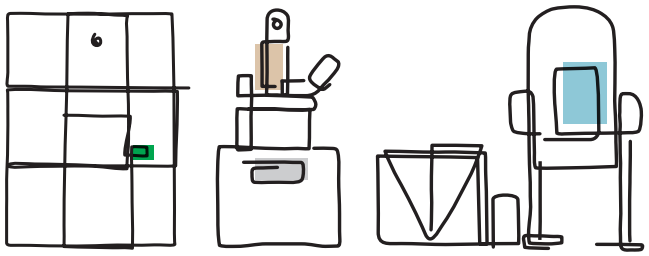
Solutions for Innovation | JEOL

JEOL Products Guide

Products Guide 2023



Nanometrology
Fabrication
Characterization

JEOL Ltd.

Introduction

Thank you for your interest in JEOL products and services.

JEOL designs and manufactures scientific instruments for high-level research and development activities. Our customers include scientists and engineers working in leading-edge academic and industrial laboratories around the world. JEOL products and services enable them to pursue a variety of R&D applications that require high resolution imaging and analytical capabilities such as: basic observation and analysis, environmental science, information technology, semiconductor production, biotechnology, nanotechnology, and a broad range of industrial endeavors.

Experts involved in the studies of medicine, biology, biochemistry, agriculture, materials science, metallurgy, ceramics, chemistry, petroleum, pharmacy, semiconductors and electronic materials have been using JEOL products for more than 70 years. Our new products are easier-to-use than ever before and contribute to a high level of quality assurance and quality control during the production process.

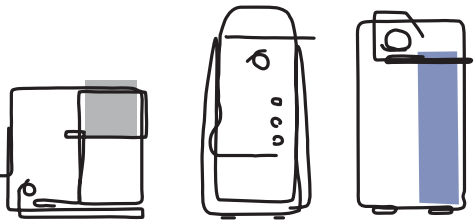
This Product Guide presents the most current high performance solutions from JEOL to meet your R&D requirements for electron optics, analytical, semiconductor, industrial, and medical instruments and equipment. For more details or information about any of our products, please contact your nearest JEOL office.

JEOL Ltd.

Company Profile

Name: JEOL Ltd.
Address (head office): 1-2, Musashino 3-chome, Akishima, Tokyo 196-8558,
Japan Establishment: May 30, 1949
Capital: 21,394,180,000 yen (as of end of March 2022)
Consolidated sales: 138,848 million yen (as of end of March 2022)
Number of employees: 3,291 (for JEOL Group as of end of March 2022)

Contents



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Transmission Electron Microscope

JEM-3300 CRYO ARM™ 300 II

Field Emission Cryo-Electron Microscope

CRYO ARM™ 300 II is a cryo-electron microscope that specializes in the observation of electron beam-sensitive specimens, such as proteins, for single particle analysis, tomography and MicroED. This system offers improved stability, throughput and ease of use compared to the previous generation of cryo-EMs. Moreover, this is an all-in-one system that can handle everything from screening to data acquisition, allowing for more flexibility in operation at the customer sites to meet the needs of the facility. These improvements allow users to obtain high quality images by simple operation even for those who have never used an electron microscope before.

- Standard accelerating voltage: 300 kV, 200 kV
- Energy filter: In-column Omega energy filter
- Accessory: Hole-free phase plate
- Maximum tilt angle: ±70°
- Specimen cooling temperature: 105 K or less
- Specimen storage: Up to 12 specimens can be held.
- Electron gun: Cold field emission gun (CFEG)

JEM-Z200CA CRYO ARM™ 200 II

Field Emission Cryo-Electron Microscope

CRYO ARM™ 200 II is a cryo-electron microscope that specializes in single particle analysis used for 3D structure analysis of proteins, etc. Succeeding to JEOL CRYO ARM™ series, this system is equipped with a CFEG, an in-column energy filter, a side-entry liquid-nitrogen cooling stage and an automated specimen exchange system. The automated exchange system enables the storing of up to 12 samples and allows for the exchange of an arbitrary one or more samples, thus enabling flexible observation scheduling by multiple users. Moreover, this cryo-EM incorporates a newly-designed high resolution pole-piece for acquiring higher-quality images.

- Standard accelerating voltage: 200 kV (option: 100 kV, 80 kV)
- Energy filter: In-column Omega energy filter
- Specimen cooling temperature: 105 K or less
- Specimen storage: Up to 12 specimens can be held.
- Electron gun: Cold field emission gun (CFEG)

JEM-ARM300F2 GRAND ARM™2

Atomic Resolution Analytical Electron Microscope

The "GRAND ARM™" has been upgraded. The JEM-ARM300F2 GRAND ARM™2 is JEOL's flagship EM that combines ultrahigh spatial resolution observation and high sensitivity X-ray analysis at a wide range of accelerating voltage from low acceleration to high acceleration.
With the adoption of new enclosure cover which can reduce the effect of environment changes as well as improved acoustic noise resistance of column, the ultimate stability of microscope has been realized.

- Resolution: 0.053 nm (300 kV, with STEM corrector)
- Accelerating voltage: 40 to 300 kV (standard 80 kV, 300 kV)
- Electron gun: Cold field emission gun

NEOARM JEM-ARM200F

Atomic Resolution Analytical Electron Microscope

New Atomic Resolution Analytical Electron Microscope "NEOARM" JEM-ARM200F comes with JEOL's unique cold field emission gun (Cold-FEG) and a new Cs corrector (ASCOR) that compensates for higher order aberrations. The combination of a Cold-FEG and ASCOR enables atomic-resolution imaging at not only 200 kV accelerating voltage, but also a low voltage of 30 kV.
"NEOARM" is also equipped with an automated aberration correction system that incorporates JEOL's new aberration correction algorithm for automatic fast and precise aberration correction.
We will deliver "High throughput atomic resolution image" to everyone.

- Resolution: 0.071 nm (UHR) for HAADF-STEM image
- Accelerating voltage Standard: 30 kV, 60 kV, 80 kV, 120 kV, 200 kV
- Electron gun: Cold-FEG

Monochromated JEM-ARM200F

Atomic Resolution Analytical Electron Microscope

An atomic-resolution electron microscope with a maximum accelerating voltage of 200 kV and incorporates JEOL's own double Wien-filter monochromator just beneath FEG. Capable of atomic resolution analysis at all accelerating voltages of 200 kV down to 30 kV (option). With several energy slits of different width, wide energy resolutions between 300 meV and 35 meV or better are selectable. Unprecedentedly high energy resolution is achieved: 24 meV at 60 kV accelerating voltage.

- Accelerating voltage: 200 kV, 80 kV (other voltages: optional)
- Energy resolution: 40 meV or better (at 200 kV)
  35 meV or better (at 80 kV)
- STEM resolution: 82 pm (at 200 kV), 136 pm (at 80 kV)

JEM-F200

Multi-purpose Electron Microscope

JEM-F200 (nickname : F2) is a multi-purpose electron microscope of the new generation to meet today's diversified needs. JEM-F200 incorporates a new probe-forming lens system, CFEG and Dual SDD system required for high-resolution analytical systems, leading to high-throughput materials analysis. "SPECPORTER™" for automatic holder insertion and retraction is also incorporated, enabling us to smoother microscope operation.

