

ZOLLER  
INSPECTION SOLUTIONS

The High-end Inspection and Measuring Machine for Precision Tools

titan

ZOLLER<sup>®</sup>  
expect great measures

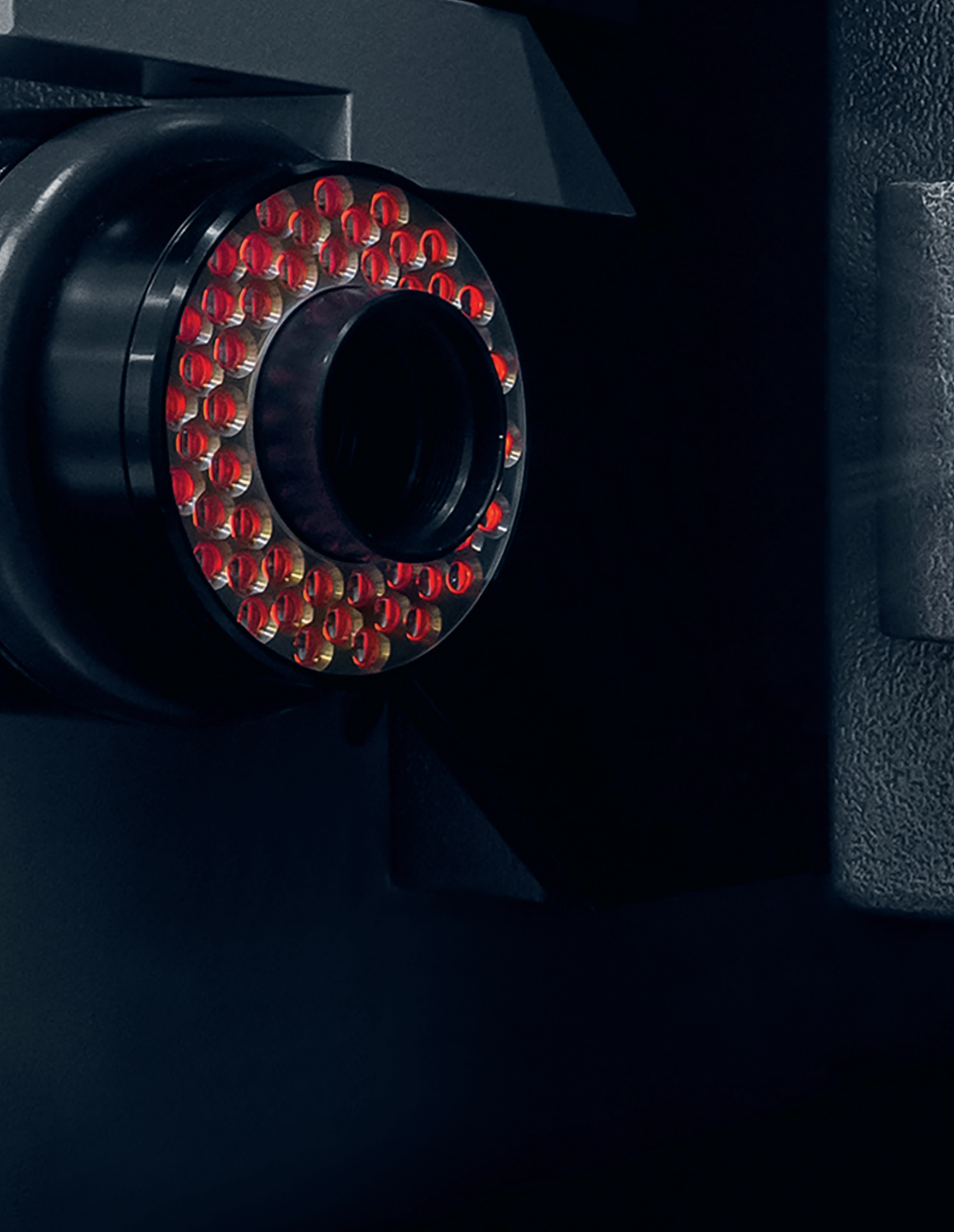


# ZOLLER Sets Standards. Time and Again.

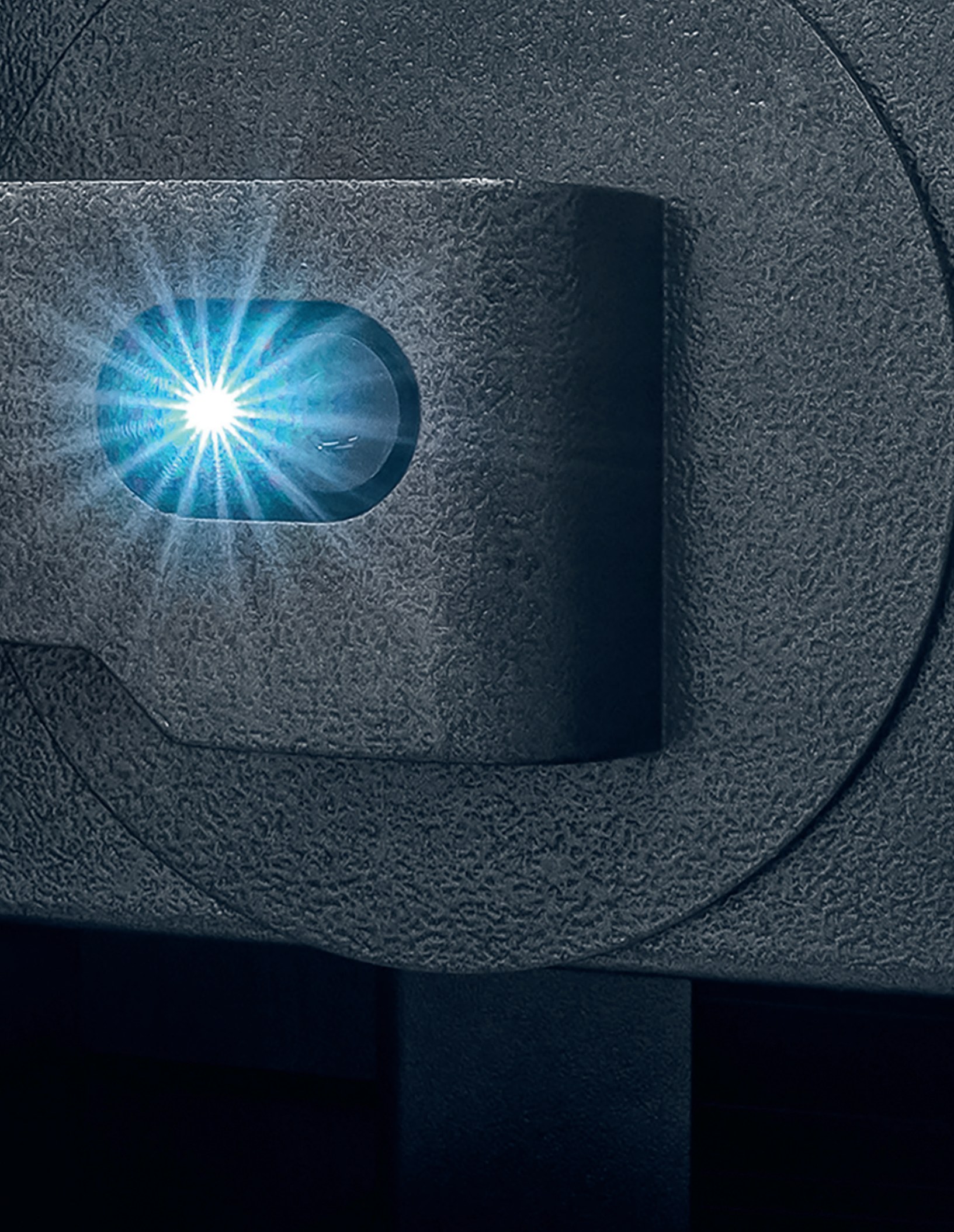
Record all the geometries of your precision tools including cutting edge preparation. Fully automatic, precise, and with repeatability in the micron range. Equipped with leading-edge, ultra-high-performance sensors and LED lighting, »Z3dCam« sensor, and up to seven CNC-controlled axes. Moreover, it is remarkably simple to operate. This high-end inspection and measuring machine developed in-house by ZOLLER is unique in the world of metrology. It genuinely deserves its name:

»titan«















# Incomparably Flexible. Absolutely Precise. Ingenuously Simple.

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## **Measure in an operator-independent and fully automatic manner**

With »titan« you can assure safe processes, independently of individual technical specialists — thanks to its incredible ease of use.

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## **Measure precision tools and cutting edge preparations**

With »titan« you save time and money because you measure automatically, precisely to the micron, and safely with a unique system.

