OLYMPUS®

Your Vision, Our Future

3D Measuring Laser Microscope

OLS4100

LEXT

Bringing Answers to the Surface

NEW

More precise measurement. Faster operation. High-quality imaging.

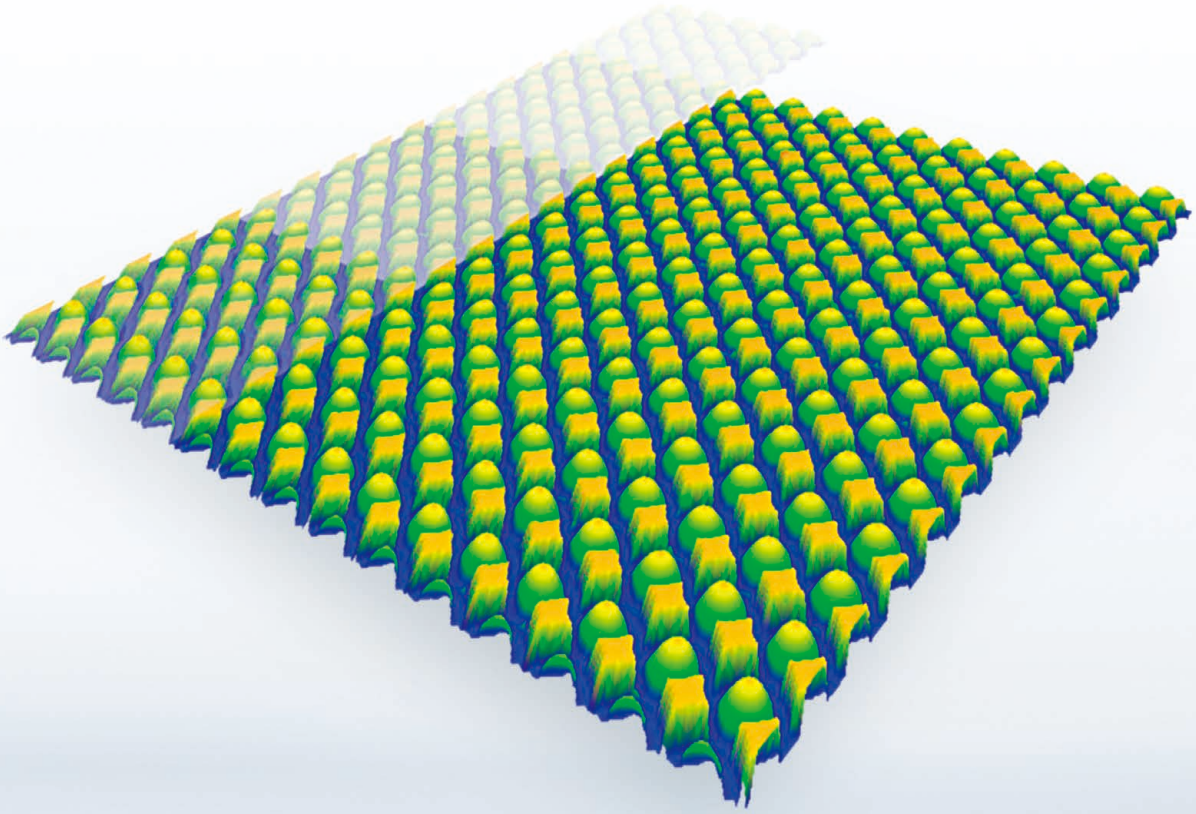
Expanding the Boundaries of Laser Microscopy

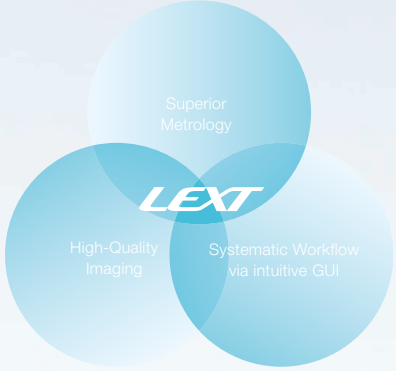
Measurements and images you can count on. Every time.

LEXT OLS4100

Widely used in quality control, research, and development across an array of industries and applications, OLYMPUS LEXT 3D measuring laser microscopes have set new standards in 3D laser microscopy. Now, as demand grows for increased measurement precision and wider observation applicability, Olympus has responded with the new LEXT OLS4100. Designed to facilitate faster, easier measurement and higher-quality imaging, the OLS4100 is expanding the boundaries of laser microscopy.

The new OLYMPUS LEXT OLS4100. Going beyond the borders of possibility.





Contents

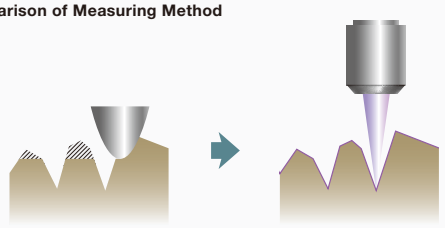
Advantages of Laser Scanning Microscopes

Non-Contact, Non-Destructive, Fast Imaging and Measurement

Non-Contact, Non-Destructive Measurement

Laser scanning microscopes (LSMs) employ a low-power light that does not touch the sample. This means you won't risk damaging your sample unlike with stylus based systems of contact-type surface roughness gauges.

• Comparison of Measuring Method



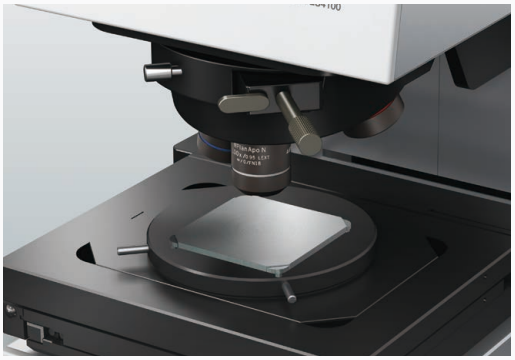
Contact Surface Roughness Measurement R: 2 µm

Non-Contact Laser Microscope R: 0.2 µm (OLYMPUS)

Imaging with No Sample Preparation

A scanning electron microscope (SEM) can require sample preparation such as vacuum evaporation and/or altering the sample to fit in the sample chamber before observation. An LSM lets you measure samples with no sample preparation. In addition, imaging can be started directly after placing the sample on the stage.

• Start Imaging and Measuring with No Sample Preparation



Operation is ready directly after placing a sample on the stage.

LSM Solution for	
SEM Samples	Roughness Gauge Samples

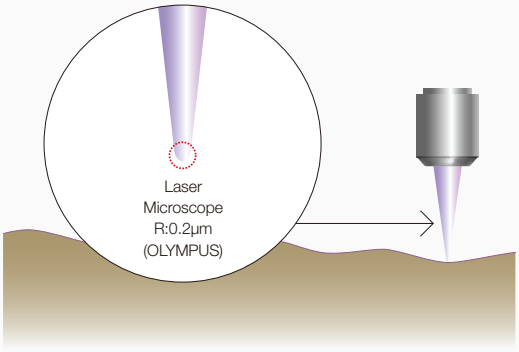
With an LSM, the sample can be safely returned to the production line or experiment thanks to non-destructive measurement.

Superior X-Y-Axis Measurement

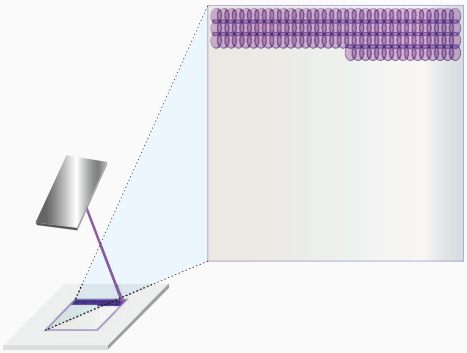
Accurate Measurement of Submicron Distances in the X-Y Axes

As an interferometer is based on a normal white-light optical microscope, it depends on the lateral resolutions of the optical microscope. By using a larger aperture objective lens and reducing the wavelength, an LSM has improved lateral resolutions.
By high precision angular-controlled movement the laser focus can be moved very precisely over the sample/area of interest. Based on the resulting images an LSM can perform very accurate X-Y plane sub-micron measurements on diverse types of samples. The LEXT OLS4100 achieves 0.12 micron lateral resolution.

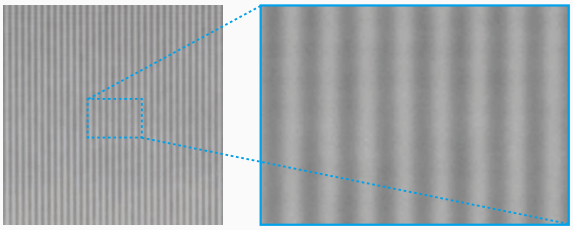
• Micron-Order Laser Spot for Detecting Micro Surface Contours



• **Angular-Controlled Laser Scanning for High-Resolution Imaging**



• **High X-Y Plane Resolution**



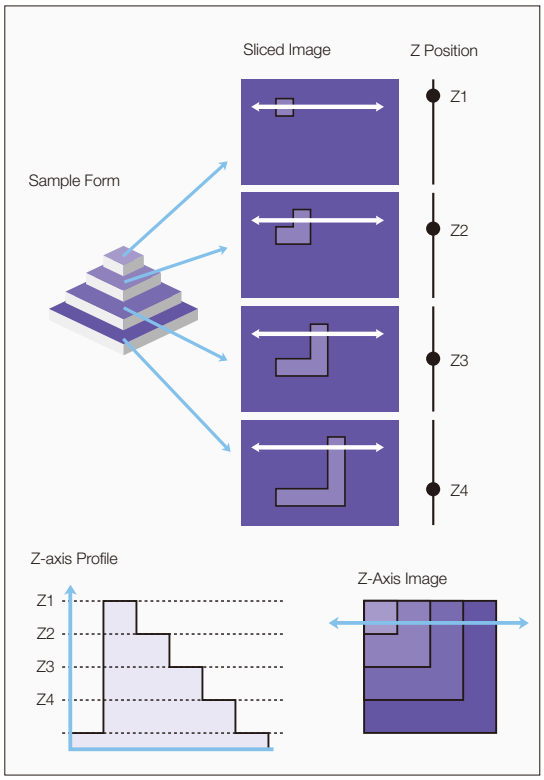
128 x 128 µm

0.12 µm Line and Space (OLYMPUS)

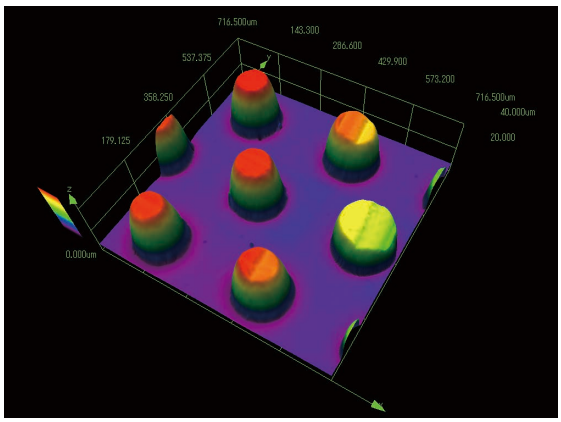
LSM Solution for	
Interferometer Samples	LSMs have superior horizontal resolution due to a confocal optical system, making it easy to measure the surface of the specific (targeted) area.