- Point resolution: TEM point to point: 0.19 nm (with CF-UHR)
  TEM lattice image: 0.10 nm (with CF-UHR)
  STEM-HAADF image: 0.14 nm (with CF-UHR)
- Accelerating voltage: standard 200 kV, 80 kV
- Magnification: ×20 to ×2,000,000 (TEM) / ×200 to ×150,000,000 (STEM)

JEM-1400Flash
Electron Microscope

Equipped with a high-sensitivity sCMOS camera, the JEM-1400Flash offers new “Flash” for TEM users via powerful new functions, including an ultra-wide area montage system and an OM (optical microscope) image linkage function.

- Resolution: 0.2 nm (HC) / 0.14 nm (HR)
- Accelerating voltage: 10 kV to 120 kV
- Magnification: ×10 to ×1,200,000 (HC) / ×10 to ×1,500,000 (HR)
- Maximum tilt angle (Tilt-X): ±70° (HR/HC)

※ With optional high tilt specimen holder

JEM-2100Plus
Electron Microscope

The JEM-2100Plus is a multi purpose transmission electron microscope, which combines the proven JEM-2100 optic system with an advanced control system for enhanced ease of operation. Achieving superior performance through intuitive operation, the JEM-2100Plus provides solutions to a wide range of applications from materials science to medical/biological studies.

- Point resolution: 0.19 nm
- Accelerating voltage: 80 kV to 200 kV
- Magnification: ×30 to ×1,500,000

JEM-2200FS
Field Emission Electron Microscope (Equipped with In-Column Energy Filter)

A field emission electron microscope equipped with a 200 kV field emission gun and a new in-column energy filter, which is optimally configured for analytical functions. The use of a new, rotation-free image forming optical system makes it easy to compare TEM images and diffraction patterns. Since the microscope allows observation of wide-field energy-filtered images, combination with the optional tomography function enables acquisition of three-dimensional information with a wide field and a high contrast.

- Point resolution: 0.19 nm
- Accelerating voltage: 160 kV, 200 kV
- Magnification: ×50 to ×1,500,000

JED-2300T
Energy Dispersive X-ray Spectrometer

The JED-2300T, installed on a TEM, can easily perform qualitative/quantitative analysis and line/area analysis of microareas, with high energy resolution. This EDS employs JEOL’s unique ultra-thin window detector with gate valve protection mechanism, making it possible to obtain high-sensitivity analysis data particularly from light elements.

- Analytical functions: Qualitative / quantitative analysis, line / area analysis
- Analyzable elements: B to U or Na to U
- Magnification: ×50 to ×1,500,000

Scanning Electron Microscopes

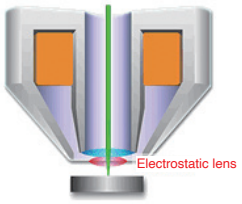
JSM-IT800
(HL version)

JSM-IT800

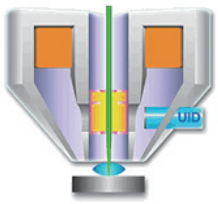
Schottky Field Emission Scanning Electron Microscope

The JSM-IT800 employs an easy-to-use GUI “SEM Center”, which serves as a common platform enabling a full range of functionality from high resolution observation to high speed elemental mapping. This platform features a JEOL In-Lens Schottky Plus Field Emission Electron Gun, a next-generation electron optical control system “Neo Engine” and a fully embedded JEOL EDS system. The JSM-IT800 satisfies various needs of users by utilizing a hybrid design of SEM objective lens. Five versions are available based on the objective lens type: Hybrid Lens (HL) version as general-purpose FE-SEM, Super Hybrid Lens (SHL) versions (two versions for different configurations) for observation and analysis at ultra-low accelerating voltage and at highest resolution, and Semi-In-Lens versions (i/is for two different configurations) for observation of semiconductor devices. Moreover, new backscattered electron detectors, Scintillator BSE detector and Versatile BSE detector are adopted. The SBED enables acquisition of material contrast image of good responsiveness at low accelerating voltage, while the VBED enables acquisition of 3D, compositional, and material contrast image.

- Resolution: HL: 0.7 nm (20 kV), 1.3 nm (1 kV)
  SHLs: 0.6 nm (15 kV), 1.1 nm (1 kV)
  SHL: 0.5 nm (15 kV), 0.7 nm (1 kV)
  i: 0.5 nm (15 kV), 0.7 nm (1 kV)
  is: 0.6 nm (15 kV), 1.0 nm (1 kV)
- Accelerating voltage: 0.01 to 30 kV
- Direct magnification: HL: ×10 to ×2,000,000 (128 × 96 mm print size)
  SHL/SHLs: ×10 to ×2,000,000 (128 × 96 mm print size)
  i/is: ×25 to ×2,000,000 (128 × 96 mm print size)
- Display magnification: HL: ×27 to ×5,480,000 (1,280 × 960 pixels on display)
  SHL/SHLs: ×27 to ×5,480,000 (1,280 × 960 pixels on display)
  i/is: ×69 to ×5,480,000 (1,280 × 960 pixels on display)



Electromagnetic/electrostatic field superposed type
HL/SHL/SHLs



Semi-In-Lens type
(i/is)

Stunning images **inspire** the future

Superb performance SEM for any user

JSM-IT700HR

Schottky Field Emission Scanning Electron Microscope

SEM – Essential in Daily Lab Operation. JSM-IT700HR Makes it Easy.
The JSM-IT700HR delivers a maximum probe current of 300 nA (15 times higher than previously), thus providing a wealth of observational and analytical information. A simple-to-operate user interface significantly simplifies observation and analysis in the SEM. In addition, this compact high-resolution SEM accommodates a large specimen chamber and is fitted with a new and improved anti-vibrational support for the main console. Consequently, all of these features and improvements of the JSM-IT700HR achieve unprecedented observation and analysis.

- Resolution: High vacuum mode: 1.0 nm (20 kV) 3.0 nm (1.0 kV)
  Low vacuum mode: 1.8 nm (15 kV BED)
- Accelerating voltage: 0.5 to 30 kV
- Direct magnification: ×5 to ×600,000 (print size of 128 mm × 96 mm)
- Display magnification: ×14 to ×1,679,449 (display size of 358 mm × 269 mm)

JSM-IT510
Scanning Electron Microscope

The JSM-IT510 is the highest-end model of our thermionic-emission SEMs. With the new Simple SEM function, you can “leave” your daily routines (respective operation) to the instrument, allowing for more efficient observations. This SEM is also equipped with a large multi-purpose chamber (200 mm dia.) for simultaneous various analyses.

