

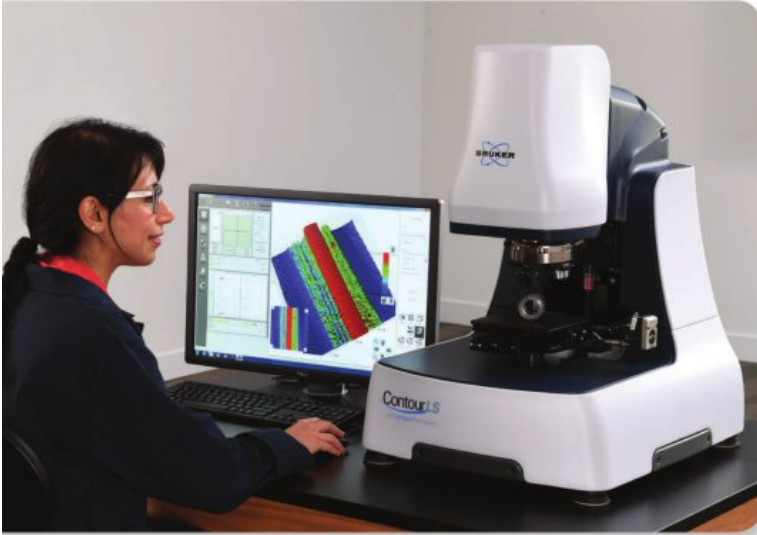
## Contour LS-K Optical Surface Profiler

● LightSpeed™ Focus Variation Provides High-Speed Metrology without Compromise

Innovation with Integrity

Optical & Stylus Metrology

## Deeper Understanding More Quickly



Bruker's new Contour LS-K 3D Optical Profiler utilizes LightSpeed™ focus variation technology to uniquely enable both high-resolution images and quantifiable data. The system rapidly captures surface data with a large field of view (FOV) at vertical scanning speeds up to 5 millimeters per second. Data-rich images are displayed in high-resolution and in real color within seconds.

From the first patents issued for Wyko® white light interferometry over 30 years ago to the very latest innovations in optical profiling, Bruker technology has a worldwide reputation as the gold standard in surface metrology performance. Contour LS-K capitalizes on this rich heritage to provide easy access to raw measurement data, allowing the operator to see exactly what is on the surface without filtering or data modification.

### Higher Throughput with High-Quality Data Acquisition

- System performs vertical scans at  $\leq 5$  mm/sec, producing real-color images in real time
- Industry-leading 6 mm (2.5x objective) FOV covers wider area, and multiple images can be automatically stitched together for even larger areas
- Raw data output shows surface detail without filtering, and data quality maps allow deeper understanding of true surface profiles without measurement artifacts

### Complete Analysis Capabilities with Superior Ease of Use

- Built on 30 years of analyses, Vision64® software provides all the necessary analysis capabilities, including several patented modes
- Most commonly used modes included on start-up screen for one-click analyses
- Easy-to-use intensity map enables ideal balance between high-brightness coaxial and ring-illumination sources

### Unmatched Measurement Capabilities with Production-Ready Automation

- Proprietary optical design and system features provide easy characterization of challenging materials and applications, e.g., high slopes, large areas
- Innovative scan assist tools automate lighting, speed, and sensitivity settings to achieve best-quality images at first capture
- Technician and Operator modes and complete stitching and automation enable high-volume production metrology



# • True Metrology with LightSpeed Focus Variation

The Contour LS-K's new LightSpeed focus variation technology builds upon over 30 years of Wyko-based optical design innovation to provide quantitative color and topographical data competing systems simply cannot match.

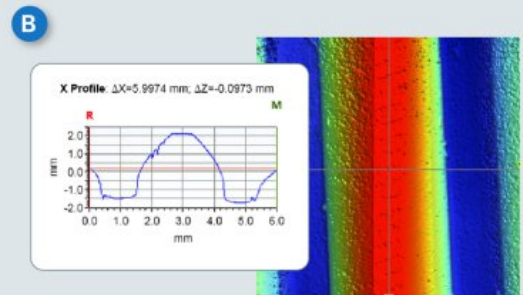
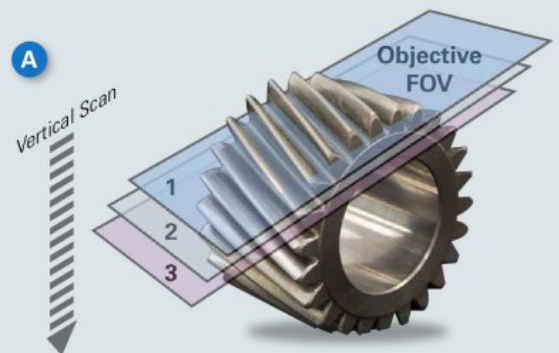
## How LightSpeed Technology Works

Focus variation uses optical objectives with a fixed focal distance and a very shallow depth of field to vertically scan a sample surface with topography. Because of the shallow depth of field, only a small plane of that surface will be in focus at any point in time.

