BRUKER

Unlimited possibilities

ACCESSORIES HANDBOOK

for NanoWizard®, ForceRobot® and CellHesion® systems

valid from 2020

Unmatched flexibility & modularity

More than 100 accessories

Over 30 operating modes

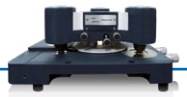
JPK BIOAFM

Accessories Handbook 2020 Contents

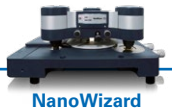
NanoWizard 4 XP
BioScience and NanoScience
System Compatibilities

System options and optics accessories

BioMAT

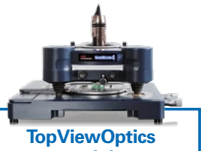


CellHesion 200



NanoWizard NanoOptics

ForceRobot 300



TopViewOptics module

Upright Fluorescence Microscope kit

Inverted optical microscopes from all major suppliers (Zeiss, Olympus, Nikon, and Leica)

TAO module

CellHesion module

TopViewOptics with granite base

TopViewOptics with breadboard

Raman reflector kit

Control electronics options

Vortis 2 SPM Controller

Vortis 2 Advanced SPM Controller

Vortis 2 Combi Controller

Software modules

Advanced AC modes | Advanced Force Spectro-scopy | Direct Overlay 2 | DirectTiling | Experiment Control | Experiment Planner | Micro Rheology | NanoLitho-graphy & Nanomani-pulation | PeakForce Tapping | QI Advanced

Sample stages

Head-up stage

Motorized precision stage

Manual precision stage | Sample holder for large samples | StretchingStage

Hybrid Stage

StretchingStage for higher forces | Standard stage

Fluid cells & temperature control

BioCell | Coverslip Holder

PetriDish Heater | PetriDish Heater for BioMAT | High Tem-perature Heating Stage | Heating Cooling Module | Heating Cooling Stage | CryoStage | PetriDish Holder | SmallCell | 3-port small volume SmallCell

Electrochemistry solutions

Heating Cooling Stage with electrochemistry cell | ECCell electrochemistry cell | Scanning Electrochemistry Microscopy package

Application modules & modes

Scanning Tunneling Microscopy module | High-Voltage Sample Bias Amplifier | Low-Voltage Sample Bias | Conductive AFM module | Conductive AFM module - enclosed volume | Tunneling Current Conductive AFM module | Tunneling Current Conductive AFM module - enclosed volume | Kelvin Probe Microscopy module | Kelvin Probe Microscopy module - enclosed volume

Tuning Fork module | Akiyama probe module | CoverslipHolder with electrical sample connection | HyperDrive fluid imaging package | Fast scanning package | 8x FluidicsModule | Electrical sample connection module | Scanning Thermal Microscopy module

Cantilever holders

Fixed-spring cantilever holder | Standard cantilever holder | Cantilever holder with electrical tip connection | Cantilever holder with electrical tip connection - enclosed volume | Side-view cantilever holder

Extras & OEM

FluidFM ADDON from Cytosurge | Humidifier | Micropipettes | ForceWheel | CO_2 Controller | Incubators | Syringe pumps | Potentiostats

Fiber coupled de-tection module | Cameras | Acoustic enclosure | Vibration isolation | Glove Box systems | Indentation solutions | Cantilevers | Small parts and useful tools

Applications

Life Sciences (highlighted with blue boxes)

- High resolution imaging, in air and liquid, of single molecules such as proteins, DNA/RNA, carbohydrates, lipids
- Live Cell Imaging
- Bacteria and virus characterization
- Cellular adhesion and cytomechanics
- Molecular interactions, receptor-ligand, antibody-antigen
- Molecular unfolding
- Molecular recognition
- Biomaterials, compound and implant characterization
- Material properties such as adhesion, elasticity, stiffness
- Drug formulation, encapsulation and aging studies

Nano Sciences (highlighted with gray boxes)

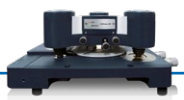
- High resolution imaging in air and liquid of single molecules, thin films, nanoparticles or nanowires
- Characterization of surface properties such as adhesion, stiffness, friction, conductivity, charges, hardness
- Polymer science
- Single molecule force measurements
- Smart organic materials
- Surface properties of conjugated polymers
- Biosensors
- Degradable materials
- Electrochemistry
- Colloidal probe, surface forces and interface phenomena

☐ BioScience ☐ NanoScience

NanoWizard ULTRA Speed 2 System Compatibilities

System options and optics accessories

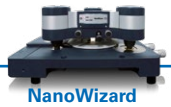
BioMAT



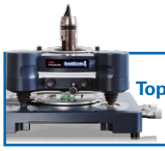
CellHesion 200

NanoWizard 4 XP

ForceRobot 300



NanoWizard NanoOptics



TopViewOptics module

Upright Fluorescence Microscope kit

Inverted optical microscopes from all major suppliers (Zeiss, Olympus, Nikon, and Leica)

TAO module with NanoWizard ULTRA Speed 2 Advanced Controller

CellHesion module

TopViewOptics with granite base

TopViewOptics with breadboard

Raman reflector kit

Control electronics options

NanoWizard ULTRA Speed 2 Controller

NanoWizard ULTRA Speed 2 Advanced Controller

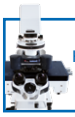
Software modules

Advanced AC modes | Advanced Force Spectroscopy | Direct Overlay 2 | DirectTiling | Experiment Control | Experiment Planner | Micro Rheology | NanoLithography & Nanomanipulation | PeakForce Tapping | QI Advanced

Sample stages

Head-up stage

Motorized precision stage | Manual precision stage | Sample holder for large samples



Hybrid Stage | StretchingStage | StretchingStage for higher forces | Standard stage

Fluid cells & temperature control

BioCell | Coverslip Holder

PetriDish Heater | PetriDish Heater for BioMAT | High Temperature Heating Stage | Heating Cooling Module | Heating Cooling Stage | CryoStage | PetriDish Holder | SmallCell | 3-port small volume SmallCell

Electrochemistry solutions

Heating Cooling Stage with electrochemistry cell | ECCell electrochemistry cell | Scanning Electrochemistry Microscopy package

Application modules & modes

Scanning Tunneling Microscopy module | High-Voltage Sample Bias Amplifier | Low-Voltage Sample Bias | Conductive AFM module | Conductive AFM module - enclosed volume | Tunneling Current Conductive AFM module | Tunneling Current Conductive AFM module - enclosed volume | Kelvin Probe Microscopy module

Kelvin Probe Microscopy module enclosed volume | Tuning Fork module | Akiyama probe module | CoverslipHolder with electrical sample connection | HyperDrive fluid imaging package | 8x FluidicsModule | Electrical sample connection module | Scanning Thermal Microscopy module

Cantilever holders

Fixed-spring cantilever holder | Standard cantilever holder | Cantilever holder with electrical tip connection | Cantilever holder with electrical tip connection - enclosed volume | Side-view cantilever holder

Extras & OEM

FluidFM ADDON from Cytosurge | Humidifier | Micropipettes | ForceWheel | CO_2 Controller | Incubators | Syringe pumps | Potentiostats

Fiber coupled detection module | Cameras | Acoustic enclosure | Vibration isolation | Glove Box systems | Indentation solutions | Cantilevers | Small parts and useful tools

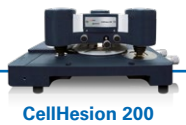
Applications

- High-speed and high resolution imaging, in air and liquid, of cells, tissues, proteins, DNA/RNA, carbohydrates or lipids
- Single molecule and live cell dynamics
- Cell kinetics and signaling processes
- Polymers, phase transitions
- Real-time, in situ-experiments simultaneously with advanced optical techniques
- Characterization of surface properties such as adhesion, stiffness, friction, conductivity, charges, hardness

NanoWizard NanoOptics System Compatibilities

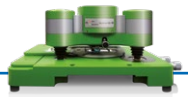
System options and optics accessories

BioMAT

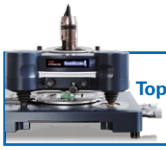


CellHesion 200

CellHesion module



ForceRobot 300



TopViewOptics module

Upright Fluorescence Microscope kit

Inverted optical microscopes from all major suppliers (Zeiss, Olympus, Nikon, and Leica)

TAO module

TopViewOptics with granite base

TopViewOptics with breadboard

Raman reflector kit

Raman spectroscopy

TCSPC

Control electronics options

Vortis 2 Advanced SPM Controller

Vortis 2 Combi Controller

Software modules

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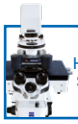
Sample stages

Head-up stage

Motorized precision stage | Manual precision stage | Sample holder for large samples



Hybrid Stage | StretchingStage | StretchingStage for higher forces | Standard stage

Fluid cells & temperature control

BioCell | Coverslip Holder

PetriDish Heater | PetriDish Heater for BioMAT | High Temperature Heating Stage | Heating Cooling Module | Heating Cooling Stage | CryoStage | PetriDish Holder | SmallCell | 3-port small volume SmallCell

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Tuning Fork module | Akiyama probe module | CoverslipHolder with electrical sample connection | HyperDrive fluid imaging package | Fast Scanning Package | 8x Fluidics Module | Electrical sample connection module | Scanning Thermal Microscopy module | Optical focus tracking

Cantilever holders

Fixed-spring cantilever holder | Standard cantilever holder | Cantilever holder with electrical tip connection | Cantilever holder with electrical tip connection - enclosed volume | Side-view cantilever holder

Extras & OEM

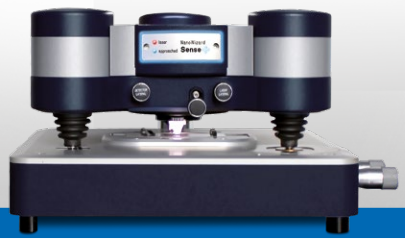
FluidFM ADDON from Cytosurge | Humidifier | Micropipettes | ForceWheel | CO_2 Controller | Incubators | Syringe pumps | Potentiostats

Fiber coupled detection module | Cameras | Acoustic enclosure | Vibration isolation | Glove Box systems | Indentation solutions | Cantilevers | Small parts and useful tools

Applications

- Aperture fiber SNOM experiments
- Scattering-type SNOM (sSNOM) experiments
- Nanomanipulation in optical fields
- Optical surface properties such as absorption, excitation or nonlinear effects
- Dyes and markers
- Quantum dots/rods
- Quenching or plasmon generation in combination with topography, nanomechanical, electrical and magnetic properties

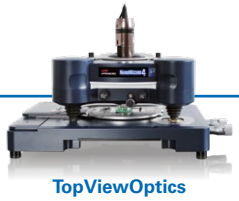
NanoWizard Sense+ System Compatibilities



