

Shimadzu Analytical and Measuring Instruments



Excellence in Science

A man in a pink shirt is lifting a baby in a white floral dress in a grassy field. The background is a lush green landscape with trees and sunlight filtering through the leaves. The overall mood is warm and joyful.

Providing people with an abundant,
comfortable, and secure lifestyle

Contributing to the happiness of society.

This is our goal and our specialty.

At Shimadzu, we provide a variety of analytical and
measuring technologies and applications
so as to achieve a global environment
where people can live comfortably, well into the future.



Contents

Chromatography Systems

	Page
Liquid Chromatographs	8-13
Gas Chromatographs	14-17

Mass Spectrometry Systems

Liquid Chromatograph-Mass Spectrometers	18-25
Gas Chromatograph-Mass Spectrometers	26-30
MALDI Time-of-Flight Mass Spectrometers	31-32
Imaging Mass Microscope	33
Inductively Coupled Plasma Mass Spectrometer	33

Spectroscopy Systems

UV-VIS Spectrophotometers	34-35
UV-VIS-NIR Spectrophotometers	35
FTIR Spectrophotometers	36-37
Atomic Absorption Spectrophotometers / Spectrofluorophotometers	38
ICP Emission Spectrometers	39
Optical Emission Spectrometers	40

Life Science Systems

Protein Sequencer	40
Microchip Electrophoresis System / Cell Culture Media Analysis Platform	41
Molecular Imaging Instruments	42

X-ray and Surface Analysis Systems

X-ray Fluorescence Spectrometers	43-44
X-Ray Diffractometers / Surface analyzers	45-46
Surface Observation Instruments	47

Environmental Measurement Systems

TOC Analyzers	48-50
Transportable Gas Analyzers	51
Stationery Gas Analyzers	52

Material Testing and Non-Destructive Inspection Systems

Universal Testing Machines	53-55
Hardness Testers / Viscosity and Flow Testers	56
Fatigue Testing Machines	57-59
Microfocus X-Ray Inspection Systems	60-61

Physical Properties Measurement Systems

Thermal Analyzers	62-63
Powders and Particle Size Analyzers	64
Balances	65-67

Evaluation Instruments for Pharmaceutical Products

Support instruments for pharmaceutical sciences research and development

Support from Drug Discovery to Quality Control

Shimadzu offers extensive support for proteomics, genomics, metabolomics and other life science research products as well as chromatograph, mass spectrometer, and properties testing instrument.

Shimadzu provides instruments for analysis and services for quality control, including IQ/OQ and supports for regulatory, to meet today's demands for safe pharmaceutical manufacture.

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

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



Nexera series →P.8
Ultra High Performance Liquid Chromatograph



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



Nexera Prep →P.10
Preparative Purification Liquid Chromatograph



Headspace Analysis System →P.29
GC and GC-MS Application System



i-Series Plus →P.11
High-Performance Liquid Chromatograph



TOC-L →P.48
Total Organic Carbon Analyzer



Aggregates Sizer →P.64
Aggregation Analysis System for Biopharmaceuticals

Evaluation Instruments for Foods

Test instruments for food and materials

The Science of Food...

Food products must taste good but they also require unceasing efforts to maintain safety and reliability. Inspection, analysis and evaluation instruments play a major role in this process.

Shimadzu instruments assist in satisfying the sophisticated and strict food safety requirements at all manufacturing and inspection stages.

Field	Application and Evaluation	Shimadzu Products
Food Safety Quality Control (General Foods)	Residual pesticides	HPLC, LCMS, GC, GCMS, Balances
	Veterinary drugs	HPLC, LCMS, Balances
	Mycotoxins	HPLC, LCMS, Balances
	Foreign substances and odor	FTIR, EDX, GC, GCMS, X-Ray Inspection System
	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-TOFMS
	Total organic carbon	TOC
	Packaging	GC, GCMS, UV, Material Testing Machine, Balances
Food Development (Functional Foods and Supplements)	Food texture, taste	Particle size Analyzer, Thermal analyzers, Moisture analyzers
	Flavor	GC, GCMS
	Functionality	HPLC, LCMS, GC, GCMS
	Therapeutic efficacy	Brain-function imaging systems

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



■ **LCMS-8060** →P.18
 ■ High Performance Liquid Chromatograph Triple Quadrupole Mass Spectrometer



■ **TOC-L** →P.48
 ■ Total Organic Carbon Analyzer



■ **GCMS-TQ8050 NX** →P.26
 ■ Gas Chromatograph Triple Quadrupole Mass Spectrometer



■ **LABNIRS** →P.42
 ■ Functional Near-Infrared Spectroscopy System for Research



■ **AP Series** →P.65
 ■ Analytical Balance



■ **EZ-X Series** →P.53
 ■ Compact Tabletop Tester

Instruments for Life Science Research

Delivering new technology for life science

Toward Discovery of Novel Life Sciences

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

Field	Applications and Objectives	Shimadzu Products
Genomics	Genotyping	MultiNA, Ampdirect Plus
	Marker discovery	MultiNA, Ampdirect Plus
	Analysis of nucleic acid compounds	MALDI-TOFMS, LCMS, TMSPC, SPM
	Genetic examination of foods	MultiNA, BioSpec-nano, Ampdirect Plus
	Microbial and viral examinations	MultiNA, Ampdirect Plus
Proteomics	Protein expression analysis	MALDI-TOFMS, LCMS-IT-TOF, nano-LC, AccuSpot
	Post-translational modifications analysis	MALDI-TOFMS, LCMS-IT-TOF, Trace-level oligosaccharide rapid analysis system, nano-LC, AccuSpot, Cell-free protein synthesis reagent kit
	Structural analysis	LC-MS/MS
	N-terminal amino acid sequencing analysis	Protein sequencing systems, MALDI-TOFMS
	Marker discovery	MALDI-TOFMS, LC-MS/MS, nano-LC, AccuSpot
Metabolomics	Marker discovery	GCMS, LC-MS/MS, iMScope TRIO
	Metabolite analysis	GCMS, HPLC (Nexera), LCMS
Imaging	<i>In vitro</i> imaging	MALDI-TOFMS, iMScope TRIO, iMLayer, EPMA
	Optical brain-function imaging	LIGHTNIRS, LABNIRS

- Genomics
- Proteomics
- Metabolomics
- Imaging



■ ■ **iMScope TRIO** →P.33
■ ■ Imaging Mass Microscope



■ ■ **LCMS-9030** →P.18
■ ■ Quadrupole Time-of-Flight Liquid Chromatograph Mass Spectrometer



■ ■ **MALDI-8020** →P.31
■ ■ Matrix-Assisted Laser Desorption/Ionization Time-of-Flight Mass Spectrometer



■ ■ **MultiNA** →P.41
■ ■ Microchip Electrophoresis System



■ ■ **BioSpec-nano** →P.41
■ ■ Life Science Spectrophotometer



■ ■ **PPSQ-51A/53A** →P.40
■ ■ Protein Sequencer



■ ■ **LIGHTNIRS** →P.42
■ ■ Portable functional Near-Infrared Spectroscopy System for Research

Evaluation Instruments for Renewable Energy Applications

Evaluation instruments for renewable energy

Renewable Energy for Building a Sustainable Society

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

Field	Manufacturing Process and Components	Shimadzu Products
Algal Biomass	Monitoring quantities of algae cells and generated organic matter	TOC, UV, Balances
	Analysis of generated oils/fats and hydrocarbons	GCMS, LCMS, HPLC
	Cell surface hardness and particle size distribution	SPM, SALD
	Qualitative-quantitative analysis of purified substances	GCMS, LCMS, HPLC, Balances
Photocatalysts and Artificial Photosynthesis	Evaluation of heterogeneous photocatalysts	UV, XRD, XPS, FTIR, SPM
	Evaluation of homogeneous photocatalysts	UV, LCMS, FTIR, QYM-01
	Evaluation of reaction products	GC, HPLC
	Isotopic evaluation of reaction mechanisms	GCMS
Energy Carriers (hydrogen energy)	Analysis of impurities in hydrogen	GC, GCMS
	Evaluation of synthetic or reforming catalysts	UV, XRD, XPS, FTIR, SPM
Fuel Cells (Solid PEFC)	Catalyst layers	EDX, FTIR, XPS
	Supported carbons	XRD, Particle size analyzers, Balances
	Membrane electrode assemblies (MEA)	EPMA, X-Ray Inspection System
	Electrolytes	Thermal analyzers, SPM, Micro Vickers 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-1900 →P.34
■ UV-VIS Spectrophotometers



■ XRD-6100 OneSight →P.45
■ X-Ray Diffractometer with Wide-Range and High-Speed Detector



■ EDX-7000 →P.43
■ Energy Dispersive X-ray Fluorescence Spectrometer



■ SPM-8100FM →P.47
■ High-Resolution Scanning Probe Microscope



■ LCMS-8060 →P.18
■ High Performance Liquid Chromatograph Triple Quadrupole Mass Spectrometer



■ GCMS-QP2020 NX →P.27
■ Gas Chromatograph Mass Spectrometer



■ Nexis GC-2030 →P.14
■ Gas Chromatograph

Ultra High Performance Liquid Chromatograph **New**

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.


**ANALYTICAL
INTELLIGENCE**

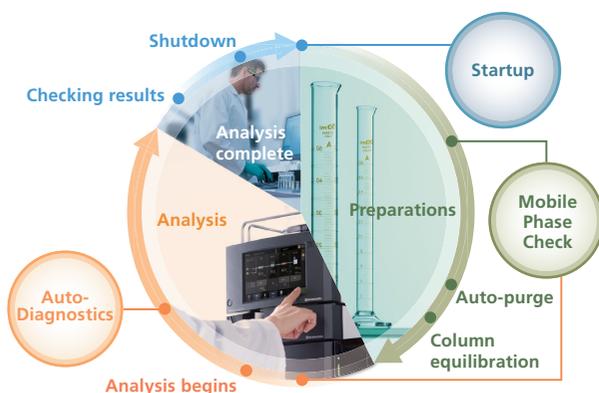
Automated support functions utilizing digital technology, such as M2M, IoT, and Artificial Intelligence (AI), that enable higher productivity and maximum reliability.

• 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

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.

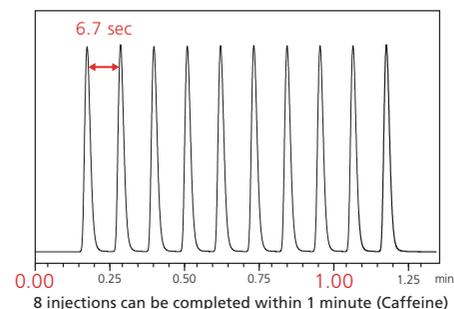
• A New Benchmark of Efficiency

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



• 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**

System Controller

SCL-40 and CBM-40/40lite **New**

SCL-40

The SCL-40 system controller includes a touch panel that can be used to directly control the instrument without using a computer. That makes it easy to prepare for analysis even without a control computer. An optional mobile phase controller can be installed in the reservoir tray area. It helps prevent running out of mobile phase by measuring the weight of mobile phase bottles in real time and sending the results to a smart device or computer.

SCL-40 and CBM-40 Specifications

Number of units controllable	8 (or 12 using option)
Event inputs/outputs	1 input and 2 outputs

Solvent Delivery Unit

LC-40D/40B Series **New**

LC-40B XR

In addition to four parallel-type double plunger models for different allowable upper pressure limits, XR and X3 models feature smaller gradient delay volumes and a dual pump that enables both ultra high-speed and high-pressure gradients using the same system. A wide variety of other solvent delivery environments are available as well, such as for low-pressure gradients or mobile phase blending.

LC-40D XR and LC-40B XR Specifications

Pump type	Parallel-type double plunger
Flow rate	0.0001 to 3.0000 mL/min (1.0 to 70 MPa)
Flow rate range	3.0001 to 5.0000 mL/min (1.0 to 44 MPa)
	5.0001 to 10.0000 mL/min (1.0 to 22 MPa)

Autosampler

SIL-40/40C Series **New**

SIL-40C XR

These models achieve ultra low carryover of 0.0003 % or less. Ultra fast injection, automatic pretreatment functions, and other features help improve analytical efficiency even further.

The optional dual-injection function enables simultaneous data acquisition using two completely different analysis systems, by installing two internal injection ports and providing completely independent flow channels downstream from those ports.

SIL-40 XR, 40C XR, 40C XS, and 40C X3 Specifications

Injection method	Total volume injection (standard) Loop injection (optional)
Injection volume settings range	0.1 to 50 μ L (standard) 1 to 2,000 μ L (optional)

Plate Changer

New

The 170 mm width results in a significantly smaller installation footprint. It holds up to 14 microplates or seven 1.5-mL vial plates. Up to three plate changer units can be linked to hold, including in the autosampler, up to 44 microplates or 16,896 samples (using 384-well plates).

Number of samples processed	Including 2 autosampler plates: 108 to 6,144 Including 2 autosampler plates and 3 linked plate changers: 276 to 16,896
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Column Oven

CTO-40C/40S **New**

CTO-40S

The 130 mm wide narrow model with forced air circulation has a maximum temperature of 85 °C and the 260 mm wide standard model has a maximum temperature of 100 °C. Both can hold 300 mm long columns and include internal connectors that recognize gradient mixers. (The narrow model includes one connector and the standard model two.) Ovens can also be installed with optional preheating tubes.

Temperature control method	Forced air circulation
Temperature control range	CTO-40C: 10 below room temperature to 100 °C CTO-40S: 10 below room temperature to 85 °C

UV-VIS Absorbance Detector and PDA Detector

SPD-40/40V and SPD-M40 **New**

SPD-40V

These newly developed models offer improved baseline stability for room temperature fluctuations and improved linearity. The photodiode array (PDA) detector includes a UV cutoff filter that improves quantitative accuracy of photolytic compounds. Cells and lamps have ID codes that help improve traceability.

Light source	SPD-40: D2 lamp SPD-40V, SPD-M40: D2 lamp, W lamp
Wavelength range	SPD-40: 190 to 700 nm SPD-40V: 190 to 1,000 nm SPD-M40: 190 to 800 nm

Ultra High Performance Liquid Chromatograph

Method Scouting System

NewAchieves Method Development Combining
Comprehensiveness and Reliability**Four Times the Previous Number of Conditions Can Be Examined**

The number of columns that can be used has been increased from six to twelve, and further two gradient patterns have been added. This provides a highly comprehensive system covering four times the previous number of conditions that can be examined for method development. The system significantly reduces the development process from method searches to optimization and evaluations of robustness, including the separation of target components and impurities, and purity checks for chiral compounds.

Displays the Optimal Separation Condition Parameters and Chromatograms

Combining with the Multi-Data Report function* from LabSolutions DB/CS enables the automatic output of the optimal analytical conditions, in order of score, based on the customer's judgment standards.

In addition, each chromatogram can be browsed, making it easy to visually check for the optimal analytical conditions. This significantly reduces the time and effort required for everything from the examination of analytical conditions to the confirmation of results.

* Supported with LabSolutions DB/CS Ver. 6.72 SP1 or later.

Compatible with the i-Series

In addition to the Nexera series, the method scouting system is compatible with the i-Series and the Nexera UC supercritical fluid chromatograph. A special kit is used for an upgrade of a customer's system to the method scouting system, which can be done simply and inexpensively.



Preparative Purification Liquid Chromatograph

New

Nexera Prep

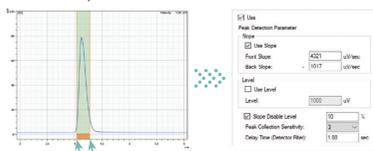
Higher Efficiency, Space-Saving,
and Multianalyte Processing

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.

Four Times Shorter Review Times

The LabSolutions fraction simulator (patent pending) automatically sets parameter settings required for collecting fractions from the desired range of peaks specified on the chromatogram. The function reduces the time spent configuring fractionation parameter settings to about one fourth the previous level.

**UFPLC Ultra Fast Preparative Trap Purification System**

Using the UFPLC ultra fast preparative trap purification system, all preparative processes can be performed online, from fractionation to concentration, purification, and recovery. That can significantly save labor and reduce operating errors involved in preparative purification processes. Using Shimadzu's unique concentration purification technology, target components in fractions can be trapped and concentrated to enable high-concentration and high-purity recovery of trace components contained in synthesis samples. Also, the time required to evaporate samples to dryness was shortened significantly by using highly volatile organic solvents to recover target components.



High-Performance Liquid Chromatograph

i-Series Plus**Computer-Less Laboratory Realized to Free Operators from the Laboratory**

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

innovative –Realization of Advanced Laboratory

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

Intuitive –Achieving Easier Operation

- Equipped with pretreatment functions that automatically produce dilutions, add reagents, etc.
- Unified graphical user interface between system and workstation
- Create analytical sequences on visualized vial positions: Quick batch function

Nexera-i

The Nexera-i is a simple, all-in-one UHPLC system that raises the productivity of the laboratory to the maximum by reducing the time needed to develop analysis methods, and by simplifying the work needed to transfer already proven method files.

Up to 1,536 samples can set up at once, so CMC related analyses that require many samples, or a wide variety of other analyses, such as dissolution tests, pharmacokinetics, and toxicant tests can be speedily accomplished, thus reducing the time needed. Moreover, the automatic shutdown function of the i-Series has resulted in a reduction of more than 95 % (compared with Shimadzu existing systems) in the power consumption of the instrument when in the standby state, contributing to reducing the environmental impact.

