

JEOL

Solutions for Innovation

JEM-1400Plus

Electron Microscope

JEM-1400Plus Electron Microscope

JEM-1400Plus Electron Microscope

JEM-1400Plus offers a simplified operating

Features

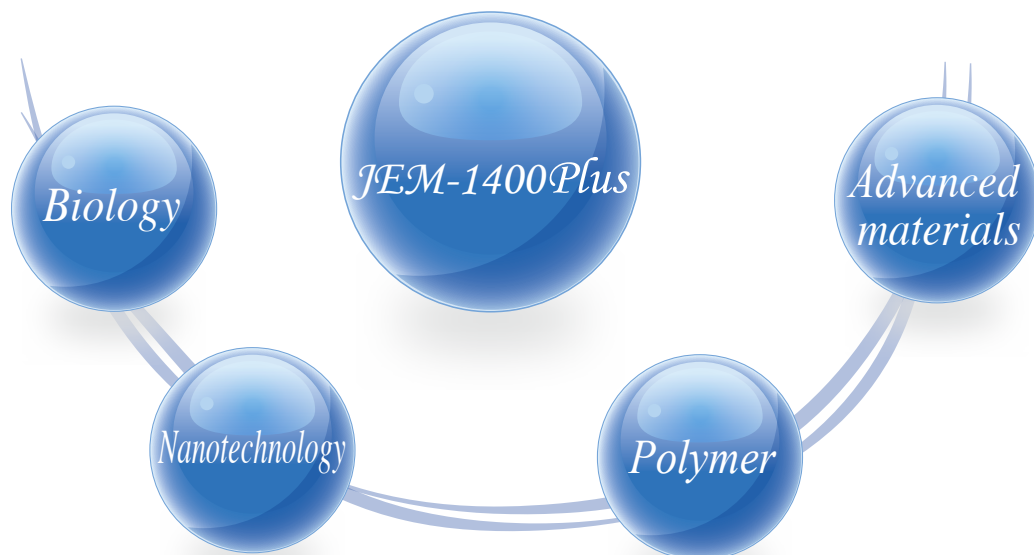
- Fully integrated high resolution camera system (8 million pixel CCD camera)
- A Minimum magnification of 10x allows for full coverage of a specimen grid
- A wide range of automated functions including Auto Focus, Auto Exposure, and Auto Montage
- New simplified control panels and LCD touch screen for intuitive operation
- Thumbnail view for all recorded images
- SightX Viewer - a remote viewer designed to view/edit saved images on a separate PC



environment optimized for TEM.



