The TMS-500 TopMap Pro.Surf and TMS-500-R TopMap Pro.Surf+ are high-precision, non-contact measurement systems with a large field of view for fast and efficient surface characterization of precision parts.

Incorporating a traceably calibrated white-light interferometer with large vertical measurement range, TopMap Pro.Surf and Pro.Surf+ can precisely characterize surfaces near steep edges such as drilled holes or on parts with large steps. Flatness and parallelism parameters, even for macroscopic samples, can be checked quickly and with excellent repeatability.

An additional chromatic-confocal sensor enables roughness evaluation in a single measurement with the TopMap Pro.Surf+.

Highlights

- Quick and precise 3D surface characterization
- Detect large areal form deviation even without stitching
- Optical roughness measurement (TopMap Pro.Surf+)
- Short measurement time and large field-of-view for automation
- Non-invasive measurements
- Measures almost any surface
- Check tolerance values with high reliability and high repeatability
- Large vertical scan range of 70 mm
- Measure hard to reach areas such as holes

TopMap Pro.Surf
TopMap Pro.Surf+
Optical surface metrology for quality control applications
Datasheet

Technical specifications

Initiative Fair Data Sheet

The information for the models TMS-500 TopMap Pro.Surf and TMS-500-R TopMap Pro.Surf+ comply with the initiative "Fair Data Sheet" for optical surface measurement devices.

General features		
Positioning volume	200 x 200 x 70 mm³ = 0.028 m³	
Max. number of points in single measurement	X: 1592, Y: 1200, X·Y: 1910400	
Optical specifications		
	Version small	**Version large**
Measuring area	X: 22.8 mm Y: 17.2 mm X·Y: 392.2 mm²	X: 44.9 mm Y: 33.8 mm X·Y: 1517.6 mm²
Working distance	13 ±3 mm	13 ±3 mm
Vertical measuring range	70 mm	70 mm
Calculated maximum angle	2.18°	1.15°
Measurement point spacing	X: 14.3 µm Y: 14.3 µm	X: 28.2 µm Y: 28.2 µm
Calculated lateral optical resolution	8.4 µm	16 µm
Extended measuring range		
	Version small	**Version large**
Extended measuring range	214 mm x 211 mm	228 mm x 221 mm
Extended measuring range with data reduction	214 mm x 211 mm	228 mm x 221 mm
Extended vertical range	equivalent to vertical measuring range	
Performance features		
Measurement noise [1, 2]	< 0.5 nm (Phase evaluation, smooth surfaces)	
Vertical resolution [1]	< 1.45 nm (Phase evaluation, smooth surfaces)	
General specifications		
Dimensions [W x L]: TMS-I-500 sensor head TMS-I-500 sensor head with stand TMS-I-500/TMS-I-500-R sensor head with XY positioning table	 350 x 678 mm² 700 x 800 mm² 700 x 900 mm²	
Weight: TMS-I-500 sensor head XY positioning table TMS-I-500 with stand TMS-I-500-R with stand	 approx. 25 kg approx. 22 kg approx. 57 kg approx. 69 kg	
Power	100...240 VAC ±10 %, 50/60 Hz	
Ambient temperature range	20 ±3 °C	
Storage temperature	-10 °C ... +65 °C	
Relative humidity	max. 80%, non-condensing	

[1] According to the initiative "Fair Data Sheet"

[2] 30 measurements (meas speed 11.9 µm/s) on a parallelly aligned optical flat (R ≈ 4 %, λ/20). Postprocessing: levelling, 5x5 spike removal, form removal: high pass filter λc = 0.23 mm (Small) / λc = 0.45 mm (Large), subtraction method according to ISO 25178-700

Other features						
Measuring principle	Scanning white-light interferometry (Michelson)					
Optical setup	Telecentric; light source: long-life LED, 525 nm					
Other features	Manual filter wheel with 3 filters for adapting to different sample reflectivities; Optical tool for automatically identifying the measurement position					
Data formats	Topography formats: SUR, ASCII Export formats: qs-STAT, PDF, BMP, PNG, TIFF, GIF					
Additional sensor with TopMap Pro.Surf+						
Measuring range	400 µm					
Measuring principle	Chromatic-confocal					
Working distance	10.8 mm					
Lateral resolution [1]	2.6 µm					
Typical roughness measurement [2]	*Ra* ≥ 100 nm					
Application-specific features						
Typical flatness measurement [3]						
Method of acquistion and evaluation	Coherence scanning on smooth surfaces [4]		Coherence scanning on rough surfaces [5]		Phase-shift	
Flatness deviation	< 75 nm		< 125 nm		< 65 nm	
Repeatability [7]	5 nm		10 nm		< 1.5 nm	
Typical step height measurement [6]						
Nominal step height	5 µm	50 µm	450 µm	1000 µm	2000 µm	5000 µm
Repeatability [7]	0.008 µm	0.06 µm	0.05 µm	0.05 µm	0.05 µm	0.05 µm
Maximum deviation of a step height measurement [8]	0.02 µm	0.09 µm	0.12 µm	0.12 µm	0.21 µm	0.31 µm
Configuration possibilities						
Hardware included	Sensor head (TMS-I-500 or TMS-I-500-R) tip-tilt unit, Control unit, PC, Monitor					
Hardware options	Roughness sensor, Positioning stages: motorized tip-tilt and motorized xy, Barcode reader, Calibration set, optical tables: pneumatically and electronically controlled					
Software included	3D data acquisition with multiple operation modes, Easy wizard, Smart Surface Scanning Technology, Pre-scan, 2D/3D data evaluation, Automation with recipes, ISO roughness analysis (ISO 25178, ISO 4287, ISO 4288), Critical dimensions					
Software options	Enviromental Compensation Technology, Quality Control (QC) package, Operator Interface, Pattern matching, Software customization, MountainsMap					

