

## Inspect S50

Easy to use mainstream SEM enabling quick, accurate answers

Tailored for the mainstream need to investigate a wide variety of materials and characterize their structure and composition, the easy to use Inspect™ S50 provides flexibility and versatility to handle most research needs. The Inspect provides all the data: surface and compositional images can be combined with elemental analysis for determining material properties and elemental composition.

Today's research extends beyond simple metals and coated samples and the Inspect S50 can handle both conductive and non-conductive sample types. Characterization of traditional samples from metals, fractures and polished sections, to non-conductive soft materials is easy and fast, maximizing the time of research staff. The user interface is simple and easy to learn, yet flexible enough for the challenges. For example, standard navigation features include double-click stage movements and drag to zoom. SmartSCAN™ technology for smart scanning strategies makes it easier to reduce noise and provide better data. Designed by microscopists for microscopists, this instrument series is truly above and beyond being merely 'easy to use'.

Many features are available to help customize an Inspect S50 for particular characterization or research needs. Additional options, such as beam deceleration, bring low kV performance to a completely different level for a tungsten based SEM. Nav-Cam™ color image navigation and new detectors provide even greater flexibility to the Inspect S50.

Better data. More flexibility. Higher efficiency. The Inspect S50 enables quick and simple operation to get quick answers and delivers more value for the investment.

### KEY BENEFITS

Easy to use, intuitive software makes highly effective operation possible for novice users.

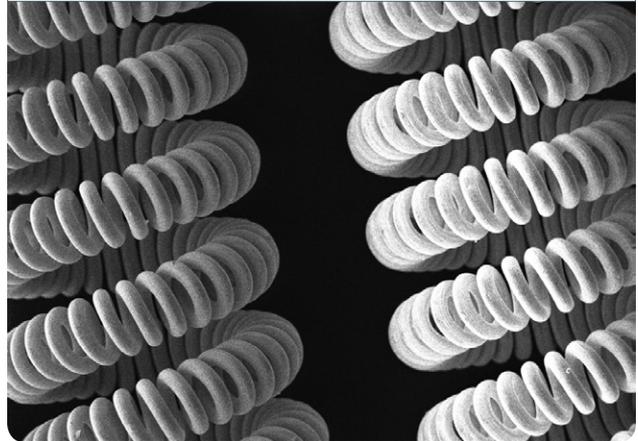
Characterize conductive and non-conductive samples easily.

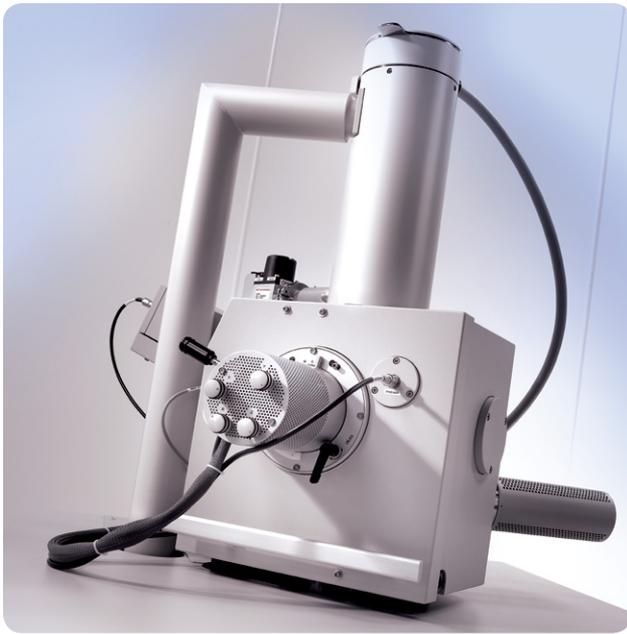
Minimize the amount of sample preparation: low vacuum enables charge free imaging and analysis of non-conductive specimens.

Increase analytical capabilities by enabling accurate EDS and EBSD analysis on conductive and non-conductive samples in high and low vacuum thanks to the patented through-the-lens pumping.

Stable high beam currents (up to 2  $\mu$ A) enable fast, accurate analytical analysis.

Enable surface imaging with optional beam deceleration mode to get surface and compositional information from conductive samples.