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## **Benefit from absolute precision and repeatability**

Reduce throughput times, and produce and deliver on schedule 100 % tested quality.

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## **Seamless documentation guarantees quality**

Offer your customers peace of mind, and protect yourself from complaints with customer-specific logging of tool parameters.

# »titan«

All in one: The high-end »titan« inspection and measuring machine measures precision tools and cutting edge preparations automatically and with micron-level precision. Equipped with a CNC-controlled multiple-sensor measuring system, automatic level control, and a vibration-damped base, »titan« guarantees optimum measuring precision. You benefit from tool-specific traceable results without a great amount of training. This metrology solution from ZOLLER delivers clear economic and qualitative benefits to your production operations.

With »titan« your production operations become simpler, faster, and more profitable: Even highly complex measurements are performed in a fully automatic, operator-independent manner at the press of a button, and the test report is produced in the same operation. From random sample measurement to complete inspection, the sensors are positioned completely automatically and are positioned accurately to the micron. State-of-the-art image processing

technology, sensors, and electronics deliver even faster measuring operations. For maximum precision, »titan« is protected against internal temperature fluctuations because the electronic components are integrated in the »controlUnit«, an additional unit. The quality of results is guaranteed with a length measuring deviation based on DIN EN ISO 10360 from E (micron) =  $(2.0 + L/300 \text{ mm})$ . With ZOLLER »titan« you can assure metrology at the highest level.

## »titan« highlights



Multiple sensors



Fully automatic cutting edge preparation



Non-contact measurement



Cutting edge inspection



»orthoScan« swivel-mounted multiple-sensor optic carrier\*



Fully automatic measurements



Tool database



Compatible interfaces\*



Power clamping



Vibration-damped Base



Ergonomic



Measuring probe\*



Tailstock\*

\* Optional



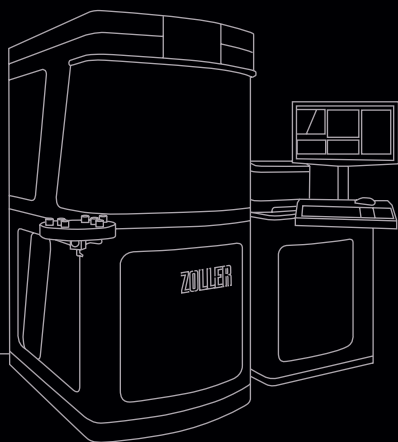
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# Incomparably Flexible. Absolutely Precise.

Transmitted and incident light camera, multiple LED lighting, and »Z3dCam« sensor for the measurement of cutting edge preparations — all controllable with up to seven CNC axes — »titan« multiple sensor array.

## Technical Data

	CNC Controller	Travel Range, Z-axis	Max. Tool Length, Z-axis	Travel Range, X-axis	Max. Measurable Tool Ø on X-axis	Travel Range, Y-axis	Max. Measurable Snap Gauge Ø
<b>»titan«</b>	up to 7* axes	600 mm	550 mm	360 mm	260 / 150** mm	± 100 mm	80 / 300*** mm



\* Optional: swivel-mounted multiple-sensor optic carrier »orthoScan« as the seventh axis.

\*\* Measurement of these parameters with the »orthoScan« pivot-mounted multiple sensor optic carrier. Through the use of adapters and tool-posts, the stated measuring areas can be reduced in some circumstances.

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

\*\*\* Without direct light measurement.





Max. Tool Length for Axial Incident Light Measurement	Working Distance »Z3dCam« Sensor	Relief Angle, Circumference (3D)	Chamfer Width Circumference (3D)	Rake Angle / Flute Depth (3D)	Tool End Geometry (3D)
535 mm	30 mm	Ø 260 / 150** mm	Ø 260 / 150** mm	Ø 75 mm	Ø 260 / 150** mm

- Complete system saves time and money — with a pivot-mounted multiple-sensor »orthoScan«\* optic carrier you can also measure helical precision tools
- Seamless operation, simple, ergonomic, space-saving design delivers secure processes and great working comfort
- 100 % inspection, fast results, no scrap — with a high measuring speed and ultra-precise, repeatable results
- Seamless documentation and guaranteed quality — with customer-specific tool logging parameters, you provide your customers with peace of mind and protect yourself against complaints.

# Equipped for the Future

With »titan«, you are prepared to meet future requirements: With up to seven CNC axes, »orthoScan«\* pivot-mounted multiple sensor optic carrier, transmitted and incident light camera, multiple LED lighting, and »Z3dCam« sensor.

With »titan« you can measure virtually every parameter on a tool: diameter, radii and angles, cylindricity, circular run-out or point angle, and a great deal more. All of these can be checked with a transmitted light camera. And with the incident light camera, various tool cutting edges are aligned using 3D focus, axial and radial inspections are carried out, and relief or rake angles are measured, along with more than 50 other parameters.

Thought has also been given to the fully automatic measurement of micro-geometries through the use of »Z3dCam« such as support chamfers or cutting edge preparations on cutting inserts, milling cutters, and boring tools with a diameter of less than 2 mm. No matter what the future may hold for the tool sector, you are equipped to meet it, thanks to the flexible expansion capability of the »titan«.

\*Optional

## Equipment Features

### Transmitted Light for Contour Projection

For micron-precise and automatic measurement of tool contours and their geometries on the basis of positionable shadow outline measurement with high-precision optics using a 2D-CCD camera with telecentric LED lighting. This enables the measuring system to record several parameters within a matter of seconds, e.g. length, diameter, radii, angles, and intersection points. This also includes scanning and digitization of external tool contours.









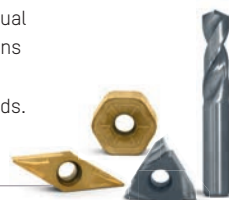
### Transmitted Light Camera with Cutting Edge Inspection

For micron-precise detection of contours and step geometries, and precise, visual inspection of wear and broken cutting edge in incident light. For multi-insert cutting tools, images are recorded automatically using the »aec« auto-edge-check software function.