Nexera-i MT i-Series Method Transfer System

This system contains two flow lines, matched to the volumes of each of UHPLC and HPLC systems. In addition to simplifying the migration of analytical test methods for customers using HPLC, this enables the smooth transfer of customer's HPLC methods to faster UHPLC methods. It enables analytical test methods established with non-Shimadzu HPLC to be migrated with excellent repeatability, significantly reducing the process of validating analytical methods. The newly developed Condition Transfer and Optimization (ACTO) function incorporated in LabSolutions allows users to transfer injection timings matched to differences in system volumes between instruments, without editing the concentration gradient programs in existing methods. Furthermore, existing HPLC methods can simply be loaded for transfer to faster Nexera-i MT methods.

**intelligent** –Smart Features Increase Work Efficiency

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

Prominence-i

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

Prominence-i LT Detectorless Model

The Prominence-i series LC-2030C LT detectorless model is an integrated LC system without a UV detector or a PDA detector. This model enhances the selectivity of the detector used, while maintaining the advantages of the i-Series, including space-saving feature, operability from a touch panel, and both fast injection & excellent reproducibility at trace injection volumes. In addition, upgrades to faster analysis are enabled by using an extension kit that provides the same pressure capacity as the Nexera-i.

It can be used as an LC-MS front-end LC for the analysis of sugars and amino acids, which do not absorb UV, for GPC analysis of polymers using a RID detector, and for fluorescence analysis of anionic surfactants in an aqueous environment.

Nexera Application System

Bromate Analysis System



This bromate analysis system uses the ion chromatography—post-column absorbance detection method (tribromide ion method), based on the Japanese ministerial ordinance regarding water quality standards. It is capable of high-sensitivity detection at the $\mu\text{g/L}$ level or less, using Shimadzu's renowned post-column reaction technique and a high-sensitivity UV-VIS detector. For the post-column unit, a piping parts kit specifically for the tribromide ion method is available, in which a reaction reagent mixing device (Japanese Patent No. 4082309) is adopted in order to efficiently mix high-concentration reaction solutions. The system enables simultaneous quantitation of halogen oxides. Iodic acid ions and chlorous acid ions are simultaneously quantitated as halogen oxides.

Major component units	CBM-40, LC-40D $\times 2$, LC-20Ai, DGU-405, SIL-20AC, inert kit, CTO-40C, SPD-40, LabSolutions LC, and others
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Nexera Application System

Anionic Surfactant Analysis System



This anionic surfactant analysis system is based on the Japanese ministerial ordinance regarding water quality standards. The fluorescence detector (RF-20Axs) achieves an unprecedented sensitivity, with a water Raman S/N ratio of at least 2,000. With grouping and group calibration functions, the system can perform quantitative analysis by totaling the peak area values for multiple isomers with differing alkyl chains. If an MS detector is used in the system, more abundant qualitative information can be obtained on a variety of surfactants.

Major component units	SCL-40, LC-40D, DGU-403, SIL-40C, CTO-40C, RF-20Axs, LabSolutions LC, and others
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Note: For systems using an MS detector, contact your Shimadzu representative separately.

Nexera Application System

Cyanic Analysis System



This high-sensitivity analysis system for cyanide ions and cyanogen chloride uses the ion chromatography—post-column absorbance detection method (4-pyridine carboxylic acid-pyrazolone method), based on the Japanese ministerial ordinance regarding water quality standards. It enables high-sensitivity simultaneous analysis of cyan and cyanogen chloride by their chemical form. The system adopts a column oven with a cooling function to achieve thermal recycling, in which the reaction heat from the second stage is reused for the first stage reaction. It is highly sensitive, with a detection limit (S/N ratio = 3) of 0.0001 mg/L (CN value). It can easily measure not only the standard value (0.01 mg/L) but even 1/10th of that concentration. Thanks to Shimadzu's proprietary high performance columns, analysis can be performed in 10 minutes or less per sample.

Major component units	CBM-40, LC-40D $\times 3$, LC-20Ai, DGU-405, SIL-20AC, inert kit, CTO-40C, SPD-40, LabSolutions LC, and others
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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
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Ultra High Performance Liquid Chromatograph for Online Dissolution Testing

Nexera FV



The Nexera FV automates the entire process from dispensing effluent from the dissolution tester, analysis, analysis of the results, all the way to outputting the reports. Since it is equipped with the fraction analysis mode that accommodates high-speed sampling at 5-minute intervals, it is capable of handling formulations that dissolve quickly. Moreover, in cases where the sampling interval is long, such as with sustained-release drug products, a high-speed analysis of the effluent within this timeframe can be performed by selecting the direct analysis mode. This can greatly reduce the amount of work required for dissolution testing. Since the system configuration is based on the Nexera X2, which is renowned for its speed, sensitivity, and stability, highly reliable dissolution test results can be rapidly obtained. It can also be used as a regular UHPLC system, so high-speed analyses can be performed at the testing site, resulting in an increase of the system operation rate.

Major component units	CBM-20A, LC-30AD, low-volume LPGE unit, DGU-20Asr, SIL-30ACFV, CTO-20AC, SPD-20A UFLC, LabSolutions LC, etc.
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Columns for Ultra High Performance Liquid Chromatograph

Shim-pack Velox LC Columns



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

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

Ion Chromatograph

Prominence HIC-NS/HIC-SP



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

Major component units	CBM-20A, LC-20AD ^{SP} , DGU-20A ^{3R} , SIL-10Ai, CTO-20AC(NS), CDD-10A ^{VP} (NS), SPD-20A(SP), HIC-20A Super(SP), LabSolutions LC and others.
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Columns for Ultra High Performance Liquid Chromatograph

Shim-pack Arata LC Columns



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

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

Gas Chromatograph

Nexis GC-2030

The Next Industry Standard

Nexis GC-2030, Shimadzu's high-end gas chromatograph, is a new-generation gas chromatograph that combines improved operability and easier maintenance with the world's highest levels* of performance for sensitivity and reproducibility.

A color touch-panel interface with clear, intuitive graphics enables all users to monitor the instrument status and set parameters with ease. In addition, Nexis GC-2030 offers excellent usability with tool-free inlet maintenance and column installation and a built-in oven light. It also provides a variety of functions to ensure compliance with GLP/GMP and a self-diagnosis function.

* As of May 2017, according to a Shimadzu survey

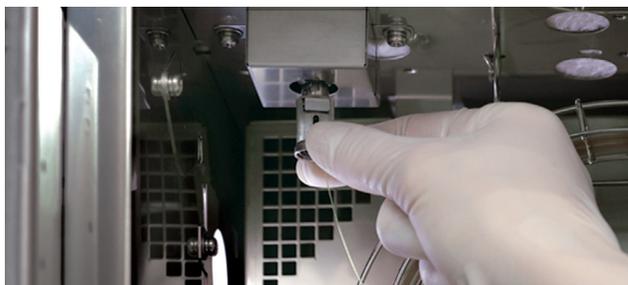
Column temperature	Max. 450°C (Room temperature + 2°C)
Carrier gas control	Constant linear speed control, constant flow rate control, constant pressure control possible Pressure: Max. 970kPa, Flow-rate: 1,300mL/min
Sample injector	Split/splitless, direct, on-column, programmable temperature vaporizer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



Tool-free Column Installation

ClickTek connectors*2 make tool free column installation a snap. The click sensation felt when finished attaching the column provides a more reliable connection and ensures a better seal under all operating conditions.

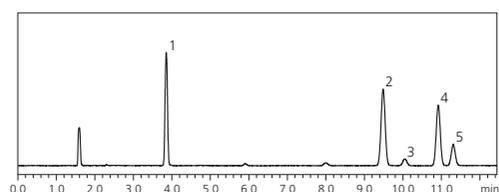
*2 Optional



ClickTek Connector

High-Sensitivity Detectors Support a Wide Variety of Analyses

The jet and collector structure on the flame ionization detector (FID-2030) has been optimized to provide improved performance. Noise levels were also decreased by improving the stability of the signal processor and flow controller. This results in the world's most*1 sensitive FID. This makes the Nexis GC-2030 the best choice to measure residual solvents in pharmaceuticals.



1. 1,1-Dichloroethane
2. 1,1,1-Trichloroethane
3. Carbon tetrachloride
4. Benzene
5. 1,2-Dichloroethane

Analysis of Trace Residual Solvents in Pharmaceuticals using Head Space GC, Class 1 Standard Solution

One Touch Inlet Maintenance

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

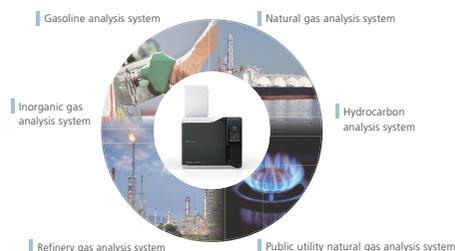


ClickTek Nut

GC Systems Customized for Specific Needs

The Nexis GC-2030 provides powerful support for configuring custom GC systems tailored to user needs. These systems are adjusted and tested at the factory for the given application before shipment, so they are ready to use for measurements as soon as they are delivered. That means no time is required for developing methods after the system arrives. Two TCD detectors and one FID detector can be installed at the same time. An optional valve box can be added to control up to eight valves from the original four.

Examples of System GC Configurations



Energy Saving Capillary Gas Chromatograph

GC-2025



Shimadzu's new-generation GC-2025 capillary gas chromatograph minimizes environmental impact by reducing power and carrier gas consumption while retaining the performance capabilities required for capillary analysis.

The GC-2025 incorporates a digital flow controller that controls both the carrier and detector gases and a newly designed energy-saving column oven that features small volume and less heating loss, realizing a dramatic improvement in operability.

The compact GC-2025 is the gas chromatograph for environmentally friendly, high value performance.

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

Gas Chromatograph for versatile applications

GC-2014 Series



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

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

Auto Injector/Auto Sampler for GC/GC-MS

AOC-20i (Plus)/AOC-20s (Plus)



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

GC Application System

Headspace Analysis System



Nexis GC-2030 HS-20 Trap

Nexis GC-2030 HS-10

The headspace sampler holds vials in an oven to heat the sample for a certain period of time. A set amount of gaseous phase is sampled and introduced to the GC or GC-MS.

The system can handle both liquid and solid samples, and is used for the analyses such as of residual solvents in pharmaceuticals, trace amounts of volatile organic compounds (VOCs) in waste water, and alcohols in blood.

Headspace Sampler HS-20 Series

With the HS-20 and HS-20 LT, introduction by means of sample loop is possible, whereas with the HS-20 Trap, both sample loop introduction and trap concentration introduction are possible. Since the oven is capable of a maximum temperature of 300 °C, high boiling point compounds can be analyzed.

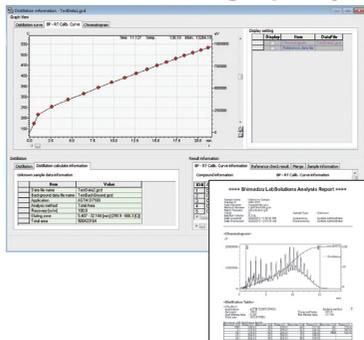
Headspace Sampler HS-10

In terms of cost performance, this model is truly superior, since it offers functions of sample stirring and of overlapped heating of multiple vials, while also providing the full range of functions necessary for headspace analyses.

	HS-20 Series	HS-10
Applicable models	Nexis GC-2030, GC-2010 Plus/2010, GC-2014	
Sample injection method	Sulfinert sample loop 1 mL (provided standard) 0.2 mL, 3 mL (optionally provided) or trap (HS-20 Trap)	1 mL (provided standard) inactivated sample loop 0.5 mL, 2 mL (optionally available)
Number of vials	90	20
Vial stirring	5-stage	3-stage

GC Application System

Distillation Gas Chromatograph System



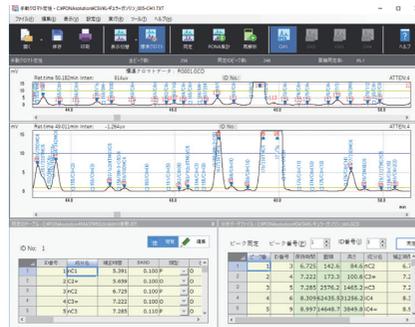
The boiling point distribution of petroleum fractions can be measured by simple operation from LabSolutions menus. This system supports various distillation GC standards such as ASTM and JIS.

- 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.)
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Analysis Software for PONA Analysis

PONA solution



In conjunction with a Nexis GC-2030 system and LabSolutions software, this software is used to perform tasks uniquely involved in PONA analysis, such as component identification/calculation, regulatory compliance report preparation, identification ID table management, and so on.

It can prepare standard reports in conformance with JIS K 2536-2 requirements for component notation. With freely customizable window layouts and multiple functions helpful for identifying components when checking chromatograms, it can dramatically increase work efficiency.

Applicable samples	Mixtures of naphtha, gasoline, and other hydrocarbons
Quantitation	Peak area %, weight %, and volume % can be quantitated based on carbon number or other features (such as n-paraffins, i-paraffins, olefins, naphthenes, diolefins, or aromatics).

Chromatopac

C-R8A



A variety of peak integration and quantitative calculation functions are included standard. Designed mainly for quality control and other routine operations, C-R8A functionality can be fully utilized easily by anyone. The VP function for automating various validation functionality provides powerful support for GLP/GMP compliance. A high-speed RS-232C port (19,200 bps) is included standard to ensure full compatibility with computer network systems operated using CLASS-Agent or Chromatopac Manager, for example. An SD card drive is included standard.

Data Management Tool for Chromatopac Data Processor

PACsolution

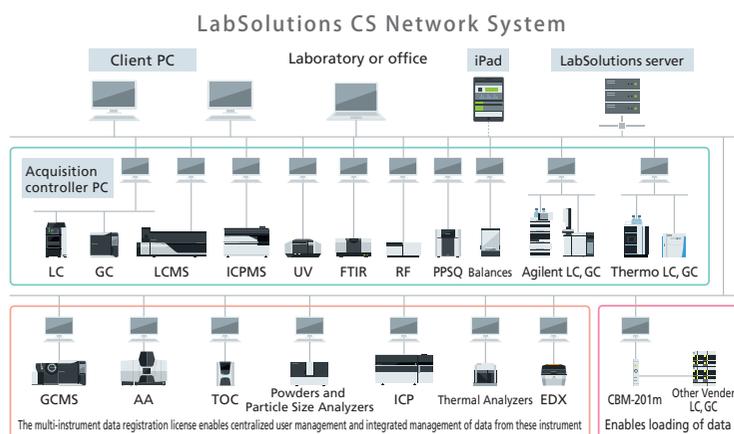


With Chromatopac alone, there are limits on procedures for postruns, comparisons with past data or the creation of reports, and data management. Using PACsolution not only heightens the efficiency of procedures such as for collecting analytical data on a PC, manual peak integration, and pasting analytical data into Excel or Word, but also heightens the efficiency of analytical data searches, and strengthens security. It also supports networking with other analytical instruments.

Applicable models	C-R7A series, C-R8A
PC	A PC running Windows 7 with a 2 GHz CPU or faster and 2 GB of RAM or more is recommended.
Number of connected instruments	Up to 8 Chromatopac units can be connected to one PC.
Connection range	Up to 15 m between the Chromatopac unit and the PC

Analysis Data System

LabSolutions CS/DB



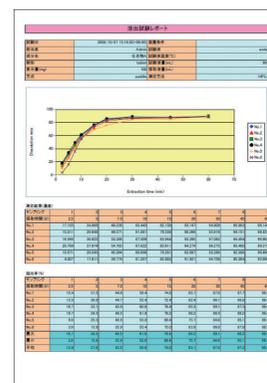
LabSolutions DB is a product that integrates the analysis data management functions of LabSolutions LC/GC, and provides for compliance with regulations such as the Japanese Ministry of Health, Labour and Welfare's ER/ES guidelines. This product's configuration is ideal for those who wish to manage all their data on one PC.

With LabSolutions CS, all analysis data is managed in a database on the server computer, so the data can be loaded using any computer on the network. Additionally, even PCs that are not connected to instruments (client PCs), can be used to stipulate that analysis is to be performed, or be used for monitoring or controlling the instruments. Furthermore, the direct control of non-Shimadzu LC/GC systems can also be performed.

Also, since the system is compatible with Windows terminal services, the functions of the client PC can be run on the server, thus eliminating the need for the LabSolutions software to be installed on the client PCs. Moreover, the system is compatible with XenApp by the Citrix Systems, Inc., thus assuring a high level of server management.

LabSolutions

Multi-Data Report

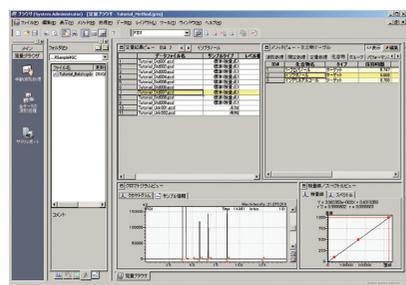


Multi-Data Report is an optional product that can be used together with LabSolutions CS/DB in order to create comprehensive reports that bring together all of the analysis data acquired from a multiple number of instruments.