### Typical applications include:

#### NanoCharacterization

- Metals & alloys, oxidation/corrosion, fractures, welds, polished sections, magnetic and superconducting materials
- Ceramics, composites, plastics
- Films/coatings
- Geological sections, minerals
- Soft materials: polymers, pharmaceuticals, filters, gels, tissues, plant material
- Particles, porous materials, fibers

#### Essential specifications

##### Electron optics

- High performance thermal emission SEM column with dual anode source emission geometry
- Fixed objective aperture for ease of operation
- 45° objective lens geometry with through-the-lens differential pumping
- Maximum horizontal field width: 6.5 mm at analytical working distance (10 mm); 11.3 mm at 25 mm WD
- Accelerating voltage: 200 V - 30 kV
- Probe current: up to 2  $\mu$ A, continuously adjustable
- Magnification: 13 to 1000000 x

##### Electron Beam resolution

- High vacuum
  - 3.0 nm at 30 kV (SE)
  - 4.0 nm at 30 kV (BSE)\*
  - 8.0 nm at 3 kV (SE)
- High vacuum with beam deceleration option
  - 7.0 nm at 3 kV (BD mode\* + vCD\*)

- Low vacuum
  - 3.0 nm at 30 kV (SE)
  - 4.0 nm at 30 kV (BSE)\*
  - 10 nm at 3 kV (SE)

#### Detectors

- Everhart-Thornley SED (secondary electron detector)
- Large Field Low vacuum SED (LFD)
- High sensitivity low kV SS-BSED\*
- IR camera for viewing sample in chamber\*
- Scintillator BSED/CLD\*
- vCD (low voltage high contrast detector)\*
- Electron beam current measurement\*
- Gaseous analytical BSED (GAD)\*
- STEM detector\*
- Nav-Cam™—color optical camera for sample navigation\*
- Cathodoluminescence\*
- EDS\*
- WDS\*
- EBSD\*

#### Vacuum system

- 1x 70 l/s TMP (turbomolecular pump), 1x PVP
- Patented through-the-lens differential pumping
- Beam gas path length: 10 mm or 2 mm
- Optional upgrade to oil free scroll/dry PVP
- Chamber vacuum (high)  $9 \cdot 10^{-4}$  Pa
- Chamber vacuum (low) < 10 to 270 Pa
- Evacuation time:  $\leq 150$  s to high vacuum and  $\leq 270$  s to LV (FEI standard test procedures)

#### Chamber

- 284 mm size left to right
- 10 mm analytical WD
- 8 ports
- EDS take-off angle: 35°

#### Stage

- X, Y = 50 mm
- Z = 50 mm (25 motorized)
- T = - 15° - to + 75° (manual)
- R = 360° continuous
- Repeatability: 2  $\mu$ m (X, Y)
- Tilt-eucentric at analytical height (10 mm)
- X, Y movements are in the tilt plane
- Beam deceleration (cathode lens/sample bias)\*

#### Sample holders

- Multi-stub holder
- Single stub mount, mounts directly onto stage
- Various wafer and custom holder(s) available by request

\* optional

### System control

- 32-bit graphical user interface with *Windows® XP*, keyboard, optical mouse
- One/two\* 19-inch LCD displays, SVGA 1280 x 1024
- Software controlled switchbox\*
- Joystick\*
- Manual user interface\*
- Scan presets

### Image processor

- SmartSCAN™ scan strategy
- Drift Corrected Frame Integration (DCFI)
- Up to 4096 x 3536 pixels (-14 Megapixel)
- File type: TIFF (8 or 16-bit), BMP or JPEG
- 256 frame average or integration

### System options

- Beam deceleration
- Manual user interface
- Support PC (including 2<sup>nd</sup> 19-inch monitor)
- Cryocleaner
- Cryocleaner spare vessel
- Joystick
- Specimen current meter
- Remote control SW
- Video printer
- Specimen holder kit
- Acoustic enclosure for vacuum pump
- 7 or 52 pin electrical feedthrough
- WDS completion kit
- Scroll pre-vacuum pump kit

### Common 3<sup>rd</sup> party accessories

- EDS
- WDS
- EBSD
- Cryo stage
- Cathodoluminescence
- Sample current detector
- Nanomanipulators
- Lithography system
- CAD navigation
- Electrical probing

### Documentation and support

- On-line help
- 'Getting Started' training CD
- RAPID enabled (remote diagnostic support)
- Free access to FEI for owners on-line resources
- Free membership in the FEI ESEM User Club

