analytical precision is provided even in high sensitivity analysis of a few ppm quantity level.

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

Brochure No. **C142-E024**

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.

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)

Brochure No. **C142-E047**

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

Brochure No. **C142-E044**

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

EDX-LE

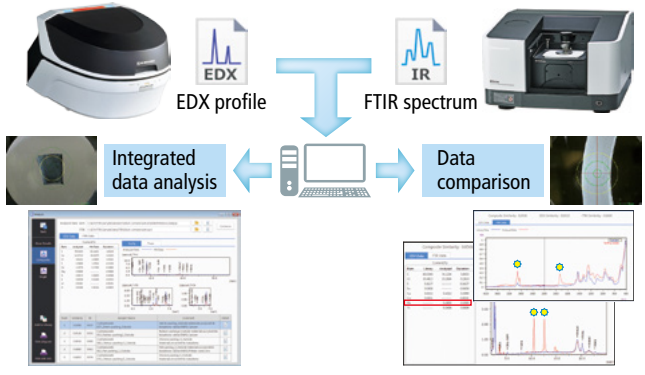
The software is loaded with the optimal functions for screening, including automatic calibration curve selection and automatic reduction of measurement time. Utilizing optional analysis kits, the EDX-LE can also accommodate screening analysis of halogen compounds and antimony that are subject to regulations. 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

Brochure No. **C142-E035**

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.

Brochure No. **C103-E112**

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

Brochure No. **C143-E013**

Electron Probe Microanalyzer

EPMA-1720/1720H

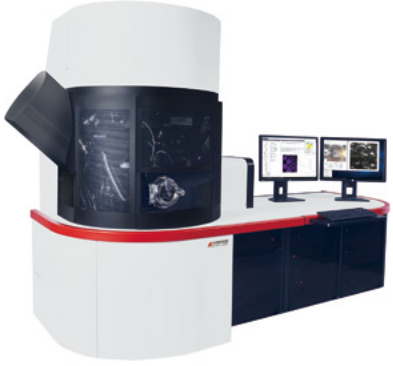
The Electron Probe Microanalyzer (EPMA) allows highly sensitive analysis of elements in micron-scale regions on the sample. The fully digital control system offers revolutionary observation and analysis operations using only the mouse and keyboard. It can also be operated from a networked PC. EPMA-1720H incorporates a high-performance CeB_6 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°	

Brochure No. **C143-E012**

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 Ag3*d*) 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

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

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.

- **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

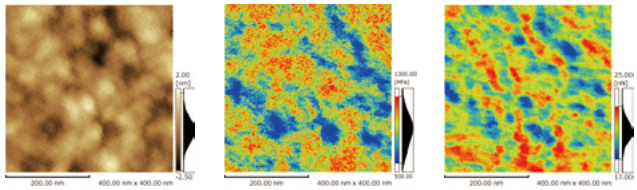
Brochure No. C147-E018

Product

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

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.

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

Brochure No. C147-E016

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

Brochure No. C147-E017

Total Organic Carbon Analyzer

TOC-L

Product

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.

Shimadzu TOC analyzers 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	

Brochure No. **C391-E079**

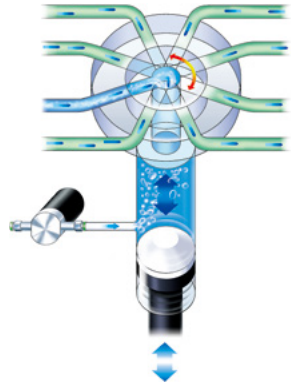
This product is certified as Shimadzu's Eco-Products Plus. Reduced power consumption by 36 % compared with conventional Shimadzu's products.