System options and optics accessories

BioMAT

CellHesion module



TopViewOptics module

Upright Fluorescence Microscope kit

TopViewOptics with granite base

TopViewOptics with breadboard

Raman reflector kit

Inverted optical microscopes from all major suppliers (Zeiss, Olympus, Nikon, and Leica)

Control electronics options

NanoWizard Sense+ Controller

Software modules

- Advanced Force Spectroscopy
- Direct Overlay 2
- DirectTiling
- Experiment Control
- Experiment Planner
- NanoLithography & Nano-manipulation
- PeakForce Tapping

Sample stages

- Head-up stage
-  Motorized precision stage
- Manual precision stage
- Sample holder for large samples
- StretchingStage
- StretchingStage for higher forces
- Standard stage

Fluid cells & temperature control

- BioCell
- Coverslip Holder
-  PetriDish Heater
- PetriDish Heater for BioMAT
- High Temperature Heating Stage
- Heating Cooling Module
- Heating Cooling Stage
- CryoStage
- PetriDish Holder
- SmallCell
- 3-port small volume SmallCell

Electrochemistry solutions

- Heating Cooling Stage with electrochemistry cell
- ECCell electrochemistry cell
- Scanning Electrochemistry Microscopy package

Application modules & modes

- Scanning Tunneling Microscopy module
- High-Voltage Sample Bias Amplifier
- Low-Voltage Sample Bias
- Conductive AFM module
- Conductive AFM module - enclosed volume
- TC-AFM module
- Tunneling Current Conductive AFM module - enclosed volume
- Kelvin Probe Microscopy module
- Kelvin Probe Microscopy module - enclosed volume
- Tuning Fork module
- Akiyama probe module
- CoverslipHolder with electrical sample connection
- 8x Fluidics Module
- Electrical sample connection module
- Scanning Thermal Microscopy module

Cantilever holders

- Fixed-spring cantilever holder
- Standard cantilever holder
- Cantilever holder with electrical tip connection
- Cantilever holder with electrical tip connection - enclosed volume
- Side-view cantilever holder

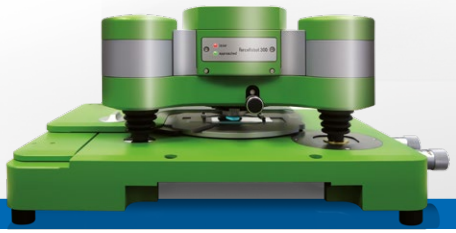
Extras & OEM

- FluidFM ADDON from Cytosurge
- Humidifier
- Micropipettes
- ForceWheel
- CO_2 Controller
- Incubators
- Syringe pumps
- Potentiostats
- Fiber coupled detection module
- Cameras
- Acoustic enclosure
- Vibration isolation
- Glove Box systems
- Indentation solutions
- Cantilevers
- Small parts and useful tools

Applications

- High resolution imaging, in air and liquid, of single molecules, cells, tissues, thin films, nanoparticles or nanowires
- Material properties such as adhesion, elasticity, friction, conductivity, hardness
- Single molecule force measurements
- Bacteria and virus characterization
- Cellular adhesion and cytomechanics
- Surface properties of conjugated polymers
- Degradable materials

ForceRobot 300
System Compatibilities



System options and optics accessories

Inverted optical microscopes from all major suppliers
(Zeiss, Olympus, Nikon, and Leica)

Control electronics options

ForceRobot 300 Controller

Vortis 2 SPM Controller

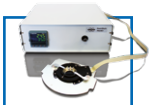
Software modules

- Advanced Force Spectroscopy
- Direct Overlay 2
- DirectTiling
- Experiment Control
- Experiment Planner
- Micro Rheology

Sample stages

Motorized precision stage

Fluid cells & temperature control

- BioCell
- Coverslip Holder
-  PetriDish Heater
- High Temperature Heating Stage
- Heating Cooling Stage
- PetriDish Holder
- SmallCell
- 3-port small volume SmallCell

Application modules & modes

8x FluidicsModule

Cantilever holders

Fixed-spring cantilever holder

Standard cantilever holder

Side-view cantilever holder

Extras & OEM

- FluidFM ADDON from Cytosurge
- Humidifier
- Micropipettes
- ForceWheel
- CO_2 Controller
- Incubators
- Syringe pumps
- Cameras
- Acoustic enclosure
- Vibration isolation
- Glove Box systems
- Cantilevers
- Small parts and useful tools

Applications

- Protein (un)folding and receptor-ligand interactions
- Analysis of adhesion forces of single macromolecules for surface chemistry and polymer science
- Elastic response or melting of DNA
- Single molecule mechanical properties, e.g. muscle proteins,
- Synthetic biopolymers, carbohydrates or spider silk protein
- Localization of binding of small molecules to proteins (e.g. inhibitors on membrane proteins)
- Quantification of kinetics, affinity and energy landscapes of biological interactions
- Colloidal probe and Nanoindentation experiments

CellHesion 200
System Compatibilities

System options and optics accessories

Upright Fluorescence Microscope kit

TopViewOptics
with breadboard

Inverted optical microscopes from all major suppliers
(Zeiss, Olympus, Nikon, and Leica)

Control electronics options

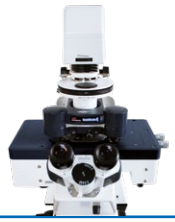
CellHesion 200 Controller

Vortis 2 SPM Controller

Software modules

- Advanced Force Spectroscopy
- Direct Overlay 2
- DirectTiling
- Experiment Control
- Experiment Planner
- Micro Rheology

Sample stages



HybridStage

Motorized precision stage

Fluid cells & temperature control

- BioCell
- Coverslip Holder

- PetriDish Heater
- Heating Cooling Module
- PetriDish Holder
- SmallCell
- 3-port small volume SmallCell

Cantilever holders

Fixed-spring cantilever holder

Standard cantilever holder

Side-view cantilever holder

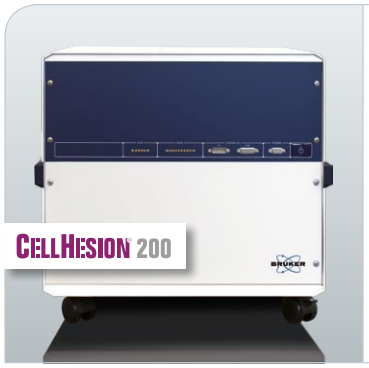
Extras & OEM

- FluidFM ADDON from Cytosurge
- Humidifier
- Micropipettes
- ForceWheel
- CO_2 Controller
- Incubators
- Syringe pumps
- Cameras
- Acoustic enclosure
- Vibration isolation
- Glove Box systems
- Cantilevers
- Small parts and useful tools

Applications

- Stiffness and elasticity mapping on samples ranging from single cells to substrates and tissues
- Cell-cell and cell-substrate interactions
- Cell adhesion and tether formation
- Biomaterial studies, biofouling, biosensors, capsules
- Implant coatings and cellular biochips
- Automated mapping of sample properties over a large range for structured substrates, microspheres, cells. etc., together with the HybridStage
- Testing functionalized surfaces
- Applications in microbiology and virus research
- Pharmaceutical studies such as drug delivery mechanisms
- Applications in food, paper or textile industry on fibers, coatings or powders in air or liquid
- Binding studies such as receptor/ligand or antibody/antigene

1 Control electronics options



CellHesion® 200 Controller

Compact control electronics for CellHesion 200 systems

Key features

- TTL output for synchronization of external equipment (e.g. CCD cameras)

ForceRobot® 300 Controller

Compact control electronics for ForceRobot 300 systems

Key features

- Fully digital data processing and measurement control
- Modular design with dual core PowerPC @ 1.4 GHz and high-speed FPGA for superior performance
- High-speed 16 bit ADCs @ 60 MHz
- Precision 4 × 20 bit DACs for piezo control
- Software-controlled toggle of the z-piezo voltage for optimum resolution

NanoWizard® Sense+ Controller

Full featured, low-noise, high performance, digital SPM controller for NanoWizard Sense+ systems

Key features

- Modular hybrid analog/digital design with latest FPGA/PPC technology (dual core PowerPC @ 1.4 GHz). Overcomes limitations of conventional DSP designs
- 2 × high-speed 16 bit ADC channels with 60 MHz sample rate
- 6 × 18 bit ADC channels with 800 kHz sample rate
- 1 × high-speed 14 bit DAC channel with 120 MHz sample rate
- 4 × 20 bit DAC channels with 800 kHz sample rate
- 1 × high-speed lock-in amplifier for precise amplitude and phase detection
- 3 channel, low noise, capacitive distance sensor interface
- Thermal noise cantilever calibration up to 2 MHz
- Easy Connection of accessories at the front panel

Vortis™ 2 SPM Controller

Full featured, low-noise, high-performance, digital SPM controller

Key features

- High-speed data capture with a maximum data pixel rate of up to 800.000 pixels/sec
- Modular, hybrid analog/digital design with latest FPGA/PPC technology (dual core PowerPC @ 1,4 GHz). Overcomes limitations of conventional DSP designs
- 2 × high-speed 16 bit ADC channels with 60 MHz sample rate
- 6 × 18 bit ADC channels with 800 kHz sample rate
- 1 × high-speed 14 bit DAC channel with 120 MHz sample rate
- 4 × 20 bit DAC channels with 800 kHz sample rate
- 1 × high-speed lock-in amplifier for precise amplitude and phase detection
- 3 channel, low noise, capacitive distance sensor interface
- Thermal noise cantilever calibration up to 7.5 MHz
- Low voltage output for electronic modules and pre-amplifiers with +/- 15 V and +/- 5 V
- Digital input: 6 channels (Sub-D) Digital output: 10 channels (Sub-D) e.g. for pixel and line clock
- Easy connection of accessories at the front panel

NanoWizard® CellHesion® ForceRobot® NanoTracker™

Vortis™ 2 Advanced SPM Controller

Most advanced and flexible high-performance digital SPM controller

Key features

- Access to external and internal signals for flexible research and easy combining of additional advanced optical instrumentation (e.g. SuperResolution, FLIM)
- High-speed data capture with maximum data pixel rate of up to 800.000 pixels/sec
- Modular, hybrid, analog/digital design with latest FPGA/PPC technology (dual core PowerPC @ 1,4 GHz). Overcomes limitations of conventional DSP designs
- 4×high-speed 16 bit ADC channels with 60 MHz sample rate
- 12×18 bit ADC channels with 800 kHz sample rate
- 6×high-speed 14 bit DAC channel with 120 MHz sample rate
- 8×20 bit DAC channels with 800 kHz sample rate
- 2×high-speed lock-in amplifiers for precise amplitude and phase detection
- 6 channel, low noise, capacitive distance sensor interface
- Two channel, gated photon counting (2+2 inputs, 32 bit TTL counters, up to 20 Mcounts/s, 20 ns min pulse width, 40 ns pulse separation)
- Thermal noise cantilever calibration up to 7.5 MHz
- Low voltage output for electronics modules and pre-amplifiers with +/- 15 V and +/- 5 V
- Digital input: 6 channels (Sub-D) Digital output: 10 channels (Sub-D) e.g. for pixel and line clock
- Easy connection of accessories at the front panel

