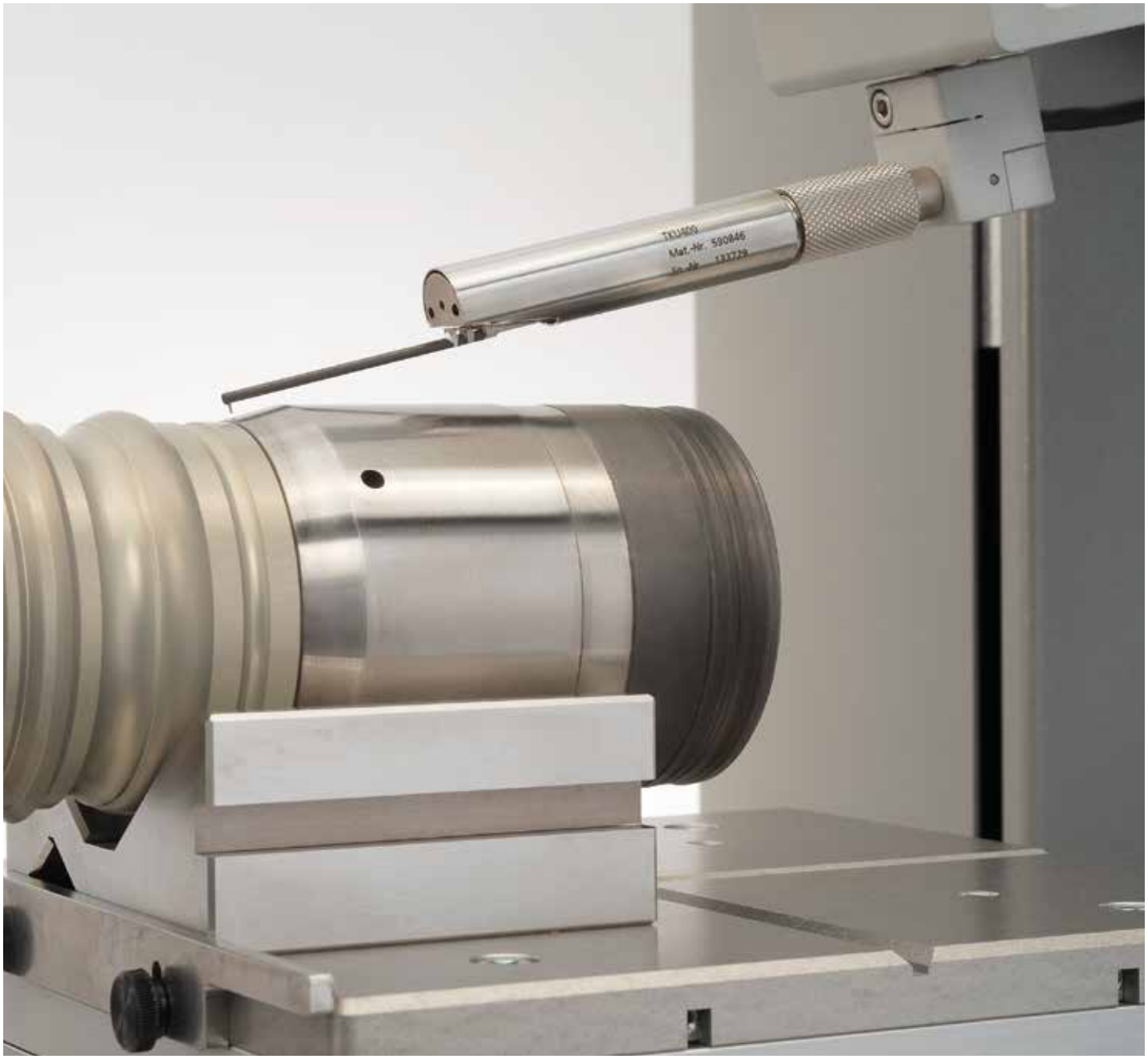
Waveline – Roughness and contour metrology

Mobile and stationary systems
for efficient, automatable measurements in the metrology lab or in production



HOMMEL ETAMIC

A member of the JENOPTIK Group

www.hommel-etamic.com

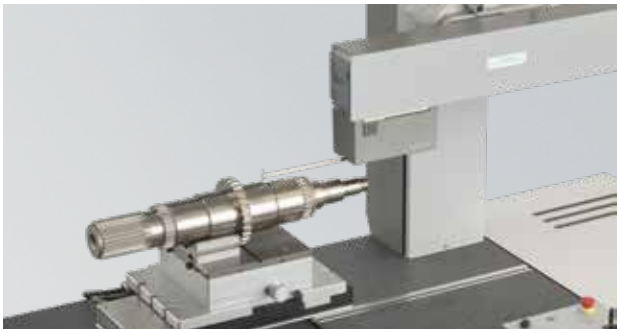
Precise metrology for efficient quality control

As a leading manufacturer of metrology systems, HOMMEL ETAMIC offers a broad portfolio of measurement solutions for industrial manufacturing processes. Our technologies include pneumatic measurement, tactile or optical measurement of roughness, contour, form and dimensional features, as well as optical inspection of machined surfaces.

Comprehensive services such as consulting, training, DAkkS-DKD calibration and service, including long-term maintenance contracts, round off our worldwide range of metrology services for quality assurance in industrial manufacturing.

Our measuring systems ensure the quality of the workpiece throughout the entire production process and provide precise measurement data in the shortest possible time. Automatic measuring technologies enhance overall productivity during production through efficiently designed inspection solutions – whether inline or offline, or using spot checks through 100 % inspection of all manufactured workpieces.

Mobile roughness measurement



Stationary roughness & contour measurement

Waveline measuring systems offer you extensive evaluation possibilities for surface measurement. Our product range consists of mobile surface measuring instruments, stationary measuring systems for manual and automated roughness, contour, topography or twist measurement, as well as combined systems for roughness and contour measurements. We also offer measuring stations tailored to meeting your specific measuring requirements.