- Resolution: High Vacuum Mode: 3.0 nm (30 kV), 15.0 nm (1.0 kV)
  Low Vacuum Mode: 4.0 nm (30 kV, BED)
- Accelerating voltage: 0.3 to 30 kV
- Direct magnification: ×5 to ×300,000 (print size of 128 mm × 96 mm)
- Display magnification: ×14 to ×839,724 (display size of 358 mm × 269 mm)

JSM-IT200
Scanning Electron Microscope

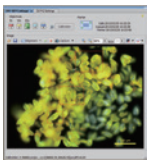
The JSM-IT200 incorporates innovative functions, comparable to those of a higher-end model, JSM-IT510. These functions include Zeromag for smooth transition from optical to SEM images and Live Analysis for quick and efficient elemental analysis. Furthermore, this SEM enables the innovative observation & analysis functions to operate at a higher throughput.

- Resolution: High vacuum mode: 3.0 nm (30 kV), 8 nm (3 kV), 15.0 nm (1.0 kV)
  Low vacuum mode: 4.0 nm (30 kV, BED)
- Accelerating voltage: 0.5 to 30 kV
- Direct magnification: ×5 to ×300,000 (print size of 128 mm × 96 mm)
- Display magnification: ×14 to ×839,724 (display size of 358 mm × 269 mm)

JCM-7000 NeoScope™
Benchtop Scanning Electron Microscope

JCM-7000 is a new benchtop scanning electron microscope with helpful functions. Low vacuum (LV) mode makes it possible to observe without sample preparation. Stage Navigation System helps users easily look for the area of interest. Zeromag provides smooth transition from optical images to SEM images. Live Analysis enables real-time elemental analysis during observation. Furthermore, Live 3D gives 3D image restructure simultaneously with the SEM image. JCM-7000 has incorporated those new functions aiming at “observations and analyses by everyone”.

- Direct magnification: ×10 to ×1,000,000 (Magnification is defined by 128 mm × 96 mm)
- Monitor magnification: ×24 to ×202,168 (Magnification is defined by 280 mm × 210 mm)
- Specimen size: 80 mm diameter
- Main options: EDS (energy dispersive X-ray spectrometer),
  Stage Navigation System, Tilting and Rotating Motor Drive Holder



OM

SEM

miXcroscopy™

Linked Optical and Scanning Electron Microscope System

The same specimen holder is used for both the optical microscope (OM) and the scanning electron microscope (SEM). By managing the stage data using dedicated software, the sites viewed with the optical microscope are saved, making it possible to view the fine structures at the same sites at even greater magnification using the scanning electron microscope.

SXES Series

Soft X-ray Emission Spectrometer Series

The Soft X-ray Emission Spectrometer (SXES) achieves superbly high energy resolution with combination of a newly developed diffraction grating and a high-sensitivity CCD camera. SXES allows parallel detection comparable to EDS and surpasses WDS in terms of energy resolution.
It is excellent at chemical state analysis and detection of trace elements. This spectrometer is used with an EPMA or an FE-SEM.
*EPMA is an abbreviation of Electron Probe Micro Analyzer.

SMILE VIEW™ Standard

Analysis & Measurement Integrated Software

The SMILE VIEW™ Standard simplifies the user interface of the highly regarded SMILE VIEW™ Program which is a PC-based system facilitating a series of operations of listing to printing of images saved in the same folder. An image sharpening function is also added to this new program.

Ion Beam Application Equipment

New Product

JIB-PS500i
FIB-SEM System

The combination of the high image quality high-resolution SEM and high-performance FIB enables accurate and high-quality TEM specimen preparation at the intended area of the specimen. The large specimen stage with large tilt angles makes it easy to perform TEM specimen preparation such as trimming specimen blocks. By using the double-tilt cartridge, the specimen can be transferred to the TEM without replacing the TEM grid.

- SEM resolution: 0.7 nm at 15 kV, 1.4 nm at 1 kV, 1.0 nm at 1 kV in BD mode
- FIB resolution: 3 nm at 30 kV
- FIB probe current: 1.0 pA to 100 nA

JIB-4700F
MultiBeam System

The JIB-4700F features a hybrid conical objective lens, GENTLEBEM™ (GB) mode and an in-lens detector system to deliver a guaranteed resolution of 1.6 nm at a low accelerating voltage of 1 kV. Using an “In-Lens Schottky FEG” that produces an electron beam with a maximum 300 nA probe current, this new FIB-SEM allows for high-resolution imaging and fast analyses. For the FIB column, a high-current density Ga ion beam with a maximum 90 nA probe current is employed for fast ion milling and processing of specimens.

- SEM image resolution: 1.2 nm (15 kV, GB mode), 1.6 nm (1 kV, GB mode)
- FIB image resolution: 4.0 nm (30 kV)
- FIB probe current: 1 pA to 90 nA

IB-19530CP
CROSS SECTION POLISHER™ (CP)

The IB-19530CP adopts a newly-developed, multi-purpose stage to meet increasingly diversified market needs and provides multi-functionality by the use of different types of specialized functional holders. The multi-purpose stage combined with these holders expands its applications to planar surface milling and polishing, sputter coating as well as conventional cross-section ion milling.

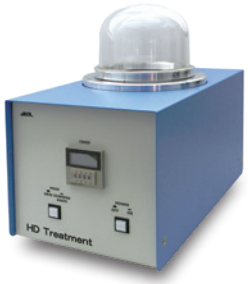
IB-19520CCP
Cooling CROSS SECTION POLISHER™ (CP)

The IB-19520CCP Cooling CROSS SECTION POLISHER™ incorporates a specimen cooling system suitable for specimens susceptible to beam damage. A new air isolation system transfers a specimen between SEM and CP in an air-isolated environment. Its unique cooling system can cool the specimen for 8 h or more only with 1 L liquid nitrogen, enabling specimen exchange in a short time while liquid nitrogen is held. It features high-throughput milling (milling speed) of 500 µm/h (Si single crystal, protrusion: 100 µm).

Peripheral Equipment

EC-52000IC
ION CLEANER

This is a device for removing hydrocarbon contaminants deposited on the sample using physical and chemical reactions while maintaining the sample in a glow discharge. Collecting the hydrocarbon contaminants helps to prevent the generation of sample contamination when an electron beam is irradiated onto the sample by an electron microscope, and by accumulation of hydrocarbon contaminants (contamination).



DII-29020HD
HD Treatment

HD Treatment is a device that was designed with the electron microscope sample fabricator in mind, offering the long-desired hydrophilic treatment applicable to a wide range of samples prepared for TEM and SEM. Operation is exceptionally easy; all processing from start to finish is fully automatic.

JEC-3000FC
Auto Fine Coater

This device consists of a main unit and a rotary pump, and is used mainly to prepare specimens for scanning electron microscopes. Various types of coatings can be deposited onto biological and other non-conductive specimens efficiently in a short time.

DII-29010SCTR / DII-29030SCTR

Samples for use in a scanning electron microscope are coated with a metal (Au, Pt) to prevent charging of the specimen and improving the generation efficiency of secondary electrons, thus making it possible to improve the quality of the observed images.