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

TOC-LCSH/CSN standalone model

TOC-LCPH/CPN PC-controlled model

A Wealth of Options to Further Expand Applications

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

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

Applicable in a Variety of Fields

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

Quality Control
Water supply equipment
Electronic components
Aluminum foil
Raw materials

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

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

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

Autosampler for TOC-L Series

ASI-L

ASI-L

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

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

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

8-Port Sampler for TOC-L Series

OCT-L

OCT-L

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

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

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

TN (Total Nitrogen) Unit for TOC-L Series

TNM-L

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

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

Solid Sample Combustion Unit for TOC-L Series

SSM-5000A

SSM-5000A

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

- Can also be connected to the TOC-V series

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

Wet Oxidation TOC Analyzers

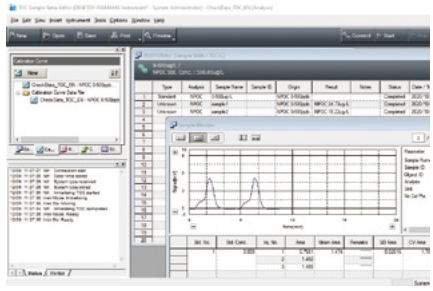
TOC-V$_{WP}$

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

Detection limit	0.5 µg/L
Measured items	TC, IC, TOC, NPOC
Measurement range	TC 0 – 3,500 mg/L, IC 0 – 3,500 mg/L

Software for TOC-L

LabSolutions TOC



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 TOC Analyzers for Pure Water

eTOC Series

TOC-1000e

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

Brochure No. **C391-E110**

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 50,000 mgC/L f.s. with dilution function)
Measurement Cycle	4 minutes minimum (Using NPOC)
Repeatability	Within ±2 % f.s.

Brochure No. **C391-E083**

Transportable Gas Analyzers

NOA-7100, CGT-7100

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.

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

Brochure No. **C391-E101**

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

Brochure No. **C391-E098**

Pretreatment Unit for Portable Gas Analyzers

CFP-8000

The CFP-8000 is pretreatment unit that is used with NOA-7100/7000 or CGT-7100/7000. 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.

Intended use	Air and other gas samples
Permissible ambient temperature	5 to 40 °C
Sampling quantity	Approx. 5 L/min (maximum)

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-V2 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 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.

Newly equipped with the world's first* voice operation device "XV-Talk" as standard, it supports safe and correct testing in a conversational style. In addition to the standard models, we offer five models, including a "model with a large LCD touch panel" that improves testing efficiency, a "model with a wide testing space" that enables testing of large parts, and a "model with a separate control unit" that is useful for developing new materials.

* As of February 2023, according to a Shimadzu survey

Product

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.

Choose between Two Controllers

Two types of controllers with touch panel LCD screens are available. Choose from the large LCD "Operation Controller" with graph display and direct operation buttons, or the portable "Smart Controller".

New Operability with voice "XV-Talk"

The AGX-V2 responds to the operator's voice. The AGX-V2 operates in response to key phrases spoken by the operator. This frees the operator from frequently used buttons, such as "Start Test" and "Return".

AGX-10kNVD2

AGX-50kNVD2

AGX-100kNV2

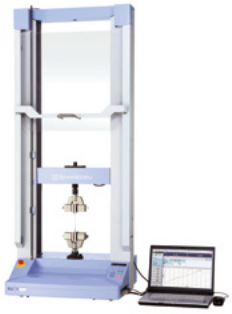
AGX-600kNV2

Capacity	Table-top model 10 N to 50 kN, floor model 20 kN to 600 kN		
Testing speed	AGX-10kNVD2		0.0005 to 3,000 mm/min
	AGX-20/50kNVD2		0.0005 to 1,500 mm/min
	AGX-20/50kNV2, AGX-100kNV2		0.00005 to 1,500 mm/min
	AGX-250/300kNV2		0.00005 to 720 mm/min
	AGX-500/600kNV2		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)

Brochure No. C224-E122

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)

Brochure No. **C224-E057**

Table-Top Universal Testers

EZ Test

EZ-LX/EZ-LX HS EZ-SX

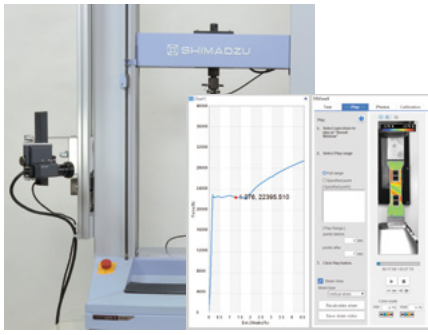
This easy-to-use, compact, stylish frame incorporates enhanced functions, enabling tests to be carried out with good efficiency.

