Hitachi Model S-3400N PC-Based Variable Pressure Scanning Electron Microscope

Guaranteed Resolution:
- 3.0nm, (SED Image in High Vacuum Mode at 30kV)
- 4.0nm, (BSED Image in VP Mode at 30kV)

Chamber Size:
- Specimen size of 200mm in diameter can be inserted.

<table>
<thead>
<tr>
<th></th>
<th>Type I</th>
<th>Type II</th>
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</thead>
<tbody>
<tr>
<td>X Traverse</td>
<td>80mm</td>
<td>100mm</td>
</tr>
<tr>
<td>Y Traverse</td>
<td>40mm</td>
<td>50mm</td>
</tr>
<tr>
<td>Rotation</td>
<td>360° Continuous</td>
<td>360° Continuous</td>
</tr>
<tr>
<td>Z Traverse</td>
<td>5 – 35mm</td>
<td>5 – 65mm</td>
</tr>
<tr>
<td>Tilt Range</td>
<td>-20° to +90°</td>
<td>-20° to +90°</td>
</tr>
<tr>
<td>Motorization</td>
<td>Manual</td>
<td>5-Axis Eucentric</td>
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<tr>
<td>Observable Area</td>
<td>106mm dia.</td>
<td>130mm dia.</td>
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<tr>
<td>Max. Sample Height</td>
<td>40mm</td>
<td>85mm</td>
</tr>
</tbody>
</table>

System Operation:
- Microsoft® Windows® XP Professional (SP3)
- Intel® Core™ i5-650 Processor 3.20GHz
  4GB DDR3-1333 ECC RAM, 250GB SATA hard drive, 16X SATA SuperMulti Drive, Gigabit Ethernet, 8 USB ports.
- Standard Mouse, Full Knob-set and Keyboard Operation

Vacuum System:
- One turbomolecular pump rated at 210 liter/sec
- One 162 liter/min large-capacity rotary pump
- Fully automatic pneumatic valve operation with self-contained air compressor
- Full safety interlock
- 6Pa to 270Pa selectable in the Variable Pressure range
- Chamber pump down time ~90 seconds

Magnification Range:
- 5X to 300,000X Magnification

SE Detector:
- Everhart-Thornley secondary electron detector

SE Accelerator Plate:
- Improves collection of secondary electron signal for improved low voltage imaging.
BSE Detector: Super thin five-segment solid-state detector with 3 modes of operation: Compositional, Topographic and 3D. Each one of the five segments can be individually controlled, with bias set to plus, minus or off.

ESE Detector: Optional, environmental SE detector allows imaging of samples in the variable pressure mode.

Electron Source: Pre-centered tungsten hairpin type

Accelerating Voltage: 300V to 30kV

Gun Bias: Continuously variable bias, plus the Hitachi patented “Quad-Bias” Circuit which provides enhanced emission current at 3kV, 5kV and 15kv for superior low voltage imaging and analytical capability.

Gun Alignment: 2-Stage Electromagnetic Alignment
One button automatic filament saturation and gun Alignment.

Condenser Lens: 2-Stage Electromagnetic Condenser Lens with both Coarse and Fine Control.

Objective Lens: Super conical 50° lens.

Electronic Image Shift: Electronic image shift of +/-50um at the analytical working distance of 10mm.

Objective Lens Aperture: 5-Position (four apertures + open) self-aligning, click stop, single piece strip aperture. One button, electronic Automatic Aperture Alignment function (AAA).

Stigmator Coils: 8-Pole Electromagnetic X/Y correction for astigmatism, one button Automatic Stigmator Alignment function.

Analytical Chamber: Nine ports to accommodate EDS, WDS (Full Focusing/PBS), EBSD and other accessories.
Three 35° Take Off Angle analytical ports, 10mm analytical WD.
Digital Beam Control (DBC) provides interface for EDX unit for external scan control.
Automatic Functions:

- **Automatic Brightness and Contrast Control (ABCC)**
  A one-button control automatically sets the viewing and photo image brightness and contrast level that can be defined by the user.

- **Automatic Focus Control (AFC)**
  A one-button control automatically adjusts coarse or fine focus. Lens hysteresis is automatically eliminated each time the AFC is activated. A search function is provided for fast and accurate focus adjustment.

- **Automatic Stigmator and Focus Control (ASF)**
  A one-button control quickly and accurately automatically adjusts focus and stigmation of image.

- **Automatic Filament Saturation (AFS)**
  A one-button control automatically adjusts precise filament saturation point. Three levels of saturation intensity can be selected to insure longer filament life, best resolution or high throughput for EDX mapping.