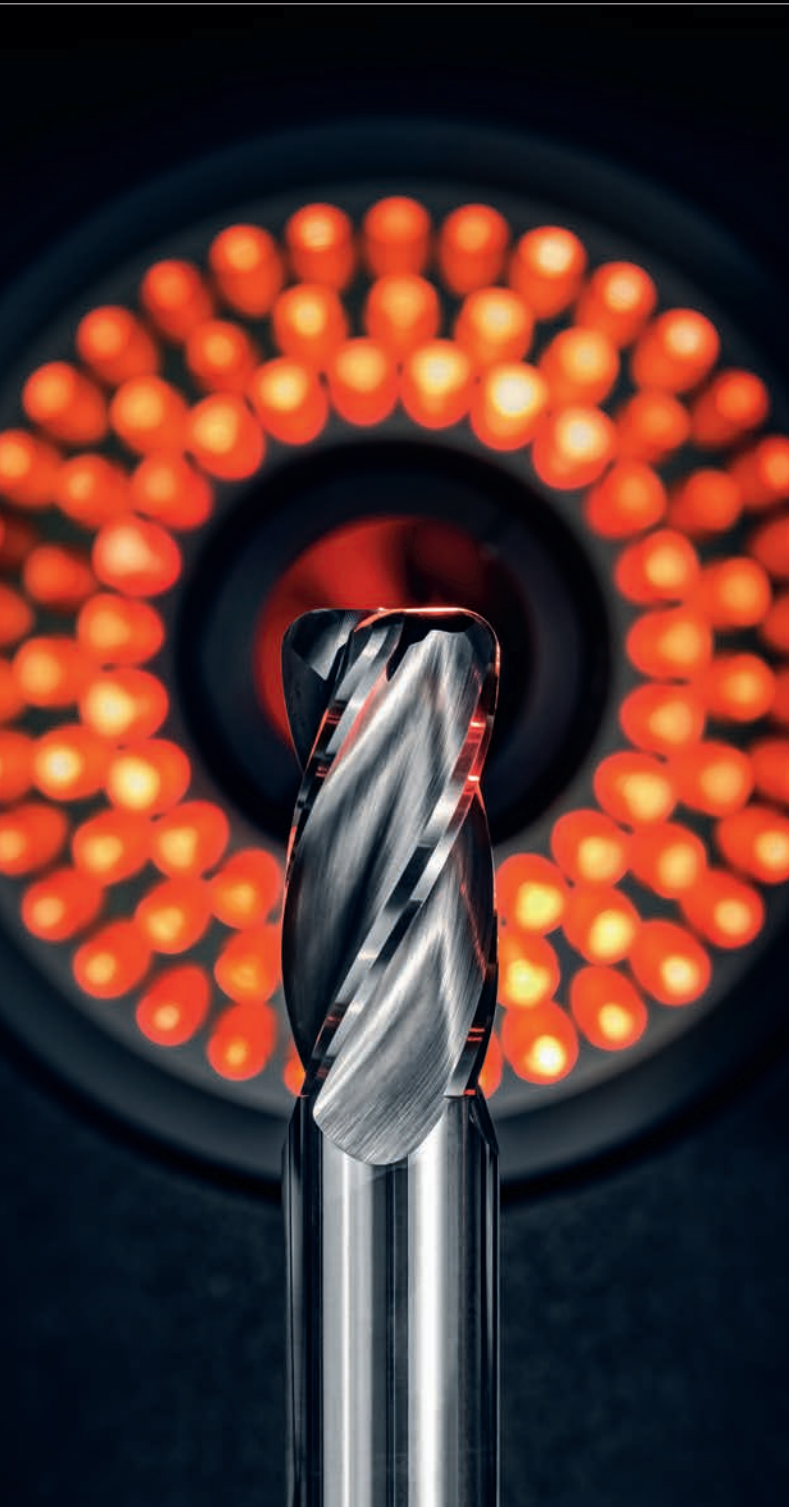


### Fully Automatic Measurement of Cutting Edge Preparation

Fully automatic alignment of sensor to cutting edge, and measurement of cutting edge preparation with the ZOLLER »skp« measuring program. Even specific forms of cutting edge preparations, such as "waterfall" (see p. 25) can be digitized in 3D and logged in a tool-specific manner. In addition, graphic nominal-actual comparisons or even topographical representations of the height characteristics for cutting edge preparation are possible within a matter of seconds.







### Incident Light Camera with Multi-LED Lighting

For inspection and measurement of geometries in incident light, at circumference, in chip space and on the tool end. For this, through input of nominal parameters in the measuring program dialog, all parameters can be measured and logged automatically: rake angle, relief angle, chamfer width, groove contour, and many other geometries.



### Fully Automatic Swivel-mounted Multiple Sensor Optic Carrier\*

For distortion-free and micron-precise measurement of helical tools, e.g. taps, thread forming tools, or hobs\*\* and their cutting edge geometries.

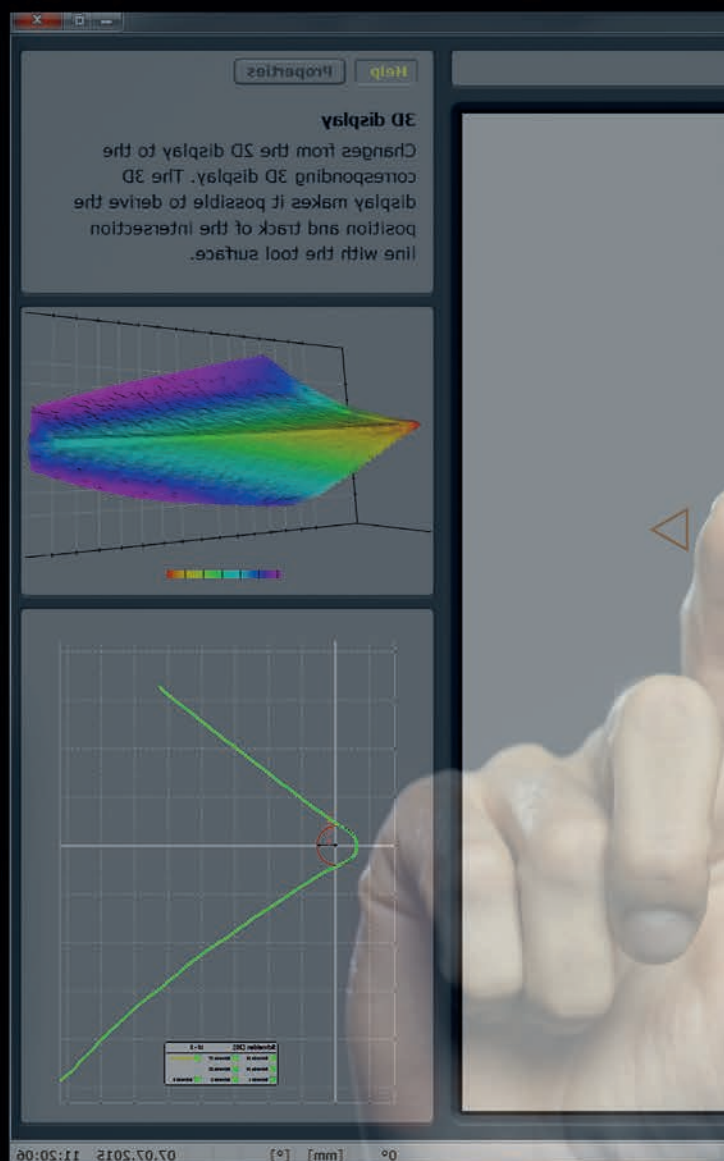
\*Optional

\*\*Tailstock and measuring probe are advisable

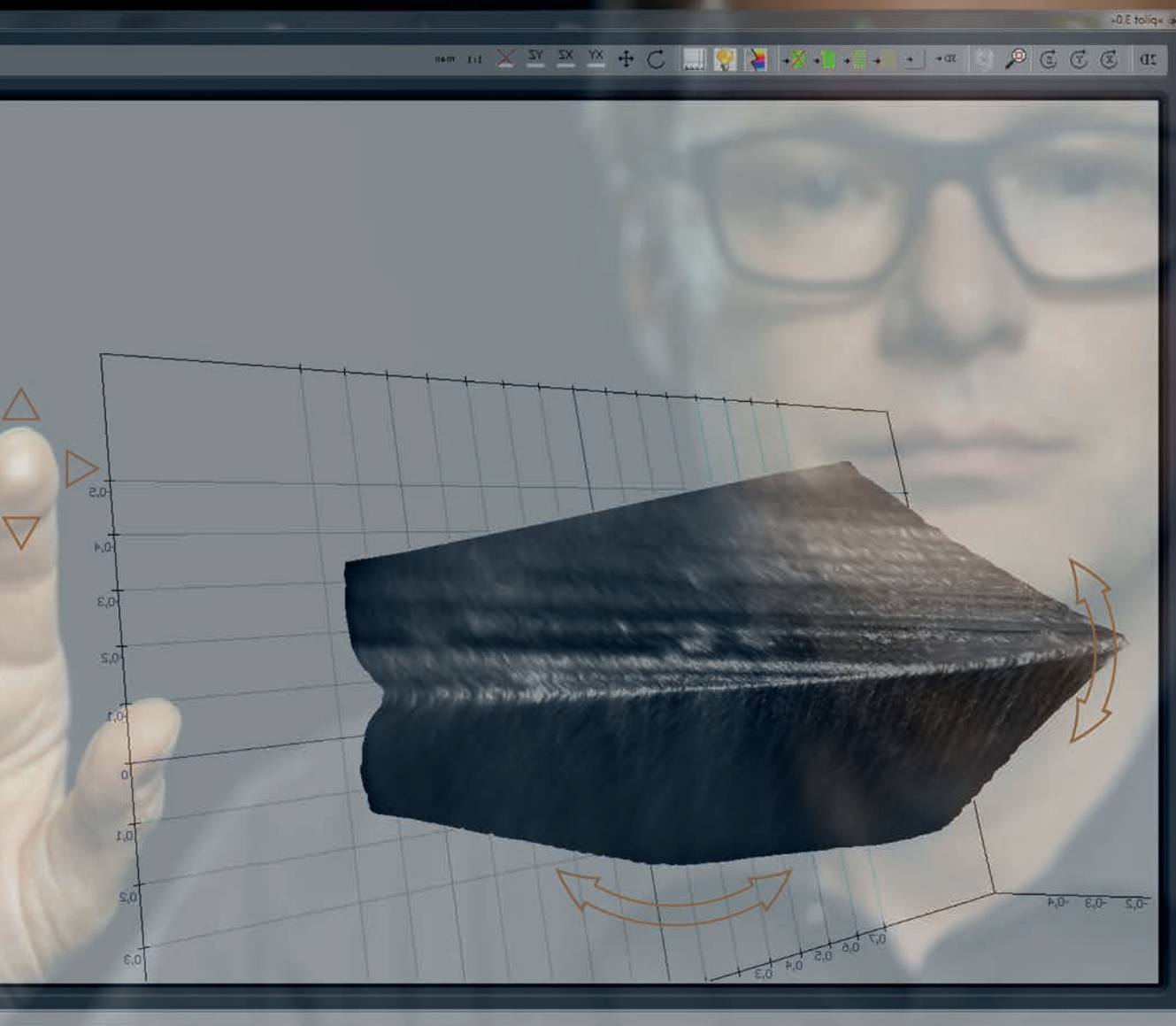


# Simply Gigantic. Gigantically Simple.

With »titan«, ZOLLER once again delivers evidence that a gigantic range of performance can be operated very simply and intuitively. That is because the system is equipped with the tried and proven ZOLLER »pilot 3.0« image processing for the entire spectrum of tool measurement applications. The self-explanatory user interface with the graphic menu buttons makes navigation much easier. The desired functions can be selected using the touch function, and even highly complex measuring operations can be run entirely automatically without needing prior programming. With its modular design, measuring programs can be added as and when required. This enables the system to get adapted perfectly to the tool spectrum and to the requirements of users.