From the standpoint of data integrity, its use can be effective, since the reports can be used for audit trails and digital signatures. Reports combining data from a variety of different instruments connected to the system, including HPLC or GC, MS, FTIR, UV, or electronic balance can be created.

Integrated Workstation

LabSolutions LC/GC



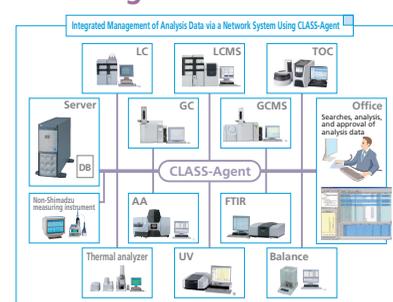
This next-generation workstation integrates GC and LC control, and provides users with stronger network functions. It features a Quantitation Browser that allows you to verify multiple data acquisition results and has substantial functions for automating processes from startup right through to shutdown, which results in improved operator ease and analytical productivity. It is also provided with a PDF output function as well, which helps conserve paper. Nexis GC-2030, GC-2014 and GC-2025 can be controlled.

- Windows 7, LabSolutions LC/GC and CLASS-Agent Manager are pre-installed.
- PONASolution and MDGCSolution are not supported so use GCSolution.

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

Analysis Data Management Tool

CLASS-Agent

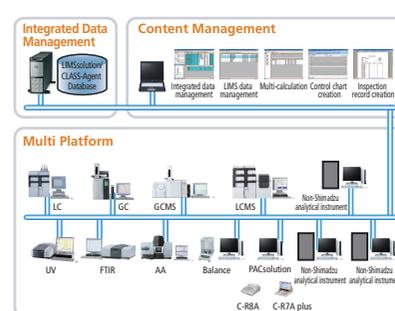


With many analytical instruments networked, the CLASS-Agent performs integrated data management using a database. Target data from the database can be searched for quickly. It also provides easy connection with Excel and other software, as well as LIMS and other computer systems. In addition, it can accommodate digital signatures and the management of digital records in compliance with FDA 21 CFR Part 11.

Applicable models	Support for a number of analytical instruments including chromatographs, electronic balances, spectrophotometers (Contact your Shimadzu representative for further details.)
Controllable data	Raw data such as chromatograms and spectra, metadata such as measurement schedules and data analysis methods, PDFs and other printing images, files

Analysis Information and Data Management System

LIMSsolution



This system is used to manage the vast quantity of information from diverse analytical and measuring instruments in analytical laboratories. It is equipped with functions to fully automate analytical procedures and to heighten their efficiency. This includes connection with production control systems, test registration, creation of analysis instructions, creation of batch files, analysis and measurement, collection of analysis and measurement results, calculations for each analysis and test; judgments based on upper and lower limits, and creation of summary tables, inspection records, and control charts.

Server PC	A PC running Windows Server 2012 R2 with a 2 GHz CPU or faster and 8 GB of RAM or more is recommended.
Database	Oracle 11g or SQL Server 2014
Client PC	A PC running Windows 7 with a 2 GHz CPU or faster and 2 GB of RAM or more is recommended.

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.

» New TOF Technologies

UFaccumulation™

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

UFgrating™

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

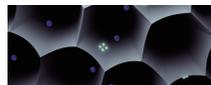
Funnel MCP

Lossless microchannel plate design maximizes sensitivity.

Conventional MCP



Funnel MCP



UF-FlightTube™

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

iRefTOF™

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



iRefTOF

Effortless Performance



TOF mass range	<i>m/z</i> 10 to 40,000
Resolution (TOF)	30,000 FWHM
Mass accuracy	<1 ppm at <i>m/z</i> 622.5662
Maximum acquisition rate	100 Hz

High Performance Liquid Chromatograph Triple Quadrupole Mass Spectrometer

LCMS-8060



The LCMS-8060 features an optimized ion guide and new technologies incorporated in the ion transport optical system. As a result, the ion sampling efficiency and ion focusing capability are significantly increased, to achieve improved sensitivity, approx. 3 times better than that of the LCMS-8050. Inheriting the high-speed performance of the LCMS-8050, this flagship model in the UFMS series features both the world's highest level of sensitivity and the world's highest throughput. It is capable of detecting ultra trace components in complex matrices, which have been difficult to detect to date, both quickly and with high sensitivity. This will contribute to further improvements in data quality in all types of trace quantitative analysis applications, such as for biological samples, which requires the highest level of sensitivity.

Mass range	<i>m/z</i> 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 channels/sec

Note: LC units are not included with this product.

High Performance 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	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.

High Performance 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 the world's fastest scan speed (30,000 u/sec) and polarity switching speed (5 msec). These enable ultra-high-speed, high-sensitivity analysis. The excellent cost performance of this system is demonstrated in food safety, environmental analysis, and other routine quantitative analyses. In addition, it can be upgraded to the LCMS-8060.

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

Note: LC units are not included with this product.

High Performance Liquid Chromatograph Triple Quadrupole Mass Spectrometer
LCMS-8040



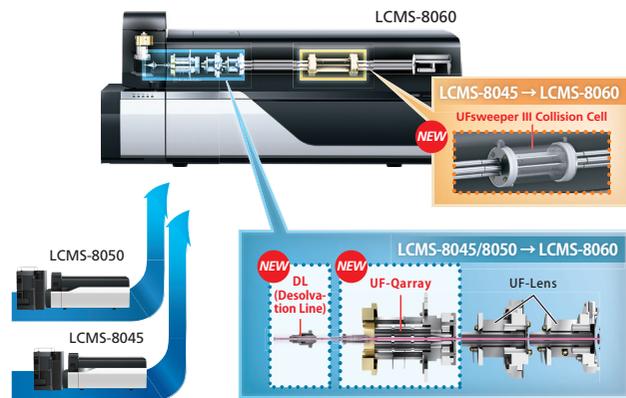
The LCMS-8040 was designed to provide significantly higher sensitivity while maintaining the high speed offered by the LCMS-8030. Ultrafast MRM transition speeds, up to 555 MRMs per second (dwell times of 1 msec and pause times of 1 msec) are achieved. In addition, the LCMS-8040 features the world's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

* Per survey result as of May 2012

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

Note: Product does not include LC Units.

High Performance Liquid Chromatograph Mass Spectrometer
LCMS-8045/8050 Upgrade Kit



Installation of the ion sampling technology, ion optical system, and vacuum system, newly developed for the LCMS-8060, allows the LCMS-8045/8050 to achieve comparable performance to the LCMS-8060.

After upgrading, the system will have the same level of performance as the LCMS-8060, excluding its external appearance.

This is recommended for customers who want higher sensitivity in the LCMS-8045/8050 they are using.

Note: Changing the external appearance to that of the LCMS-8060 is not included. The UFsweeper III collision cell is included in the LCMS-8045 upgrade kit. Contact your Shimadzu representative for further details.

Option for LCMS-8060/8050
LDTD Ion Source



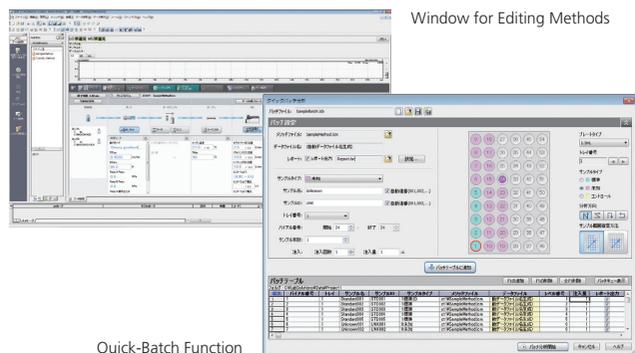
The LDTD* ion source provides for ultra high speed analysis. After a sample is dispensed and dried on a specialized plate (96 holes), the sample is volatilized by laser irradiation and ionized with the corona discharge of atmospheric pressure chemical ionization (APCI). This system makes possible ultra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

* LDTD: Laser Diode Thermal Desorption

Note: LC and LCMS units and a PC are not included with this product.

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

LabSolutions LCMS

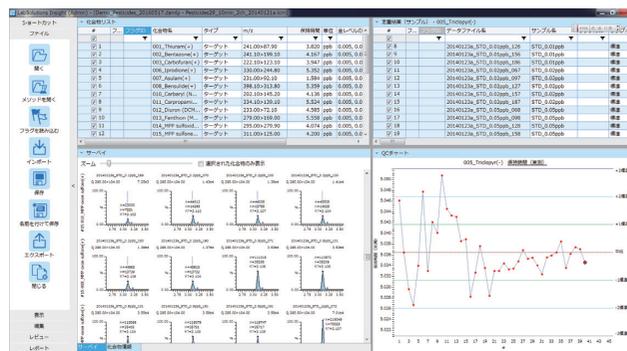


LabSolutions LCMS is used for LCMS-9030/8060/8050/8045/8040/2020 system control, data acquisition, and data analysis. In addition to simultaneous LC control, data acquisition, and data analysis, it also supports sophisticated application functionality, such as for co-injection and expansion to a method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

Note: LCMS-2010 series, LCMS-QP8000 series, and LCMS-IT-TOF systems are not supported, but data processing is supported for LCMS-2010 systems.

Multi-analyte Quantitation Support Software

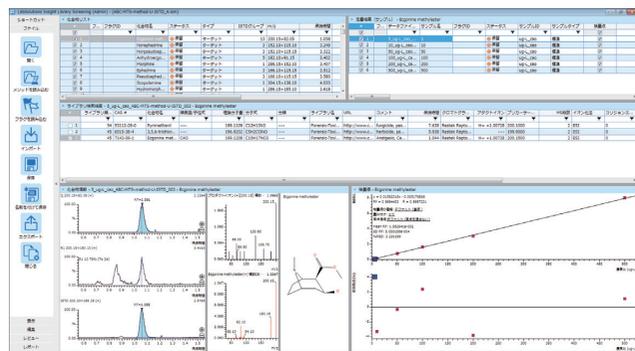
LabSolutions Insight



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

LC/MS/MS Screening Software

LabSolutions Insight Library Screening

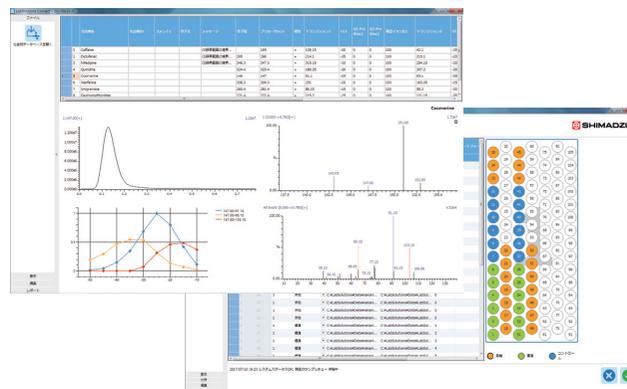


This optional software for LabSolutions Insight uses the MTS* method to search for MS, MS/MS spectra of known compounds in the library, and spectra of the actual sample, and then displays both the qualitative results and the quantitation results. In the search results window, structural formulas and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

* MTS: Multi-Targeted Screening

Analysis software for LCMS-8060/8050/8045/8040

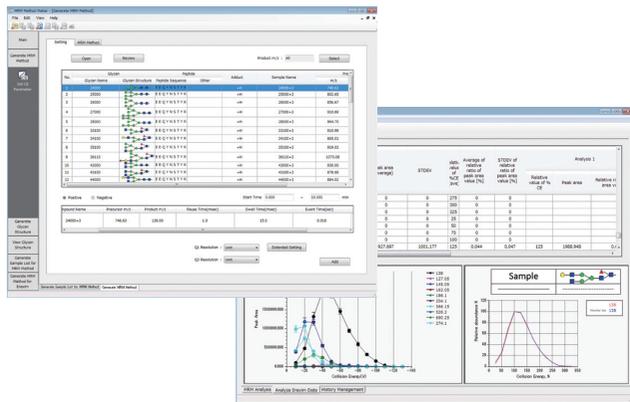
LabSolutions Connect



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

Note: LabSolutions LCMS and LabSolutions Insight are required separately.

Software Platform for Glycan Quantification and Qualification by LCMS-8060/8050

Erexim Application Suite

Erexim (Energy-resolved oxonium ion monitoring) is highly innovative, patented technology that enables you to understand the structure and relative amounts of each glycans without decomposing glycopeptide. (Developed in collaboration with RIKEN) This product consists of the following three software applications.

- (1) Profile Database Manager, which provides for the registering/editing of basic data, such as that for glycan structures.
- (2) MRM Method Maker, for easily creating methods
- (3) Data Analyzer, which automatically creates graphs of analytical data

By using this software, the entire process from creating glycan structures to the setting of MRM transitions can be performed graphically.

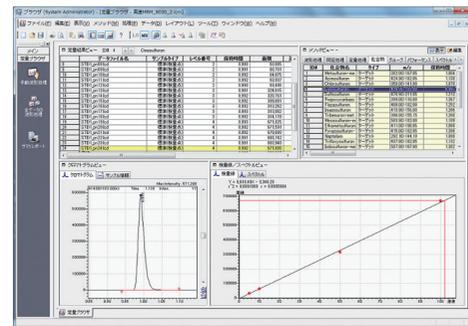
For LCMS-8060/8050/8045/8040/8030

LC/MS/MS MRM Library for Phospholipid Profiling

In order to identify phospholipids, it is important to determine the phospholipid class, such as choline and ethanolamine, as well as to estimate the fatty acid composition of their skeletal structures.

The MRM library contains examined MRM transitions, which eliminates the troublesome process of examining MRM conditions and LC methods, significantly shortening the time needed for method development. As a result, it achieves a smooth analysis process. Further, by using the method parameter list included in the product, new methods for only the components of interest can be created. The library includes phospholipid classification methods (422 components) for analyzing main phospholipids in biological samples containing C14 to C22, fatty acids, as well as fatty acid composition determination methods (867 components). These two types of methods enable batch analysis for determining a variety of phospholipids contained in biological samples.

For LCMS-8060/8050/8045/8040/8030

LC/MS/MS Method Packages

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

Residual Pesticides	836 components
Veterinary Drugs	42 compounds
Water Quality Analysis	76 compounds
Rapid Toxicology Screening	161 compounds
Primary Metabolites	55 + 97 compounds
Lipid Mediators	158 compounds
Cell Culture Profiling	95 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

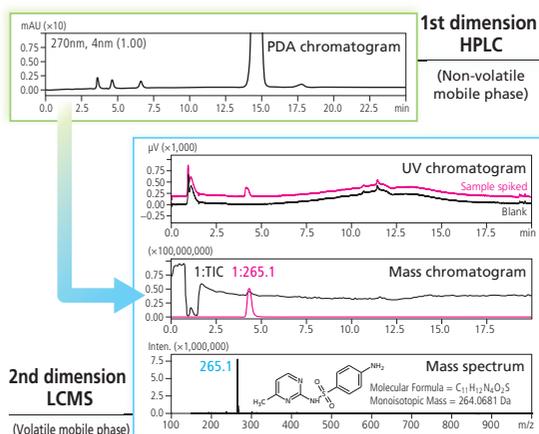
For LCMS-8060/8050/8045/8040/8030

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

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

For LCMS-8060/8050/8045/8040/8030/2020

Trap-Free 2D LCMS System



This convenient support tool enables online switching from a nonvolatile mobile phase to a volatile mobile phase. Simply enter the retention time for an impurity peak observed in the 1st dimension UV chromatogram. The optimal valve sequence is then constructed, and only the impurities of interest are introduced into the MS unit, so there are no concerns about misidentification. This significantly reduces the time and effort needed to examine conditions for volatile mobile phases, which can contribute to heightening the efficiency of identifying impurities.

Note: This system consists of an LC unit, mass spectrometer, and a start kit.

High-Performance Liquid Chromatograph Mass Spectrometer LCMS-2020

UPLC/MS
ULTRA FAST MASS SPECTROMETRY



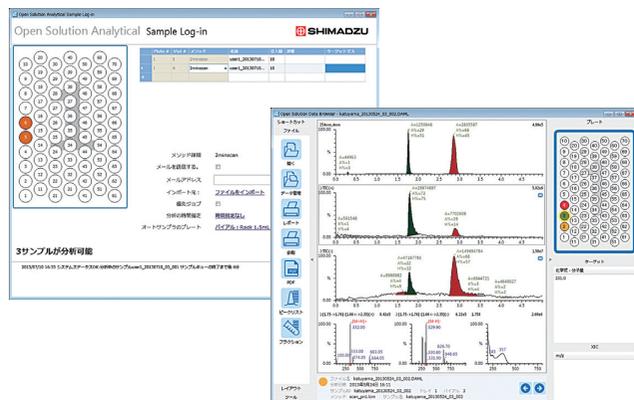
LCMS-2020 is optimized for the Prominence UFLC/UFLCxR Ultra Fast Liquid Chromatograph. Novel patent-pending technologies offer significantly enhanced scan speed and positive-negative ion polarity switching time, which are essential for UFLC, and simultaneously boost sensitivity. The instrument combines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

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

Note: This Product does not include LC units.

