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

Contents

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 circular grinding

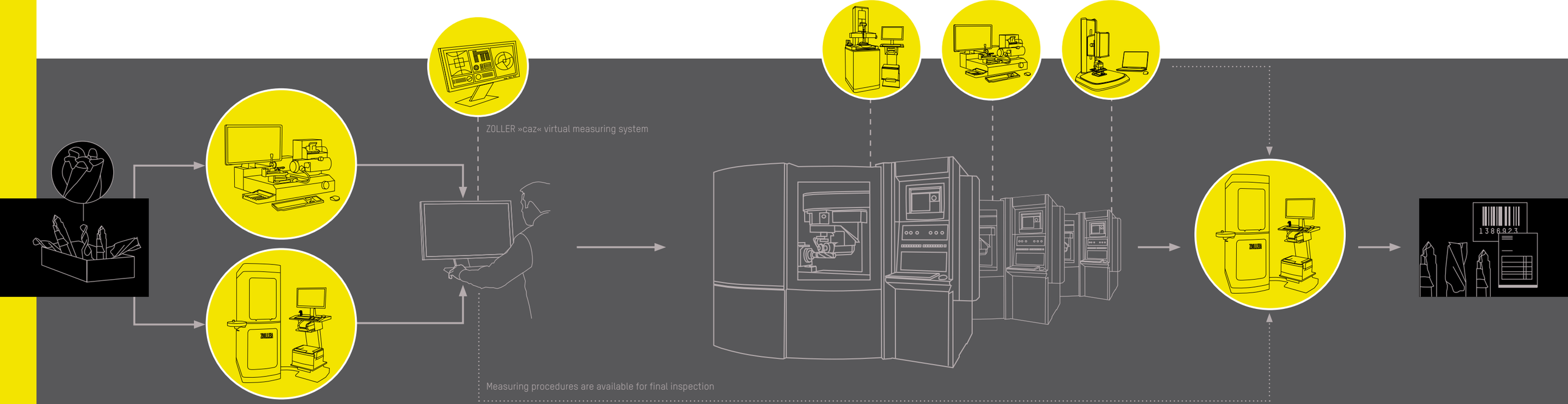
»pomDiaCheck« determines the diameters (circular grinding) of circular ground tools or blanks with high precision < 1µm.

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

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



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 system.

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.

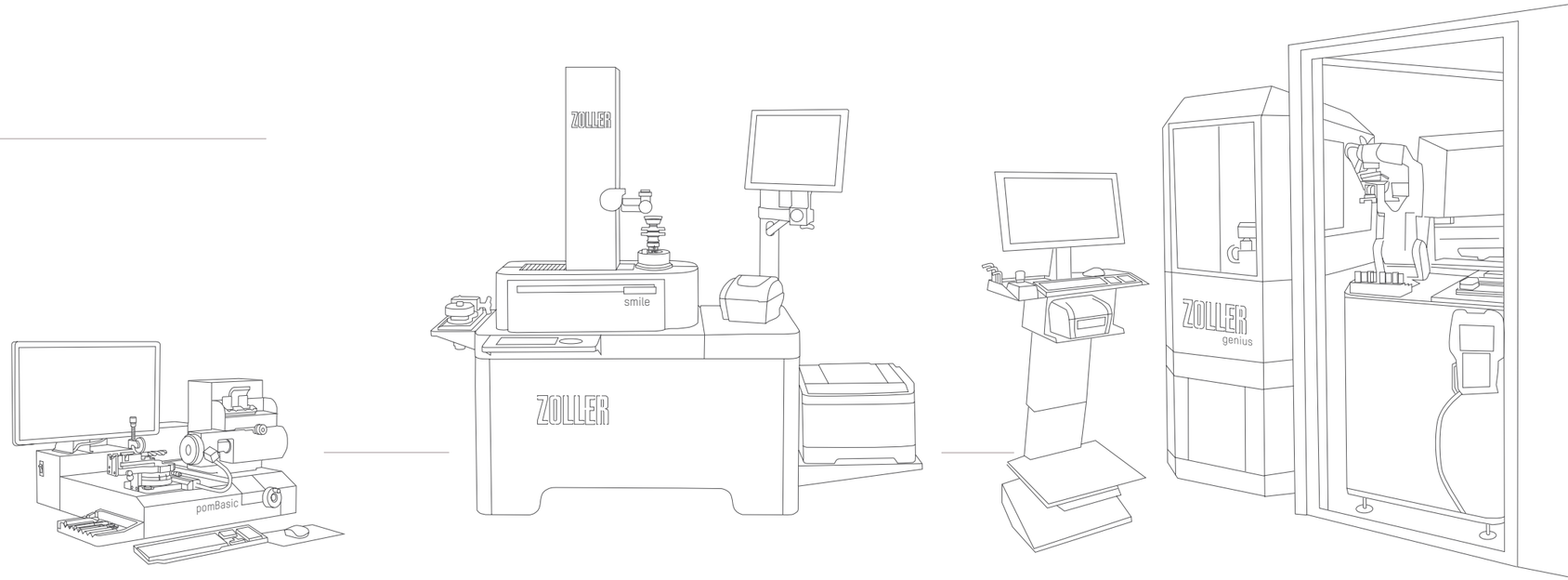
6 Shipment

On-time delivery of high quality and documented tools.

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 it's »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 %.

Innovative technology for highest accuracy

Precision has a name: ZOLLER

nearly 70 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.

3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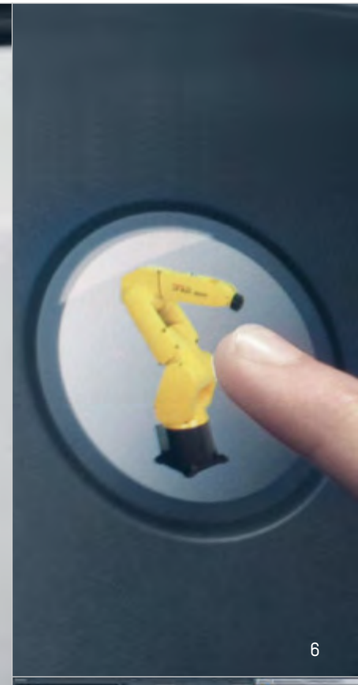
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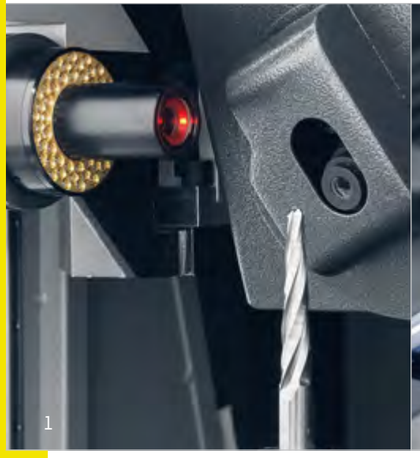
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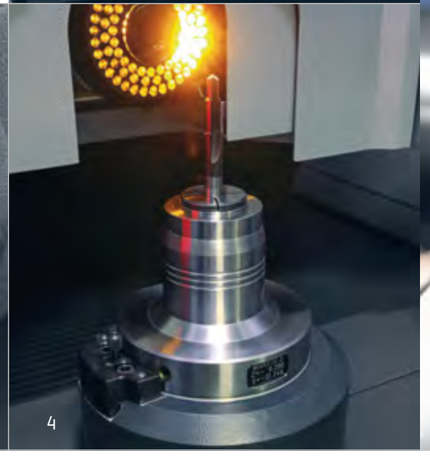
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1__Multi sensor technology
Image processing systems with incident and transmitted light and special sensors for contactless and automatic detection of various tool contours, surfaces, cutting edge preparations and many other tool geometries.

