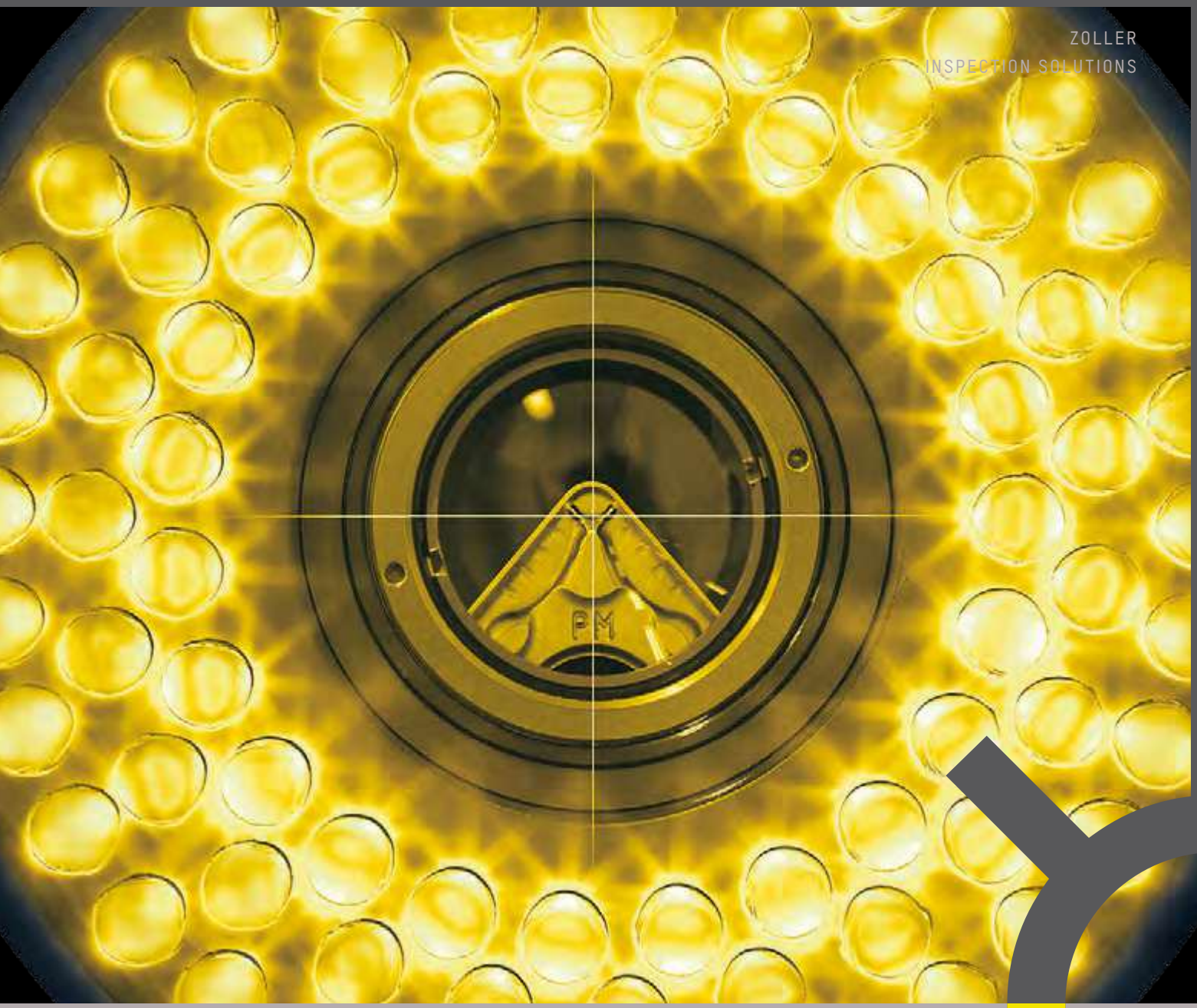


An Overview of ZOLLER Inspection Solutions

Tool Measuring Technology

ZOLLER
expect great measures®

ZOLLER solutions

ZOLLER solutions - comprehensive optimization of your manufacturing operations to increase quality, efficiency, and productivity. To do this, ZOLLER combines measuring machines, hardware, software, and services to create individual system solutions that guarantee you a sustainable and competitive advantage.

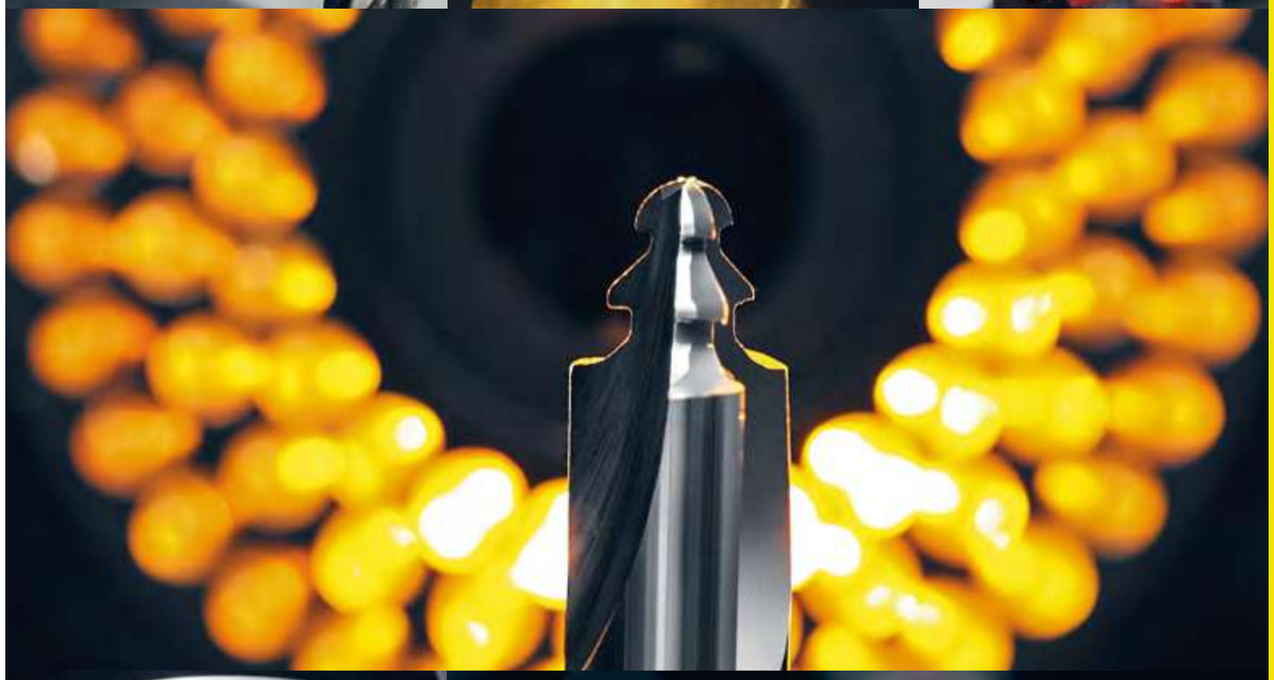
The ZOLLER company is a worldwide expert and market leader in the field of metrology for tools and tool-based manufacturing organizations. ZOLLER has been developing innovative tool presetter and measuring machines and measuring equipment as well as software for measuring, inspection and the management of metal cutting tools for over 70 years.

In close cooperation with our customers and partners, ZOLLER has developed practice-oriented and user-friendly leading edge technology at our facilities in Germany, a commitment now in its third generation of the family-run business. Certified according to DIN EN ISO 9001:2008 and DIN EN ISO 14001:2004 for quality and environmental management, we manufacture durable quality products which excel through highest precision and maximum efficiency.

Our worldwide subsidiaries and agents guarantee customer proximity and first class service in local markets. Our declared aspiration is for products with our name to fully satisfy your requirements and make a measurable contribution to your success.

Yours, the ZOLLER family
Alexander Zoller, Christoph Zoller, Eberhard Zoller



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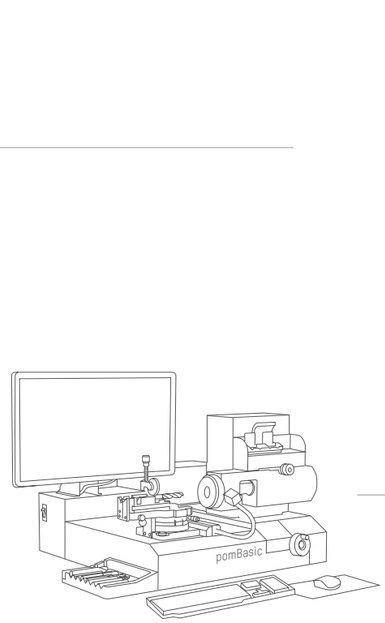
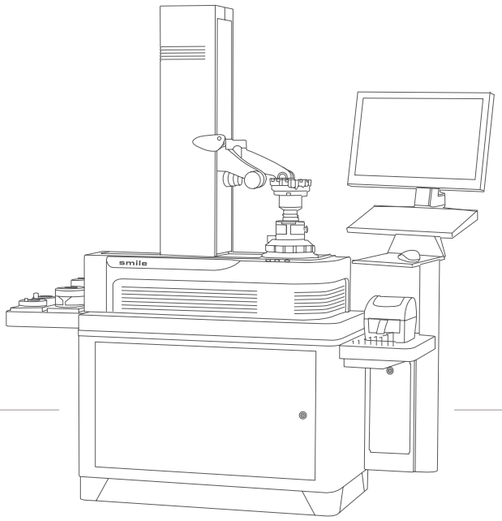
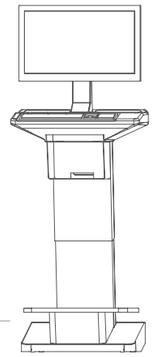
From Simple Measuring Tasks to Highly Complex Challenges

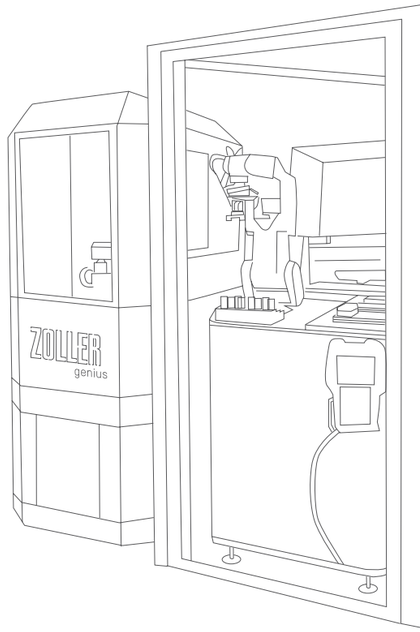
The Right Measuring Solution for Every Application

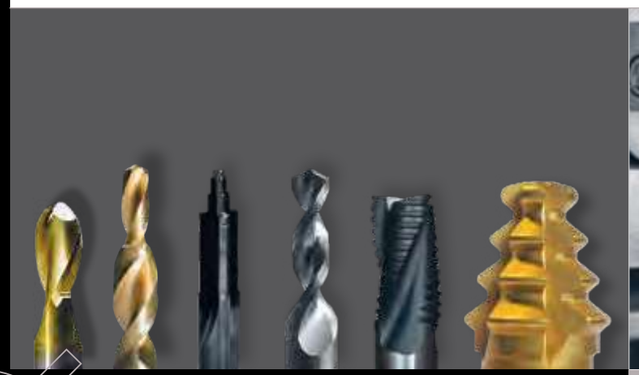
At ZOLLER you can find solutions ranging from simple and in-process inspection through to cost-effective and fully automated measurement of all tool parameters. With its »pom« series, ZOLLER's proven universal measuring machines and smart automation solutions offer a broad spectrum of tool metrology ranging from entry level to superior level.











efficient
cost-effective
designed to meet your requirements

Checking

ZOLLER offers workshop-compatible and traceable compact solutions for universal tool inspection – easy to operate, adapted to your requirements, and for universal use wherever measuring and inspection tasks need to be solved.