Open Access Software for LC and LCMS

Open Solution Analytical

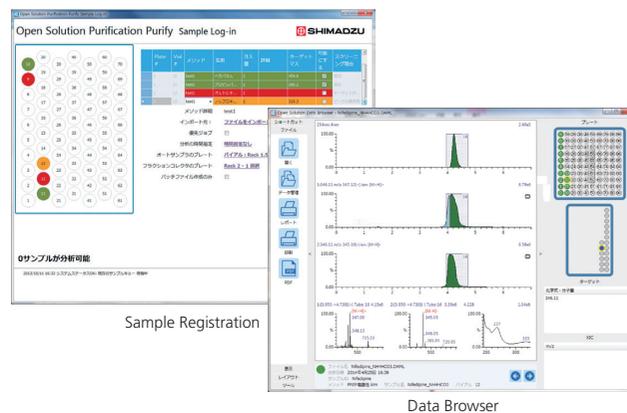


Supports LC and LCMS analysis in an open access environment. After logging in on the sample registration window, registration of samples and the analyses can be performed in one window. Moreover, data can be displayed using the Open Solution data browser simply by clicking the link in the e-mail that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

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

Open-Access Software for LC and LCMS

Open Solution Purification



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

Note) Only supported by the LCMS-2020.

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

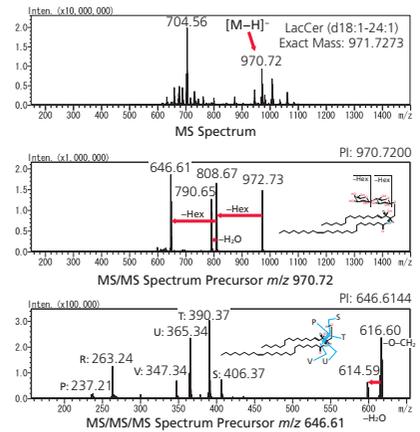


This unique, tandem mass spectrometer combines an ion trap with a time-of-flight (TOF) mass spectrometer. The ion trap offers MSⁿ capacity (MS/MS, MS/MS/MS, MS/MS/MS/MS, ...) and the TOF provides high-resolution, highly accurate MS analysis capacity. Together, they offer the diverse analysis information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

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

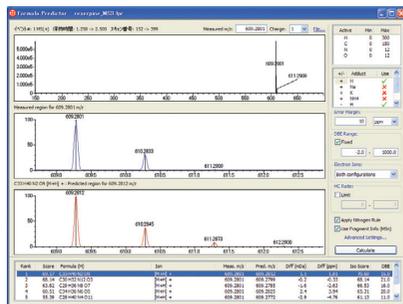
For LCMS-IT-TOF

Glycolipid Library



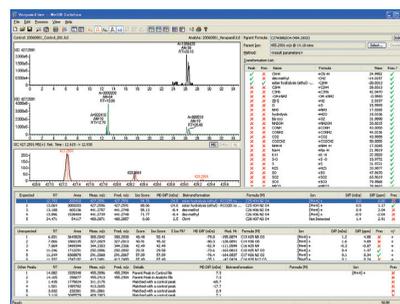
The glycolipid library includes data for a total of 309 types of glycolipids such as gangliosides, ceramides and acidic glycolipids. It contains accurate mass information and spectra up to MS⁴ obtained by LCMS-IT-TOF after extraction and purification from actual samples. A number of glycolipids for which standard substances are not commercially available are also included. Using the glycolipid library makes it possible to specify not only the sugar chain structure of glycolipids existing at trace quantities in biological samples, but also the lipid structures.

Software for LCMS-IT-TOF
Formula Predictor



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

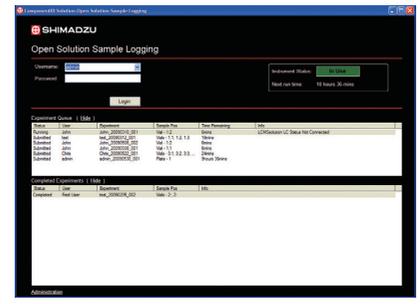
Metabolite Structural Analysis
Software for LCMS-IT-TOF
MetID Solution



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

Open Access Software
for LCMS-IT-TOF

Open Solution ComponentID



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

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

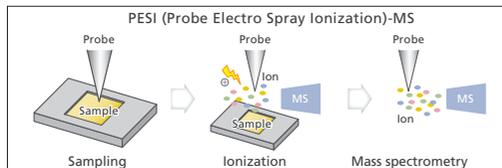
Probe Electrospray Ionization Mass Spectrometer DPiMS-2020



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

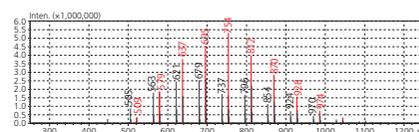
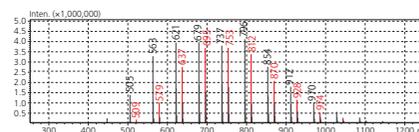
Features of PESI (Probe Electrospray Ionization Method)

- MS analysis can be started quickly, with a minimal amount of pretreatment.
- Enables monitoring of changes over time, such as for synthesis reaction and deterioration.
- Since only the tiny amount that contacts the probe is ionized, it offers great resistance to contamination of the MS section.



Analysis of Surfactant Mixtures

By measuring samples containing mixtures of multiple surfactants, changes in the spectral patterns can be easily confirmed. With shampoos and the like, measurements can often be performed simply by adding the sample directly to the plate, so analytical results can be obtained quite easily.



Sample: PPG Diol:PPG Triol Upper 1:1 Lower 1:2.5
Solvent: 50% IPA aq. (0.05% formic acid)

Probe Electrospray Ionization Kit

New

DPiMS-8060

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

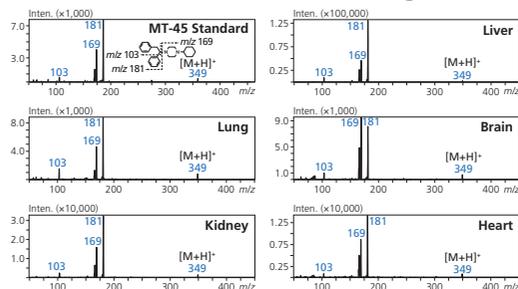
Measures a Wide Variety of Samples

- Body fluids, such as blood or urine
- Tissue sections, such as from laboratory animals or foods
- Plant materials, such as vegetables and fruits

Applicable for a Wide Variety of Objectives

- Detecting biological components
- Detecting materials for chemical products
- Detecting drugs, poisons, etc.

MT-45 Product Ion Scan Results for Each Organ



Note: This product does not include an LCMS unit.



DPiMS-8060+LCMS-8060

Switching to LCMS is Easy

The PESI TQ unit can be removed easily and replaced with an ESI unit. That means samples can be measured using the same ionization principle and standard substance for data comparisons.



With PESI TQ Unit Installed



With ESI Unit Installed

Supporting Micro Flowrate Range Liquid Chromatograph Mass Spectrometer System

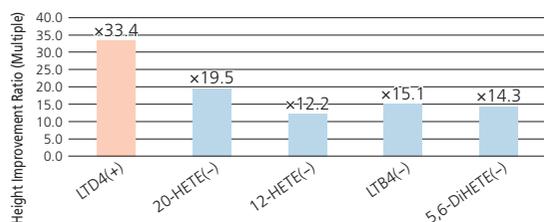
Nexera Mikros

Robustness and Operability Combined with High Sensitivity

While continuing to provide the same robustness and operability that our liquid chromatograph mass spectrometry (LC/MS) systems are known for, 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.

More Than 10 Times Higher Sensitivity Compared to Previous LC/MS Systems

Thanks to the new control system of the solvent delivery pump, the stabilized feeding in the micro flowrate range has been possible. Additionally, the ionization interface with optimized position and angle when injecting samples into the mass spectrometer. Together, these features make it possible to achieve more than 10 times the sensitivity of previous LC/MS systems.



Intensity improvement ratio relative to previous products for 5 lipid mediator components (LC flowrate 400 μ L/min. vs 2 μ L/min.)



Robustness Remains the Same

The ionization interface is optimized for analyzing in the micro flowrate range, so it prevents unwanted droplets from entering the mass spectrometer and contaminating the interior. Superior robustness is assured thanks to its contamination-proof design.

Anyone Can Easily and Reliably Perform Analysis

With micro-LC/MS analysis, minute gaps at the portion where tubing is connected can cause diffusion of the sample and lead to a loss in sensitivity. The newly developed "UF-Link" mechanism provides for one-touch, secure connection of analytical columns to the ionization interface of the mass spectrometer. Anyone can easily perform high sensitivity analyses with a minimum sensitivity loss.



Place the column in the UF-Link mechanism in the oven.



Lower the lever, and the connection is complete.

Automatic LCMS Pretreatment System

CLAM-2030

Revolutionize Your Workflow by Automating Pretreatment

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

It can be connected to the LCMS-8040/8045/8050/8060 system.

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

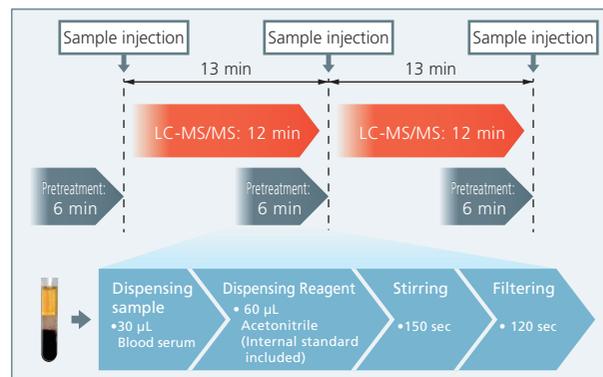
Note 1: LC and LCMS units are not included with this product.

Note 2: For Research Use Only. Not for use in diagnostic procedures.

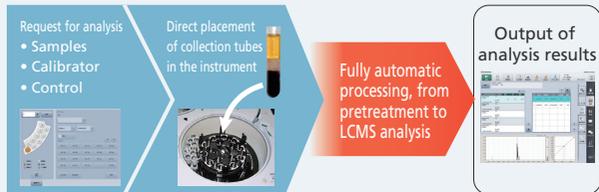
New



Automatic LCMS Pretreatment System
CLAM-2030



Analyze Drug Concentrations in Biological Samples Easily with LCMS via Integrated Software



Triple Quadrupole Gas Chromatograph Mass Spectrometer

GCMS-TQ8050 NX

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

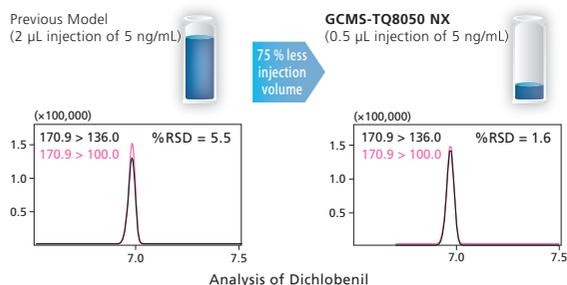
The GCMS-TQ8050 NX features a new highly efficient detector and three noise reduction technologies that enable previously unachievable femtogram-level quantitative analysis of ultra trace quantities.

The system also enables quantitative analysis for a variety of new applications, such as utilizing the dramatically high sensitivity for reducing the maintenance frequency and cost of long-term use, for example, or the high mass resolution to achieve even higher separation from contaminants.

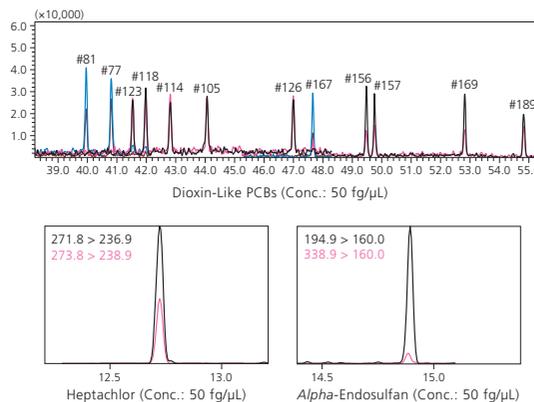


High-Sensitivity Detection of Ultra Trace Ion Quantities

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



Even Supports Analyzing Environmental Pollutants that Require Trace Analysis



Triple Quadrupole Gas Chromatograph Mass Spectrometer

GCMS-TQ8040 NX

Smart Performance that Boosts Routine Analytical Work

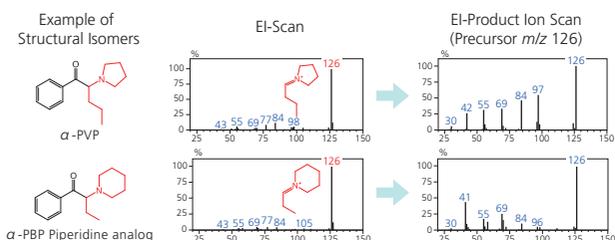
Smart performance offers simultaneous high-sensitivity analysis of multiple components, smart productivity achieves outstanding productivity with thorough efficiency improvements, and smart operation provides support for easy method creation and data analysis.

In combination, these three types of “smart” features provide a universal triple quadrupole GC-MS system that offers high performance for a wide variety of applications.

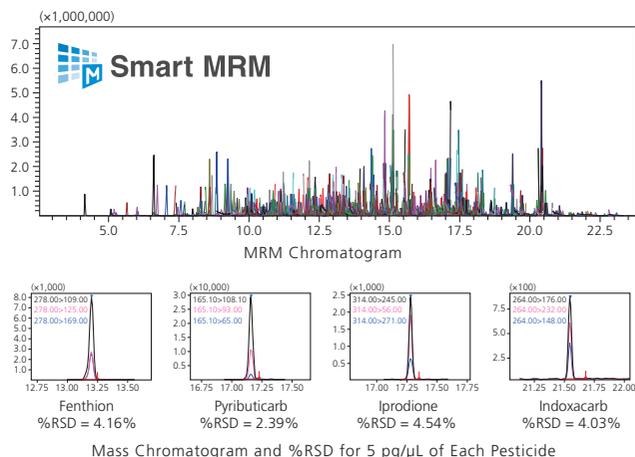


Qualitative Analytical Using GC-MS/MS

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



Simultaneous Analysis of 439 Pesticide Components by Smart MRM Scan



Gas Chromatograph Mass Spectrometer

GCMS-QP2020 NX

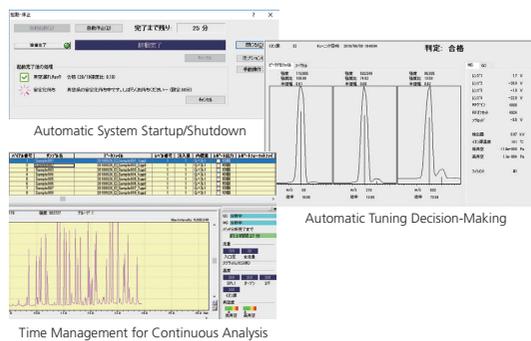
Smart Solutions for Maximizing the Potential of Laboratories

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



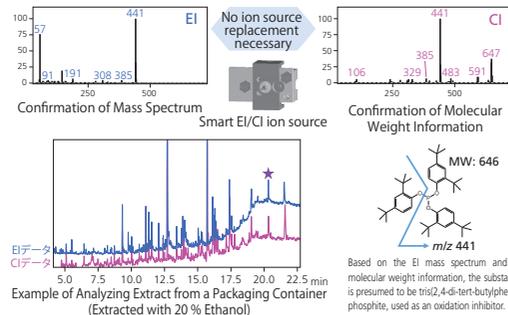
Active Time Management

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



Smart EI/CI Ion Source

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



Gas Chromatograph Mass Spectrometer

GCMS-QP2010 SE

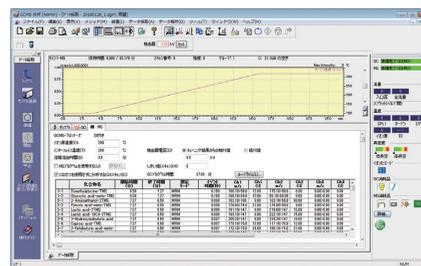


The GCMS-QP2010 SE is a high cost-performance model featuring both a variety of functions and ease of operation. In addition to high level performance, the user friendly design ensures that anyone can quickly and easily acquire highly reliable data, with ease of operation and maintenance in every situation.

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

Workstation for GC-MS

GCMS Insight Software Package



GCMS Insight is workstation software for GC-MS and GC-MS/MS systems, combining GCMSsolution and LabSolutions Insight into a single package. This software dramatically improves the efficiency of the analysis process, thanks to a user interface that can be operated intuitively even by novices; automatic method creation and data analysis functions that make multi-analyte and multicomponent analysis easier; and reliable qualitative analysis functions using retention indices.

In GC-MS analysis, a number of GC and MS parameters need to be optimized during data acquisition. The GCMSsolution automatic method creation function (Smart MRM/SIM), and automatic adjustment function for retention times (AART) make it possible to create optimal analytical methods automatically.

Furthermore, during data analysis, it is necessary to identify unknown components contained in samples, and to quantitatively determine over several hundreds of components quickly. LabSolutions Insight displays the chromatograms for each sample in sequence, making it easy to confirm peak detection results and whether criteria are exceeded. In addition, it displays quantitative results for each sample as a group. Thanks to the flagging function, peaks that deviate from the criteria are color-coded, making them instantly visually discernable. This dramatically reduces the number of peaks that need checking, so the process of quantitation can proceed efficiently.