Instruments for Microarea and Surface Analysis

JXA-iHP200F

JXA-iSP100

JXA-iHP200F / JXA-iSP100

Electron Probe Microanalyzer

JXA-iHP200F and JXA-iSP100 are integrated EPMA with enhanced features, achieving more efficient operations from observation to analysis based on the concept “anyone can easily perform microanalysis in defined regions of interest”.
Functions to realize high throughput such as Auto Loader, Stage Navigation System, and “Live Analysis” function are equipped as standard. Moreover, as JXA-iHP200F and JXA-iSP100 have high expandability, they can serve for diversified analysis purpose by incorporating detectors such as soft X-ray emission spectrometer (SXES), crystal orientation analysis system (EBSD), and cathodoluminescence detector (CL).

JAMP-9510F

Field Emission Auger Microprobe

The JAMP-9510F is a high-grade field-emission Auger Microprobe, featuring high-throughput chemical-state analysis achieved by a hemispherical electrostatic energy analyzer (HSA) and large probe current even at small probe diameter offered by an FEG. Combining a eucentric tilt stage and a charge neutralizing gun allows analysis of insulating materials as well as metals. Auger analysis extends from chemical composition to chemical-state information for any sample.

JPS-9030

Photoelectron Spectrometer (XPS)

The JPS-9030 is a multi-purpose XPS adopting newly-developed software for greater ease-of-use. A new Kaufman-type etching ion source is installed in the specimen exchange chamber to prevent contamination of the measurement chamber. In addition to the standard Mg/Al twin anode, an infrared heating system and an Ar gas cluster ion source are available.

X-ray Fluorescence Spectrometers

JSX-1000S

Energy-dispersive X-ray fluoresence spectrometer

By adoption of a new optical system, abundance of filter configurations and SDD, the JSX-1000S energy dispersive X-ray fluorescence spectrometer provides even higher sensitivity. Other new features are a touch panel that allows intuitive operation, automated measurement menus provided by the solution application, as well as a smart FP method of standard-less analysis with enhanced accuracy.

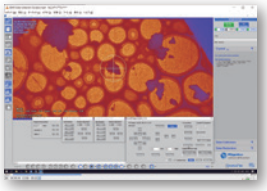
Electron Diffractometer

New Product

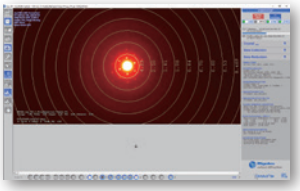
XtaLAB Synergy-ED

Electron Diffractometer

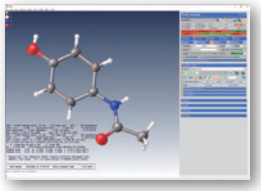
The XtaLAB Synergy-ED is a new and fully integrated electron diffractometer that uses electron beams to create a seamless workflow from data collection to structure determination of three-dimensional molecular structures. The XtaLAB Synergy-ED is the result of combining core technologies to achieve synergy between Rigaku's high-speed, high-sensitivity detector (HyPix-ED) and single crystal analysis software (CrysAlis^{Pro} ED) and JEOL's transmission electron microscope technology. By creating a seamless workflow from sample selection (nanocrystals) to data collection and structure analysis, the XtaLAB Synergy-ED makes electron diffraction easily accessible to non-experts who do not have the expertise in electron microscopy and crystallography that is typically required.



❶ Select the target crystal



❷ Measure and analyze using electron diffraction



❸ Analyze crystal structure

NMR Spectrometers

JNM-ECZL (ECZ Luminous™) series

FT NMR System

The JNM-ECZL series (ECZ Luminous™) is an FT NMR system equipped with state-of-the-art digital and high-frequency technologies. The highly integrated Smart Transceiver System, a high-speed, high-precision digital high-frequency control circuit, enables further miniaturization and ensures the stability of spectrometer. The new Multi Frequency Drive System enables multi-resonance measurements in a standard configuration, providing a wider range of solutions.

ECZL G series

This is a flagship model that supports diversified, cutting-edge solutions, including high-magnetic-field, and solid-state NMR measurements. The system is flexible in terms of expansion, with support for three or more channels, high-power amplifiers, and high-power magnetic field gradients.

- Frequency: 400 MHz to 1.3 GHz
- Sample type: solution/solid
- Number of channels: 2 (standard), expandable up to 8 channels
- Power amplifier: High frequency side
  400 to 600 MHz, 100 W, 700 MHz or higher, 200 W
  500 W /1000 W (as option)
  Low frequency side
  400 to 600 MHz, 300 W, 700 MHz or higher, 500 W
  1000 W /2000 W (as option)
- Magnetic field gradient amplifier: 10 A (standard), 30 A /50 A (as option)

ECZL R series

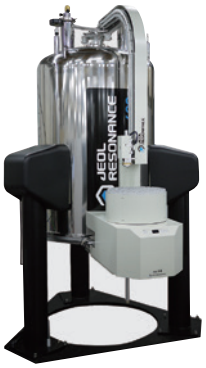
This is a compact model that supports solid-state NMR measurements. Its footprint is less than 50% of that of the JNM-ECZR.

- Frequency: 400 MHz to 600 MHz
- Sample type: solution/solid
- Number of channels: 2
- Power amplifier: High frequency side 100 W, Low frequency side 300 W
- Magnetic field gradient amplifier: 10 A

ECZL S series

This is an entry-level model dedicated to 400 MHz solution NMR while incorporating the high-performance digital high-frequency technology of the ECZL series.

- Frequency: 400 MHz
- Sample type: solution
- Number of channels: 2
- Power amplifier: High frequency side 50 W, Low frequency side 150 W
- Magnetic field gradient amplifier: 10 A



ASC64 (64 samples)

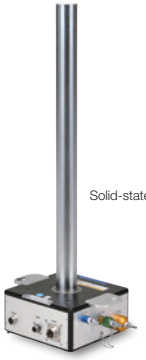
ASC series
Auto Sample Changer

An automatic sample changer makes it possible to measure many samples sequentially by exchanging multiple samples automatically one by one. Four changer models are available for 24 samples, 30 samples, 64 samples and 100 samples.


ASC24 (24 samples)


ASC30 (30 samples)


ASC100 (100 samples)


Solid-state NMR probe

JNM-ECZR series
Solid-state NMR

Solid-state NMR accessories are used to measure solid samples (powder or film-like samples). The solid-state NMR technique is effective for samples not soluble in solvents (inorganic samples, etc.) and of crystalline polymorph that is meaningful to measure in the solid state. The AUTOMAS probe, rotor carrier and auto sample changer enable automatic measurements of multiple samples like solution NMR.


Rotor carrier for AUTOMAS probe

ESR Spectrometers

JES-X3 series
ESR Spectrometers

Recently, it has been widely accepted that even relatively few unpaired electrons in a sample can affect the function of the material, so a lower detection limit (higher sensitivity) is required of ESR measurements.
The JES-X3 Series has achieved higher sensitivity by developing a low-noise Gunn oscillator for its new spectrometer.

