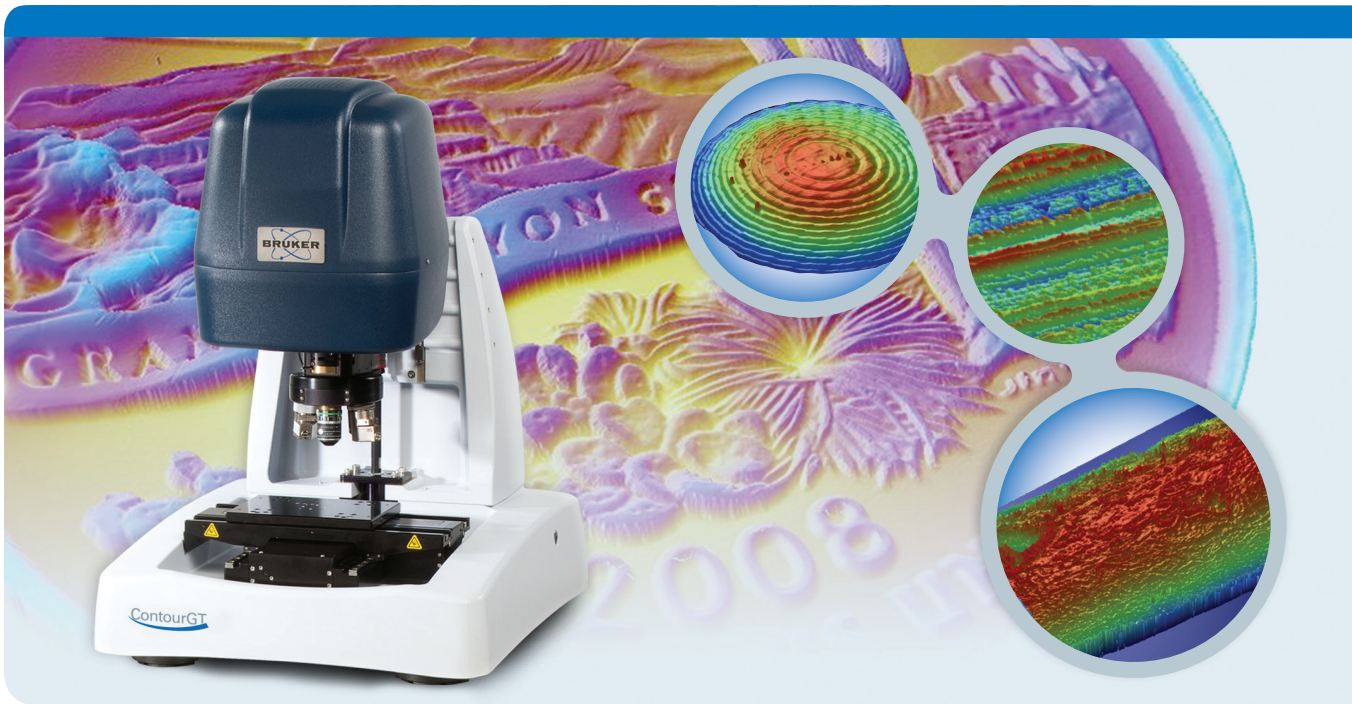


ContourGT-I 3D Optical Microscope

● World's First Automated Benchtop Profiler with Tip/Tilt Head

The ContourGT-I 3D Optical Microscope combines over three decades of surface metrology innovation and experience from industry partnerships into a single benchtop system to deliver production-ready automation, measurement angle flexibility, outstanding imaging, and proven gage-capable performance. Incorporating Bruker's proprietary tip/tilt optical head, the system is fully automated and programmable to measure surface features over a range of angles while minimizing tracking errors. Latest generation Vision64® software and a streamlined staging design provide intuitive analysis capabilities and the ultimate operator ease of use. The ContourGT-I has everything needed to immediately measure on demand. Never before have so many advanced metrology features been available in one benchtop system.