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

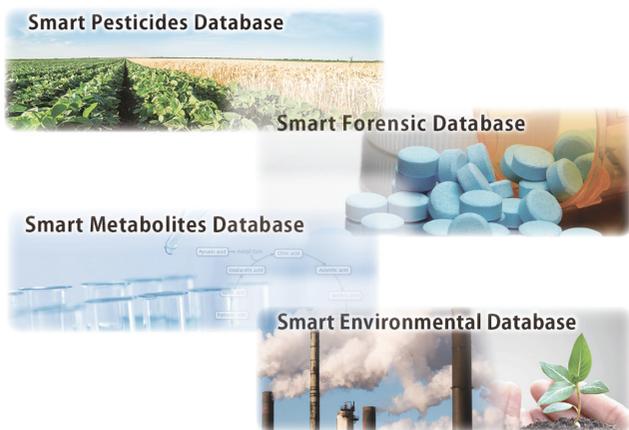
Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

Database for GC-MS and GC-MS/MS

Smart Database Series



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

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

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

Thermal Desorption System

TD-30 Series



GCMS-TQ8040 + TD-30R

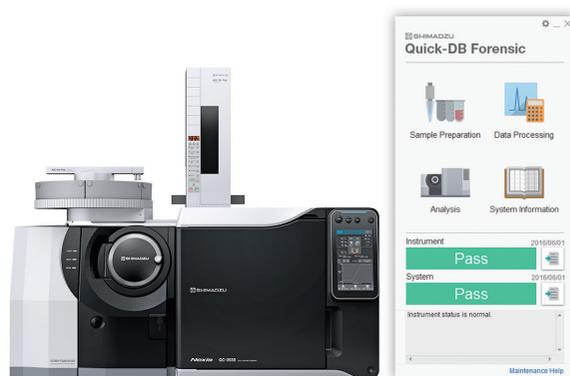
Thermal desorption systems heat samples in a sample tube and then concentrate the thermally desorbed gases before injection into a GC or GC-MS system. They are commonly used to measure volatile organic compounds (VOCs) in the atmosphere or measure trace components that are generated from plastic or other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

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

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

Database for GC-MS and GC-MS/MS

Quick-DB Series



Quick-DB is a screening database that enables easy quantitation without using standard samples.

The database contains not only optimized MRM transitions and other analytical conditions, but also data analysis conditions including retention indices and calibration curve information acquired using the internal standard method. Thanks to the automatic method creation function (Smart MRM/SIM), it allows analytical methods to be created easily, and quantitative values to be calculated without using standard samples.

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

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

Screening System for Phthalate Esters

Py-Screener



This system is designed for screening for phthalate esters in polymers. The use of phthalate esters is restricted in toys and food packaging and so on. They are expected to be regulated as restricted substances under the RoHS (II) Directive.

The system supports a series of procedures from sample preparation to data acquisition, analysis, and maintenance. It consists of special software, special standard samples, and a sampling toolkit. It provides an environment in which even novices can operate it easily.

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

Off-Flavor Analyzer



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

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

OPTIC-4 Multifunction Sample Injection System



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

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

GC-MS Application System

AOC-6000 Multifunctional Autosampler System



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

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

GC and GC-MS Application System

Headspace Analysis System



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

System configuration	GCMS-QP2020 + GCMSsolution + HS-20 series
Sample vial	20 mL or 10 mL (no adaptor required)
Number of samples	90
Sample temperature	300 °C max.

- Systems can also be configured with the GCMS-TQ series, QP series, GC-2030, GC-2010 Plus, GC-2014, or GC-2025.

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

GC and GC-MS Application System

Pyrolysis System



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

System configuration example	GCMS-QP2020 + GCMSsolution + EGA/PY-3030D Multi-Shot Pyrolyzer (Frontier Laboratories)
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- A system can be constructed with the GCMS-TQ series, QP series, and GC-2030/2010 Plus. Contact your Shimadzu representative for further details.

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

Comprehensive GC-MS (GC×GC-MS) System



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

Multi-Dimensional GC/GC-MS System

MDGC/GCMS-2010 Series



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

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

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

MALDI Digital Ion Trap Mass Spectrometer

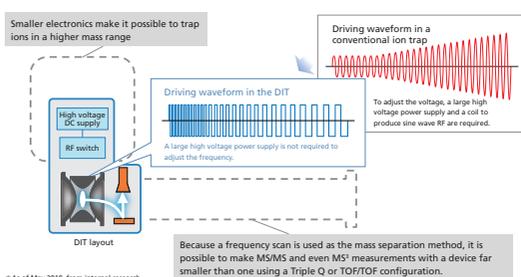
New

MALDImini-1

Towards new possibilities with the compact MALDImini-1

Despite its light and compact shape, The MALDImini-1 is capable of achieving MS³ 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 MSⁿ analysis even on micro-quantity samples.

Digital Ion Trap (DIT) technology provides high sensitivity over a wide mass range, despite the device's small foot print



Begin taking measurements quickly without fuss



Place the sample onto the plate (FlexMass-SR or FlexMass-DS can be used)



Insert the plate into the device and wait for the vacuum

Begin analysis

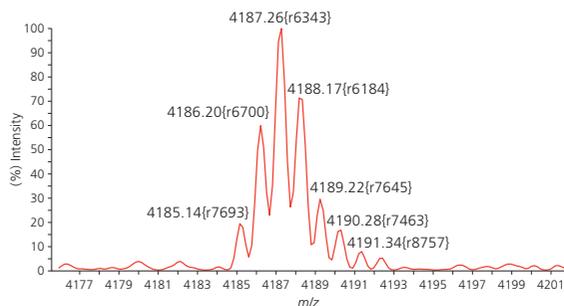
Matrix-Assisted Laser Desorption/Ionization Time-of-Flight Mass Spectrometer

MALDI-8020

Compact Design, Uncompromising Performance

The MALDI-8020 is a compact, desktop-type linear mode MALDI-TOF instrument that can be placed on a laboratory table. It provides all of the functionality of its predecessor, AXIMA Assurance.

Designed to have a small footprint, so it can fit even into narrow spaces (width of main unit 60 cm), and to be lightweight (weight of main unit 86 kg), it nonetheless achieves superior resolution and sensitivity. Moreover, longevity has been enhanced due to adoption of a solid-state laser, and it is equipped with TrueClean, an automatic ion source cleaning function. As a result, downtime is reduced to a minimum and maintenance costs can be reduced. It is readily capable of delivering the performance needed for measurements for QC and profiling applications that target peptides, proteins, polymers, oligonucleic acids, etc.



Measurement example of peptide with molecular weight 4.2 kDa showing a mass resolution (FWHM) of 5,000 or more



Sample Plate Can Be Chosen Depending on Application

A different type of plate can be selected depending on the flow of the experiment. The FlexiMass-DS is a disposable type that can be used as is. Freeing the analyst from the task of plate washing, it also reduces the risk of carryover, and supports a simple routine work process. The FlexiMass-SR is made of stainless steel and can be reused. It is ideal for situations where the cost of the disposables used for sample pretreatment are a concern, or when more long-term use is desired.

Mass range	m/z 1 to 500,000
Mass resolution	> 5,000FWHM
Sensitivity	> 250 amol
Mass accuracy	< 20 ppm (internal standard), < 150 ppm (external standard)
Laser	Solid-state laser (355 nm) Pulse rate: 50, 100, 200 Hz (variable)

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

MALDI-7090



This high performance flagship model achieves high speed measurement (MS, MS/MS) at up to 2 kHz, and high MS/MS resolution (10,000) via ASDF*. Thanks to truly high energy CID-MS/MS, this system maximizes structural data for a variety of samples including biologically active substances and industrial materials. In addition, this system can flexibly accommodate a wide range of needs with its unique functionality, including a laser beam diameter-changing mechanism suited to imaging mass analysis; a sample loader with a 10 plate capacity, providing strong support for LC-MALDI; and multi-user compatibility.

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

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

AXIMA Confidence / AXIMA Assurance



AXIMA Assurance

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

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

* CFR: Curved Field Reflectron

AXIMA Performance - a highly flexible research-grade mass spectrometer

AXIMA Performance



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

True high-energy MS/MS - CID with a laboratory frame collision energy of 20 KeV
Optimal precursor ion selection resolution using revolutionary gating technology
Outstanding sensitivity - uncompromised design, to ensure no MS/MS signal is discarded

Low sample consumption - allowing many more MS/MS experiments to be performed on the same sample spot

LC-MALDI software allowing confident identification of off-line separated complex mixtures via automated MS/MS

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 Mass Microscope

iMScope TRIO

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

This new type of analysis instrument combines morphological observation using a microscope with structural analysis using a mass spectrometer.

Microscopes allow observation of morphological images in great detail, whereas mass spectrometers produce images showing the distribution of the measured molecules. Overlaying the images obtained based on these two different principles and analyzing the resulting imaging mass spectrometer images increases the speed and accuracy of research.

Usage for LC-MS is also possible (optional).

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

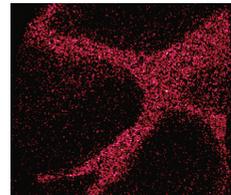
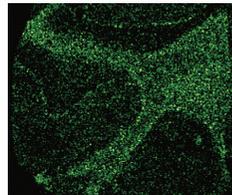
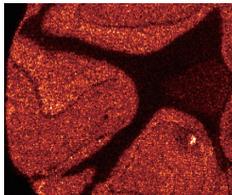
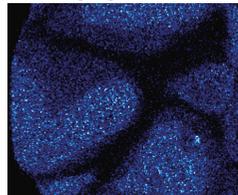


Visualization of Lipid Distribution of Mouse Cerebellum

Optical Image



MS Imaging



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

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

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

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

Note: Sales area: All areas excluding North America

Inductively Coupled Plasma Mass Spectrometer

ICPMS-2030

Accelerating Reliable Performance

With its newly developed collision cell and optimized internal structure, the ICPMS-2030 provides superior sensitivity. At the same time, thanks to the adoption of its proprietary mini-torch unit and provision of an Eco mode, the quantity of argon gas needed for analyses has been greatly reduced to the industry's lowest levels. As a result, low running costs are assured.

The Development Assistant function of the software automatically sets the optimal analysis conditions for quantitative analysis. Then, after measurements are complete, the Diagnosis Assistant function automatically checks the validity of the necessary data. While reducing the burden on the user, the efficiency of analyses is enhanced and the reliability of the data can be increased. It complies with FDA 21 CFR Part 11.

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



Creating Analytical Method Using Development Assistant

Prepare sample (pretreat sample)

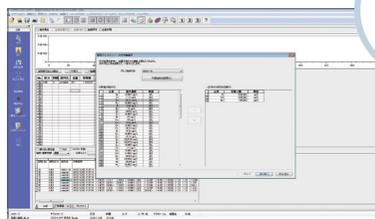
Qualitatively analyze all elements

Select target measurement elements

The Development Assistant function automatically sets the optimal mass numbers and internal standard elements for the target measurement elements, and suggests a calibration scheme.

Method completed in **2 minutes**

2min



UV-VIS Spectrophotometer

UV-1900

This double-beam UV-VIS spectrophotometer features Shimadzu's proprietary Lo-Ray-Ligh® grade grating. With additional advancements from the UV-1800 series, it offers the highest level of performance in its class.

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.

The color touch panel is designed to be user-friendly and easily understandable at a glance. Consequently, the system offers both high performance and easy operability.

User-Friendly Interface is Immediately Understandable

The touch panel display is designed with an ergonomic easy-to-use user interface (UI).



More Advanced Regulatory Compliance

Validation functionality ensures testing can be performed easily in compliance with the pharmacopeia of respective countries (JP, USP, and EP). In combination with LabSolutions DB/CS software, the system is compliant with FDA 21 CFR Part 11 and PIC/S GMP guidelines.



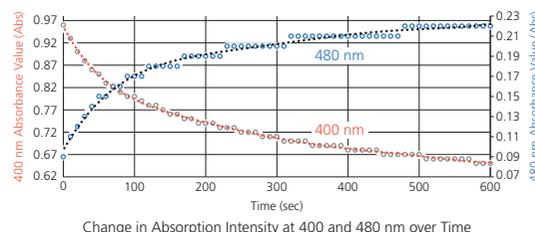
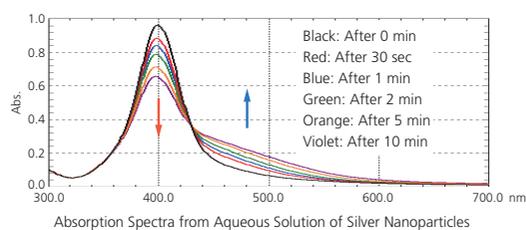
Navigate Your Way



High Performance for Satisfying a Wide Variety of Needs

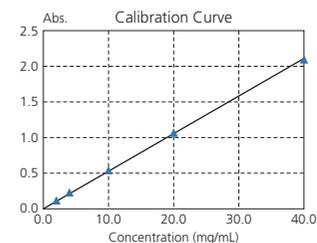
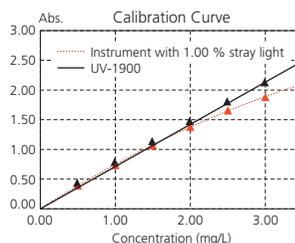
Ultra Fast Scan

Spectra can be acquired at scan rates up to 29,000 nm/min. It is especially useful for monitoring chemical reactions for short periods.



Low Stray Light and High Reproducibility/Repeatability

A Lo-Ray-Ligh grade diffraction grating is used at the heart of the monochromator. That further improves optical performance, such as lower stray light and higher photometric repeatability. It is also capable of highly accurate quantitative analysis and detection of low concentration components.



The low stray light enables measurements down to the 2.0 Abs level, even in the ultraviolet region. That ensures even samples with high concentrations can be quantitated accurately.

High photometric repeatability inhibits variability in measurement results, so that lower concentrations can be measured.

Measurement wavelength range	190 to 1,100 nm
Spectral bandwidth	1 nm
Photometric system	Double-beam optics
Included software	Photometric, spectral, quantitation, kinetics, time scan, multicomponent separation quantitation, DNA/protein quantitation, instrument validation

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 D2/WI lamp with a monitor double beam system, more than sufficient stability can be obtained despite its small size. Equipped as standard with instrument validation, which facilitates maintenance inspections for the instrument.

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

UV-VIS-NIR Spectrophotometer

UV-3600 Plus



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

Measurement wavelength range	185 to 3,300 nm
Stray light	0.00008 % max. (220 nm, NaI) 0.00005 % max. (340 nm, NaNO ₂)
Monochromator	2 × 2 grating type double monochromator

UV-VIS Spectrophotometers

UV-2600/2700



UV-2700

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

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

UV-VIS-NIR Spectrophotometers

SolidSpec-3700/3700DUV



This system is equipped with an integrating sphere as standard. It uses three built-in detectors, a photomultiplier tube (for the UV and visible region), an InGaAs detector (for the near-infrared region), and a cooled PbS detector (for the near-infrared region), and achieves the world's highest level of sensitivity in the near-infrared region. The SolidSpec-3700DUV is designed for the deep ultraviolet region.

Measurement wavelength range	3700: 240 to 2,600 nm (190 to 3,300 nm)* 3700DUV: 175 to 2,600 nm (165 to 3,300 nm)*
Noise	0.0002 Abs max. (500 nm), 0.00005 Abs max. (1,500 nm) RMS value at 1 second response
Spectral bandwidth	0.1 to 32 nm
Stray light	0.00008 % max. (220 nm, NaI)*
Monochromator	2 × 2 grating type double monochromator

* When an optional direct detection unit is used

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

Fourier Transform Infrared Spectrophotometer

IRSpirit

Despite their small footprint, smaller than an A3 size sheet of paper, these models have been engineered with a wide sample compartment that accommodates existing accessories from Shimadzu and other manufacturers. This capability makes them the smallest (installation footprint) and lightest FTIR spectrophotometers in the world that can be used with optional products from other manufacturers. They also include a program, IR Pilot, with 23 application-specific workflows that can be utilized without involving any complicated parameter setup process. Customers can select from either the IRSpirit-T model, which offers sensitivity equivalent to standard Shimadzu models, or the reasonably priced IRSpirit-L model.

Space-Efficient with High Expandability

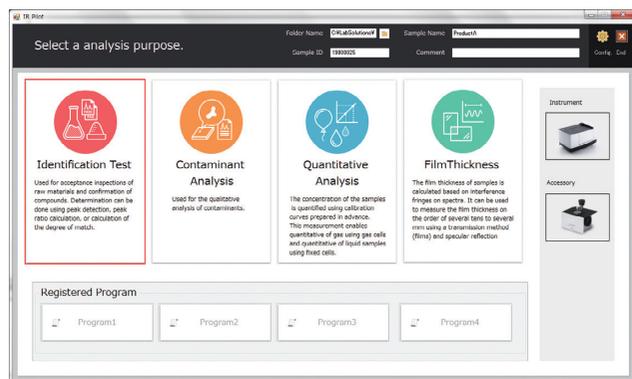
Despite its compact size, the sample compartment width is the same as on higher-end models, allowing it to easily accommodate both Shimadzu and third-party accessories. Samples can be measured with the unit positioned horizontally or vertically for sites with only a narrow space available. The start switch is accessible and the humidity indicator is visible from both directions. That means this single system can be used for a wide variety of applications.



With the widest sample compartment in its class, it easily accommodates Shimadzu and third-party accessories.