		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		

Brochure No. **C224-E055**

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)

Brochure No. **C224-E052**

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

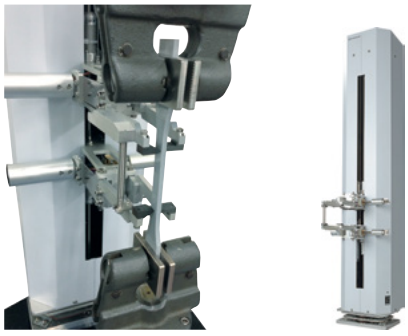
Fully Automatic Plastic Testing System

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



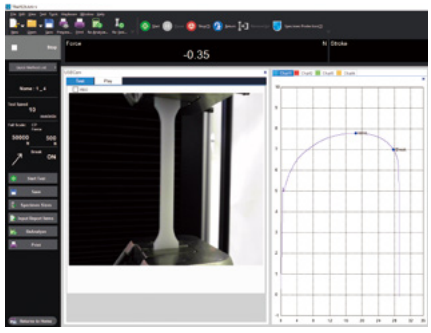
Provides high-precision measurement of the extension of metals, plastics, etc. from the elastic range (very small displacement) to failure (large displacement). All operations, such as automatic fitting and removal of the extension arm onto the specimen, automatic setting of the distance between standard 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

Brochure No. **C224-E111**

Operation Software for Material Testing

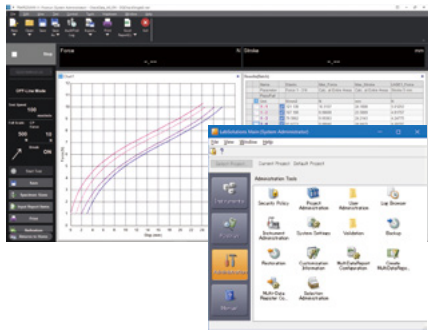
TRAPEZIUM X-V



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



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

Brochure No. **C224-E116**

Compact Thermostatic Chamber for Autograph

TCE-N300A

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

Brochure No. **C224-E117**

Precision Universal Testing Machines

Autograph X-V Retrofit

Image after the Retrofit

The Autograph X-V Retrofit is a partial upgrade kit, consisting of a controller and software, for precision universal testing machines. Replacing the existing controller and software with this product significantly improves operation and safety with existing systems. The replacement provides comparable measurement capabilities to the Autograph AGX-V series, Shimadzu's premier systems.

Applicable systems	AG-D, AG-E, AG-G, AG-I, AG-IS, AG-X, AG-Xplus

Brochure No. **C224-E121**

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.

Brochure No. **C221-E010**

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)

Brochure No. **C221-E012**

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

Brochure No. **C221-E012**

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

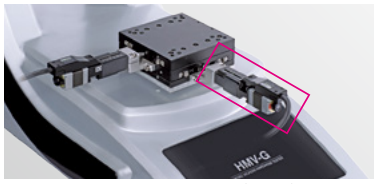
Standardized automatic length measurement function using a digital camera built into a novel G frame

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

Brochure No. **C227-E027**

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)

Brochure No. **C227-E024**

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

Brochure No. **C227-E020**

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

Brochure No. **C228-E008**

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

Brochure No. **C228-E009**

Testing Machine Remote Monitoring System

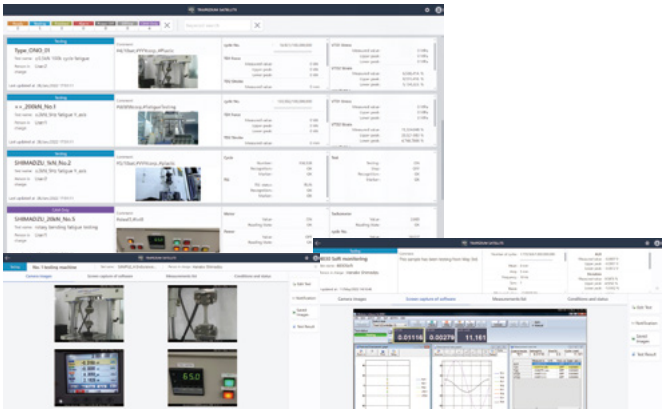
TRAPEZIUM SATELLITE

TRAPEZIUM SATELLITE is a remote monitoring system for testing machines. It consists of a monitoring device, a USB camera, and software for remotely monitoring the operating status of fatigue testing machines using a web browser. The ability to monitor the operating status of equipment away from the laboratory increases the efficiency of testing work and reduces workloads.