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

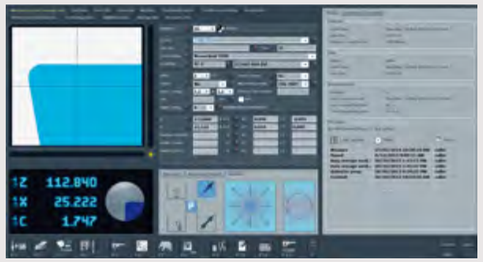
The benefits of simple to operate measuring solutions are obvious: with the aid of automated solutions, tools are measured reliably and accurately at the push of a button, operator-independent, and consistently repeatable. Results are recorded in their entirety and documented in detail. The advantage: 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

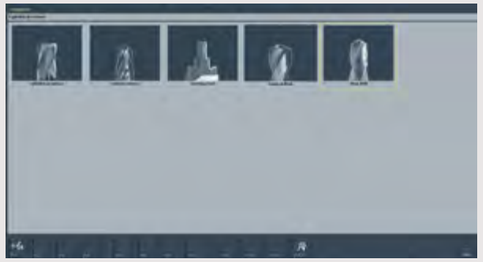
Tool measurement with »elephant« technology

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«



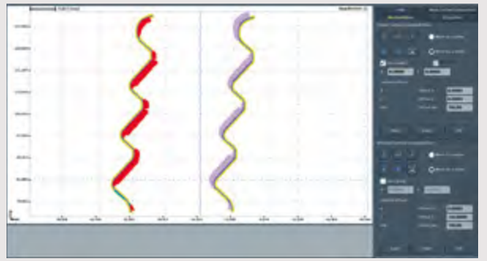
1 **Select the type of tool from the overview**



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«

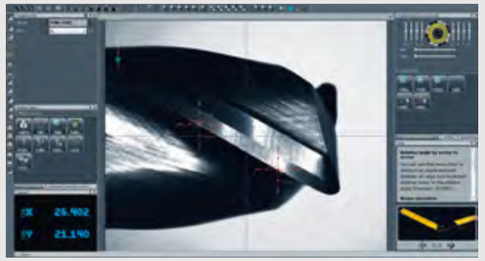
The ZOLLER inspection machines »pomBasic« and »pomBasicMicro« measure and check drills, milling cutters and countersinks – in all sizes, and down to micro tools. Compact and universal, the machines can be employed in the metrology room, tools receiving or directly in manufacturing.

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«

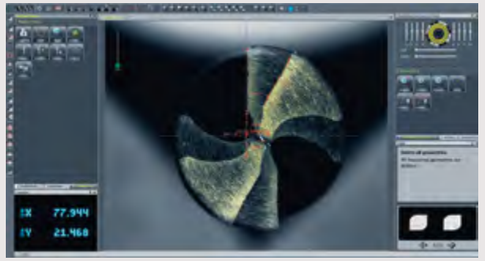
The universal holding fixture accepts shaft tools from 2 to 40 mm. The prism can be rotated by ± 90° for axial and radial measurement.

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's or printed inspection reports.

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 Ø	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.

ZOLLER
INSPECTION SOLUTIONS

The mobile solution for measurement of the cutting edge preparation

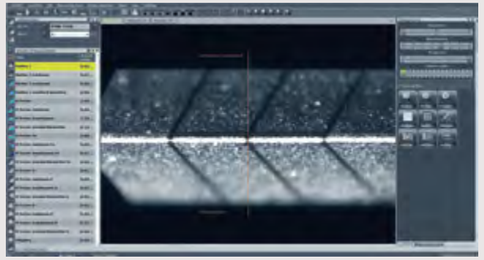
»pomSkpGo«

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.

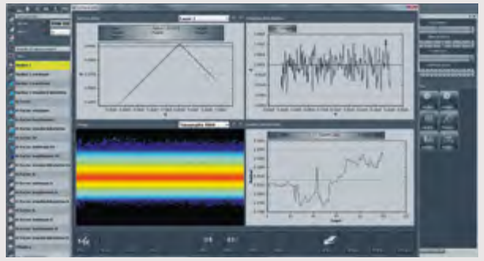
»pomSkpGo« with »Z3dCam« and Notebook with Software »pomSoft«.

Cutting edge preparation »skp«



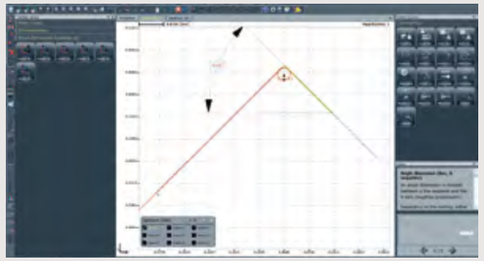
Live image of the cutting edge preparation for fast alignment and checking of surface.

Results and evaluation



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

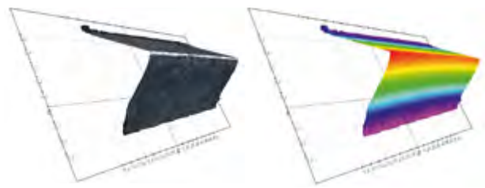
Nominal/actual comparison and dimensioning



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

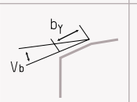
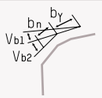
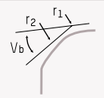
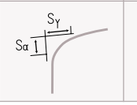
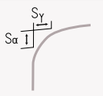
mobile and fast
micro-precise
contactless

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

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

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

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 Ø	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 measuring machine for highly accurate determination of diameters (circular grinding)

»pomDiaCheck«

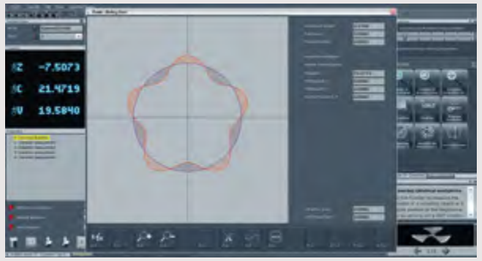
The ZOLLER »pomDiaCheck« allows fast and highly accurate determination of cylindrical parts diameters, turned parts or circular ground tools. The measurement is process-oriented and the range below 1. It includes information on tolerances quickly documents the measured results.

In order to measure drilling and reaming tools or circular ground blanks, the specimen is simply clamped between two tail centers, the desired measuring point is selected manually or CNC-driven, and the measured value given. Concentricity can also be measured by simply pushing a button.

The »pomDiaCheck« is CNC-driven and equipped with a state-of-the-art laser micrometer.

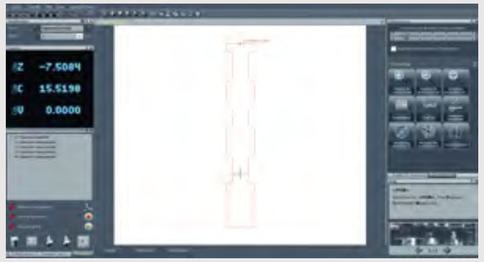
micro-precise
fast
workshop-compatible

Graphical user interface



Graphical evaluation of the measurement results including tolerance range.

High precision laser measurement



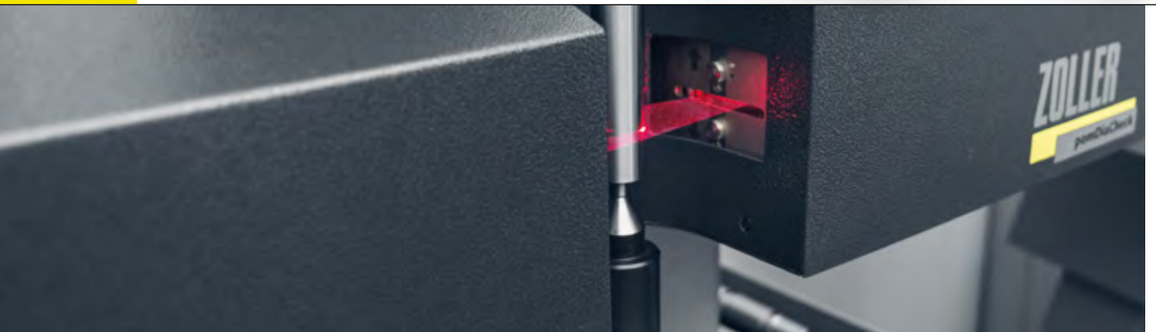
Highly accurate determination of diameters <1 absolute using the snap gauge principle.