Dedicated IR Pilot Program

The newly developed dedicated program (IR Pilot) features 23 standard application workflows within four programs: identification test, contaminant analysis, quantitative analysis and film thickness calculation, which can be conducted without setting parameters. By simply selecting the analysis purpose and accessory, analysis can be performed, which makes it easy for operators with minimal FTIR experience to obtain results.



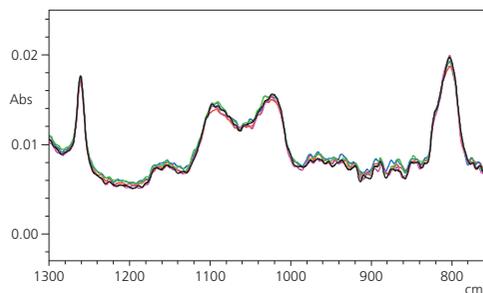
IRSpirit, Ready to Run



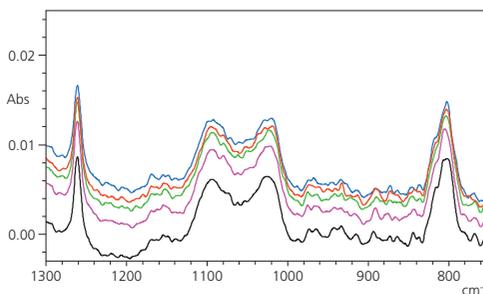
High Reliability Ensures the System Can Be Introduced with Confidence

IRSpirit offers the highest S/N ratio (30,000:1*) in its class using the technology inherited from the high-end model. Furthermore, the robust optics are designed to ensure the system can be used reliably even under harsh temperature and humidity conditions.

*: DLATGS detector with KBr window.



DLATGS Detector with Temperature Control



DLATGS Detector without Temperature Control

ATR Spectrum of Silicone Oil Content in Paraffin Oil (measurement repeated five times)

Interferometer	Michelson interferometer (30° incident angle) Equipped with Dynamic Alignment system Sealed interferometer with desiccant
Optical system	Single-beam optics
Beam splitter	Germanium-coated KBr
Light source	High-energy ceramic
Detector	IRSpirit-T model: DLATGS detector with temperature control IRSpirit-L model: LiTaO ₃ detector
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

AIM-9000 Infrared Microscope

Automatic Micro Analysis System

Finally, the Era of Automatic Failure Analysis

Three Steps to Pursuing Causes

Observe

Measure

Analyze

Observe

Look for the Item to Be MeasuredQuickly Determine the Measurement Position
—Wide-Field Camera and Microscope Camera—

Shimadzu's proprietary wide-field camera and microscope camera help observe samples efficiently. In addition to observing a large area up to 10×13 mm, the wide-field camera also supports variable digital zooming. Furthermore, by sharing positional information with the microscope camera, it achieves a digital zoom function capable of zooming to a magnification of about 330x for observing extremely small areas as small as 30×40 μm .

Measure

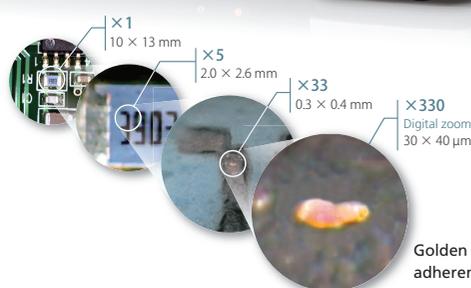
Determine Where to Measure, and Measure AutomaticallyAutomatically Determine Measurement Positions
—Automatic Contaminant Recognition System—

A function that automatically recognizes contaminants is included standard. The analyst simply clicks one button and the software automatically recognizes the contaminant. It even determines the optimal aperture size and angle in only one second. The automatically determined measurement positions can either be measured without editing or the analyst can add or delete measurement positions. Sample images are stored into the measured spectra automatically.

Analyze

Identify the Cause of FailuresAutomatic Identification of Contaminants
—Contaminant Analysis Program—

The contaminant analysis program, the functionality for automatically qualifying contaminants, is included as a standard feature in LabSolutions IR software. Measured spectra using AIMsolution can be loaded directly into LabSolutions IR and analyzed. The contaminant analysis program identifies measured contaminants with high precision.

reddot award 2018
winnerGolden contamination
adherent on metal plate

Measurement mode	Transmission, reflection, ATR
Optical system	15x Cassegrain objective mirrors 15x Cassegrain condenser mirrors (with automatic adjustment mechanism)
MCT detector	Wavenumber range: 5,000 to 700 cm^{-1} (narrow band) 5,000 to 650 cm^{-1} (middle band) Liquid nitrogen monitoring function: With a liquid nitrogen sensor
TGS detector (Option)	Wavenumber range: 4,600 to 400 cm^{-1} Automatically switches between detectors, if equipped with multiple detectors
Supports for observation and measurements	Auto focus, automatic adjustment function for lower Cassegrain, automatic ATR measurement (with purchase of pressure sensor)

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)
Resolution	0.25, 0.5, 1, 2, 4, 8, 16 cm^{-1}
S/N ratio	60,000:1 or higher
Mirror speed	Standard: 2, 2.8, 5, 9 mm/sec Optional: 10, 20, 30, 40 mm/sec (rapid scan)

Fourier Transform Infrared Spectrophotometer

IRAffinity-1S



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

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

Atomic Absorption Spectrophotometer

AA-7000 Series



AA-7000 Full System

AA-7000 Series instruments are highly advanced atomic absorption spectrophotometers. The optical double-beam system enhances sensitivity and stability to achieve a top-class minimum limit of detection. Two types of background correction methods (D2, SR) are available. Dual Atomizer System offers automatic flame/furnace switching. AA-7000 has the smallest installation footprint in the class and are first instruments in the world fitted with a vibration sensor to improve safety. The system can be expanded to suit the requirements and can be configured to achieve the sensitivity required.

Measurement wavelength range	185 to 900 nm
Background correction method	D2 or SR method selectable
Accuracy management	QA/QC functions
Photometric mode	Optical double-beam photometric system
Atomizer	Dual atomizer (automatic flame/furnace switching)
Hollow-cathode lamp	Six lamps, automatic setup

Atomic Absorption Spectrophotometer

AA-6200



The AA-6200 is a completely PC-controlled Atomic Absorption Spectrophotometer featuring easy-to-use Windows XP software with the Wizard function, double-beam optics, and D2 background correction. The AA-6200 uses the least linear bench space of any Atomic Absorption Spectrophotometer in the world.

Measurement wavelength range	190 to 900 nm
Background correction method	D2-Lamp method
Atomizer	Flame only
Hollow-cathode lamp	Two lamps, automatic setup

Spectrofluorophotometer

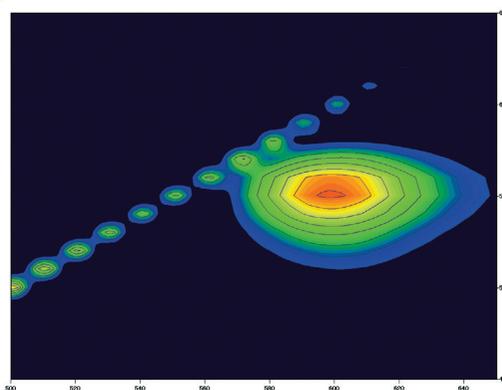
RF-6000



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.

High-Speed 3D Measurements

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



Light source	150 W Xenon lamp
Scanning Wavelength range	200 to 900 nm and 0 order
Resolution	1.0 nm or less (Emission)
Sensitivity	The SN ratio of the Raman line of distilled water is 350 and more (P-P) 1,000 and more (RMS)
Wavelength slewing speed	60,000 nm/min.

Multitype ICP Emission Spectrometer

ICPE-9800 Series

Due to their high detection sensitivity down to ppb levels, ability to analyze a broad 5 to 6-digit range of concentrations, and ability to measure multiple elements simultaneously, ICP emission spectrometers are used in a broad range of fields, such as environmental testing, pharmaceuticals, foods, chemicals, and metals.

The next-generation ICPE-9800 series offers the superior accuracy necessary to simultaneously and quickly analyze multiple elements regardless of their concentration levels and they also feature user-friendly software that makes analysis easy.

Reduces Gas Consumption Costs

Eco Mode

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

Mini-Torch System

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

Vacuum Spectrometer

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

Supports Using Argon Gas with 99.95 % Purity

The system is guaranteed for use with 99.95 % purity argon gas,



BEST for all laboratories

which means less expensive industrial grade argon gas (99.99 %) can be used.

Without the need for expensive high-purity (minimum 99.999 %) argon gas required for conventional ICP systems, the ICPE-9800 can significantly reduce costs.

Simplified Data Analysis Process

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

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

Twin Sequential ICP Emission Spectrometer

ICPS-8100



An ICP Emission Spectrometer boasting high speed and high resolution.

The twin sequential monochromators enhance the speed to yield semi-quantitative values in approximately three minutes for the qualitative analysis of 72 elements.

The analysis of metal, rare earths, and soils require high wavelength resolution.

ICPS-8100 achieves unparalleled ultra-high resolution of 0.0045 nm. Batch analysis from ppb to percent levels offers easy analysis from principal components to trace elements.

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

Sequential Plasma Emission Spectrometer

ICPS-7510



This sequential ICP emission spectrometer covers a wide wavelength range with high resolution. In the standard design, plasma observations can be selected in either the radial or the axial direction. Analysis conditions can be registered for each analysis group with control from a computer.

Optical system	1 m, Czerny-Turner mounting, double grating
No. of diffraction grating grooves and measurement wavelength range	3600 grooves/mm for 160 to 458 nm 1800 grooves/mm for 458 to 850 nm
High-frequency power supply unit	27.12 MHz, max. 1.8 kW

Optical Emission Spectrometer

PDA-8000



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

Optical Emission Spectrometer

PDA-7000 Series



PDA-7000

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

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

Protein Sequencer

PPSQ-51A/53A

Simpler and More Reliable Determination of Amino Acid Sequences

Enhanced Functions for FDA 21 CFR Part 11 Compliance

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.

Isocratic System

- Isocratic elution ensures that highly reproducible retention times can be acquired.
- Analyses can be carried out easily using simple procedures.
- Operates with a low running cost.



PPSQ-53A Gradient System

Gradient System

- Gradient elution enables detection of trace amounts of PTH-amino acids.
- Advantageous for analysis of amino acid sequences in trace samples.
- Thanks to inclusion of the solvent delivery pump capable of superior feeding in the micro flowrate range, stable retention times can be obtained.

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

Note: The MultiNA, and BioSpec-nano have not been approved or certified as a medical device under the Japanese Pharmaceutical Affairs Law. Therefore, they cannot be used for treatment or diagnostic purposes and procedures.

Cell Culture Media Analysis Platform

C2MAP System

New



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

Automated Process from Pretreatment for the Culture Supernatant Analysis to Measurement

Seamless analysis and management can be performed for from the pretreatment unit to the LC/MS/MS measurement.

Supports a Wide Range of Measurement Compounds and Culture Supernatant Samples

A total of 95 components can be simultaneously analyzed at high speed, including major basal culture media components for animal cells, and secreted metabolites.

Easy Confirmation of Component Variations in Culture Media

Temporal changes in the components obtained can be displayed as trend graphs. The results under multiple experimental conditions can be overlaid in the display, enabling comparative analysis.

Spectrophotometer for Life Science

BioSpec-nano



Capable of performing quantitation and purity checking of nucleic acids, quantitation of proteins, and photometric measurements (OD values displayed and printed for specified wavelengths, up to 8 wavelengths). 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
Quantitation range (OD, calculated as density of double stranded DNA)	Optical path length 0.2 mm: 1 to 75 OD, 50 to 3,700 ng/ μL Optical path length 0.7 mm: 0.3 to 21 OD, 15 to 1,000 ng/ μL
Wavelength range	220 to 800 nm
Wavelength accuracy	± 1 nm

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.

Portability Expands Range of Research Applications

- It is portable, enabling measurements under closer to daily life conditions.
- The LIGHTNIRS and PC are connected wirelessly, so measurements can be performed more freely and over a wider range than before.
- Multiple PCs can be synchronized, for the simultaneous measurement of up to four subjects.
- The system is compatible with data from LABNIRS and FOIRE, Shimadzu's existing high performance multi-channel measurement instruments.



Realtime Monitoring Process Functions

Trend graphs are added for each task or channel, and mapping information is simultaneously integrated during measurements.



Realtime channel addition

Realtime map integration

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

Functional Near-Infrared Spectroscopy System for Research

LABNIRS



Measurement using up to 40 sets, 142 channels (previously 16 sets, 52 channels) is achieved, and measurement of the brain over a wider range, higher-density measurement (2x conventional spatial resolution) and faster measurement (5x 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)



High Performance

- Next-generation optical brain-function measurements start with multi-channel and high density
- High-speed sampling
- Reliability of 3 wavelengths and photomultiplier tube achieve superb sensitivity



Easy Operation

- Intuitive user interface
- Measurement and analysis by simple button clicks



Outstanding Scalability

- Comprehensive options provide powerful measurement support
- Increase the number of channels according to the aim of the experiments

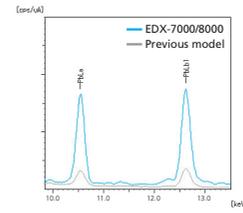
Energy Dispersive X-ray
Fluorescence Spectrometer

EDX-7000/8000/8100



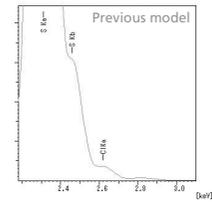
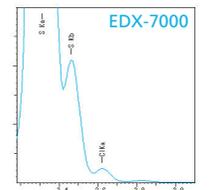
High Sensitivity

- Lower Limit of Detection Improved 1.5 to 5 Times! -



Profile Comparison for Lead (Pb) in Copper Alloy

High Resolution



Comparison of Energy Resolutions (sample: PPS resin)

Equipped with an electronically cooled high-performance semiconductor detector, the EDX-7000/8000 is designed for reduced running costs and ease of maintenance while providing better sensitivity, throughput, and resolution than conventional models. A wealth of optional functions is available, including a vacuum measurement unit, which is effective for light element analysis, and a turret unit, which is effective for consecutive analyses. Two software programs are included as standard. PCEDX-Navi allows easy operation, and PCEDX-Pro is for general analysis applications. As an analysis option, the instrument can also be equipped with the screening functions achieved with the EDX-LE. From management applications involving compliance with RoHS/ELV directives and other environmental regulations to research applications involving the high-level needs of general sample analysis, the EDX-7000/8000 can be applied broadly, whatever the industry. The EDX-8100 is a model that accommodates light elements and allows for helium purge.

	EDX-7000	EDX-8000	EDX-8100
Elements to be determined	11Na to 92U		6C to 92U
Sample chamber dimensions	300 (W) × 275 (D) × approx. 100 (H) mm max. (Assuming no rounded corners)		
Primary filters	5 types (6 including the open position); automatic replacement		
Software	Simple analysis software (PCEDX-Navi) General analysis software (PCEDX-Pro)		
Options	Vacuum measurement unit, helium purge unit, turret unit, screening analysis kits	Vacuum measurement unit turret unit; screening analysis kits	

Note: Options are not included.

Integrated EDX-FTIR Analysis Software

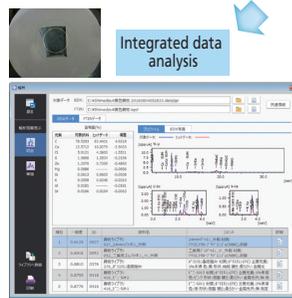
EDXIR-Analysis

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.

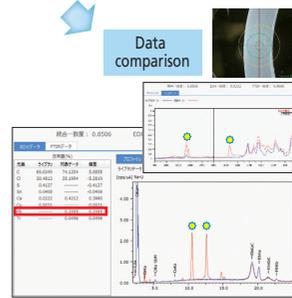
Integrated Analysis for Contaminant Analysis and Data Comparisons for Confirmation Tests

The examples here show an integrated analysis of black rubber contaminant data acquired and a data comparison for a polyvinyl chloride (PVC) examination object and the standard product. From the integrated data analysis results, it is evident that the black rubber contaminant is acrylonitrile-butadiene rubber (NBR), which contains calcium carbonate and zinc stearate. In addition, from the data comparison, the degree of matching between the PVC examination object and the standard product is 0.8506.

Lead (Pb) and acrylic were detected from the EDX and FTIR data, which were not detected in the standard product. Accordingly, it is surmised that the examination object contains components different to those in the standard product.



Integrated Data Analysis Results for a Black Rubber Contaminant



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

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

Energy Dispersive X-ray Fluorescence Spectrometer

Pharmaceutical Elemental Impurities Analysis System for EDX-7000



With the pretreatment-free, non-destructive features, this system is designed for $\mu\text{g/g}$ level analyses and control of elemental impurities in pharmaceuticals. The targeted elements are 12 elements in total from the 24 elements listed in the ICH Q3D Guideline for Elemental Impurities (Class 1: Cd, Pb, As, Hg; Class 2A: V, Co, Ni; Class 2B: Ir, Pt, Ru, Rh, Pd).