NanoWizard® ULTRA Speed 2 Controller

Fully featured, low-noise, high-performance, digital SPM controller for NanoWizard ULTRA Speed 2 systems

All features of the Vortis 2 SPM Controller, and additionally:

- Allows fast, adaptive feedback schemes
- High current/high-speed amplifiers
- Includes Fast Scanning Adaptation Board

NanoWizard® ULTRA Speed 2 Advanced Controller

Most advanced and flexible high-performance digital SPM controller for NanoWizard ULTRA Speed 2 systems

All features of the Vortis 2 Advanced SPM Controller, and additionally:

- Allows fast adaptive feedback schemes
- High current/high-speed amplifiers
- Includes Fast Scanning Adaptation Board

Vortis™ 2 Combi Controller

One system for all nano-force applications
High-end solution for JPK Scanning Probe Microscopes and Optical Tweezers systems

NanoWizard® CellHesion® ForceRobot® NanoTracker™

2 System options

NanoWizard® 4 XP

for high-resolution imaging with extreme performance

The NanoWizard 4 XP BioScience and NanoScience atomic force microscopes combine atomic resolution and fast scanning with rates of up to 150 lines/sec and a large scan range of 100 µm in one system. (see NanoWizard 4 XP brochures)

Key features

- Tip-scanner technology for safe and easy operation in air, gases, and fluids
- Full transmission optical capabilities with standard condenser; e.g. bright field, phase contrast, Hoffman modulation or DIC simultaneous to AFM imaging with inverted research microscopes
- Simultaneous operation with advanced optical techniques like FRET, TIRF, FLIM, FCS, single molecule detection, epi-fluorescence or confocal laser scanning (CLSM) with optional optical microscopes
- Simultaneous operation with optical superresolution techniques like STED, STORM/PALM and SIM
- JPK´s DirectOverlay 2 feature for perfect combination of AFM and optical microscopy
- Open hard and software architecture
- Comprehensive set of AFM modes like Bruker's exclusive PeakForce Tapping, JPK's real force curve based QI mode, contact mode with lateral force, advanced AC modes like non-contact, phase detection, and accessories for the characterization of electrical and magnetic properties, including state-of-the-art FluidFM cantilevers for cell injection and manipulation

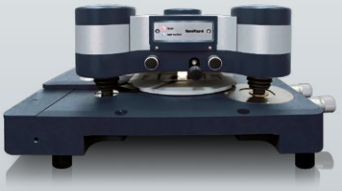
NanoWizard® ULTRA Speed 2

for high-speed AFM combined with advanced optical microscopy

The NanoWizard ULTRA Speed 2 AFM combines true atomic resolution and fastest scanning with rates of 10 frames/sec. (see NanoWizard ULTRA Speed 2 brochure)

Key features

- High-speed imaging at 10 frames/sec with excellent resolution for tracking dynamic processes
- Comes with Bruker`s exclusive PeakForce Tapping and JPK's real force curve based QI mode for easy imaging
- Atomic resolution in closed-loop mode as a result of lowest scanner, position-sensor and detection-system noise level
- NestedScanner feature for fast tracing of high features
- Unique integration with optical microscopy as a result of tip-scanning design and DirectOverlay 2 feature for most precise correlative microscopy
- Highest flexibility and upgradeability with a broad range of modes and accessories



NanoWizard® NanoOptics

1) with fiber port for fiber SNOM experiments

2) UV transparency for top-down illumination

The NanoWizard NanoOptics AFM head is optimized for a broad range of applications ranging from nanoscale optical imaging by aperture and scattering-type SNOM to experiments involving interactions of light with the sample such as absorption, excitation, nonlinear effects and quenching. (see NanoWizard NanoOptics brochure)

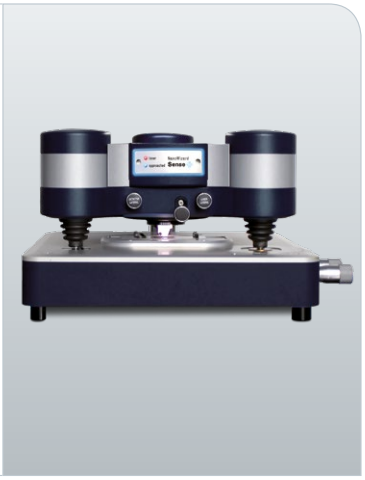
Key features

- Comprehensive solutions for AFM and Raman spectroscopy, Tip-Enhanced Raman Spectroscopy (TERS), Aperture SNOM and Scattering-type SNOM (sSNOM), Confocal microscopy, NanoManipulation in optical fields
- Compatible with most commercially available inverted research microscopes (Zeiss Axiovert and Axio Observer lines, Nikon TE and Ti lines, Olympus IX line and Leica DMI/DMi lines)
- Unique integration with optical microscopy thanks to tip and sample scanning design, DirectOverlay 2 mode, smart engineering
- Seamless integration with inverted microscopes, Raman spectrometers, photon counting systems
- 980 nm laser source for detection of cantilever deflection prevents cross talk with other wavelengths
- Wide range of operation modes and accessories such as Tuning Fork, STM, Conductive AFM, Fiber SNOM

NanoWizard® Sense+

for exceptional flexibility & modularity with proven NanoWizard technology

The NanoWizard Sense+ is a high-quality, entry level AFM, that enables AFM imaging with excellent resolution and highest mechanical and thermal stability, even on an inverted optical microscope. (see NanoWizard Sense+ brochure)

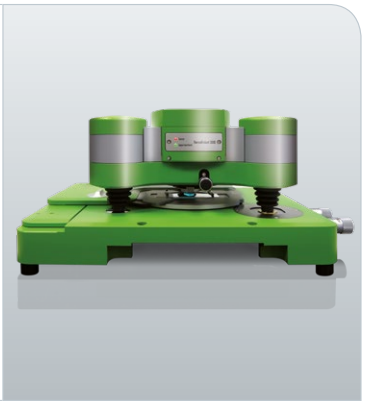


Key features

- Tip-scanner technology for safe and easy operation in air, gases, and fluids
- JPK´s DirectOverlay 2 feature for perfect combination of AFM and optical microscopy
- Supports Bruker's exclusive PeakForce Tapping
- Outstanding flexibility with a broad range of modes and accessories for the characterization of mechanical, electrical, optical, magnetic and chemical sample properties, including state-of-the-art FluidFM cantilevers for cell injection and manipulation
- Can be easily upgraded to a full NanoWizard 4 XP AFM system

ForceRobot® 300

The innovative force spectroscope with fully automated workflow. Collects more than 80,000 force curves within 24 h while varying parameters such as temperature or loading rate. (see ForceRobot 300 brochure)

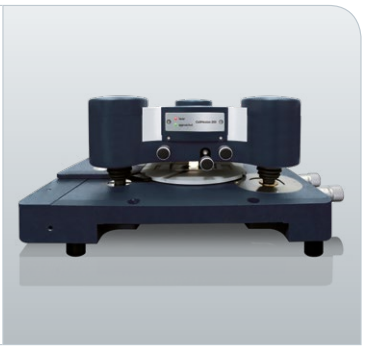


Key features

- Fully automated force spectroscope with highest flexibility
- Cutting edge force spectroscopy and force mapping in combination with single molecule fluorescence
- Automated laser and detector alignment
- Automated cantilever drift compensation
- Advanced and dedicated software with ExperimentPlanner, RampDesigner™ and built-in data batch processing
- Compatible with the Vortis 2 controller

CellHesion® 200

The single cell force testing solution for cell adhesion and elasticity studies. Specialized platform for cell adhesion and cell mechanics measurements for samples ranging from single molecules to entire cells. (see CellHesion 200 brochure)



Key features

- Cantilever sensor lifting system with 100 µm + 15 µm travel range with closed-loop control thanks to high-speed capacitive sensor feedback
- Integrates with advanced optical imaging (DIC, CLSM, TIRF, FRET...)
- Compatible with the Vortis 2 controller

TAO™ Tip Assisted Optics module

Specialized sample stage for advanced experiments combining AFM and optical spectroscopy based on proven NanoWizard technology. 2 axis and 3 axis version available. (see TAO module product note)

Key features

- Ultimate platform for TERS, scatter type SNOM, and single molecule imaging/spectroscopy experiments
- NanoOptical studies such as quenching, field enhancement or bleaching
- Integrated, sample scanning, confocal imaging
- Integrates with conventional and advanced optical imaging (DIC, Phase contrast, CLSM, TIRF, FRET...)
- Flexible software system solution for experimental freedom and remote operation
- Ultimate flexibility as a result of simultaneous control of up to 6 scan axes with closed loop precision (linearized with capacitive sensors):
- Sample scanner:
  - 100 × 100 × 10 µm³
  - 100 × 100 µm²
- Compatible with the Vortis 2 Advanced controller

BioMaterials Workstation BioMAT™

The specialist for investigations of opaque samples in life and material sciences.
(see BioMAT product note)

Key features

- For studies on non-transparent substrates or samples with AFM and optics
- Outstanding reproducibility of the focussed position (ROI) with both systems
- Unique capability to investigate the ROI precisely with optics and AFM
- Also perfect during operation in liquids
- Wide range of applications:
  Biochips, cell chips or patterned substrates for cell adhesion, plant cell applications, microbiology, tissue engineering, ...
- Flexible concept with shuttle stage
- Both techniques can even be operated in different laboratory rooms

*Optical microscope and NanoWizard head are not included

CellHesion® module

As an add-on to the NanoWizard, the CellHesion module combines the capabilities of the BioAFM with precise adhesion force measurements and all optical microscopy features simultaneously. (see CellHesion module product note)

Key features

- 100 µm additional z-travel
- Perfect hardware linearization as a result of capacitive sensors
- Simultaneous focus tracking option
- Integrates with advanced optical imaging (DIC, Confocal microscopy, FRET...)