Roughness measurement

- Roughness parameters
- Core roughness parameters
- Profile parameters
- Waviness parameters
- Motif parameters
- JIS parameters
- Topography evaluation
- Dominant waviness
- Twist parameters

Contour measurement

- Angle
- Radius
- Distance
- Parallelism
- Crowning
- Gothic arcs
- Edge geometries
- Line profile
- Threads
- Diameter

Please scan for detailed Waveline information

Waveline W5. Portable, reliable roughness measurement

Mobile measurement in production

Precise workpiece support

Exchangeable probes

Tolerance evaluation at a glance

Waveline W5 with optional printer Waveline P5

System features

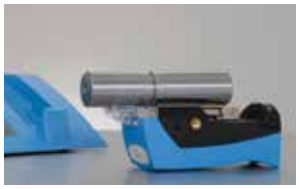
- Portable and battery-supplied
- Compact and light in design
- Easy, intuitive handling with click wheel and graphical user interface
- No calibration necessary
- Easily exchangeable probes
- USB port with Windows-compatible data format and battery charging function
- Features *Bluetooth*® technology for wireless data transfer and printing
- Battery capacity for up to 800 measurements
- Storage capacity for 5 measuring programs with measuring conditions
- Optional printer P5 with *Bluetooth*® technology for documentation of the measurement results on the spot
- Tolerance evaluation at a glance for immediate assessment of the measurement results
- Precise workpiece support, even on small shafts
- Measurement in all possible measuring positions, including on perpendicular surfaces and overhead

Waveline W10. Flexible, precise roughness measurement without boundaries

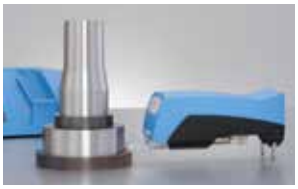
Waveline W10

Intuitive operation via touchscreen

Integrated roughness standard



Measurement in overhead position

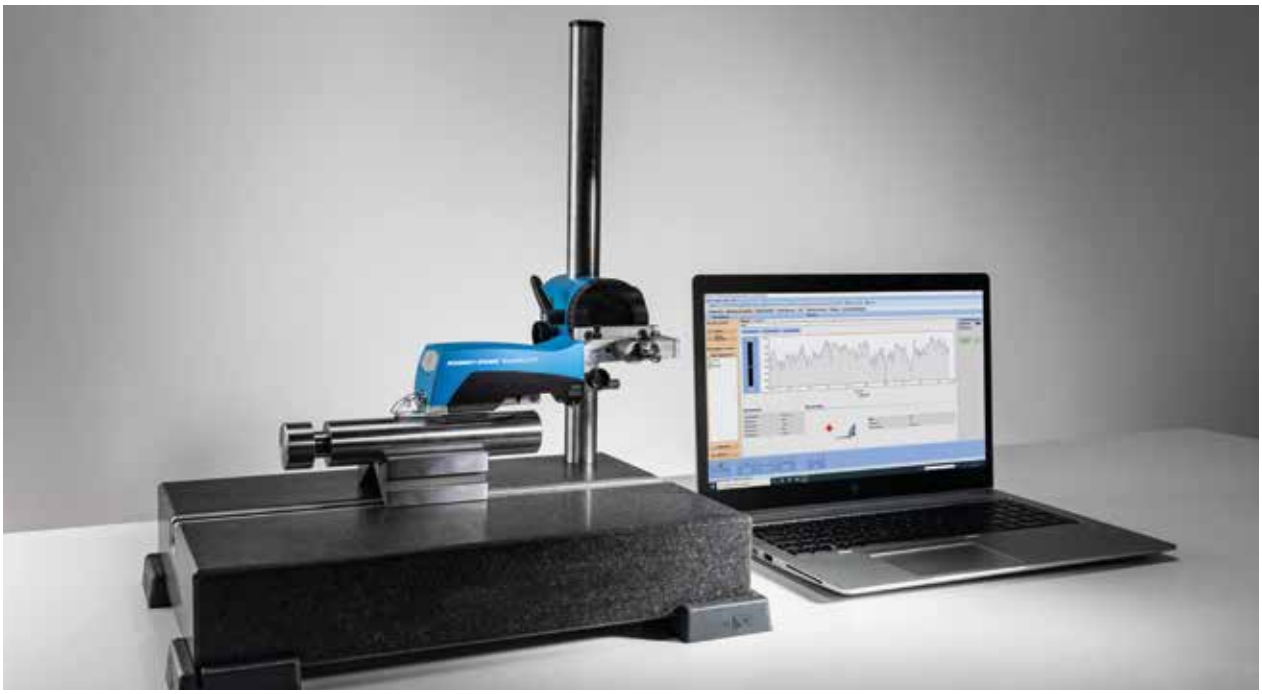


Height adjustment of traverse unit

System features

- Mobile and cable-free traverse unit LV17
- Usable as stationary instrument
- Measurement of all common roughness parameters according to international standards
- Modern, intuitive operation via color touchscreen
- Integrated rest and barrel jack for secure storage and continuous operational readiness of the traverse unit
- Immediate verification of the measuring system via the integrated roughness standard
- Easy changing of the skid probes
- Wireless data transfer via *Bluetooth*® interface
- Integrated printer for documentation of the measurement results on the spot
- Storage capacity for 7 measuring programs
- Measuring program specifically for verification of the measuring instrument with predefined nominal values
- 90° tilting of the probe for measurements in grooves and incisions or between collars
- Transverse probing without conversion
- Measurement of small workpieces in overhead position
- Contact to the workpiece via precisely polished shafts
- 3-point support on the traverse unit for secure positioning when measuring perpendicular surfaces
- Extendable tripod legs for height adjustment

Waveline W15 set. Mobile, wireless roughness measurements in the production environment