	X310	X320	X330
Maximum Magnetic Field	0.65 T	1.3 T	1.4 T
Sweep Width	±0.01 to 250 mT	±0.01 to 500 mT	
Pole Gap	60 mm	60 mm	75 mm
Frequency Range (GHz)	8.750 to 9.650		
Field Resolution (μT)	2.35		
Correction by Marker	Standard		
Operating System	Windows® 10		

ES-CT470
Liquid Helium Variable Temperature Controller

The ES-CT470 varies the sample temperature in the temperature range between 2.5 K and 470 K. Temperature setting is performed by digital display and the set temperature is kept constant by automatic control circuits. Combined use with a UV Irradiation device is possible. A GaAs element is used as a temperature sensor, enabling high-accuracy temperature setting.

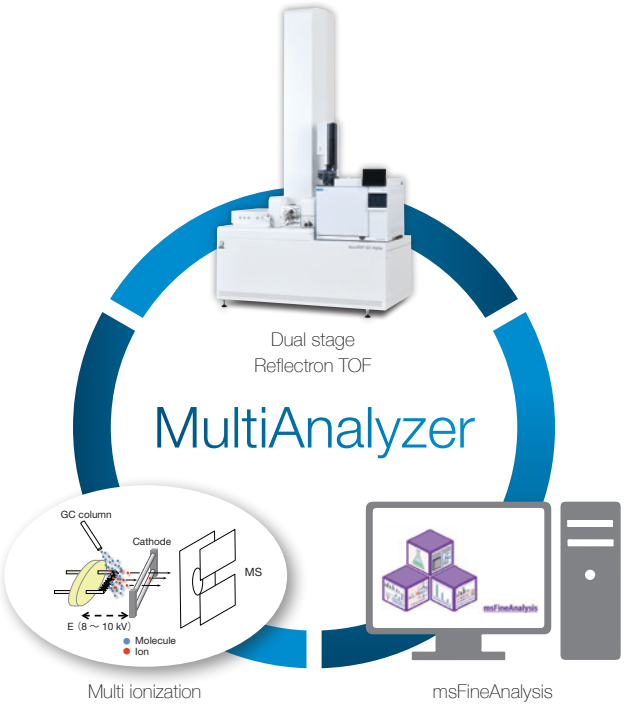
- Variable temperature range: 2.5 K to 470 K
- Temperature stability: ±0.01 K for 2.5 K to 4.2 K
  ±1% or 0.5 K for 4.2 K to 470 K
- Required cooling time: 20 min to 25 min from room temperature
- Liquid helium consumption: 0.8 to 2 L/h
- Dewar adapter: 5/8 inch
- Power supply: 90 – 125/180 – 250 V AC 50 Hz/60 Hz
- Sample tube O. D. : 5 mm

Mass Spectrometers

JMS-Q1600GC UltraQuad™ SQ-Zeta

Gas Chromatograph - Quadrupole mass spectrometer (GC-QMS)

JMS-Q1600GC UltraQuad™ SQ-Zeta is our 6th generation high-end Gas Chromatograph Quadrupole Mass Spectrometer (GC-QMS) based on JEOL's MS technologies and years of in-depth experience. The IDL of the standard EI ion source is 5 fg (OFN) or less. An Enhanced Performance Ion Source (EPIS) is also available for analysis at even higher sensitivity. Based on our highly acclaimed msFineAnalysis software for GC-TOFMS, the new msFineAnalysis iQ expands this integrated qualitative analysis capability into GC-QMS data analysis and provides GC-MS qualitative analysis results faster than before. From quantitative applications such as environmental samples, water quality control and agrochemicals, to qualitative applications such as materials and aroma analyses, the SQ-Zeta is the ultimate general-purpose GC-MS with high-performance capabilities for a wide variety of measurement and analysis needs.



JMS-T2000GC MultiAnalyzer

Multi-ionization Unknown Compounds Analysis System

Materials are getting more complex, our environment is diversifying, and hundreds of new chemicals are created every day. The Multi-ionization Unknown Compounds Analysis System MultiAnalyzer performs qualitative analysis even for unknown compounds and provides answers to such complicated and challenging problems. We are committed to provide high throughput, high quality analysis results with MultiAnalyzer.

JMS-T2000GC AccuTOF™ GC-Alpha

High Performance Gas Chromatograph - Time-of-Flight Mass Spectrometer

The JMS-T2000GC AccuTOF™ GC-Alpha is a high performance GC-MS system that simultaneously realizes high mass resolution, high mass accuracy, high sensitivity, high speed data acquisition, wide dynamic range, and wide mass range. Two types of multi-ionization combination ion sources - EI/FI/FD combination ion source and EI/PI combination ion source - are available. Soft ionization methods can produce molecular ions from unknown compounds whose molecular ions can not be produced by EI, and facilitate the elucidation of their elemental compositions. The system comes with the automatic data analysis software “msFineAnalysis” for integrated analysis of the data measured by the multi-ionization combination ion sources, thus providing fast automatic qualitative analysis, which does not solely depend on mass specral library databases.

JMS-TQ4000GC UltraQuad™ TQ

Gas chromatograph - Triple Quadrupole mass spectrometer (GC-QMSMS)

The new GC Triple Quadrupole Mass Spectrometer that provides both high productivity and highly sensitive analysis with the combination of JEOL's proprietary short collision cell technology and the ion ejection technology (ejecting ions after accumulating and pulsing them). It exerts its capabilities in microanalysis and quantitative analysis of samples containing many foreign substances such as analysis of residual agricultural chemicals in food. Further microanalysis is possible by using an optional ion source such as an Enhanced Performance Ion Source (EPIS).

Photo: JMS-Q1600GC + Headspace autosampler system

MS-62071STRAP

Headspace Autosampler

The MS-62071STRAP is a new-generation headspace sampler(HS) providing ultra-low concentration measurement, which was not possible with the HS method using a conventional sample loop. In addition, the HS-GCMS system, combined with a JMS-Q1600GC, guarantees detection of mold odor in water down to 1 ppt.

JMS-800D UltraFOCUS™

Mass Spectrometer Dedicated to Dioxin Analysis

The JMS-800D UltraFOCUS™, conforming to international standards on dioxin analysis, including EPA, EN, and JIS methods, focuses on analysis of ultra-trace amounts of dioxins, PCBs, PBDEs, and POPs components. Equipped with a socket-type ion chamber, a standard sample inlet system with automatic ON/OFF function, and a photo-multiplier detector, the JMS-800D is optimum for detecting dioxins with ultrahigh sensitivity and ultrahigh selectivity.

JMS-S3000 SpiralTOF™-plus 2.0

Ultra-High Mass-Resolution MALDI-TOFMS System

The JMS-S3000 SpiralTOF™-plus 2.0 is a MALDI-TOFMS* incorporating JEOL's unique SpiralTOF™ ion optical system. With superior capabilities than conventional MALDI-TOFMS, the JMS-S3000 provides state-of-the-art analytical solutions for a wide range of research needs, including functional synthetic polymers, materials chemistry, and biomolecules.

