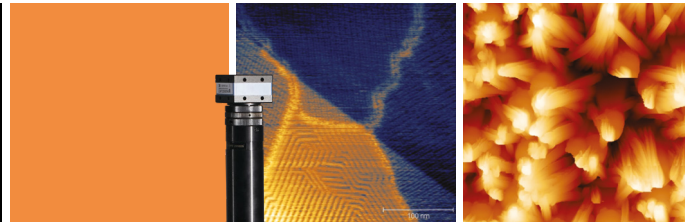


SmartSPM™

Advanced
Scanning Probe Microscope



Resolution

High resolution and stability



Automation

Automated operation



Versatility

Versatile - environments and options



SPM Modes

All SPM modes included



Upgradability

Flexibility to upgrade to NanoRaman™

SmartSPM Measuring Modes	
Basic modes:	<ul style="list-style-type: none"> • Contact AFM • Semicontact AFM • True Non-contact AFM • Top Mode™ • Phase Imaging • Dissipation Force Microscopy • Contact AFM in liquid (optional) • Semicontact AFM in liquid (optional)
Electrical modes:	<ul style="list-style-type: none"> • Single / Double pass Kelvin Probe Force Microscopy (KPFM) AM and FM • Capacitance Microscopy (SCM) • Single / Double pass Electric Force Microscopy (EFM) • Piezo Response Force Microscopy (PFM) • PFM with High Voltage (optional) • PFM-Top mode™ • Conductive AFM (optional) • Conductive AFM High Voltage (optional) • I-Top mode™ (optional) • I-V Spectroscopy (optional) • Photocurrent Mapping (optional) • Volt-ampere characteristic measurements (optional)
Nanomechanical modes:	<ul style="list-style-type: none"> • Lateral Force Microscopy (LFM) • Force Modulation Microscopy (FMM) • Force Curve Measurement (Force Distance (F-D) Spectroscopy and Mapping) • Nanolithography • Nanomanipulation
Special modes:	<ul style="list-style-type: none"> • Single / Double pass Magnetic Force Microscopy (MFM) • Tunable Magnetic Field (optional) • Shear-force Microscopy with tuning fork (ShFM) • Normal-force Microscopy with tuning fork
Other:	<ul style="list-style-type: none"> • Scanning Tunneling Microscopy (STM) (optional) • Scanning Tunneling Spectroscopy (optional)

SmartSPM Scanner and base	
Sample scanning range:	100 x 100 x 15 μm^3 (+/-10%)
Non-linearity:	XY < 0.05%, Z < 0.05%
Noise:	<ul style="list-style-type: none"> • < 0.1 nm RMS in XY dimension in 100 Hz bandwidth with capacitance sensors on • < 0.02 nm RMS in XY dimension in 100 Hz bandwidth with capacitance sensors off • < 0.1 nm RMS in Z dimension in 1000 Hz bandwidth with capacitance sensor on • < 0.03 nm RMS in Z dimension in 1000 Hz bandwidth with capacitance sensor off
Resonance frequency:	XY 7 kHz (unloaded); Z 15 kHz (unloaded)
Open loop XY drift:	< 0.5 nm / min
Motorized approach range:	17 mm
Maximum sample size:	40 x 50 mm ² , 15 mm thickness
Sample positioning: Motorized sample positioning range:	5 x 5 mm ²
Motorized approach range:	17 mm

SmartSPM AFM Head	
Laser wavelength:	1300 nm No influence of registration laser on photovoltaic measurements or on biological samples
Fully motorized:	4 stepper motors for automatic cantilever and photodiode alignment
Access:	Free access to the probe for additional external manipulators and probes
Illumination:	Illumination intensity is software controlled