3 Software modules

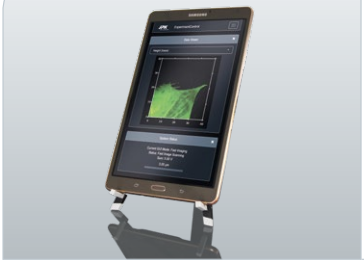
PeakForce Tapping
10 YEARS
How AFM Should Be

PeakForce Tapping software module

Enables easy imaging without any expert knowledge

Key features

- Imaging mode with lowest interaction forces for the widest range of samples
- Lowest forces for preserving probe quality
- Easy to Use for brilliant results
- **FAST version available with more than 5x faster imaging**



ExperimentControl™

Remote control and monitoring of complex and long-term experiments

Key features

- Simplifies setting up the instrument, in particular, inside an acoustic hood
- Continuous status update of the instrument
- Tablet with holder is included
- Remote control and monitoring of complex and long-term experiments via the internet by a PC, tablet or smartphone

ExperimentPlanner™

Allows customized experimental procedures, including control of external equipment

Key features

- Full access to imaging and force spectroscopy functions
- Control of fluidics, temperature, position (requires motorized stage), camera image acquisition etc.
- Convenient program editor with extensive online help and loading/saving of plans

NanoWizard® CellHesion® ForceRobot® NanoTracker™

QI™ Advanced software module

For NanoWizard systems; delivers quantitative mechanical properties

Key features

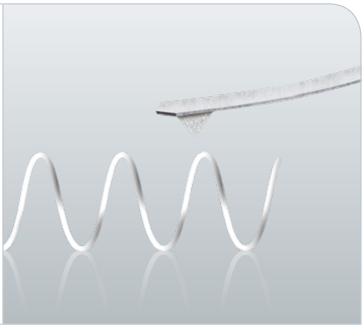
- Any kind of sample can be imaged: samples with steep edges, loosely attached samples, soft, sticky and brittle samples
- Works under ambient conditions and in fluid
- Quick to learn and easy to operate
- Provides additionally adhesion, stiffness and dissipation data while scanning
- Depending on application, it can also deliver electrical conductivity or molecular recognition in a single scan
- Contact Point Imaging (CPI) mode for extremely soft and inhomogeneous surfaces
- QI Advanced imaging mode for conductive measurements in combination with the JPK CAFM module

Advanced AC modes module

Software module for NanoWizard systems

Key features

- Comprehensive range of advanced dynamic feedback modes
- Phase Modulation (PM), Frequency Modulation (FM) or self-excitation FM
- Modes can be combined with Amplitude Gain Control (AGC) and Q-Control
- Higher harmonics with extra lock-in amplifier
- Requires cantilever holder with DirectDrive™ capability

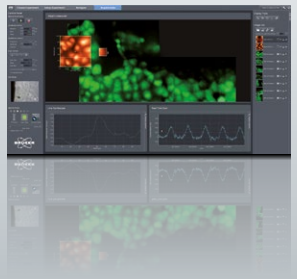


DirectOverlay™ 2 module

Perfect integration of optical and AFM data; JPK's proprietary and patented solution for perfect overlay of optical and AFM information

Key features

- Perfect overlay of optical and AFM data with sub-diffraction limit precision
- Direct "in optical image" selection of AFM measurements (imaging and force curves)
- Dramatic reduction of overview image scanning in AFM, giving faster results & lower tip contamination
- Optical image navigation to specific regions of interest, even without AFM scanning. This protects functionalized tips for molecular recognition, avoids tip passivation from image scanning before the force measurements.

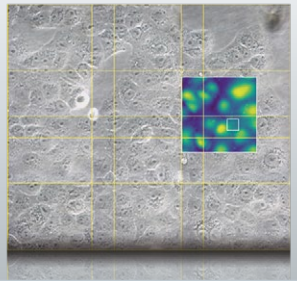


DirectTiling™ software module

Provides a clear visual overview, allowing a fast setup of optically guided experiments.

Key features

- Improved user-friendly workflow
- Large range tiling of optical images
- Allows easy navigation of extended scan-ranges
- Automated mapping of large sample areas
- Requires the DirectOverlay 2 software module
- Only compatible with Motorized Precision Stage or HybridStage

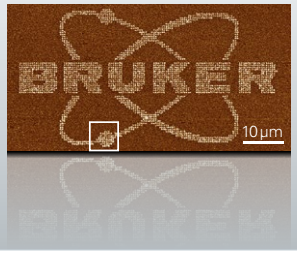


NanoLithography/NanoManipulation module

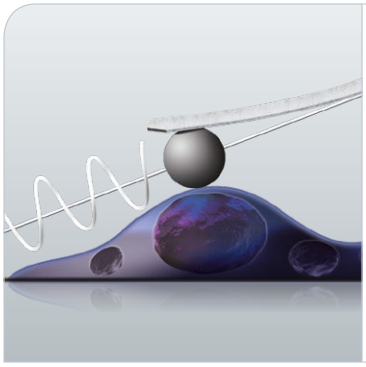
Software module for NanoWizard systems

Key features

- Moving objects or scratching the surface with controlled force
- Free hand, vector-based patterns possible
- Pattern creation by electrical current such as anodic oxidation



NanoWizard® CellHesion® ForceRobot® NanoTracker™

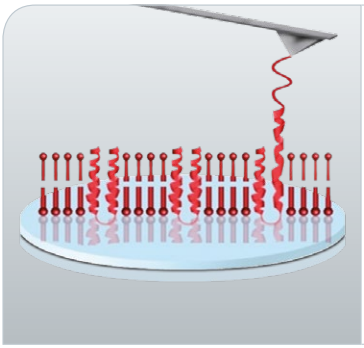


MicroRheology module

For visco-elastic properties of living cells and other samples such as gels or foams

Key features

- Extension to RampDesigner™ offering sine modulation segments
- Perform oscillating measurements with settings for amplitude and frequency
- Force history can be defined by the user through choice of preceding and following segments in RampDesigner™
- Sine modulation analysis in the Data Processing software fits amplitude and phase of response



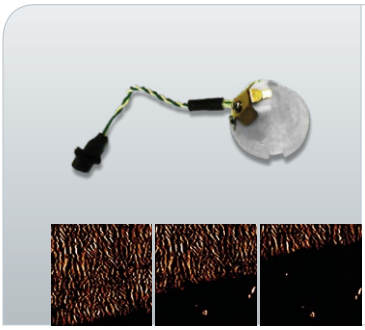
Advanced Force Spectroscopy module

For advanced force measurement experiments ranging from single protein unfolding, and DNA stretching to probing of cells and tissue

Key features

- Integrated RampDesigner™ for user-defined segmentation of force curves
- Advanced force clamp
- Tuneable frequency sweep from 0.1 to 10 kHz
- Setting of user-defined patterns for rheology applications

4 Application modules and modes



Fast scanning package

Fast scanning option for NanoWizard 4 and NanoWizard 4 XP

Key features

- Scan speed up to 150 lines/second for scan ranges up to 2 µm
- Includes PeakForce Tapping – FAST version
- Ultra stable JPK DirectDrive™ cantilever excitation for dynamic modes
- > 70 kHz z-scanner resonance frequency
- Software upgrade for fast scanning modes
- Fast data acquisition
- Includes NestedScanner feature for fast tracing of high features

HyperDrive™ imaging package

For highest resolution imaging of soft samples in air and liquid

Key features

- Designated cantilever holder with built-in oscillation excitation
- Works with standard intermittent-contact mode cantilevers
- Low dynamic forces (< 50 pN). Small oscillation amplitudes in water (< 1 nm) enable sub-nm resolution.
- HyperDrive operating software module
- HyperDrive starter kit includes 5 cantilevers
- Supports FM-AFM and self-excitation FM-AFM
- For aqueous solutions and temperatures up to 60 °C

OEM micropipettes

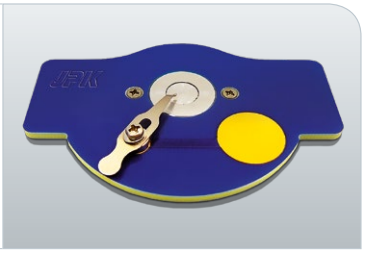
JPK offers a micropipette system, e.g. CellTram® models from Eppendorf, together with NanoWizard or CellHesion 200 systems.

*Optical microscope and NanoWizard head are not included

NanoWizard® CellHesion® ForceRobot® NanoTracker™

Electrical sample connection module

Key features
- Accommodates electrical conductive samples such as AFM metal stubs thanks to magnetic fixation, or transparent samples such as ITO coated glass coverslips
- Insert for Life Science stages



CoverslipHolder with electrical sample connection

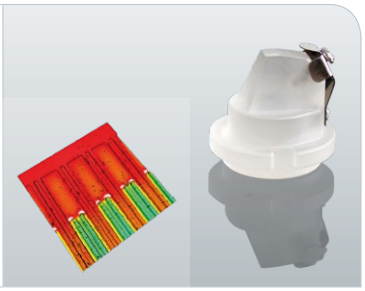
For electrical measurements such as Conductive AFM or STM on a coverslip in combination with high NA optics

Key features
- For Life Science stage
- Compatible with JPK modules like CAFM (also enclosed volume), STM, KPM, and PFM
- Bottom access for high numerical aperture optical imaging
- Sample size up to 25×25 mm and 0-1 mm thickess
- Includes two sample mounting frames:
  - Bolt-down frame with silicone seal for dry operation or aqueous solutions
  - Low profile frame for dry operation with improved optical accessibility and three contact clamps
- Electrical connection from sample topside

Kelvin Probe Microscopy (KPM) module

Option for nanoscale mapping of surface potential distribution

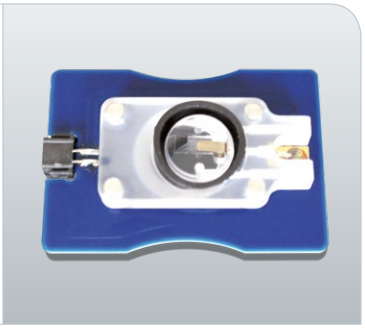
Key features
- Surface Potential Mapping
- Cantilever Holder with electrical tip connection included
- One-pass and two-pass operation possible
- Software interface



Kelvin Probe Microscopy (KPM) module – enclosed volume

For nanoscale mapping of surface potential distribution under controlled environmental conditions

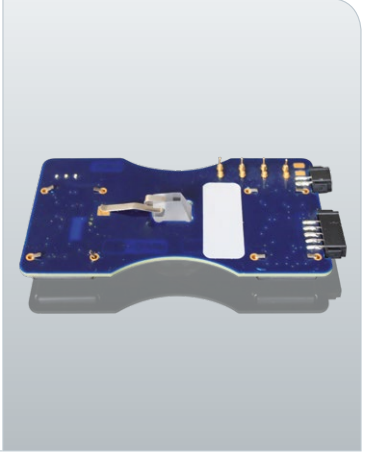
Key features
- Surface Potential Mapping
- Cantilever Holder with electrical tip connection included
- One-pass and two-pass operation possible
- Software interface