Fastest, Easiest Nanometer-Scale Measurements

- First fully automated benchtop solution (focus, intensity, staging, tip/tilt head, FOV)
- Nanometer-scale resolution on high-contour surfaces

Maximum Vibration Stability and Robustness

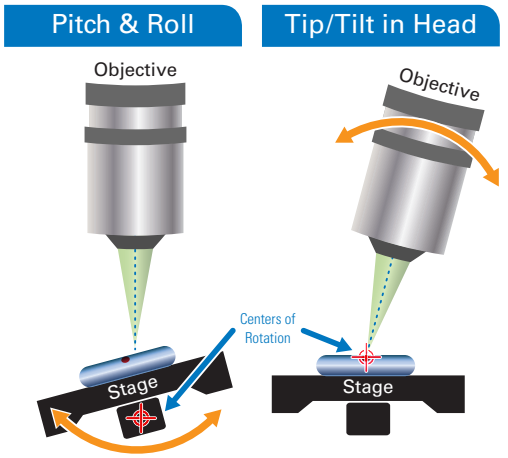
- Integrated air isolation
- High-stability, space-efficient footprint

Most Powerful Measurement Analysis

- Streamlined interface and intuitive workflow
- Real-time automated measurement optimization
- Extensive library of filters and analysis options
- Customized analysis reporting

Speed to Results

Bruker's proprietary tip/tilt in the head provides unmatched user flexibility for production setup and inspection. By coupling the tip/tilt functionality with the optical path in the microscope head, Bruker has coupled the point of inspection to the line of sight independent of tilt. This is a tremendous throughput and ease-of-use advantage for production metrology, where both surface tracking and simplicity is critical for rapid inspection of varying surfaces. The combination of this feature with automated staging and objectives makes the ContourGT-I ideally suited to "measure-on-demand" industrial requirements -- all within a compact footprint.



Traditional pitch-and-roll stage designs require operator adjustment of five axes of motion to maintain point of inspection on line of sight for measurement. The unique Bruker tip/tilt in the head design maintains the line of sight on the point of inspection — regardless of tilt — resulting in optimized image acquisition and fastest time to data.

Robust Metrology for the Factory

In addition, the ContourGT-I utilizes proprietary vibration-resistant measurement techniques and a unique base design with integrated air isolation to deliver accurate measurements under very demanding shop floor production conditions. The time-tested, vibration-tolerant design is fully optimized to provide uncompromised, repeatable and quantitative results.

The benchtop ContourGT-I delivers fully automated, gauge-capable, measure-on-demand reliability for R&D and production.

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Specifications

Max. Scan Range	>10 mm
RMS Repeatability (PSI)	<0.03 nm; 0.02 nm typical*
Lateral Resolution	0.38 µm min (Sparrow criterion); 0.26 µm (with AcuityXR®)
Step Height Accuracy	<0.75%**
Step Height Repeatability	<0.1% 1 sigma repeatability
Max. Scan	73 µm/sec (with standard camera)
Sample Reflectivity	0.05% - 100%
Max. Sample Slope	Up to 40° (shiny surfaces); Up to 87° (rough surfaces)
Sample Height	Up to 100 mm (4in.) standard; Up to 150 mm (6in.) option
Sample Weight	Up to 10 kg (22lb)
XY Sample Stage	150 mm (6in.) automated
Z Focusing	100 mm (4in.) automated
Tip/Tilt Function	±5° automated in head
Optical Metrology Module	Patented dual-LED illumination; Single-objective adapter or automated turret; Single or auto zoom lenses
Objectives	Parfocal: 2.5x, 5x, 10x, 20x, 50x, 115x LWD: 1.5x, 2x, 5x, 10x TTM: 2x, 5x, 10x, 20x Brightfield: 2.5x, 5x, 10x, 50x
Available Zoom Lenses	0.55x, 0.75x, 1x, 1.5x, 2x, auto-sensing modules
Camera	Standard monochrome: 640 x 480 High-resolution monochrome (option): 1280 x 860 Standard color (option): 640 x 480 High-resolution color (option): 1280 x 860
Software System	Vision64® Analysis Software on Windows 7 64-bit OS
Software Packages	Production interface; AcuityXR; Annular Analysis; High Speed AF; Optical Analyses; Advanced Image Processing; TCP/IP; Thick and Thin Film; MatLab scripts
XY Automation	Automated stitching, scatter and grid automation
Calibration	Via traceable step standards
System Footprint	450 mm (W) x 534 mm (D) x 632 mm (H)
System Weight	60 kg (133 lb)
Warranty	12 months

* As demonstrated by taking the one sigma Sq value of 30 PSI repeatability measurements on an SiC reference mirror.

** Absolute accuracy for step heights 8 µm and greater.

Cover images

Foreground: ContourGT-I 3D Optical Microscope.
Background: Stitched image of U.S. quarter. Insets: 3D images of diffractive lens (top), rolled aluminum (middle), and heart stent (bottom).

