

SiM : STM iMproved

*nanoREV*TM Vacuum STM Specification Sheet



Quazar Technologies Pvt. Ltd.
New Delhi, India

Cover Image: Royal Poinciana (Delonix Regia), popularly known here as the Gulmohar tree is a flamboyant flaming tree blooming in the summers, a sheer delight to the eyes in an otherwise scorching city heat. It is such a wonderful tree, but its numbers are dwindling in the Capital, we would love to see them flourishing always!

Specifications of *nanoREV*TM : Vacuum STM

Electronics

Main Power Supply input	220-240V AC/50 Hz, 9.0W
Power Supply outputs	+5V DC, ±15V DC, 110V DC, 110V AC
Computer Interface	USB 2.0 Port
Measurement Channels	Single channel 16-bit A/D converter
Scan generator	4-channel 12-bit D/A converter
Scan speed	51ms/line (max) for 256 data-points in each line (Dual imaging mode)
Scan drive signals	±110V DC
Slope compensation	Both Hardware and Software horizontal & vertical Slope Compensation
Tunnel Current Set Point Adj.	-5nA to +5nA in steps of 0.1nA (Option 1) -25nA to +25nA in steps of 0.5nA (Option 2) (Any one of the option is provided as per user requirement)
Servo Control	Analog Feedback Parameter (Gain, Time Constant, T.C. Setpoint) Adjustments
Walker Display	LCD Display of piezo-electric walker's direction and no. of steps
Bias Settings	-10,000mV to +10,000mV in Steps of 5mV
I-V Spectroscopy	5mV bias resolution for 750 data points, <i>I/V</i> , <i>dI/dV</i> & Normalized <i>dI/dV</i> plots, Export to ASCII option available
I-V Spectroscopy Modes	- Point mode - Line mode - Grid mode
I-Z Spectroscopy	Tunneling Current vs Distance plots, Conductance vs Distance plots (Normal & Semilog), Export to ASCII option available

STM Measurements

Sizes	Min.	Max.	X/Y
	Area	Area	Resolution
XL Area	20 × 20nm ²	2.0 × 2.0μm ²	500pm
Large Area	10 × 10nm ²	200 × 200nm ²	50pm
Small Area	20 × 20Å ²	40 × 40nm ²	10pm
Z-resolution	Analog Mode : 0.008 – 0.01nm Digital : 0.025 – 0.05nm (Using 12-bit DAC)		
Scan orientation	Horizontal and Vertical		
Max Z Range	±350 to ±500nm (Full-Stretch and Full-Retract)		
Imaging modes	Constant Current, Constant Height and Conductance Imaging		

Software	
Image Display	Dual Imaging Window for Scan and Retrace Image Display
CRO	In-built software CRO plotting imaging signal during scans
Sample Navigator	Graphical assistant for localized zooming w.r.t. a large area scan
3D	Colored 3D renderings, selection of color look-up tables
Data Export	Export to standard image file formats like jpg, png, ASCII, postscript format.
Analysis Functions	Line (Single line profile) Extraction, localized Zooming, Roughness Display, Measure length & angles on the images, 2D Fast Fourier, Transformation
Calibration	X/Y/Z-Calibration Utility
Image Processing Tool	Spatial and Fourier Low-Pass Filtering, Background Subtraction, Histogram Equalization, Zooming, Contrast, Slope Correction etc.
Image Viewing	Independent <i>nanoREV</i> TM images (*.npic) viewing & processing software for both Windows® & Linux platforms
Tip Locator Window	Displays current position of the tip over the sample
Nano-Lithography	In-situ tip cleaning & restructuring utility by applying voltage pulses to the sample (-10V to +10V)
Color Mode Selection	Customizable color modes for the images (both in 2D and 3D)
Vacuum Setup Features	
Vacuum range	Ambient to 10^{-3} mbar
Vacuum Holding Time	2-3 hours @ 10^{-3} mbar with sorption pump
Spare ports	Two blanked-out KF-25 ports
Vibration Isolation	No further isolation required for the chamber
Chamber Dimensions	25cm (dia) $\times$ $\sim$ 17cm (height)
Rotary Pump (<i>not supplied</i>)	For vacuum range 10^{-2} to 10^{-3} mbar
Liquid Nitrogen Required (<i>not supplied</i>)	8 to 10 liters per experiment
Variac (<i>not supplied</i>)	0 - 220V /5A for heating tape
Computer Requirements (<i>not supplied</i>)	
System Configuration	RAM >1GB, Min. Resolution 1024×768 , DVD Drive
Computer Interface	USB 2.0 port
Operating system	Runs from <i>UbiKewti</i> © <i>Linux Live DVD/USB</i> (with installation option)
Other Features	
Spectroscopy modes	Current-Voltage, Current-Distance
Sample approach	Piezo-tube Walker, Illuminated tip-sample junction view
	Camera attachment for coarse approach assistance
Sample size	Sample disc dia. 10mm