Presenting the next generation of NanoScan’s high-precision Scanning Force Microscope: the Vacuum Large Stage SFM sets the standard in sample navigation by providing high-accuracy calibrated stage motion along with excellent positional reproducibility. High-vacuum enhances the Q-factor for outstanding measurement sensitivity. Closed-loop scanner electronics, large sample stage and a variable magnetic field option all combine to provide an instrument that defines a new state-of-the-art in scanning force microscopy.
# VLS-80 Key Specifications

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| **Scan Range**              | - xyz: $80 \times 80 \times 10 \, \mu m^3$, closed-loop operation  
- Scan linearity better than 0.1%                                                                 |
| **Microscope Resolution**  | - Digitally-controlled 20-bit scanner  
- Lateral (XY) / normal (Z) bit resolution: 0.8 / 0.1 Å  
- MFM lateral resolution: 10 nm                                                                 |
| **Sample Stage**            | - Sample size: $100 \times 100 \times 15 \, mm^3$  
- Sample weight up to 300 g  
- Motorized stage with 20-nm accuracy and up to 8 mm/s speed  
- Fast positioning with Drive-To-Point function                                                                 |
| **Magnetic Field Option**   | - Variable perpendicular magnetic field up to ±550 mT                                                                                       |
| **Optical Access**          | - Top-view camera for precise positioning: 6 μm resolution, 1 mm² FOV  
- Lateral-view camera for fast cantilever approach                                                                 |
| **Cantilever Detection**    | - 4-quadrant beam deflection for simultaneous normal and lateral force measurement                                                                 |
| **Controller & Software**   | - ScanDirector: Windows-based user interface  
- ScanEngine: Real-time controller running on PXI industry-standard                                                                 |
| **Phase-Locked Loops**      | - Up to two fully independent Phase-Locked Loops                                                                                               |
| **Measurement Modes**       | - All standard static and dynamic SFM measurement modes  
- Multifrequency, Double-Pass, hr-MFM, KPFM, Long-distance Profiling  
- Q-factors up to 100 000 in high-vacuum increase sensitivity by a factor of >10 compared to air operation |
| **Vacuum Operation**        | - <5 × 10⁻⁶ mbar  
- 24-hour Quiet Mode operation with <50 dBA (roughing pump off)                                                                 |
| **Vibration Isolation**     | - Triple-level passive vibration isolation  
- Optional active vibration damping                                                                                                             |

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