JEM-1400Plus applications

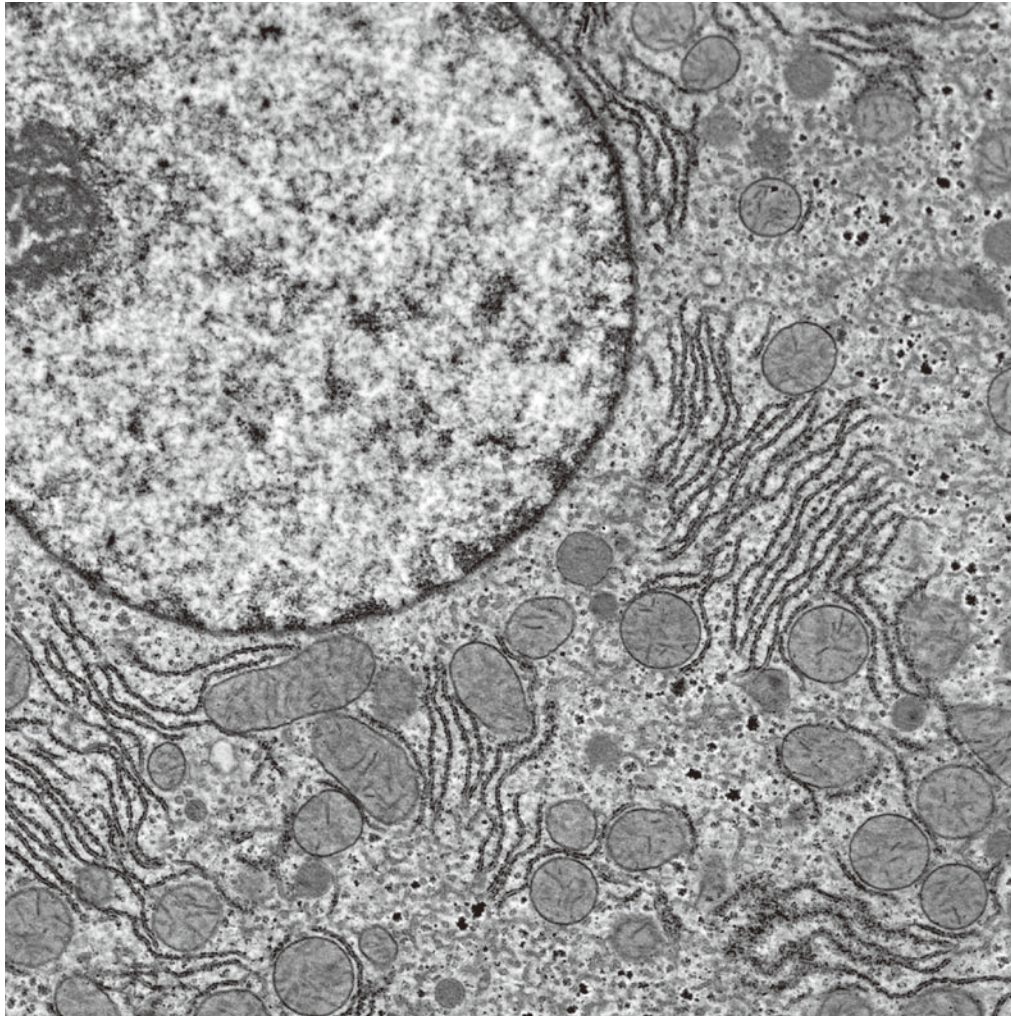




Fully integrated high resolution CCD camera system

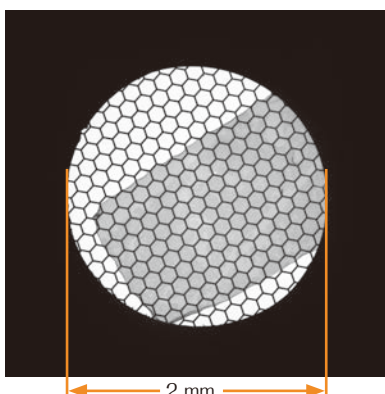
8 million pixel CCD camera

JEOL has developed a new 8 million pixel camera, optimized for the *JEM-1400plus*. The camera's control system is fully integrated into the TEM control system, TEM Center, for simple, intuitive operation. *



Sample: Rat hepatic cells
Sample courtesy of Prof. Yoshinori Muranaka
Hamamatsu University School of Medicine

- ◆ This new interlaced CCD rapidly updates images, facilitating the process of navigation and image focusing.
- ◆ The CCD is lens-coupled, capable of recording diffraction patterns.
- ◆ It supports a large field of view for recording an area of 43 (V) x 58 (H) mm (on film surface).



The minimum magnification has been reduced to 10x from 50x, allowing the operator to use a single camera system for seamless operation from area search to data acquisition. The bottom camera is capable of capturing an image of the entire specimen grid. *