Superior Z-Axis Measurement

Accurate Measurement of Submicron Heights in the Z direction



An SEM delivers excellent high resolution images, but with no height information. In an LSM with a short-wavelength semiconductor laser and its confocal optical system, only in-focus reflections are detected as the same height by eliminating the signal from out-of-focus sections. Combined with a high-precision linear scale, this allows high-definition imaging, enabling accurate 3D measurement. The LEXT OLS4100 achieves 10 nanometer height resolution.



LSM Solution for		
SEM Samples	Interferometer Samples	LSMs are suitable for measuring the surface contour of samples with complex undulations ranging from several hundred micro-meters to the submicron order.

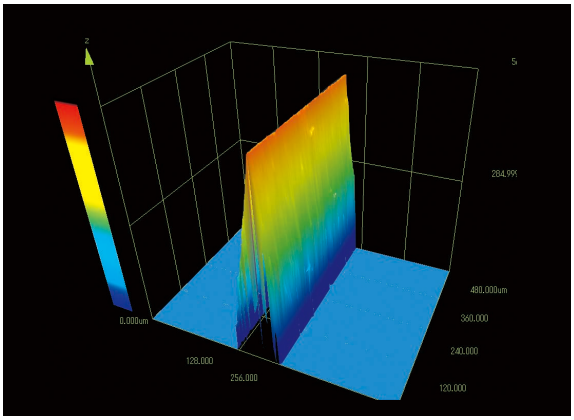
Superior Metrology

3D measurement of diverse sample types of with 10 nanometer height resolution and advanced measurement parameters.

Wider Sample Range

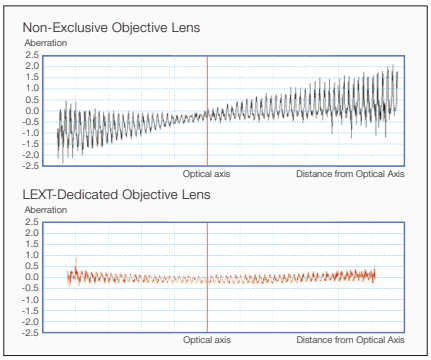
Imaging Slopes up to 85°

Thanks to dedicated objective lenses with high numerical apertures and a dedicated optical system that obtains superior performance from a 405 nm laser, the LEXT OLS4100 can reliably measure acute-angled samples that were previously impossible to measure. This improves to measure micro roughness on a non-level surface.



Razor with an Acute Angle

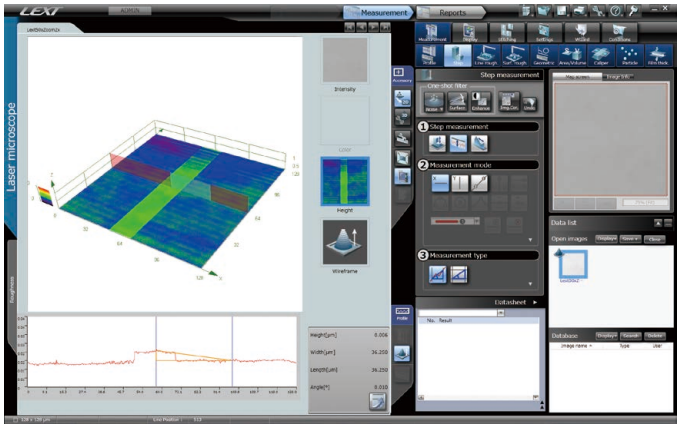
LEXT-Dedicated Objective Lenses



Minimized Aberrations with Dedicated Lens

Micro-Profile Measurements with 10 Nanometer Height Resolution

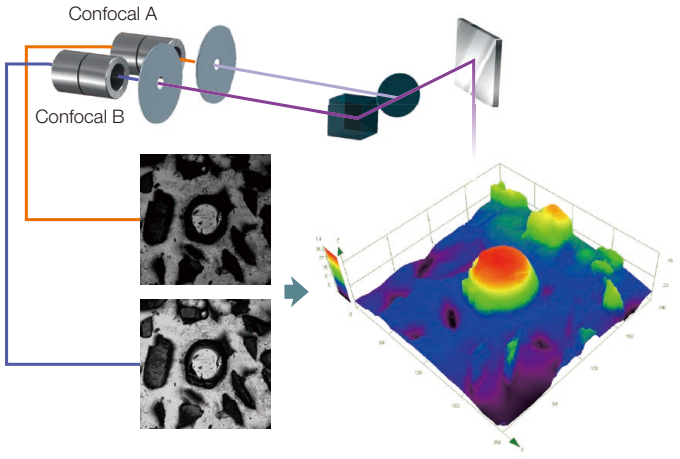
Thanks to a short-wavelength 405 nm laser light and a higher-aperture objective lens, 0.12 micron meter XY resolution is available. As a result, the OLS4100 can perform submicron measurements of a sample's surface. With a high-precision 0.8 nanometer-resolution linear scale and software algorithm such as our original I-Z curve (see page 23), the OLS4100 can resolve height differences on the order of 10 nanometers.



(MPLAPON50XLEXT)
STEP Height standard Type B, PTB-5, Institut für Mikroelektronik, Germany,
6 nm Detection in Height Measurement

Overcoming Reflectance Differences

The OLS4100 employs a dual confocal system, incorporating two confocal optical systems. In combination with a high-sensitivity detector, this enables the OLS4100 to capture optimal height information from a sample consisting of materials with different reflectance characteristics.

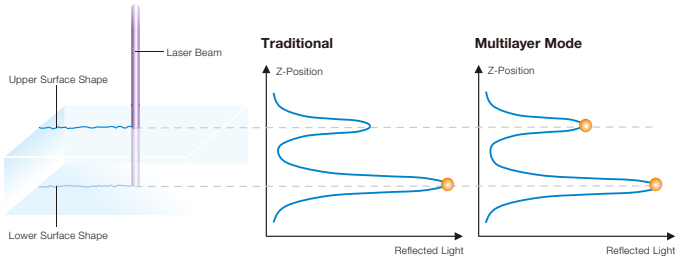


Diamond Electroplated Tool
Objective Lens: MPLAPON50XLEXT

Applicable to Transparent Layers

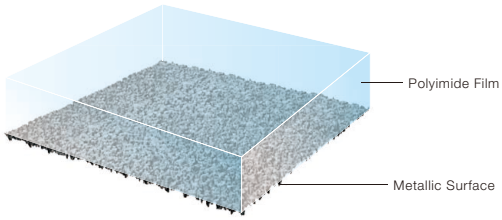
• Multi-Layer Mode

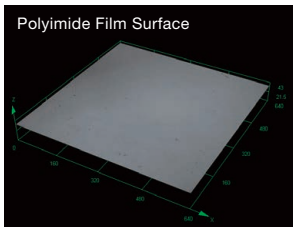
The LEXT OLS4100's new multi-layer mode is capable of recognizing the peaks of reflected light intensities of multiple layers and setting each layer as the focal point, making it possible to observe and measure the upper surface of a transparent sample, as well as to analyze multiple layers and measure the thickness of each layer.

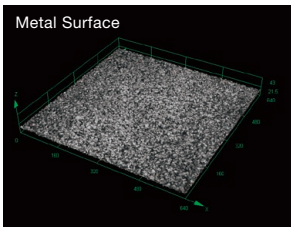


• Observation/Measurement of Multiple Layers of Transparent Material

The multi-layer mode facilitates observation and measurement of the transparent layer at the top surface of a transparent sample. Even with a transparent resin layer on a glass substrate, the shape and roughness of each layer as well as the thickness of the surface film can be measured.



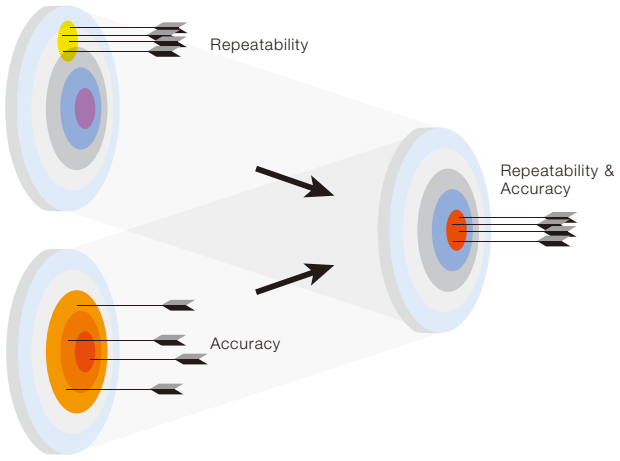




Industry's First* Double Performance Guarantee

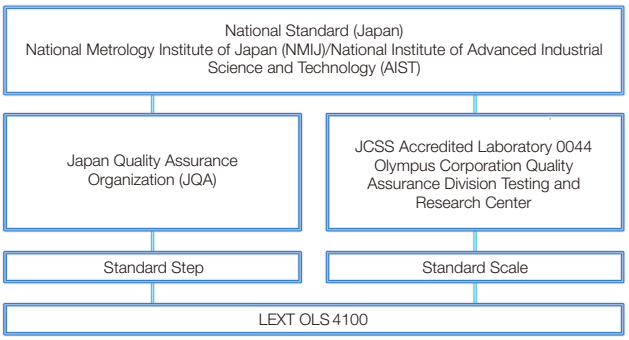
Accuracy and Repeatability

The performance of a measuring tool is typically expressed using two different terms: "accuracy," which indicates how close a measurement value is to its true value, and "repeatability," which indicates the degree of variations among repeated measurement values. The OLS4100 is the industry's first* laser scanning microscope able to assure both accuracy and repeatability.



Traceability System

The OLS4100 uses a rigorous system of production for every component. From the objective lens to the laser head, Olympus delivers only the highest-quality systems based on comprehensive inspection to the strictest standards. On delivery, final adjustment and calibration is performed by qualified engineers in the actual measurement environment.



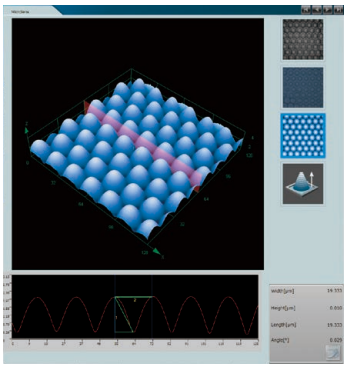
*According to Olympus survey as of Dec 2008.

Wide Range of Measurement Types

Seven Measurement Modes

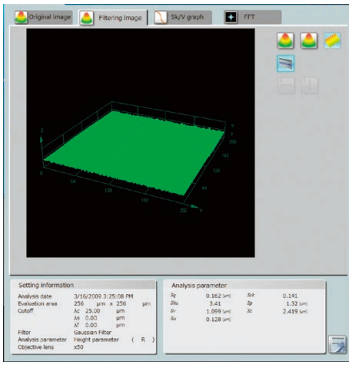
Step Measurement

This mode allows measurement of a step between any two arbitrary points on a surface profile. Profile Measurement is also available.



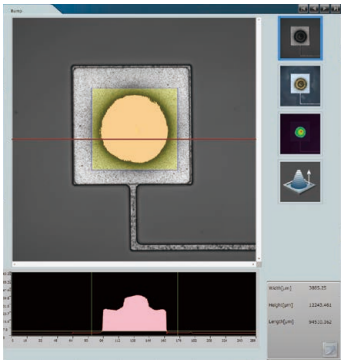
Surface Roughness Measurement

This mode allows measurement of line roughness on one line and plane roughness on the entire surface.