Waveline W15 set with optional MS300 measuring station and accessories

Transverse probing

Wireless traverse unit

Optional height measuring stand

Perpendicular measurement

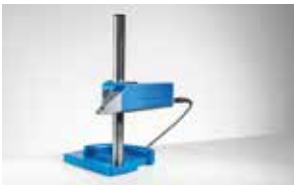
System features

- Handy and cable-free traverse unit LV17 for various measuring tasks
- Integrated start button for one-handed operation
- Wireless data transfer via *Bluetooth*® interface
- Optional height measuring stand HS300 for measuring tasks that require precise positioning
- Optional compact measuring station MS300 for stationary use in production or in the metrology lab
- Solves all common roughness measurement tasks
- Measurement in all positions, even overhead
- Various measuring speeds
- PC-based evaluation with Evovis Mobile Standard
- All current standards including the new ISO 21920 series of standards
- Flexible program design and logging
- Export of parameters and profiles, optional statistical interfaces
- Large range of skid probes

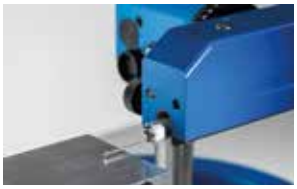
Waveline W40 set. Mobile measurement of common roughness, waviness & profile parameters

Waveline W40 set with optional MS300 measuring station, PC and accessories

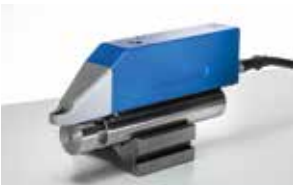
Measurement in overhead position



Optional height measuring stand



Motorized probe lowering



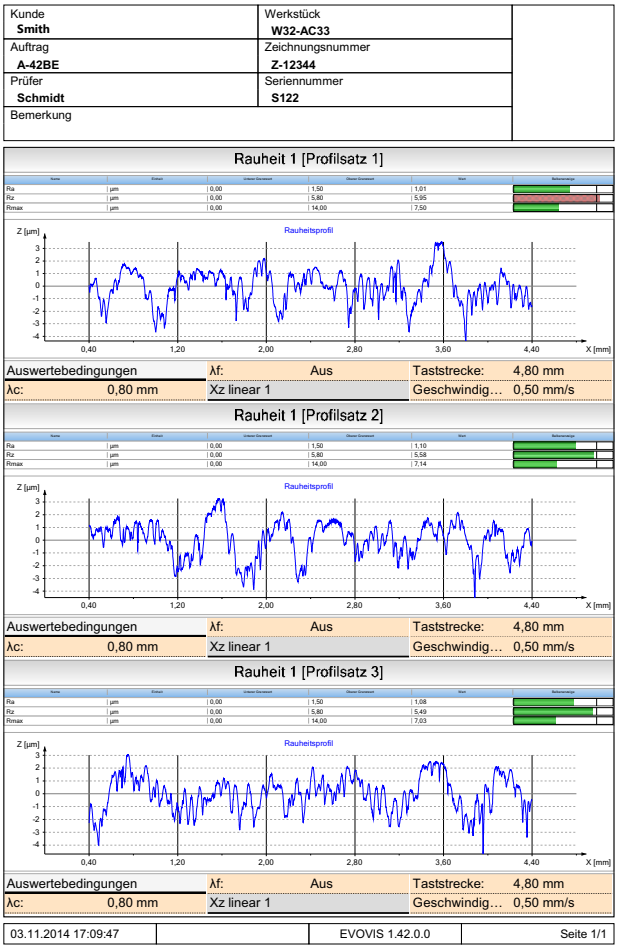
Precise workpiece support

System features

- Handy traverse unit Xmove 20 for a wide range of different measuring tasks
- Integrated start button for one-handed operation
- Optional, compact measuring station, can be used in the measuring room or in production
- Optional height measuring stand HS300 with tilting device for precise probe positioning
- Solves all common roughness, waviness and profile measurement tasks
- Supports reference plane and skid probes
- Large range of probes
- Motorized probe lowering for automatic positioning and positioning and lifting after measurement
- Measurement in all positions and orientations, including upwards (depending on probe)
- Variable measuring speed
- PC-based evaluation with Evovis Mobile Standard
- All current standards including the new ISO 21920 series of standards
- Flexible program design and logging
- Export of characteristic values and profiles, optional statistical interfaces

Evovis Mobile. Simple evaluation and operation of mobile measuring instruments

The Evovis Mobile software is specifically designed for operation with mobile measuring devices and small measuring stations. In online mode, the mobile measuring device is controlled directly by the software. Parameters and profile data recorded with the Waveline W5 or W10 can be transferred to the software and evaluated centrally. Evovis Mobile is available in Standard and Advanced versions.



Kunde	Werkstück
Smith	**W32-AC33**
Auftrag	Zeichnungsnummer
A-42BE	**Z-12344**
Prüfer	Seriennummer
Schmidt	**S122**
Bemerkung	

Rauheit 1 [Profilsatz 1]

Ra	µm	0,00	1,50	1,01
Rz	µm	0,00	5,80	5,95
Rmax	µm	0,00	14,00	7,50

Rauheitsprofil

Auswertebedingungen	λf:	Aus	Taststrecke:	4,80 mm
λc:	0,80 mm	Xz linear 1	Geschwindig…	0,50 mm/s

Rauheit 1 [Profilsatz 2]

Ra	µm	0,00	1,50	1,10
Rz	µm	0,00	5,80	5,58
Rmax	µm	0,00	14,00	7,14

Rauheitsprofil

Auswertebedingungen	λf:	Aus	Taststrecke:	4,80 mm
λc:	0,80 mm	Xz linear 1	Geschwindig…	0,50 mm/s

Rauheit 1 [Profilsatz 3]

Ra	µm	0,00	1,50	1,08
Rz	µm	0,00	5,80	5,49
Rmax	µm	0,00	14,00	7,03

Rauheitsprofil

Auswertebedingungen	λf:	Aus	Taststrecke:	4,80 mm
λc:	0,80 mm	Xz linear 1	Geschwindig…	0,50 mm/s