# Comprehensive Software Functions for Maximum Monitoring

## ■ The »expert«, a photo-realistic measuring program generator

The simplest way to produce fully automatic programs for measurement in transmitted light and incident light, at the circumference, in the chip space, and on the tool end geometry. The parameters to be measured can be selected in a simple photo-realistic manner using the checkbox. In addition, through input of nominal data, the tolerance check is performed automatically.



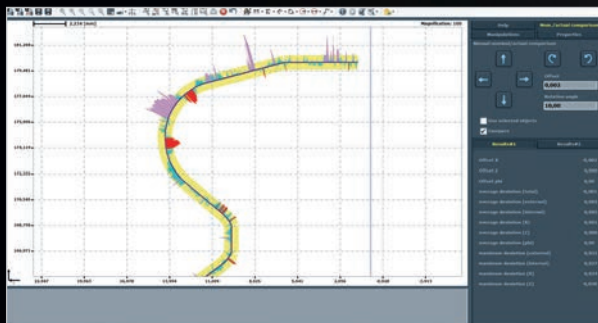
ZOLLER

titan



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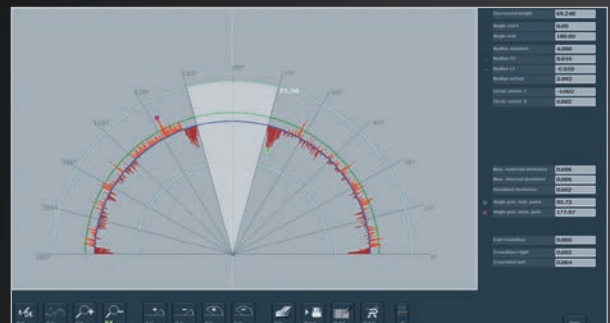
## Contour Profile Measurement »lasso«/ Nominal-Actual Comparison



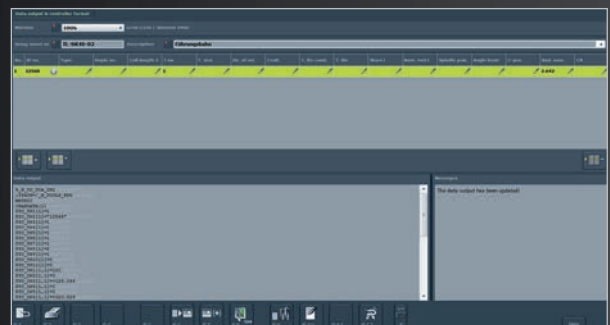
## Editable Test Report Including Tolerance Check



Radius Contour »contur«



## Control-adequate Data Output



The software function assures data output appropriate to the control unit with respect to measured tool data, either on a USB drive, via serial port or using the network to download directly to the CNC machine.

# Multiple Sensors Approaching Perfection: »orthoScan«

Would you also like to measure helical tools without physical contact, without distortion and accurately to the micron? If so, you can equip your »titan« with the swivel-mounted »orthoScan« multiple-sensor optic carrier and you are prepared to meet the rising demand for threading tools.

Measuring Program for Threading Tools

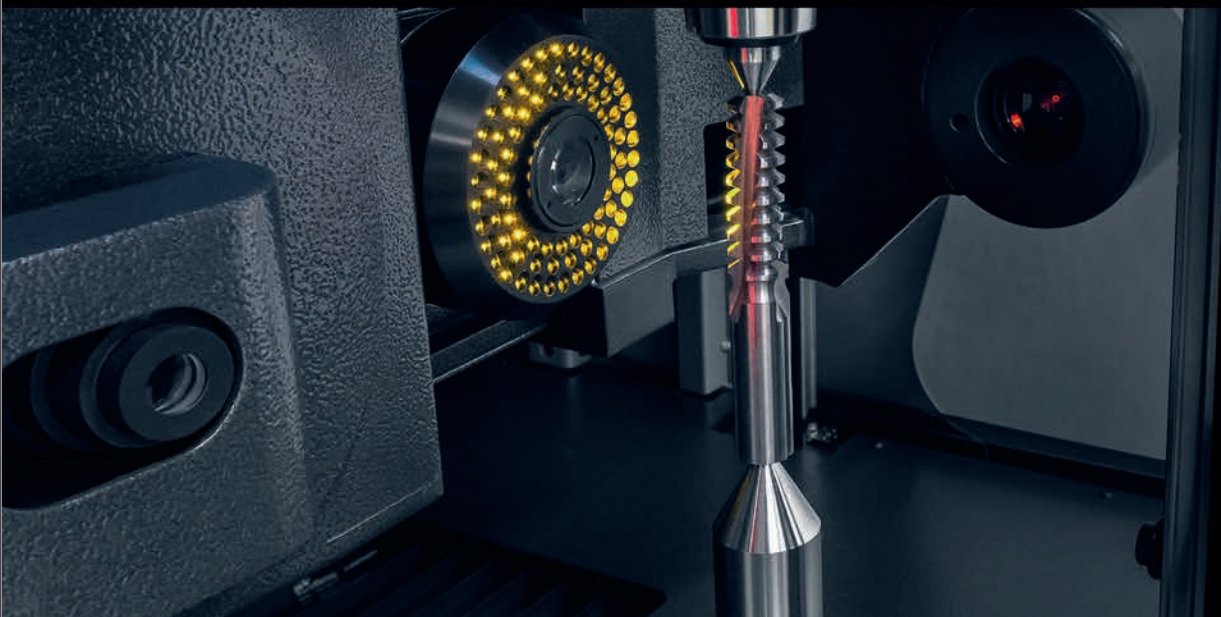


With the ZOLLER thread measurement program for metric ISO and Whitworth pipe threads, it is possible, without programming, to measure and record results for threading taps, mills and forming tools with or without spiralization, without physical contact, and to high standards of precision.

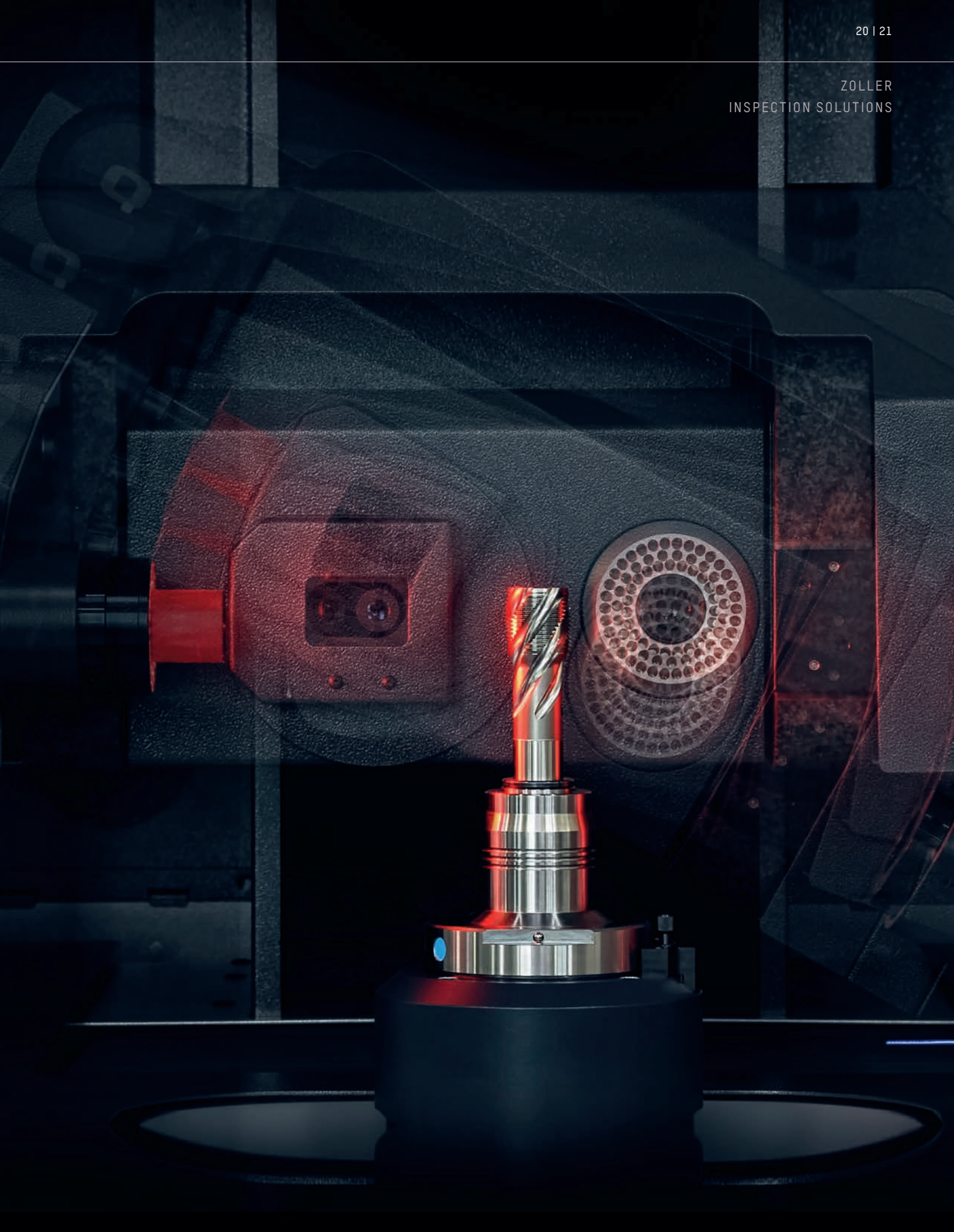
Measurement of Thread Milling Cutters in Incident Light