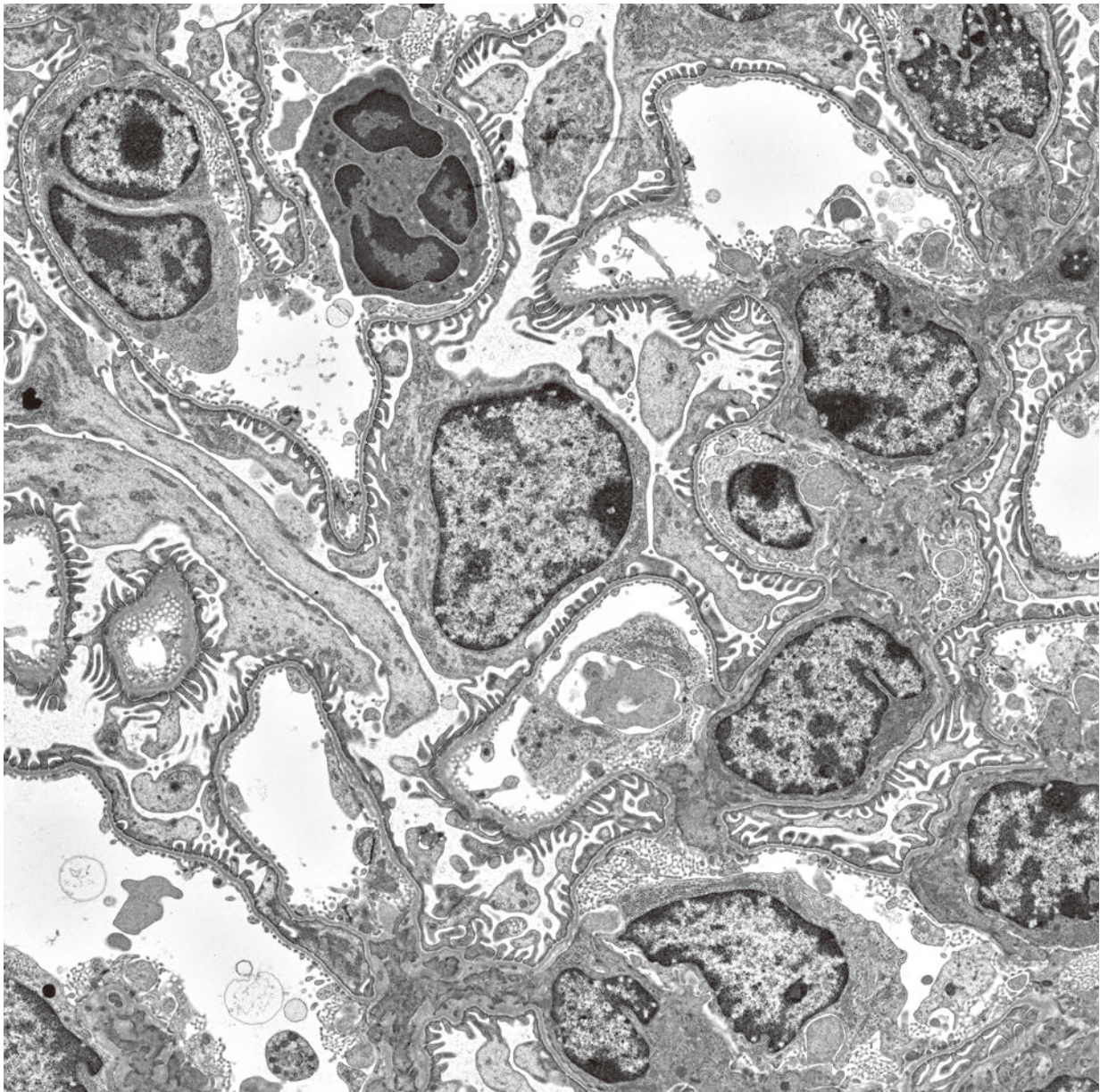
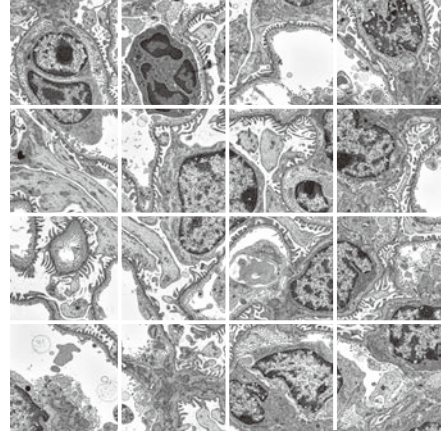
500.0 μm
Image at 10x: Full coverage of specimen grid

*JEOL's proprietary CCD camera is required.

Digital montage system

A single button controls fully automated operation from image acquisition to stitching. The system automatically adjusts the brightness and contrast, resulting in a single image with no visible stitching. It is effective for fast acquisition of high quality, high pixel resolution images of a large area.

*JEOL's proprietary CCD camera is required.