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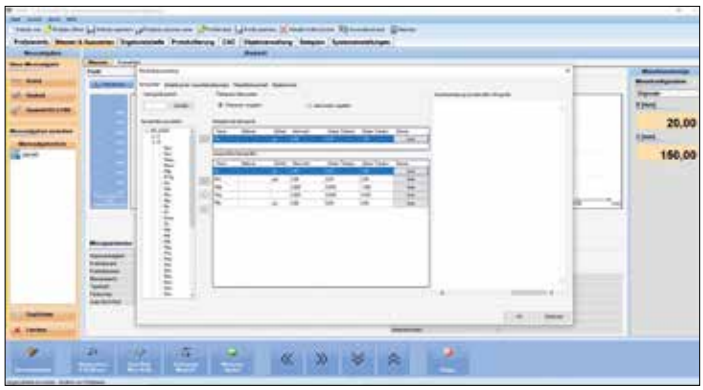
Multiprint log

Measurement & evaluation with Evovis Mobile Standard



Evaluation according to ISO 21920

System features Evovis Mobile Standard

- Clear, user-friendly operating structure
- All common roughness and waviness parameters in accordance with ISO 21920, ISO 4287 and other ISO and national standards (ASME, DIN, JIS, Motif, etc.)
- Continuous further development of the software in line with new standards/changes in standards
- Import and subsequent processing of profiles and parameters
- Individual test plan creation
- Integrated help with the parameters
- Wizard for selecting the measuring conditions
- Open design of the print log
- Electronic archiving of reports via PDF printout
- Optional qs-STAT® data export interface
- Optional evaluation of dominant waviness according to VDA 2007

Additional features Evovis Mobile Advanced

- Management of several measuring points in one test plan
- Control of measurement sequences via CNC function

Waveline W600. Compact measuring systems with simple operation

Waveline W612 measuring station with Digiscan probe system for contour measurement and accessories

Manual height adjustment

Wide range of mounting options (optional)

Roughness probe system with quick-change-adapter

System features

- Universal, easy-to-use measuring system
- High measurement quality thanks to stable mechanics
- Manual height adjustment with handwheel for precise probe positioning
- Optional base plate for mounting on granite plate with T-slot or threaded bushings provides numerous mounting options
- Interface for probe systems for either roughness or contour measurement with TKU400 or Digiscan probe system
- Subsequent expansion of the measuring system possible due to modular design
- Measurement and evaluation software Evovis with modern interface and extensive functions

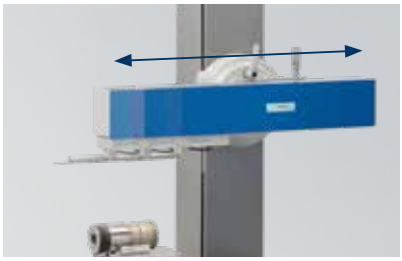
Model	W600R	W600C Digiscan	W600RC Digiscan
Traverse unit [mm]	120	120	120
Measuring column [mm]	300	300	300
Granite plate [mm]	700x400x100	700x400x100	700x400x100

Waveline W800. Modular system concept for maximum flexibility

Waveline W812 Digiscan with 500 mm measuring column and 120 mm traverse unit

Quick-change adapter QCA

Probe arms with magnetic coupling



Optimal accessibility of measuring positions

System features

- Modern, high-resolution probe systems
- Sophisticated probe arm technology
- Unique traverse unit concept for optimum access to measuring positions
- Probe arms with magnetic coupling for fast and easy probe arm change over
- All contour probe arms equipped with an RFID chip for simplified calibration and automatic configuration
- Quick-change adapter QCA enables quick probe system changeover with minimum retooling time and automatic configuration feature
- Horizontal motion of the probe system occurs via the traverse unit enclosure, meaning the probe arm is always in front of the traverse unit
- Control panel for easy, direct operation of the most important measuring and control functions as well as emergency stop function with restart at interrupted axis position

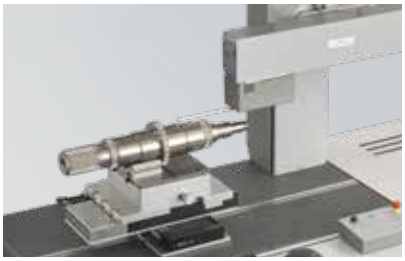
Model	W800R	W800C Digiscan	W800RC Digiscan	W800RC Surfscan	W800RC Nanoscan
Traverse unit [mm]	120 or 200	120 or 200	120 or 200	120 or 200	120 or 200
Measuring column [mm]	500 or 800	500 or 800	500 or 800	500 or 800	500 or 800
Granite plate [mm]	700x520 or 1000x520	700x520 or 1000x520	700x520 or 1000x520	700x520 or 1000x520	700x520 or 1000x520

Waveline W900. Fast measuring axes for maximum precision and performance

Waveline W920 with 500 mm measuring column and 200 mm traverse unit

Dual operation of two probe systems

Motorized tilt unit



Additional measuring and positioning axes

System features

- Fast measurement technology
- Highly flexible, dynamic measurement
- Excellent measuring accuracy in combination with Nanoscan probe system
- Dual operation of two probe systems; a roughness probe system can also be installed on the front of the traverse unit; also suitable for optional rotary module
- Optional motorized tilt unit for precise adjustment of the tilt angle and automatic alignment of the probe to the workpiece level
- Extensive options for automated, CNC-controlled measurement runs
- Measuring Z column with linear scale at a resolution of 0.1 µm for measurement of vertical distances outside the Z measuring range of the probe; requires probe arm with double probe tip
- Additional motorized Y axis or X-Y axis combination for automatic zenith search, topography measurement and workpiece positioning
- Optional rotational axis for roughness measurement on cylindrical workpieces in circumferential and axial direction

Model	W900R	W900C Digiscan	W900RC Digiscan	W900RC Surfscan	W900RC Nanoscan
Traverse unit [mm]	120 or 200	120 or 200	120 or 200	120 or 200	120 or 200
Measuring column [mm]	500 or 800	500 or 800	500 or 800	500 or 800	500 or 800
Granite plate [mm]	700x520 or 1000x520	700x520 or 1000x520	700x520 or 1000x520	700x520 or 1000x520	700x520 or 1000x520

Probe systems with quick-change adapter QCA.
For optimum configuration of your measuring system

Probe systems with quick-change adapter QCA allow quick and simple system changeovers to accommodate new measurement tasks and thus guarantee reproducible measurement results.