### Software options

- Remote control/viewing software
- Image analysis software
- Web-enabled data archive software
- Height mapping/roughness measurement software

### Warranty and training

- 1 year warranty
- Optional applications training class available
- Choice of service maintenance
- Choice of operation/application training contracts

### Installation requirements (refer to pre-install guide for additional data)

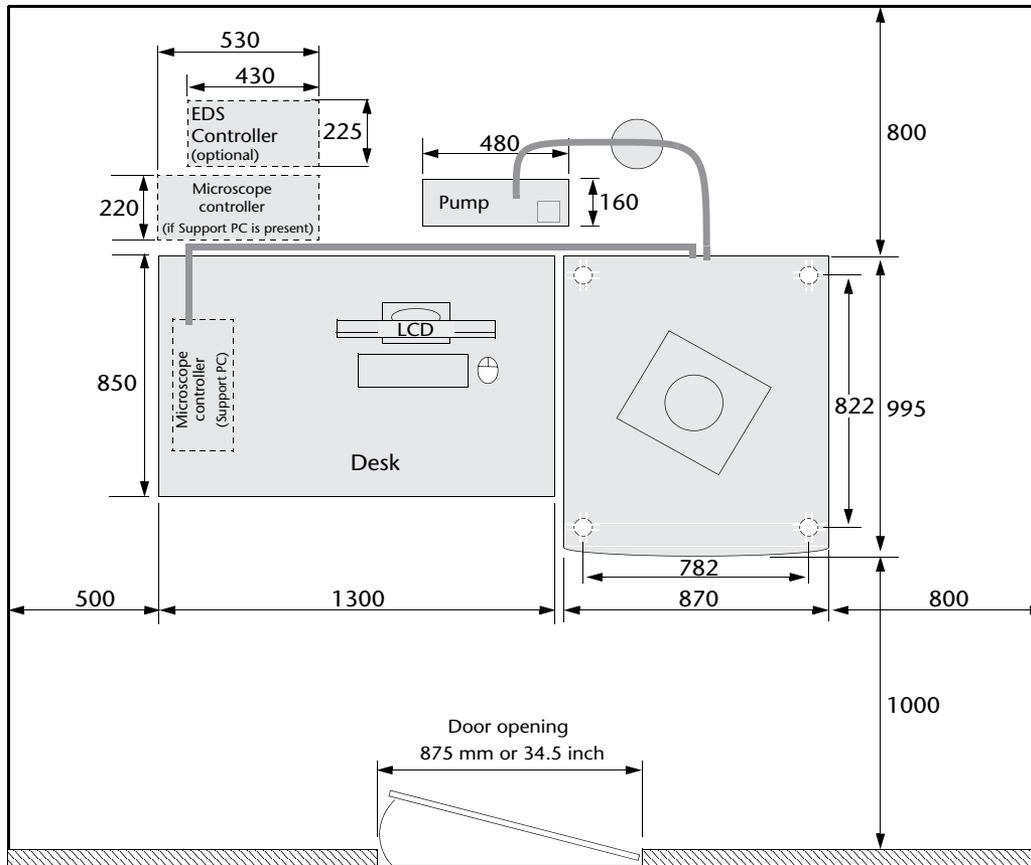
- Power: voltage 230 V (+ 6%, - 10%), frequency 50 or 60 Hz (+/- 1%)
- Power consumption: < 3.0 kVA for basic microscope
- Earth resistance: < 0.1 Ω
- Environment: maximum temperature range for operation 15°C to 25°C, relative humidity below 80% RH (non-condensing), stray AV magnetic fields
  - < 100 nT asynchronous
  - < 300 nT synchronous
- Door width: 90 cm
- Weight: column console 450 kg
- Dry nitrogen: system (0.7 to 0.8 bar, max 10 l/minute during vent); dry pump (1.0 bar, 2 l/minute)
- Acoustics: < 68 dBC (site survey required as acoustics spectrum relevant)
- Floor vibrations (site survey required as floor spectrum relevant)
- Vibration isolation table available as option

### Energy conservation

- Energy Star compliant monitors and PC systems
- System designed to operate without water chiller or compressed air
- System employs a vacuum buffer tank which reduces pre-vacuum pump operation by approximately 90%

\* optional

Floor plan



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