Various metal cutting tools, specifically thread milling cutters, are measured in incident light. In this way, parameters such as rake and clearance angle, chamfer height, and core diameter, can all be determined rapidly in a fully-automatic process.

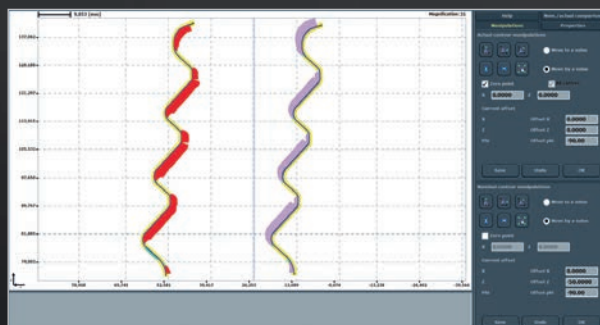






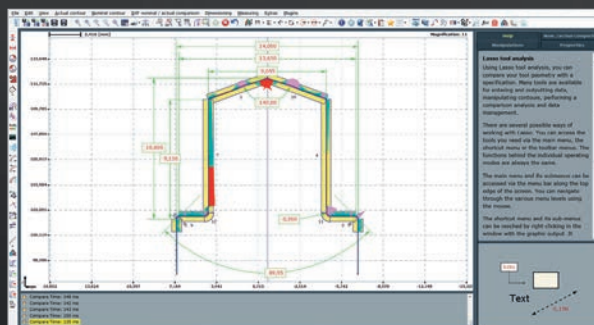
# Software Functions for Efficient Measurement Operations

## Check Profiles: »coCon« for Form Tools



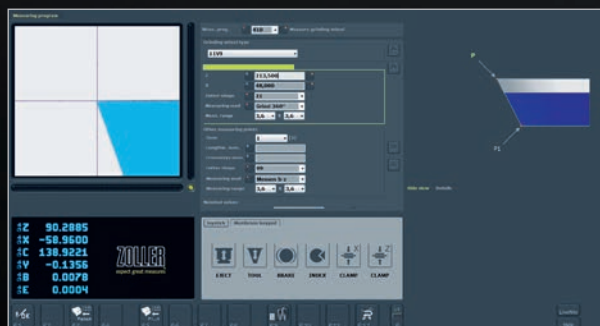
With this measuring program, the tool contour is scanned and the contour correction is calculated on the basis of the nominal DXF file for eroded or ground shaping tools. Output of the new contour is in DXF format.

## Detailed Dimensioning Function



Nominal-actual comparison of the tool cutting edge and with graphic deviation of the actual contour to nominal contour, including a pre-defined tolerance band. In addition, automatic dimensioning of the actual contour is possible with the help of a dimensioned nominal contour.

## Safe Grinding Wheel Measurement



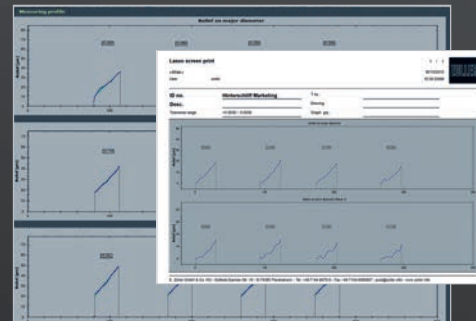
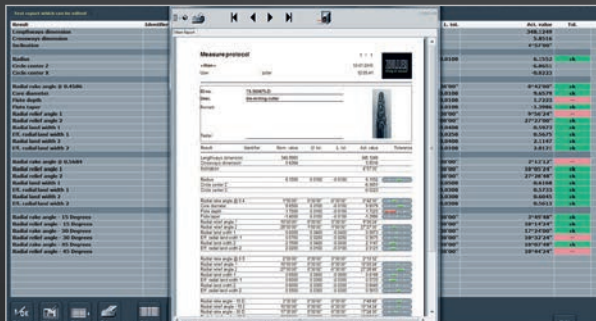
This specially developed measuring program for grinding wheels ensures fast, micron-precise, and reliable measurement in accordance with the FEPA standard. The grinding wheels, depending on geometry and type, are automatically selected, measured, and logged in detail. At several stages, you can save the grinding wheels as a package and continue measuring without interruption and independently of the operator.



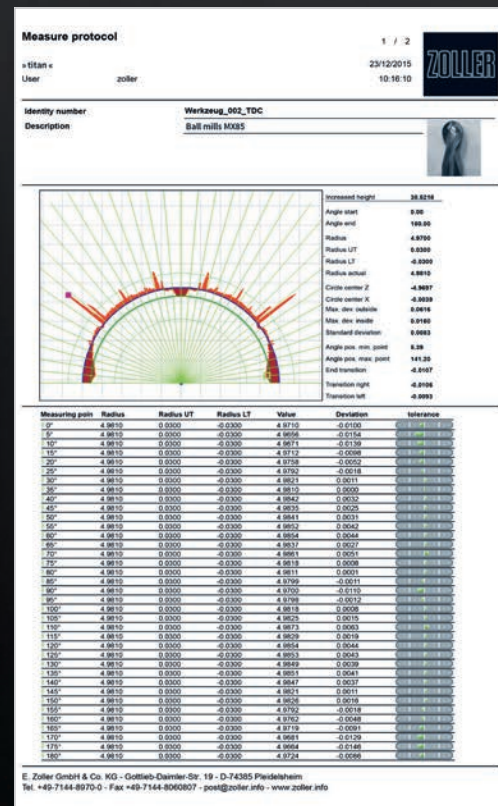
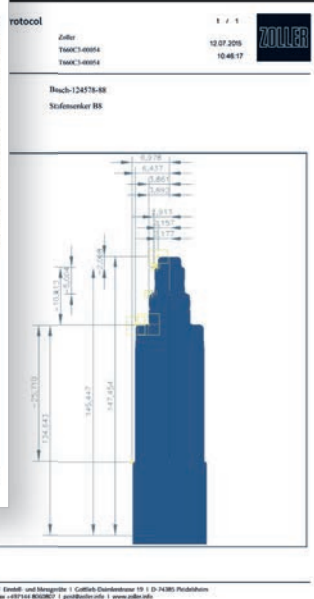
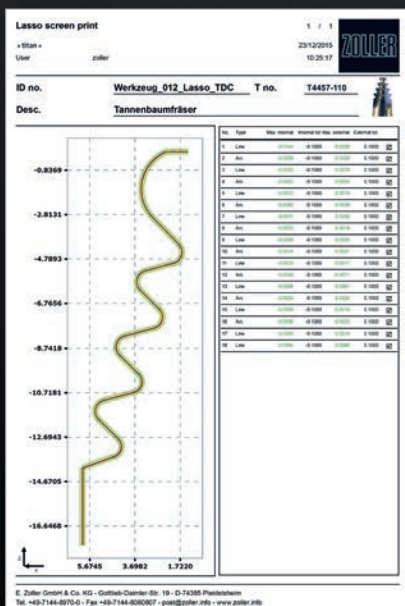


# Maximum Monitoring With Seamless Documentation

## Evaluation of Results Including Test Report



The results are documented seamlessly, they are evaluated automatically and they are issued in a tool-specific manner in the form of a PDF or printed test report. For example, tables of measuring results together can be documented with a tolerance band or graphics, including nominal-actual comparison.