Set-up

Tool management, easy measuring of the grinding wheel package, data transmission, and the inspection of first grinding results are all essential for the effective set-up of grinding machines. ZOLLER offers solutions with guaranteed minimization of set-up times and maximum process safety, all based on intuitive and easy operation.

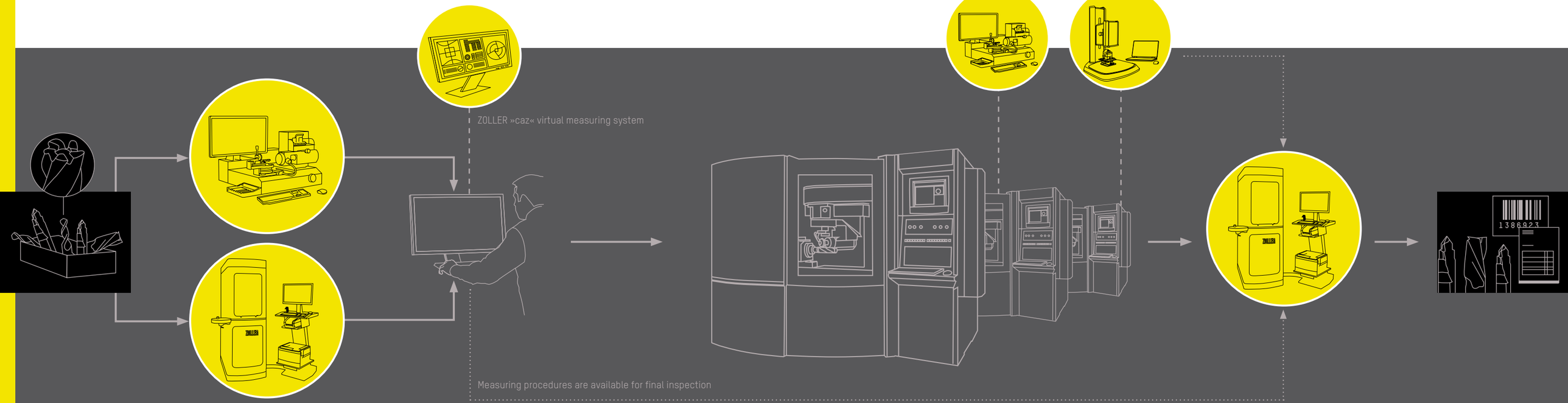
Automated Quality Assurance

Automatic control, traceability, and documentation have become indispensable in the field of metrology. ZOLLER's automation solution »roboSet« sets standards for efficient quality control up to 100 %.

Inspection and Measurement Technology? ZOLLER Has the Solutions

For Perfect Regrinding or Manufacturing Processes

Whether incoming tools inspection, manufacturing, or final inspection:
ZOLLER offers the perfect solution for checking and measuring tools.
For 100 % perfect tools – always and everywhere.



ZOLLER Solution Face Grinding and Much More

»pomBasic« allows face grinding to be checked close to the process: the important parameters are checked quickly and easily during feeding to the CNC guided grinding machine.

ZOLLER Solution Rounding

Microscopically small cutting edge preparations can be checked and measured quickly and contactless with »pomSkpGo«.

1 Delivery

Delivery of worn tools: cleaning and sorting.

2 Incoming Tools Inspection

Collection of actual data with ZOLLER »genius«, »smartCheck« or »pomBasic« series: with »genius« the relevant data for the grinding program are measured automatically and transferred paperless to the corresponding programming system via the ZOLLER interface. The actual wear dimensions for regrinding of the tools are determined using »pomBasic« in order to remove as little material as possible and preserve the tools as best possible.

3 Machine Programming

Transfer of tool data to the programming software. Complementation or new generation of the CNC program. Installation and simulation of the measuring procedures on the 3D tool model using the ZOLLER »caz« virtual measuring machine.

4 Production of Tools

Resharpening or regrinding of tools at the universal tool grinding machine with the NC programs provided via the interface. Using the parameters from the original tool, the set-up times are reduced considerably as parameters are already known. Only the position of the cutting edge needs to be determined with the machine's sensor. ZOLLER metrology ensures the quality of tools in new production runs and also reduces the start-up times for machines.

5 Final Inspection

Using ZOLLER »genius«, tools are checked 100% prior to shipment. The measured values are collated in test reports and supplemented with further parameters if required. This enables verification of accuracy, avoids complaints, reduces costs, and enhances supplier assessment.

6 Shipment

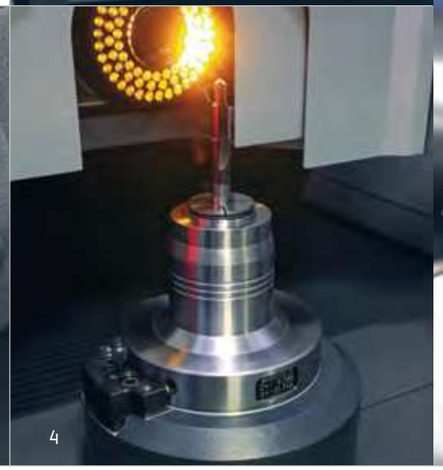
On-time delivery of high quality and documented tools.

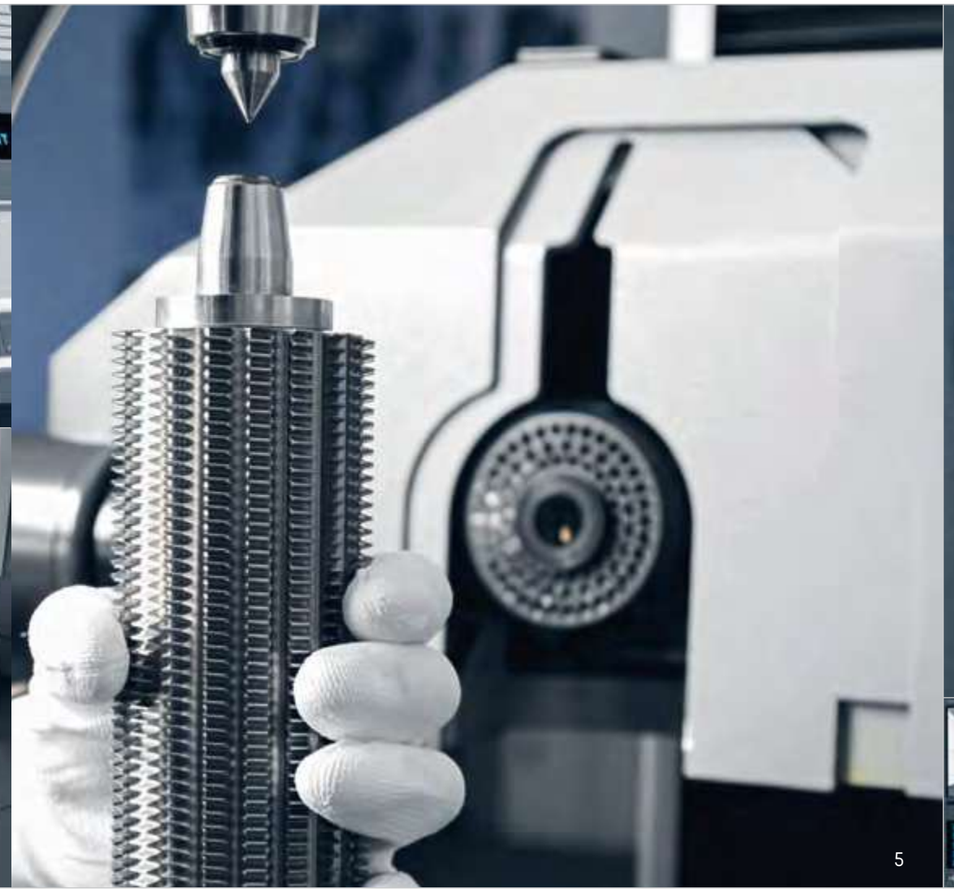
Innovative Technology for Highest Accuracy

Precision Has a Name: ZOLLER

nearly 75 years of industry knowledge
made in Germany
high quality branded components

Every detail of the ZOLLER measuring and inspection machines offers maximum quality. Innovative technologies and superior operating comfort result in precision far greater than the mere result in micros. ZOLLER achieves this precision fully automated and process-safe, with pre-structured data, proven documentation and, if required, special solutions.





1__Multi Sensor Technology
Image processing systems with incident and transmitted light and special sensors for contactless and automatic detection of various tool contours, surfaces, cutting edge preparations, and many other tool geometries.

2__Segmented Led Ring Light of the CCD Camera
Showing products in the right perspective: tool contours are displayed in minute and brilliant detail with the special LED lighting and evaluated using »pilot 3.0« image processing.

3__Automatic/Control (CNC)
Fully automated CNC-control of the axes of the measuring machines for operator-independent full control of optional types of tools.

4__Tool Clamping
Universal high precision spindle with integrated calibration balls and power-operated tool clamping for SK, HSK, Capto, Hydrodehn and many others, with rapid tool post change, changing precision 0.001 mm.

5__Special Solutions
The right solution for every challenge – ZOLLER!
Even highly complex helical tools, for example hob cutters, can be measured fully automatically and precisely due to intelligent technology.

6__Automation
Fully automated checking and inspection of serial tools for 100 % final inspection and documentation.

7__Image Processing/Software
Intuitive image processing for fast and micro-precise measurement results. Perfectly matched CCD cameras, lenses and automatically controlled LED lighting ensure that ZOLLER deliver brilliant cutting edge images, provide smooth inspection within seconds as well as micro-precise contours for metrology.

Clear and Intuitive Software

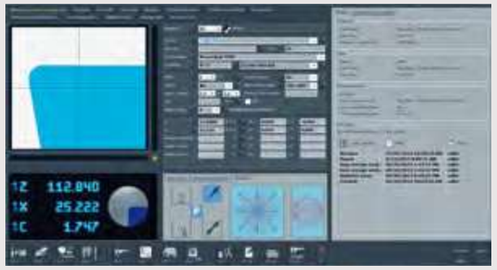
ZOLLER Makes Measuring Simple and Safe

The benefits of simple to operate measuring solutions are obvious: with the aid of automated solutions, tools are measured reliably and accurately at the push of a button, operator-independent, and consistently repeatable. Results are recorded in their entirety and documented in detail. The advantage: expensive errors and complaints are avoided, consistent quality is achieved resulting in cost recovery and shorter delivery times.

100 % documentation
tool-specific measuring procedures
process optimization

Tool measurement with »elephant« technology

Using this unique technology, every employee can measure any standard tool fully automatically without requiring any training – and determine up to 52 different parameters. Place the tool, clamp by pushing the button, select »elephant« with the desired type of tool from the screen overview and start the fully automated measuring procedure. All measuring procedures can be saved, adapted as required, documented, and repeated for each tool.