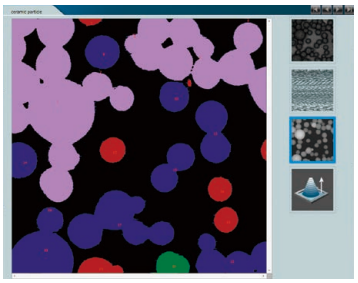
Area/Volume Measurement

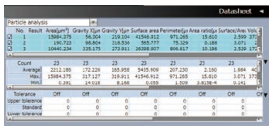
With a user-defined threshold level on a surface profile, this mode allows measurement of the volume (or area) of a geometry above or below the threshold level.



Particle Measurement*

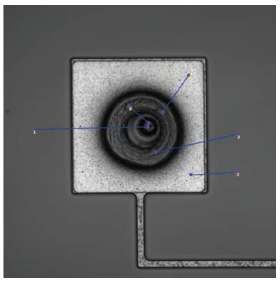
This mode enables auto-separation of particles with the separator function, setting of a threshold level, and setting of a detection range within a region of interest.

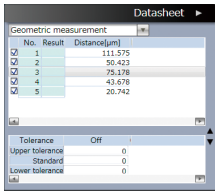




Geometric Measurement

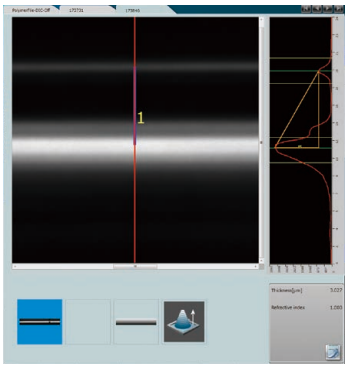
This mode allows measurement of the distance between two arbitrary points on a geometric image. The geometric shape and angle for circle, rectangle, etc. are measured.





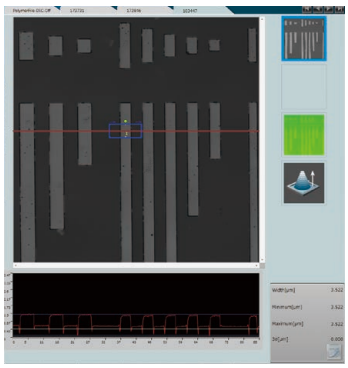
Film Thickness Measurement*

This mode allows the thickness of a film on a transparent body to be measured by detecting changes in refractive index.



Auto Edge Detection/ Measurement*

This mode allows a line width or a diameter to be measured by automatically detecting edges in a geometric image. This reduces uncertainty by eliminating operator error.



OLYMPUS Stream*

Workflow Solution for Improved Image Analysis Performance

For grain size analysis or nonmetallic inclusion rating, optional OLYMPUS Stream micro-imaging software is available, which can be uploaded directly from the OLS4100.

"OLYMPUS Stream" Launch Button

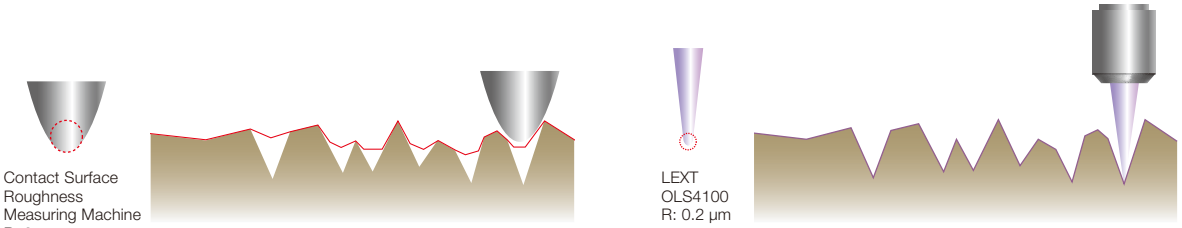
*Optional unit.

Improved Roughness Measurement

The LEXT OLS4100 has been developed to represent a new standard of surface roughness measuring. The OLS4100 is calibrated in the same way as contact surface roughness gauges and has the necessary roughness parameters and filters required per ISO and JQA. This allows users with contact surface roughness gauges to obtain output results from the system consistent with their existing instruments, with the advantage of greater speed and non-contact measurement. The OLS4100 has a roughness-specific mode enabling roughness profile measurement for sample lengths up to 100mm with an automatic line stitching function.

Micro Roughness

Contact surface roughness gauges cannot measure micro surface contour less than the stylus tip diameter. The OLS4100 can measure the surface roughness of micro geometries at high resolution due to a minute laser spot diameter.

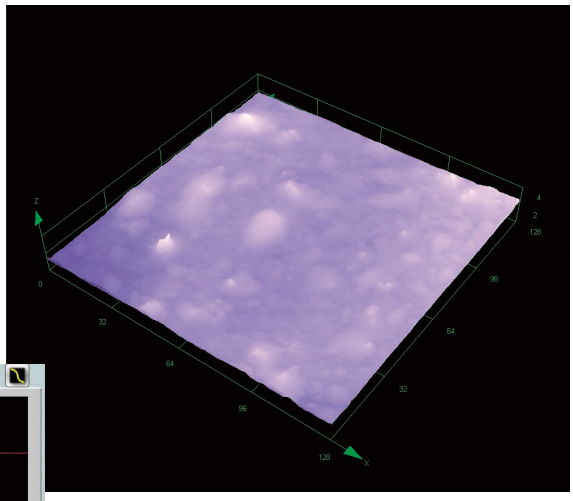


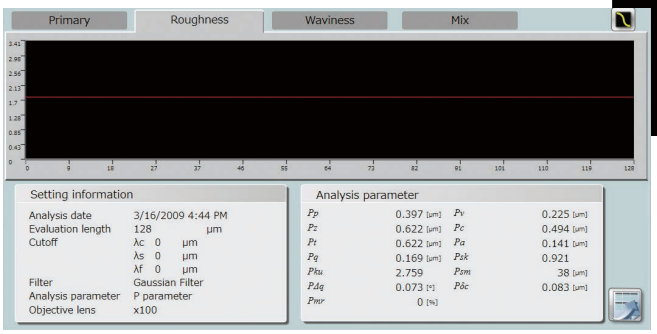
Contact Surface Roughness Measuring Machine
R: 2 µm

LEXT OLS4100
R: 0.2 µm

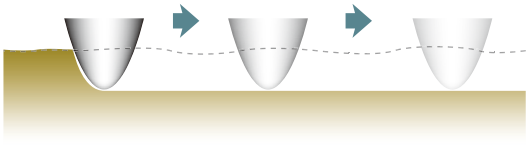
Non-Contact Measurement

Since a contact surface roughness gauge uses a hard needle-shaped stylus, it is more likely to scratch the surface of a soft specimen, damaging or deforming it. With adhesive specimens, on the other hand, the stylus can attach to the specimen and be damaged when pulled loose, making it impossible to obtain correct results. The OLS4100, a non-contact laser microscope, can perform accurate surface roughness measurement regardless of surface texture conditions.

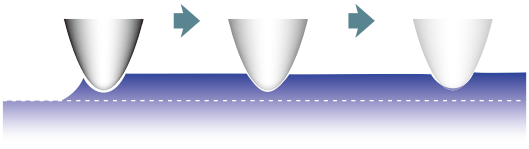




Polymer Film 3D image (above) and Results of Roughness Measurement (left)



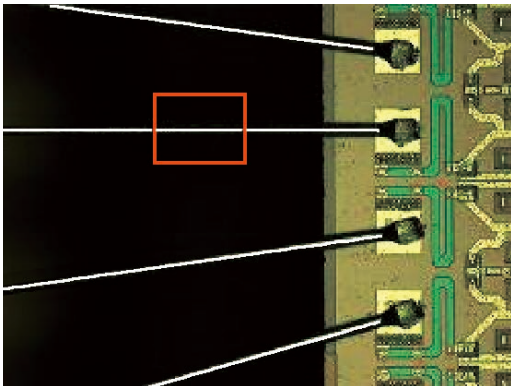
Soft Specimen

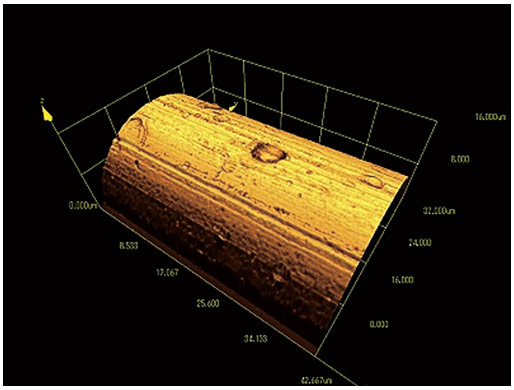


Adhesive Specimen

Measurement of Features at the Micron Level

Surface roughness gauges cannot measure micron-level features since their styli are not able to access these areas. The OLS4100 can correctly identify a measuring position and easily perform roughness measurement of a target micro area.





Bonding Wires

LEXT OLS4100 Parameters

Parameter Compatibility

The OLS4100 comes with the same Surface Profile Parameters as contact-type surface roughness gauges, offering compatible operability and measurement results.

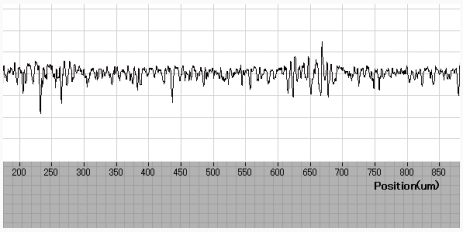
Primary Profile	*: Pp, Pv, Pz, Pc, Pt, Pa, Pq, Psk, Pku, Psm, PΔq, Pmr(c), Pδc, Pmr*
Roughness Profile	*: Rp, Rv, Rz, Rc, Rt, Ra, Rq, Rsk, Rku, Rsm, RΔq, Rmr(c),Rδc, Rmr, RZJIS, Ra75*
Waviness Profile	*: Wp, Wv, Wz, Wc, Wt, Wa, Wq, Wsk, Wku, Wsm, WΔq, Wmr(c), Wδc, Wmr*
Bearing Area Curve	*: Rk, Rpk, Rvk, Mr1, Mr2*
Motif	*: R, Rx, AR, W, Wx, AW, Wte*
Roughness Profile (JIS1994)	*: Ra(JIS1994), Ry, Rz(JIS1994), Sm, S, tp*
Others	*: R3z, P3z, PeakCount*

Accommodating Next-Generation Parameters

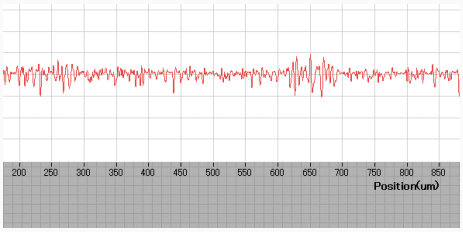
The OLS4100 comes with roughness (3D) parameters conforming to ISO25178. By evaluating the planer area, high-reliability analysis is made possible.

Amplitude Parameters	*: Sq, Ssk, Sku, Sp, Sv, Sz, Sa*
Functional Parameters	*: Smr(c), Sdc(mr), Sk, Spk, Svk, SMr1, SMr2, Sxp*
Volumetric Parameters	*: Vv(p), Vvv, Vvc, Vm(p), Vmp, Vmc*
Lateral Parameters	*: Sal, Str*

• LEXT OLS4100 has compatibility with results of a surface roughness gauge.