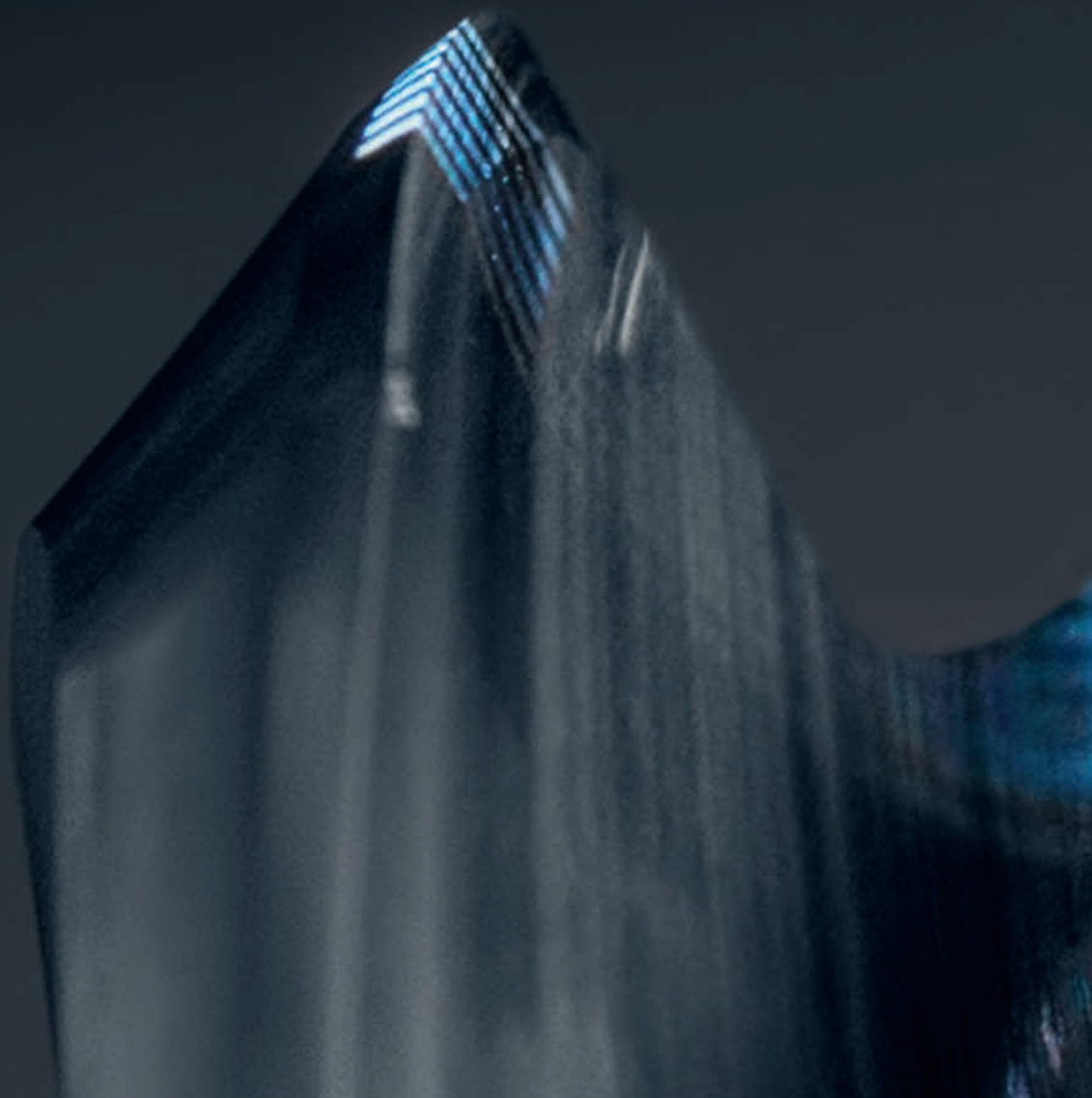
# Fully Automated Measurement of Cutting Edge Preparation

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Another evolutionary jump in metrology from ZOLLER: With »titan« you can measure virtually all precision tools and cutting edge preparations in a fully-automated manner — efficient simplicity.

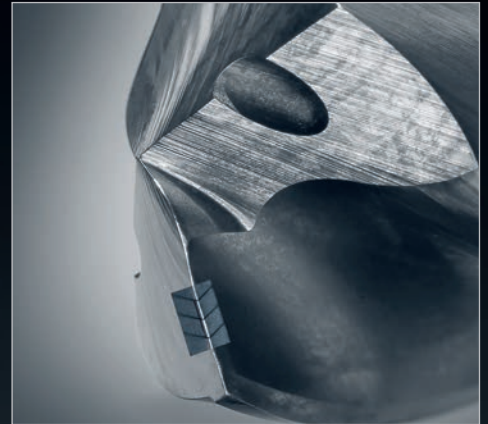
Everything has been thought of to enable cutting edge geometries, which are becoming more and more complex, to be checked easily and cost-effectively. The »Z3dCam«, a CNC-controlled swivel-mounted sensor, delivers rapid and precise results without physical contact right across the work range, which extends up to 1.8 mm — on a

vast array of cutting edge preparation forms. Also, complete 3D digitization, and automatic evaluation and logging, are all included in the standard scope. This enables highly complex measurements to be performed in very short periods of time, without incurring great time and cost.



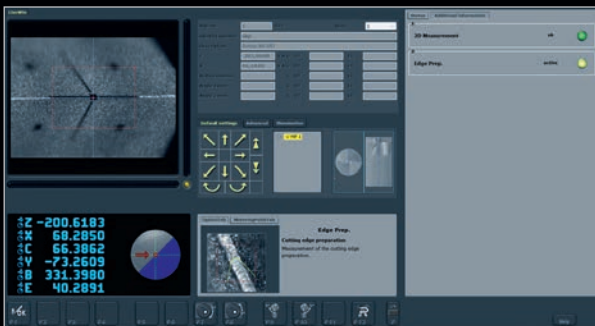


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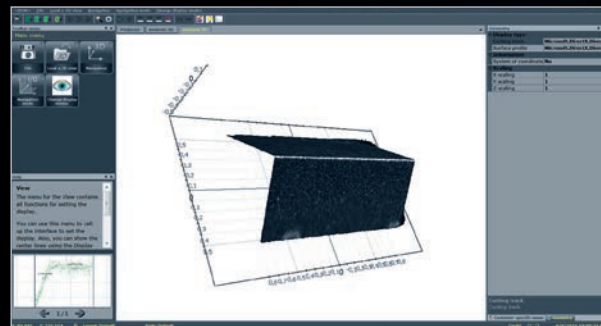
# Examples of Cutting Edge Preparations Suitable for Evaluation

## Fast Measurement and Evaluation



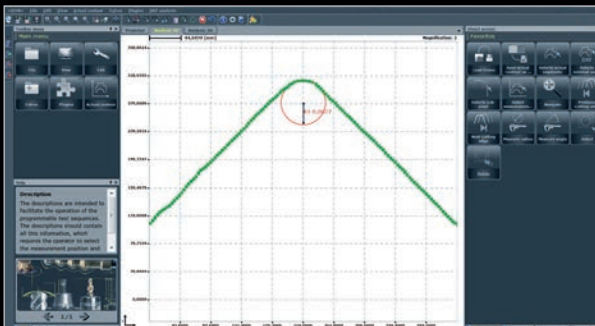
The operator can choose between live image and graphic representation. This live image enables the cutting edge to be positioned, aligned, and examined.