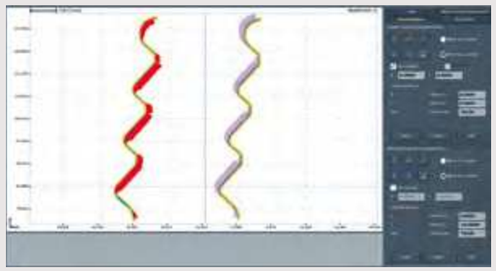
ZOLLER user interface »pilot 3.0«

1 **Select the type of tool from the overview**

2 **Select the parameters to be measured and start: no programming required**

3 **Measured results are displayed, the actual data is archived. Descriptions can be edited using the »apus« test report.**

Check Profiles: »coCon« for Form Tools



Measuring program for scanning tool contours and calculation of contour correction using the target DXF file of eroded or ground form tools. Output of the new contour is in DXF format.

Complete Evaluation According to DIN 3968 for Hob Cutters

Detailed and graphic evaluation of cylindrical hob cutters according to DIN 3968. Documentation of the concentricity/run-out of the hub diameters, deviation in shape/position of the rake face, deviation in shape of the cutting edge/tooth thickness, flute direction and many more parameters, including grading of the quality class.

»roboSet« – the Automation Solution

Runs smoothly for 24 hours, 7 days a week – just by clicking the start button of the ZOLLER »pilot 3.0« image processing system. For more information on ZOLLER automation solutions see page 40.

The Compact Solution for Universal Tool Inspection

»pomBasic«
»pomBasicMicro«

The ZOLLER inspection machines »pomBasic« and »pomBasicMicro« measure and check drills, milling cutters, and countersinks – in all sizes and down to micro tools. Compact and universal, the machines can be employed in the metrology room, tools receiving, or directly in manufacturing.

The individually adjustable »pomSoft« image processing system with intuitive operation offers numerous measuring and evaluation algorithms with automatic cutting edge search. These are used primarily for measuring angles, distances, wear and tear, cutting edge quality, and micro sections. The video microscope system with zoom optics allows for brilliant recording of the tools, adjustment of sections, and thus detailed inspection.

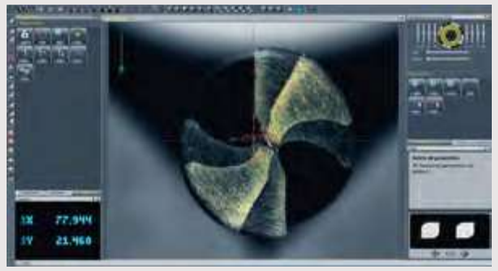
»pomBasicMicro«

The universal holding fixture accepts shaft tools from 2 to 40 mm. The prism can be rotated by ± 90° for axial and radial measurement.

Fast and Easy Circumferential Measurement

Determination of chamfer width and spiral angle.

Target-Actual Comparison on Live Image



Direct comparison of the target-actual contour by superimposing saved cutting edge images with the live image of the new tool.

Test Protocols at the Push of a Button

Measurements can be documented and edited in their entirety. In addition, the language can be selected individually prior to outputting the results as PDF or printed inspection report.

ZOLLER
INSPECTION SOLUTIONS

ergonomic
compact
universal

Swiveling table axial

Swiveling table 45°

Swiveling table 90°

With automatic lighting control

Technical Specification	Travel Range X-Axis	Travel Range Y-Axis	Fine Adjustment Optics	Measurable and Clampable Shaft Diameter	CCD Camera	Field of Vision
»pomBasic«	190 mm	50 mm	55 mm	0,5–50 mm	6,5-fold zoom lens (color)	3 x 2,5 mm – 20 x 16 mm
»pomBasicMicro«	190 mm	50 mm	55 mm	0,5–50 mm	12-fold zoom lens (b/w)	0,6 x 5 mm – 7 x 5,8 mm

Subject to technical modifications. The depicted machines may include options, accessories, and control variants.

The Mobile Solution for Measurement of the Cutting Edge Preparation

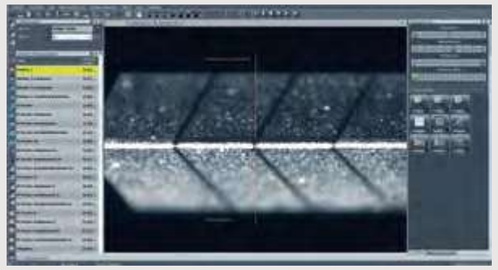
»pomSkpGo«

The ZOLLER solution for milling tools and reversing plates scores with 100% workshop compatibility, unlimited mobility, intuitive operation, and precisely traceable results. The stiff and light basic carbon design enables a high level of accuracy as well as mobile use: the machine is set up at the place of operation and can be started after only 5 minutes.

Major advantages are: easy operation, contactless measurement, and fast alignment of tools. This allows even untrained operators to conduct highly accurate measurements by themselves within minutes. Easy to load tool holding fixtures and fast and universal positioning of the cutting edge under the high-resolution sensors with live image form the basis of perfect measuring results.

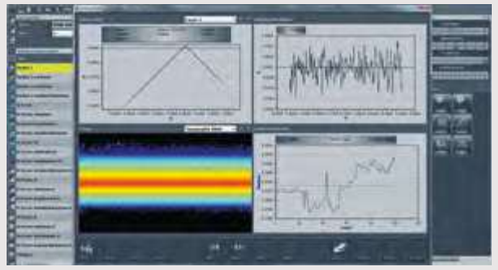
»pomSkpGo« with »Z3dCam« and Notebook with Software »pomSoft«.

Cutting Edge Preparation »skp«



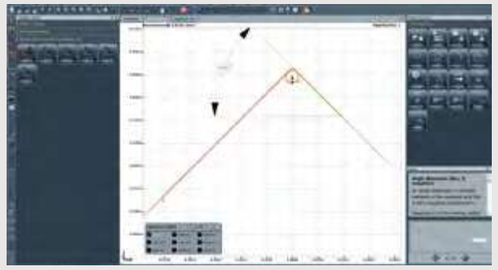
Live image of the cutting edge preparation for fast alignment and checking of surface.

Results and Evaluation



Measured results and graphic section profiles are displayed together, including evaluation of chipping and radius profile along the cutting edge.

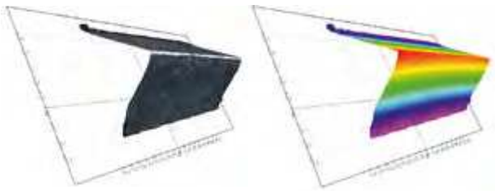
Nominal/Actual Comparison and Dimensioning



This function enables a target-actual comparison versus a DXF ideal contour including automatic dimensioning of the contour of the cutting edge.

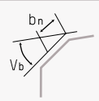
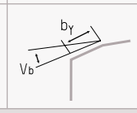
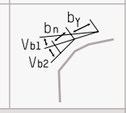
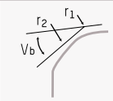
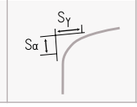
mobile and fast
micro-precise
contactless

Detailed 3D Presentation



The cutting edge can be displayed in different modes – as texture for the immediate recognition of possible surface indentations and surface quality, or topographically to display the height profile of the cutting edge preparation at a glance.

Freely Definable Form Types in the Configuration Menu

Chamfer			Combination
Chamfer	Protective chamfer	Double chamfer	Chamfer and rounding
			
Rounding			**Sharp edge**
Ideal radius	Trumpet shape	Waterfall	Sharp edge
			

Examples of evaluable edge shapes.

100% workshop-compatible solution of a typical laboratory application

Technical Specification	Travel Range Z-Axis	Manual Fine Adjustment	Manual Rapid Adjustment	Lateral Resolution	Vertical Resolution
»pomSkpGo« | Premium Sensor	300 mm	± 50 mm	200 mm	1.2 µm	0.1 µm

Measuring Volume	Measuring Points	Smallest Measurable Rounding	Working Distance
1.6 x 1.2 x 1.0 mm³	1.3 million	3 µm	30 mm

Subject to technical modifications. The depicted machines may include options, accessories, and control variants.

The Measuring and Inspection Station for Milling Head Manufacturing

»pomZenit«

Used close to production, »pomZenit« opens a new dimension in measuring and inspection stations for manufacturing milling heads: the ergonomic measuring machine can automatically check the quality of right-angle milling heads and face milling cutters precisely without requiring an operator.

»pomZenit« convinces with automated measuring procedures, highly accurate measuring results, and ease of operation for every user. Equipped with CNC controls, a high precision spindle with autofocus and the ZOLLER »pilot 3.0« image processing system, the machine determines run-out and concentricity, measures the cutting edge angles and radii, and inspects cutting edges – including automatic remeasurement from the diagram with the tolerance range.

»pomZenit« is available as tool presetting and measuring machine for production and as bench top version for inspection stations in final inspection.

Measurement of All Cutting Edges Including Graphic Display of Measured Results »focus 360°i«

The software measures all cutting edges of a tool in a rotary manner and displays the measured values of every cutting edge graphically or in table form, including the tolerance range and fast remeasurement of individual cutting edges (yellow bar) directly from the diagram.

Automatic Recording of Cutting Edge Images with »aec«

Fully automatic single image recording of the cutting edges at incident light for checking wear.

automatic
operator-independent
ergonomic

Machine table »pom«

Work bench

Automated measuring procedures = less effort, more precision

Technical Specification	Travel Range Z-Axis	Travel Range X-Axis	Max. Measurable Tool Diameter	Max. Tool Weight
»pomZenit«	100 mm	110 mm	200 mm	20 kg

Subject to technical modifications. The depicted machines may include options, accessories, and control variants.

The Professional Start to the Measurement of Tools and Grinding Wheels

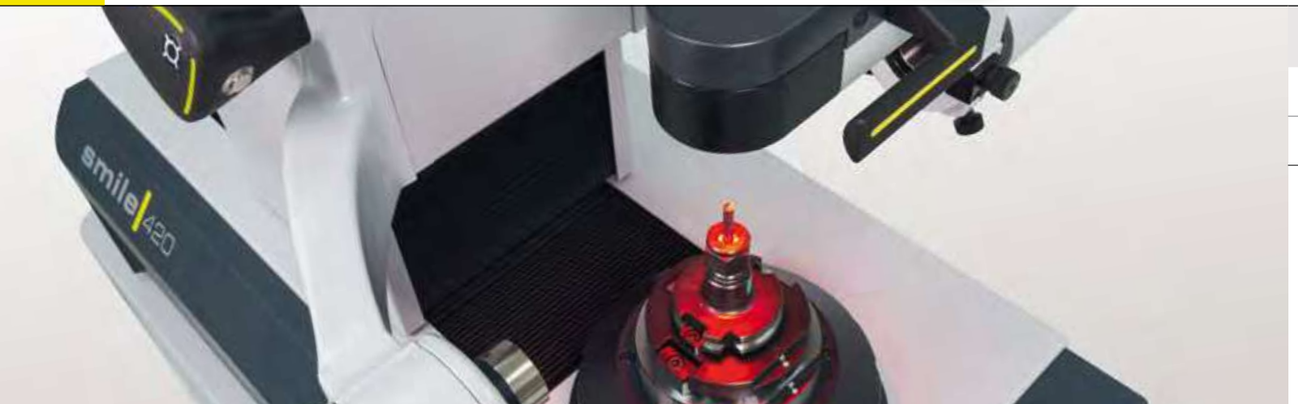
»smile / pilot 3.0«

The professional start to cost-effective tool measurement has a name: ZOLLER »smile«. Together with its fast, reliable, and accurate results, it offers convincing ergonomic design and simple operation which can be made even faster and more convenient by adapting the software interface to individual requirements.