Primary Profile from LEXT OLS4100
λs=2.5 μm with Filtering



Primary Profile from a Contact Surface Roughness Gauge

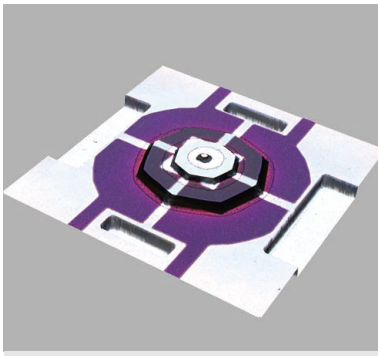
High-Quality Imaging

Clear 3D color images, high-sensitivity laser DIC, and high dynamic range (HDR) microscope images.

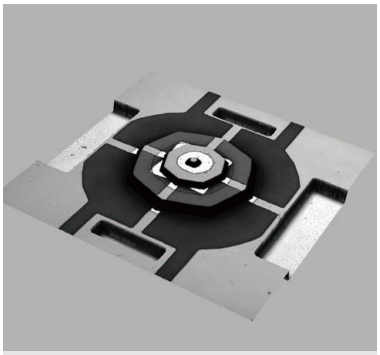
Crystal-Clear 3D Color Images

Three Types of Integration Images

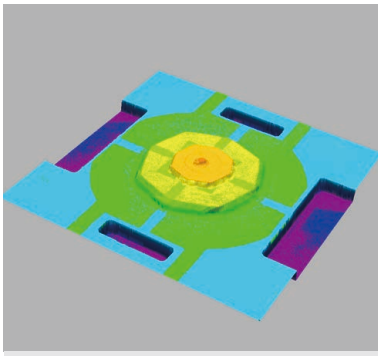
The LEXT OLS4100 can acquire three different types of information at the same time: a true-color optical microscope image, a laser microscope image, and height information. The OLS4100 makes it possible to capture an optical microscope image consisting of in-focus pixels only and integrate them with a true-color optical microscope image and height information.



Real-Color 3D Image



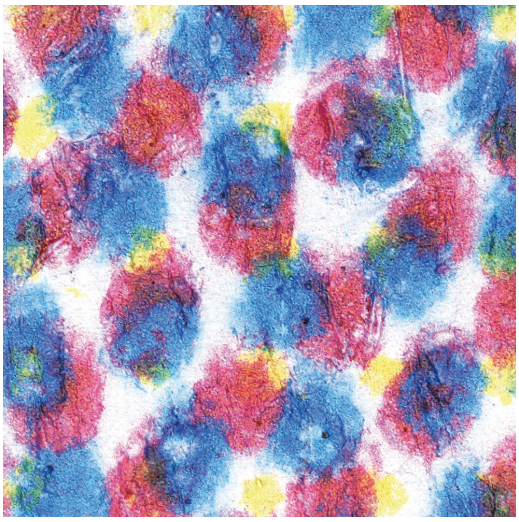
Confocal 3D Laser Image



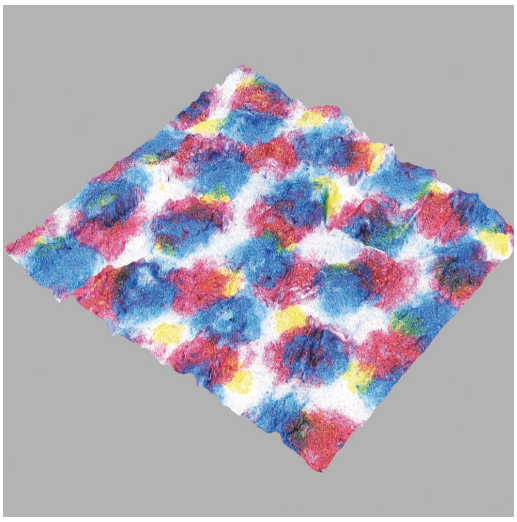
Height Information

Natural Color Reproduction

The OLS4100 uses a white LED light and a high-color-fidelity CCD camera to generate clear, natural-looking color images, comparable to those obtained with high-grade optical microscopes.



2D Color Image (Inkjet Dots on Paper, Objective Lens 20x)



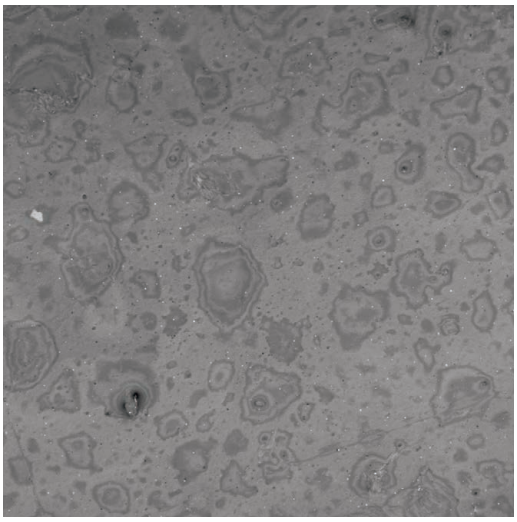
3D Color Image (Inkjet Dots on Paper, Objective Lens 20x)

More Realistic Surface Reproduction

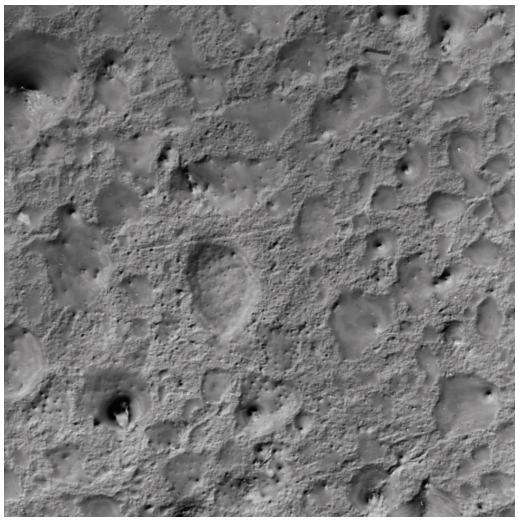
Laser DIC (Differential Interference Contrast)

DIC

Differential Interference Control (DIC) is an observation method used to visualize nanometer micro surface contours, which are normally far beyond the resolving power of a laser microscope. Thanks to its DIC laser mode, the LEXT OLS4100 allows you to obtain live images comparable to those of an electron microscope under relatively low power magnifications.

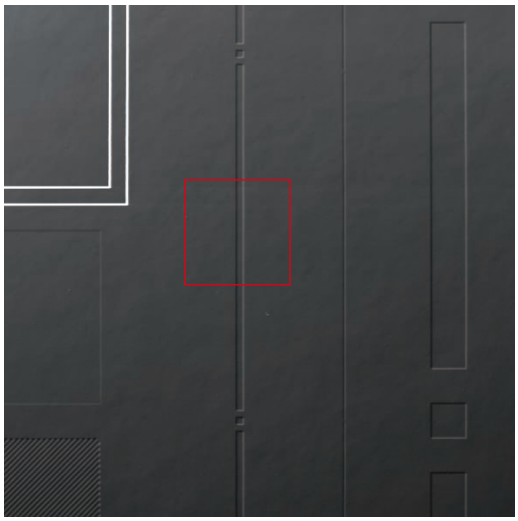


Laser Image with No DIC (Polymer Film)



Laser Image with DIC (Polymer Film)

Laser Image with No DIC (5x Objective Lens)
STEP Height standard Type B, PTB-5, Institut für Mikroelektronik, Germany



Laser Image with DIC (5x Objective Lens)
STEP Height standard Type B, PTB-5, Institut für Mikroelektronik, Germany,
Actual Height of the Feature : 6 nm

Optimized Balance Between Brightness and Contrast

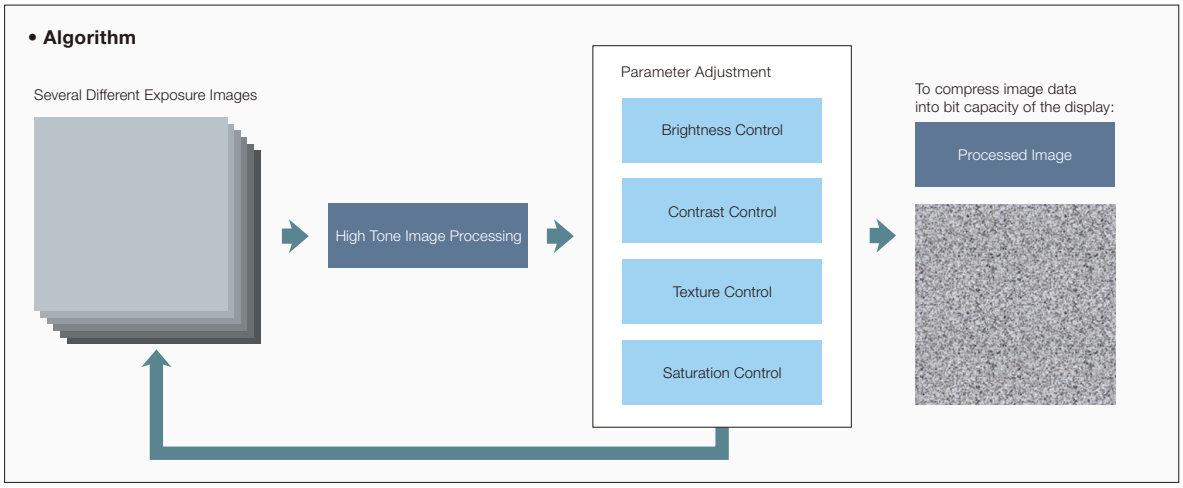
HDR (High Dynamic Range) Imaging

HDR

The OLS4100's High Dynamic Range (HDR) function combines several optical microscope images taken at different exposures and it controls brightness, contrast, texture, and saturation individually so that HDR processes images with a wide dynamic range. The OLS4100's HDR enables to visualize clearly the color image of especially a sample with less texture.

Color Image without HDR
(Super-Density Fabric, Objective Lens 20x, Zoom 1x)

Color Image with HDR
(Super-Density Fabric, Objective Lens 20x, Zoom 1x)



Stabilization of Measurement and Imaging Environments

To eliminate external influences on measurement and imaging, the OLS4100 incorporates a hybrid vibration-dampening mechanism using coil springs and dampening rubber to stabilize the operating environment. This eliminates the need for a dedicated vibration-dampening stand, allowing measurements on any desktop.

Hybrid Vibration-Dampening Mechanism

Systematic Workflow via Intuitive GUI

Easy operation accomplishes goals faster than ever.

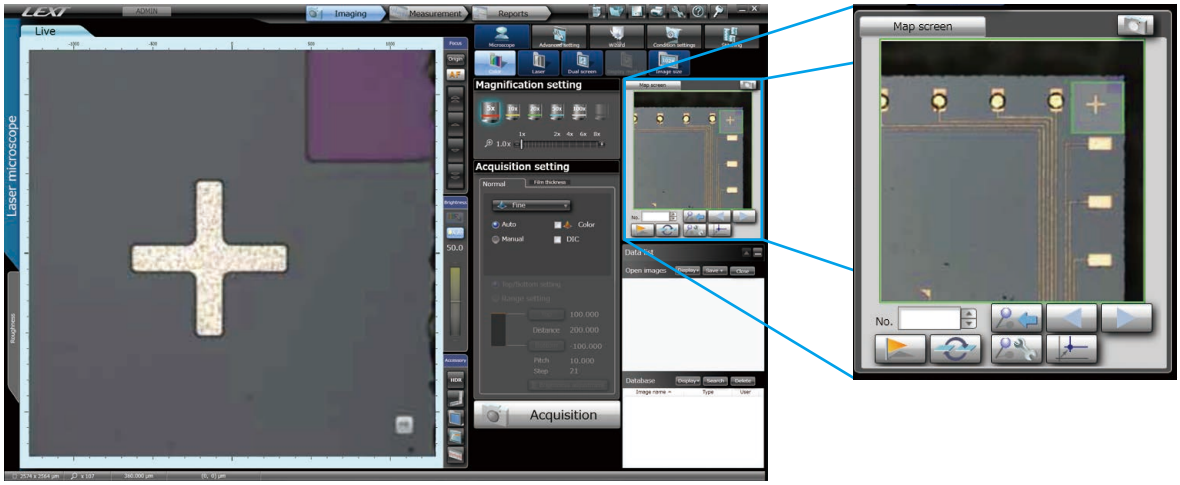
Easy Three-Step Process

With the LEXT OLS4100, you can start observation/measurement immediately after placing your sample on the stage. Thanks to an easy three-step process—Imaging, Measurement, and Reports—you can quickly master measurement procedures even if you are not familiar with laser microscopy.