Montage image (7792x7768 pixels)
Conditions: 4x4 frames
Sample: Mouse liver

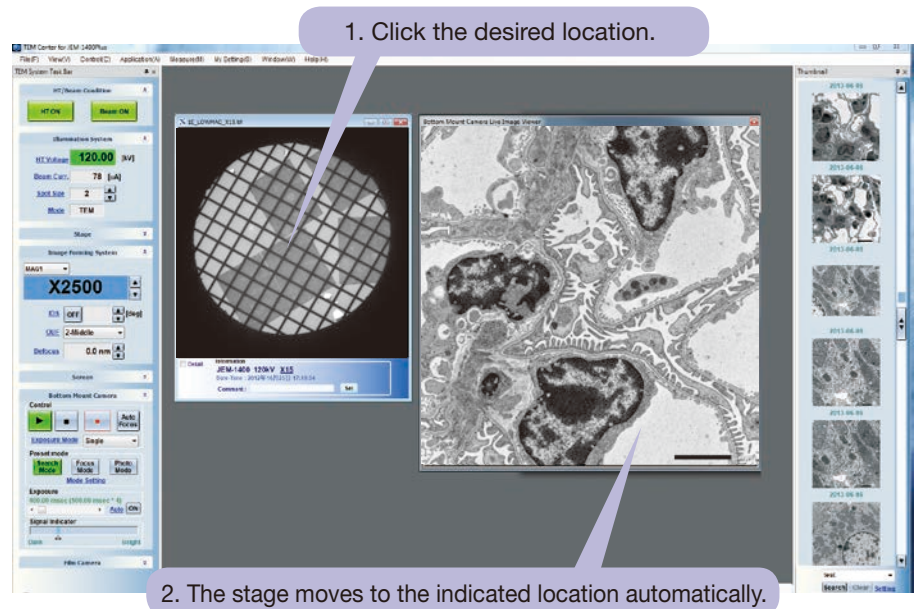
5.0 μ m

A single software unit for a complete range of function from TEM control to data management

Stage Navigation/drift correction/thumbnailed view/metrology

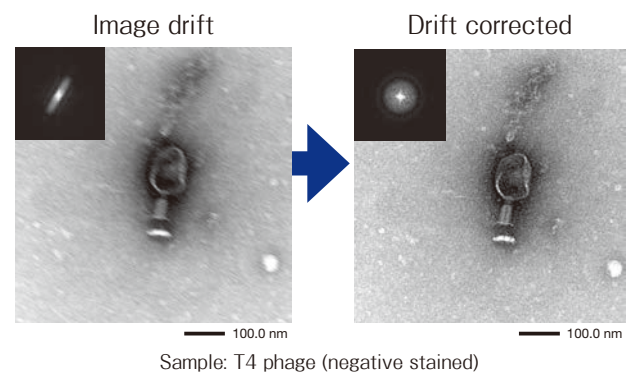
Stage Navigation

Clicking any area on a saved low magnification image will move the stage to the indicated location, allowing the operator to navigate to the area of interest without changing the magnification. *



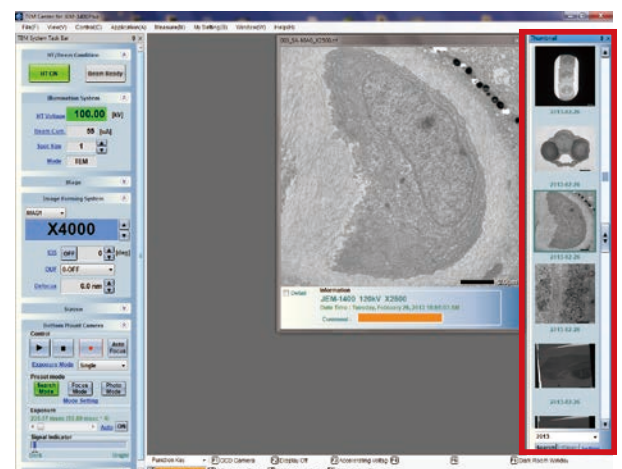
Drift correction

The *JEM-1400Plus* incorporates, as standard, auto drift correction capable of acquiring a crisp image regardless of specimen drift. *



Thumbnail view with keyword search

The thumbnail view shows all recorded images. The search function allows the operator to select specific images using a keyword. *



Metrology tools

JEM-1400Plus comes with standard metrology tools. The tools are applicable to live images as well as saved images, allowing for linewidth, angle, and area measurements. *

*JEOL's proprietary CCD camera is required.



TEM Navigation "JENIE" (JEOL Electron microscope Navigation Interactive Engine)

JENIE is designed to help the operator navigate through a wide range of tasks, from simple imaging to advanced system maintenance. The operator can follow a series of steps displayed on the GUI to accomplish a desired procedure.

The screenshot shows the JENIE software interface with a help window titled "How to insert a specimen holder". The window contains a table of contents on the left, a main text area with numbered steps, a "TEM System Task Bar" window showing parameters like HT Voltage (120.00 kV) and Beam Current (65 µA), and a video player showing a specimen holder being inserted into the TEM column.