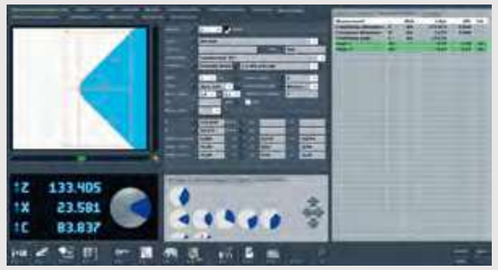
»smile / pilot 3.0« meets all manufacturing requirements and remains user-friendly despite its many high performance features. Image processing is based on modular design and its numerous measuring programs make it both individual and workshop-compatible. Grinding wheels can be measured with micro precision according to the FEPA standard, by any operator and including detailed documentation.

»smile« with image processing »pilot 3.0«.

Swiveling tool inspection for axial and radial measurement.

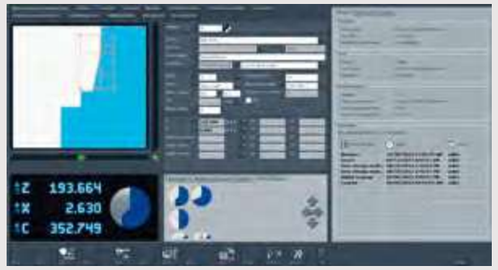


Angle and Radius Measurement



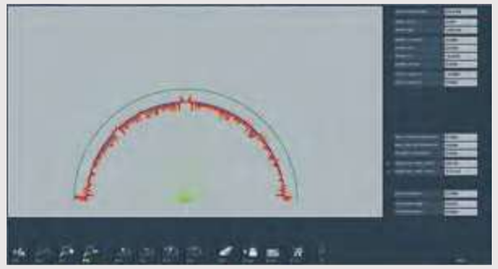
User interface »pilot 3.0« with automatic measurement of length, diameter, corner radius, and cutting edge angle.

Automatic Recognition of Cutting Edge Shape and Dynamic Crosshairs



Simply focus – finished! Length, diameter, corner radii, cutting edge angles, and measuring range are calculated instantly. Fine adjustment is not required due to the dynamic crosshairs.

Radius Contour »contur«

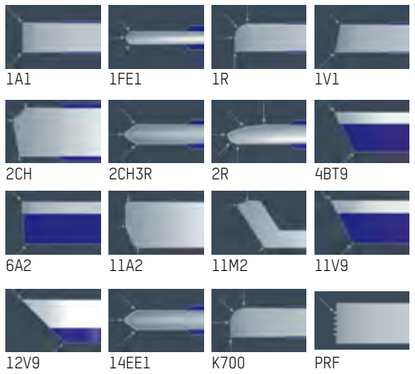


Fully automated determination of the cutting edge profile, and radius and graphic evaluation of the entire contours with tolerance range and variable setting of the angle sectors.

cost-effective
ergonomic
individually adaptable

Measurement of Grinding Wheels

Photo-realistic input dialog including documentation and reports. Library of grinding wheels according to FEPA standard.



Numerous measuring programs included

Technical Specification	Travel Range Z-Axis	Travel Range X-Axis	Maximum Measurable Tool Diameter	Maximum Measurable Snap Gauge Diameter
»smile 420«	420 / 600* / 800*[1] mm	210 mm	420 mm	100 mm[2]
»smile 620«	420 / 600* / 800*[1] mm	310 mm	620 mm	100 mm[2]

* optional
[1] Measuring range Z axis 800 mm is only possible in combination with the table system.
[2] Snap gauge 70 mm when selecting the optic carrier standard with tool inspection.
Subject to technical modifications. The depicted machines may include options, accessories, and control variants.

The Universal Measuring Machine for Tool Inspection

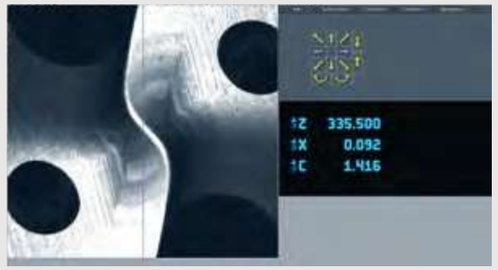
»smartCheck«

»smartCheck« is the high-performance universal measuring machine for all metal cutting tools – either as manual or 3-axis CNC version: this provides the ability to cost effectively check and document tools prior to and after grinding in accordance with the DIN EN ISO 9000 guidelines.

The »smartCheck« and swiveling incident light processing allows cost effective checking, measuring, and documenting of axial and radial geometries of tools. Simply click the mouse – no special training required. The measurement of tools prior to regrinding can result in a 25% increase in productivity or potentially greater with CNC grinding machines.

»smartCheck« with swiveling tool inspection camera for fast and universal inspection.

Tool Analysis »metis«/Circumferential Measurement



For the automatic determination of tool contours, radii, angles, distances, chamfer widths as well as wear, and other parameters with incident and transmitted light.

Concentricity Check 360°/Wobble Compensation

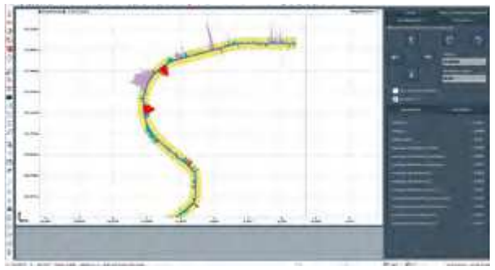
Fully automatic determination of concentricity with graphic analysis of the contour profile, including target-actual comparison and subsequent automatic concentricity, and wobble compensation.

»apus« Test Reports

Editable test report for arbitrary and savable adaptation of the scope and descriptions.

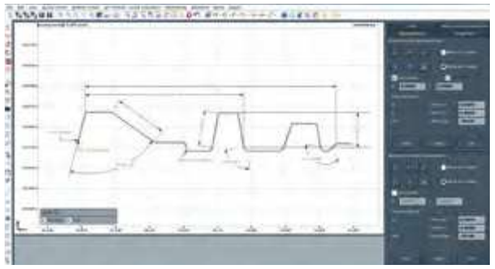
high performance
flexible
modular

Contour Profile Measurement »lasso«/Target-Actual Comparison



For scanning of arbitrary tool or workpiece contours and generation of a target-actual comparison on the basis of a DXF target contour with variable tolerance range.

Automatic Dimensioning



CAD function for generating and dimensioning the actual contours.

Tool check with maximum cost-efficiency

Technical Specification	Travel Range Z-Axis	Travel Range X-Axis	Maximum Measurable Tool Diameter	Maximum Measurable Snap Gauge Diameter
»smartCheck 450«	450 / 620 / 820 mm	210 / 310* mm	420 / 620* mm	70 mm with incident light camera 0° 100 mm with incident light camera 90°
»smartCheck 600«	600 / 800 / 1000 mm	220 / 270* mm	370 / 540* mm	80 / 35* mm with incident light camera 0° 200 / 100* mm with incident light camera 90°
»smartCheck 800«	600 / 800 / 1000 mm	500 mm	1000 mm	80 mm with incident light camera 0° 200 mm with incident light camera 90°

* optional
Subject to technical modifications. The depicted machines may include options, accessories, and control variants.

The Universal Measuring Machine for Precision Tools

»genius 3s«
»genius 3m«

ZOLLER »genius 3s« is the universal measuring machine for metal cutting tools. The »genius 3m« version can also be used for micro-geometries. Five CNC-guided axes enable extensive, precise, and fully automated measuring procedures.

Tools are checked quickly, easily, and with the highest precision, starting with individual criteria through fully automated and operator independent complete checks. The measured results are documented in detail and can be transferred to the grinding machines at the push of a button. Thus »genius 3« saves valuable time during work preparation and programming, excludes reworking, and complaints and provides excellence in quality.

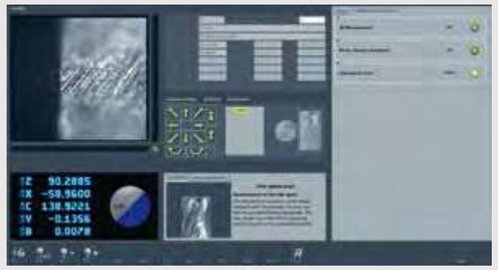
»genius 3s« with full housing to protect against dirt and extraneous light.

fully automatic
fast and precise
over 1000 units in use worldwide

Photo-Realistic Input Dialog »fored«

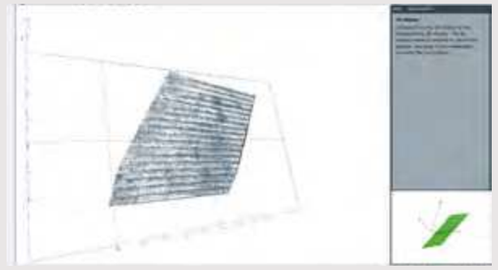
For measuring the chip space (see above), the circumference, and the face of tools. The measuring procedures and parameters can be freely defined, selected via the Checkbox, and saved for the tool.

Configuration Assistant »expert«



Regardless of the incident light measurement used, the configuration assistant carries out the measuring window sizes, lighting optimization and positions, live and once only, and then automatically stores the data.

»genius« Tool Analysis/Chip Space

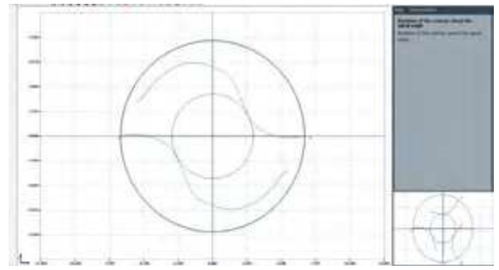


The contactless and automatically scanned tool surfaces can be displayed to give three-dimensional information on the calculation of the effective cutting angles or draft angles.

Data Import/Export XML

This function allows data in the ZOLLER »pilot 3.0« to be imported and exported in XML file format at the push of a button.

Groove/Chip Space Scan



The groove/chip space contour is scanned contactless automatically and displayed graphically. It can be exported as DXF/XML and subjected to a target-actual comparison.

Greater productivity through latest technology and ergonomics

Technical Specification	Travel Range Z-Axis	Travel Range X-Axis	Travel Range Y-Axis	Tool Diameter	Snap Gauge Diameter	Max. Tool Length for Axial Incidental Light Measurement	Draft Angle Circumference (3D)	Chamfer Width Circumference (3D)	Chip Space/ Groove Depth (3D)	Face Geometry (3D)
»genius 3s« »genius 3m«	600 mm	175 mm	± 50 mm	340 mm	100 mm 70* mm	470 mm	Ø < 200 mm	Ø < 200 mm	Ø < 75 mm	Z < 470 mm Ø < 230 mm Step < 35 mm

* When selecting the optic carrier with micro incident light camera
Subject to technical modifications. The depicted machines may include options, accessories, and control variants.

The Universal Measuring Machine Specifically for Threaded Tools

»threadCheck«

»threadCheck« is the ZOLLER measuring machine for the distortion-free and accurate measurement of threaded tools.

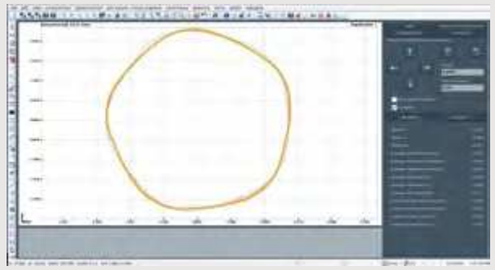
Six CNC-driven axes and the fully automatic swiveling optical carrier enable complex measurement of thread geometries, threaded drills, milling cutters and formers as well as numerous other metal cutting tools. The full housing protects against dirt and extraneous light. All measured results are recorded in detail and the photo-realistic and modular selection of »pilot 3.0« measuring programs enable »threadCheck« to meet a host of requirements.