SmartSPM Options

Conductive Unit (Current range 100 fA - 10 μA / 3 current ranges (1 nA, 100 nA and 10 μA) software switchable)
Liquid Cell / Electrochemical Cell (Liquid exchange capability)
Protection enclosure with stand for optical microscope
Humidity control system (Relative humidity range 10-85% / Relative humidity stability ±1%)
Heating Cooling module (from -50°C to +100°C)
Heating module (heating up to 300°C / Temperature stability 0.1°C)
Heating module (heating up to 150°C / Temperature stability 0.01°C)
Combined Shear-force and Normal-force tuning fork holder
Nanoindenter unit (Maximum load 5 mN)
Signal Access Module
Optical Coupling for co-localized AFM-Raman/PL, TERS and TEPL (OmegaScope)

SmartSPM Software

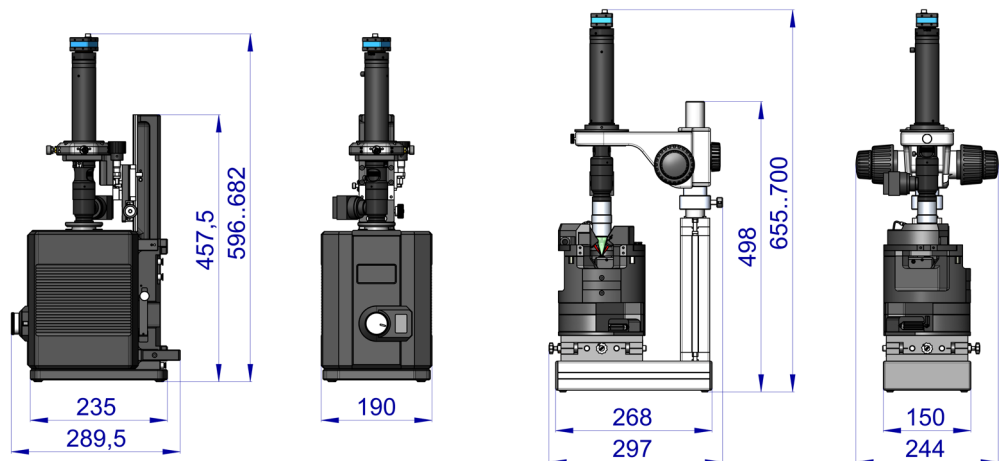
Omega:	<ul style="list-style-type: none"> Automatic alignment of registration system Automatic configuration with preset parameters for standard measuring techniques Automatic cantilever resonance frequency adjustment Macro language Lua for programming user functions, scripts and widgets Capability to reprogram DSP macro language of the controller in real time without reloading control software Spring constant calibration (Thermal method)
IAPro:	<ul style="list-style-type: none"> Process images in coordinate space including making cross-sections, fitting and subtracting of polynomial (up to 12 degrees) surface FFT processing with the capability to treat images in frequency space including filtering and analysis
Processing:	<ul style="list-style-type: none"> up to 5000 x 5000 pixel images.

SmartSPM Controller electronics

Modular, fully digital, expandable controller
High speed DSP 300 MHz
ADC: 20 channels
High speed 500 kHz 18-bit ADCs for scanner position sensor
5 MHz frequency range registration system
2 lock-in amplifiers with 5 MHz frequency range
6 digital 32-bit generators with 5 MHz frequency range, 0.018 Hz resolution
7 stepper motors control
Digital outputs for integration with external equipment
Analog input/outputs for integration with external equipment



AIST-NT
Technology



info.sci@horiba.com

www.horiba.com/scientific

HORIBA
Scientific

USA: +1 732 494 8660
UK: +44 (0)1604 542 500
China: +86 (0)21 6289 6060
Taiwan: +886 3 5600606

France: +33 (0)1 69 74 72 00
Italy: +39 06 51 59 22 1
India: +91 80 41273637
Brazil: +55 (0)11 2923 5400

Germany: +49 (0) 6251 8475 0
Japan: +81(75)313-8121
Singapore: +65 (0)6 745 8300
Other: +33 (0)1 69 74 72 00