In the risk assessment management of $\mu\text{g/g}$ level impurities in new pharmaceutical materials, which in most cases are organic compounds, analysis can be performed using the EDX-7000 as an alternative method to ICP-AES and ICP-MS analysis, which involve chemical pretreatment and are listed in the United States Pharmacopeia (USP), the European Pharmacopoeia (EP), and the Japanese Pharmacopoeia (JP). Doing so reduces the burden of chemical pretreatment, and also leads to reductions in the total cost of analysis.

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

EDX-LE



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

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

Note: Options are not included.

Sequential X-Ray Fluorescence Spectrometer

XRF-1800



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

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

Multi-Channel X-Ray Fluorescence Spectrometer

MXF-2400



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

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

X-Ray Diffractometer with Wide-Range and High-Speed Detector
XRD-6100 OneSight/7000S OneSight/7000L OneSight



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

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

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



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

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

Electron Probe Microanalyzer

EPMA-8050G

Debut of the Grand EPMA

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

Features

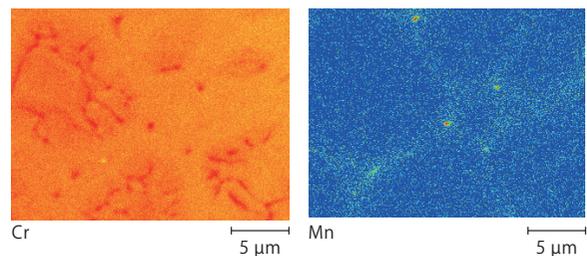
- Includes cutting-edge FE electron optical system
- Up to five high-sensitivity 4-inch spectrometers can be included.
- Includes 4-interval high-sensitivity BSE detector
- Windows-compatible operating system
- Intelligent vacuum evacuation system
- Includes easy mode analysis function for the automation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

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



Ultra High Resolution Mapping

The beam can be emitted at a maximum current over 3 μ A.



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

Electron Probe Microanalyzer

EPMA-1720/1720H



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

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

Imaging X-Ray Photoelectron Spectrometer

KRATOS ULTRA2 (AXIS Supra)



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

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

Imaging X-Ray Photoelectron Spectrometer

KRATOS NOVA



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

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

High-Resolution Scanning Probe Microscope

SPM-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.

Features of the HR-SPM

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

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

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

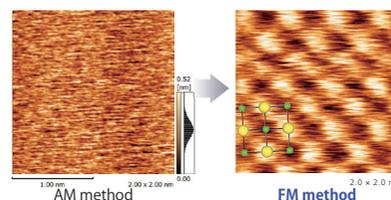
HR-SPM

See the Nano World Come to Life

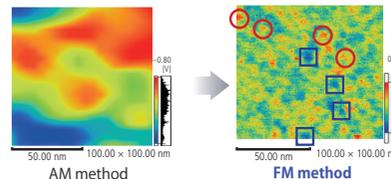


Differences Compared with Existing SPM/AFM

Atomic Resolution Observation in Liquids



KPFM Observation* of Atmospheric Pt Catalyst Particles



* KPFM : Kelvin Probe Force Microscope

Environment-Control Scanning Probe Microscope

WET-SPM Series



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

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

TOC-L

TOTAL ORGANIC CARBON ANALYZER

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



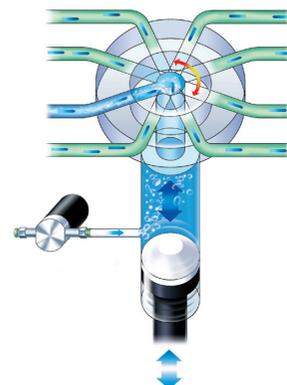
		High-sensitivity model		Standard model	
Model		TOC-LCPH	TOC-LCSH	TOC-LCPN	TOC-LCSN
Operation method		PC-controlled	Standalone	PC-controlled	Standalone
Measurement method		680°C combustion catalytic oxidation – non-dispersive infrared detection (NDIR) method			
Measurement items		TO, IC, TOC, NPOC (Optional: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



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

Extremely wide measurement range, from 4 µg/L 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.



Multifunction sample pretreatment injector

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.

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)

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)



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

Autosampler for TOC-L Series

ASI-L



ASI-L

Combination with the TOC-L series results in a fully automatic measurement system.

Vials with three different capacities, 9 mL, 24 mL, and 40 mL, can be used.

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

Types and number of vials	9 mL × 93 vials 24 mL × 93 vials 40 mL × 68 vials
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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-Vws/WP Series



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

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

On-Line TOC Analyzer

ON-LINE TOC-VCSH



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

680°C combustion catalytic oxidation /NDIR method.	
Measured items	NPOC, TC, IC, TOC (TC-IC), (Option: TN)
Measurement range	TC 0 – 25,000 mg/L, IC 0 – 30,000 mg/L
Measurement cycle	Approx. 5 – 999 minutes (for NPOC measurement)
Equipped with off-line measurement functions.	

On-Line Total Organic Carbon Analyzer

TOC-4200

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

Support for a Wide Range of Samples

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

*Optional

Advanced Operability

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

*Optional



Multi-Stream Suspended Solids Sampling Unit



Calendar scheduling setup

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

* With automatic settings

Transportable NO_x-O₂ Analyzer

NOA-7100

The normal pressure chemiluminescence method is adopted for NO_x analyzers, and the zirconia method is adopted for O₂ analyzers.

This all-in-one portable analyzer incorporates the pretreatment parts needed for measurements.

Switching between eight ranges from 25 to 4,000 ppm supports a wide range of NO_x measurements.

Two types are available, for measuring exhaust gas from combustion equipment (type 1) and for testing and research (type 2).

Features

- Pretreatment parts such as the pump, cooler, and filter are built-in.
- Thanks to wireless data communication, measured values and charts can be displayed on PCs and smart devices.
- Measurement data can be exported using a USB flash drive. The analyzer can be connected to a PC via Wi-Fi or a LAN cable for data export.
- Measurements can be performed on sample gases with flowrates as low as 100 mL/min. (type 2)
- Thanks to a function for bypassing the converter catalyst that reduces NO₂ to NO (optionally available, type 2 is provided as standard), it is possible to switch measurements between NO_x and NO, and output the difference as NO₂.

	Type 1	Type 2
Amount of sample gas collected	Approx. 2 L/min	100mL/min
Measurement range	NO _x : 0 to 25/50/100/250/500/1,000/2,500/4,000 ppm O ₂ : 0 to 5/10/25 vol%	NO _x , NO, NO ₂ : 0 to 2/0/100/250/500/1,000/2,500/4,000 ppm
Repeatability	Within ±0.5 % of full scale	
Weight	Approx. 16 kg	

All-in-One Measurement



Transportable Gas Analyzer

CGT-7100



CGT-7100



CFP-8000

The CGT-7100 analyzer measures the concentration of gases using a ratio photometric non-dispersive infrared absorption method, which offers superior stability. All pretreatment parts required for measurement, such as the pump, filter, and electric cooler, are built-in. The analyzer can measure three components including CO, CO₂, or CH₄ (any two of these) and O₂, and is compatible with measurement at 100 vol%.

It is capable of wireless data transmission via Wi-Fi, so measurement values and charts can be displayed wirelessly on PCs or smart devices, and measurement data can be exported using a USB flash drive. There is a lineup of three types to suit your measurement application. The CFP-8000 pretreatment set is also available for use in combination with the CGT-7100 when measuring special gases and for continuous measurements.

Type	Type 1: CO-CO ₂ analyzer for measuring exhaust gases from combustion Type 2: CO-CH ₄ analyzer for fuel cell research Type 3: CO-CO ₂ analyzer for catalyst research (small flow rate type)
Measurement range	CO: 0-100 ppm to 0-100 vol% CO ₂ : 0-1,000 ppm to 0-100 vol% CH ₄ : 0-200 ppm to 0-100 vol% O ₂ : 0 to 5/10/25 vol% (optional)
Repeatability	Within ±0.5 % of full scale
Weight	Approx. 16 kg

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, SO₂, and CO or CO₂. An O₂ 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.
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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, SO₂, CO, and O₂, and for measurement of these four components plus CO₂ 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 O₂ 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 O₂.

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 Tester

AGX-V Series *New*



AGX-10kNVD



AGX-50kNVD



AGX-100kNV



AGX-600kNV

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

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

AUTOGRAPH Table-Top Precision Universal Tester

AGS-X Series



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

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

Micro AUTOGRAPH

MST-I



Utilize the MST-I to evaluate the strength of small test samples such as electronic parts, micro-devices and fine wire. A high-precision drive system and measurement system allows very small test forces and displacements to be measured and controlled, enabling various types of data to be obtained. An X-Y stage and a microscope are provided to enable easy positioning and observation of the sample.

Test force measuring range	2 mN to 2 kN
Drive resolution	HR type: 5 nm, HS type: 20 nm
Displacement display resolution capability	20 nm
Test speed	HHR type: 0.0012 to 30 mm/min, HS type: 0.0048 to 120 mm/min

Compact Tabletop Tester

EZ-X Series



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	

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

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)

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

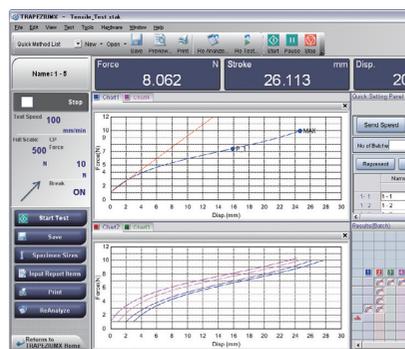
Fully Automatic Metal Tensile Testing System



This is a fully automatic tensile testing system for metals. The system is fully automated from supply of specimens, measurement of specimens, tensile testing, recovery of specimens, and data processing, and is capable of continuous nighttime testing.

Load capacity	100 kN
Applicable specimen	JIS No. 5, ASTM 1/2"
Specimen storage method	Stacking type
Measuring device	Magnet scale type (thickness) Laser scan type (width)
Transport device	Linear type auto hand
Details of data processing	Specimen size Upper yield point Yield strength point Max. stress Fracture elongation r value, etc.

Material Testing Software TRAPEZIUM X



Windows 10 compatible TRAPEZIUM X can carry out various tests ranging from simple test control to complex custom-made patterns, using the industry's first data search and preview function, free layout reports, visual wizard settings, quick panel, and quick conditions lists.

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 $\pm 1.5 \mu\text{m}$ or $\pm 1.5 \%$ of indicated value (for camera field of view 240 mm or less and constant temperature measurement)

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 $\pm 1 \mu\text{m}$, 0.5 % (JIS B7741 0.5 class) 560A $\pm 2.5 \mu\text{m}$, 0.5 % (JIS B7741 1 class)
Gauge length	560SA 50 mm (variable with option) 560A 10 to 550 mm

Hydraulic Universal Testing Machines

UH-X Series and UH-FX Series



UH-500kNX



UH-F500kNX

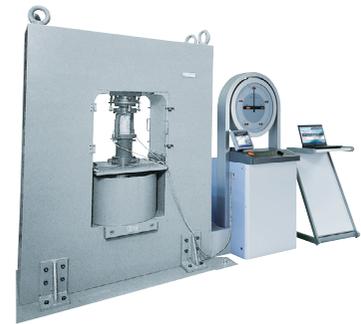
The operability and visibility of the computer-controlled hydraulic servo type universal testing machine (UH-X) and the high-performance universal testing machine (UH-FX), equipped with front opening type hydraulic grips, have been greatly improved by the adoption of a large color touch panel. Equipped with a semi autotuning function that automatically adjusts the control parameters, stress control and strain control (ISO 6892 compliant) can be easily carried out without the need for a preliminary test.

The UH-Xh and UH-FXh models feature a new hybrid hydraulic oil source that reduces the required quantity of hydraulic oil, thereby achieving a major reduction in electrical power (about 50 %).

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

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

High-Rigidity Compression Testing Machine



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

Load capacity	3,000, 5,000 kN
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Concrete Compression Testing Machine

CCH-X/CCM-X Series



CCH-2000kNX

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

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

Concrete Compression Testing Machine

CONCRETO 2000X/3000X



CONCRETO 2000X

This compression testing machine can safely and efficiently perform tests at a high capacity without causing explosive fracture (failure of the specimen) on ultra-high-strength concrete, which is used as a structural material in high-rise buildings, etc.

This one machine can be used for materials ranging from ultra-high-strength concrete to specimens that have been recently cast, mortar, etc.

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

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

Micro Vickers Hardness Tester

HMV-G Series

New



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.

Test force range	0.0098 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/G31DT

Dynamic Ultra Micro Hardness Tester

DUH-211/211S



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

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

Micro Compression Tester

MCT Series



With high temperature system, length measurement kit (option)

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

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

Capillary Rheometer Flowtester

CFT-500EX/100EX



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

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

Mooney Viscometer

SMV-301/301RT



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

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

Servopulser Table-Top Fatigue and Endurance Testing Machine
EHF-LM/LV Series



EHF-LV Series

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

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

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

Servopulser Fatigue and Endurance Testing Machine
EHF-EM/EV Series



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

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

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

Servopulser Overhead Actuator Type Fatigue and Endurance Testing Machine
EHF-UM/UV 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).

Electromagnetic Force Micro Tester
Micro-Servo MMT Series



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

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

Electromagnetic Force Fatigue and Endurance Testing System
Servopulser EMT Series



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

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

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

Energy-Conservation Unit for Servopulser Hydraulic Power Supply Unit
ECU1/ECU2 Series



The conventional hydraulic power supply unit for fatigue and endurance tests is always driven at full power to achieve the maximum test force and maximum velocity and the hydraulic power supply unit is selected in order to satisfy the maximum test performance. Therefore, depending on the test conditions, energy is excessively consumed. With the ECU Series the motor rotational speed and the supply pressure of the hydraulic power supply unit can be set in multiple stages, so energy savings of up to about 50% can be achieved depending on the test conditions and test circumstances. It is used in combination with the Servo Controller 4830. (The Servo Controller 4830 is provided separately.)

Applicable hydraulic power supply unit	Water-cooled type, air-cooled type
Motor capacity	5.5 kW, 11 kW, 22 kW, 37 kW

Chromatography Systems

Mass Spectrometry Systems

Spectroscopy Systems

Life Science Systems

X-ray and Surface Analysis Systems

Environmental Measurement Systems

Material Testing and Non-Destructive Inspection Systems

Physical Properties Measurement Systems

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.

Ono Rotary Bending Fatigue Testing Machine

H-7 Type



This machine carries out rotary bending fatigue tests at high temperatures or at room temperature on heat-resistant materials and normal metal materials. The rotation speed can be varied between 1,700 and 3,400 rpm, and it has been designed for high-speed continuous operation. To carry out high-temperature tests, a furnace, temperature-adjustment device, and chucking rod are used (options).

Max. bending moment	100 N·m (10 kgf·m)
High-temperature test device	300 to 850 °C

High-Speed Impact Testing Machines

HITS-X Series



HITS-TX

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

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

Note 1: The PC and printer are not included, so they must be ordered separately.

Note 2: A constant temperature tank can be added as an option.

Servopulser 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.

Electric Motor Driven Actuator

NJ-SERVO Series



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)

Compact Hydraulic Vibrator Force Simulator

EHF-JF Series

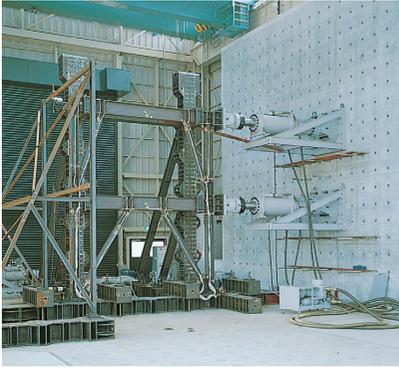


This is a ±20 kN ±100 mm vibrator weighing only about 25 kg. It is a light and compact easy-to-handle hydraulic vibrator that can evaluate durability by applying repeated loads to products such as automotive parts, furniture and structures.

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

Servopulser Structural Fatigue Testing Machine (Jack System)

EHF-J Series



This is a structural fatigue testing machine for researching the dynamic behavior of full-size or model structures by applying repeated loads. The actuator that supplies the loads to the specimens can be installed on load frames, reaction floors, reaction walls, etc.

Loading method	Electro-hydraulic servo method (capacity 10 to 1 MN)
Control mode	Test force and displacement (strain) (Strain) is a special ancillary
Test speed	0.001 to 30 Hz (the upper limit increases or decreases depending on the capacity of the hydraulic pressure source)

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.