- All probe systems equipped with QCA interfaces
- Automatic setup after probe changeover
- Probe changeover without tools
- Precise, repeatable mechanical position
- Hot-plug-capable
- Future-proof

TKU400 with TAM probe arms: roughness measurement

- Universal roughness probe system
- Large measuring range
- Suitable for length and transverse measurements
- Easily exchangeable probe arms

Digiscan with TD probe arms: contour measurement

- Digital measuring system with high resolution
- Optional top/bottom measurement
- Probe arms with magnetic coupling and electronic detection
- Extensive range of probe arm solutions

Surfscan with WCN probe arms: roughness and contour measurement rolled into one

- Roughness measurement in the measuring range of 8 mm with a resolution of 3 nm
- Probe arms with magnetic coupling and electronic detection
- Optional top/bottom measurement

Nanoscan with WCN probe arms: roughness and contour measurement rolled into one

- Ultra-precise opto-mechanical probe system
- Wide measuring range with extremely high resolution
- Excellent roughness and contour measuring accuracy in conjunction with W900

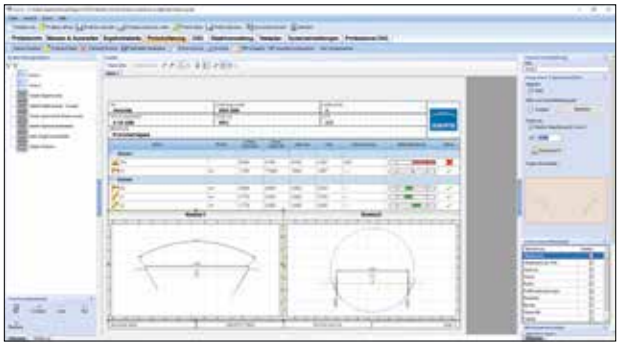
Probe arm	**Measuring range | Resolution**			
Probe system	TKU400	Digiscan	Surfscan	Nanoscan
Standard length	±400 µm | 1 nm	60 mm | 10 nm	8 mm | 3 nm	24 mm | 0.3 nm
2-fold length	±800 µm | 2 nm	90 mm | 15 nm	16 mm | 6 nm	48 mm | 0.6 nm
Use with measuring system	W600, W800, W900	W600, W800, W900	W800, W900	W800, W900

Evovis. Evaluation software for roughness and contour measurement with W600/W800/W900

Measuring station control

Evaluation according to ISO 21920

CNC editor for automated measuring runs



Report and template editor

Evovis, the measurement and evaluation software for roughness and contour measurement, offers a standardized user interface with easy-to-understand control logic and extensive support functions for designing individual measurement applications. Its applications range from simple measurements of a single characteristic to fully automated measurement applications within the Industry 4.0 environment.

User-friendly, intuitive operation

- Modern user interface for safe operation with little training needed
- Central control with all frequently used operating and display functions in one view
- Measuring station control with live display
- Automatic system configuration when changing the probe system or probe arm
- Extensive statistical functions
- Interactive analysis and evaluation functions
- Central administration of all test characteristics
- Evaluation of roughness parameters in the contour profile
- Roughness and contour parameters summarized in a table for further statistical evaluation

Optimized measurement runs: CNC editor

- Fast and easy programming of automated measurement and evaluation processes with a click of the mouse
- Clear representation in a graphic workflow
- Reduction of operator influences
- Comprehensive function library

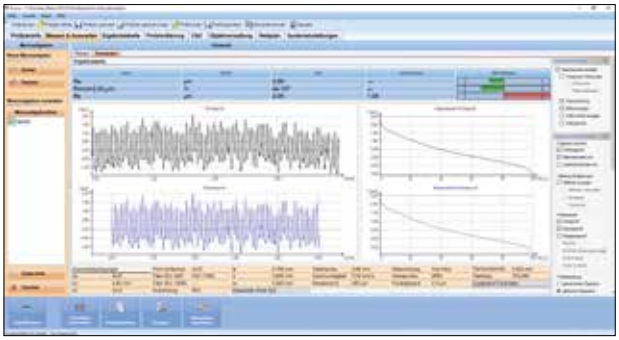
Option CNC Professional

- Programming of complex, automated measuring processes with axis control, electronic workpiece identification,
- simplified user interface and automated data export

Documented quality

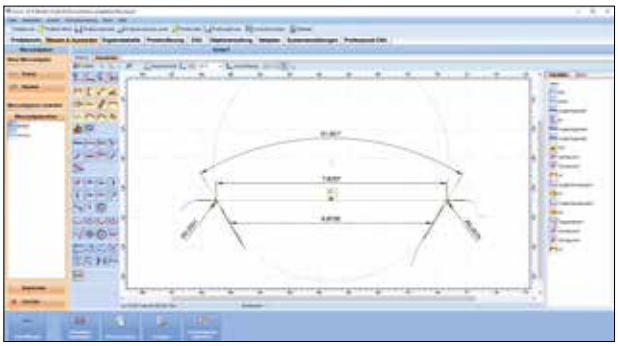
- Individual, free design of test plans as well as display and print reports
- Easy design and management of templates
- Automatic, electronic archiving of the reports