## Detailed 3D Presentation



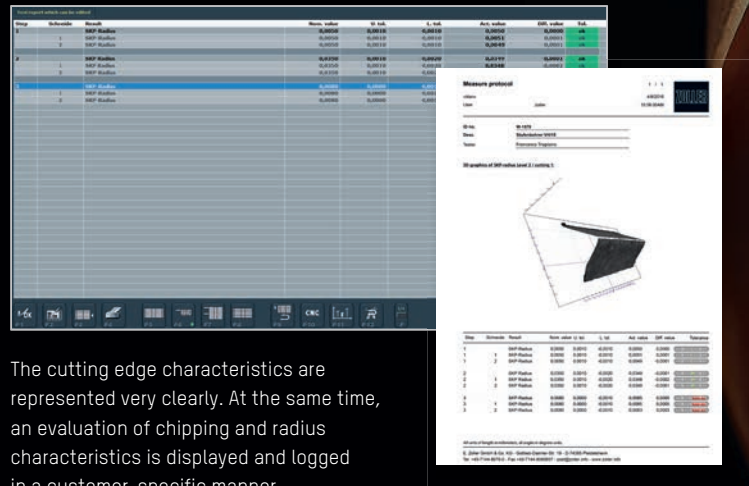
The cutting edge can be displayed in different modes, e.g. texture presentation for immediate detection of possible surface indentations and surface quality.

## Nominal/Actual Comparison and Dimensioning



This function enables a nominal/actual comparison with DXF ideal contours and automatic dimensioning of the section via the contours of the cutting edge.

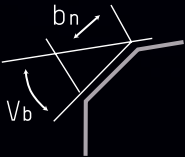
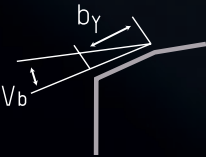
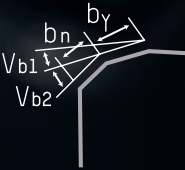
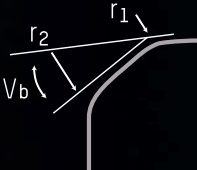

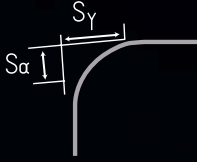
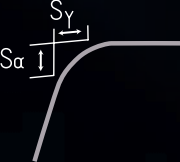
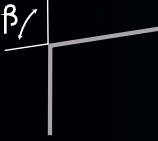
## Evaluation of Test Reports



The cutting edge characteristics are represented very clearly. At the same time, an evaluation of chipping and radius characteristics is displayed and logged in a customer-specific manner.



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
			

Technical Data	Measuring Volume	Minimum Measurable Radius	Working Distance
»titan«   »Z3dCam-Premium« measuring sensor	1,6 x 1,2 x 0,8 mm³	3 µm	30 mm

# Measure Everything. Clamp Everything. Accelerate Everything.

Whether steep or hollow shaft taper, whether Coromant Capto, VDI or Kennametal, whether shaft diameter 3 mm or 32 mm: With the power-operated high-precision spindle»ace« (all-clamping-element) from ZOLLER you always have the correct tool post available and you can change it in no time at all with precision to the micron — just as quickly and conveniently as you change tools. That is because all tool shafts are power-clamped at the touch of a button with consistently the same level of force, repeatability, and speed.

Step Drill

Form Tool

Reduction  
Sleeves  
D32 mm

Collet Chuck  
Adapter  
D32 mm

Measuring Plate  
for Small Parts  
D32 mm

Insert Plate  
Holding Fixture  
D32 mm

Insert Plate  
Holder  
D32 mm



Hydro-expansion D32 mm Tool Post

Grinding Wheel Pack

Monobloc Tool



Tool Post for Hollow Shank Taper (HSK)

Universal tool holding fixture for fast, micron-precise changes:  
The power-operated high-precision spindle from ZOLLER

»ace«

The »ace« (all-clamping-element) high-precision spindle from ZOLLER clamps every tool in a power-actuated manner — with repeatability of 1 micron in just 10 seconds for each tool post change.







fast  
universal  
micron-precision

For decades, the brilliantly simple principle of the ZOLLER tool post holder with modular design has been convincing customers of ZOLLER precision around the world. Here is the great thing about it: The spindle is equipped with a ball bushing into which all ZOLLER tool post holders can be inserted precisely and, above all, with zero clearance. This tried and tested system is absolutely

free of wear and is proven: it has a small number of components, is light weight and provides accelerated workplace operations. Summary: With ZOLLER you can change the tool post successfully in less than 10 seconds with a precision of 0.001 mm — this changeover system is the first choice, in technical as well as economical terms.

SK40 Tool Chuck



Tool Post, Steep-angle Taper (SK)

Coromant Capto-  
Multifunctional ToolCoromant  
Capto Milling Cutter

Tool Post, Coromant Capto

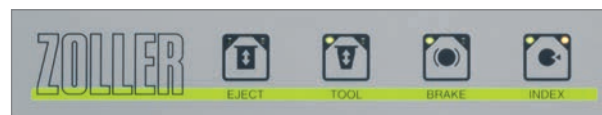
Kennametal Turning Tool Holder



Tool Post, Kennametal

Tool post, adapter and tools not included in scope of delivery.

#### Membrane Keyboard



For fast and convenient operation of all power-operated functions of the tool holding fixture spindle.

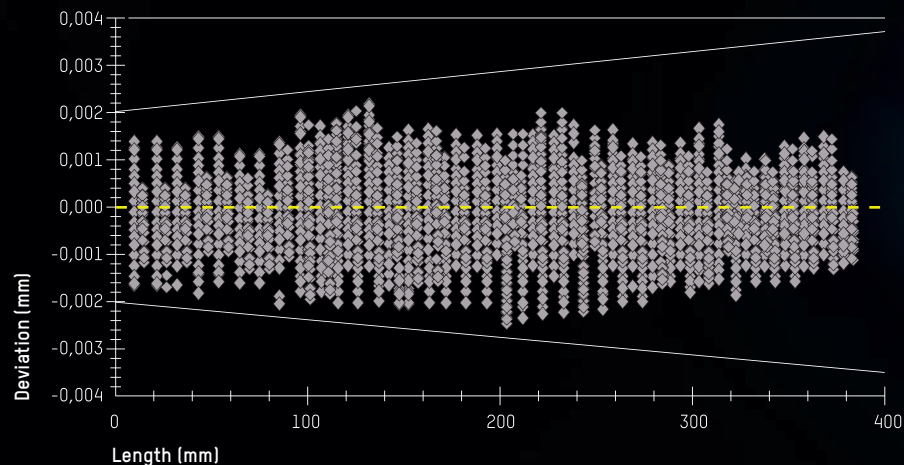
# Inspected Quality. Guaranteed.

The demands facing quality management are rising all the time. You must depend on constant measuring uncertainties of your measuring machines. With ZOLLER, you are always making a sound choice. There are good reasons why we lead the market for micron-precision measuring machines.

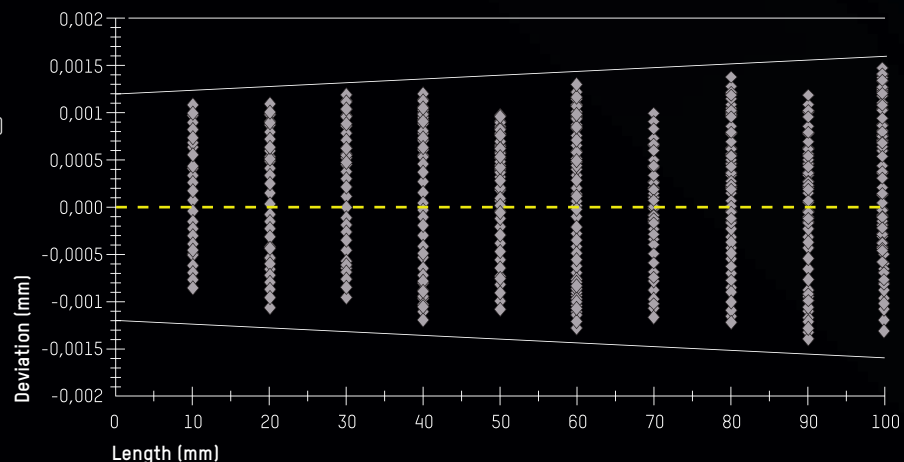
In ZOLLER measuring machines, ultra-precise calibration gauges made of Borofloat glass determine the length deviations on the basis of the DIN EN ISO 10360 standard. In accordance with this standard, at least three measuring runs are performed (25,326 reference points). With this procedure, the 2D accuracy of ZOLLER measuring machines is determined and can be verified at any time.

## ZOLLER Length Measurement Deviations

**Two-dimensional**  
based on  
DIN EN ISO 10360  
 $E \text{ [microns]} = (2.0 + L/300 \text{ mm})$



**One-dimensional**  
acc. to VDI/VDE 2617  
 $E_1 \text{ [microns]} = (1.2 + L/250 \text{ mm})$







The ZOLLER calibration gauge, made of Borofloat glass with reflection-reduced chromized bores, mounted in a protective frame, makes it possible to provide the required level of precision to presetters, inspection, and measuring machines of our customers around the world.

