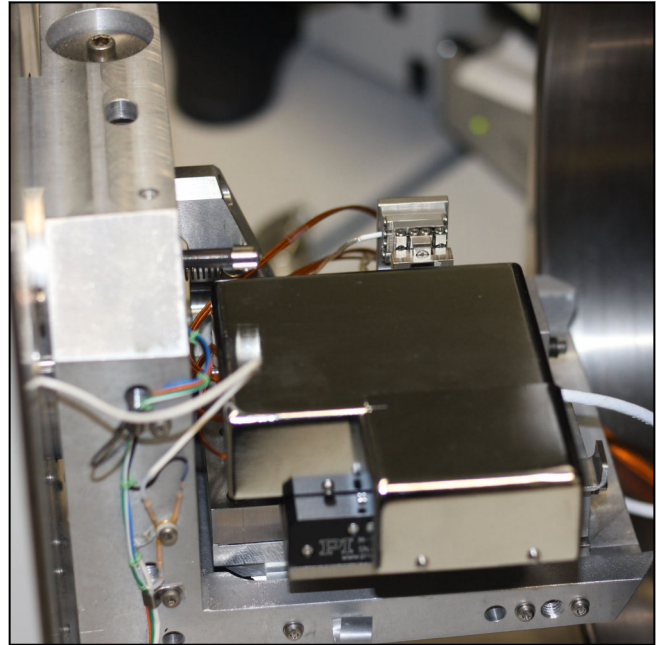
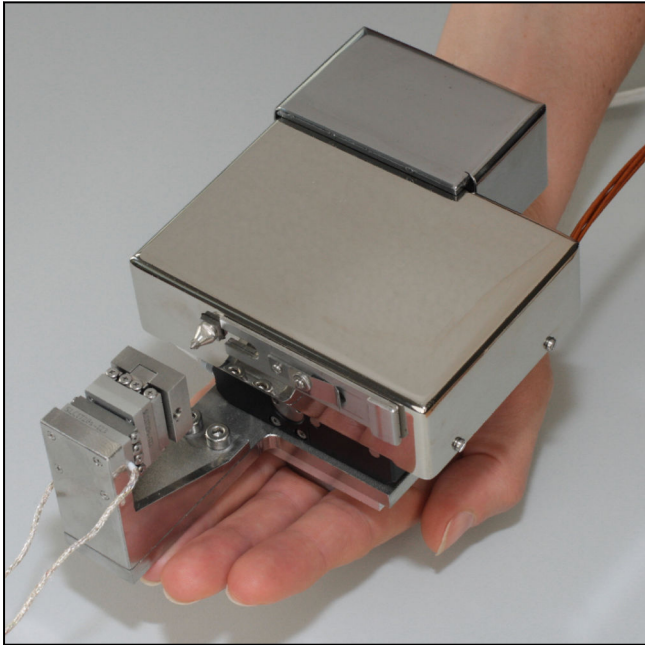


## Product Information

### ZHN/SEM - Nanoindenter for Scanning Electron Microscope

CTA: 202217 98961



#### Applications

The ZHN/SEM nanoindenter for installation in a scanning electron microscope (SEM) enables micromechanical experiments to be performed while observing the specimen at maximum resolution. It possesses the largest measuring range currently available, with a maximum displacement measurement of 200  $\mu\text{m}$  and a maximum force of 200 mN, combined with very low-noise force and displacement sensors in a low-vibration environment. Instrument stiffness is so high that conventional hardness measurements can be performed without difficulty.

The standard system was developed for installation on the stage system of various SEMs, but can also be mounted on the chamber wall. The existing tilt and positioning options of the SEM stage can be used with this system.

The system consists of:

- the measuring head with sensors and actuator
- a piezo stage system for positioning specimens in the XY direction and optional rotation around the indenter axis
- a stiff mechanical Z-stage for displacement of the measuring head towards the specimen
- PC and controller
- easy-to-use, highly flexible software
- one or two flanges with feed-throughs (SEM-specific)

#### Advantages and features

- Indenter can be tailored to customer requirements over a wide range.
- Force and displacement control available as closed or open loop.
- Dynamic measurement method with frequencies up to 100 Hz for fatigue and continuous stiffness measurements available as option.
- An outstanding feature of the measuring head is that it can be used in the compression and tensile directions over the entire measuring range.
- Video synchronization: the recorded image can be shown by transferring data to an additional window on the SEM computer via TCP/IP.