Evovis. Software functions and options for specific measurement tasks

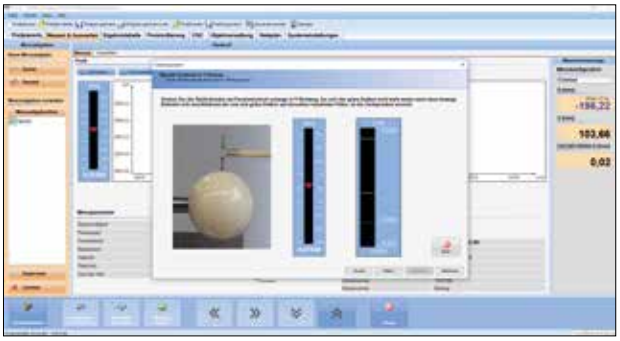


Roughness measurement with interactive profile evaluation

Contour evaluation



Multiple profile



Calibration assistant

Roughness measurement and evaluation

- All common parameters in accordance with ISO 21920, ISO 4287 and other ISO and national standards
- Assistant for quick selection of roughness parameters and definition of the measurement conditions for safe processes and simple implementation of complex measurement tasks
- Interactive profile analysis functions for surface parameters
- Evaluation of the measurement results according to tolerance specifications with display in a compact form
- All globally standardized surface parameters for primary, roughness and waviness profiles
- Optionally expandable with function-oriented parameters

Contour measurement and evaluation

- Contour evaluation with assessment of geometric dimensions, tolerancing of profiles and extensive functions for the assessment of line profile deviations
- Processing of several profiles/characteristics in one test plan
- Evaluation of complex geometric elements such as Gothic arcs or edge geometries
- Icon-based features for quick test plan creation
- Realization of complex applications thanks to precise fitting procedures and various auxiliary elements

Evaluation of several profiles in one run

- Top/Bottom measurement
- Parallelism, angles and distance between several profiles

Automated calibration (contour)

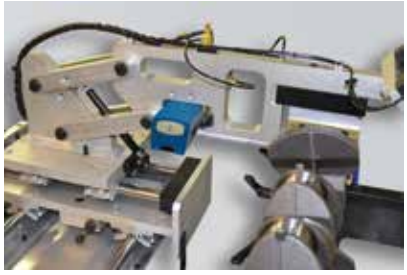
- Guided calibration process with recording of the history
- Automatic calibration in CNC mode
- Management of the calibration means

Options

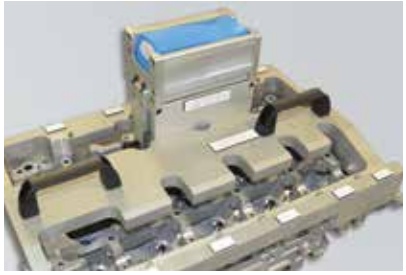
- qs-STAT® (Q-DAS ASCII transfer format): AQDEF-certified statistics export interface
- Dominant waviness according to VDA 2007
- TwistLive® twist evaluation in accordance with Daimler standard MBN 31 007-07 with additional quick analysis method and live display
- 3D topography evaluation

Individual, manual and semi-automatic measuring fixtures and stations

Measurement in bores



Measurement on shafts



Measurement on plane surfaces

POU (Point-of-Use) measuring devices are used for roughness measurement on large workpieces and come with a workpiece-specific design. They are ideal for manual SPC control of roughness features in all stages of the production process and deliver safe and repeatable positioning of the measuring devices.

- Secure and accurate positioning of the traverse unit on the workpiece
- Repeatable measurement results due to template positioning
- Reduction of operator influence
- Transfer of measurement results to process monitoring systems
- Robust measurement in production
- Tailor-made solutions for different workpieces

Waveslide measuring stations are individually tailored to suit specific measurement tasks. They are based on proven system components and provide reliable, semi-automatic measurements in the manufacturing environment. These systems are extremely robust and operate with high precision. Workpiece positioning is manual via guided air slides, the measuring process is fully automated.

Guided X-Y positioning via air slide with additional fine adjustment

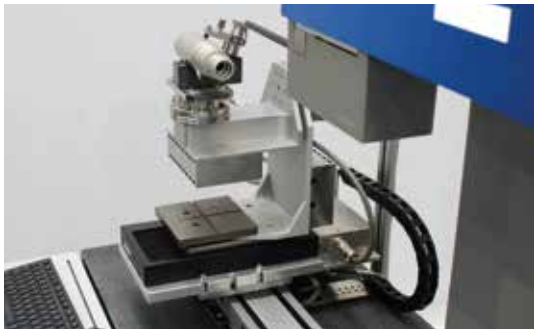
- Manual, simple positioning of the workpiece (alternatively of the measuring column) via air slide
- Suitable for large and heavy workpieces
- Flexible use for roughness and contour measurement tasks

Measuring station Waveslide with 800 mm column, TKU400 probe system for roughness measurement and manually movable measuring table on air slides

Flexible concepts for individual, fully automatic measurements

Fully automatic measuring systems offer customized, CNC-controlled roughness and contour measurements in the measuring lab or directly in production. They are configured with CNC axes and fixtures specific to the workpiece. Thus, they perform complex measuring tasks on the respective workpieces fully automatically.

- Robust measuring stations suitable for production
- Flexible system concept for numerous applications
- Independent, simultaneously operating CNC axes
- Individual fixtures, optionally with automatic identification of the workpiece
- Extensive safety features
- High reliability due to sophisticated technology
- Simple measuring program creation for fully automated processes via Evovis software
- Transfer of measurement results for further processing to statistics programs such as qs-STAT®



Individual combination of CNC standard travel axes for W800 and W900 measuring systems

Wavemove measuring stations are individually designed and feature CNC travel axes for fully automatic measurements on large workpieces. The PAT-CNC probe rotation module rotates the TKU400 roughness probe to the correct position, enabling measurements in different angular positions, such as on end faces.

Rotating measuring column and probe rotation module for optimum access to the measuring point

Fully automatic measuring station Wavemove with safety light barrier for safe, CNC-controlled roughness and contour measurement on the shop floor

Autonomous processes in the modern manufacturing environment

Fully automated measuring stations offer reliable, operator-independent measuring sequences for both random sample measurement and 100 % inspection of complex components. With the help of handling systems adapted to the measuring station, not only components are moved, but also probe arms are exchanged according to the measuring task and the measuring program.