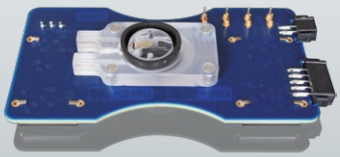


Conductive AFM module

For high-performance conductivity experiments

Key features
- Tip-bias cantilever holder with integrated current amplifier circuit and automatic sample grounding
- Sample holder for conductive samples (optional transparent sample holder)
- Bias Voltage +/-10 V
- Current Range: +/-100 nA
- Gain: 100 V/µA
- Optimized cantilever exchange tool
- Software interface
- 10× Bruker SCM-PIT-V2 cantilever
- Compatible with all stages except Cryo- and StretchingStage





Conductive AFM module – enclosed volume

For high-performance conductivity experiments under controlled environmental conditions

Key features

- Tip-bias cantilever holder with integrated current amplifier circuit
- SmallCell-based, closed volume cell with < 140 µl volume and connections for perfusion/gas flow
- Bias Voltage +/- 10 V
- Current Range: +/- 100 nA
- Gain: 100 V/µA
- Sample holder for conductive samples (optional transparent sample holder)
- Optimized cantilever exchange tool
- Software interface
- Compatible with all stages except Cryo- and StretchingStage

Tunneling Current Conductive AFM (TC-CAFM) module

For low-conducting samples

Key features

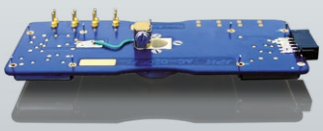
- Tip-bias cantilever holder with integrated current amplifier circuit and automatic sample grounding
- Sample holder for conductive samples (optional transparent sample holder)
- Optimized cantilever exchange tool
- Bias Voltage +/- 10 V
- Current Range: +/- 10 nA
- Gain: 1000 V/µA
- Noise limit 100 fA RMS
- Software interface
- Compatible with all stages except Cryo- and StretchingStage

Tunneling Current Conductive AFM (TC-CAFM) module – enclosed volume

For low-conducting sample experiments under controlled environmental conditions

Key features

- Tip-bias cantilever holder with integrated current amplifier circuit
- SmallCell-based, based closed volume cell with < 140 µl volume and connections for perfusion/gas flow
- Sample holder for conductive samples (optional transparent sample holder)
- Optimized cantilever exchange tool
- Software interface
- Bias Voltage +/- 10 V
- Current Range: +/- 10 nA
- Gain: 1000 V/µA
- Noise limit 100 fA RMS
- Compatible with all stages except Cryo- and StretchingStage



Scanning Tunneling Microscopy (STM) module

Tip-bias wire holder with integrated current amplifier circuit and automatic sample grounding

Key features

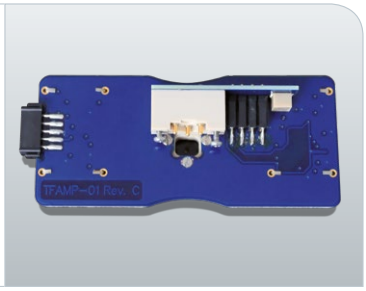
- Tip holder for 0.25 mm or 0.5 mm wire probes
- Sample holder for conductive samples (optional transparent sample holder)
- Optimized cantilever exchange tool
- Bias Voltage +/- 10 V
- Current Range: +/- 100 nA, +/- 10 nA
- Gain: 100 V/µA
- Software interface
- Compatible with all stages except Cryo- and StretchingStage

Tuning Fork module

For tuning fork-based feedback modes e.g. fiber-SNOM or TERS

Key features

- Works with self-excitation or external mechanical dither
- Allows vertical (shear force) or horizontal mounting of tuning forks
- Includes two holder boards and two 40 kHz tuning forks for customer self-assembly
- Software interface
- Improved mounting mechanism for holder boards

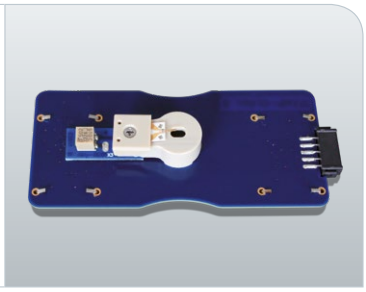


Akiyama Probe module

For TAO module, CellHesion module and HybridStage

Key features

- Software interface
- Designed to work with Akiyama-Probes
- Includes 2 Akiyama probes
- Requires Vortis 2 SPM Controller
- Allows imaging without AFM laser for light sensitive samples
- No alignment necessary, probes can be easily mounted

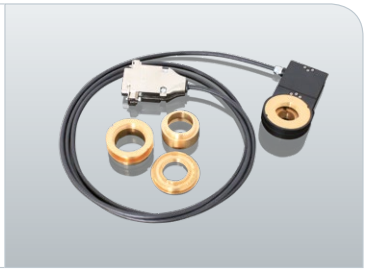


Optical focus tracking

For TAO module, CellHesion module and HybridStage

Key features

- Moves the microscope objective
- Synchronous or asynchronous focus tracking
- Spacers for rising stage and condenser
- Piezo range 100 µm (PIFOC® from Physik Instrumente (PI) GmbH & Co. KG) or 150 µm (SFS SlimFocus from nanoFaktur GmbH)

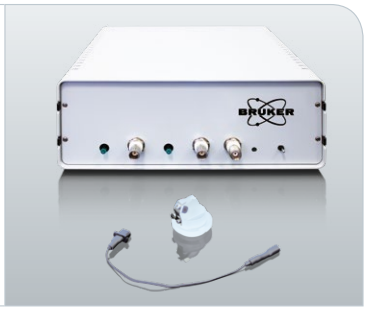


High Voltage Sample Bias Amplifier

For biasing a sample, e.g., in electro-optical experiments or in Piezoresponse Force Microscopy (PFM) and piezo hysteresis mapping

Key features

- Measurement of amplitude & phase of the response
- Voltage range +/-100 V, Bandwidth up to 100 kHz
- Max. current 75 mA
- Incl. Cantilever Holder with electrical tip connection
- Software interface, includes PFM mode



Low Voltage Sample Bias

For biasing a sample to low voltages, e.g., in electro-optical experiments or in Piezoresponse Force Microscopy (PFM) and piezo hysteresis mapping

Key features

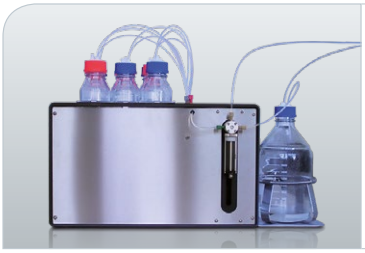
- Measurement of amplitude & phase of the response
- Voltage range +/-10 V, Bandwidth up to 100 kHz
- Max. current 2 mA
- Incl. Cantilever Holder with electrical tip connection
- Software interface, includes PFM mode

Scanning Thermal AFM from Bruker Anasys

For thermal conductivity experiments

Key features

- System includes software, power supply, controller, CAL box, bridge cable and five SThM probes
- Probes come pre-mounted for easy exchange and allow high resolution thermal imaging (< 0.1 °C) and heating up to 160 °C



8x FluidicsModule™

For fluidic experiments and studies in native environment

Key features

- FluidicsModule with up to 8 different liquids such as buffer solutions
- Software-controlled flow rate
- Automated incubation or adding of chemicals
- Comprehensive safety package

ForceWheel

For most sensitive experiment control, e.g. force fishing experiments

Key features

- Manual force curve acquisition
- Continuous setting of gains and setpoints
- Easy, controlled attachment of cells or beads to cantilever tip

5 Sample stages

HybridStage™

Automated mapping of sample properties over a large range. For samples such as structured substrates, microspheres and cells

Key features

- Combined piezo and motorized stages for automated mapping or scanning of large areas
- Maps large objects such as cell scaffolds, printed 3D structures, micro-spheres or capsules and micro/nano structured surfaces over millimeter distances
- Cell/cell or cell/substrate adhesion in 3D with a large pulling range of up to 300×300×300 µm³
- Mechanical properties of plant cells, cell layers, cartilage, parasites, scaffolds, bones or tissue, typically with rough surfaces over a mm range
- Optional XY or XYZ piezo flexure scanners with a large travel range (depending on the application) can be implemented
- Automated and streamlined workflow with the motorized HybridStage

*Optical microscope and NanoWizard head are not included

StretchingStage*

For in-situ mechanical testing

Key features

- Stand-alone stage with integrated sample
- Stretching and compression capabilities
- Enables fine motion control for precise positioning of the AFM tip relative to the sample
- Sample size/distance between jaws 10-20 mm or 25-35 mm (standard stage)
- Maximum travel range: 10 mm
- Force range: exchangeable load-cells, range 2 N and 200 N, accuracy readout +/-1 %
- Velocity: 0.1 mm/min to 1.5 mm/min
- Encoder: resolution 300 nm, linearity 0.1 % of full travel
- Flexible design for different samples
- Comprehensive software control
- Real-time display of force, extension and time, live graphical display of stress/strain curve
- Not compatible with inverted microscopes

*NanoWizard head is not included

StretchingStage for higher forces*

For in-situ mechanical testing with higher forces

Key features

- Stand alone stage with integrated sample stretching and compression capabilities
- Force range: 10 N and 5000 N (10000 N avail.) exchangeable load cells
- Velocity: 0.006 to 3 mm/min
- Maximum travel range: 40 mm for samples of 5 mm length between jaws (resolution 100 nm)
- Not compatible with inverted microscopes
- Motor power: 20 W

*NanoWizard head is not included

NanoWizard® CellHesion® ForceRobot® NanoTracker™

Motorized precision stage

Offers automatic motion control for precise positioning of the sample relative to optical axis and AFM probe

Key features

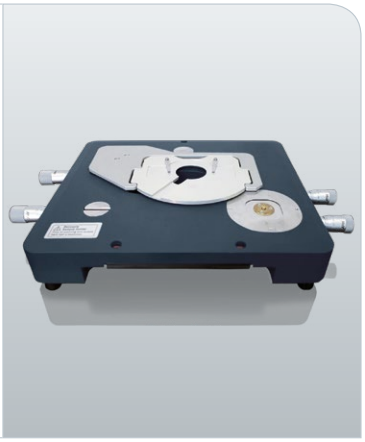
- Transmission illumination capability for inverted optical microscopes like
  - · Olympus IX line
  - · Zeiss Axio Observer/Axiovert 100/135/200
  - · Nikon TE 2000 or Ti series
  - · Leica DMI/DMi lines
  - · Please specify model upon order
- Travel range of the sample 20 × 20 mm²
- Step size (Resolution): ≤ 1 µm
- Repeatability (uni-directional): ≤ 2 µm
- Maximum velocity: 1 mm/s
- With joystick or software control
- For automated tiling or mapping applications
- Manual precision positioning of the AFM tip
- Stand alone use or for inverted optical microscopes
- Compatible with all JPK add-ons, glass slides, Petri dishes etc.
- Compatible with NanoWizard, ForceRobot 300 and CellHesion 200 heads