1. Click any item in the help topics.

2. The system displays the procedure for the selected item.

3. Follow these steps.

Video display for advanced procedures

SightX Viewer

SightX Viewer is an optional offline viewer program designed to support examination and editing of the images acquired in the JEM-1400Plus (TEM/STEM). When installed on an external computer, the program can be used exactly the same way as TEM Center to view and edit images. *

The screenshot shows the SightX Viewer software interface. It features a main image window displaying a TEM image of a specimen, a histogram viewer on the left showing a peak at 7612, and a thumbnail gallery on the right. A toolbar at the top contains various analysis tools.

Measurements of lines, angles, and areas are possible.

Image search from thumbnails.

Image search from filenames and photographing conditions.

*JEOL's proprietary CCD camera is required.

Simple operating environment for a variety of applications

Intelligent panel/TEM/STEM tomography

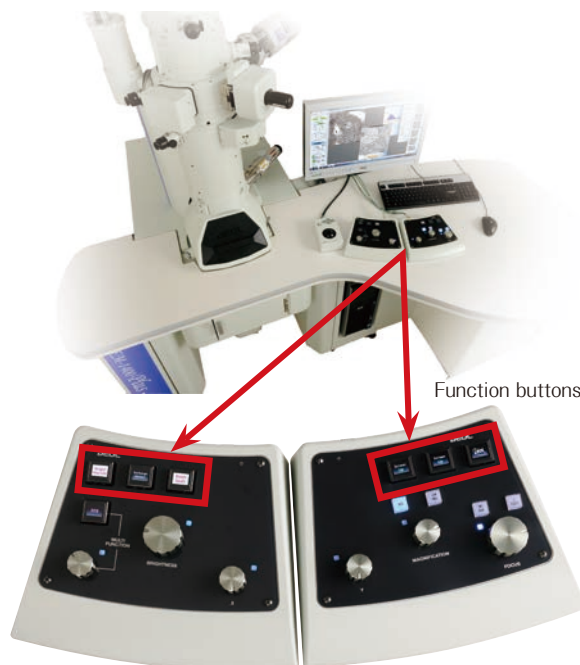
Intelligent panels

New operation panels feature advanced functions with a simple design. Organic electroluminescent (OLED) buttons in rich, vivid colors make it easier to identify the functions assigned to the buttons.

Approximately 50 functions are available for the buttons, and can be customized as needed.

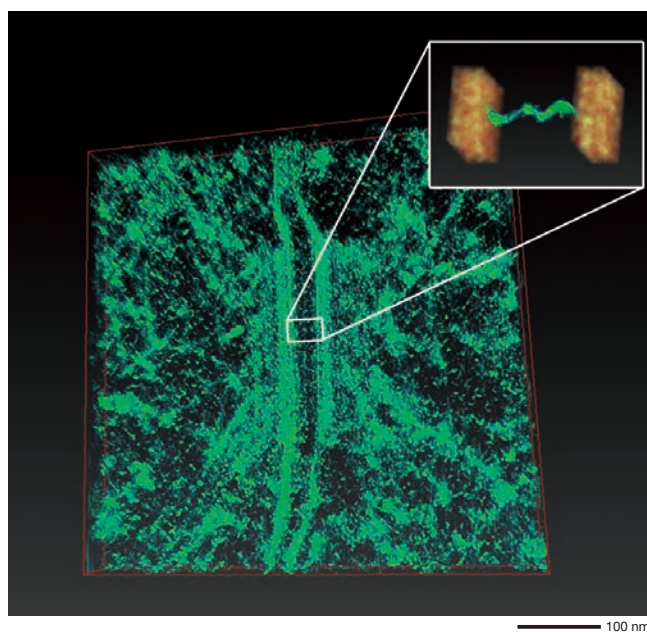


Example of function button assignment



TEM/STEM tomography (optional)

JEOL's tomography system, featuring 3 components (Recorder, Composer, and Visualizer-kai), makes it easy to acquire 3D reconstructed images.