Probe arm change via robot – magnetic holder

Probe arm and workpiece rest

Individual solutions for your requirements

- Fully automatic measurement of roughness and contour in one sequence
- Processing of parts magazines without operator intervention
- Fully automatic probe arm change and recognition
- Positioning of the parts for optimal accessibility of the measuring point
- Interfaces to different measuring and handling systems

Fully automated measuring station W920 Nanoscan with cobot for roughness and contour measurement

Permanent measurement accuracy

Due to the constant use of measuring equipment and the associated wear and tear, the measuring accuracy can change unnoticed. Regular calibration of the device with the help of traceable standards is required, because only calibrated measuring devices ensure that meaningful and correct results are generated.

DKD calibration laboratory

Our vibration-insulated and air-conditioned calibration laboratory (D-K-15030-01-00) is accredited by the Deutsche Akkreditierungsstelle GmbH (DAkkS) according to DIN EN ISO / IEC 17025.

Here we calibrate your standards. This ensures direct tracing of the measuring equipment to the Physikalisch-Technische Bundesanstalt (PTB) and guarantees measurements and calibrations at the highest metrological level.

If a standard cannot be calibrated, a new one can be obtained from any of our facilities. For non-accredited parameters we deliver a simple factory calibration certificates or test reports. We also carry out capability tests for demanding measurement tasks.

Our range of calibration services

Our DAkkS accreditation includes the measurement of variables such as roughness, form deviation, contour, contact stylus instruments and shaft measuring systems. Within this scope we issue DAkkS-DKD calibration certificates for e.g.

- roughness standards
- contour standards
- form standards

Handbook Surface Texture – Theory and Practical Use

This handbook explains roughness parameters, describes the structure of surface measuring devices, supports the user in their use and makes it easier for the designer to specify surface parameters.

Standards for surface measurement

Surface inspection standards

To check surface measuring systems with the profile method:

- **Depth setting standard** in polished glass for determining the vertical amplification and the repeatability
- **Geometry standard** in glass or nickel with uniform groove profile for checking the entire measuring system
- **Roughness standard** in steel with irregular surface profile for checking the entire measuring system

Contour standard KN8

Compliant with VDI/VDE Directive 2629. Characteristics measured: radii, angles, horizontal and vertical distances.

Twist standards

For verification of twist measuring systems. Calibrated parameters: Dt, DP, DG and Dy.

Technical data for mobile measuring devices Waveline W5 | W10 | W15 | W40

Model	W5	W10	W15	W40
Measuring principle	profile method, calibrated	profile method, calibrated	profile method, calibrated	profile method, calibrated
Total deviation as per DIN 4772	class 1	class 1	class 1	class 1
Traverse unit Suitable probes Probing direction Probing range Control elements	integrated into basic unit skid probe axial over 360° integrated start button	LV17 skid probe axial over 360°, transverse probing integrated start button	LV17 skid probe axial over 360°, transverse probing integrated start button	Xmove 20 reference plane and skid probes axial over 360° integrated start button, alignment reference level
Probe (scope of delivery)	T1E, 2 µm/90°	T1E, 2 µm/90°	T1E, 2 µm/90°	TKU300, 2 µm/90°
Max. measuring range/ max. resolution	±100 µm/5 nm[1)]	±100 µm/5 nm[1)]	±100 µm/5 nm[1)]	±300 µm/1 nm[2)]
Traverse length according to ISO/JIS according to Motif max.	1.5 | 4.8 | 15 mm 0.64 | 3.2 | 16 mm 17.5 mm	1.5 | 4.8 | 15 mm 0.64 | 3.2 | 16 mm 17.5 mm	1.5 | 4.8 | 15 mm 0.64 | 3.2 | 16 mm 17.5 mm	1.5 | 4.8 | 15 mm 0.64 | 3.2 | 16 mm 20 mm
Filter	ISO 11562: Gauss filter ISO 16610-21: Gauss filter ISO 13565-1: filter for Rk parameters ISO 3274: λs filter	ISO 11562: Gauss filter ISO 16610-21: Gauss filter ISO 13565-1: filter for Rk parameters ISO 3274: λs filter	ISO 11562: Gauss filter ISO 16610-21: Gauss filter ISO 16610-22: Spline ISO 16610-31: robust Gauss ISO 13565-1: filter for Rk parameters ISO 3274: λs filter	ISO 11562: Gauss filter ISO 16610-21: Gauss filter ISO 16610-22: Spline ISO 16610-31: robust Gauss ISO 13565-1: filter for Rk parameters ISO 3274: λs filter
Measurement speed vt	0.15 | 0.5 | 1 mm/s; return speed 3 mm/s	0.15 | 0.5 | 1 mm/s; return speed 3 mm/s	0.15 | 0.5 | 1 mm/s; return speed 3 mm/s	variable 0.1 – 2 mm/s; return speed 3 mm/s
Display	2" TFT color display	4,3" TFT color touchscreen	via PC monitor	via PC monitor
Standards	ISO 4287 ISO 13565 Motif ISO 12085 ASME B46.1 JIS B601 (2001) DIN EN 10049 Daimler MBN 31007 specific parameters	ISO 4287 ISO 13565 Motif ISO 12085 ASME B46.1 JIS B601 (2001) DIN EN 10049 Daimler MBN 31007 specific parameters	ISO 4287 ISO 13565 ISO 21920 Motif ISO 12085 ASME B46.1 JIS B601 (2001) DIN EN 10049 Daimler MBN 31007 specific parameters	ISO 4287 ISO 13565 ISO 21920 Motif ISO 12085 ASME B46.1 JIS B601 (2001) DIN EN 10049 Daimler MBN 31007 specific parameters
Battery	LiPo battery, up to 800 measuring cycles (no printout, traverse length 4.8 mm), full charge approx. 4 h	LiPo battery, up to 800 measuring cycles (no printout, traverse length 4.8 mm), full charge approx. 4 h	LiPo battery, up to 800 measuring cycles (no printout, traverse length 4.8 mm), full charge approx. 4 h	–
Measuring programs	5	7 plus 1 for system verification	unlimited	unlimited
Data memory (per measuring program)	max. 2000 measuring data records/parameters and 500 profile data records	max. 2000 measuring data records/parameters and 500 profile data records	unlimited	unlimited
Interfaces	USB, *Bluetooth*® wireless technology	USB, *Bluetooth*® wireless technology	USB, *Bluetooth*® wireless technology	USB
Dimensions [L x W x H], weight Basic unit Traverse unit	 approx. 50 x 63 x 128 mm, 270 g integrated into basic unit	 227 x 225 x 70 mm, 980 g LV17: 151 x 50 x 55 mm, 275 g	 – LV17: 151 x 50 x 55 mm, 275 g	 – Xmove 20: 238 x 43 x 66 mm, 990 g
Printer Printing method Paper/printing width Paper roll Resolution Printing functions Battery Interfaces	optional printer P5 static thermal print lines 57 ±0.5 mm/48 mm Ø = 31 mm 8 points/mm, 384 points/line measuring conditions, parameters, roughness profile, Abott curve battery pack, 1500 mAh *Bluetooth*® wireless technology	integrated static thermal print lines 57 ±0.5 mm/48 mm Ø = 31 mm 8 points/mm, 384 points/line measuring conditions, parameters, roughness profile, Abott curve, statistics via basic unit via basic unit	via PC | PDF output	via PC | PDF output