Manual precision stage

Offers sub-micron resolution & fine motion control for precise positioning of the AFM tip relative to optical axis and the sample

Key features

- Transmission illumination capability for inverted optical microscopes like
  - · Olympus IX line
  - · Zeiss Axio Observer/Axiovert 100/135/200
  - · Nikon TE 2000 or Ti series
  - · Leica DMI/DMi lines
  - · Please specify model upon order
- Travel range of the sample 20 × 20 mm²
- Precise positioning of the sample holder with thermally decoupled, magnetic fixation
- Flexible design for fluid cells, temperature control options, and customized sample holders
- Detachable from optical microscope for stand alone operation
- Drift compensated design
- Compatible with NanoWizard, ForceRobot 300 and CellHesion 200 heads

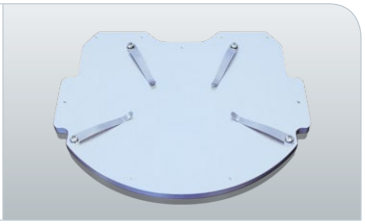


Sample holder for large samples

Fits directly on to the manual or motorized precision stage

Key feature

- The holder can accommodate larger samples such as microchips or wafers and is equipped with spring clips which can be varied

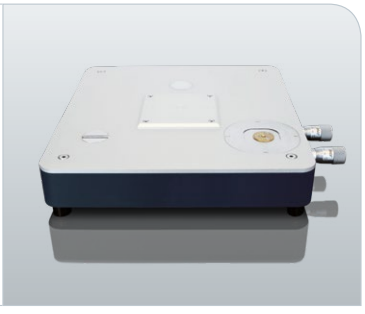


Standard stage

Offers fine motion control for precise positioning of the AFM tip relative to the sample

Key features

- Travel range of the AFM head (tip positioning) 10 × 10mm²
- Stand alone use in combination with JPK TopViewOptics
- Magnetic sample holder
- Flexible design for fluid cells and different sample holders
- Rigid, chemical resistant surface
- Maximum flexibility for customized sample mounting



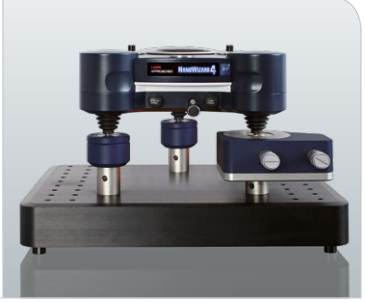
Head-up stage*

For accommodating tall samples and for additional free space around the sample

Key features

- Designed for tall samples from 68 mm up to 140 mm in height (other sample heights on request)
- Flexible design for customized sample holder setups
- 6 mm holes in metric raster with 25 mm distance to mount accessories
- Rigid, chemical resistant surface
- Enables fine motion control for precise positioning of the AFM tip relative to optical axis and the sample
- Not compatible with inverted microscopes

*NanoWizard head is not included



NanoWizard® CellHesion® ForceRobot® NanoTracker™

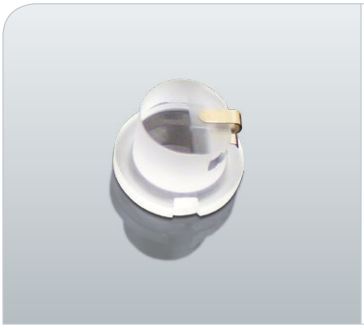
6 Cantilever holder options

Fixed-spring cantilever holder

Standard holder for all-round applications

Key features

- For air or aqueous solutions
- Compatible with JPK BioCell, CoverslipHolder or PetriDishHeater for easier navigation
- Robust design using glass and medical steel
- For measurements in fluid droplets or in fluid baths like Petri dishes or home made fluid cells
- Immersible to 8 mm fluid depth
- Easy to clean
- Easy handling even with gloves
- Included in starter kit



TopView cantliever holder

For all-round applications with a large optical field of view

Key features

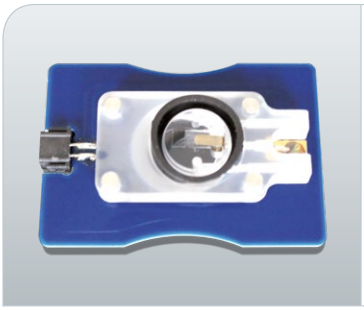
- Chemically inert cantilever holder
- Optimized for use with top-view optics
- Robust design using glass and medical steel spring only
- Immersible to 6 mm fluid depth
- Easy to clean with detergents, in an ultrasonic bath or by autoclaving
- Easy handling, even with gloves
- Measurements in droplets or in fluid baths like Petri dishes or home made fluid cells
- Works in air and liquid, including aggressive media

Cantilever holder with electrical tip connection

For use in air with a fixed cantilever spring and an electrical tip connection

Key features

- Fixed spring holding mechanism
- Super cut extended for petri dishes
- Incl. spare screws
- Length: 15.5 mm
- Electrical connection from AFM controller to cantilever
- Not suitable for working in heated liquids



Cantilever holder with electrical tip connection – enclosed volume

For use under controlled environmental conditions with a s-shaped spring and an electrical tip connection

Key features

- SmallCell-based, closed volume cell with < 140 µl volume
- connections for perfusion/gas flow
- Sample holder for conductive samples (optional transparent sample holder)
- Heating up to 70 °C only

SideView cantilever holder

For use in combination with inverted optical microscopes to observe the cantilever region from the side

Key features

- Super cut, fixed spring, length: 15.5 mm
- Cantilever holder with precise mounted mirror
- Allows both view from below and front of cantilever
- Visual observation of tip-sample region, e.g., for cell pick-up
- Compatible with aqueous solutions and epi-illumination
- Available numerical aperture: 0.3

Objectives with minimum 4 mm working distance required (20× recommended)

NanoWizard® CellHesion® ForceRobot® NanoTracker™

7 Environmental control options – fluid cells and temperature controls

BioCell™ for coverslips with temperature control

For living cell and single molecule experiments with AFM and high-end optics

Key features

- Compatible with transmission illumination
- Cover slip bottom for high NA objectives (1"/25 mm circular cover slips, 0.17 mm thickness)
- Easy sample exchange via quick lock mechanism
- Optimized stability for single molecule imaging and force measurements
- Connections for perfusion and gas supply
- 15 °C to 60 °C thermoelectric heating/cooling
- Soft sealing by silicone membrane
- Works in air or fluids for all AFM modes
- Full featured temperature controller
- Temperature stability 0.1 K

CoverslipHolder

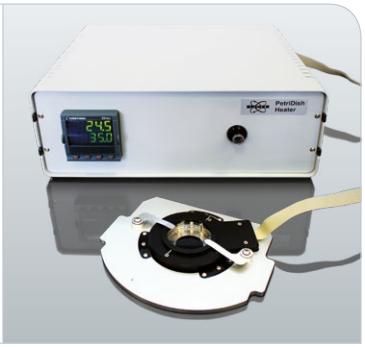
Same design as the BioCell but without temperature control; ultimate high resolution liquid cell with coverslip bottom

Key features

- Fluid cell for Life Science stage
- Perfusion connection
- Cover slip bottom for high numerical aperture fluorescence imaging
- Rigid clamping for single molecule AFM resolution
- For 1" circular cover slips

PetriDishHeater™

For temperature controlled, living cell experiments with AFM and high-end optics



Key features

- Insert for Life Science stage
- Temperature range: Room temperature up to 60 °C
- Compatible with 35 × 10 mm Petri dishes from WPI and TPP (plastic or plastic with glass bottom)
- Adaptors for other suppliers such as Matek, Willco, IWAKI, Ibidi, and BC upon request
- Ports for perfusion tubes and gas supply (only available for certain types of Petri dishes)
- Silicone anti-evaporation seal
- Software control
- Temperature stability 0.1 K

PetriDishHeater™ for BioMAT™

Shuttle stage with integrated Petri dish heater for JPK BioMaterials workstation

Key features

- Temperature range: Room temperature up to 60 °C
- Compatible with 35 × 10 mm Petri dishes from WPI and TPP – plastic or plastic with glass bottom
- Dipping lenses need to be compatible with type of Petri dish
- Temperature stability 0.1 K
- Software control

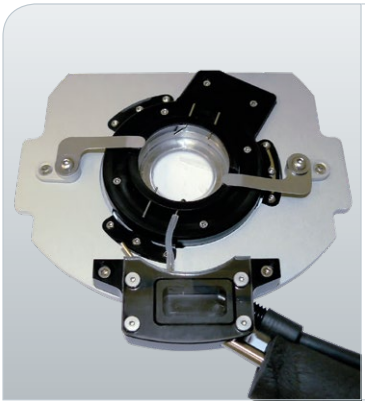
PetriDishHolder™

Designed like the PetriDishHeater, but without temperature control; ultimate liquid cell for high resolution experiments in a Petri dish

Key features

- Insert for Life Science stage
- Compatible with 35 × 10 mm Petri dishes from WPI and TPP (plastic or plastic with glass bottom)
- Adaptors for other suppliers such as Matek, Willco, IWAKI, Ibidi, and BC upon request
- Ports for perfusion tubes and gas supply (only available for certain types of Petri dishes)
- Openings for immersion medium applications
- Silicone anti-evaporation seal

NanoWizard® CellHesion® ForceRobot® NanoTracker™



OEM Humidifier from LIS

Together with the BioCell and the PetriDishHeater, JPK offers an external humidifier from LIFE IMAGING SERVICE (LIS)

Key features

- Digital gas flow sensor (<3 bar in; <1 bar out)
- Tubing (4×1 mm, 6 m)
- Humidity sensor
- Humidity sensor capsule (from JPK, with 2 screws M2.5×6 mm)
- Humidity controller
- Set of tubings
  - Insulating tubing (OD/ID - 4×2 mm)
  - Transfer tubing to fluid chamber

SmallCell™ closed liquid cell for harsh solvents

For smallest volume experiments in a hermetically sealed environment

Key features

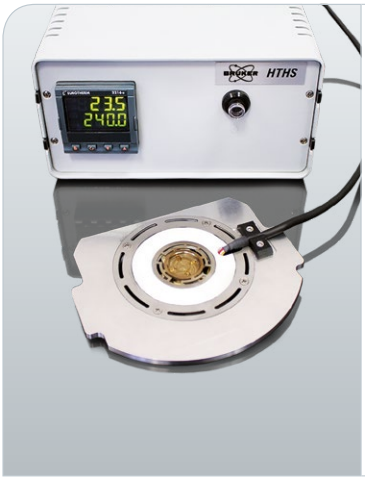
- Compatible with transmission illumination
- Small volume (<140 µl)
- Hermetically sealed
- BK7 glass and steel spring clip
- Perfusion possibility with inlet and outlet ports
- Easy to clean with solvents and ultrasonic bath
- Two springs and O-rings for aqueous solutions, acids, bases, and harsh solvents
- Independent Cantilever Holder