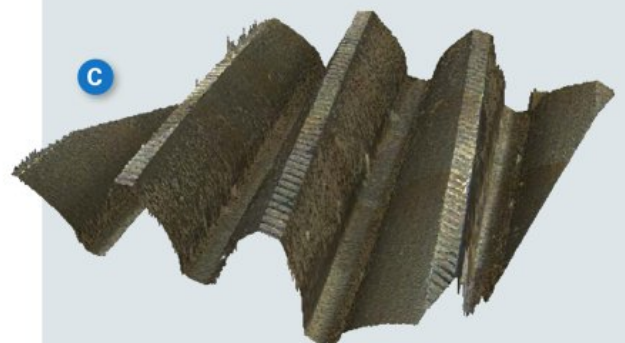
Contour LS-K takes multiple images as the objective is moved toward the sample, and each image is logged (A). By knowing the point in the scan where the image was taken, we know the distance between the objective and the surface. Once the scan is complete, proprietary algorithms analyze the data from each image to find the optimum focus for each pixel in the field of view (B). This 3D data is available to display and to conduct any one of a number of analyses (C).

With advanced automation and stitching routines, the process can be automatically repeated to cover even large surfaces or multiple specific areas of a part. The data are then collected and presented as one homogeneous dataset for further inspection and analysis. Most importantly, Contour LS-K with LightSpeed focus variation captures the raw metrology data, allowing the user to truly see what is on the inspected surface, in both real color and exact measurable detail.

## Focus Variation

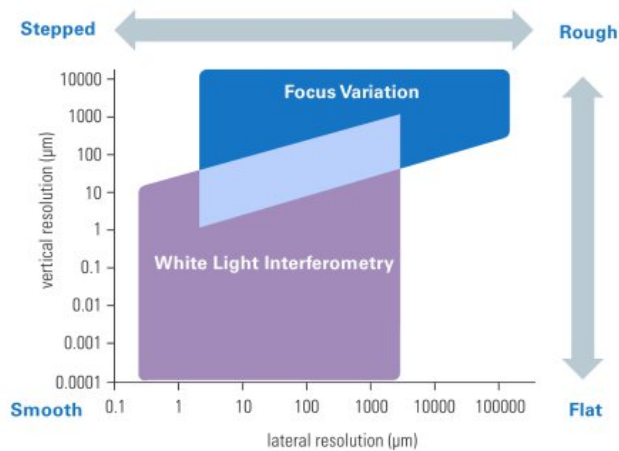


Surface Feature Height Data



Final All-in-Focus 3D Image in True Color

## Application Space for WLI and Focus Variation



# Advanced Software Makes Metrology Simple

Built on decades of Vision64® software innovation, Contour LS-K systems feature proprietary software algorithms for data processing, analysis, and visualization. An innovative user interface provides unique features to simplify the measurement setup and reduce the time to acquire high-quality surface data. Icons guide the user from measurement setup through stitching, automation, reporting, and other functions. Unique scan automation graphics allow the operator to quickly establish scan range and optimum lighting. While in measurement mode, a real-time, real-color image is displayed to simplify locating the target, and one-click analysis reduces a routine's start-to-finish time to a matter of seconds.

**Measurement**      **Large Image**      **Quick Analysis**

**Measurement Control**

- User login
- Mode:** Measure, Automation, Stitch, Full Analysis, Reporting, Database
- Z-axis control
- XY-axis control
- Coaxial light control
- Ring light control
- Quick Scan Output:** Focus map, Intensity map
- Z-resolution

**Quick Analysis**

- One-click analysis
- Select either of two filters: Terms Removal (F-Operator), Mask Data
- Six commonly used analyses: S Parameters - Function, Irregular Step, Volume, Multiple Region, S Parameters - Height
- Result Log
- Save Dataset
- Toggle between:** Live image, Height map, All-in-focus image, Quality map, 3D image, Analyses

An intuitive visual workflow, extensive user-customization features, and automated functions provide the fastest, most comprehensive data collection and analysis available for a vast range of research and production applications.



### Fast Time to Real Data

The Contour LS-K interface has been designed to capitalize on the system's rapid data acquisition. Several tools have been added to simplify obtaining a high-quality image in seconds. Unique features guide the user through setting scan ranges and achieving optimum lighting settings before initiating the scan with a single click. Contour LS-K images can be manipulated and rotated for better viewing, tipped up or down, and easily adjusted in hundreds of ways.

The user can determine step heights of features, depths of holes, and a variety of other parameters via simple cursor placements directly on the measurement screen. And, once the scan is complete, there is a vast library of analyses to choose from, with the most commonly used functions also available through a single icon click on the measurement screen. Another set of icons guides the user to further functions, such as stitching, automation, reporting, export, and advanced analysis.