Keeping track of the position on the sample

Macro Map Functionality

The OLS4100's macro map function allows you to display a wide-field image of your sample under low magnification, with a rectangular observation marker on the macro sample image. The field of view can be set up to 441 (21 x 21) times wider than the conventional view. When used together with the motorized six-lens nosepiece, the macro map function allows smooth, convenient, one-click operation for stage movement and magnification. Accurate parfocality and objective lens centering can be preset and synchronized with one-click stage movement and magnification.



Fast Macro Map Stitching

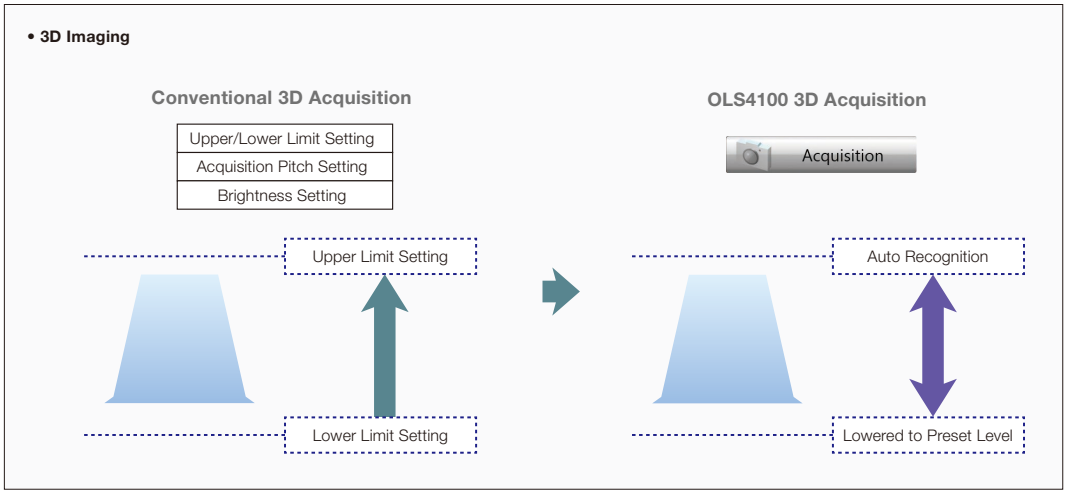
Two stitching methods are available for scanning large areas: Manual mode for live image acquisition and Automatic mode for quicker image acquisition. Operation is quick and simple—2D stitching starts automatically at the touch of a single button, and wide area images are acquired immediately. The stitching size is available from five steps in 3x3, 5x5, 7x7, 9x9, and 21x21 in Automatic mode. Unnecessary parts of the acquired images can be removed manually with simple mouse/joystick operation.

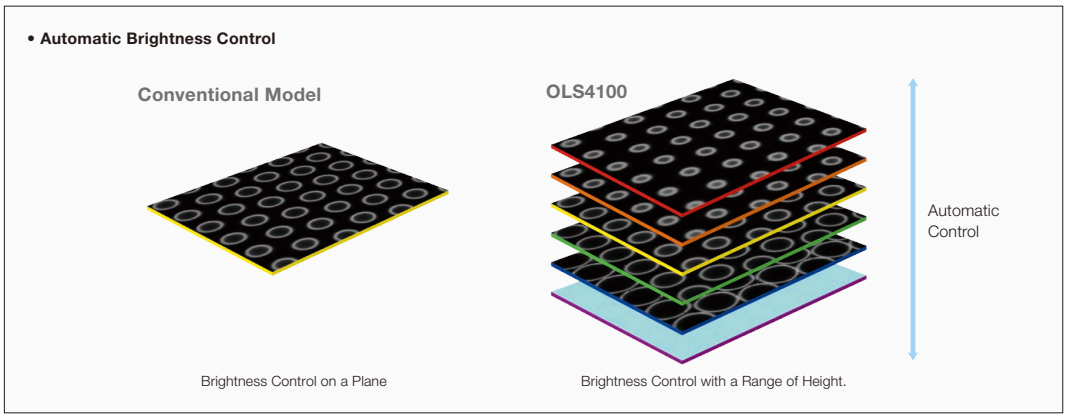
Smart Scan for Simple 3D Imaging

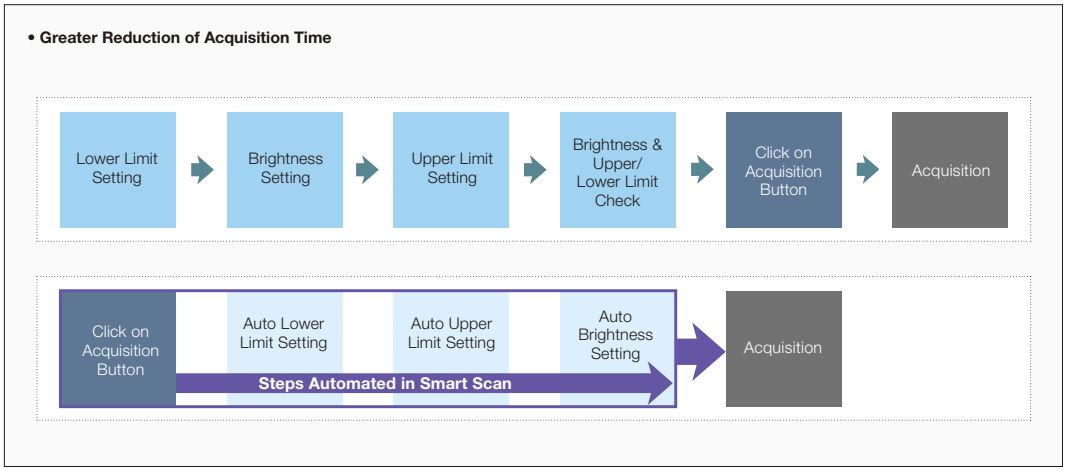
No Z-axis direction adjustment is required, and sensitivity adjustment is performed for the planer surface and Z-axis direction, resulting in significantly reduced image acquisition time.

Automatic 3D Image Acquisition

Conventional 3D scanning requires complicated settings that are difficult for novice users. With the LEXT OLS4100's new Smart Scan mode, even first-time users can quickly acquire 3D images with a single click of a button. In addition to upper and lower limit settings, appropriate brightness level is automatically set up by the system based on the image to be captured. This allows even a first time user to obtain accurate height measurements and an optimized image.

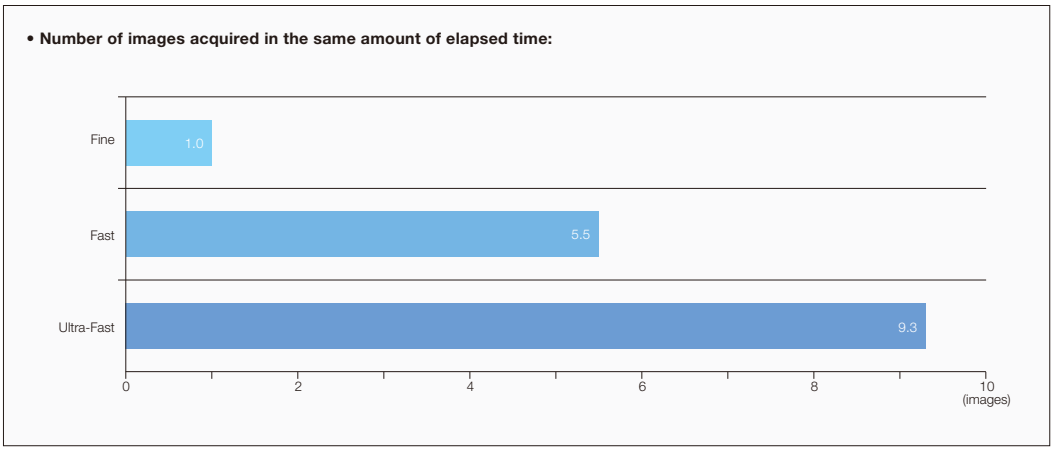






Improved Scanning Speed

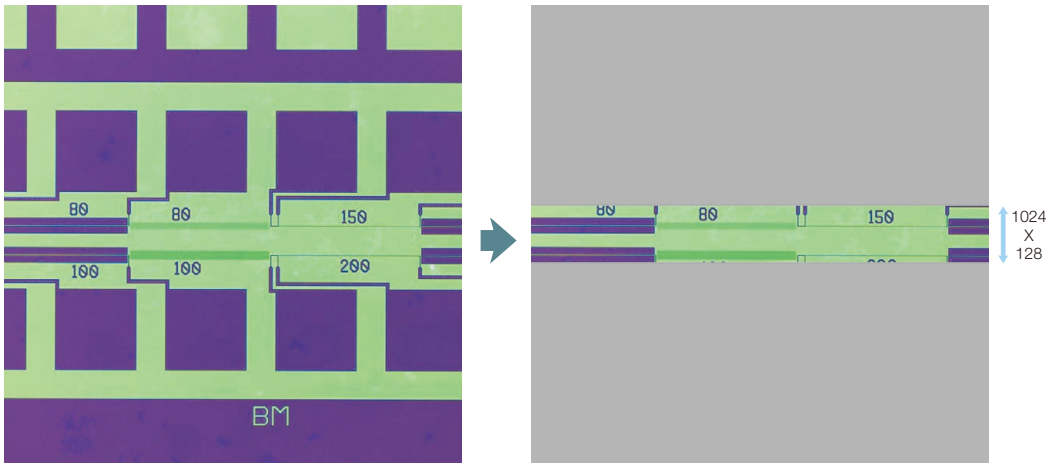
The new Ultra-Fast mode allows you to acquire scanned images twice as fast as with the conventional Fast mode, and approximately nine times faster than with the Fine mode. This makes it possible to measure micro samples with very steep angles, such as the tip of a knife that's hard to observe due to wide Z-step movement and high magnification.



Actual scanning time varies depending on magnification in use and Z-acquisition range.

High-Speed Acquisition of Required Areas Only

The OLS4100 also comes with a Band Scan mode for measurement of limited target areas, providing measurement performance 1/8th faster than conventional modes.



