Cooperation ANCA | ZOLLER

Tool inspection and data transfer
INTRODUCTION

Since the company’s launch in 1974, ANCA has grown to become one of the world’s foremost CNC tool grinding machine manufacturers and has gained recognition in the industry as a leading technology innovator.

ANCA’s progressive R&D program has ensured that ANCA remains at the cutting edge of global CNC grinder design and has resulted in the company receiving numerous international industry and business awards.

As ANCA designs and manufactures its own machines, the company is able to provide ingenious solutions for key components such as CNC controls, spindle and servo drives. ANCA manufacture all their own main mechanical components and assemblies, while also testing each final product to rigorous international machine tool standards. ANCA also develops its own advanced system and easy-to-use application software.

This unmatched level of autonomy and control allows ANCA to be extremely flexible with respect to customers’ specific requirements.

Enthusiasm for inspection and measuring technology, a keen sense of efficiency and consequent commitment to quality have assured ZOLLER’s position in the world’s top league. For over 70 years the name ZOLLER has symbolized innovative technology, high quality products and reliable customer service. More than 30,000 presetting and measuring machines installed worldwide tell their own story.

Today, the 3rd generation continues the ZOLLER success story – worldwide. The ZOLLER company has successfully established subsidiaries in the growth markets USA, China, India and Japan. With ZOLLER you can measure your tools quickly, easily, with µm precision – and reliably. Measured and preset tools also reduce your rate of rejects and machine downtimes. At the same time the produced quality and generated profits are increased. ZOLLER technology sets trends for the future – renown customers such as Daimler, Bosch, Trumpf, Mahle or Festo speak for themselves.

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For perfect regrinding and 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.

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» (computer aided ZOLLER) virtual measuring 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 Solutions, 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.
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.

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

Technical specification:

<table>
<thead>
<tr>
<th>Technical specification</th>
<th>Travel range Z-axis</th>
<th>Travel range X-axis</th>
<th>Travel range Y-axis</th>
<th>Measurable and clampable shaft Ø</th>
<th>CCD camera</th>
<th>Field of vision</th>
</tr>
</thead>
<tbody>
<tr>
<td>»pomBasic«</td>
<td>60 mm</td>
<td>200 mm</td>
<td>±50 mm</td>
<td>2–40 mm</td>
<td>6.5-fold zoom lens</td>
<td>2–12 mm</td>
</tr>
<tr>
<td>»pomBasicMicro«</td>
<td>60 mm</td>
<td>200 mm</td>
<td>±50 mm</td>
<td>2–32 mm</td>
<td>12-fold zoom lens</td>
<td>0.5–6 mm</td>
</tr>
</tbody>
</table>

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.

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.

Numerous measuring programs included

<table>
<thead>
<tr>
<th>Technical specification</th>
<th>Travel range Z-axis</th>
<th>Travel range X-axis</th>
<th>Tool Ø</th>
<th>Snap gauges Ø</th>
</tr>
</thead>
<tbody>
<tr>
<td>»smile 400«</td>
<td>400 mm</td>
<td>210 mm</td>
<td>420 mm</td>
<td>100 mm*</td>
</tr>
<tr>
<td>»smile 600«</td>
<td>600 mm</td>
<td>210 mm</td>
<td>420 mm</td>
<td>100 mm*</td>
</tr>
</tbody>
</table>

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

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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 3s« 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.

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

Data import / export XML

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

»apus« test reports

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

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.

Greater productivity through latest technology and ergonomics

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

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.

The new universal solution for numerous requirements

Technical specification

<table>
<thead>
<tr>
<th>Measuring program for threading tools</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>For operator-independent and automatic measurement of threaded tools.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Automatic contour scan and status display</th>
<th></th>
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<tbody>
<tr>
<td>Automatic display of measuring status and scan taking pitch and rotation angle into account.</td>
<td></td>
</tr>
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</table>

<table>
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<tr>
<th>Outer measurement of drop</th>
<th></th>
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<tbody>
<tr>
<td>Fast focusing and measuring of drop due to simultaneous CNC drive.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measuring program for threading tools</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Determination of contour profile and transfer of target contour in »lasso« for thread formers.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evaluation of results including test report</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete documentation of measurements through automatic evaluation and output as PDF or printed test report.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Travel range</th>
<th>Travel range</th>
<th>Measurable tool Ø</th>
<th>Max. tool length for axial incident light measurement</th>
<th>Measurable snap gauge Ø</th>
<th>Swiveling device for optical carrier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z-axis</td>
<td>X-axis</td>
<td>Y-axis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>600 mm</td>
<td>235 mm</td>
<td>± 50 mm</td>
<td>100 mm</td>
<td>± 30°</td>
<td></td>
</tr>
</tbody>
</table>

Optional: without protective housing and/or with 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 \( E = 1.8 + \frac{L}{250} \) µm is achieved with the »titan«.