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

JMS-T100LP AccuTOF™ LC-Express

Atmospheric Pressure Ionization High-Resolution Time-of-Flight Mass Spectrometer

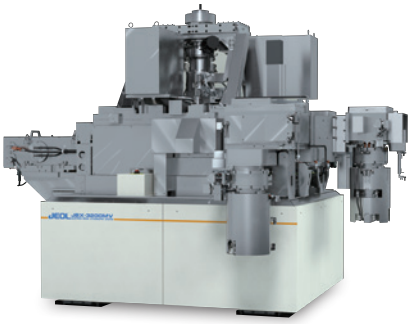
The JMS-T100LP AccuTOF LC series of atmospheric pressure ionization time-of-flight mass spectrometers are robust, easy-to-maintain, high-throughput mass spectrometers intended for high productivity with multiple ionization methods. The AccuTOF™ LC-Express is the advanced version of JMS-T100LP with a significantly improved dynamic range. By using DART™ (Direct Analysis in Real Time), which is JEOL's unique ionization technology of rapidly providing accurate mass information, as well as easy replacement of the ion source with the electrospray ionization (ESI) source for LC/MS operation or with the ColdSpray ionization (CSI) source, the AccuTOF™ LC-Express satisfies various research needs in organic chemistry, material science, and other fields.

JMS-T100LP + DART™ Ion Source

Ambient Ionization High-Resolution TOFMS

DART™ (Direct Analysis in Real Time) is a new ion source that can analyze samples with various shapes and states without any sample preparation. DART was born in 2003 at the mass spectrometry applications laboratory of JEOL USA, Inc. Among a series of new ionization techniques, which were later termed "ambient ionization," DART was the first to have been invented and the first to have been commercialized in 2005. You can acquire high mass-resolution, accurate-mass spectra in real time by simply presenting samples of various shapes and states to the DART™ ion source without any sample preparation. DART can handle samples with arbitrary shapes or "dirty" sample that conventional analytical method cannot deal with. The DART™ was developed for the JEOL AccuTOF™ series of mass spectrometers. AccuTOF™ LC-Express and DART are the perfect combination.

Semiconductor Equipment



JBX-3200MV
Electron Beam Lithography System

The JBX-3200MV is an electron beam lithography system developed for the production of next generation, ultra-high-precision masks and reticles. This system employs a variable shaped electron beam of 50 kV and a step & repeat specimen stage.

- High throughput enabled by a new PEC (Proximity Effect Correction) system
- High-speed data-transfer system for a large quantity data
- High-precision design for mask / reticle production

JBX-9500FS
Electron Beam Lithography System

The JBX-9500FS is a spot beam lithography system developed to meet a wide range of applications with high throughput and high precision performance. This system covers fields from the nanotechnology research to the production of leading edge devices.

- Accelerating voltage: 100 kV
- Electron beam source: ZrO / W Schottky emitter
- Substrate size: maximum 300 mm wafer

JBX-8100FS
Electron Beam Lithography System

The JBX-8100FS is a Gaussian beam lithography system that performs superior accuracy and writing speed. Upgradable platform offers various options to meet the fields from high-end nanostructure applications to batch production of compound semiconductor.

- Accelerating voltage: 100 kV / 50 kV / 25 kV
- Electron beam source: ZrO / W Schottky emitter
- Scanning speed: 125 MHz to 250 Hz
- Substrate size: up to 200 mm wafer

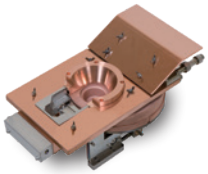
Metal AM Machine

JAM-5200EBM
Electron Beam Metal 3D Printer

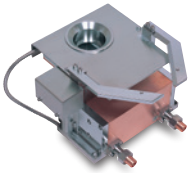
Metal 3D printer that employs additive manufacturing with powder bed fusion techniques. This 3D printer irradiates the laid metal powders with an electron beam to melt and solidify the powders for fine-structure production. The features of the printer include direct manufacturing of 3D micro-structures, and large-output, high-speed, high-density manufacturing, thus allowing for additive manufacturing with high quality and high reproducibility.

- Manufacturing dimensions: Maximum 250 mm (dia.) × 400 mm (H)
- Electron beam output: Maximum 6 kW

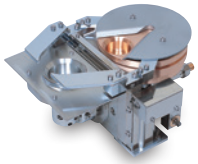
Industrial Equipment for thin-film formation and material processing



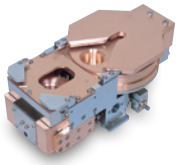
BS-60211DEM



BS-60060DEBS



EBG-102UB6S



EBG-203UB6S

BS series / EBG series
Electron Beam Source

Electron beam sources for vacuum evaporation of thin-film deposition. Various models are selectable for oxide films, nitride films and metal films. Extended-use models are also available for multilayer films and continuous evaporation with the long-lifetime filament.

BS-60610BDS

BS-60310BDS

BS-60610BDS / BS-60310BDS
Bombardment Deposition Source

Deposition sources that utilize electron-beam bombardment indirect heating techniques. Suitable for low-damage, low-defect, low-absorption film evaporation. The BS-60610BDS achieves large capacity and high rate for liners.


JEBG-3000UB


JEBG-1000UB

JEBG series
High-power Electron Beam Source

High-power electron beam sources for vacuum evaporation of metal and metal-oxide for wide plastic films or large glass plates that are continuously fed. And they can also be used for vacuum melting of high-melting point metals.


BS-80011BPG


BS-80020CPPS

BS-80011BPG / BS-80020CPPS
Plasma Source

Plasma Sources are installed in a vacuum chamber and generate high-density plasma. Used for Ion Plating (Plasma Assisted Deposition) and it is possible to improve film properties for optical thin films, protective films and functional films. Because high density plasma can be generated in a mass space, high-rate deposition to a large area is possible.

BS-04 series
Rotary Sensor

Multi-point sensor for measuring the deposition rate and film thickness in vacuum evaporation or sputtering by connecting it to a quartz-rate control monitor. Equipped with 6 or 12 quartz crystals, smooth crystal replacement is achieved for deposition of multilayer or thick films. Sensor length in the chamber is selectable and two kinds of sensor-head angle are available, thus enabling flexible sensor installation into small to large equipment.

BS series
Electron Beam Source for research and development

Electron beam source suitable for research and development. Various optional accessories can be added for a wide range of customization, including lift-off evaporation with low temperature, low damage, low defect, etc.


TP-40020NPS
Nano-powder synthesis system

TP series
RF Induction Thermal Plasma System

Thermal plasma around 10,000 °C by RF inductive coupling. Applications of the thermal plasma system include nano-powder synthesis, fine-powder spheroidization, high-speed thick-film synthesis and gas decomposition. Irrespective of materials and gases, chemical reactions (oxidization, nitriding) and surface reforming can be made.

TP-99260FDR
Powder Feeder

The table-type powder feeder that can stably feed minute particles of various sizes ranging from submicron to 100 µm or larger. It feeds particles using carrier gas through the piping. Even particles of a few microns or less in size that are highly cohesive and therefore poor in fluidity can be fed continuously. The powder feeding rate is approximately from 0.1 to 100 g/min. The closed structure enables feeding into a reduced-pressure atmosphere. Not only single-composition particles but also mixed-composition particles can be fed continuously without changing the mixing ratio. It also supports real-time monitoring of powder feeding, feedback, and external control.