Brochure No. **C225-E040**

Check the Operating Status of Multiple Instruments

The test status for each instrument is arranged vertically, so the status of multiple instruments can be assessed at a glance.

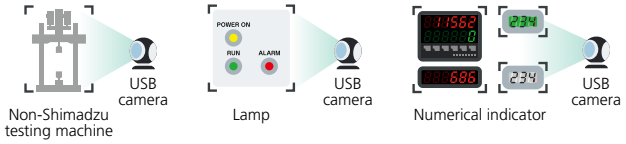


USB Camera Image Browsing Window

Windows Software for 4830 Browsing Window

AI Monitoring Function Digitizes the Information

AI image analysis can digitize and monitor indicator ON/OFF status and the numerical values from displays. Users are notified in real time of the status whenever it changes.



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
Maximum 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).

Brochure No. **C225-E029**

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).

Brochure No. **C225-E029**

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
Maximum 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).

Brochure No. **C225-E029**

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).

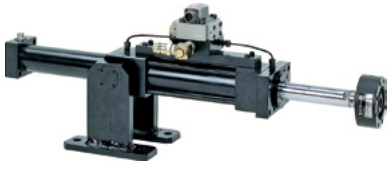
	EMT-1kNV-30	EMT-1kNV-50
Maximum test force	±1 kN (static and dynamic tests)	
Stroke	±30 mm	±50 mm
Maximum speed	1 m/s	2 m/s
Maximum frequency	200 Hz	

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

Brochure No. **C225-E029**

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)

Brochure No. **C225-E029**

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)

Brochure No. **C225-E030**

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.

Brochure No. **C225-E029**

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	
Maximum frequency	60 Hz	100 Hz	
Power requirements	AC100 V		

Brochure No. **C225-E029**

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.

Brochure No. **C225-E037**

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.

Brochure No. **C225-E021**

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.

High-Speed Video Camera

Hyper Vision HPV-X2

The newly developed high-speed CMOS image sensor, FTCMOS2, combines the same shooting speed of up to 10 million frames per second as conventional products with the high sensitivity of ISO 16,000 (reference value), which is 6 times higher than conventional products. In addition, it delivers sharper high-speed images even when used in conjunction with high-magnification optical systems such as microscopes. It is also equipped with a synchronous shooting function using two cameras, allowing simultaneous 2-way shooting and 3D image analysis using commercially available software.

Resolution	100,000 pixels (400 (horizontal) × 250 (vertical)) (FP mode)
Recording speed	10 Mfps, 5 Mfps (fixed) (fps = frames per second)
Continuous recording capacity	256 frames max.

Brochure No. **C220-E015**

MAIVIS Ultrasonic Optical Flaw Detector

MIV-X

Ultrasonic optical flaw detection refers to nondestructive inspection technology that uses ultrasound and light. The surface of the test object is excited using ultrasound, and the tiny changes in the surface produced by these vibrations are detected using laser irradiation and a camera. If peeling, cracks, or other flaws are present, ultrasound discontinuities (propagation disturbances) are detected. Ultrasonic optical flaw detection enables the visualization of internal flaws (at a depth of about 1 mm) that are hard to find using conventional ultrasonic testing. The MIV-X can easily detect flaws in joints and bonding surfaces in research and development processes involving multi-materials, which are created by combining different materials to increase strength and reduce weight.