3-port small volume SmallCell™

For smallest volume experiments in a hermetically sealed environment with aqueous solution exchange

Key features

- Set of two cells
- For aqueous solutions
- Compatible with transmission illumination
- Ultra-small volume of <60 µl
- Polycarbonate with silicone seal
- Perfusion possibility
- 2 Luer ports for buffer exchange
- 1 inlet port with septum for small amounts of substances or drugs
- Easy to clean in ultrasonic bath or with ethanol
- Cantilever fixation with designated glue
- Starter kit with tubing, syringe, syringe adaptors, and 2 seals



High Temperature Heating Stage (HTHS™)

High performance heating stage is designed for demanding polymer applications and for stable, long time temperature studies of single molecules or nanoparticles

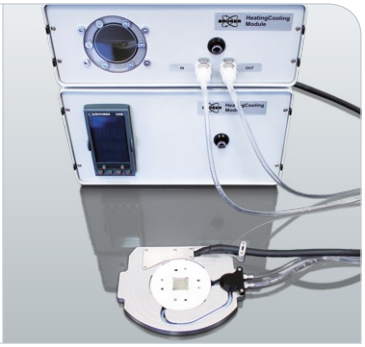
Key features

- Insert for Life Science stage
- Opaque samples
- Resistive heating ambient to 300 °C
- 15 mm diameter area size
- Full featured temperature controller
- Works in air and fluids for all AFM modes controlled by software (fluids up to 80 °C)
- Fast settling time
- Temperature stability 0.1 K

NanoWizard® CellHesion® ForceRobot® NanoTracker™

Heating Cooling Module (HCM™)

Designed for heating and cooling experiments in gas or liquids with minimized drift in all dimensions

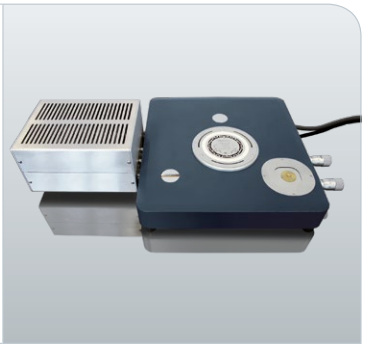


Key features

- Insert for life science stages
- Temperature control from -30 to 120 °C
- Soft sealed cell with gas flow connection for dry or inert gas
- 15×15 mm sample size, magnetic fixation
- Thermoelectric cooling/heating
- Closed circuit liquid cooling – a chilled reservoir is required for lowest temperatures (not supplied)
- Complete set of tubes and connectors including flow indicator

Heating Cooling Stage (HCS™)

Designed for AFM experiments in air or liquids, from 0 °C up to 100 °C, with minimized drift in all dimensions

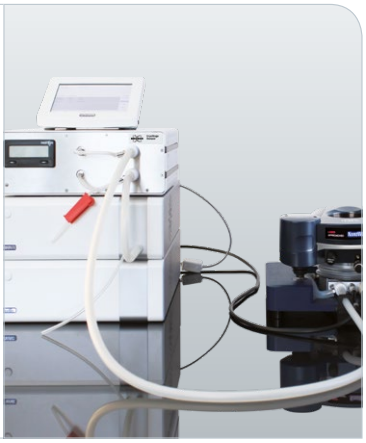


Key features

- 0 °C to 100 °C temperature range
- Stand-alone stage for opaque samples
- Thermo-electric temperature control
- Includes JPK SmallCell fluid cell
- 20 mm×20 mm maximum sample size
- Full featured temperature controller
- Works in air or fluids and all AFM modes
- Fast settling time
- Temperature stability 0.1 K

Cryostage

From -120 °C to 220 °C for low temperature applications



Key features

- Temperature range from -120 °C up to 220 °C, temperature stability +/-0.2 °C
- Minimized vibration for high-resolution imaging of samples
- Sealed volume with gas flow connection for dry or inert gas over the complete temperature range
- Rapid cooling rate with liquid nitrogen (> 10 °C/min) and nitrogen environment to prevent ice formation while cooling
- Fine motion control for precise positioning of the AFM tip relative to the sample of 10×5 mm
- Integrated Linkam Scientific Instruments technology
- Ergonomic LCD touch screen control
- Sample size: Up to 22 mm×22 mm
- For opaque samples, no transmission illumination
- Can be combined with electrical, magnetic, nanomechanical measurement modes

*NanoWizard head is not included

8 Electrochemistry solutions

Temperature controlled ECCell™

For electrochemistry with temperature control and transmission optics such as phase contrast, DIC or fluorescence together with AFM; ideal for combined studies of temperature and potential-sensitive biomolecules

Key features

- Works with transparent or non-transparent substrates
- Accommodates standard coverslips, metal or silicon chips or other substrates
- Temperature range from ambient to 60 °C
- max. 1350 µl liquid volume with perfusion capability
- Sealed design for inert gas filling
- Wire electrodes and miniature reference electrode. Suitable for conductive films or substrates (e.g., ITO coated glass)
- Compatible with common potentiostats
- Allows the use of high numerical aperture lenses for optimum fluorescence performance
- Unrestricted high resolution AFM imaging

Heating Cooling Stage (HCS™) with electrochemistry cell

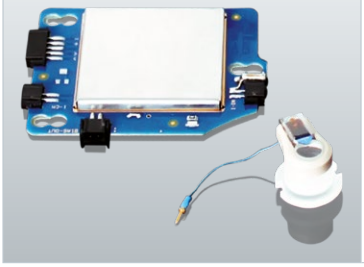
Designed for electrochemistry AFM experiments with controlled heating and cooling of the sample

Key features

- For opaque samples
- Temperature range from 0 °C to 100 °C
- Temperature resolution 0.1 °C
- Twin stage thermoelectric element
- Drift minimized in all directions for full temperature ramps simultaneous to AFM imaging
- Heat-pipe design – no water cooling or fan required
- Top-view optical access for easy navigation
- Max. 1350 µl liquid volume with perfusion capability
- Sealed design for inert gas filling
- Wire electrodes and miniature reference electrode

Potentiostats

Potentiostats from Bruker and third parties for electrochemistry applications together with NanoWizard systems



Scanning Electrochemistry Microscopy (SECM) package

For scanning electrochemistry; **available from October 2020**

Key features

- Previously unobtainable electrochemical information with < 100 nm spatial resolution
- Simultaneous electrochemical, electrical, and mechanical mapping in liquid
- Reliable, easy-to-use commercially available probes specifically designed for SECM
- Highest resolution SECM and atomic force microscopy performance with a NanoWizard AFM

9 Vibration and acoustic isolation

Acoustic enclosure table top version

Approved for high performance applications:
Space saving acoustic hood for utmost stability and isolation

Key features

- 76 × 75 × 100 cm³ external dimensions
- Houses NanoWizard AFM with TopViewOptics
- Acoustic insulation for common laboratory noise conditions
- Provides space for active vibration isolation platforms like Accurion i4 or TS150
- Requires a solid table or base frame for setup suitable for AFM operation

*TopViewOptics, tablet and NanoWizard head are not included

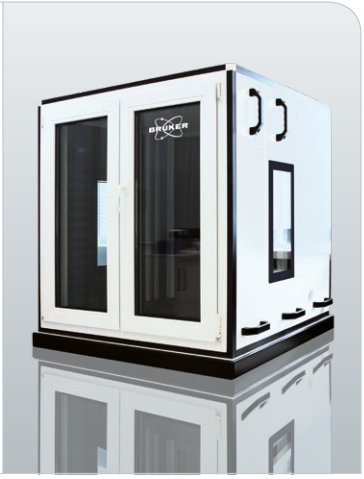
Active vibration isolation from Accurion

Key features

- i4 Series – compact table-top vibration isolation unit
- Active Workstation 780 and 900 – active vibration isolation workstations

Acoustic enclosure, various versions

Approved for high performance applications:
Acoustic hood for utmost stability and isolation



Key features

- Standard: 1060 × 1060 × 1160 mm³ ext. dimensions
- Large: 1560 × 1065 × 1160 mm³ ext. dimension
- Extra-large: 1860 × 1060 × 1160 mm³ ext. dimensions
- Houses inverted optical microscope with NanoWizard AFM
- Foam acoustic insulation for common laboratory noise conditions (can also be obtained without foam at no extra charge. Suitable e.g. for washing down in a Biosafety environment)
- Provides space for active vibration isolation platforms like Accurion i4 or TS150
- Front section detachable for easier transport
- Standard and large versions also available with heating system

Base for acoustic enclosure

Approved for high performance applications:
Base frame with flat top surface designed for carrying Bruker's acoustic hoods

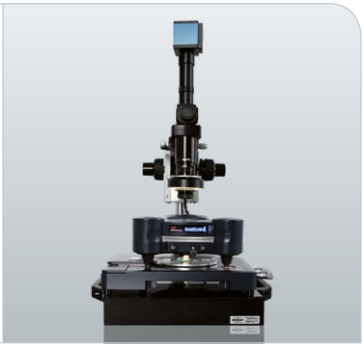
Key features

- Free standing support table
- Robust, welded steel construction
- Stable sandwich top-plate:
  - Standard: 113 cm × 113 cm
  - Large: 162 cm × 112 cm
  - Extra-large: 190 cm × 112 cm
- Stable base for Acoustic Enclosure
- Can accommodate active vibration isolation systems from Accurion or Table Stable

10 Optics accessories

TopViewOptics™ with granite base

For stand-alone AFM configuration



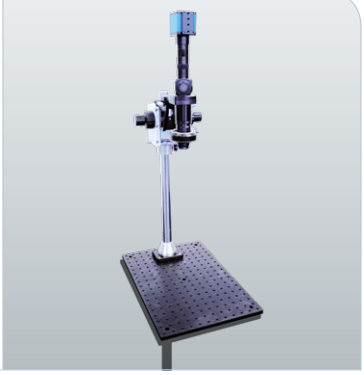
Key features

- For opaque samples
- Long working distance zoom lens from Navitar™
- 2 mm-400 µm field of view
- Köhler illumination, fiber light illumination
- Color CCD camera
- Easy positioning and focus adjustment

*NanoWizard head is not included

TopViewOptics™ with breadboard

For use with inverted optical microscopes or JPK BioMAT



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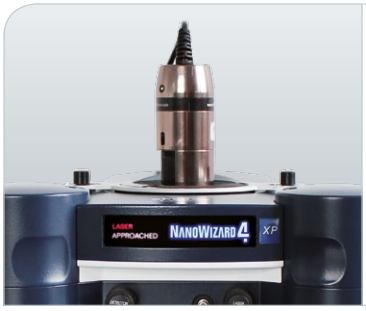