Clinical Chemistry Analyzers

JCA-BM8020/8040/8060 (BioMajesty 8000GX)

Ultra High Throughput Clinical Chemistry Analyzer

JCA-BM8000 series offers high throughput and extensive sample handling capacity with a loading mechanism for up to 300 samples, a sample pre-dilution unit, and interconnected single-line multiple-testing modules. Ready for the next generation network support system “JEOINT™”.

BioMajesty is a registered trademark of JEOL Ltd.

BioMajesty 8000GX 4B

JCA-BM6070/C

High Throughput High Performance Clinical Chemistry Analyzer

With high throughput of 2,400 T/H (including ISE) as well as new functions to support various laboratory operation flows such as wash operations between samples, this model further streamlines clinical chemistry testing.
Ready for the next generation network support system “JEOINT™”.

JCA-ZS050

Clinical Chemistry Analyzer BioMajesty™ Zero Series

JCA-ZS050 is equipped with a system to avoid sample-to-sample carryover, which is suitable for analyzing a variety of samples. Its Flexible Access system and an enhanced wash mechanism (three wash modes) successfully achieve unprecedentedly high throughput and high inspection quality. Furthermore, JCA-ZS050 significantly reduces the time and cost of medical inspections, owing to drastic cost reduction by ultramicro-volume measurement with the minimum 40 µL reaction volume, together with pleasant usability and simple maintenance. These innovative features enable the establishment of new workflows in a wide range of clinical test applications.
With the optional on-board hemolysis mechanism, this model is capable of automated HbA1c measurement. Ready for the next generation network support system “JEOINT™”.

JCA-BM6050

SIEMENS HEALTHCARE DIAGNOSTICS

Clinical Chemistry Analyzer BioMajesty™ Series

JEOL's micro volume technology and unique sample pre-dilution mechanism realizes high throughput chemistry analysis with reduced sample and reagent volume. More than 5,000 systems have been placed in clinical laboratories all over the world.

JCA-BM6010/C

Compact & High Performance Clinical Chemistry Analyzer

JCA-BM6010/C is a compact, but efficient automatic analyzer that maintains the basic concept of the BioMajesty™ series while achieving the excellent capability of microanalysis with sample volume as small as 1 µL. BM6010/C also offers fully automated HbA1c analysis with on-board hemolysis. Simultaneous measurement of Glucose and HbA1c improves laboratory workflow.

▼ Local office

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JEOL Ltd.

3-1-2 Musashino Akishima Tokyo 196-8558 Japan Sales Division Tel. +81-3-6262-3560 Fax. +81-3-6262-3577

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ARGENTINA
COASIN S.A.C.I.yF.
Virrey del Pino 4071,
C1430CAM-Buenos Aires
Argentina
Tel. 54-11-4552-3185
Fax. 54-11-4555-3321

AUSTRALIA & NEW ZEALAND
JEOL (AUSTRALASIA) Pty.Ltd.
Suite 1, L2 18 Aquatic Drive
- Frenchs Forest NSW 2086
Australia
Tel. 61-2-9451-3855
Fax. 61-2-9451-3822

AUSTRIA
JEOL (GERMANY) GmbH
Gute Aenger 30
85356 Freising, Germany
Tel. 49-8161-9845-0
Fax. 49-8161-9845-100

BANGLADESH
A.Q. CHOWDHURY SCIENCE & SYNERGY PVT. LTD.
87, Suhrwardry Avenue, Floor 2
Baridhara, Dhaka1212
Bangladesh
Tel. 88-02-222262272
Fax. 88-02-222264428

BELGIUM
JEOL (EUROPE) B.V.
Planet II, Gebouw B
Leuvensesteenweg 542,
B-1930 Zaventem
Belgium
Tel.32-2-720-0560
Fax.32-2-720-6134

BRAZIL
JEOL Brasil Instrumentos Cientificos Ltda.
Av. Jabaquara, 2958 5° andar conjunto 52 ;
04046-500 Sao Paulo, SP
Brazil
Tel. 55-11-5070 4000
Fax. 55-11-5070 4010

CANADA
JEOL CANADA, INC.
3275 1ere Rue, Local #8
St-Hubert, QC J3Y-8Y6, Canada
Tel. 1-450-676-8776
Fax. 1-450-676-6694

CHINA
JEOL (BEIJING) CO., LTD.
Zhongkeziyuan Building South Tower 2F,
Zhongguancun Nansanjie Street No. 6,
Haidian District, Beijing, P.R.China
Tel. 86-10-6804-6321
Fax. 86-10-6804-6324

JEOL (BEIJING) CO., LTD., SHANGHAI BRANCH
2F-BC Room, Building A, Mingji Business Plaza,
No.207 Songhong Road, Changning District,
Shanghai 200335, P.R.China
Tel. 86-21-6248-4487
Tel. 86-21-5836-6350
Fax. 86-21-5836-3668

JEOL (BEIJING) CO., LTD., GUANGZHOU BRANCH
Rm.3501, OneJinkCenter, 230 Tianhe Road, Tianhe District,
Guangzhou, Guangdong Prov., 510620, China
Tel. 86-20-8778-7848
Fax. 86-20-8778-4268

JEOL (BEIJING) CO., LTD., WUHAN BRANCH
Room A2118, Zhongshang Plaza Office Bldg.,
No. 7 Zhongnan Road, Wuhan,
Hubei, 430070, P.R.China
Tel. 86-27-8713-2567
Fax. 86-27-8713-2567

JEOL LTD. (BEIJING) CO., LTD., CHENGDU BRANCH
1807A Zongfu Building,
NO. 35 Zhongfu Road, Chengdu, Sichuan, 610016
P.R. China
Tel. 86-28-86622554
Fax. 86-28-86622564

EGYPT
JEOL SERVICE BUREAU
3rd Fl. Nile Center Bldg., Nawal Street,
Dokki, (Cairo), Egypt
Tel. 20-2-3335-7220
Fax. 20-2-3338-4186

FRANCE
JEOL (EUROPE) SAS
Espace Claude Monet, 1 Allee de Giverny
78290, Croissy-sur-Seine, France
Tel. 33-13015-3737
Fax. 33-13015-3747

GERMANY
JEOL (GERMANY) GmbH
Gute Aenger 30
85356 Freising, Germany
Tel. 49-8161-9845-0
Fax. 49-8161-9845-100

GREAT BRITAIN & IRELAND
JEOL (U.K.) LTD.
Silver Court, Watchmead,
Welwyn Garden City, Hertfordshire AL7 1LT, U.K.
Tel. 44-1707-377117
Fax. 44-1707-373254

GREECE
N. ASTERIADIS S.A.
56-58,S. Trikoupi Str. P.O. Box 26140
GR-10022, Athens, Greece
Tel. 30-1-823-5383
Fax. 30-1-823-9567

HONG KONG
FARMING LTD.
Unit No. 1009, 10/F., Prosperity
663 King's Road, North Point, Hong Kong
Tel. 852-2815-7299
Fax. 852-2581-4635