## Product Information

### ZHN/SEM - Nanoindenter for Scanning Electron Microscope

#### ZHN0.2/SEM measuring head

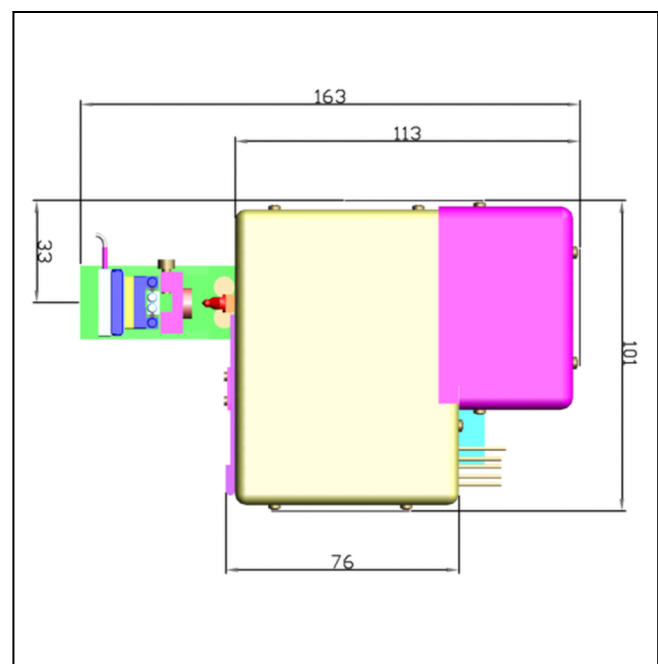
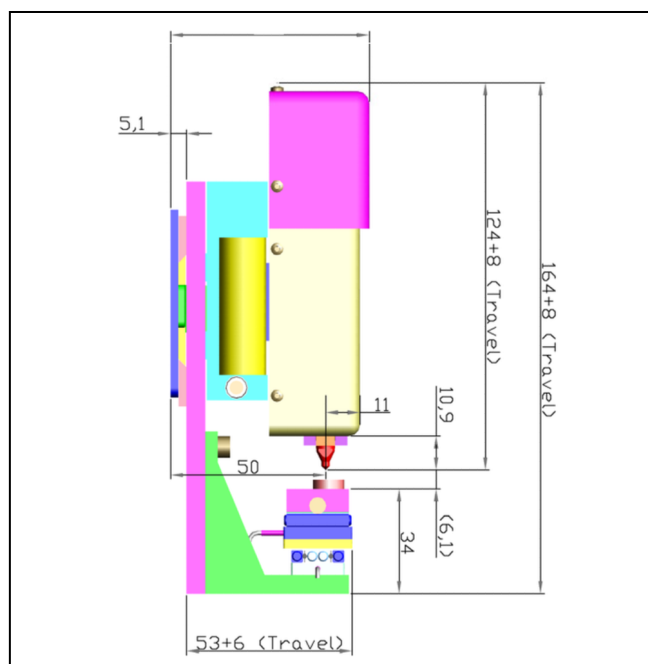
Item No.	1020054	
Type	ZHN/SEM	
Test load, max. (Fmax)	approx. 200	mN <sup>1)</sup>
Displacement, max.	approx. 200 µm at 20 mN; 1500 µm at 200 mN	
Force resolution, digital	≤0.02	µN
Displacement resolution, digital	≤0.001	nm
Noise level, force measurement (RMS)	≤0.5	µN
Noise level, displacement measurement (RMS)	≤0.5	nm
<b>Stage system</b>		
X and Y-stage: movement range (standard)	21 x12	mm
X and Y-stage: positioning accuracy	≤50	nm
X and Y-stage: measurement system resolution	1	nm
Z-stage: movement range	15 (optionally 25)	mm
Z-stage: positioning accuracy	≤0.1	µm
Z-stage: measurement system resolution	50	nm

1) Compression and tensile

- For use in a scanning electron microscope (SEM)
- Consisting of measuring head, control electronics, control unit with monitor, keyboard and mouse