»threadCheck« can also be used as a universal measuring machine for metal cutting tools in general.

Measuring Program for Threading Tools

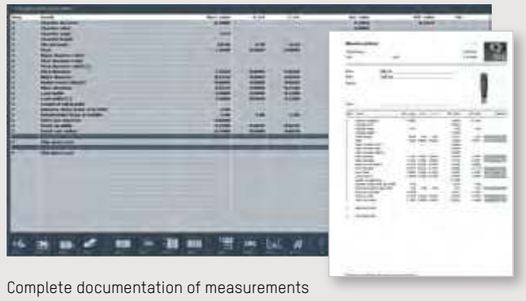
For operator-independent and automatic measurement of threaded tools.

Actual-Target Contour Comparison »lasso«



Determination of contour profile and transfer of target contour in »lasso« for thread formers.

Evaluation of Results Including Test Report



Complete documentation of measurements through automatic evaluation and output as PDF or printed test report.

ZOLLER
INSPECTION SOLUTIONS

fully automatic
distortion-free
universal

Options

Measuring sensor for tactile measurement, for example, pitch or form/position tolerance of hobbing machines.

Swiveling optical carrier for distortion-free measurement and checking of helical tools with transmitted light.

Micro sensor for measuring micro-geometries, i.e. protective and supporting chamfers.

The new universal solution for numerous requirements

Technical Specification	Travel Range Z-Axis	Travel Range X-Axis	Travel Range Y-Axis	Measurable Tool Diameter	Max. Tool Length for Axial Incidental Light Measurement	Measurable Snap Gauge Diameter	Swiveling Device for Optical Carrier
»threadCheck«	600 mm	235 mm	± 50 mm	400 mm	500 mm	100 mm	± 30°

Optional: without protective housing and with or without tailstock
Subject to technical modifications. The depicted machines may include options, accessories, and control variants.

The High-End Inspection and Measuring Machine for All Precision Tools

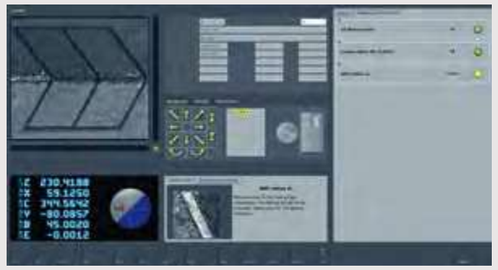
»titan«

In the world of tool metrology, the new ZOLLER universal »titan« machine is unsurpassed in its flexibility and precision.

The ergonomic and easy operation of a measuring machine of these dimensions offers an unbeatable advantage in terms of cost-efficiency and quality in the micro-precise measurement of metal cutting tools. The five to seven CNC-driven axes of the ZOLLER »titan« measure every type of metal cutting tool fully automatically and with the highest precision, ranging from measuring the outer contours, operator-independent complete control through extensive documentation. The vibration-reduced base is designed to fit further axes and sensors so that, for example, cutting edge preparations can be measured fully automatically and with unique repeatability.

»titan« with vibration-reduced base, automatic level control, full housing, five to seven CNC-driven axes, and a multi-sensor optical carrier.

Cutting Edge Preparation »skp« in »expert« Mode

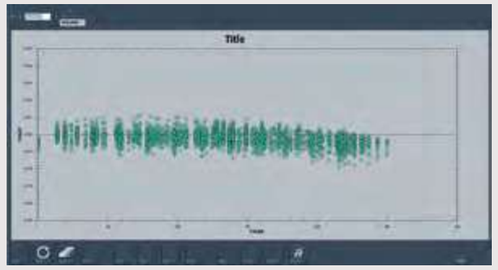


The 3D sensor is positioned CNC-driven to the contactless cutting edge preparation.

Graphic »skp« Display

A 3D model of the scanned cutting edge is generated and outputted to evaluate the contour profile of the cutting edge preparation.

Measuring Machine Ability »titan«



The certified FKM gauge, which can be traced to the national standard, automatically determines a range where the true value of the measured dimension lies, with a probability of 95%. A measuring uncertainty of at least E = (2.0 + L/250 mm) µm is achieved with the »titan«.

multisensor ability
reduced vibration
attractive

Incidental and Transmitted Light Measurement

Measuring room »titan« with high precision spindle, with CNC swiveling device for optical carrier, CCD cameras, and LED lighting.

Edge Rounding

Measurement of edge rounding in the radius segment with CNC-swiveling »Z3dCam« sensor.

The new high-end solution for all metal cutting tools

Technical Specification	Travel Range Z-Axis	Travel Range X-Axis	Travel Range Y-Axis	Measurable Tool Diameter	Measurable Snap Gauge Diameter	Max. Tool Length for Axial Incidental Light Measurement
»titan«	600 mm	130/75* mm	± 100 mm	260/150* mm	80 mm	400 mm

* Optional with optical carrier CNC swiveling device
Subject to technical modifications. The depicted machines may include options, accessories, and control variants.

The Solution for the Fully Automated Measurement of Cylindrical Hobbing Machines

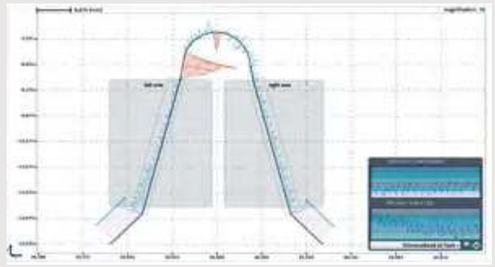
»hobCheck«

The »hobCheck« opens up unprecedented opportunities for fully automated, cost-effective, and complete measurement of hobbing machines – and much more!

Equipped with a CNC-driven swiveling optical carrier, electronic measuring sensor, transmitted light processing, and incident light camera, it can measure parameters such as tooth profiles, concentricity/wobble, pitch etc. Over 200 measured values can be evaluated and the calculation of the quality grades and graphic documentation is fully automatic. Additionally, the »hobCheck« offers convenient wear determination.

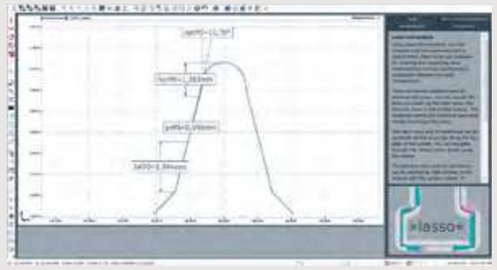
»hobCheck« with swiveling optical carrier for distortion-free measurement and checking of helical tools.

Target-Actual Comparison Tooth Profile



Evaluation of tooth form via variable measuring windows at the flanks, including automatic target-actual comparison.

Measuring Program »Protuberanz« for Hob Cutters



For the measurement of cylindrical hob cutters including calculation of the amount, height, and angle of protuberance.

Wear Inspection »aec« (auto-edge-check)

The »aec« function automatically records the circumferences of an optional number of teeth and thus provides a quick overview for finding and targeted checking of major wear to ensure that neither too little or too much is removed during resharpening.

easy operation
fully automatic
workshop-compatible

Display of Results According to DIN 3968

Graphic display of the measured results according to DIN 3968 with tolerance check and information on the quality grade achieved per parameter.

Test Reports Including Tolerance Graphs

Exact and complete documentation, competent and clear.

Fully automatic measurement of hobbing machines

Technical Specification	Travel Range Z-Axis	Travel Range X-Axis	Travel Range Y-Axis	Measurable Tool Diameter	Measurable Snap Gauge Diameter
»hobCheck«	600 / 800* / 1000* mm	200 mm	± 40 mm	400 mm	60 mm

Maximum Measuring Depth Sensor	Maximum Measuring Length of Face	Swiveling Device for Optical Carrier	Tool Lengths Tailstock (Option)
25 mm	200 mm	± 30°	100–600/800 mm

* optional
Subject to technical modifications. The depicted machines may include options, accessories, and control variants.

The Measuring and Inspection Machine for the Complete Check of Precision Saws

»sawCheck«

ZOLLER »sawCheck« optimizes the precise and cost-efficient manufacturing and regrinding of precision saws. The saw blades are checked fast, reliably and precisely, and are extensively documented – regardless of the clamping.

The saw blades are clamped via universal reducers and the run-out for the saw body is documented automatically. Subsequently, it is compensated when measuring the teeth. The manually operated –90°/0°/+90° incident light image processing system is available for tooth inspection (radial/axial).

The universal clamping system of the »sawCheck« provides optimal, distortion-free clamping and measurement through horizontal holding of the saws.

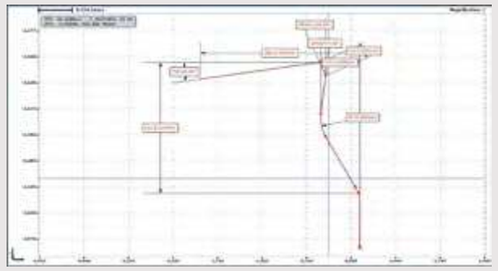
»metis« Tool Analysis

Radial measurement of the saw tooth with incidental and transmitted light and direct display of the measured contour.

Measuring Program "Tooth Shape"

For fully automatic generation of measuring procedures and programs in »pilot 3.0«, including calculation of the intersection points, distances, angles, and much more.

Display of Results Including Dimensioning



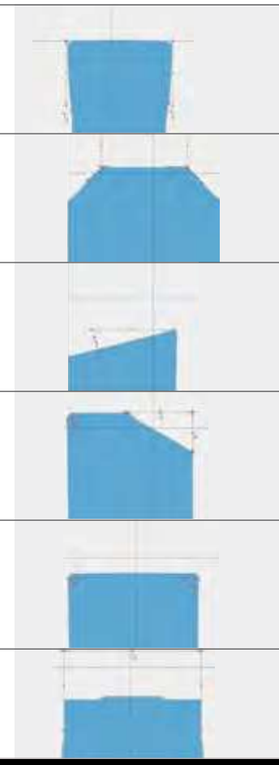
Complex dimensioning of distances and contour elements, illustrated here the tooth shape "thin kerf precision saw".

ZOLLER
INSPECTION SOLUTIONS

unique
automatic
fast and accurate

All parameters are measured with transmitted light with cutter shapes or with »metis«:

- Flank angle and tooth width
- Head width
- Cone angle
- Chamfer length/angle
- Corner radius
- Width of tooth face



Precise, cost-efficient manufacturing and regrinding

Technical Specification	Travel Range Z-Axis	Travel Range X-Axis	Measurable Tool Diameter	Incident Light Camera Diameter	Width of Saw Blade
»sawCheck«	100 mm	300 mm	300-800 mm	200 mm	1.5–8 mm

Subject to technical modifications. The depicted machines may include options, accessories, and control variants.

ZOLLER
INSPECTION SOLUTIONS

The Automation Solution for Companies with High Tool Throughput Levels

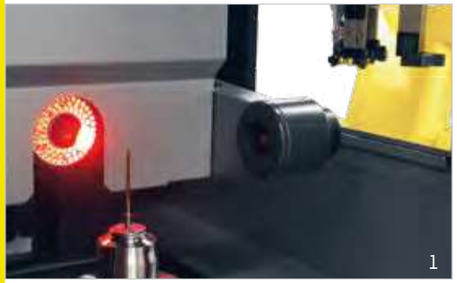
»roboSet«

»roboSet« loads your ZOLLER measuring machine 24/7.
Complex measuring tasks can be processed fully automatically with 100% checking guaranteed.