Optical sensor

Laser micrometer for micro-precise measurement, contactless and close to production.

High precision spindle/tailstock

Precise positioning: the CNC-driven base spindle with rapid change interface for optional inserts and the pneumatic tailstock ensure precise clamping which is essential for accurate measurement.



Process-oriented measuring for smooth processes

Technical specification	Diameter measurement of cylindrical objects	Max. resolution	Laser width	Measuring field Ø	Measuring accuracy	Measuring speed
»pomDiaCheck« vertical	Lmax = 300 mm	0.01 µm	0.1 mm	0.06–38 mm*	± 0.5 µm (centered)	1,500 HZ
»pomDiaCheck« horizontal	Lmax = 300 mm	0.01 µm	0.2 mm	0.75–78 mm**	± 1 µm (centered)	1,200 HZ

* Less loss in measuring range in Z direction
** < 6mm diameter cannot be clamped between centers

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.

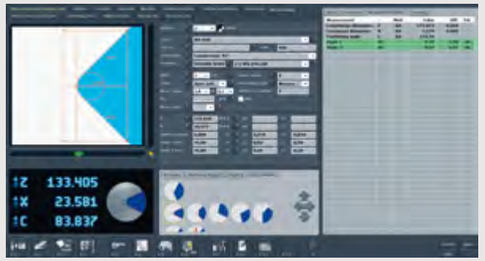
»smile« with image processing »pilot 3.0«.

Swiveling tool inspection for axial and radial measurement.

ZOLLER
INSPECTION SOLUTIONS

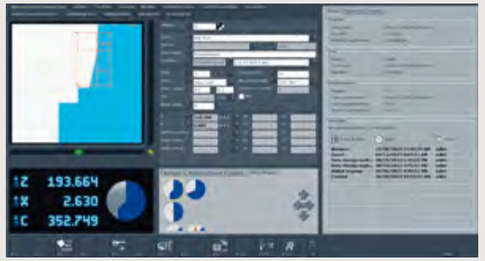
cost-effective
ergonomic
individually adaptable

Angle and radius measurement



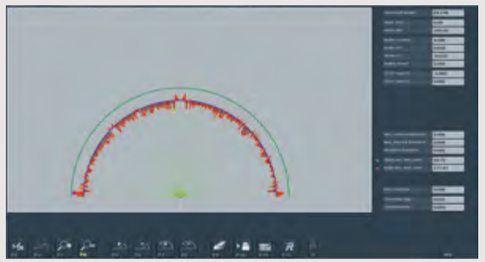
User interface »pilot 3.0« with automatic measurement of length, diameter, corner radius and cutting edge angle.

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.

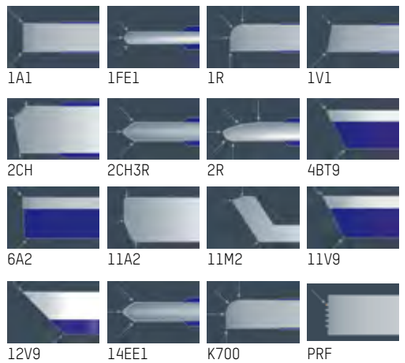
Radius contour »contur«



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.

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	Tool Ø	Snap gauges Ø
»smile 400«	400 mm	210 mm	420 mm	100 mm*
»smile 600«	600 mm	210 mm	420 mm	100 mm*

*Selecting "snap gauge" or "tool inspection" reduces the maximum tool diameter to 320 mm.

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.

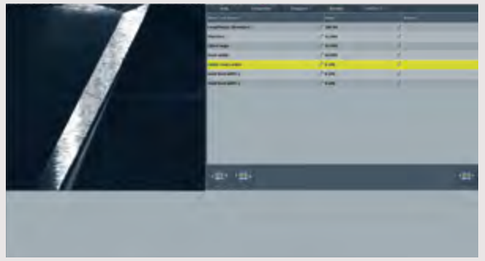
The »smarTcheck« and swiveling incident light processing allows cost effective checking, measuring and documenting of axial and radial geometries of tools. Simply click the mouse – no special training required. The measurement of tools prior to regrinding can result in a 25% increase in productivity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

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

Drawing generator »sinope«

For the automatic generation of 2D sectional drawings or 3D (CAD) graphics from the measured actual dimensions on step tools or die plates.

Tool analysis »metis«/circumferential measurement



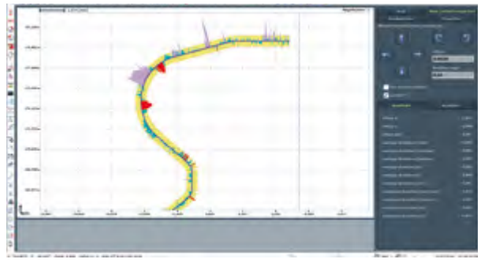
For the automatic determination of tool contours, radii, angles, distances, chamfer widths as well as wear and other parameters with incident and transmitted light.

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.

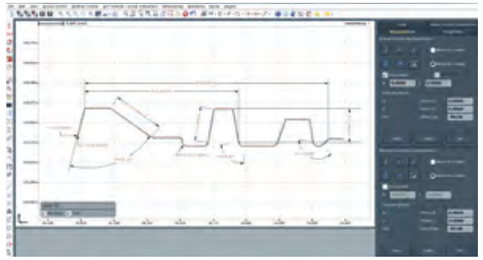
high performance
flexible
modular

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	Max. tool Ø	Snap gauges Ø
»smarTcheck 450«	450/600 mm	175 mm	350 mm	35 mm
»smarTcheck 600«	600/800 mm	320 mm	370/540 mm	80/35 mm
»smarTcheck 800«	600/800/1000 mm	550 mm	1000/1200 mm	80/0 mm

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

The universal measuring machine for precision tools

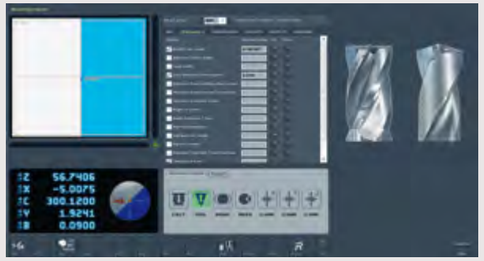
»genius 3s«
»genius 3m«

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.

Photo-realistic input dialog »fored«

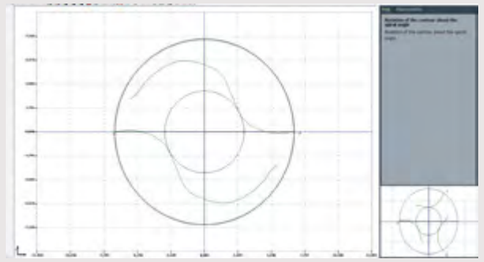


For measuring the chip space (see above), the circumference and the face of tools. The measuring procedures and parameters can be freely defined, selected via the Checkbox and saved for the tool.