### Complete Suite of Analysis Functions

Vision64 is the most comprehensive standard software package provided with any optical profiler. Due to its long use in industry, it has solutions to almost any metrology profiling challenge. Along with surface roughness analysis, the user has the ability to measure dimensions of critical features, automatically calculate volumes, and compare step heights, to name just a few. Vision64 also includes several proprietary analyses to automatically analyze large datasets and provide answers to complex questions with just a few mouse clicks.

### Designed for Production

Predefined recipes allow the easy performance of measurements for routine QA/QC and production floor process control operations. Software prompts and password-protected entries eliminate human error and support robust and accurate metrology from operator to operator.



**Contour**LS  
with LightSpeed™ Focus Variation



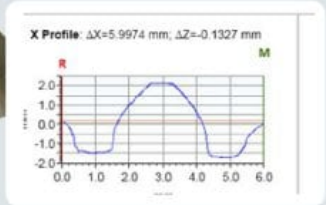
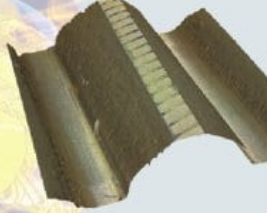




# • Across Every Industry

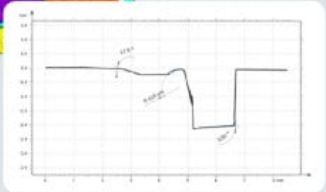
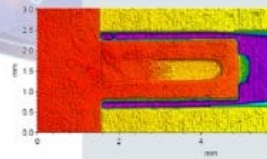
## Automotive

Gears, cams, injectors, and other precision parts are not a challenge for LightSpeed focus variation technology with its ability to measure slopes greater than 87°. The wide field of view ensures data from a large area can be collected in one pass, and toggling between height maps, all-in-focus images, and datasets takes only one click.



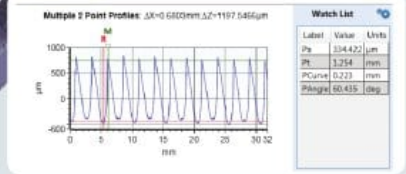
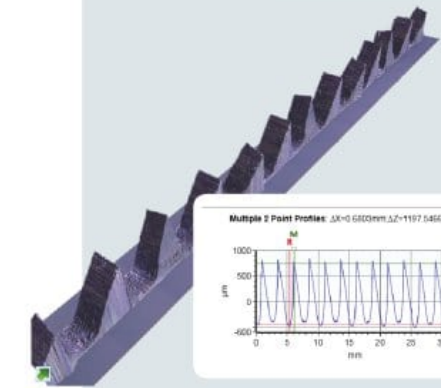
## Electronics

Driven by automated routines, Contour LS-K makes first article inspection, in-process monitoring, or incoming part inspection of electronics devices simple and error-free. Heights and dimensions are displayed and stored for statistical analysis and reporting. Defects can be automatically identified and quantified, catching problems before they lead to production losses.



## Precision Machining

The manufacture of precision screws, optical assemblies, and many other devices is enabled by the high-speed and exacting metrology of Contour LS-K. The system's fast scanning, wide range of analysis options, and automation capabilities provide reliable answers to solve difficult manufacturing issues.

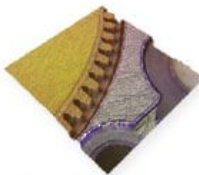


## Medical Devices

Tight tolerances, intricate assemblies, and mandatory data tracking requirements in medical device manufacturing are all facilitated by Contour LS-K. Rapid surface finish or critical dimension measurements on prosthetics, dental implants, optics, and stents are all possible with traceable metrology.

## Flexibility to measure diverse surfaces

Watch gears



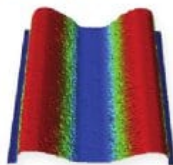
Mini bolts



Laser texturing



Plastic gears



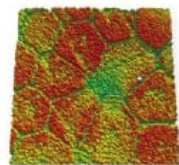
Exhaust sensors



Electronic devices



Food packaging





## Proper lighting is key

Since focus variation images rely on good lighting, the Contour LS-K includes several features to optimize this aspect. Each instrument includes a magnetically attached ring light. Powered by pin connectors, the light can be moved from one objective to another without the need to connect wires. Optimum lighting balance is also a snap. The software provides a histogram of optimum contrast to guide the user to the best combination of coaxial and ring light illumination.

### Contour LS-K Specifications

Maximum scan speed	5 mm/s
Available objectives	2.5x; 5x; 10x; 20x; 50x
Maximum single field of view	6x6 mm
Maximum number stitched images	>2000 images
XY motorized stage	150x150 mm <sup>2</sup>
Maximum sample size	150x150x90 mm <sup>3</sup> ; ≤4 kg weight
Maximum slope	>70° (even at low magnification)
Linearity of Z scanner	<0.25%
Vertical resolution	≤10 nm
Repeatability	<0.02% (on 200 μm step)
Accuracy	±1.5%
System-to-system correlation	±1%
Flatness on data	λ/4
Analysis software	Free site license

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