INDIA
JEOL INDIA PVT. LTD.
Unit No.305, 3rd Floor,
ABW Elegance Tower,
Jasola District Centre,
New Delhi 110 025, India
Tel. 91-11-4595-8000
Tel. 91-11-4595-8005
Tel. 91-11-4595-8017

JEOL INDIA PVT. LTD. Mumbai Office
214 E Square, Subhash Road,
Vile Parle (EAST),
Mumbai 400 057, India
Tel. 91-22-2612-9387

JEOL INDIA PVT. LTD. Bangalore Office
125, Brigade Road,
Unit No.402, Level 4, Palms Square,
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Tel. 91-80-4375-3351

JEOL INDIA PVT. LTD. Kolkata Office
Regus, The Legacy, 25 / A,
Shakespeare Sarani,
Kolkata - 700017, India
Tel. 91-98-3023-0484

JEOL INDIA PVT. LTD. Hyderabad Office
422, Regus Solitaire Business centre,
1-10-39 to 44, level 4, Gumidelli Towers, Old Airport Road,
Begumpet, Hyderabad - 500016, India
Tel. 91-40-6704-3708

INDONESIA
PT. TEKNOLABindo Penta Perkasa
Komplek Gading Bukit Indah Blok I/11
Jl. Bukit Gading Raya Kelapa Gading Permai,
Jakarta 14240, Indonesia
Tel. 62-21-45847057/58
Fax. 62-21-45842729

ITALY
JEOL (ITALIA) S.p.A.
Palazzo Pacinotti - Milano 3 City,
Via Ludovico il Moro, 6/A
20079 Basiglio(MI) Italy
Tel. 39-02-90414431
Fax, 39-02-90414343

KOREA
JEOL KOREA LTD.
Dongwoo Bldg, 7F, 1443, Yangjae Daero,
Gangdong-Gu, Seoul, 05355, Korea
Tel. 82-2-511-5501
Fax. 82-2-511-2635

KUWAIT
Ashraf & CO. Ltd.
P.O.Box 3555 Safat 13036, Kuwait
Tel. 965-1805151
Fax. 965-24335373

MALAYSIA
JEOL (MALAYSIA) SDN.BHD.
508, Block A, Level 5,
Kelana Business Center,
97, Jalan SS 7/2, Kelana Jaya,
47301 Petaling Jaya, Selangor, Malaysia
Tel. 60-3-7492-7722
Fax. 60-3-7492-7723

MEXICO
JEOL DE MEXICO S.A. DE C.V.
Arkansas 11 Piso 2
Colonia Napoles
Delegacion Benito Juarez, C.P. 03810
Mexico D.F., Mexico
Tel. 52-5-55-211-4511
Fax. 52-5-55-211-0720

Middle East
JEOL GULF FZCO
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Dubai Airport Free Trade Zone West Wing 5WA No. G12,
Dubai, UAE
Tel. 971-4-609-1497
Fax. 971-4-609-1498

PAKISTAN (Karachi)
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Khayaban-e-Sehar,
D.H.A-VII, Karachi-75500, Pakistan
Tel. 92-21-35345581/35340747
Fax. 92-21-35345582

PANAMA
PROMED S.A.
Parque Industrial Costa del Este
Urbanizacion Costa del Este
Apartado 0816-01755, Panama, Panama
Tel. 507-303-3100
Fax. 507-303-3115

PHILIPPINES
JATEC Philippines Corporation
28 Floor, The Enterprise Center Tower 2,
Ayala Avenue corner Paseo de Roxas,
Brgy. San Lorenzo, Makati City, 1226 Philippines
Tel. (632) 849 3904

PORTUGAL
Izasa Portugal Lda.
R. do Proletariado, 1
2790-138 CARNAXIDE, Portugal
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Fax. 351-21-418-60-20

QATAR
Mannai Trading Company W.L.L.
ALI Emadi Complex,
Salwa Road P.O.Box 76, Doha, Qatar
Tel. +974 4455-8216
Fax. +974 4455-8214

RUSSIA
JEOL (RUS) LLC
Office 351.,floor 3, 23,
Novoslobodskaya St,
Moscow 127055, Russia
Tel. 7-495-748-7791/7792
Fax. 7-495-748-7793

SAUDI ARABIA
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Algosaibi Building-Old Airport Road
P.O. Box 215, Riyadh-11411, Saudi Arabia
Tel. 966-1-477-7932

SCANDINAVIA
SWEDEN
JEOL (Nordic) AB
Hammarbacken 6A, Box 716, 191 27 Sollentuna
Sweden
Tel. 46-8-28-2800
Fax. 46-8-29-1647

SINGAPORE
JEOL ASIA PTE.LTD.
2 Corporation Road
#01-12 Corporation Place
Singapore 618494
Tel. 65-6565-9989
Fax. 65-6565-7552

SOUTH AFRICA
ADI Scientific (Pty) Ltd.
370 Angus Crescent,
Northlands Business Park, 29 Newmarket Road
Northriding, Ranburg, Republic of South Africa
Tel. 27-11-462-1363
Fax. 27-11-462-1466

SPAIN
IZASA Scientific SLU.
Argoneses, 13, 28108 Alcobendas,
Madrid, Spain
Tel. 34 902 20 30 80
Fax. 34 902 20 30 81

SWITZERLAND
JEOL (GERMANY) GmbH
Gute Aenger 30
85356 Freising, Germany
Tel. 49-8165-77346
Fax. 49-8165-77512

TAIWAN
JIE DONG CO., LTD.
7F, 112, Chung Hsiao East Road,
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Tel. 886-2-2395-2978
Fax. 886-2-2322-4655

For NMR & Mass Spectrometer Products:
TechMax Technical Co., Ltd.
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Tel. 886-2-8990-1779
Fax. 886-2-8990-2559

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2F-2, No. 192, Dongguang Rd.
East Dist., Hsinchu City 30069,
Taiwan (R.O.C.)
Tel. 886-3-571-5656
Fax. 886-3-571-5151

THAILAND
BECTHAI BANGKOK EQUIPMENT & CHEMICAL CO., Ltd.
300 Phaholyothin Rd. Phayathai, Bangkok 10400,
Thailand
Tel. 66-2-615-2929
Fax. 66-2-615-2350/2351

JEOL ASEAN TECHNICAL CENTER (JATC)
MTEC building room 533
114 Moo9, Thailand Science Park
Paholyothin Rd., Klong 1, Klong Luang,
Pathumthani 12120
THAILAND
Tel. 66-2-564-7738
Fax. 66-2-564-7739

THE NETHERLANDS
JEOL (EUROPE) B.V.
Lireweg 4, NL-2153 PH Nieuw-Vennep,
The Netherlands
Tel. 31-252-623500
Fax. 31-252-623501

TURKEY
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Fax. 58-212-443-4342

VIETNAM
TECHNICAL MATERIALS AND RESOURCES
IMPORT-EXPORT JOINT STOCK COMPANY(REXCO)
Hanoi Branch
SALES & SERVICE
155-157 Lang Ha Street, Dong Da District, Hanoi, Vietnam
Tel. +84 (43) 562 0516
Fax. +84 (43) 853 2511

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