Configuration assistant »expert«

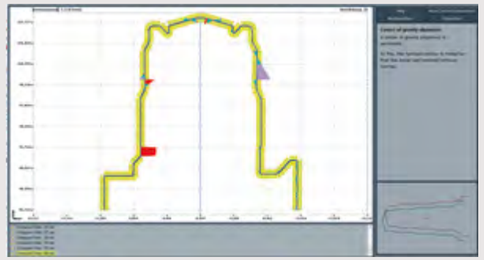
Regardless of the incident light measurement used, the configuration assistant carries out the measuring window sizes, lighting optimization and positions live and once only and then automatically stores the data.

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.

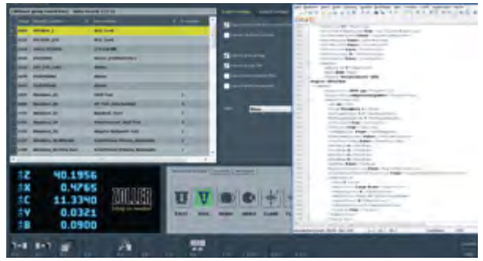
Contour check - form tools



Scan, compare - finished! Whether drills, countersinks, milling cutters or cutting inserts: simply enter the start and end points, the scan is performed automatically and the actual contour is compared with the target contour with micro-precision.

fully automatic
fast and precise
over 600 units in use worldwide

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.

»apus« test reports

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

Greater productivity through latest technology and ergonomics

Technical specification	Travel range Z-axis	Travel range X-axis	Travel range Y-axis	Tool Ø	Snap gauges Ø	Max. tool length for axial incidental light measurement
»genius 3s«	600 mm	175 mm	± 50 mm	340 mm	100 mm	500 mm
»genius 3m«	600 mm	175 mm	± 50 mm	340 mm	70 mm	500 mm

Draft angle circumference (3D)	Chamfer width circumference (3D)	Chip space/groove depth (3D)	Face geometry (3D)
Ø < 200 mm	Ø < 75 mm	Ø < 230 mm	Ø < 200 mm

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

The modular universal measuring machine for precision tools

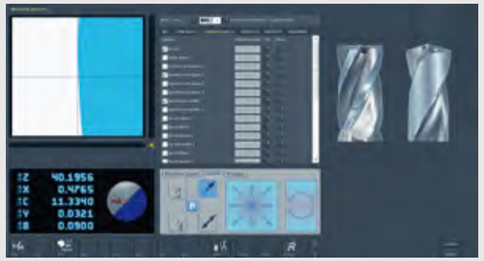
»genius 4«

ZOLLER »genius 4« continues the success story of the universal measuring machines for metal cutting tools in the fourth generation.

Any type of metal cutting tool can be measured accurately and fully automatically with »genius 4« due to five CNC-driven axes. The design of the »genius 4« was designed to meet the increasing requirements. In addition to the established and proven functions of the genius« the new platform includes universal extension stages. Furthermore, the look of the compact measuring machine was adapted to the new ZOLLER design line.

»genius 4« with »pilot 3.0« electronics: saves space and looks attractive.

Interactive configuration assistant »expert«

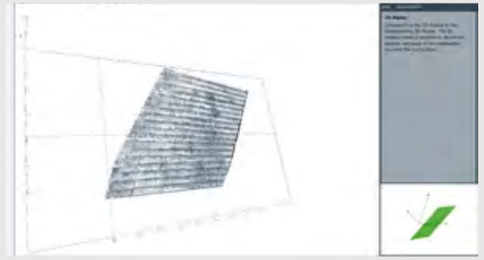


For measuring the chip space, the circumference (see above) and the face of tools. The measuring procedures and parameters can be freely defined and selected individually via the Checkbox.

»expert« measuring menu

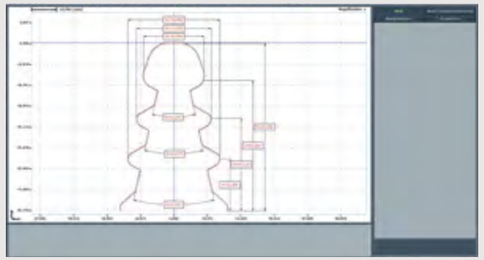
Live image and virtual joystick with navigator allow very easy definition of the measuring position.

»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.

Automatic dimensioning of actual contours

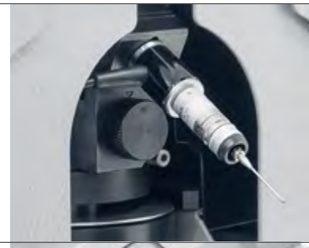


The actual contours are automatically dimensioned and evaluated in accordance with the given target contours.

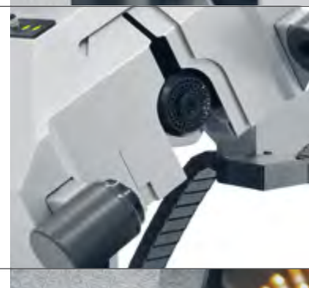
compact
modular
high performance

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.

Ergonomic and modular design with the latest technology

Technical specification	Travel range Z-axis	Travel range X-axis	Travel range Y-axis	Tool Ø	Snap gauges Ø	Max. tool length for axial incidental light measurement
»genius 4«	600 mm	235 mm	± 50 mm	400 mm	100 mm	500 mm

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.

Automatic contour scan and status display

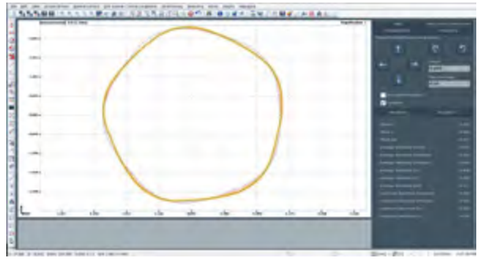
Automatic display of measuring status and scan taking pitch and rotation angle into account.

Outer measurement of drop

Fast focusing and measuring of drop due to simultaneous CNC drive.

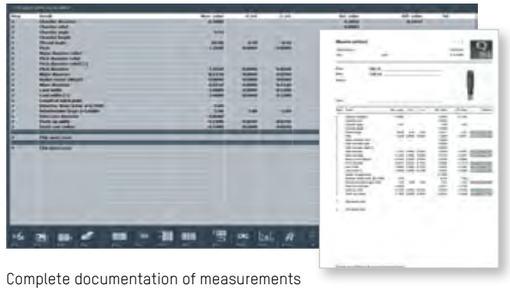
fully automatic
distortion-free
universal

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..

The new universal solution for numerous requirements

Technical specification	Travel range Z-axis	Travel range X-axis	Travel range Y-axis	Measurable tool Ø	Max. tool length for axial incidental light measurement	Measurable snap gauge Ø	Swiveling device for optical carrier
»threadCheck«	600 mm	235 mm	± 50 mm	400 mm	500 mm	60 mm	± 30°

Optional: without protective housing and/or with tailstock

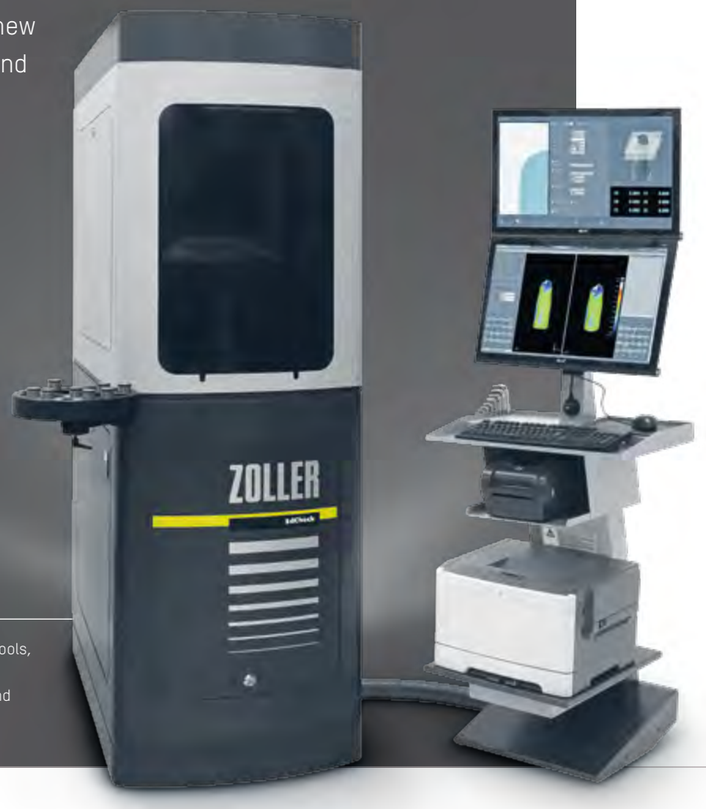
Subject to technical modifications. The depicted machines may include options, accessories and control variants.