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

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.

<table>
<thead>
<tr>
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<th>Travel range Z-axis</th>
<th>Travel range X-axes</th>
<th>Travel range Y-axes</th>
<th>Measurable tool Ø</th>
<th>Measurable snap gauge Ø</th>
<th>Max. tool length for axial incidental light measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>»titan«</td>
<td>550 mm</td>
<td>130/90* mm</td>
<td>&gt; 100 mm</td>
<td>260/200* mm</td>
<td>60 mm</td>
<td>400 mm</td>
</tr>
</tbody>
</table>

* Optional with optical carrier CNC swiveling device

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.

Technical specification

<table>
<thead>
<tr>
<th>Range</th>
<th>Positioning accuracy</th>
<th>Maximum load</th>
<th>Working area</th>
<th>Number of pallets</th>
</tr>
</thead>
<tbody>
<tr>
<td>700 mm</td>
<td>±0.02 mm</td>
<td>5 kg without gripper</td>
<td>1050 x 350 mm</td>
<td>3 pieces</td>
</tr>
<tr>
<td>900 mm</td>
<td>±0.03 mm</td>
<td>5 kg without gripper</td>
<td>1050 x 350 mm</td>
<td>3 pieces</td>
</tr>
</tbody>
</table>

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

Online status display: status on view for 24 hours.

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

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

Automation solution for tool labeling »roboMark«
Operator-defined labeling options directly after measuring.

Automation solution for tool cleaning »roboClean«
Unit for fully automatic cleaning of shaft tools prior to measuring.

Automatic assignment of pallets
Automatic target-actual comparison of tools through input of tolerances into »pilot 3.0« pallet management including sorting.
For smooth production processes

Process optimization with ZOLLER | ANCA interfaces

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«, »spotBase«, »smile« or many other ZOLLER machines: target/actual data paperless (depending on the scope of performance/measurement) can transmit fast, correctly, and automatically.

ZOLLER offers the matching interfaces for the virtually ANCA grinding process.

- Automatic generation of measuring procedure for measuring and inspecting tools from grinding programs
- Fully automatic contour correction for form tools with the ZOLLER measuring program »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

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
Processing of nominal data which has been programmed with ANCA

New tools

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 ZOLLER genius from which ZOLLER generates a fully automated measuring procedure. 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.

Recording a complex form tool for production or correction

Form tools

The automatically scanned contour profile provided by the ZOLLER genius to the programming system generates the NC program for the grinding or erosion machines.

The first ground tool is scanned automatically by the ZOLLER genius together with a target-actual comparison with the target contour in DXF. Using the measuring program «coCon» for scanning the tool contour and calculating the contour correction, deviations are inverted and the newly calculated correction contour (new path) exported.
Determining measuring tasks directly with the 3D model of the tool

Software Solutions

Measuring program for precise recording of individual parameters for grinding wheels

Measurement of grinding wheels

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 CAD model.

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

3. 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.

4. 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.

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

6. Check incl. test report
   After measuring and corrected tolerance check on the «genius» the tool is ready for shipment.
ANCA-SERVICE

We have a global network of ANCA service centres and maintain one of the most experienced machine tool field service teams in the world. Our OEM factory trained service technicians are able to provide technical support, training and advice to keep your machine running at peak performance. ANCA also has an extensive network of applications engineers who can provide tool grinding solutions at a local level.

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At home in Germany – at your call worldwide

BUSINESS SOLUTIONS – from A–Z

ZOLLER-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.

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
Product overview ANCA

CNC Grinding Machines

ANCA CNC tool and cutter grinders are chosen by the type of industries where high precision tools and reliability are paramount.

The machines are designed to meet the demands of competitive industries, and are supported by ANCA’s worldwide team of technical specialists. Confidence that ANCA is the right choice goes beyond the machine. The ANCA team will be your partner with application and machine support, from training right through to maintenance.

For full product overview see www.anca.com
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.
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.