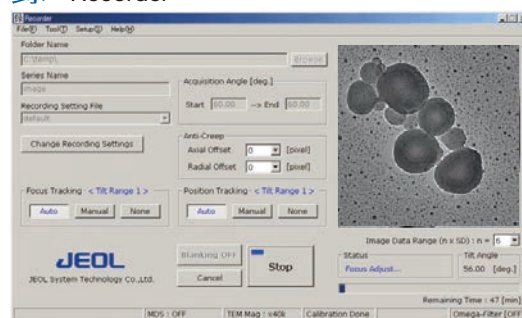


3D reconstruction of desmosome of mouse small intestine epithelium

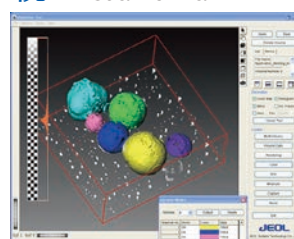
Left: Volume rendered reconstruction

Insert: Segmented image showing cell membrane (orange) and cell bonding protein (green)

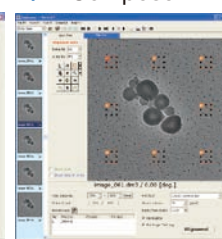
録 Recorder



視 Visualizer-kai



築 Composer



Recorder : Records tilt series of TEM/STEM images

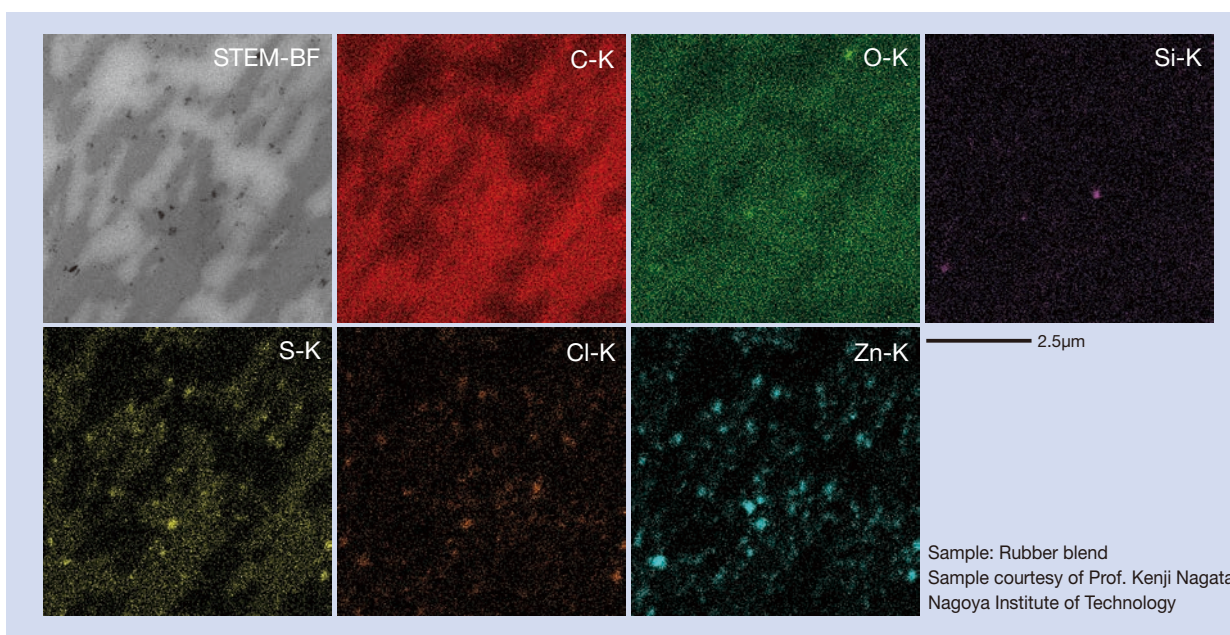
Composer : Generates 3D reconstruction from the acquired tilt series