ContourGT Objectives Chart

Turret Mountable, Standard Objective Series (Parfocal with each other)

Objective (Magnification[1])	2.5X		5X		5XL		10XBF		10X		20X		50X		115X	
Working Distance (mm)	3.5		6.7		9.4		10.6		7.4		3.7		3.4		0.6	
Numerical Aperture	0.07		0.12		0.13		0.25		0.3		0.4		0.55		0.8	
Max Slope on Shiny Surfaces (deg)[2]	3		5.5		5.9		N/A		11.3		18.9		26.7		39.1	
Max Slope on Rough Surfaces (deg)[3]	62		65		65		N/A		70		72		81		87	
Optical Resolution (µm)[4]	3.8		2.2		2.1		1.1		0.9		0.7		0.5		0.33	
Tallest Sample: ContourGT-X (mm)	101.6		101.6		101.6		101.6		101.6		101.6		101.6		101.6	
Tallest Sample: ContourGT-K (mm)	95.3		95.3		95.3		95.3		95.3		95.3		95.3		95.3	
Vertical Resolution (nm)[5]	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1	
	FOV (X by Y) (mm)	**Spatial Sampling (µm)**	**FOV (X by Y) (mm)**	**Spatial Sampling (µm)**	**FOV (X by Y) (mm)**	**Spatial Sampling (µm)**	**FOV (X by Y) (mm)**	**Spatial Sampling (µm)**	**FOV (X by Y) (mm)**	**Spatial Sampling (µm)**	**FOV (X by Y) (mm)**	**Spatial Sampling (µm)**	**FOV (X by Y) (mm)**	**Spatial Sampling (µm)**	**FOV (X by Y) (mm)**	**Spatial Sampling (µm)**
Standard Camera																
0.55x zoom	4.6 x 3.5	7.2	2.3 x 1.7	3.6	2.3 x 1.7	3.6	1.2 x 0.9	1.8	1.2 x 0.9	1.8	0.6 x 0.4	0.9	0.23 x 0.17	0.36	0.10 x 0.08	0.16
0.75x zoom	3.4 x 2.5	5.3	1.7 x 1.3	2.6	1.7 x 1.3	2.6	0.8 x 0.6	1.3	0.8 x 0.6	1.3	0.4 x 0.3	0.7	0.17 x 0.13	0.26	0.07 x 0.06	0.11
1.0x zoom	2.5 x 1.9	4.0	1.3 x 1.0	2.0	1.3 x 1.0	2.0	0.6 x 0.5	1.0	0.6 x 0.5	1.0	0.3 x 0.2	0.5	0.13 x 0.10	0.20	0.06 x 0.04	0.09
1.5x zoom	1.7 x 1.3	2.6	0.8 x 0.6	1.3	0.8 x 0.6	1.3	0.4 x 0.3	0.7	0.4 x 0.3	0.7	0.2 x 0.2	0.3	0.08 x 0.06	0.13	0.04 x 0.03	0.06
2.0x zoom	1.3 x 1.0	2.0	0.6 x 0.5	1.0	0.6 x 0.5	1.0	0.3 x 0.2	0.5	0.3 x 0.2	0.5	0.2 x 0.1	0.2	0.06 x 0.05	0.10	0.03 x 0.02	0.04
High-Res Camera (except K0 model)																
0.55x zoom	6.4 x 4.8	4.7	3.2 x 2.4	2.3	3.2 x 2.4	2.3	1.6 x 1.2	1.2	1.6 x 1.2	1.2	0.8 x 0.6	0.6	0.32 x 0.24	0.23	0.14 x 0.10	0.14
0.75x zoom	4.7 x 3.5	3.4	2.4 x 1.8	1.7	2.4 x 1.8	1.7	1.2 x 0.9	0.9	1.2 x 0.9	0.9	0.6 x 0.4	0.4	0.24 x 0.18	0.17	0.10 x 0.07	0.10
1.0x zoom	3.5 x 2.6	2.6	1.8 x 1.3	1.3	1.8 x 1.3	1.3	0.9 x 0.7	0.6	0.9 x 0.7	0.6	0.4 x 0.3	0.3	0.18 x 0.13	0.13	0.08 x 0.06	0.06
1.5x zoom	2.4 x 1.8	1.7	1.2 x 0.9	0.9	1.2 x 0.9	0.9	0.6 x 0.4	0.4	0.6 x 0.4	0.4	0.3 x 0.2	0.2	0.12 x 0.09	0.09	0.05 x 0.04	0.04
2.0x zoom	1.8 x 1.3	1.3	0.9 x 0.7	0.6	0.9 x 0.7	0.6	0.4 x 0.3	0.3	0.4 x 0.3	0.3	0.2 x 0.2	0.2	0.09 x 0.07	0.06	0.04 x 0.03	0.03
High-Res Camera (K0 model)																
0.55x zoom	3.5 x 2.6	2.7	1.8 x 1.3	1.4	1.8 x 1.3	1.4	0.9 x 0.7	0.7	0.9 x 0.7	0.7	0.4 x 0.3	0.3	0.18 x 0.13	0.14	0.07 x 0.05	0.05
0.75x zoom	2.6 x 1.9	2.0	1.3 x 1.0	1.0	1.3 x 1.0	1.0	0.7 x 0.5	0.5	0.7 x 0.5	0.5	0.3 x 0.2	0.3	0.13 x 0.10	0.10	0.05 x 0.04	0.04
1.0x zoom	1.9 x 1.5	1.5	1.0 x 0.7	0.8	1.0 x 0.7	0.8	0.5 x 0.4	0.4	0.5 x 0.4	0.4	0.2 x 0.2	0.2	0.10 x 0.07	0.08	0.04 x 0.03	0.03
1.5x zoom	1.3 x 1.0	1.0	0.6 x 0.5	0.5	0.6 x 0.5	0.5	0.3 x 0.2	0.3	0.3 x 0.2	0.3	0.2 x 0.1	0.1	0.06 x 0.05	0.05	0.03 x 0.02	0.02
2.0x zoom	1.0 x 0.7	0.8	0.5 x 0.4	0.4	0.5 x 0.4	0.4	0.2 x 0.2	0.2	0.2 x 0.2	0.2	0.1 x 0.1	0.1	0.05 x 0.04	0.04	0.02 x 0.02	0.02