»roboSet« can load virtually any CNC-driven ZOLLER measuring machine equipped with automatic power-operated clamping and »pilot 3.0« with shaft tools. It is easy to operate – simply push the start button to start the automatic operation.
ZOLLER »roboSet« offers a high level of process safety due to the automatic path correction of the robot during every single feeding procedure. In addition, mechanical disconnection from the measuring device assures the highest standards of measuring accuracy.

Fit for every requirement with »pilot 3.0« - fast and simple. Ideal for fully automatic CNC-driven measuring machines with »roboSet«.

Online status display: status on view for 24 hours.

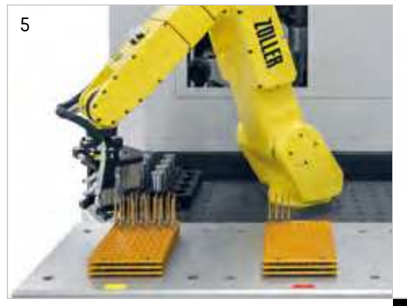


1

2

3

4



5

fully automatic
enduring
accurate

1__Universal Automation Solution »roboSet / genius«
Automation solution for automatic measurement of optional parameters with the universal »genius 3« measuring machine.

2__»roboSet / threadCheck«
100 % check, even with helical threaded tools.

3__Automation Solution for Tool Labeling »roboMark«
Operator-defined labeling options directly after measuring.

4__Automation Solution for Tool Cleaning »roboClean«
Unit for fully automatic cleaning of shaft tools prior to measuring.

5__Automatic Assignment of Pallets
Automatic target-actual comparison of tools through input of tolerances into »pilot 3.0« pallet management including sorting.

Automatic and efficient: ZOLLER automation solutions

Technical Specification	Range	Positioning Accuracy	Maximum Load	Working Area	Number of Pallets
»roboSet«	900 mm	±0.03 mm	5 kg without gripper	1050 x 350 mm	3 pieces

Subject to technical modifications. The depicted machines may include options, accessories, and control variants.

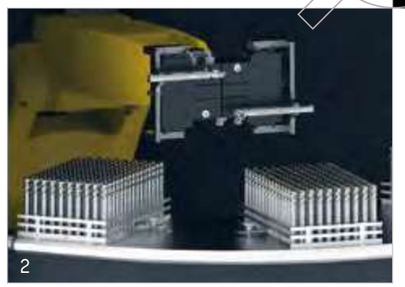
The 24/7 Automation Solution for High Tool Throughput

»roboSet 2«

»roboSet 2« is available in combination with closed ZOLLER universal measuring machines »titan«, »threadCheck«, and »genius«.

Ideal for tool manufacturers with very high tool throughput who need 100% monitoring and logging. Networked directly with your ZOLLER universal measuring machine, »roboSet 2« can load tools around the clock, 7 days a week, completely autonomously. Thanks to a multi-pallet system and double gripper, it can process and document large numbers of tools fully automatically. The machine also guarantees maximum process security and measurement accuracy through automatic path correction during feeding, and a loading system which is mechanically decoupled from the measuring machine.


1


2


3

4


5

100% certifiable quality
absolute process security
maximum measurement precision

1__8 Pallets on 2 Levels
Automatic target-actual comparison of tools through input of tolerances into »pilot 3.0« pallet management including sorting.

2__Double Gripper for Extra Fast Tool Throughput
Fully automatic loading, measuring, and removing tools as well as changing of reduction sleeves.

3__Fully-Automatic Ultrasonic Cleaning: »roboClean«
Unit for fully automatic cleaning of shaft tools prior to measuring.

4__Automatic Tool Labeling: »roboMark«
Operator-defined labeling options directly after measuring.

5__24/7 automatically Mesurement
»roboSet 2« loads tools around the clock, 7 days a week, completely autonomously. During the day you use the measuring machine also self-sufficient.

Automatic and efficient: ZOLLER automation solutions

Technical Specification	Range	Positioning Accuracy	Maximum Load	Working Area	Number of Pallets
»roboSet2«	920 mm	±0,03 mm	7 kg without gripper	1050 x 350 mm	8 pieces

Subject to technical modifications. The depicted machines may include options, accessories, and control variants.

For Smooth Production Processes

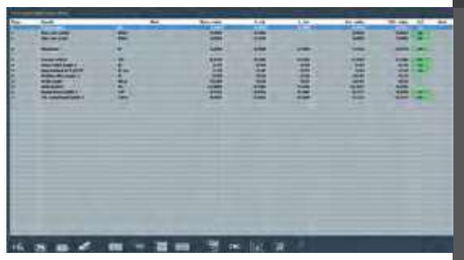
Process Optimization with ZOLLER

Growing demands are being placed on grinding and sharpening businesses as well as tool manufacturers. 100% checking, traceability, and process safety are increasingly becoming standard. The following pages demonstrate how these changes can easily be managed with ZOLLER:

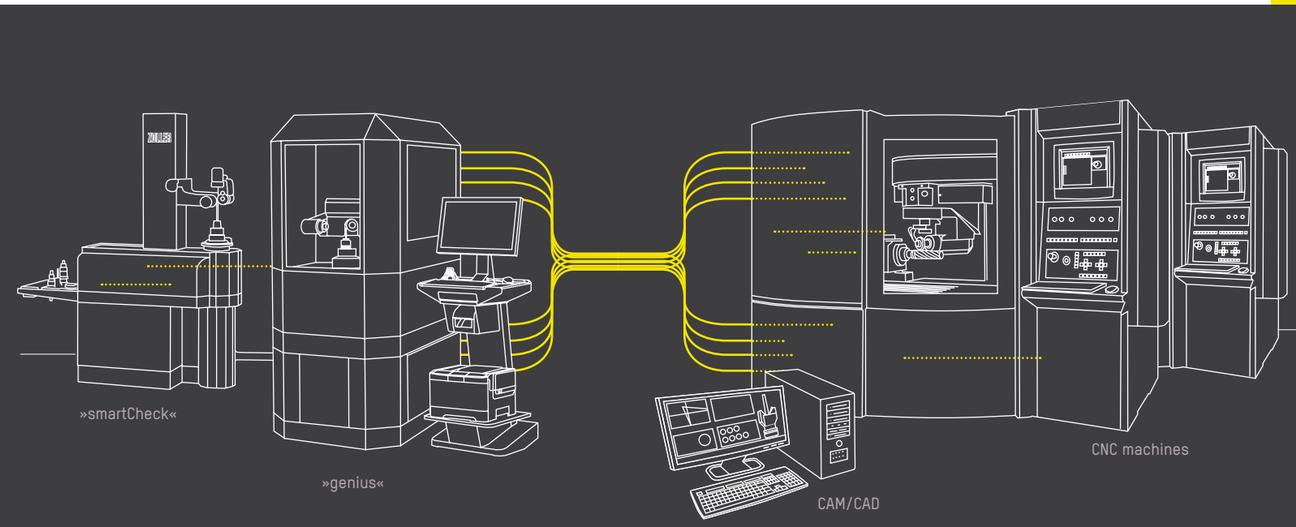
The ZOLLER interfaces are the basis for smooth operations and offer you entirely new savings potentials: the grinding program simultaneously creates the data set for the measuring machine from which the fully automatic ZOLLER measuring procedure is generated. Depending on the interface, the measured data are sent to the programming system or the grinding machine and the grinding program is corrected temporarily. This way the programming requirements and machine downtimes are reduced to a minimum. You save time and costs – and also avoid errors in data entry and in generating a new grinding program.

1 Call-up of interface and enter target data.

2 Programming and conducting measurements.



3 Measured results and resending of data.



Whether »genius«, »smartCheck« or »smile«: all ZOLLER machines can transmit the tool target/actual data paperless (depending on the scope of performance/measurement).

ZOLLER offers the matching interfaces for virtually all systems involved in the grinding process, like GDX 2.0, NUMROTO, Anca, MTS, and many more.

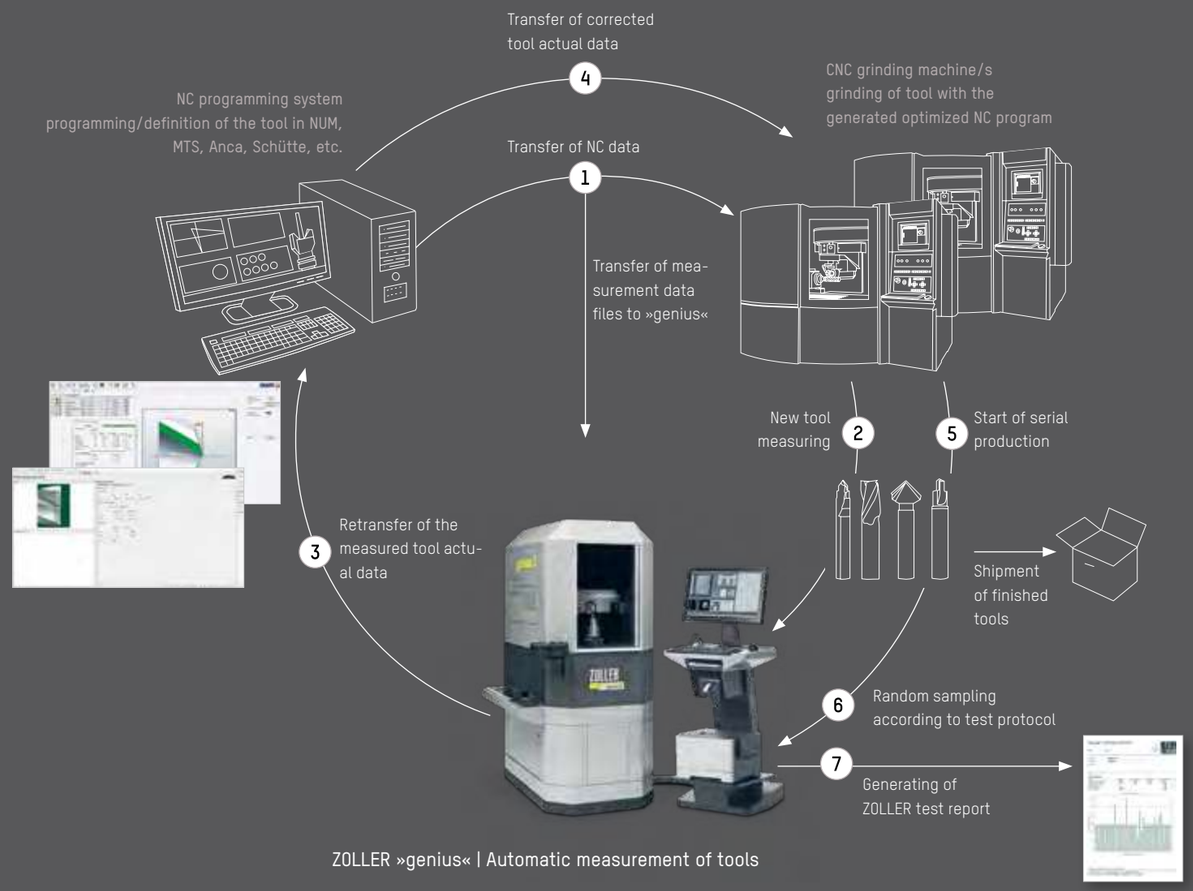
GDX Interface

- Open data interface for the construction and manufacturing of cutting tools
- Transfer of the tool definition to the ZOLLER measuring machine in GDX format
- Acquisition of real tool contour and all parameters to be measured
- Retransfer of the data in GDX format
- Transfer of the grinding wheel data from the measuring machine to the grinding machine

- Automatic generation of measuring procedure for measuring and inspecting tools from grinding programs
- Fully automatic contour correction for form tools »coCon«
- Fully automatic measurement and data transfer of the grinding wheel sets
- Marginal programming requirements for regrinding of metal cutting tools
- Complete documentation with automatically generated and saved test reports

Processing of Nominal Data Which Has Been Programmed with NUM, MTS, Anca, Schütte etc.