Visualizer-kai : Visualizes the 3D reconstruction



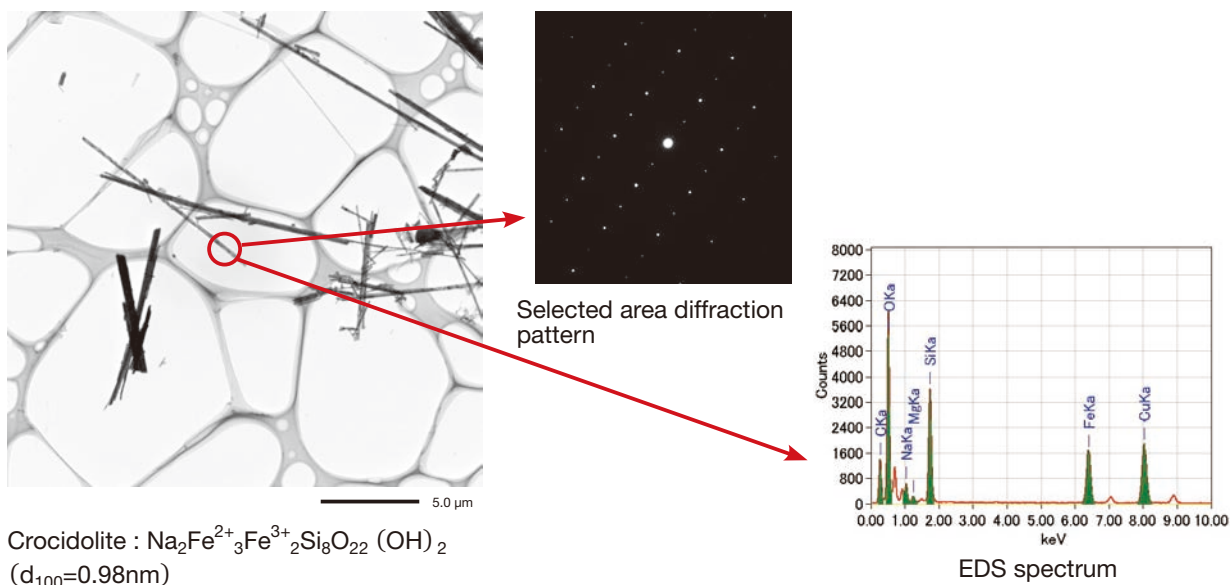
STEM/EDS system (optional)

Scanning Transmission Electron Microscopy (STEM) is a technique whereby a finely focused electron beam is scanned over a sample and images are acquired from the scattered transmitted electrons by dedicated detectors, such as bright field images (STEM-BF) and dark field images (STEM-DF) that contains Z-contrast. Combined with an energy dispersive spectroscopy (EDS) system, STEM can be used for a wide range of applications including elemental mapping, linescans, and spot analysis.



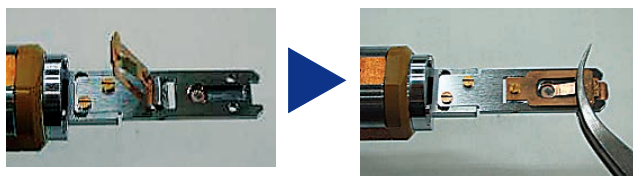
Analysis of asbestos

TEM, combined with EDS, can identify the morphology, crystalline structure, and composition of samples. In the example below, the type of asbestos was identified from a single fiber.



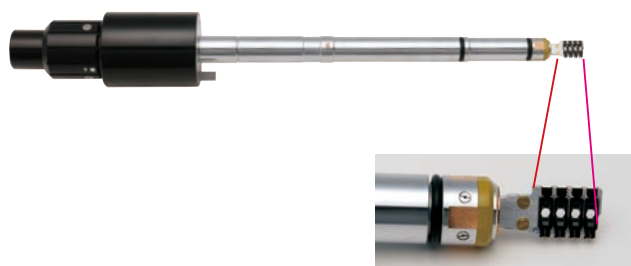
Specimen quick-change holder

The holder for the *JEM-1400Plus* is designed to be easily and quickly loaded and be quickly secured using only a pair of tweezers.



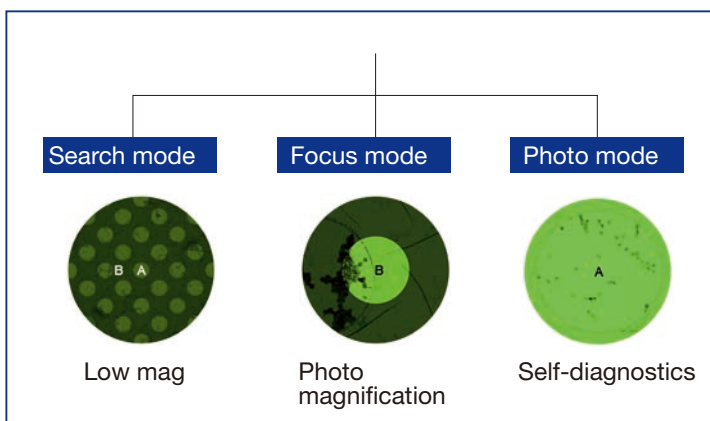
Specimen quartet holder (optional)

The specimen quartet holder can accommodate up to 4 grids at a time for multiple sample imaging. The grids can be separately changed, making specimen exchange easier and less confusing. The samples can be selected for observation in the TEM using a selector knob on the holder.