Minimum detection size	Approx. 1/100 of inspection area (depends on sample and inspection condition)
Camera distance	250 to 1000 mm
Inspection time	Approx. 25 seconds or less (Observation + Analysis)

Brochure No. **C227-E029**

Bench-top X-Ray CT System

XSeeker 8000

Product

The XSeeker 8000 bench-top X-ray computed tomography (CT) system is equipped with a high-output X-ray generator and a high-resolution flat panel detector. Despite its compact size, it has a high X-ray output of 160 kV, enabling clear observations of molded plastic parts, aluminum die cast parts, and other metal parts. In addition, the newly developed XSeeker control software provides high operability and the highest throughput to date. With clear image quality and high throughput, it supports applications in a wide range of situations, from detailed observations in product development and quality evaluation to inspections at machining sites.

Target object	Plastics, light metals and foods, etc.
Maximum sample size	300 mm dia. × H: 320 mm, max. 10 kg max.
Field of view	100 mm dia. max.

Brochure No. **C251-E042**

Compact, High-Output System

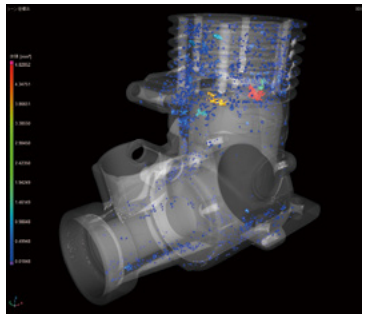
- Smallest, lightest bench-top CT system in its class
- High 160 kV output achieves high penetration ability

Image Quality and Functionality on Par with High-End Models

- High-resolution FPD enables visualization of microstructures
- High-functionality all-in-one viewer for intuitive observation

Operation Optimized for Inspections

- Easy 3-step scanning process
- Recurring inspection is possible at the push of a button



Defect Analysis of Aluminum Die Cast

VR Image of a Cup of Noodles (mini size)

Microfocus X-ray Inspection System

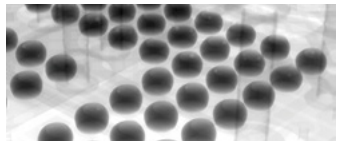
Xslicer SMX-6010

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.

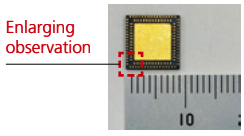
Product

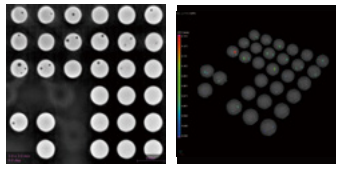
Target object	Electronic parts, mounting boards, etc.
Maximum sample size	W: 470 × D: 420 × H: 100 mm, max. 5 kg max.
Fluoroscopic field of view size	0.75 (vertical) × 1.3 mm (horizontal) to 21 (vertical) × 38 mm (horizontal)
CT field of view size	3 to 30 mm (given 45° laminographic angle) 3 to 14 mm (given 60° laminographic angle)
Vertical CT (Optional)	
Maximum sample size	PCB: 100 × 150 mm max. Small sample objects: Dia 50 × 100 mm max.
	200 g max.

Brochure No. **C251-E040**

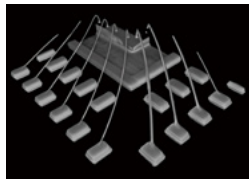


Fluoroscopic Image





Cross-Sectional Image (Imaging with PCT)



IC Chip Captured with Optional Vertical CT

High-Accuracy Imaging

The 3 megapixel at panel detector and Shimadzu's unique HDR processing

Simple Operation

Start fluoroscopic imaging in just three steps

A single button switches between fluoroscopy and PCT.

Versatile, User-Friendly Functions

The system features a Teaching Function and Stepwise Movement, enabling consecutive imaging, as well as functions for a variety of measurements, including BGA measurements and area ratio measurements.

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.

Brochure No. **C251-E039**

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: 300 mm, max. 10 kg max.
Field of view	300 mm dia. × 210 mm max.
Accuracy (sphere distance error)	±(3.8 + L/50) µm

Brochure No. **C251-E035**

Microfocus X-ray CT System

inspeXio SMX-225CT FPD HR Plus

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 large high-resolution flat panel detector mounted, 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.

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.
Field of view	400 mm dia. max.