[1] Half of the spot diameter, in the middle of measurement range.
[2] Additional roughness measurement with TMS-500-R TopMap Pro.Surf+ according to DIN EN ISO 4287.
[3] Rounded values derived by empirical measurement data and a statistical evaluation of the measured flatness for several TMS-500: average of 30 flatness measurements according to ISO 1101 (meas speed 11.9 µm/s) on a parallelly aligned optical flat (R ≈ 4 %, λ/20). Postprocessing: levelling, 5x5 spike removal, low pass filter λc = 0.8 mm, evaluation of 95% (S) respectively 92% (L) of FoV (Single field meaurement)
[4] Evaluation of the correlogram phase
[5] Evaluation of the correlogram envelope
[6] Empirically determined representative performance for measurements on a calibrated PTB depth setting standard type A1 (ISO 5436-1).
[7] Standard deviation of the measurement values for a series of measurements under repeatability conditions, averaged for several measurement devices.
[8] Eight measurements in different sections of the measuring range

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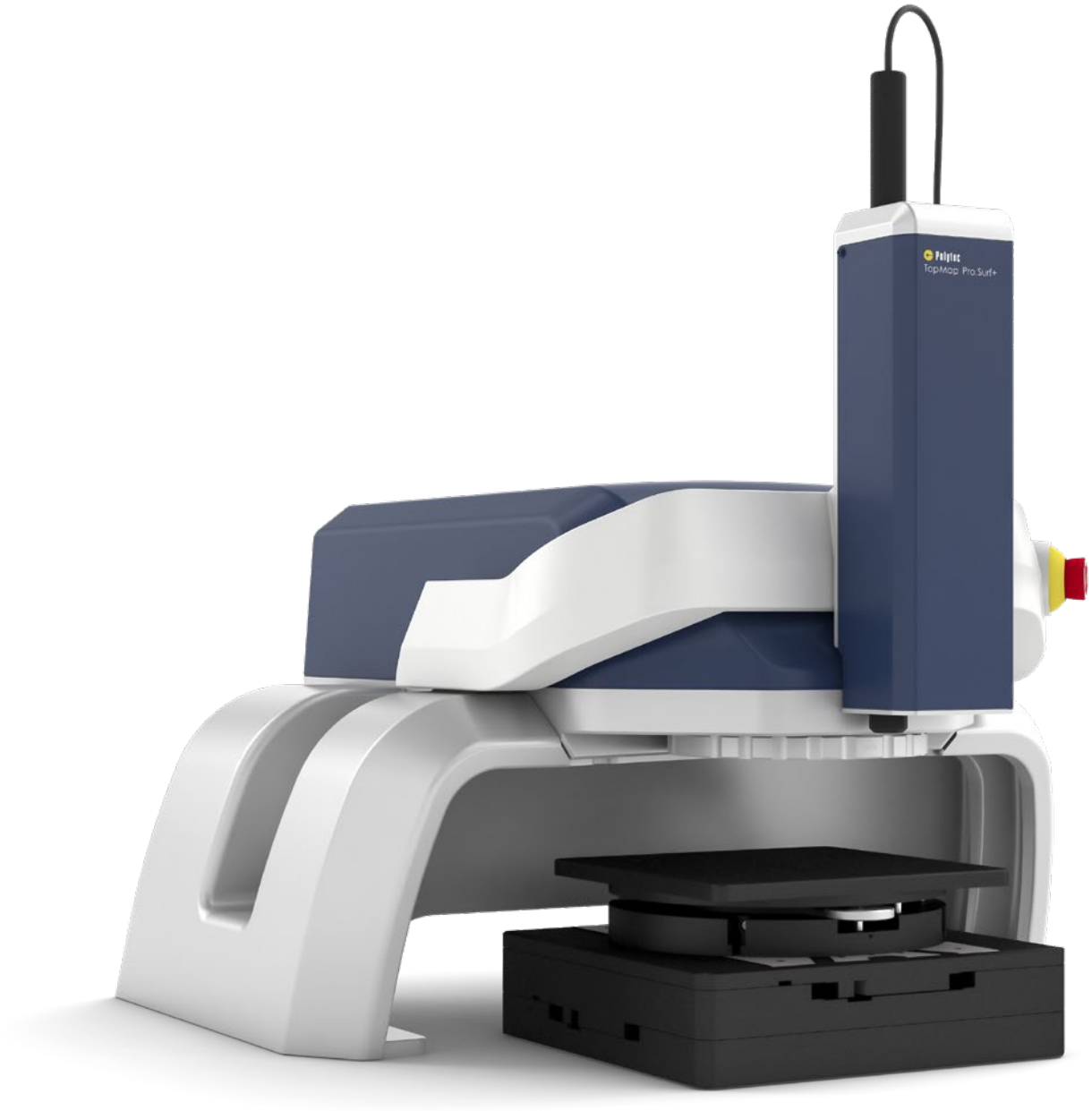

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