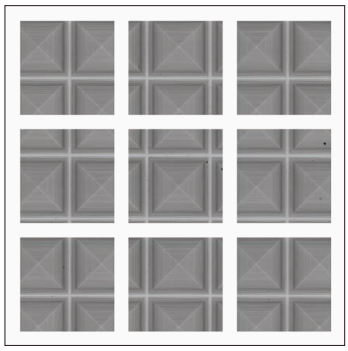
Acquisition with a Full Scan

Acquisition with Band Scan (1/8th)

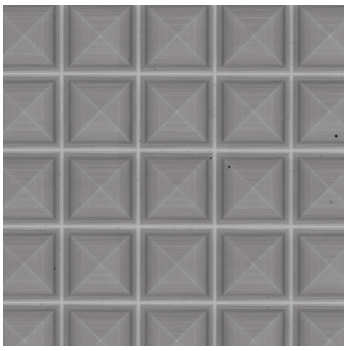
New High-Speed Stitching Mode

Specify Target Areas from Wider-Area Stitched Images

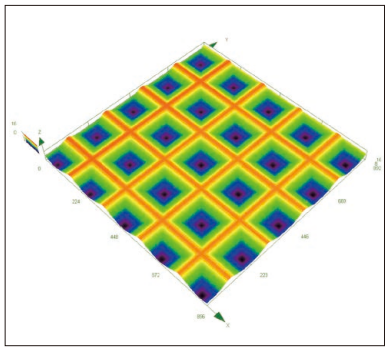
As in macro mapping, the area to be observed can be specified from a wide area map. In Automatic mode, an area map can be automatically generated in roughly half the time it normally takes by setting a rectangular stitching size of up to 625 images. Next, specify the target area required for images on the area map and start observation immediately.



Individual 2D Images Before Stitching (Simulation)



2D Image After Stitching



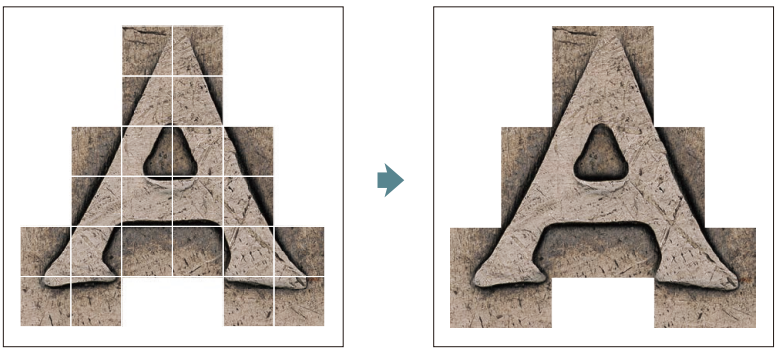
3D Image After Stitching

Stitching Area: Square (21x3) 63 Pieces

Stitching Area: Circle (3 Points)

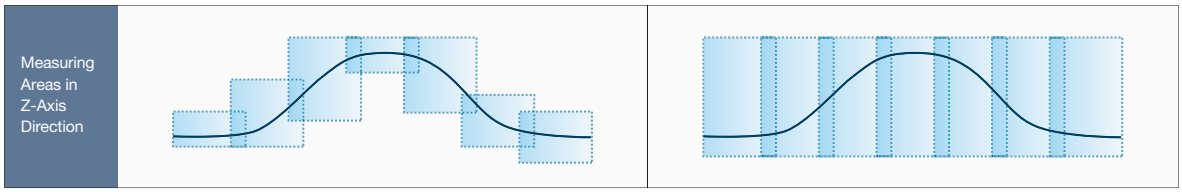
Manually Specifying Required Image Areas

In Live mode, the area to be observed can be selected manually by tracing the required areas on screen. This is convenient when the sample to be observed has an irregular shape.



Quick Image Acquisition

To use Smart Scan mode for image acquisition, all it takes is the click of a button. As the setting for Z-axis direction is automatically adjusted in Smart Scan, image acquisition in the Z-axis direction can be restricted to required areas only, saving a tremendous amount of time while using high-power observation across a wide area.



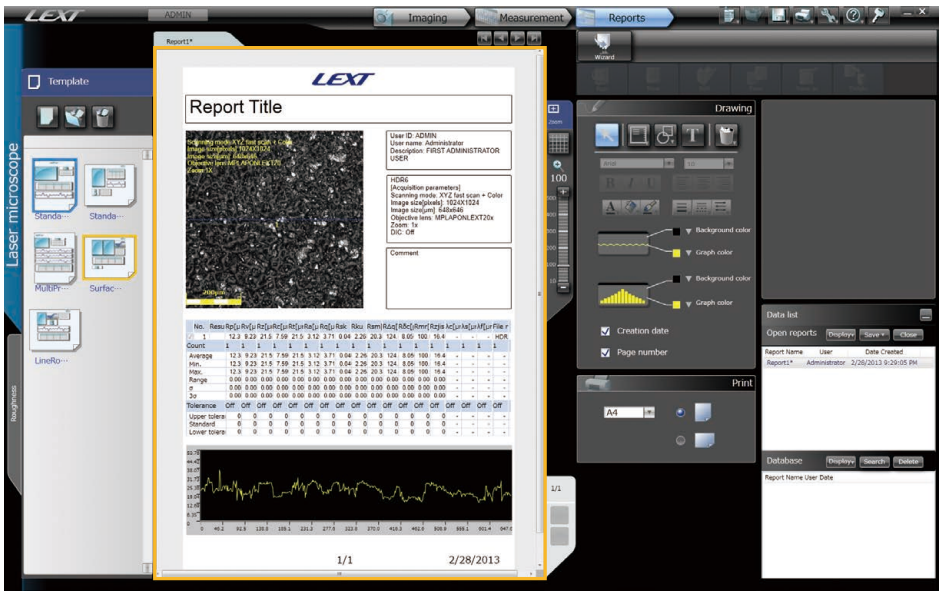
Smart Scan Mode

Conventional Acquisition Mode

Customizable Reports with the Push of a Button

Report Creation

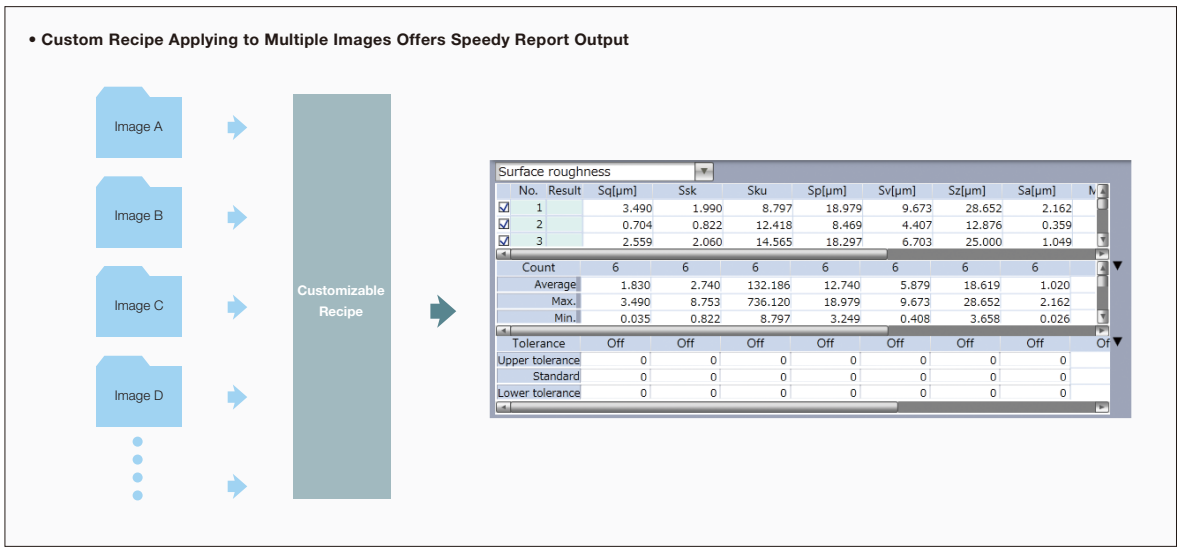
The OLS4100 generates reports with the push of a button after measurement, and an edit function allows the operator to customize each report template. Copying and pasting measured results to a word processing/spreadsheet application is also quite simple, as is retrieving required images/reports from a database.



One-Click Solutions for the Goals

Wizard Function

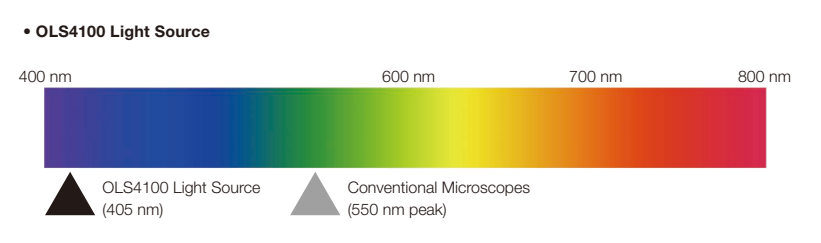
A detailed user-designed wizard function eliminates the need for lengthy training and allows quick and easy operation by new operators.



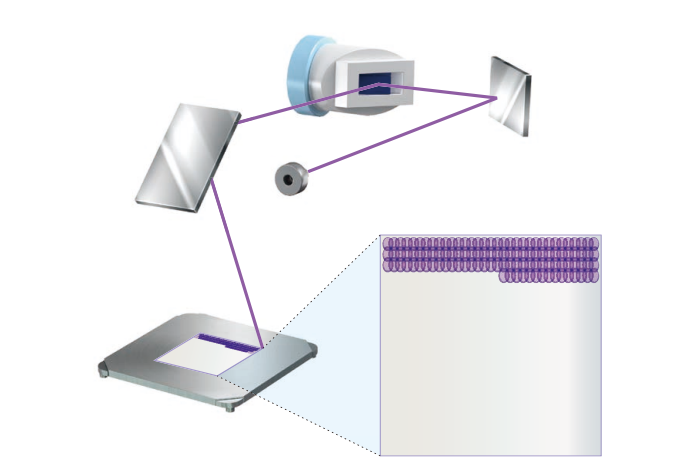
Basic Principles of the LEXT OLS4100

405 nm Laser Scan

The lateral resolution of an optical microscope is defined largely by the parameters of the optics and the wavelength of the light source. With a 405 nm short-wavelength semiconductor laser, the LEXT OLS4100 enjoys a high lateral resolution in comparison to a conventional microscope using visible light with a 550 nm peak.



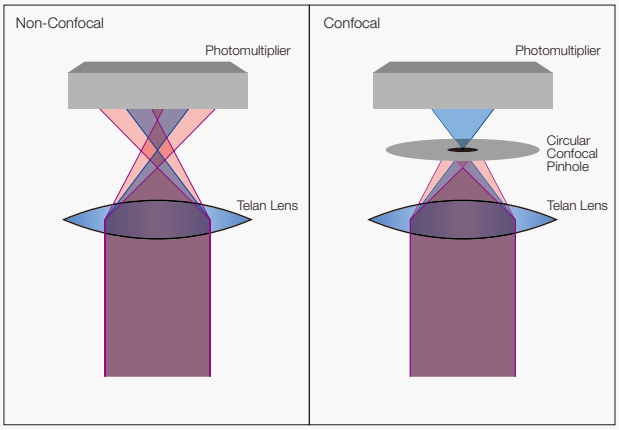
2D Scanning System



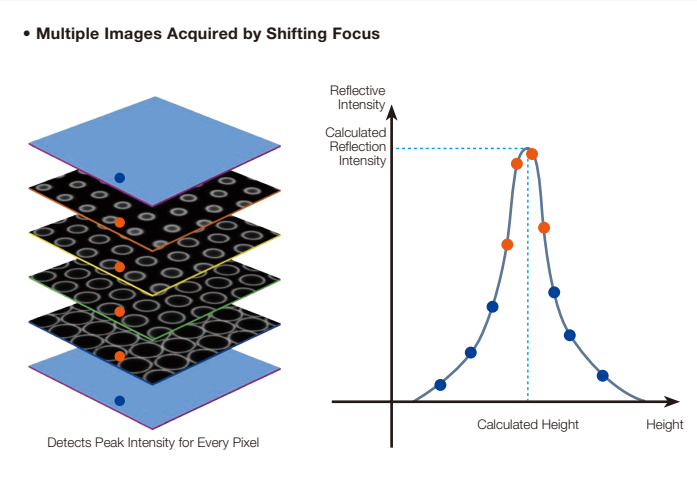
For 2D scanning, the OLS4100 incorporates an Olympus scanner-on-scanner. An electromagnetic MEMS scanner handles the X direction, while a high-precision Galvano mirror takes care of scanning in the Y direction. This innovative system enables the axis of the scanner and the exit pupil of the objective lens to be placed at an optically conjugate position. This ideal optical layout allows high-speed, low distortion accurate X-Y scanning, enabling the OLS4100 to provide high-density scanning up to 4096 x 4096 pixels.

