

1.2.6 Operation system

- Basic system
 - Personal computer (PC) IBM PC/AT compatible computer
 - Operation system (OS) Windows 2000
- Operation
 - Windows 2000 is a trademark of Microsoft Corp.)
 - Graphical user interface (GUI), mouse and keyboard
 - Operation keyboard is optionally available
- Recipe functions
 - An each operators can be registered
 - Saving and loading of the operation conditions for each operator and lens conditions, etc.
- Automatic function
 - Auto gun alignment (AGC) Provided (effective only in the HV mode)
 - Auto focusing (AFD) Provided
 - Combination with ACB possible, linked to photograph and accelerating voltage change
 - Auto astigmatism Correction (ASD) Provided
 - Combination with ACB and AFD possible
 - Auto contrast/brightness (ACB) Provided
 - Linked to photo recording and accelerating voltage change

1.2.7 Vacuum system

JSM-5610

- System control Fully automatic
- Ultimate pressure in the gun chamber 0.1mPa order
- Evacuation time Approx. 2 minute and 30 seconds
- Oil rotary pump 100l/min × 1
- Oil diffusion pump 4-inch 420 l/s with water cooling baffle × 1

JSM-5610LV

- System control Fully automatic
- Ultimate pressure in the gun chamber
 - HV mode 0.1mPa order
 - LV mode 1mPa order (when the specimen chamber pressure is 27Pa)
- Evacuation time
 - HV mode Approx. 1 minute and 40 seconds
 - LV mode Approx. 1 minute and 30 seconds
- Oil rotary pump 100l/min × 2
- Oil diffusion pump 4-inch 420 l/s with water cooling baffle × 1
- Foreline trap Reuse type (heater and timer provided)
- Orifice holder Removable type (mounted always)
- Orifice 400 μ m diameter (used when the specimen chamber pressure is set to 130Pa or higher)
- Control valve Fine metering valve type
- Specimen chamber pressure gauge Pirani gauge

1.2.8 Safety device

- Protection devices against vacuum, water, power, and leakage current failures are provided

1.2.9 Others

● Ports for X-ray analyzing device	EDS port	Provided	× 1
	WDS port	Provided	× 1
● Service receptacle	100V AC, 8A/5A		each 1

1.3 Specifications of JSM-5510 series

1.3.1 Performance

HV mode

Resolution (SEI)	3.5nm guaranteed (Acc.V 30kV, WD6mm)		
Magnification	× 18 (WD48mm) to 300,000 (136 steps, digital indication) Automatically corrected for Acc.V and/or WD changes. Instantaneously changeable to an optionally preset magnification from any current magnification.		
Image mode	SEI, BEI (detected by the SE detector and/or BE detector)		
Probe current:	1pA to 10nA		

LV mode

Resolution (BEI)	4.5nm guaranteed (Acc.V 30kV, WD8mm)		
The specimen			
Chamber pressure	Adjustable pressure	10 to 270Pa	
	Lowest pressure	1 Pa	
Image mode	Three kinds of BEI (Composition image, Topographic image and Shaded image)		

SEI:	Secondary electron image	WD:	Working distance
BEI:	Backscattered electron image	HV:	High Vacuum
Acc. V:	Accelerating voltage	LV:	Low Vacuum

1.3.2 Electron optical system (EOS)

The following specifications are common for both HV and LV modes except the auto-gun alignment

- Electron gun

Accelerating voltage	0.5 to 30kV (53 steps) (0.5 to 3kV :100V steps, 3 to 30kV:1kV steps)
Filament	Precentered W (tungsten) hairpin filament
Bias voltage	Auto-bias
Alignment	Manually adjustable
- Lens system

Condenser lens (CL)	Electromagnetic 2-stage zoom condenser lens system
Objective lens (OL)	Conical objective lens
Lens clear function	Provided for OL (for hysteresis elimination)

Focusing	AFD (auto focusing) provided, Manual focusing possible
Focus link	Provided for Acc.V change
Dynamic focus	Option
Auto magnification correction	Provided for Acc.V and/or WD changes
OL aperture	Single aperture with fine position, Adjustment in X and Y directions
Wobbler	Provided for OL aperture alignment, Linked to magnification
Stigmator (astigmatism correction)	Electromagnetic 8-pole, Precentered , X-Y adjustment type
Stigma-memory	Provided, Linked to the Acc.V and/or magnification
Auto stigmator	Provided, Manual correction possible
Scan coil	Electromagnetic 2-stage deflection type
Image fine shifter	Approx. $\pm 10 \mu\text{m}$ in X and Y directions (Acc.V30kV, WD20mm)