New Tools



ZOLLER »genius« | Automatic measurement of tools

1__Data Transfer/ Programming/Definition

The NC program for tool grinding is transferred to the NC grinding machine. At the same time the programming system sends a measurement data file to the »genius« from which ZOLLER generates a fully automated measuring procedure.

2__Manufacturing and Measuring Tools

The new tool is ground on the CNC grinding machine. This is then immediately measured fully automatically afterwards on the ZOLLER »genius«. Time-consuming programming is not required with the ZOLLER universal measuring machine.

3__Retransfer of the Measured Actual Data

The measured tool data are resent from the ZOLLER »genius« to the programming system or directly to the machine control.

4|5__Serial Production with Corrected Actual Data

Based on the actual tool data, the optimized NC program can be transmitted back to the machine and serial production can be started with micro-precise actual tool data.

6__Random Sampling Incl. Test Report

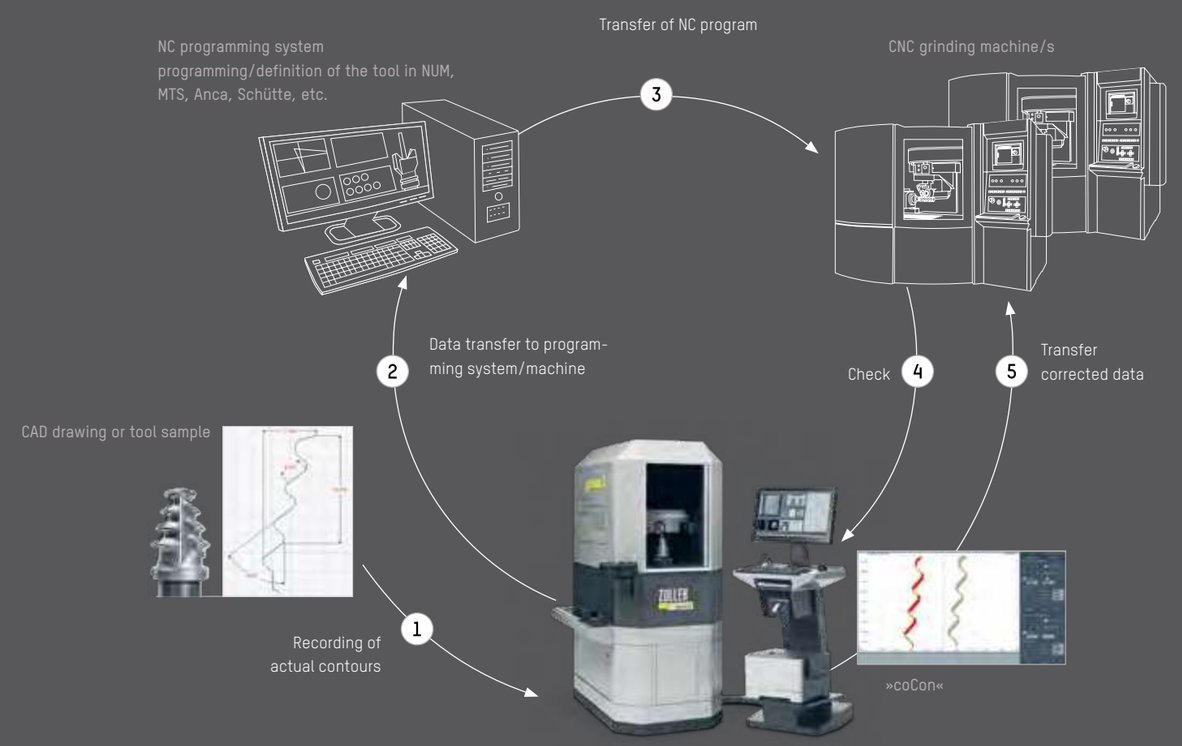
Serial tools are measured on the »genius« according to a predefined test plan and the measured results are printed out as a test report.

7__Shipment Incl. Test Report

Shipment of the finished tools includes ZOLLER test reports.

Recording a Complex Form Tool for Production or Correction

Form Tools



ZOLLER »genius« | Automatic measurement of tools

1__Recording of Actual Contours

The contours of the form tool are scanned fully automatically and with micro precision with the ZOLLER »genius« and recorded as complete contour profile with thousands of coordinate points. Only the start and end points of the measuring task are adopted via playback input.

2__Data Transfer Programming/Machine

The automatically scanned contour in the »genius« is exported in DXF format. The file is transferred to the programming system or directly to the machine controls.

3__NC Program

Based on the contour profile provided by the »genius«, the programming system generates the NC program for the grinding or erosion machines.

4__Check

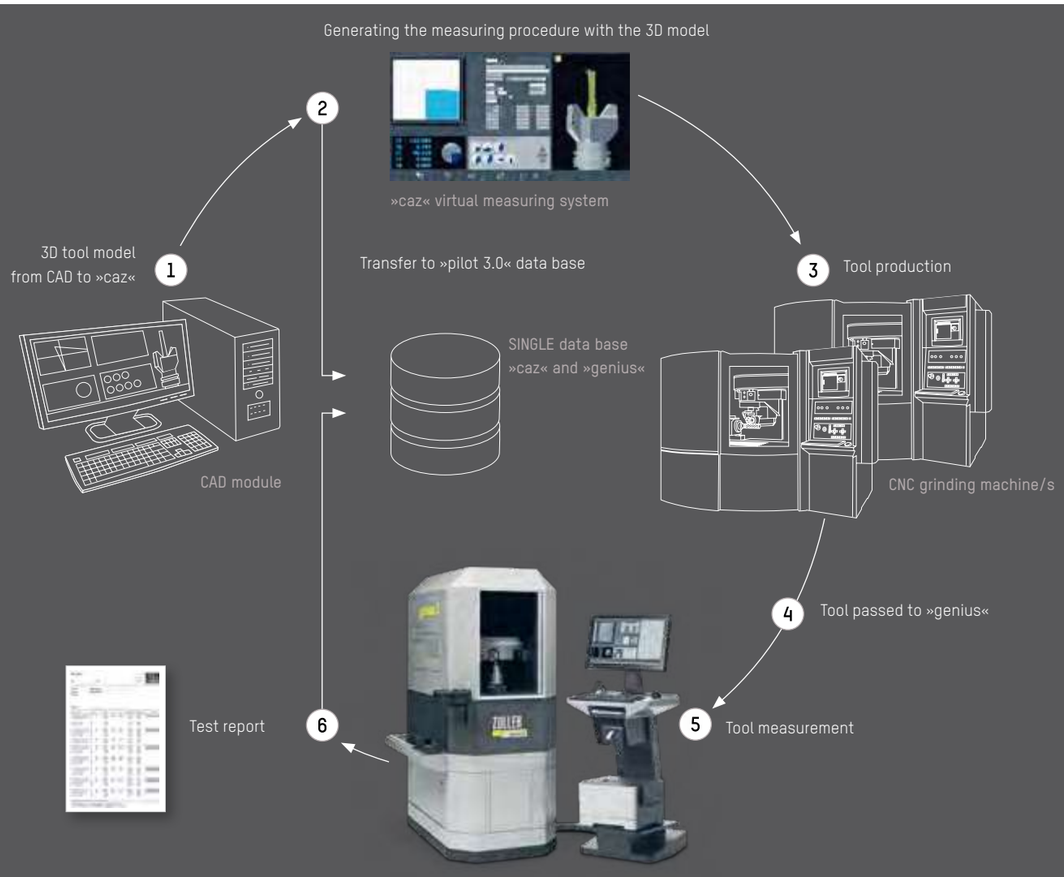
The first ground tool is scanned automatically by the »genius« together with a target-actual comparison with the target contour in DXF. Using the »coCon« software, deviations are inverted and the newly calculated correction contour (new path) is exported.

5__Transfer Corrected Data

The corrected files are resent to the programming system or transferred directly to the machine. The second tool is manufactured with an optimized program so errors in the grinding wheel or technical deviations of the machine are taken into account.

Determining Measuring Tasks Directly with the 3d Model of the Tool

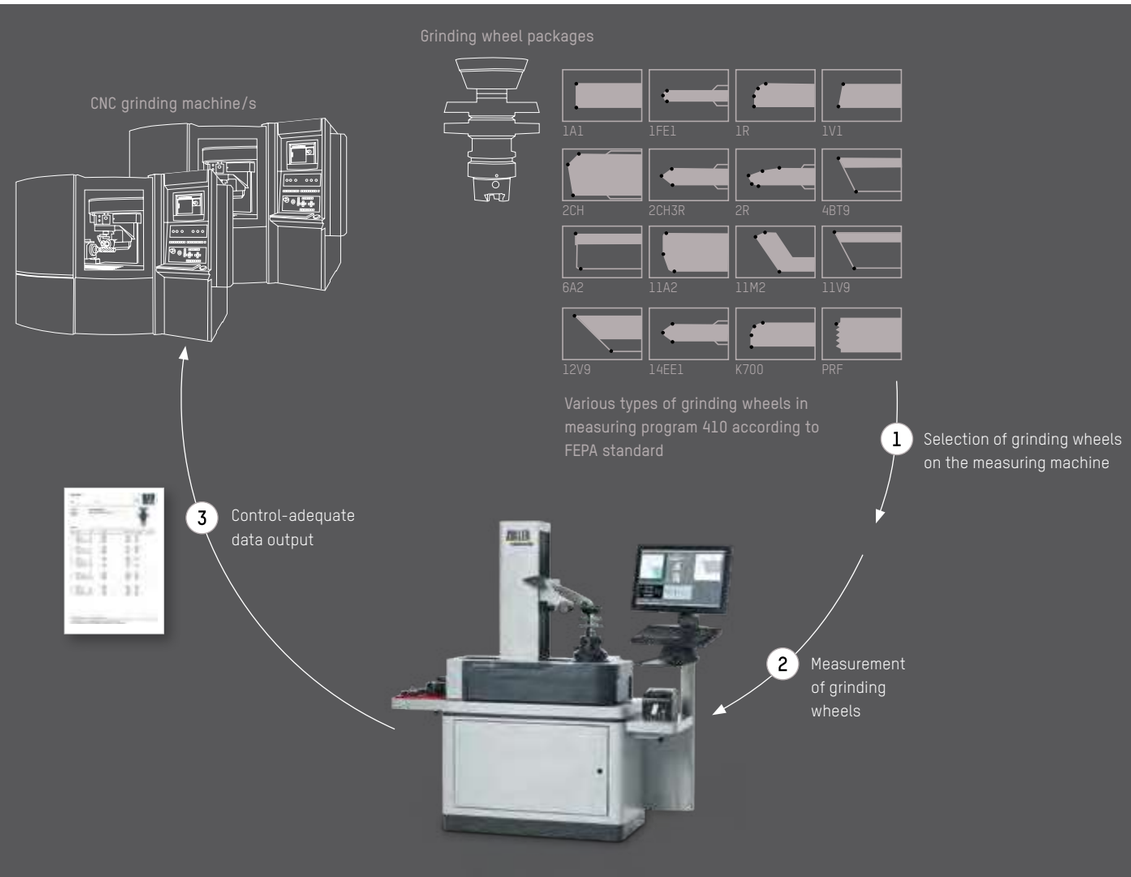
»caz« for Tool Manufacturers



ZOLLER »genius« | Automatic measurement of tools

Measuring Program for Precise Recording of Individual Parameters for Grinding Wheels

Measurement of Grinding Wheels



ZOLLER »smile / pilot 3.0«

1__Programming and Analysis

Tools are developed with CAD software and the 3D model transferred to »caz«. Prior to fabricating a prototype, the tool is analyzed in an FEM application using the 3D model.