Confocal Optical System

A confocal optical system captures only the in-focus image, while simultaneously eliminating flare. In addition, confocal technology can be used as a height sensor, since only thin image planes of the same height are captured. The OLS4100 is equipped with an Olympus dual confocal system, enhancing optical performance to ensure optimal height information even with samples made up of materials with different reflectances. The circular pinhole point of laser light also produces a uniform confocal effect, enhancing contrast in every direction.

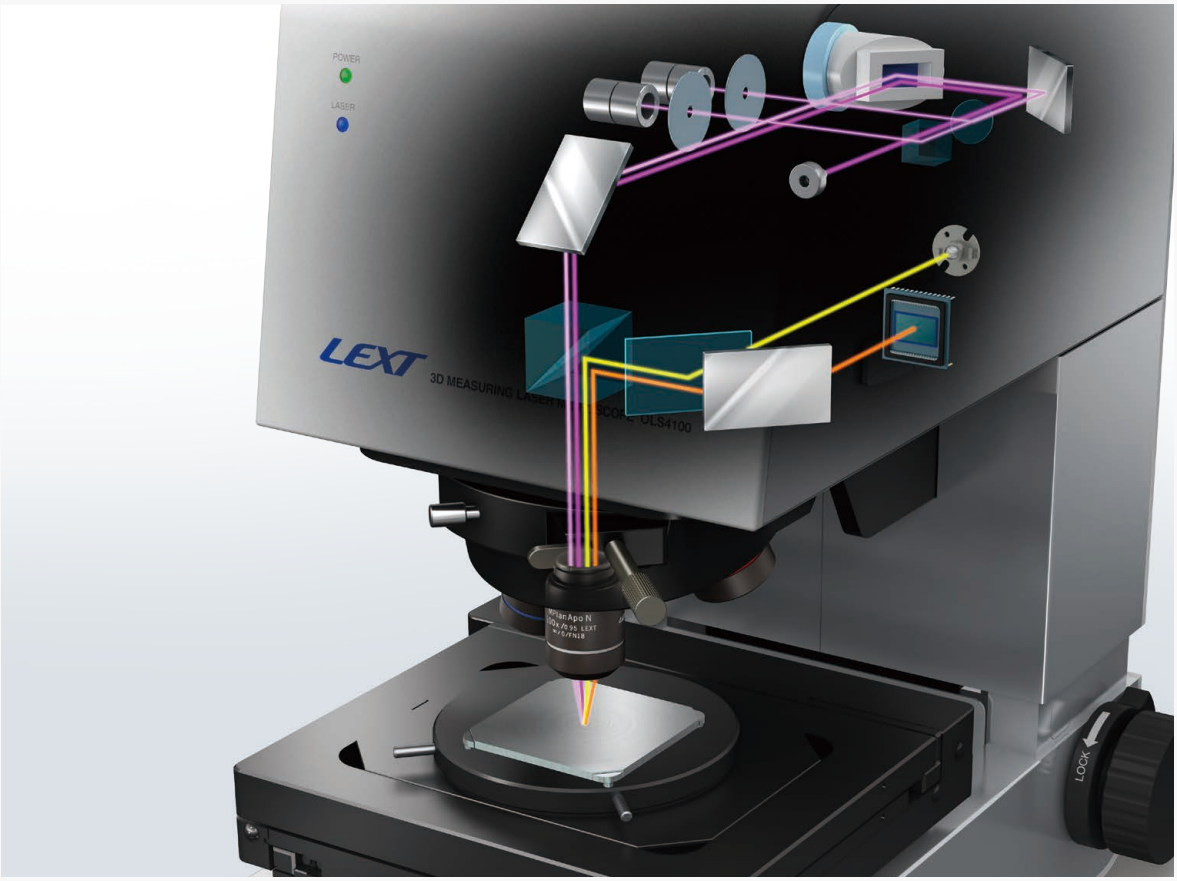


CFO Search



Obtaining height information is a primary function of the OLS4100, and is achieved by moving the objective lens upward to detect the change of light intensity along the Z-axis. Olympus CFO (calculated focus operation) technology automatically detects reflective light intensity in order to obtain accurate height data. This works by fitting the approximate I-Z curve to the reflective intensity value and height information of sampled pixels along the Z-axis, as shown with some discrete data points on the adjacent diagram. Using this curve, accurate height information is calculated from pixel brightness. CFO search technology significantly improves repeatability — one of the most indispensable assets of a measurement tool.

OLS4100 Optical Path Diagram

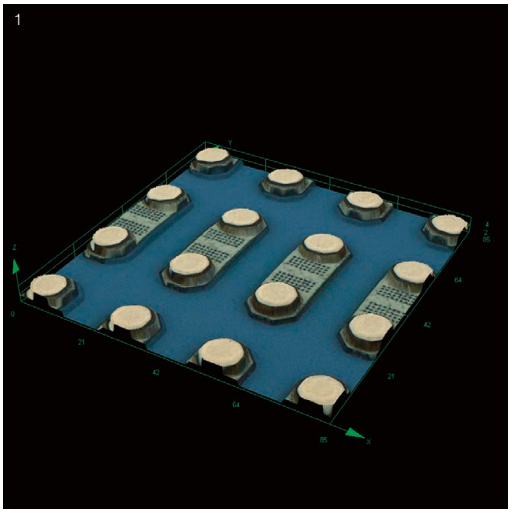


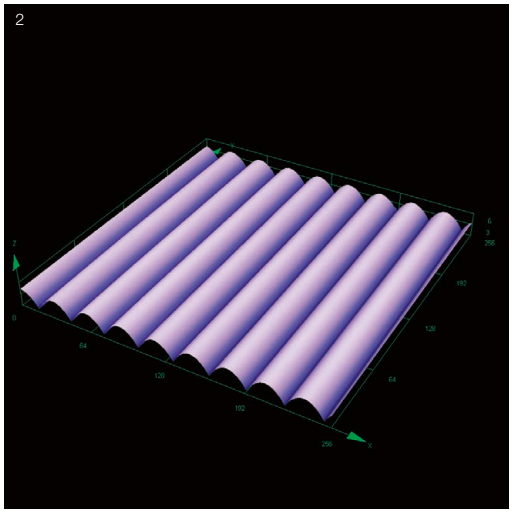
Based on these basic principles, the LEXT OLS4100 offers the following features:

10 nanometer resolution in Z-axis direction to enable 3D surface contour measurement	Horizontal (X-Y direction) resolution of 0.12 µm to enable high-definition image observation	Violet laser enables non-contact observation and measurement

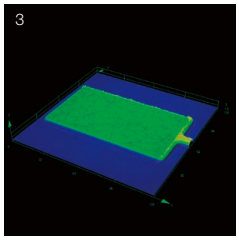
Sample Applications

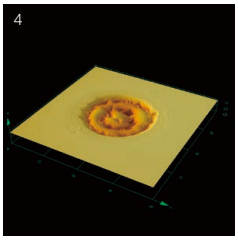
Semiconductor/FPD (Flat Panel Display)



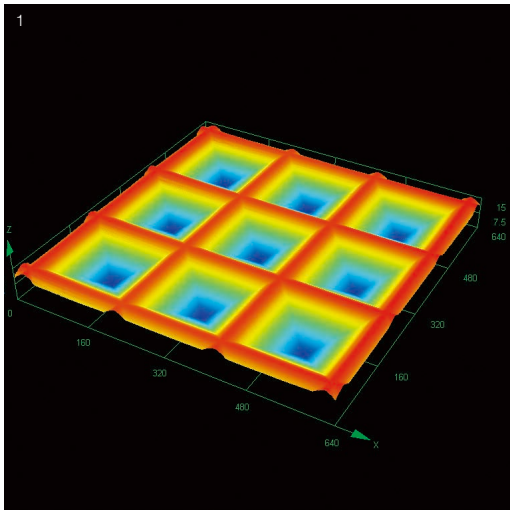


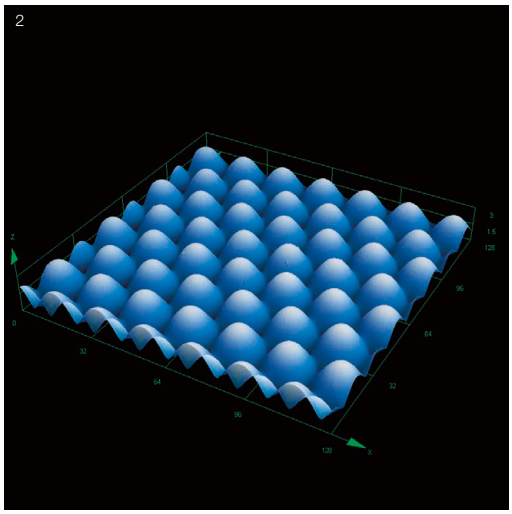
1 Wafer Bump
(objective lens 100x/optical zoom 1.5x/scanning area 85 µm x 85 µm)
2 Light Guide Panel
(objective lens 50x/optical zoom 1x/scanning area 256 µm x 256 µm)
3 Chip Pad
(objective lens 50x/optical zoom 2x/scanning area 128 µm x 128 µm)
4 Laser Dot on Light Guide Panel
(objective lens 100x/optical zoom 1x/scanning area 128 µm x 128 µm)



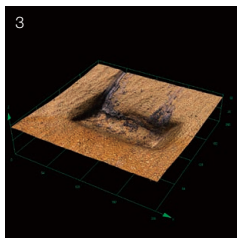


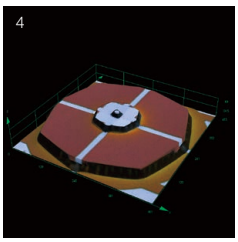
Electronic Component/MEMS (Microelectromechanical System)