Brochure No. **C251-E029**

Phase-Contrast X-Ray CT System

Xctal 5000

The Xctal 5000 is a new X-ray CT system that creates images of X-ray phase shifts. In addition to the X-ray absorption information detected by conventional X-ray CT systems, this system can detect X-ray scattering and refraction information. This enables observations of fine structure, including cracks and the flow of fiber bundles, across a wide field of view, and high-contrast observations of samples with no absorption differences. This is useful for research and development of fiber reinforced resins, composite materials, and biomaterials.

Target object	Fiber reinforced resins, composite materials, and biomaterials
Maximum sample size	150 mm dia. × H: 275 mm, max. 5 kg max.
Field of view	100 mm × 100 mm max. (Fluoroscopy), 100 mm dia. max. (Fiber Orientation Fluoroscopy), 100 mm dia. × H: 100 mm max. (CT Scan), 85 mm dia. × H: 85 mm max. (Fiber Orientation CT Scan)

Brochure No. **C251-E043**

Differential Scanning Calorimeters

DSC-60 Plus Series

DSC-60 Plus

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. 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)

Brochure No. **C160-E006**

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)

Brochure No. **C160-E006**

Thermomechanical Analyzers

TMA-60/60H

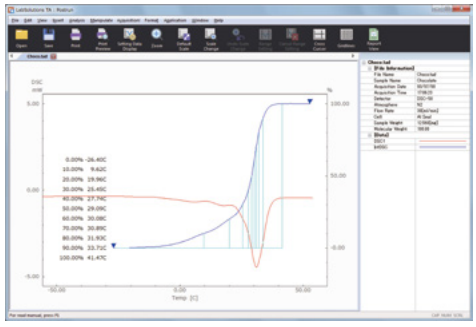
This analyzer can handle a wide variety of samples and measurement methods and a large temperature range to perform thorough measurement of the mechanical properties of materials. A high-precision digital sensor allows displacement measurement with a low drift in a wide range.

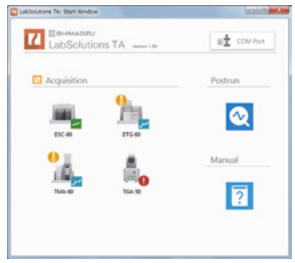
Temperature range	Ambient to 1,000 °C/1,500 °C from −140 °C with an optional adapter
Measurement range	Displacement : ±5 mm Load : ±5 N
Sample size	8 dia. × 20 mm, 5 × 1 × 20 mm (60 type)

Brochure No. **C160-E006**

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.

Brochure No. **C160-E006**

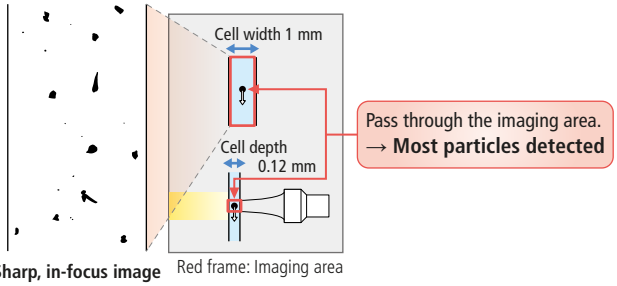
Dynamic Particle Image Analysis System

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.

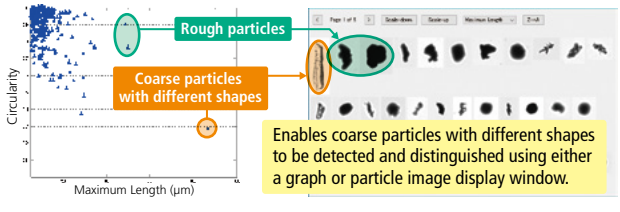
Microcell Method Improves Image Acquisition Efficiency

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.



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.