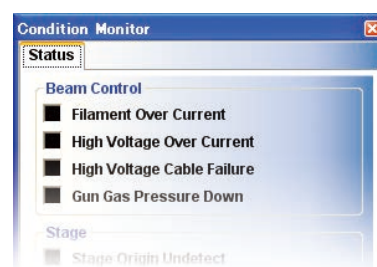
Minimum dose system (MDS) linked to CCD camera

MDS is designed to enable recording of beam sensitive samples such as cryo samples, organic materials, etc. In MDS mode, the system displays the series of steps associated with the Photo mode, Search mode and Focus mode on the GUI. Image acquisition can be initiated on the GUI or using a function button. MDS is linked to JEOL's CCD camera. *



Self-diagnostics

The *JEM-1400Plus* has a protective system that prevents damage to the TEM by monitoring for failures. The cause of the failure is displayed on the GUI for immediate attention and maintenance.



*JEOL's proprietary CCD camera is required.



System specifications

Specifications

Version* ¹	High Contrast (HC)	STEM (ST)	
	TEM	TEM	STEM ²
Resolution			
Point image	0.38 nm	0.38 nm	
Lattice image	0.2 nm	0.2 nm	
STEM bright field image (Edge to edge)			2.0 nm
Accelerating voltage	40, 60, 80, 100, 120 kV	40, 60, 80, 100, 120 kV	
Minimum step	33 V	33 V	
Magnification			
MAG mode	× 200 ~ 1,200,000	× 200 ~ 1,200,000	× 5,000 ~ 2,000,000
LOW MAG mode	× 10 ~ 1,000	× 10 ~ 1,000	× 120 ~ 4,000
SA MAG mode	× 2,000 ~ 300,000	× 2,000 ~ 300,000	
Maximum tilt angle ³			
Tilt-X	± 70° ⁴ / ± 25° ⁵	± 70° ⁴ / ± 25° ⁵	
Tilt-Y	± 9° ⁶	± 9° ⁶	

*1: Select a configuration when placing an order.

*2: Optional scanning image observation device needed.

*3: With standard objective aperture, EM-10230AOA

*4: With optional high tilt specimen holder, EM-11230HTH

*5: With standard quick change holder, EM-11210SQCH

*6: Optional double tilt specimen holder, EM-31630

*Specifications and appearance are subject to change without notice due to modification.

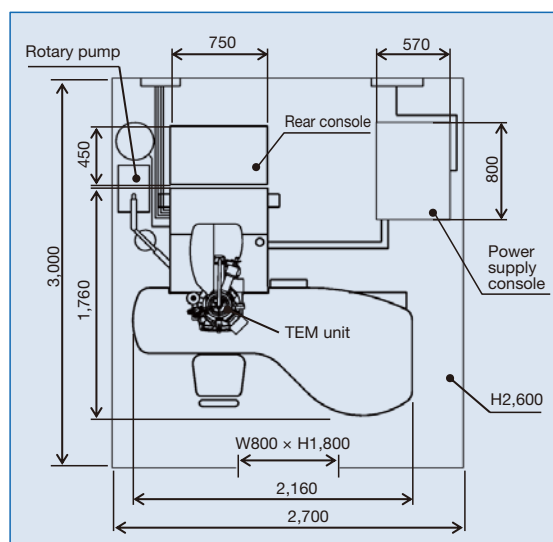
Installation requirements

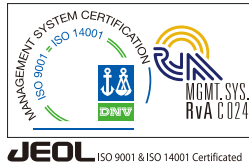
Room temperature	15 to 25°C, fluctuation: 1.0°C/h or less Humidity 60% or less
TEM power supply	Single phase AC 200 V, 50/60 Hz, 5 kVA (8 kVA with scanning image observation device)
Cooling	Water flow: 5 L/min, Water temperature 15±20°C fluctuation 0.1°C/h or less
Floor space	2,700(W) × 3,000(D) mm minimum
Ceiling height	2,600(H) mm minimum
Entrance	800(W) × 1,800(H) mm minimum

Dimensions / Weight

	Height (mm)	Width (mm)	Depth (mm)	Weight (kg)
TEM unit	2,490	2,160	1,760	900
Power supply	1,250	570	800	250
Rear console	850	750	450	90
Rotary pump	270	470	180	25

Example of layout





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