TopView optical module*

Optical system for viewing tip and sample during experiments on opaque samples

Key features

- Integrated camera with images captured directly into the AFM software
- Can be mounted on the AFM head while the head is mounted on the inverted fluorescence microscope as well as standalone
- Top-down view perpendicular to sample plane
- Magn. 10×
- Up to 5 MP , frame rate max 9 FPS
- Camera connection type USB 2.0

*NanoWizard head and stage are not included

Raman reflector kit

Optical system for Tip-Enhanced Raman Scattering (upright-TERS) on opaque samples

Key features

- Cantilever holder with integrated reflector for Raman excitation @ 532 nm
- Optical transmission for shorter wavelengths and infrared
- Raised sample holder and objective extension ring
- Compatible with NanoSensors Advanced TEC, AppNano Access-NC or similar AFM cantilevers
- Suitable for samples up to 4 mm in diameter
- Requires long working distance objective lens with a working distance of minimum 10.6 mm

Upright Fluorescence Microscope (UFM) kit

Enables the combined use of AFM and upright fluorescence zoom microscopy for co-localization experiments on opaque substrates

*Optical microscope and NanoWizard head are not included

Fiber-coupled detection module

Allows the precise capture of light emitted by the SPM tip region into a fiber-coupled detector; suitable for home-built SNOM or other light emitting tip experiments

Key features

- Fiber coupler for 50 µm core multi-mode optical fiber (FC connector)
- Fits to c-mount equipped inverted optical microscopes
- Precise manual xy positioning of the fiber end
- Built-in CCD-camera system for the alignment of emission spot to fiber center
- Three way optical switch for viewing sample, fiber end, and semi-transparent overlay

Inverted optical microscope configurations

Research lines of inverted optical microscopes from Zeiss, Olympus, Nikon, and Leica; ask the Bruker JPK BioAFM applications team for more information

Raman spectroscopy

Raman spectrometers from Princeton Instruments and Renishaw

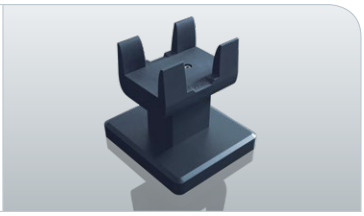
Time correlated single photon counting (TCSPC)

FLIM systems from PicoQuant

NanoWizard® CellHesion® ForceRobot® NanoTracker™

11 OEM solutions and small parts

Stand for AFM head
Parking stand for all NanoWizard, CellHesion or ForceRobot 300 heads

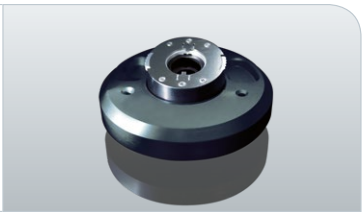


JPK sample holder for small samples
Adaptor for standard sample holder; holds magnetically fixed AFM metal stubs

JPK cable anchorage pillow
Heavy weight pillow for fixation of cables to reduce noise coupling

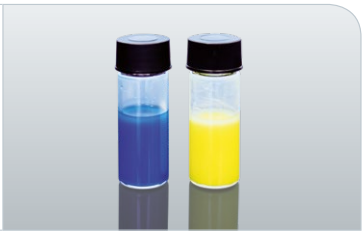
JPK cantilever changing tool
Probe loading station for convenient cantilever exchange

- Included in starter kit



JPK biocompatible glue
For cantilever or sample fixation, easily removable and biocompatible

- Included in starter kit



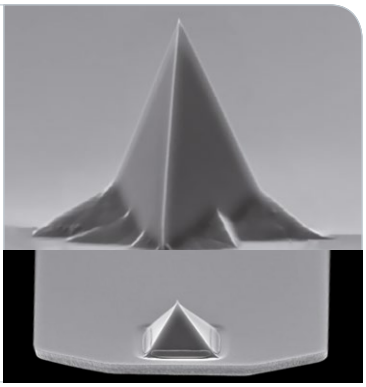
JPK spare parts
Available on request

- Springs for different cantilever holders
- Fluid cell seals
- Adapters
- Coverslips
- Tubing for fluid cells

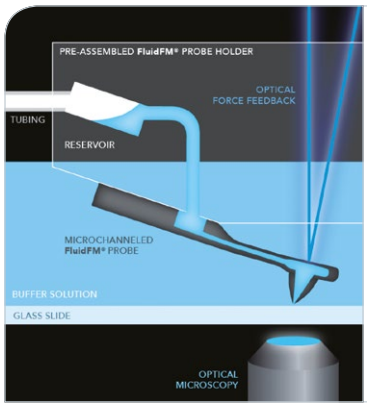
AFM probes and cantilevers
For all kind of applications and experimental needs

- Probes for standard applications (e.g., contact mode, AC mode)
- Super sharp probes for high resolution applications
- Probes for living cell/soft matter imaging
- Probes for force spectroscopy
- Probes for specialized applications (SECM, conductive, high aspect ratio, and many more)

Please visit our online store at brukerafmprobes.com for an overview.



NanoWizard® CellHesion® ForceRobot® NanoTracker™



FluidFM® ADD-ON from Cytosurge

For advanced single cell, spectroscopy and nanomanipulation experiments

The FluidFM technology enables easy handling of liquid volumes at the femtoliter scale by providing a range of hollow cantilever designs. It enhances the capabilities of your system and opens up new fields of application such as:

- Single cell adhesion measurements with forces >50 nN
- Single cell injection of targeted drugs or gene vectors
- Colloidal spectroscopy to directly measure interaction forces between colloidal particles and surfaces
- Enhanced nanomanipulation capabilities, and more
- All NanoWizard, CellHesion and ForceRobot platforms are compatible with the FluidFM ADD-ON from Cytosurge.
- It is available as
  - · separate add-on (FluidFM ADD-ON Silver) or
  - · fully integrated solution (FluidFM ADD-ON Gold and Platinum)

© Cytosurge AG

CO_2 Controller

For living cell applications

Key features

- CO_2 control device for the generation of a defined CO_2 concentration
- CO_2 setpoint value from 0.0 Vol-% up to 20.0 Vol-%
- Resolution of the CO_2 display: 0.1 Vol-%
- Resolution of the internal CO_2 loop control: 0.01 Vol-%
- Humidification bottle (500 ml) is included, to compensate the strong drying effect
- Tubing and adapters are included
- External CO_2 support needed (CO_2 from e.g. gas cylinder is added to the ambient air)

© PeCon GmbH

OEM syringe pumps

JPK offers syringe pumps from World Precision Instruments (WPI):

Aladdin AL-1000

- Accepts syringe sizes: 1 - 60 mL
- Programmable, economical, versatile
- Single pump
- Up to 100 pumps can be daisy-chained together via RS232 network

Aladdin AL-4000

- Accepts two different syringe sizes: smallest - 60 mL
- Programmable, economical, versatile
- Infuses and withdraws
- Pumping rates: 1.459 mL/hr-127.2 mL/min

CCD, EMCCD and CMOS cameras

The DirectOverlay 2 optical integration can be used with any camera.
The following cameras are preferred and can be offered directly:

Andor™ Technology

- iXon+ EMCCD[1)]
- Luca EMCCD[1)]
- Clara Interline CCD[1)]
- Zyla sCMOS[1)]

Jenoptik ProgRes® cameras series, such as

- MF cool[1)]
- CF cool[1)]
- Gryphax USB 3.0 CMOS cameras (Arktur, Rigel, Kapella)[2)]

1) Native 2) On-board based on company supported SDK/Demo software 3) Communication link to separate hardware and software

The Imaging Source
- FireWire CCD camera[1)]

IDS Imaging Development Systems
- Compact USB CCD 1 and CMOS cameras of type µEye® and UI[1)]

Photometrics
- Evolve™ EMCCD[3)]

Hamamatsu Photonics K.K.
- ORCA CMOS[3)]

PCO
- Panda family USB, sCMOS[2,3)]

OEM incubators for Live Cell experiments under controlled environments

JPK offers different incubator models for LIVE CELL applications together with NanoWizard or CellHesion systems.

OEM glove box systems for NanoWizard® AFMs

The AFM system can be used in a glove box under controlled atmospheres.

12 Indentation solutions

Bruker BioSoft in-situ indenter

For soft biomaterials mechanical characterization

- Seamless integration with inverted microscopes for maximum test flexibility
- Characterization of specimens ranging from sub-cellular to tissue levels
- In-situ observation during mechanical testing
- Access to physiological pressures from Pa to kPa
- Customizable probes
- Maximum Force: 10 mN
- Load Noise Floor: < 750 nN
- Normal Force Bit Resolution: 1 nN
- Maximum Displacement: 150 µm
- Displacement Noise Floor: < 1 nm
- Normal Displacement Bit Resolution: 0.006 nm
- Thermal Drift of Sensor: ≤ 0.05 nm/sec

1) Native 2) On-board based on company supported SDK/Demo software 3) Communication link to separate hardware and software

NanoWizard® CellHesion® ForceRobot® NanoTracker™

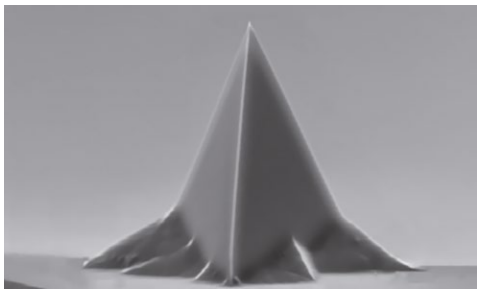
Bruker Online Probes Store

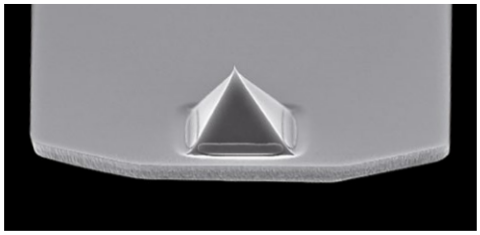
For all your application needs

No matter what your sample, application or environment, Bruker has the right probe for you.

Bruker is the only major AFM/SPM equipment manufacturer that also owns and operates an AFM Probes Nanofabrication Center. Find an extensive line of industry-standard and specialized probes:

- Probes for living cell/soft matter imaging and mechanobiology applications
- Performance probes for highest resolution imaging and materials property mapping
- Only supplier of Bruker's unique PeakForce Tapping probes
- Probes for specialized applications (SECM, conductive, high aspect ratio, and many more)
- Probes for standard applications (e.g., contact mode, AC mode)
- Value Line probes for budget-conscious AFM research





For a complete list of our products and further useful information, visit

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This handbook reflects a large variety of options and will continue to grow in the future with the latest developments. If you cannot find an accessory or operating mode in this handbook, please ask us directly. Bruker is able to deliver customized solutions even for advanced applications.

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