The solution for the 3D digitalization of workpieces and tools

»3dCheck«

The »3dCheck« is the perfect inspection machine for fast and process-oriented 3D digitalization and opens up completely new avenues for the measurement of tools and workpieces such as turbine blades and similar objects.

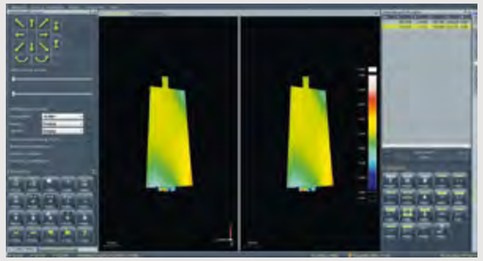
The ZOLLER »3dCheck« combines the benefits of a 3D sensor with high-precision CNC axes and fully automated transmitted light processing. In addition, coordinate measurements and reverse engineering can be conducted in the fields of quality assurance and R&D through to fast and process-oriented 3D simulation. The user interface is equipped with a CNC joystick, scan plan, teach display and evaluation function.



With the ZOLLER »3dCheck«, 3D models of tools, plate pockets, implants, turbine blades or similar objects can be generated quickly and without requiring major effort.

easy to operate
space-saving
future-oriented

3D target-actual comparison

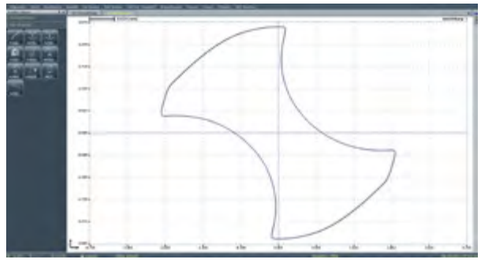


Fully automatic color coding of target-actual comparisons for any type of object, as illustrated for a turbine blade here.

Library of data sets

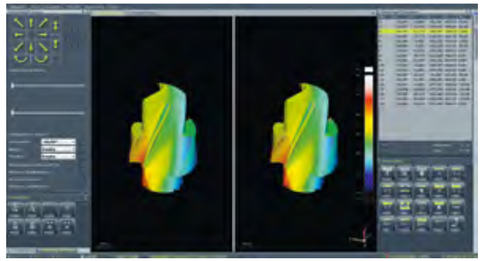
Data set library for the quick selection of data sets, the saved scanning plan and the target data, can be extended as required.

Target-actual comparison of cutting planes



Micro-precise recording of contours via the ZOLLER »pilot 3.0« software function »lasso«, illustrated here for a drill section.

All at a glance: measuring plan, navigator, 3D evaluation



Compilation of the desired and one-off saved positions including target values for the CNC axes, measuring window sizes, lighting values and measurement-specific parameters.

Fast, process-oriented 3D digitalization

Technical specification	Travel range Z-axis	Travel range X-axis	Travel range Y-axis	Measurable tool Ø	Measurable snap gauge Ø	Swivel range of sensor	Max. object Ø
»3dCheck«	600 mm	235 mm	± 50 mm	400 mm	60 mm	-35° to + 90°	70 mm

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.

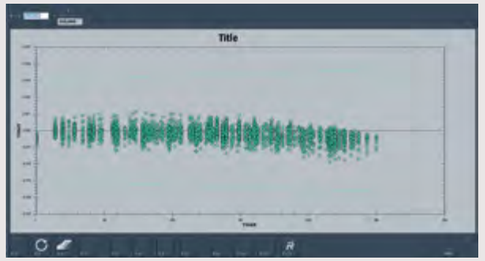
Cutting edge preparation »skp« in »expert« mode

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=1.8+ (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 Ø	Measurable snap gauge Ø	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

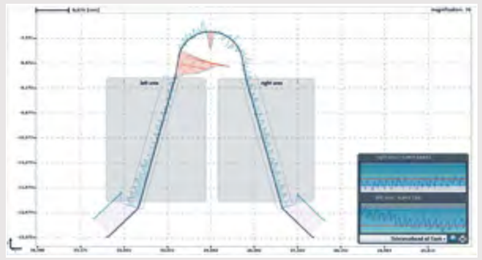
»hobCheck«

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

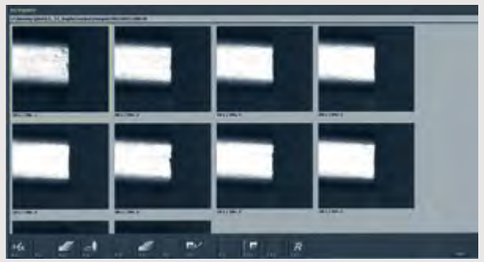


Evaluation of tooth form via variable measuring windows at the flanks, including automatic target-actual comparison.

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«



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 Ø	Measurable snap gauge Ø
»hobCheck«	600/800 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

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.

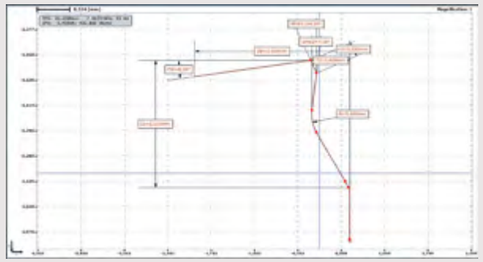
»metis« tool analysis

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 much more.

Display of results including dimensioning



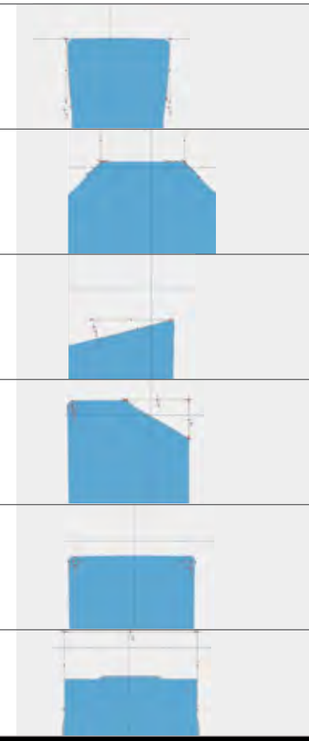
Complex dimensioning of distances and contour elements, illustrated here the tooth shape "Thin kerf precision saw".

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 Ø	Incident light camera Ø	Width of saw blade
»sawCheck«	450 mm	200 mm	300/800 mm	200 mm	1.5–8 mm

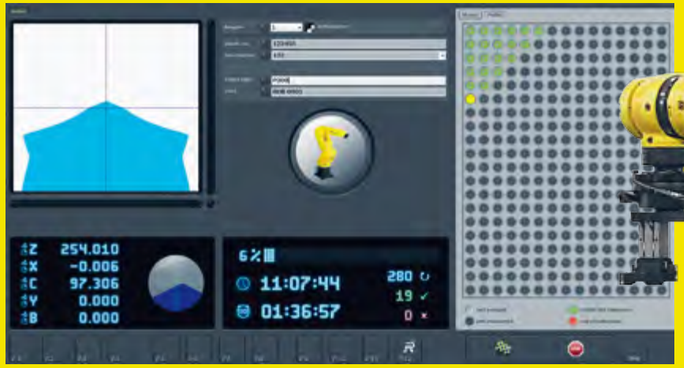
Subject to technical modifications. The depicted machines may include options, accessories and control variants.