Power supply: 100-240 V AC 50/60 Hz; operating temperature: +5° C to +40° C, relative humidity max. 85 %, without condensation (Δ T 2° C/h); storage temperature: -20° C to +50° C.

1) Depending on probe used.

2) Resolution across the entire measuring range.

Technical data for stationary measuring systems Waveline W600 | W800 | W900

Measuring systems

Model	W600		W800				W900			
Traverse unit	Xmove 120-8		Xmove 120 | Xmove 200				Xmove 120 | Xmove 200			
Traverse length	120 mm		120 mm | 200 mm				120 mm | 200 mm			
Straightness (X axis)	0.9 µm		0.4 µm | 0.6 µm				0.2 µm | 0.4 µm			
Positioning repeatability	<50 µm		<50 µm				<10 µm			
X axis scale resolution	0.1 µm		0.1 µm				0.01 µm			
Max. positioning speed	20 mm/s		20 mm/s				200 mm/s			
Max. basic disturbance Rz (0.2 mm/s)*	<60 nm		<50 nm				<30 nm			
Number of probe system interfaces	1, bottom		1, bottom				2, bottom & front			
Measuring column	Zpos 300M		Zmove 500 | Zmove 800				Zmove 500 | Zmove 800			
Vertical travel	300 mm		500 mm | 800 mm				500 mm | 800 mm			
Positioning repeatability	–		<50 µm				<10 µm			
Max. positioning speed	–		20 mm/s				80 mm/s			
Scale resolution	–		–				0.1 µm			
Vertical distance measurement	–		–				absolute angle, inner/outer diameter			
Tilt unit										
Tilt range[1)]	–		± 45°				± 45°			
Fine adjustment (optional)	–		± 5°				± 5°			
Probe system accuracy	TKU400	Digiscan	TKU400	Digiscan	Surfscan	Nanoscan	TKU400	Digiscan	Surfscan	Nanoscan
Rz min. tolerance cg/cgk ≥ 1.33	1.2 µm	–	0.8 µm	–	0.8 µm	0.5 µm	0.5 µm	–	0.5 µm	0.15 µm
Radius measurement R = 15 mm	–	±7 µm	–	±5 µm	±5 µm	±3 µm	–	±3 µm	±3 µm	±1 µm
Radius form deviation	–	5 µm	–	3 µm	3 µm	1.5 µm	–	1.5 µm	1.5 µm	0.8 µm

Probe systems

Probe system	TKU400	Digiscan	Surfscan	Nanoscan
Measurement of	roughness	contour	roughness & contour	roughness & contour
Measuring range/resolution (Standard probe arm length)	± 400 µm/1 nm[2)]	60 mm/10 nm[2)]	8 mm / 3 nm[2)]	24 mm/0.3 nm[2)]
Measuring range/resolution (1.5x probe arm length)	± 600 µm/1.5 nm[2)]	90 mm/15 nm[2)]	–	–
Measuring range/resolution (2x probe arm length)	± 800 µm/2 nm[2)]	–	16 mm/6 nm[2)]	48 mm/0.6 nm[2)]
Top/bottom measurement	no	optional	optional	yes
Measuring principle	analog	digital	digital	digital
Probe identification	yes	yes	yes	yes
Probe force setting	fixed	electronic	electronic	electronic
Probe arm identification	no	yes	yes	yes
Probe arm interface	magnetic	magnetic	magnetic	magnetic

System configurations

System configuration	Description
W600R | W800R | W900R	roughness measuring station with TKU400 probe system
W600C | W800C Digiscan | W900C Digiscan	contour measuring station with Digiscan probe system
W800RC TKU | W900RC TKU	roughness and contour measuring station with TKU400 probe system
W600RC Digiscan | W800RC Digiscan | W900RC Digiscan	roughness and contour measuring station with separate TKU400 and Digiscan probe systems
W800RC Surfscan | W900RC Surfscan	combined roughness and contour measuring station with Surfscan probe system
W800RC Nanoscan | W900RC Nanoscan	combined roughness and contour measuring station with Nanoscan probe system
Optional for all system configurations	traverse unit 120 mm or 200 mm measuring column 500 mm or 800 mm granite plate 700 x 520 mm or 1000 x 520 mm desktop, instrument table, measuring cabin

* TKU400 with standard probe arm length.

1) The technical data can change depending on the tilt angle.

2) Resolution across the entire measuring range.

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Worldwide availability

Our expert teams are available to assist you wherever you are located. We have subsidiaries and distribution partners in key national nations, in order to assist our customers as a reliable production partner.

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