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**Main specifications**

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<tr>
<td>Acceleration Voltage</td>
<td>30 kV</td>
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<tr>
<td>Landing Voltage</td>
<td>15 kV</td>
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<tr>
<td>Maximum Probe Current</td>
<td>&gt; 200 nA</td>
</tr>
<tr>
<td><strong>Detector</strong></td>
<td></td>
</tr>
<tr>
<td>Variable Pressure Mode</td>
<td></td>
</tr>
<tr>
<td><strong>Specimen Stage</strong></td>
<td></td>
</tr>
<tr>
<td>Specimen Size</td>
<td>300 mm</td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td></td>
</tr>
<tr>
<td>Large screen display</td>
<td>23-inch (1,920×1,080 pixels)</td>
</tr>
<tr>
<td>Single image display</td>
<td>23-inch (1,280×960 pixels)</td>
</tr>
<tr>
<td>Small image display</td>
<td>23-inch (800×600 pixels)</td>
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<tr>
<td><strong>Spatial Resolution</strong></td>
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<tr>
<td><strong>Magnification</strong></td>
<td>10×000 × (based on 4 “× 5 “picture)</td>
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<tr>
<td><strong>Monitor</strong></td>
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<td>Electronic calibrating function</td>
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<td>Automatic AFC</td>
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<td>Top detector for high resolution imaging Through-the-lens**</td>
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<tr>
<td>Ultra Variable-Pressure Detector(VPD)</td>
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<tr>
<td>Wavelength Dispersion K-ray detector [KDD]</td>
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<tr>
<td>Energy Dispersive X-ray detector (EDX)</td>
<td></td>
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<tr>
<td>EBSD detector for Crystallographic analysis</td>
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<tr>
<td>EBSD detector for Microstructure analysis</td>
<td></td>
</tr>
<tr>
<td>STEM detector</td>
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<tr>
<td><strong>Suggested Layout</strong></td>
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**SU5000**

**FIELD EMISSION / VARIABLE PRESSURE SCANNING ELECTRON MICROSCOPE**

Notice: For correct operation, follow the instruction manual when using the instrument.

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2015.06
The SU5000 has a redesigned Schottky field emission electron gun, which produces a very fine electron beam, with high brightness and a narrow energy width. Combined with a new, low aberration objective lens, beam deceleration and an in-column detector, the SU5000 can capture high resolution images at voltages as low as 100 V.

The SU5000 always provides >200 nA of current, perfect for EDX, WDX, EBSD, and CL. No need to physically change any pressure limiting apertures inside the chamber, so there is no risk of damaging anything. No aperture switching between HV and LV modes.

High probe current with high performance

Advanced optics for >200 nA of probe current and simple switching between high and low vacuum modes

The SU5000’s unique design allows for a simple transition between high vacuum and variable pressure modes. There is no need to physically change any pressure limiting apertures inside the chamber, so there is no risk of damaging anything. No aperture change also means no reduction in the imaging field of view or loss of probe current, when going from high vacuum to variable pressure. The SU5000 always provides >200 nA of current, perfect for EDX, WDX, EBSD, and CL.

The SU5000’s unique design allows for a simple transition between high vacuum and variable pressure modes. There is no need to physically change any pressure limiting apertures inside the chamber, so there is no risk of damaging anything. No aperture switching between HV and LV modes.

High resolution at low accelerating voltage

2.0 nm SE Image resolution at 1 kV

The SU5000 has a redesigned Schottky field emission electron gun, which produces a very fine electron beam, with high brightness and a narrow energy width. Combined with a new, low aberration objective lens, beam deceleration and an in-column detector, the SU5000 can capture high resolution images at voltages as low as 100 V.

High probe current images shown at 50 nA and 200 nA for analytical work under both HV and LV modes. No reduction in field of view between HV and LV modes.

Unique five segment BSE detector

Concentric detectors can separate low and high angle BSEs, but have no directional information. 4-quadrant detectors are just the opposite. The SU5000’s new hybrid BSED does both, revealing crystal orientation and surface (left) or compositional details (right), depending on the signal orientation to the electron beam axis.

CS Scan for charge reduction and limiting radiation damage for beam sensitive samples

CS Scan changes the way the electron beam moves across the sample, reducing time the primary beam dwells at a location. This helps reduce sample charging and radiation damage on beam sensitive samples.