- **Automatic Beam Alignment (ABA)**
  Automatically adjusts gun tilt and gun horizontal.

- **Automatic Beam Setting (ABS)**
  A one-button control automatically adjusts gun horizontal gun tilt, filament saturation and gun bias.

- **Automatic Objective Aperture Alignment (AAA)**
  Automatically aligns objective lens aperture.

- **Auto Beam Blanking**
  Automatically deflects the electron beam whenever a live image is not displayed to reduce or eliminate beam damage to "beam sensitive" samples.

Display Monitor:

- One 19” LCD.

Signal Mixing:

- Provides composite image of two different signals (BSE, SE or ESED) that can be adjusted in live time and pseudo-colored. Signal mixing can also be accomplished using a saved image.

Display Modes:

- Standard, Full screen, Real-Time Dual Image.

Scan Modes:

- **TV rate** (2 speeds with selectable steps from 1 to 256 frame recursive filtering)
  - Fast Scan
  - Slow Scan rate (4 Speeds)
  - Photo Scan
  - Reduced Area Scan rate (2 steps)
  - Signal Monitor
**Linescan** (SE, BSE or X-ray)
**Split-Screen** Live time scan
**Dual Magnification** Scan
**Raster Rotation**
**Dynamic Focus**
**Tilt Compensation**

**Image Saving:**
- **Pixel Resolution:**
  - Quick Save: 640 x 480
  - Standard Resolution: 1280 x 960
  - High Resolution: 2560 x 1920
  - Ultra High Resolution: 5120 x 3840
- **Frame Integration** (Selectable from 2 to 1024 frames)

**Image Archiving:**
- **SEM Data File Manager** (standard)
- **PCI Image Management System** (standard)

**Image Processing:**
- **Pseudo color**
- **Digital Zoom**
  Provides high magnification field zoom.
- **Digital Contrast and Brightness**
  Allows adjustment of contrast and brightness in a saved image.
- **Local Contrast**
  Technique that obtains information from shadowed areas of the image.
- **Image Cropping and Resizing**
- **Memory Photo**
  Provides retrieval of digital image to the photo CRT.
- **Gamma Control** (real time scan)
  Non-linear enhancement of median level signal components with suppression of under and over-saturated values.
- **Differential**
Differential scan provides edge enhancement of specimen image.

- **Polarity Image**
  Reverses signal polarity from black to white and visa versa.

- **Real-time Histogram**
  Provides a graphic display of contrast and levels that can be adjusted to improve image quality in real time.

- **Measurement and Annotation Functions**
  Input of text, graphics and measurements on a live or memory image.

- **Data Edging**
  Enhances text and graphics against image background.

- **Birds Eye View**
  Provides 3D image information on a saved image.

**Report Generation:**
- Two report generation features are available as standard.

**Operator Assist Functions:**

- **Stage Memory (Type II)**
  Up to 200 positions with comment can be saved in the stage memory.

- **Move Stage (Type II)**
  The stage will move to the same position at which the selected thumbnail in image capture box was acquired.

- **Image Navigator (Type II)**
  Captures a low magnification reference image that is used with the mouse to direct the stage to the desired position and magnification. Also allows image from a digital light microscope or camera to be imported and used for navigation within the SEM.

- **3D Maintenance Videos**
  Provides user with 3D animations and step-by-step instructions for completing basic maintenance procedures.

- **Condition Save Files**
  Allows storage and instant recall of microscope operating parameters or “recipes”, includes sample image.

- **Magnification Preset**
  Two user-defined presets.

- **NTSC Video Output**
  Provides NTSC output for a TV, thermal printer, video capture system or VCR recorder without data-display.

- **Password Protection**
- **Beam Wobbler**
  Beam wobbler aids in alignment of objective aperture in manual mode.

- **Filament Image**
  Provides image of filament to check cleanliness of apertures and column alignment.

**Power and Safety:**

- **Auto Transformer**
  Accepts 100 to 220 Volt single-phase input with a 2.0kVA power requirement.

- **Safety Interlocks**
  Provides interlock safety against overheating as well as air and power failures.

- **Rapid Start**
  Six minutes from cold start (all power off) to HV ready.

- **Anti-Vibration System**
  Reduces vibration from environmental sources.

**Spare Parts Kit:**

- Complete spare parts kit necessary for routine maintenance of the S-3400N. Includes the following: 10 pre-centered cartridge filaments, 20 condenser apertures.

**Installation and Training:**

- Includes installation of equipment and operations and maintenance training by a certified field service engineer.

**Warranty:**

- One full year parts and labor

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*All specifications subject to change without notice*