1.3.3 Specimen stage

● Type	Eucentric goniometer stage
● Specimen movements	X movement 20mm Y movement 10mm Z movement 43mm (WD5 to 48mm continuously variable) T (Tilt) -10 to 90° (Tilting range limited when the BE detector is installed.) Rotation (R) 360° (endless)
● Specimen holder	10mm dia. × 10mm H 32mm dia. × 10mm H (with four 10mm dia. specimen mounting adapter)
Max specimen size	32mm dia. Note: The Eucentric Large-Specimen Stage (LGS) is optionally available for 152.4mm dia. specimen
● Specimen exchange	Stage draw-out type (Specimen holder slide-in type)

1.3.4 Electron detector

HV mode	
SE detector	Collector, scintillator, light guide and photomultiplier tube
BE detector	Scintillator, light guide and photomultiplier tube (SE detector) and Semiconductor (P-N junction) detector (option)
LV mode	
BE detector	Semiconductor (P-N junction) detector (option)

1.3.5 Display system

- Display tube 17-inch SVGA monitor
- Scan system Full frame scan, 1/2 reduced scan
- Scanning speed

	Horizontal (ms)	Vertical (s)	Pixel
SCAN1	0.284	0.071	320×240
SCAN2	0.284	0.142	640×480
SCAN3	20 (16.67)	10 (8.33)	640×480
SCAN4 (selectable)	80 (66.67)	80 (66.67)	1280×960
	160(133.3)	160(133.3)	1280×960
PHOTO (selectable)	80 (66.67)	80 (66.67)	1280×960
	160(133.3)	160(133.3)	1280×960

50Hz area, () 60Hz area

- Frame memory
 - Capacity 1280×960×8 bit
 - Number of pixels 640×480, 1280×960
- Image processing
 - Averaging 1 to 255 frames
 - Lookup table Option (Contrast enhancement, contrast reduction, γ -correction, multi-level coding, partial enhancement, inversion, histogram)
 - Pseudo color image Option (16 color from among 16.77 million colors)
 - Multi-display Option (2 or 4 images display in one frame)
 - Digital zoom Option (×2 or ×4 magnified image display of optionally designated area on image)
- Text display
 - Display position 36 column×24 line in on a image
 - Text letter Alphabet, numeric character, symbol
 - Background Black or image selectable
 - Text enter device Keyboard
- Data display
 - Display position Horizontal at the bottom of the screen
 - Contains
 - HV mode Accelerating voltage, Magnification, Micron marker with micron value, Film number (4 digits), Alphanumeric character (10-characters)
 - Note: Display ON/OFF selectable for each item Ten alphanumeric characters can be changed to date, WD, spot size or image mode.
 - LV mode Same as that for the HV mode except that the vacuum pressure (Pa) in the specimen chamber is indicated instead of the image mode
 - Background Black or image selectable
 - File saving Format BMP or TIFF
 - Media Floppy disk and hard disk

1.3.6 Operation system

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Auto astigmatism Correction (ASD)	Provided Combination with ACB and AFD possible
Auto contrast/brightness (ACB)	Provided Linked to photo recording and accelerating voltage change
Auto filament saturation (AFS)	Provided

1.3.7 Vacuum system

JSM-5510

● System control	Fully automatic
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JSM-5510LV

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● Evacuation time	HV mode Approx. 1 minute and 40 seconds LV mode Approx. 1 minute and 30 seconds
● Oil rotary pump	100l/min × 2
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● Foreline trap	Reuse type (heater and timer provided)
● Orifice holder	Removable type (mounted always)
● Orifice	400 μ m diameter (used when the specimen chamber pressure is set to 130Pa or higher)
● Control valve	Fine metering valve type
● Specimen chamber pressure gauge	Pirani gauge