2__Analysis and Generation of Measuring Procedure

The tool designer, who knows the relevant details of the tool, generates and simulates the measuring procedure in »caz« using the 3D model. The data is then transferred to the ZOLLER data base.

3__Tool Production

Milling or grinding of the tool on the CNC machine is performed according to the 3D model or NC program.

4|5__Shipment of Tools and Tool Measurement

Adoption of the finished tool and measuring according to the measuring procedure as described under point 2 with tolerance check on »genius«.

6__Check Incl. Test Report

After measuring and corrected tolerance check on the »genius« the tool is ready for shipment.

1__Selection of Types of Grinding Wheels

Different types of grinding wheels can be selected on the ZOLLER »smile«, compiled as a package and saved.

2__Measurement

After entering and confirming the values in the input dialog, the measuring run can be started. The X and Z target positions are positioned automatically and measured.

3__Control-Specific Data Output

Output of the measured data via the network to the CNC machine, programming system for manufacturing or simulation. A printout of the measured values can be added at any time as accompanying documentation.

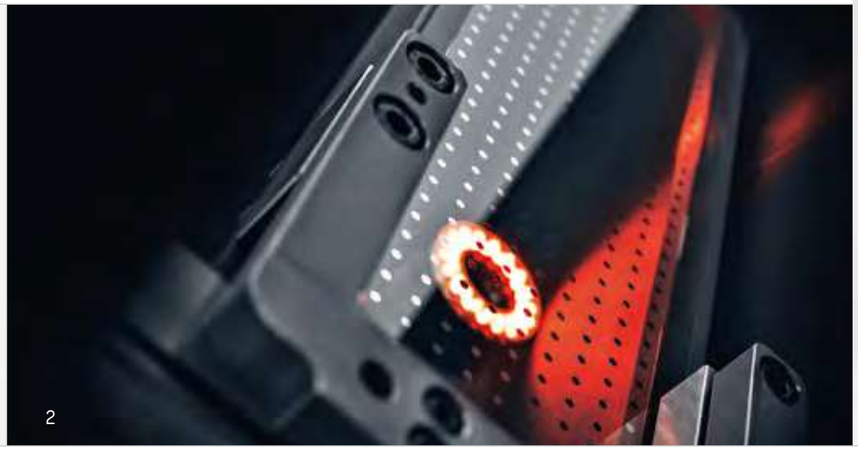
For Proven Quality in Tool Production

Certified Accuracy

traceable
verifiable
complete

ZOLLER measuring technology is your quality guarantee for precision in manufacturing. The measuring uncertainty of the ZOLLER inspection and measuring machines is verified with certified test mandrels, angle, step, and radius gauges, image processing is calibrated accurately, and the suitability of the measuring machine is established 100%. The result is a traceable and documented precision which meets the product-specific requirements of metrology. This guarantees our customers permanent traceable measuring reliability.

1



2

3

4

5

6

1__Angle Gauge
For checking angle measurement precision of the measuring machine, for draft angles and effective cutting angles.

2__FKM Gauge
Calibration gauge made of fiber ceramics for calibration of absolute accuracy and determining the measuring uncertainty E = (3 + L/250 mm) µm.

3__Step Gauge
For verification and checking of diameter precision.

4__Calibration Gauge »pilot 3.0«
For calibration of the image processing system »pilot 3.0« with transmitted and incident light.

5__Radius Gauges
For checking measuring precision at the radii.

6__Test Mandrels
For verification of parallelism and concentricity with high-precision interfaces for ZOLLER universal spindles.

Satisfied Customers Speak for Themselves – and for ZOLLER

Success Is the Best Reference

AIRBUS
ALSTOM
ALCATEL
ANCA
ANTON HÄRING
AUDI
BARMAG
BMW
BOEING
BOERBOOM SONDERWERKZEUGE
BOMBARDIER TRANSPORTATION
BOSCH
BRAUN
BRITISH AERO SPACE
CATERPILLAR
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SULZER
TAEGUTEC
TOYOTA
TRUMPF
VOITH
VOLKSWAGEN
VOLLMER
VOLVO
WEBB WHEEL
ZF FRIEDRICHSHAFEN
ZUMTOBEL
YG-1
AND MANY MORE.

Christel and Ralph Hufschmied, Hufschmied Zerspanungssysteme GmbH

„In the field of metrology there is an increasing demand for 100 % documentation and traceability. Therefore we need to automate more and more. We operate ZOLLER »roboSet« in combination with »genius« in 3 shifts, they run day and night and give us time savings of approximately 30 %."

Jean Madern, Managing Director Madern International B.V., Netherlands

„The ZOLLER »genius« can really measure all the relevant parameters of the milling tools: this applies both to the cutting edges at the circumference and the helix, as well as effective cutting angles and draft angles, face geometries and the diameters at any point for tapered tools. By using this universal measuring machine we can now better understand the wear process and improve our knowledge in the field of grinding technology decisively."

Frank Höhnel, Project Manager Nomos Glashütte, Glashütte

„We place the highest demands on measuring and inspection. Our experience with ZOLLER has been good."

„All we need to do is to place the tool into the »pomBasic«, position it, measure it – and finished. It is so simple: automatic finding of the cutting edges for high accuracy, it is like an assisted measuring process. And we get the test reports at the click of a mouse."

Paul Lanza, sales employee and operator,
Neuber Industrial Diamond Company, Burlington, MA, USA

„If you are looking for a measuring machine for convenient and fully automated measuring of metal cutting tools, there is really only one choice: the ZOLLER »genius«."

Daimler, Stuttgart, Department WZI

At Home in Germany – There for You Around the World

ZOLLER quality is "made in Germany" – and there for you, anywhere in the world.

Our company has its own operations and branches in 58 countries, guaranteeing we are close to customers and can provide first-class, personal customer service support in local markets.

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REPRESENTATIVES

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BUSINESS SOLUTIONS – from A–Z

Service

Supplying quality at ZOLLER also means being there for you after the sale. With personal advice and with high quality maintenance models for your ZOLLER tool presetter and measuring machines. The ZOLLER Service Team with its specially ZOLLER-trained technicians is always at your call. For low downtimes and first class service.

ZOLLER Service, an Overview:

ZOLLER offers you unique support and service - worldwide. This starts with preventive maintenance for a long service life, precision, and reliability. And is complemented by quality certificates, calibration services, and targeted training measures to ensure that your entire hardware and software are always in top condition. Extremely well trained and equipped ZOLLER service employees are available to install and service the measuring machines.

The competent ZOLLER hotline offers you support in all questions pertaining to applications and services. A call is all it takes:

Telephone +49 7144 8970-0

- Training and courses on numerous application fields
- Full service maintenance in contract
- ISO 9000 check with calibration certificate
- Measuring machine capability test
- Machine calibrations
- Proof of accident prevention regulations
- Software updates and hardware upgrades
- Modification and retrofitting of mechanical, optical and electronic components

Product Overview

Economical Solutions for All Applications

Unless stated otherwise, the tool presetter and measuring machines as well as the measuring and inspection devices are equipped with ZOLLER »pilot 3.0« image processing. The »pom« series is equipped with ZOLLER »pomSoft« image processing.

BRONZE

Software package for the economical organization of complete tools, individual components and machines

SILVER

Software package for efficient stock management and standardized data management for production

GOLD

Software package for a transparent process chain and solid cost control

Tool Management

Automation solutions

»roboSet / venturion«

Smart automation solution for 100 % tool check

»roboSet / genius 3«

Smart automation solution for the comprehensive inspection of all metal cutting tools

»roboSet 2 / genius«
»roboSet 2 / threadCheck«

The smart 24/7 automation solution for for tool manufacturers with very high tool throughput

»smileCompact«

The mini-must-have for professional tool presetting and measuring

»smile / pilot 1.0«

Vertical tool presetter and measuring machine for contract manufacturing

»smile / pilot 2 mT«

Vertical tool presetter and measuring machine with innovative Touch-Screen operating technology

»smile / pilot 3.0«

Vertical tool presetter and measuring machine for a professional start

»venturion 450«

The premium presetting and measuring machine for tools of all kinds

»venturion 600/800«

Tool presetting and measuring machine series of modular premium class with extended measuring range

ZOLLER Data base

»pomBasic«
»pomBasicMicro«

Inspection machines for process-oriented measurement and inspection of drills, milling cutters and countersinks, design also for micro-geometries

»pomSkpGo«

Mobile solution for the measurement of the cutting edge preparation

»pomZenit« mit »pilot 3.0«

Measuring and inspection station for milling head manufacturing directly next to the machine

»hyperion 300«

Horizontal tool presetting and measuring machine series specifically for turned production

»hyperion 500/700«

Horizontal tool presetting and measuring machine series specifically for turned production with extended measuring range in the Z-axis

»redomatic«

The universal presetting, measuring and heat-shrink machine

»tribos«

The presetting, measuring and shrinking machine with TRIBOS clamping system

»zenit«

CNC tool presetting and measuring machine for face and right-angle milling heads

»millCheck«

CNC presetter and measuring machine for milling heads and cap milling machines

»smartCheck«

The high performance universal measuring machine for tool inspection

»genius 3s«
»genius 3m«

The universal measuring machine for precision tools

»threadCheck«

Universal measuring machine for complete measurement of helical tools

»gemini 2«

Special presetter and measuring machine for crankshaft cutters

»aralon«

The CNC-driven measuring instrument for crankshaft cutters with internal tool cutting edges

»reamCheck«

The measuring machine for the tactile measurement of finely adjustable cutting inserts, especially reamers

»powerShrink«

Inductive manual shrinking machine for HSS and hard metal tools

»toolBalancer«

Modular balancing system for maximum accuracy

»millSet«

Presetting station for face milling cutters at the machine directly in manufacturing

Presetting and measuring technology

Tool measuring technology

»titan«

The high-end universal measuring machine for fully automated complete tool measurement

»hobCheck«

Universal measuring machine for complete measurement of hob cutters

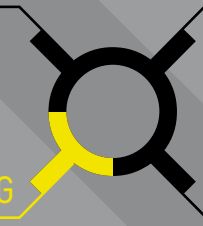
»sawCheck«

Measurement and inspection device for the fully automated, micro-precision measurement of metal saw blades

ZOLLER solutions

PRESETTING & MEASURING

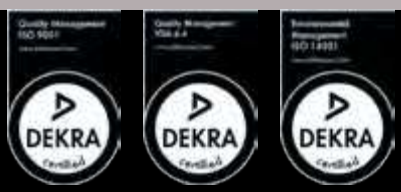
TOOL MANAGEMENT



INSPECTION & MEASURING

AUTOMATION

ZOLLER solutions – comprehensive optimization of your manufacturing operations. ZOLLER combines hardware, software and services to individual system solutions to improve quality, efficiency and productivity. Customers of ZOLLER will benefit from our knowledge as a market leader in the field of tool measurement technology. As a family-run business, ZOLLER guarantees to provide a sustainable and competitive advantage thereby making a measurable contribution to your success.



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ZOLLER®
expect great measures