#### Dimensions

CTA: 98997 98996



## Product Information

### ZHN/SEM - Nanoindenter for Scanning Electron Microscope

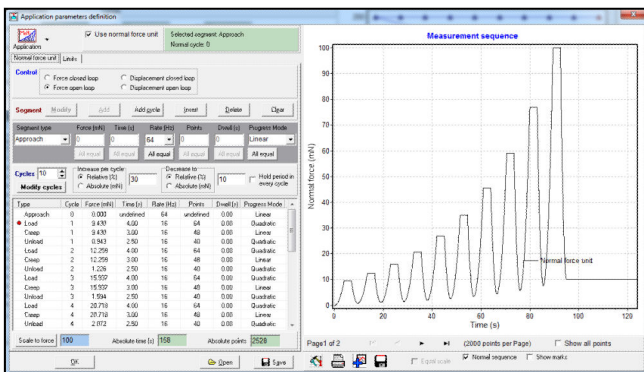
#### InspectorX software

Description	ArticleNumber
InspectorX control and evaluation software (available in German or English) <ul style="list-style-type: none"> <li>incl. autofocus and focusing module</li> <li>Software module for automatic focusing of specimen surface and for performing focusing to generate a composite image with large depth of field</li> <li>Analysis software for evaluation of registering indentation measurements as per EN ISO 14577, comprehensive evaluation and correction routines</li> </ul>	<b>1023952</b>
InspectorX in version 5.3 <ul style="list-style-type: none"> <li>Delivery of InspectorX will be in version 5.3</li> </ul>	<b>1102288</b>
InspectorX in version 5.14 <ul style="list-style-type: none"> <li>Delivery of InspectorX will be in version 5.14</li> </ul>	<b>1093308</b>
Data processing software InspectorX (2. Licence) <ul style="list-style-type: none"> <li>Software for the analysis of force indentation depth curves measured with the ZHN according to ISO 14577 including comprehensive export functions, special analysis and correction functions</li> </ul>	<b>1073594</b>

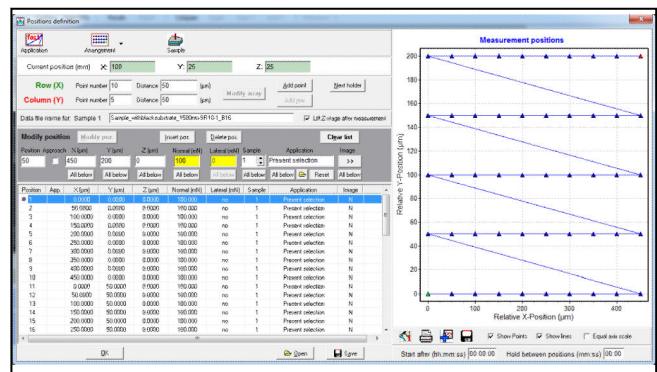
The software gives easy access to a number of predefined applications which can be modified in a very flexible manner like:

- Indentation hardness and modulus measurement according to ISO 14577
- Purely elastic measurements using spherical indenters
- Dynamic mode for a fatigue tests or viscoelastic characterization
- Tensile test with dog bone specimens and adapted grips
- Measurements can be graphically presented, compared, averaged or exported (ASCII, EXCEL, BMP, JPG and more). Comprehensive correction routines are available.
- A large number of test positions can be programmed with an accuracy of about 50 nm and run automatically.

CTA: 98958 98956



Definition of test process in InspectorX



Definition of test positions

#### Accessories for ZHN/SEM

The ZHN/SEM requires a conductive indenter. Optionally, a rotation stage can be configured to the table system.

Description	ArticleNumber
Berkovich indenter for ZHN Conductive; 3-sided diamond pyramid, face angle 65.27° Applicational range: e.g. ISO 14577, Mapping, contact resistance measurements	<b>1016452</b>
Diamond ball indenter for ZHN Conductive; with 10 µm radius (nominal); opening angle 90° Applicational range: e.g. for scratch tests, contact resistance measurements	<b>1016453</b>

All data at ambient temperature.

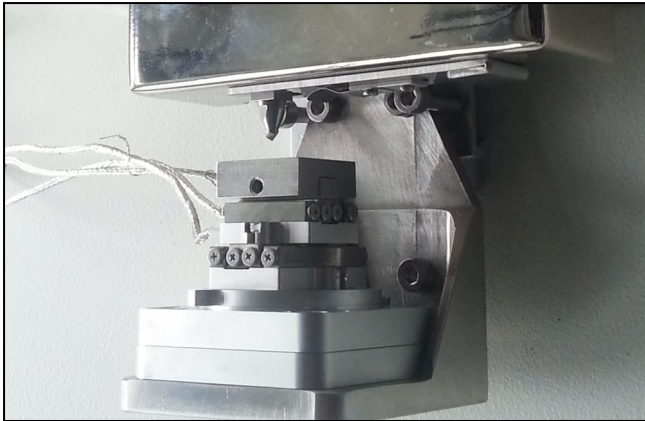
Subject to change in the course of further development.

## Product Information

### ZHN/SEM - Nanoindenter for Scanning Electron Microscope

Description	ArticleNumber
Diamond ball indenter for ZHN Conductive; with 20 µm radius (nominal); opening angle 90° Applicational range: e.g. for scratch tests	<b>1073489</b>
Rotation stage for ZHN/SEM • Rotatory positioner with integrated nano-sensors • HV-compatible (10e-6 mbar), travel range limited to 340°	<b>1020060</b>

CTA: 98998



Rotation stage enables rotation around the indenter axis in the X-Y direction