The automation solution for companies with high tool throughput levels

»roboSet«

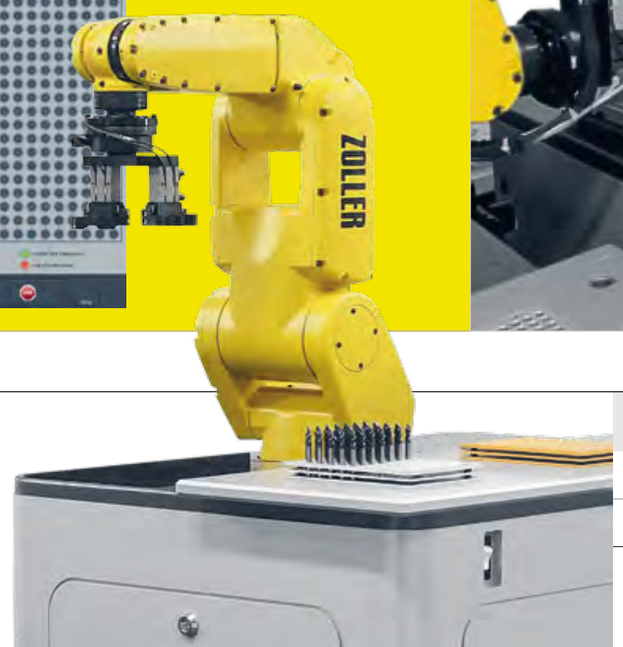
»roboSet« loads your ZOLLER measuring machine 24/7.
Complex measuring tasks can be processed fully automatically with 100% checking guaranteed.

»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 the »roboSet«.

Online status display: status on view for 24 hours.



fully automatic
enduring
accurate


1

2


3


4

5

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«	700 mm	±0.02 mm	5 kg without gripper	1050 x 350 mm	3 pieces
»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.

For smooth production processes

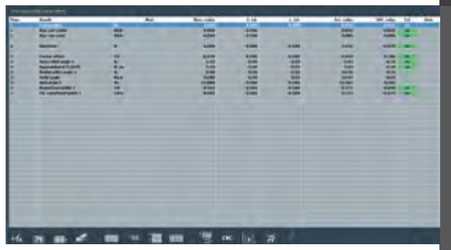
Process optimization with ZOLLER

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:

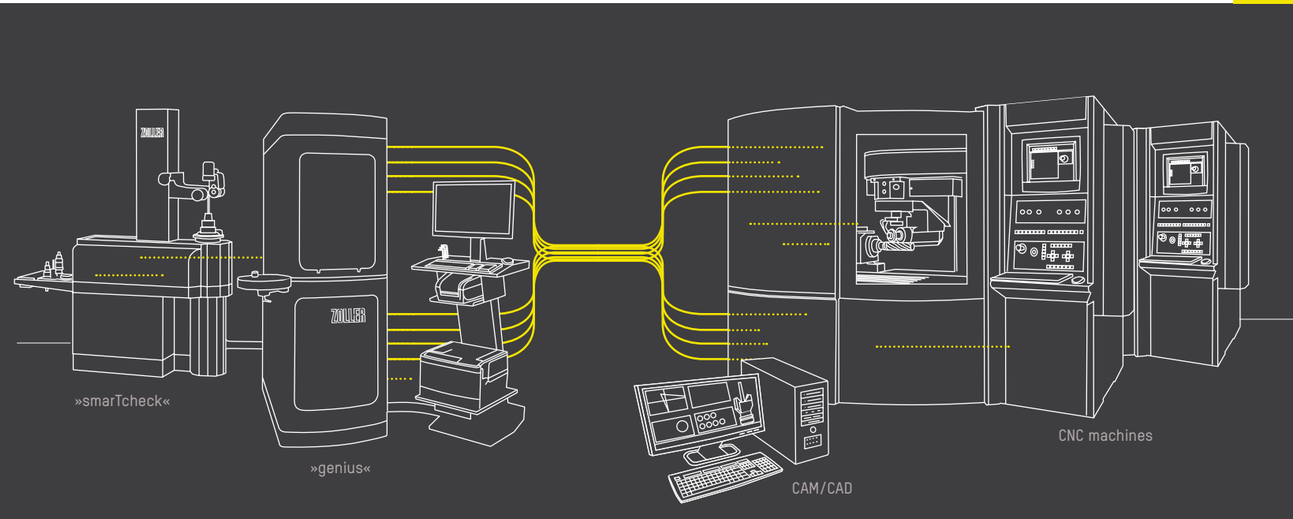
The ZOLLER interfaces are the basis for smooth operations and offer you entirely new savings potentials: the grinding program simultaneously creates the data set for the measuring machine from which the fully automatic ZOLLER measuring procedure is generated. Depending on the interface, the measured data are resent 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, for example GDX 2.0, NUMROTO, Anca, MTS, and many more.

- 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

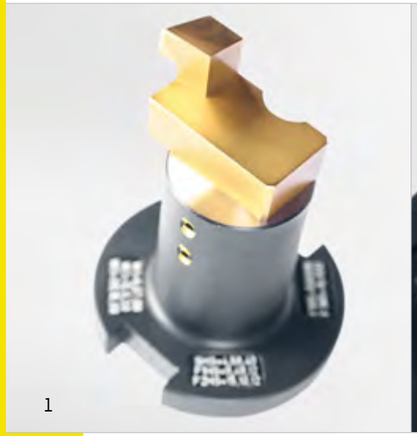
ZOLLER
INSPECTION SOLUTIONS

traceable
verifiable
complete

For proven quality in tool production

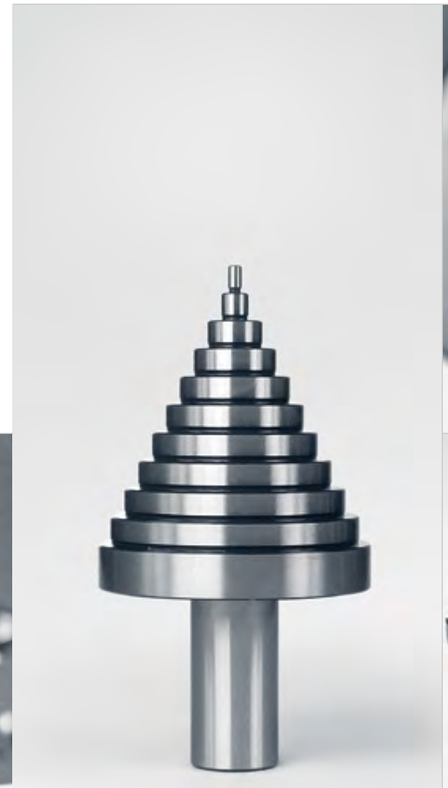
Certified accuracy

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 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.