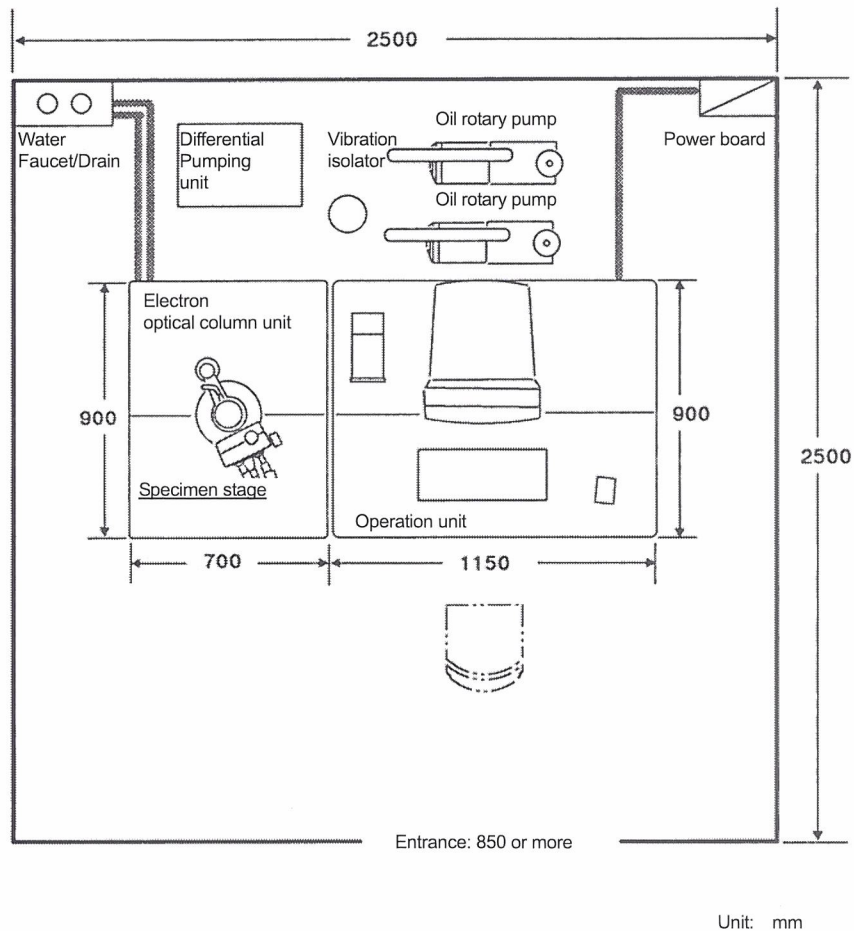
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1.3.9 Others

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1.4.1 Installation layout example



【Ex. JSM-5610LV】

The inclination of the specimen stage is different in a JSM-5510 series.

- This above figure shows a typical installation layout for a LV-SEM (JSM-5610LV). The Differential pumping unit and Oil rotary pump (one) are removed in the case of the standard SEM.
- Be sure to maintain service areas at the left and right sides and the rear side of the microscope even if a small installation area is available.
- Install the microscope well apart from facilities producing vibrations or electromagnetic waves such as roads, busy passages, railroads, elevators, air conditioners and their air outlets, and power transmission lines.
- This microscope does not require any darkroom facilities such as blackout curtain.

1.5 Configuration

JSM-5610, JSM-5510

● Electron optical column unit	1 set
● Operation unit	1 set
● Specimen stage (including specimen holder, etc.)	1 set
● Personal computer unit (including personal computer, monitor, etc.)	1 set
● Software	1 set
● Oil rotary pump	1 set
● Vibration isolator	1 set
● Tool box (including standard accessories and tools)	1 set
● Parts for installation and transportation (including power cable, water hose, etc.)	1 set

JSM-5610LV, JSM-5510LV

● Electron optical column unit	1 set
● Operation unit	1 set
● Specimen stage (including specimen holder, etc.)	1 set
● Personal computer unit (including personal computer, monitor, etc.)	1 set
● Software	1 set
● Oil rotary pump	2 set
● Differential pumping unit	1 set
● Vibration isolator	1 set
● Tool box (including standard accessories and tools)	1 set
● Parts for installation and transportation (including power cable, water hose, etc.)	1 set

1.6 Instrument warranty

This instrument is guaranteed for one year from the date of installation. We undertake to repair it free of charge in the event that it breaks down within this period, except in cases where the breakdown is the result of a force majeure or careless handling.