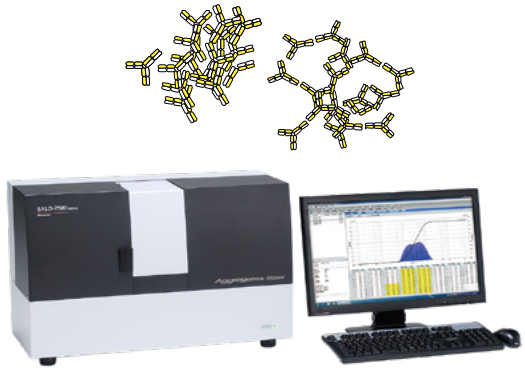


Particle size measurement range	5 to 100 µm
Particle count concentration reproducibility	CV ≤ 5 %
Measurement items	Equivalent circular area diameter, equivalent circular perimeter diameter, maximum length, length perpendicular to maximum length, vertical Feret diameter, horizontal Feret diameter, particle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

Brochure No. **C060-E016**

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

Brochure No. **C060-E010**

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

Brochure No. **C060-E009**

Laser Diffraction Particle Size Analyzer

SALD-2300

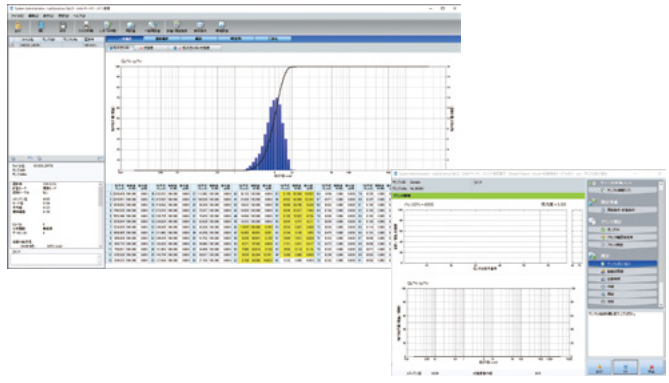
The new standard in the SALD series. While maintaining continuity and compatibility with respect to the data of the SALD-2000/2100/2200, which were popular, widely distributed models, this instrument is equipped with many new functions useful for evaluating changes (dispersion, aggregation, dissolution) 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

Brochure No. **C060-E007**

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.

Brochure No. **C060-E017**

Analytical Balances

AP Series

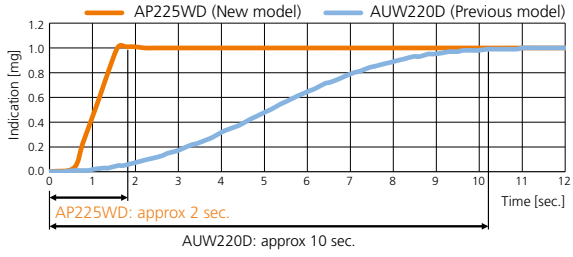
AP225W-AD

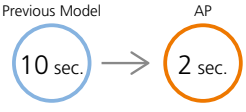
Product

Fast Response with UniBloc AP Technology

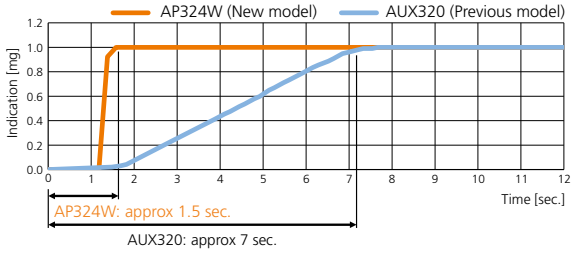
The response time is reduced to about 1/5 the time of previous models.

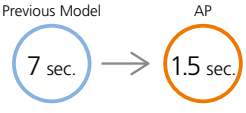
Response During Trace Measurements with the 0.01 mg Model
(Equivalent to 1 mg / With Conditions Set by Shimadzu)





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





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.

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

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

Brochure No. **C054-E078**

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

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	120 g/42 g	0.1 mg/0.01 mg
AUW220D	220 g/82 g	0.1 mg/0.01 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

Brochure No. **C054-E032**

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 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 and USB device. 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

Brochure No. **C054-E032**

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 and minimum display of 0.01 g 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

Brochure No. **C054-E076**

Electronic Balances

TW-N/TX-N 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	

Brochure No. **C054-E032**

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 an optional 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	

Brochure No. **C054-E032**

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 (used for optional printer connections)

Brochure No. **C054-E067**

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 %

Brochure No. **C054-E053**

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)

Brochure No. **C054-E032**

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