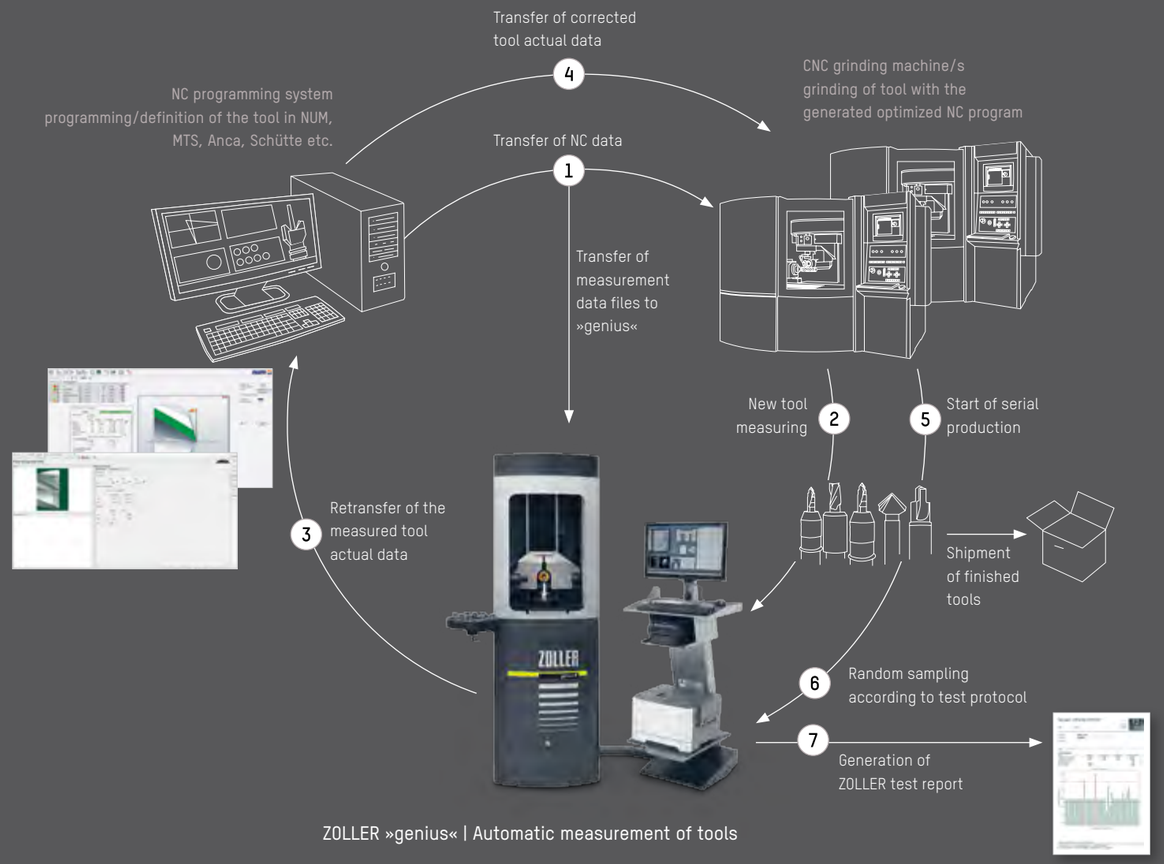
4__Calibration gauge »pilot 3.0«
For calibration of the image processing system »pilot 3.0« with transmitted and incident light.

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.

Processing of nominal data which has been programmed with NUM, MTS, Anca, Schütte etc.

New tools

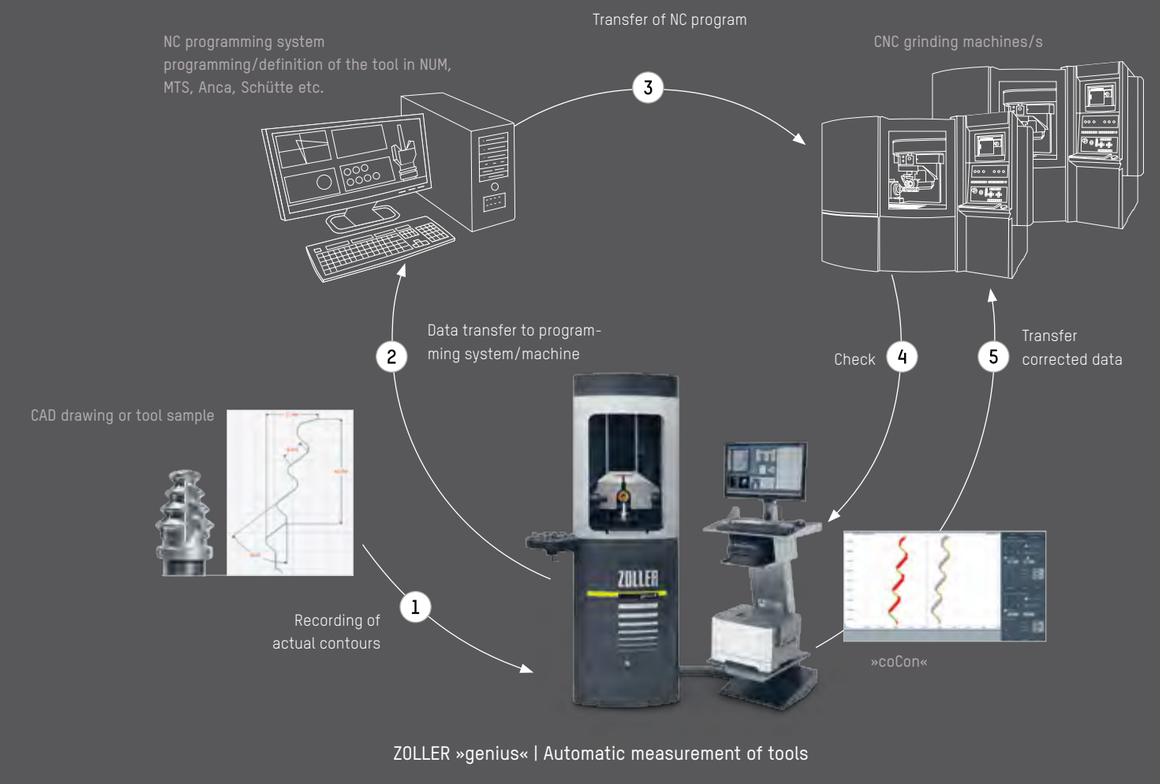


ZOLLER »genius« | Automatic measurement of tools

1__Data transfer/ Programming/Definition	2__Manufacturing and measuring tools	3__Retransfer of the measured actual data	4|5__Serial production with corrected actual data	6__Random sampling incl. test report	7__Shipment incl. test reports
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.	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.	The measured tool data are resent from the ZOLLER »genius« to the programming system.	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.	Serial tools are measured on the genius« according to a predefined test plan and the measured results are printed out as a test report.	Shipment of the finished tools includes ZOLLER test reports.