ContourGT Objectives Chart

Non-Turret Mountable Objectives

	LWD Objectives (Parfocal with each other)			Through Transmissive Media Objectives (Parfocal with each other)				Low Magnification Objectives	
Magnification[1]	2X	5X	10X	2X	5X	10X	20X	1.0X	1.5X
Working Distance (mm)	22	22	22	8.0-9.8[6]	8.0-9.8[6]	8.0-9.8[6]	8.0-9.8[6]	2.5	9.6
Numerical Aperture	0.055	0.14	0.17	0.055	0.14	0.25	0.28	0.04	0.14
Max Slope on Shiny Surfaces (deg)[2]	2.4	5.9	7.8	2.4	5.9	11.3	13	0.8	1.8
Optical Resolution (µm)[4]	4.9	1.9	1.6	4.9	1.9	1.1	1.0	6.7	6.5
Tallest Sample: ContourGT-X (mm)	66.8	66.8	66.8	70.9	70.9	70.9	70.9	60.7	60.7
Tallest Sample: ContourGT-K (mm)	60.5	60.5	60.5	64.5	64.5	64.5	64.5	54.4	54.4
Vertical Resolution (nm)[5]	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

	FOV (X by Y) (mm)	Spatial Sampling (µm)	FOV (X by Y) (mm)	Spatial Sampling (µm)	FOV (X by Y) (mm)	Spatial Sampling (µm)	FOV (X by Y) (mm)	Spatial Sampling (µm)	FOV (X by Y) (mm)	Spatial Sampling (µm)	FOV (X by Y) (mm)	Spatial Sampling (µm)	FOV (X by Y) (mm)	Spatial Sampling (µm)	FOV (X by Y) (mm)	Spatial Sampling (µm)
Standard Camera																
0.55x zoom	5.8 x 4.3	9.0	2.3 x 1.7	3.6	1.2 x 0.9	1.8	5.8 x 4.3	9.0	2.3 x 1.7	3.6	1.2 x 0.9	1.8	0.6 x 0.4	0.9	11.5 x 8.7	18.0	7.7 x 5.8	12.0
0.75x zoom	4.2 x 3.2	6.6	1.7 x 1.3	2.6	0.8 x 0.6	1.3	4.2 x 3.2	6.6	1.7 x 1.3	2.6	0.8 x 0.6	1.3	0.4 x 0.3	0.7	8.4 x 6.4	13.2	5.6 x 4.2	8.8
1.0x zoom	3.2 x 2.4	4.95	1.3 x 1.0	1.98	0.6 x 0.5	0.99	3.2 x 2.4	4.95	1.3 x 1.0	2.0	0.6 x 0.5	1.0	0.3 x 0.2	0.5	6.3 x 4.8	9.9	4.2 x 3.2	6.6
1.5x zoom	2.1 x 1.6	3.3	0.8 x 0.6	1.3	0.4 x 0.3	0.7	2.1 x 1.6	3.3	0.8 x 0.6	1.3	0.4 x 0.3	0.7	0.2 x 0.2	0.3	4.2 x 3.2	6.6	2.8 x 2.1	4.4
2.0x zoom	1.6 x 1.2	2.5	0.6 x 0.5	1.0	0.3 x 0.2	0.5	1.6 x 1.2	2.5	0.6 x 0.5	1.0	0.3 x 0.2	0.5	0.2 x 0.1	0.2	3.2 x 2.4	5.0	2.1 x 1.6	3.3
High-Res Camera (except K0 model)																
0.55x zoom	8.0 x 6.0	5.9	3.2 x 2.4	2.3	1.6 x 1.2	1.2	8.0 x 6.0	5.9	3.2 x 2.4	2.3	1.6 x 1.2	2.3	0.8 x 0.6	1.2	16.0 x 12.0[7]	11.7	10.7 x 8.0	7.8