The UVD detects photons emitted from collisions between electrons and gas molecules in the sample chamber, creating images with excellent surface detail and topographic information in variable pressure mode. The UVD is efficient at low and high accelerating voltages, across the full pressure range of the microscope, making it a versatile tool for variable pressure imaging.

Charge Suppression Technology

UVS principle

Accelerating Voltage: 2 kV, SE image
Sample: Aluminum
Electrolytic capacitor
Slow scan: 32 seconds
Without CS Scan

Accelerating Voltage: 2 kV, SE image
Sample: Aluminum
Electrolytic capacitor
Slow scan: 32 seconds
With CS Scan
**EM Wizard technology for inspiring learning**

**“EM Wizard”**

EM wizard is a completely new, knowledge-based system for SEM imaging that goes beyond basic pre-set conditions and recipes. Self-directed optical alignment, fast and accurate automated image adjustment functions and a simplified user interface redefine ease of use for a field emission SEM.

Any operator can acquire quality images with a few point-and-click selections, telling the SEM the intended purpose for observing the sample. Integrated visual applications assist, practical guidance, tutorials and training tools inspire the user to learn more.

Novice or expert, the results can now be the same.

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**Intuitive user interface**

Standard mode offers simple and quick operation. Novice users are guided, step by step, and learn along the way, thanks to the interactive user guide.

The advanced mode provides full access to all SEM controls the expert requires, with versatile control and display of multiple detector signals. The advanced 3D MultiFinder stage navigation safely carries out complex tilt and rotation stage movements, based on simple click and drag input. 3D MultiFinder also provides precise positioning of the sample’s field of view for high tilt EBSD analysis.

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**Advanced guide**

Guides the user step-by-step and educates the operator along the way.

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**Operation tutorial**

Teaches proper focus and astigmatism correction via simulations.

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**Powerful Automated Alignment**

Beam axis and astigmatism alignments are automatically calibrated, stored and then adjusted for a variety of SEM conditions, corresponding to different EM applications. It can also restore the SEM back to its “best condition” state whenever necessary.

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**Camera navigation**

Camera navigation lets the operator quickly move the stage to an area of interest, using a low-magnification digital image. This image is most often from the integrated navigation camera but can also be a low-mag SEM image or imported from any digital camera source.

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**Large area SEM image**

Multiple SEM images are automatically collected and saved to disk. Subsequent wide area SEM images are created by “stitching” together the stored images.

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**Live Stereoscopic Imaging Function**

Live stereoscopic imaging enables real-time 3-D SEM viewing, without tilting the specimen. Live stereoscopic images are generated by rapidly alternating the electron beam tilt angle, to yield left and right parallax images. The parallax images are then synchronized and observed directly with colored 3D eyeglasses.
Multi-functional Specimen Chamber

The large SU5000 analytical chamber has 11 ports to accommodate various accessories and supports simultaneous EDX, WDX, and EBSD. The drawer style chamber with door mounted stage provides for safe and easy sample exchanges, with a fast 3 minute pump down time.

EBSD requires a sample to be tilted to 70 deg. This high tilt condition causes substantial trapezoidal image distortion of rectangular areas, due to changes in focus, magnification, beam rotation and other factors. Traditional routines, such as dynamic tilt and focus compensation, attempt to correct for these distortions, but close inspection reveals that spatial inaccuracies remain. Hitachi has developed a new solution that corrects for all conditions to maintain the precise shape and dimensions of the original area. For EBSD, this is essential for reliable grain measurements and accurate stitching of multi-field orientation maps.

Cryo stage

Cryo preparation for SEM is a common form of observation for “beam sensitive” specimens. Brevipalpus species have different surface contours. Sample courtesy of USDA, ARS - Beltsville, MD Drs. Gary Bauchan & Ronald Ochoa

Cooling stage

Cryo-SEM system is optional. Cooling stage attachment. Peltier cooling of specimens (-120 °C) can be utilized to slow the evaporation process under vacuum, thus allowing ample time to locate the area of interest and generate images.

Sample: Bonding solder (Cross-section) Accelerating voltage: 15 kV, Ip: 2 nA Acquisition time: 5 min Acquisition time: 5 min

Backscatter electron image Lead EDS map (Pb-M) Sn EDS map (Sn-L) Copper EDS map (Cu-L)

The pictured EDX and EBSD and WDX components are optional

The pictured Cryo-SEM system is optional

The pictured peltier cooling stage device is optional

Vast Analytical Performance