Dimensional X-Ray CT System

XDimensus 300

A "New Dimension" in Measurement

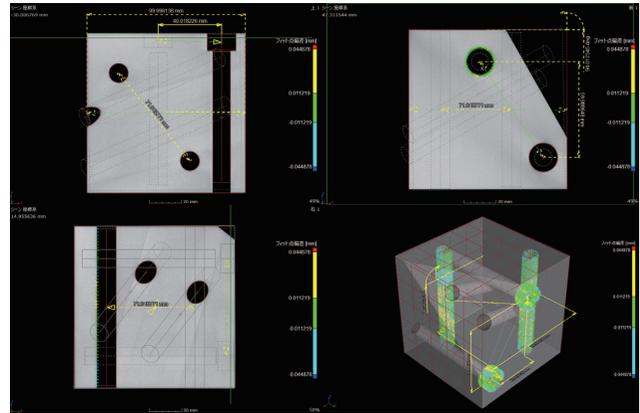
The XDimensus 300 is a dimensional X-ray CT system capable of measuring samples in 3D. In addition to the external surface form of objects, it is capable of measuring the internal form (in locations where probes and lasers cannot reach). It brings added value that could not be provided by conventional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

Features

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

* Based on Shimadzu's evaluation of sphere distance error

Target object	Resins and light metals
Max. sample size	Max. 300 mm dia. × 210 mm
Max. sample weight	Max. 10 kg
Max. field of view	300 mm dia.
Accuracy (sphere distance error)	±(3.8+L/50) μm



Dimensional measurement

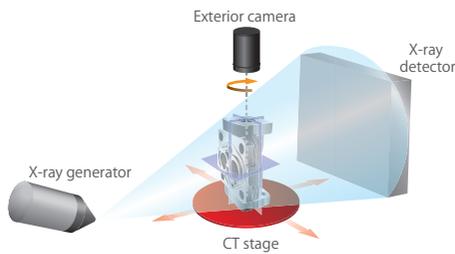
Microfocus X-Ray CT System

inspeXio SMX-225CT Series



inspeXio SMX-225CT FPD HR

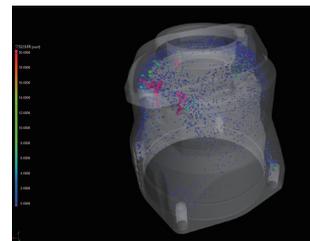
Principle of System



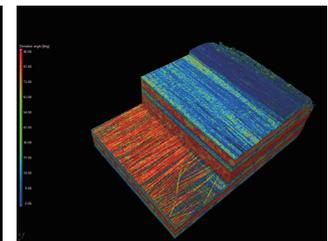
The target object (sample) is placed between the X-ray generator and X-ray detector. The target object is rotated 360 degrees, and X-ray fluoroscopic data is collected from various angles, and cross-sectional images are calculated.

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

	inspeXio SMX-225CT FPD HR	inspeXio SMX-225CT FPD
Target object	Aluminum die castings, electronic circuit boards, electronic parts, composite materials, etc.	
Max. sample size	Max. 400 mm dia. × H300 mm	Max. 350 mm dia. × H300 mm
Max. sample weight	Max. 12 kg	Max. 9 kg
X-ray detector	16-inch flat panel detector	8-inch flat panel detector
Max. field of view	400 mm dia.	250 mm dia.



Aluminum Die Cast Defect Analysis



Analysis of CFRTP Fiber Orientation (supplied by Ehime University)

Examples of Images Obtained by the inspeXio SMX-225CT FPD HR

Microfocus X-Ray Inspection System

Xslicer SMX-6000

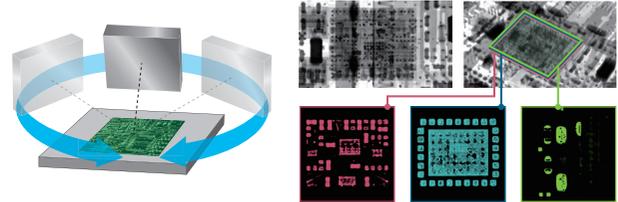


The Xslicer SMX-6000 is an X-ray inspection system equipped with a Shimadzu microfocus X-ray generator and a high-sensitivity flat panel detector, and it features CT scanning capability. With a seamless fusion of X-ray fluoroscopy and CT scanning, the fluoroscopic images and cross-sectional images can be rapidly viewed using the smooth switching operation. In addition, the system includes the new Xslicer CT image processing engine used to fully automate calibration and provide high-speed scanning and reconstruction. The system enables the detailed observation of internal structures and defects in flat samples such as electronic devices with high-resolution images without distortion.

Target object	Mounted circuit boards, electronic parts, etc.
Max. sample size	Max. W470 × D420 × H100 mm
Max. sample weight	Max. 5 kg
X-ray output (max.)	160 kV-100 μA (max. 16 W)
Detector	Flat panel detector
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)

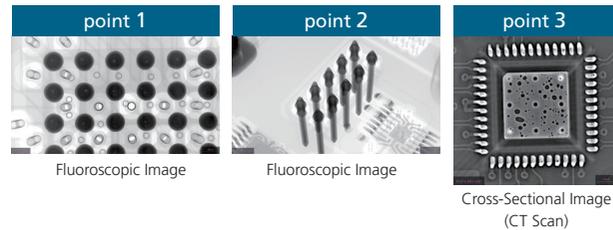
Principal and Effect of CT Imaging

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



Useful Functions That Support Inspection

With the teaching function, fluoroscopic imaging and cross-sectional imaging (CT scanning) can be set for each registered point.



Microfocus X-Ray CT System inspeXio SMX-100CT



The inspeXio SMX-100CT is a system capable of performing high-magnification 3D observations of resins, pharmaceuticals, bones, and other materials with low specific gravity. The system is equipped with an X-ray tube with 5 μm resolution and ultra-high-sensitivity X-ray detector. The HPC inspeXio high-performance computing system is equipped as standard, so high-magnification, clear CT images can be obtained faster and more clearly.

Target object	Resins, pharmaceuticals, bone, etc.
Spatial resolution	5 μm (chart resolution, fluoroscopic image)
Max. sample size	Max. 180 mm dia. × 250 mm
Max. sample weight	Max. 4 kg
X-ray output (max.)	100 kV-200 μA (Approx. 20 W)
Detector	4-inch variable field of view image intensifier
Max. field of view	90 mm dia.

Microfocus X-Ray CT System inspeXio SMX-90CT Plus



Built to be easy to use, fast, and compact, the inspeXio SMX-90CT Plus benchtop X-ray CT system makes CT imaging simple for everyone. The HPC inspeXio high-performance computing system is equipped as standard, so CT images can be viewed immediately after completion of scanning. The system can be used for a wide range of applications such as observation and analysis of the structure of teeth, bone, and pharmaceuticals, and for the inspection of resin parts and small electronic parts.

Target object	Resins, pharmaceuticals, bone, etc.
Max. sample size	Max. 160 mm dia × H100 mm
Max. sample weight	Max. 4 kg
X-ray output (max.)	90 kV - 250 μA (10 W)
Detector	Flat panel detector
Max. CT scan area	50 mm dia.

Microfocus X-Ray Inspection Systems SMX-1000 Plus/SMX-1000L Plus



The SMX-1000 Plus and SMX-1000L Plus X-ray inspection systems are a further refinement of the previous models (SMX-1000/SMX-1000L). By combining with separately sold optional systems, the automatic judgment system for ball grid array (BGA) measurement can be configured. In addition, by mounting the optional VCT unit, 3D analysis that could not be performed with the fluoroscopic function alone is enabled. Note that a Plus modification kit has been prepared for the previous models (SMX-1000/SMX-1000L).

Target object	Mounted circuit boards, electronic parts, resins, etc.
Max. sample size	350 × 450 mm (1000 Plus), 570 × 720 mm (1000L Plus)
Max. sample weight	Max. 5 kg
X-ray output (max.)	90 kV - 110 μA (10 W)
Detector	Flat panel detector
Magnification	Approx. 8x to 161x

Differential Scanning Calorimeter

DSC-60 Plus Series

Addressing All Needs for DSC Applications

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

All Temperature Ranges Measured at High Sensitivity

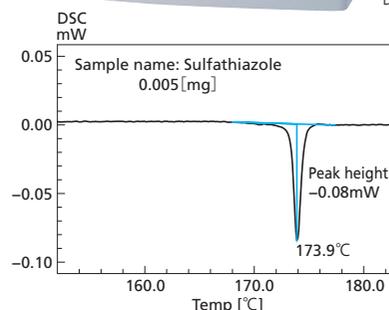
The new detector in the DSC-60 Plus series and heating furnace unit achieve a stable baseline across the entire measured temperature range (-140 °C to 600 °C) as well as top-class calorimetric sensitivity for a DSC. It also features a wide dynamic range of ± 150 mW.

Various Measurements Achieved by Simple Operation

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

Complies with Analytical Laboratory Regulations

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



High-Sensitivity Measurements of Trace Samples (pharmaceutical)

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

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

TG-DTA Simultaneous Measuring Instrument

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 an 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)	$\pm 1,000$ μ V
Number of settable samples	24 per sample tray (DTG-60A/60AH)

Thermomechanical Analyzer

TMA-60/60H



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

Temperature range	Ambient to 1,000°C/1,500°C from -140°C with an optional adapter
Measurement range	Displacement : ± 5 mm Load : ± 5 N
Sample size	$\phi 8 \times 20$ mm, $5 \times 1 \times 20$ mm (60 type)

Workstation Software for Thermal Analyzers **New**

LabSolutions TA

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

Convenient Operability

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

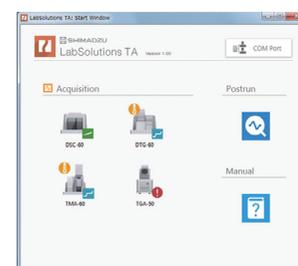
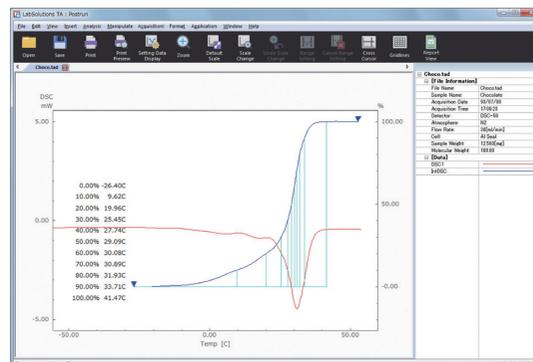
Improved Productivity

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

Improved Data Reliability

Sophisticated security and user management functionality are provided to ensure data reliability and enable compliance with FDA 21 CFR Part 11, PIC/S GMP, and other ER/ES regulations.

- Compatible with Windows 7 and 10



Thermogravimetric Analyzers

TGA-50/50H/51/51H



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

The 51-model units are macro-type analyzers.

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

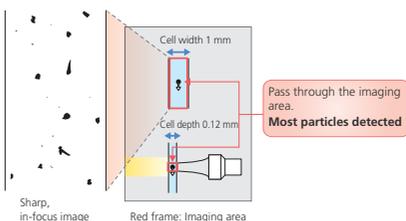
Dynamic Particle Image Analysis System New iSpect DIA-10

A Single System Enables Various Types of Analyses of Particles that cannot be Understood from Particle Size Distribution Alone

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.

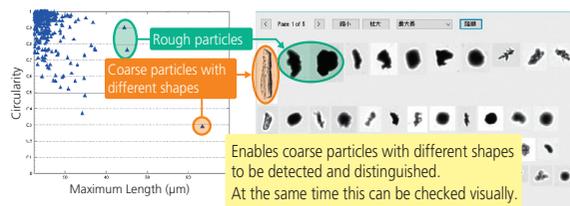


Particle size measurement range	5 to 100 μm
Particle count concentration reproducibility	CV \leq 5 %
Measurement items	Equivalent circular area diameter, equivalent circular perimeter diameter, maximum length, length perpendicular to maximum length, vertical Feret diameter, horizontal Feret diameter,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

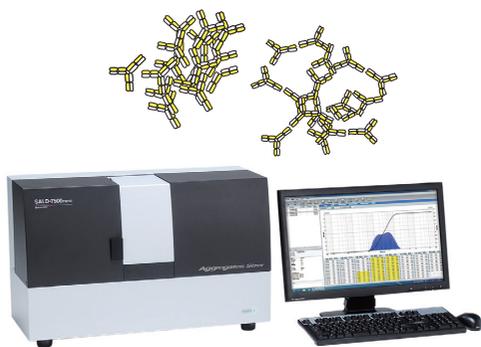


Detection of Coarse Particles in LIB Cathode Material

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.



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 $^{\circ}\text{C}$), 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 $^{\circ}\text{C}$ (constant temperature)
Batch cell	Sample amount: 5 mL mechanical stimulus can be applied while measuring
Micro cell	Sample amount: 125 μL

Nano Particle Size Analyzer SALD-7500nano



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

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

Laser Diffraction Particle Size Analyzer

SALD-2300



The new standard in the SALD series. While maintaining continuity and compatibility with respect to the data of the SALD-2000/2100/2200, which were popular, widely distributed models, this instrument is equipped with many new functions useful for evaluating changes (dispersion, aggregation, dissolution) in particle size distribution relative to the concentration or time. It supports a particle concentration range from 0.1 ppm to 20% and can perform a series of measurements of 200 data points at 1 second minimum intervals.

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

Single Nano Particle Size Analyzer

IG-1000 Plus



Shimadzu's highly innovative Induced Grating (IG) particle size measurement technology is adopted. This method employs dielectrophoresis instead of scattered light. Numerous particles form a diffraction grating, and the particle sizes are measured based on the speed of diffusion/disintegration of this diffraction grating. As a result, adequate signals can be obtained even in the single nano region, so highly sensitive measurements with excellent reproducibility can be obtained.

It offers approximately 10 times the sensitivity of the previous model, the IG-1000.

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

Analytical Balance

AP Series



Thanks to the built-in UniBloc AP integrated aluminum mass sensor and an optimized control system, this balance achieves high-speed measurements with a response as quick as 2 seconds. Featuring an easy-to-read organic EL display, it has been redesigned for excellent operability. The AP-W series is equipped with a function to automatically calculate the weight values required for sample concentration preparation, which supports routine weighing operations.

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

Model	Capacity	Minimum Display
AP135W	135 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

AP-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

AP-Y series

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

Analytical Balances

AU Series



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

Dual Range Semi-Micro Balances AUW-D Series

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

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

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

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

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

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

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

Analytical Balances

AT Series



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

ATX Series (with built-in calibration weight)

Model	Capacity	Minimum Display
ATX84	82 g	0.1 mg
ATX124	120 g	0.1 mg
ATX224	220 g	0.1 mg
ATX324	320 g	0.1 mg

ATY Series

Model	Capacity	Minimum Display
ATY64	62 g	0.1 mg
ATY124	120 g	0.1 mg
ATY224	220 g	0.1 mg
ATY324	320 g	0.1 mg

Electronic Balances

UW/UX Series



UW6200H



Bucket for small animals

Shimadzu's newest top-loading balance series provides the supreme combination of performance and innovative features. The weighed result is displayed instantly and stands still. Excellent durability also meets repeated use in production sites. Choice of auto print modes and Shimadzu's unique WindowsDirect function enhance productivity without optional software. Check-weighing modes for quality control purposes and a back light display are also useful features in factory use. Measurement administration is also given good consideration.

A calibration report can be automatically output to meet international standards. The UW is equipped with built-in calibration weight and PSC, and Clock-CAL fully automatic calibration functions as standard. Specific gravity measurement software is already installed and an optional measurement kit allows more efficient measurements.

UW Series

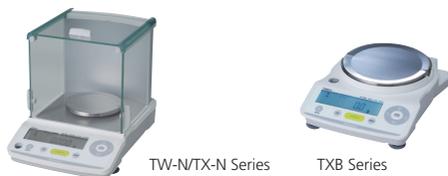
Model	Capacity	Minimum display	PSC	Clock-CAL	GLP/GMP/ISO calibration report	Windows Direct
UW220H	220 g	0.001 g	•	•	•	•
UW420H	420 g	0.001 g	•	•	•	•
UW620H	620 g	0.001 g	•	•	•	•
UW820H	820 g	0.001 g	•	•	•	•
UW1020H	1,020 g	0.001 g	•	•	•	•
UW2200H	2,200 g	0.01 g	•	•	•	•
UW4200H	4,200 g	0.01 g	•	•	•	•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

UX Series

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

Electronic Balances

TW-N/TX-N/TXB Series



TW-N/TX-N Series

TXB Series

The beginning of the new standard: TX/TXB has everything you need.

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

TW-N Series

Model	Capacity	Minimum display	Windows Direct
TW223N	220 g	0.001 g	
TW323N	320 g	0.001 g	
TW423N	420 g	0.001 g	

TX-N Series

Model	Capacity	Minimum display	Windows Direct
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	•

TXB Series

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

Precision Platform Balances

BW-K/BX-K Series



Animal Balances

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

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

Unibloc Moisture Analyzer

MOC63u

A new type of moisture analyzer has been introduced.

This electronic moisture analyzer is capable of performing reliable moisture content measurements quickly and easily.

Simply load the sample on the pan and shut the cover to start measuring.

The system can accommodate a wide range of samples, thereby contributing to heightened work efficiency.



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

Electronic Moisture Balance

MOC-120H

Reliable moisture measurement backed by UniBloc technology

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



Weighing capacity	120 g
Minimum indication	0.001 g / 0.01 %

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 (ions balanced within ± 10 V) for long periods without applying an opposite charge. Because no wind is necessary for ion emission, there is no risk of scattering powder samples. The device can be used in three ways. It can be secured in a stand that is included standard, freely carried in a hand for convenient portability, or installed in an AP series analytical balance. It can also be used to remove static from samples and containers for other applications besides analytical balance weighing.



Static removal method	AC corona discharge
Static removal range	Approx. 50 to 400 mm from discharge electrode
Static removal time	1 second (without wind)
Ozone concentration	0.06 ppm or less (at 150 mm from the outlet)
Electrode probes (materials)	Tungsten (Durability: 30,000 hours)
Weight	Approx. 710 g (Main unit: Approx. 395 g, Stand: Approx. 315 g)



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