0.75x zoom	5.9 x 4.4	4.3	2.4 x 1.8	1.7	1.2 x 0.9	0.9	5.9 x 4.4	4.3	2.4 x 1.8	1.7	1.2 x 0.9	1.7	0.6 x 0.4	0.9	11.8 x 8.8	8.6	7.8 x 5.9	5.7
1.0x zoom	4.4 x 3.3	3.23	1.8 x 1.3	1.3	0.9 x 0.7	0.6	4.4 x 3.3	3.23	1.8 x 1.3	1.3	0.9 x 0.7	1.3	0.4 x 0.3	0.6	8.82 x 6.6	6.45	5.9 x 4.4	4.3
1.5x zoom	2.9 x 2.2	2.2	1.2 x 0.9	0.9	0.6 x 0.4	0.4	2.9 x 2.2	2.2	1.2 x 0.9	0.9	0.6 x 0.4	0.9	0.3 x 0.2	0.4	5.9 x 4.4	4.3	3.9 x 2.9	2.9
2.0x zoom	2.2 x 1.7	1.6	0.9 x 0.7	0.6	0.4 x 0.3	0.3	2.2 x 1.7	1.6	0.9 x 0.7	0.6	0.4 x 0.3	0.6	0.2 x 0.2	0.3	4.4 x 3.3	3.2	2.9 x 2.2	2.2
High-Res Camera (K0 model)																
0.55x zoom	4.4 x 3.3	3.4	1.8 x 1.3	1.4	0.9 x 0.7	0.7	4.4 x 3.3	3.4	1.8 x 1.3	1.4	0.9 x 0.7	0.7	0.4 x 0.3	0.3	8.8 x 6.6	6.8	5.9 x 4.4	4.5
0.75x zoom	3.2 x 2.4	2.5	1.3 x 1.0	1.0	0.7 x 0.5	0.5	3.2 x 2.4	2.5	1.3 x 1.0	1.0	0.7 x 0.5	0.5	0.3 x 0.2	0.3	6.5 x 4.8	5.0	4.3 x 3.2	3.3
1.0x zoom	2.4 x 1.8	1.9	1.0 x 0.7	0.8	0.5 x 0.4	0.4	2.4 x 1.8	1.9	1.0 x 0.7	0.8	0.5 x 0.4	0.4	0.2 x 0.2	0.2	4.9 x 3.6	3.75	3.2 x 2.4	2.5
1.5x zoom	1.6 x 1.2	1.3	0.6 x 0.5	0.5	0.3 x 0.2	0.3	1.6 x 1.2	1.3	0.6 x 0.5	0.5	0.3 x 0.2	0.3	0.2 x 0.1	0.1	3.2 x 2.4	2.5	2.2 x 1.6	1.7
2.0x zoom	1.2 x 0.9	0.9	0.5 x 0.4	0.4	0.2 x 0.2	0.2	1.2 x 0.9	0.9	0.5 x 0.4	0.4	0.2 x 0.2	0.2	0.1 x 0.1	0.1	2.4 x 1.8	1.9	1.6 x 1.2	1.3

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Notes

1. Chart specifications are based on nominal magnifications. Actual magnification is calibrated to National Institute of Standards Technology (NIST) traceable calibration standards.
2. As measured on an optically smooth surface and 1X magnification selector lens.
3. As measured on a rough-polished Si wafer and 1X magnification selector lens.
4. Optical resolution based on Sparrow Criteria at 535nm.
5. As demonstrated by a PSI measurement on a SiC reference mirror.
6. Dependent on the index and thickness of the transmissive material.
7. The 1.0X objective and 0.55x zoom provide a maximum FOV of 16.5mm diameter.