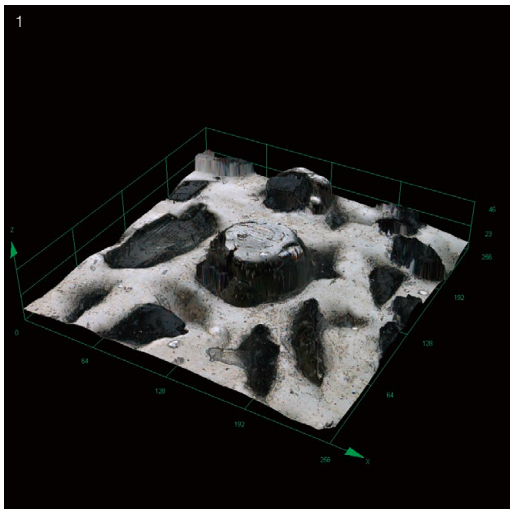


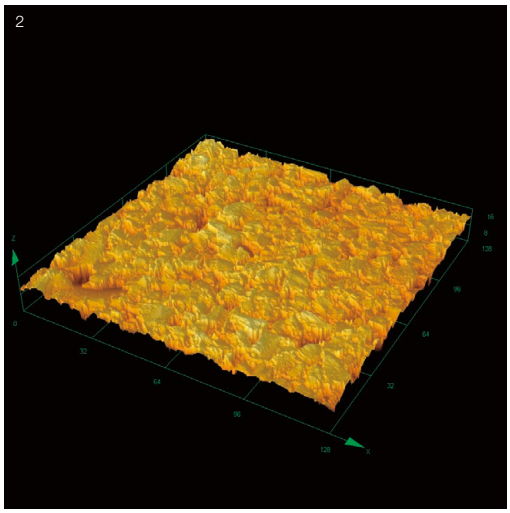
1 Photomask
(objective lens 20x/optical zoom 1x/scanning area 640 µm x 640 µm)
Sample provided by: Koshibu Precision Co., Ltd. (P3,P24)
2 Micro Lens
(objective lens 100x/optical zoom 1x/scanning area 128 µm x 128 µm)
3 Flexible PCB Connector
(objective lens 50x/optical zoom 1x/scanning area 256 µm x 256 µm)
4 MEMS
(objective lens 20x/optical zoom 1.3x/scanning area 483 µm x 483 µm)



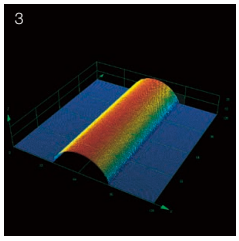


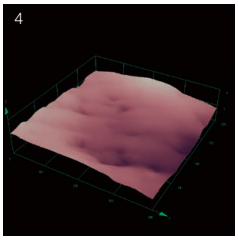
Material/Metal Processing

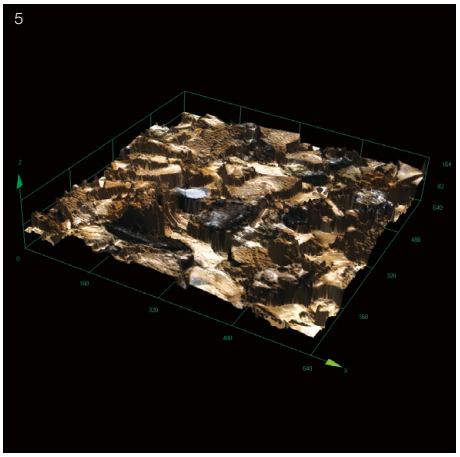


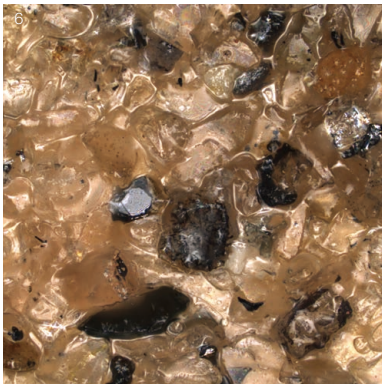


1 Diamond Electrocoating Tool
(objective lens 50x/optical zoom 1x/scanning area 256 µm x 256 µm)
2 Carbon
(objective lens 100x/optical zoom 1x/scanning area 128 µm x 128 µm)
3 Ultra-Thin Pipe
(objective lens 100x/optical zoom 1x/scanning area 128 µm x 128 µm)
4 Adhesive Tape
(objective lens 50x/optical zoom 2x/scanning area 128 µm x 128 µm)

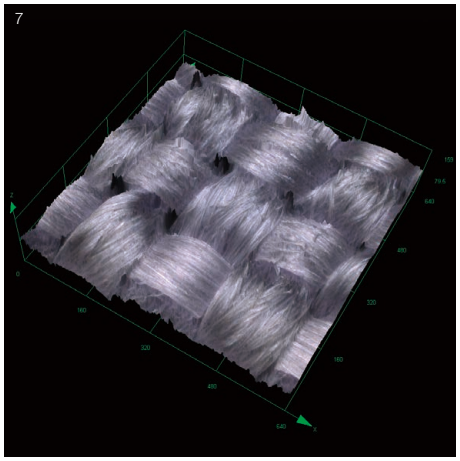




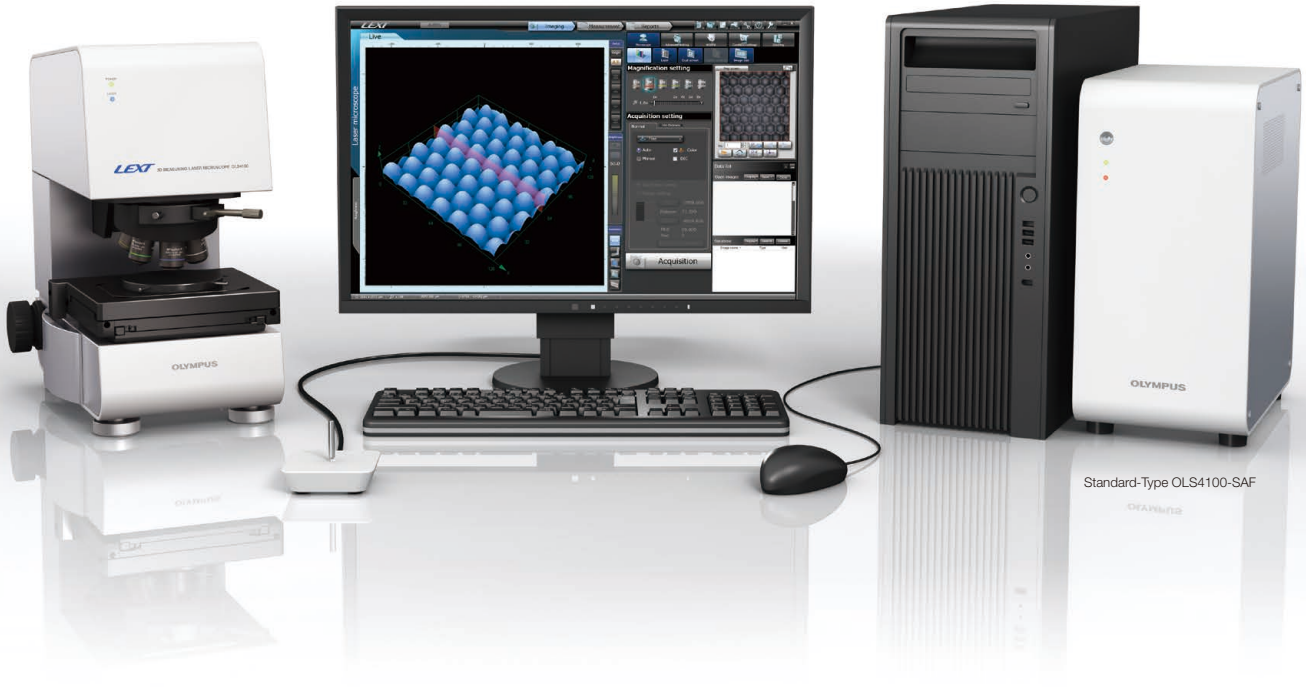




5 Sandpaper #400 (3D)
(objective lens 20x/optical zoom 1x/scanning area 640 µm x 640 µm)
6 Sandpaper #400 (2D)
(objective lens 20x/optical zoom 1x/scanning area 640 µm x 640 µm)
7 Super-Density Fabric (3D)
(objective lens 20x/optical zoom 1x/scanning area 640 µm x 640 µm)



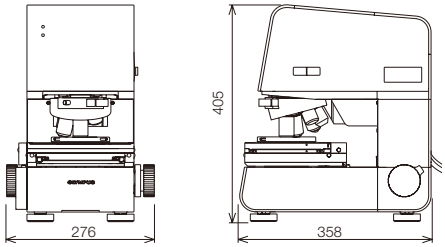
LINEUP



Standard-Type OLS4100-SAF

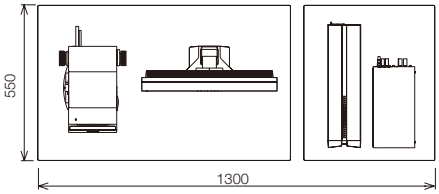
300mm-Stage-Type OLS4100-LAF

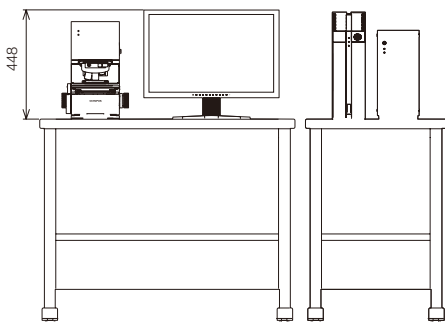
MAIN UNIT DIMENSIONS



Unit: mm

COMBINATION SYSTEM DIMENSIONS





MAIN UNIT

LSM Section		Light Source/Detector	Light Source: 405 nm Semiconductor Laser, Detector: Photomultiplier
		Total Magnification	108x – 17,280x
		Zoom	Optical Zoom: 1x – 8x
Measurement	Planar Measurement	Repeatability	100x: $3\sigma_{n-1}$=0.02 µm
		Accuracy	Measurement Value ±2%
	Height Measurement	System	Revolving Nosepiece Vertical-Drive System
		Stroke	10 mm
		Scale Resolution	0.8 nm
		Movement Resolution	10 nm
		Display Resolution	1 nm
		Repeatability	50x: σ_{n-1}=0.012 µm
		Accuracy	0.2+L/100 µm or Less (L=Measuring Length)
Color Observation Section		Light Source/Detector	Light Source: White LED, Detector: 1/1.8-Inch 2-Megapixel Single-Panel CCD
		Zoom	Digital Zoom: 1x – 8x
Revolving Nosepiece			Motorized BF Sextuple Revolving Nosepiece
Differential Interference Contrast Unit			Differential Interference Contrast Slider: U-DICR, Polarizing Plate Unit Built-In
Objective Lens			BF Plan Semi-apochromat 5x, 10x LEXT-Dedicated Plan Apochromat 20x, 50x, 100x
Z Focusing Unit Stroke			100 mm
XY Stage			100x100 mm (Motorized Stage), Option: 300x300 mm (Motorized Stage)

The device is designed for use in industrial environments for the EMC performance (Class A device). Using it in a residential environment may affect other equipment in the environment.

OBJECTIVE LENS

Model	Magnification	Field of View	Working Distance (WD)	Numerical Aperture (NA)
MPLFLN5X	108x-864x	2,560-320 µm	20.0 mm	0.15
MPLFLN10X	216x-1,728x	1,280-160 µm	11.0 mm	0.30
MPLAPON20XLEXT	432x-3,456x	640-80 µm	1.0 mm	0.60
MPLAPON50XLEXT	1,080x-8,640x	256-32 µm	0.35 mm	0.95
MPLAPON100XLEXT	2,160x-17,280x	128-16 µm	0.35 mm	0.95

LEXT

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- Images on the PC monitors are simulated.
- Specifications and appearances are subject to change without any notice or obligation on the part of the manufacturer.
- The device is designed for use in industrial environments for the EMC performance (Class A device). Using it in a residential environment may affect other equipment in the environment.

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