Recording a complex form tool for production or correction

Form tools

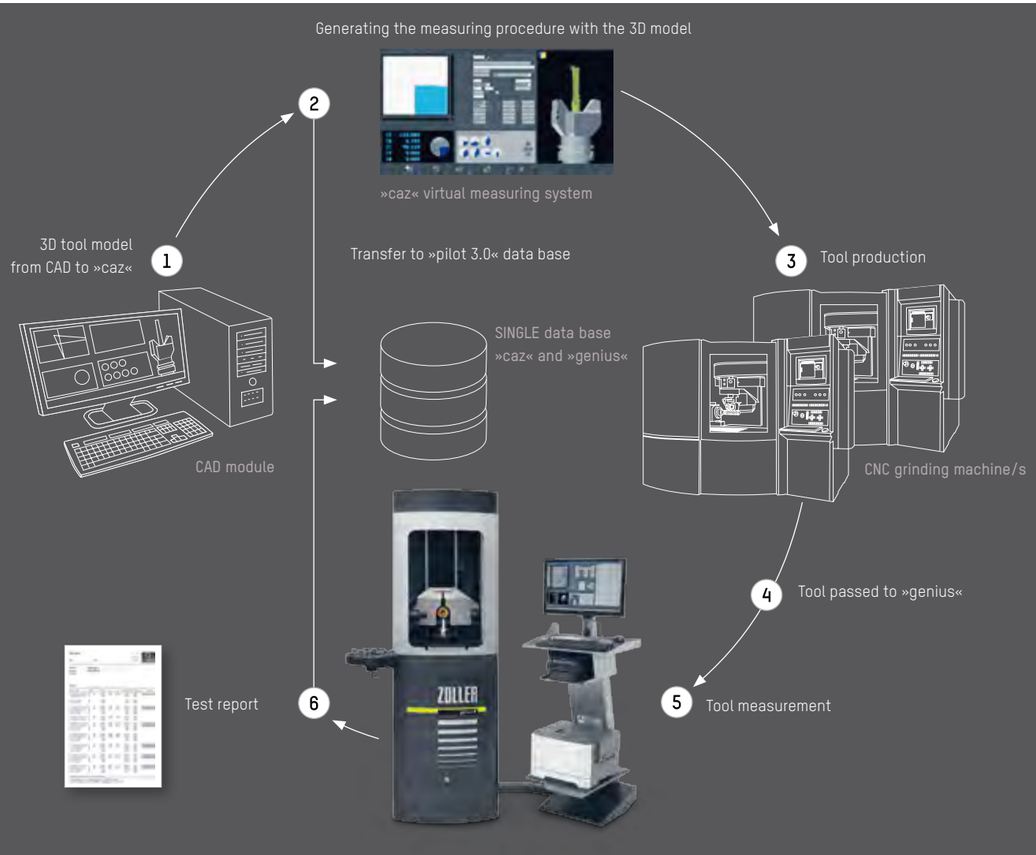


ZOLLER »genius« | Automatic measurement of tools

1__Recording of actual contours	2__Data transfer programming/machine	3__NC program	4__Check	5__Transfer corrected data
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.	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.	Based on the contour profile provided by the »genius«, the programming system generates the NC program for the grinding or erosion machines.	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) exported.	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 that 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

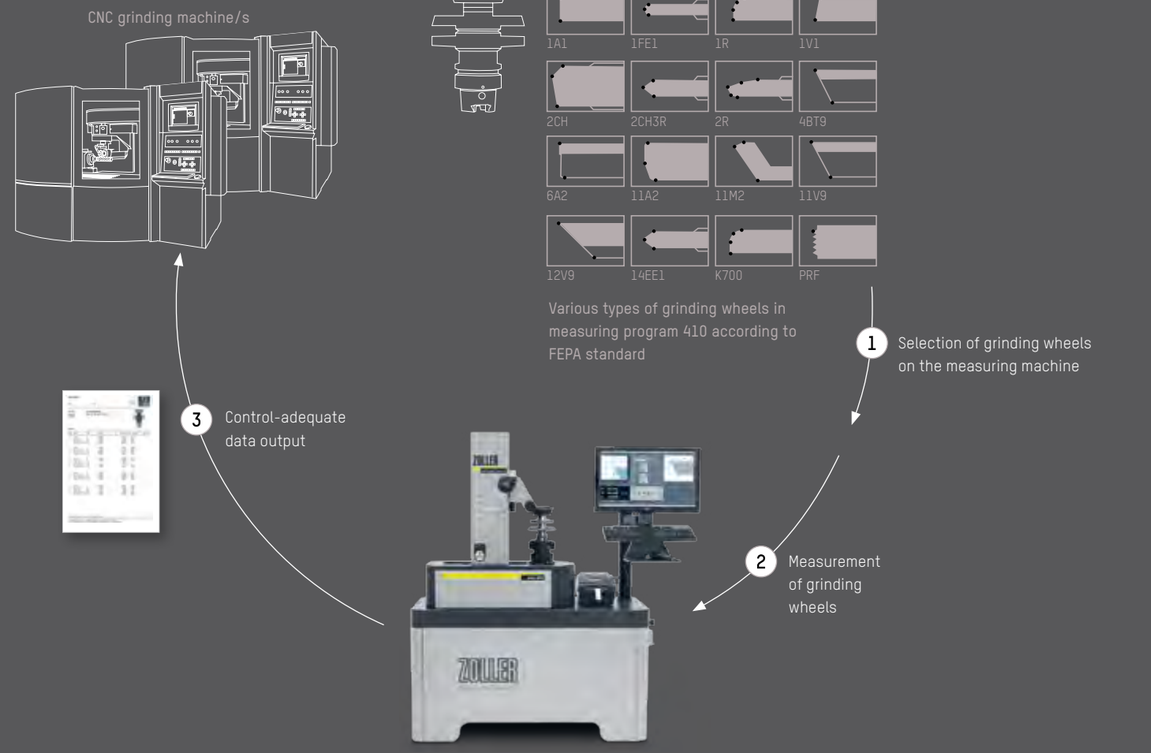
»caz« for tool manufacturers



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.

Satisfied customers speak for themselves – and for ZOLLER

Success is the best reference

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ALCATEL
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ANTON HÄRING
AUDI
BARMAG
BMW
BOEING
BOERBOOM SONDERWERKZEUGE
BOMBARDIER TRANSPORTATION
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DASSAULT
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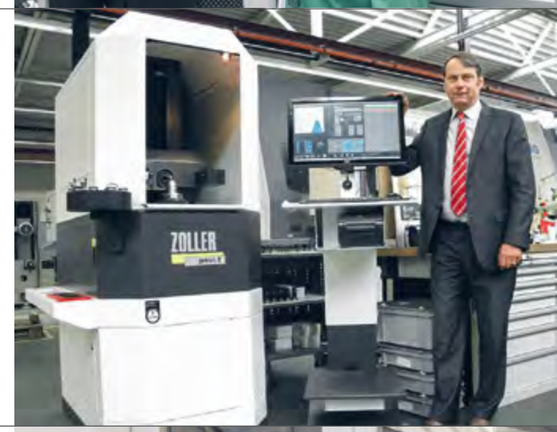
SULZER
TAEGUTEC
TOYOTA
TRUMPF
VOITH
VOLKSWAGEN
VOLLMER
VOLVO
WEBB WHEEL
ZF FRIEDRICHSHAFEN
ZUMTOBEL
YG-1
AND MANY MORE.

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 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 your call everywhere

At home in Germany – at your call worldwide

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ZOLLER
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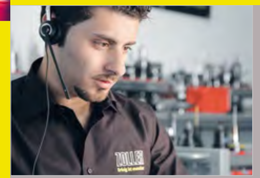
BUSINESS SOLUTIONS – from A–Z

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.

- 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

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

Telephone +1 734 332-4851

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.

Tool Management

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

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 / threadCheck«
Smart automation solution for complete measurement, even for helical tools

Presetting and measuring technology

»smile / pilot 2.0«
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«
Vertical tool presetter and measuring machine in modular design

»venturion 600/800«
Tool presetting and measuring machine series of modular premium class with extended measuring range

»hyperion 300«
Horizontal tool presetter and measuring machine for turning

»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

»gemini 2«
Special presetter and measuring machine for crankshaft cutters

»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

»aralonBasic«
The manual measuring instrument for crankshaft cutters with internal tool cutting edges

»aralon CNC«
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

Tool measuring technology

»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« with »pilot3.0«
Measuring and inspection station for milling head manufacturing directly next to the machine

»pomDiaCheck«
The measuring machine for determining diameters

»smarTcheck«
The high performance universal measuring machine for tool inspection

»genius 3s«
»genius 3m«
The universal measuring machine for precision tools

»genius 4«
The modular universal measuring machine for precision tools

»threadCheck«
Universal measuring machine for complete measurement of helical tools

»3dCheck« with »pilot 3.0« and »pomSoft«
The solution for the 3D digitalization of workpieces and tools

»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 Data base

ZOLLER solutions

PRESETTING SOLUTIONS
presetting & measuring

SOFTWARE SOLUTIONS
managing tools

INSPECTION SOLUTIONS
inspection & measuring

BUSINESS SOLUTIONS
from A-Z

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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