# More Than 100 Measurable Parameters — an Overview of the Most Important Ones



**Distance from Contour to Contour (End, Circumference, Chip Space)**

\_ Edge detection  
\_ Repeatability  
0,005 mm  
\_ Duration:  
approx. 5 seconds

**Cutting Edge Alignment - End**

\_ Edge detection  
\_ Repeatability  
0,07°  
\_ Duration:  
approx. 6 seconds



**Distance from Contour to Middle (End, Circumference, Chip Space)**

\_ Edge detection  
\_ Repeatability  
0,004 mm  
\_ Duration:  
approx. 4 seconds

**SE Alignment - End**

\_ Edge detection  
\_ Repeatability  
0,01°  
\_ Duration:  
approx. 7 seconds



**Distance Line-Line (End, Circumference, Chip Space)**

\_ Edge detection  
\_ Repeatability  
0,005 mm  
\_ Duration:  
approx. 5 seconds

**Cut-out Length**

\_ Edge detection  
\_ Repeatability  
0,005 mm  
\_ Duration:  
approx. 11 seconds



**Alignment HP - Face**

\_ Edge detection  
\_ Repeatability  
0,07°  
\_ Duration:  
approx. 7 seconds

**Cut-out Angle**

\_ 3D measurement  
\_ Repeatability  
0,25°  
\_ Duration:  
approx. 4 seconds



**Diameter D / Snap Gauge**

\_ 2D measurement  
\_ Repeatability  
0,002 mm  
\_ Duration:  
approx. 3 seconds

**Clearance Angle End <sup>3/4</sup> (Clearance Angle 1 / 2 / 3)**

\_ 3D measurement  
\_ Repeatability  
0,05°  
\_ Duration:  
approx. 4 seconds



**Chamfer Width, Length, Angle <sup>11</sup>**

\_ 2D measurement  
\_ Repeatability  
Chamfer width 0,005 mm  
Chamfer length 0,005 mm  
Chamfer angle 0,03°

**Clearance Angle, Circumference <sup>31</sup> (Clearance Angle 1 / 2 / 3)**

\_ 3D measurement  
\_ Repeatability  
0,05°  
\_ Duration:  
approx. 4 seconds



**Axial Land Width <sup>21</sup>**

\_ Edge detection  
\_ Repeatability  
0,005 mm  
\_ Duration:  
approx. 3 seconds

**Relief Radius**

\_ 3D measurement  
\_ Repeatability  
0,15 mm  
\_ Duration:  
approx. 5 seconds



**Flank End Differences**

\_ 3D measurement  
\_ Repeatability  
0,01 mm  
\_ Duration:  
approx. 3 seconds

**Core Diameter**

\_ 3D measurement  
\_ Repeatability  
0,005 mm  
\_ Duration:  
approx. 4 seconds



**Head Length**

\_ Edge detection  
\_ Repeatability  
0,005 mm  
\_ Duration:  
approx. 6 seconds

**Flute Depth**

\_ 3D measurement  
\_ Repeatability  
0,005 mm  
\_ Duration:  
approx. 4 seconds



**Length Z**

\_ 2D measurement  
\_ Repeatability  
0,002 mm  
\_ Duration:  
approx. 2 seconds

**Opening Angle**

\_ Edge detection  
\_ Repeatability  
0,06°  
\_ Duration:  
approx. 9 seconds



**Line Center Offset**

\_ Edge detection  
\_ Repeatability  
0,005 mm  
\_ Duration:  
approx. 6 seconds

**Run-out / Cutting Edge Top Runout**

\_ 2D measurement  
\_ Repeatability  
0,002 mm  
\_ Duration:  
approx. 10 seconds



**Minor Cutting Edge Angle**

\_ 3D measurement  
\_ Repeatability  
0,06°  
\_ Duration:  
approx. 5 seconds

**Chisel Length**

\_ Edge detection  
\_ Repeatability  
0,005 mm  
\_ Duration:  
approx. 9 seconds



**Chisel Edge Radius**

\_ Edge detection  
\_ Repeatability  
0,1 mm  
\_ Duration:  
approx. 5 seconds

**Radius 1 (Front, Circumference, Chip Space)**

\_ Edge detection  
\_ Repeatability  
0,01 mm  
\_ Duration:  
approx. 3 seconds

**Chisel Angle**

\_ Edge detection  
\_ Repeatability  
0,08°  
\_ Duration:  
approx. 5 seconds

**Radius 3 (Front, Circumference, Chip Space)**

\_ Edge detection  
\_ Repeatability  
0,01 mm  
\_ Duration:  
approx. 8 seconds

**Chisel Angle, Sharp**

\_ Edge detection  
\_ Repeatability  
0,11°  
\_ Duration:  
approx. 5 seconds

**Radius End Gash**

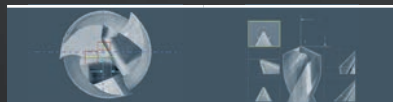
\_ 3D measurement  
\_ Repeatability  
0,005 mm  
\_ Duration:  
approx. 5 seconds

**Radius / Cross Dimension <sup>1)</sup>**

\_ 2D measurement  
\_ Repeatability  
0,0015 mm  
\_ Duration:  
approx. 2 seconds

**Concentricity**

\_ 2D measurement  
\_ Repeatability  
0,0015 mm  
\_ Duration:  
approx. 7 seconds

**Cutting Edge via Center**

\_ Edge detection  
\_ Repeatability  
0,005 mm  
\_ Duration:  
approx. 6 seconds

**Peaks / Cutting Edge Angle <sup>1)</sup>**

\_ 2D measurement  
\_ Repeatability  
0,03°  
\_ Duration:  
approx. 6 seconds

**Cutting Height Differences**

\_ 2D measurement  
\_ Repeatability  
0,002 mm  
\_ Duration:  
approx. 8 seconds

**Axial Rake Angle**

\_ 3D measurement  
\_ Repeatability  
0,1°  
\_ Duration:  
approx. 4 seconds

**Rake Angle**

\_ 3D measurement  
\_ Repeatability  
0,1°  
\_ Duration:  
approx. 5 seconds

**Tooth Height <sup>2)</sup>**

\_ 3D measurement  
\_ Repeatability  
0,01 mm  
\_ Duration:  
approx. 4 seconds

**Helix Angle**

\_ Edge detection  
\_ Repeatability  
0,01°  
\_ Duration:  
approx. 10 seconds

**Full-radius Contour**

\_ 2D measurement  
\_ Repeatability  
0,002 mm  
\_ Duration:  
approx. 5 seconds

**Angle on a Line (Front, Circumference, Chip Space)**

\_ Edge detection  
\_ Repeatability  
0,07°  
\_ Duration:  
approx. 5 seconds

**Angle Between 2 Lines (End, Circumference, Chip Space)**

\_ Edge detection  
\_ Repeatability  
0,06°  
\_ Duration:  
approx. 8 seconds

**Centering Radius**

\_ 2D measurement  
\_ Repeatability  
0,005 mm  
\_ Duration:  
approx. 2 seconds

**Cylindricity / Back Taper**

\_ 2D measurement  
\_ Repeatability  
0,002 mm  
\_ Duration:  
approx. 8 seconds

**Captions**

2D = transmitted light measurement

3D = incident light measurement

1) Depending on the quality of contour and size of object

2) Depending on the transitional contrast of clearance angle 1-2

3) From measuring window 0.35 mm

4) On step tools up to max. step length of 30 mm

**Notes**

The parameters depicted can be included as standard or as optional items in the scope of delivery of software for the »titan« function. All technical data subject to change.

All specified values depend on the surface structure.

The specified accuracies require that the measuring machine is not exposed to vibrations and is installed in an environment with stable ambient conditions. Different measurement methods for the same parameter may not be compared since calculations which are different technologically or mathematically may lead to different measurement results. The acceptance and verification of the specified accuracies is performed only using certified ZOLLER gauges: ZOLLER step gauge [2D] type no. 05B0031 ZOLLER angle-testing gauge [3D] type no. 9100116

# Automation Solution Based on Example of Cutting Edge Preparation

**Cleaning, inspecting, measuring, and archiving, on the basis of an automated and integrated system:**

## **1-2 | Pallet / Tool Delivery**

The tools are delivered from the grinding machine on pallets. ZOLLER »roboSet« then individually transfers the tools to the rounding machine for cutting edge preparation.

## **3 | »roboClean« Automatic Tool Cleaning**

After production of cutting edge preparation, the tool is cleaned automatically on the »roboClean« system in »roboSet«.

## **4 | Loading »titan«**

»roboSet« loads »titan« with the cleaned, dried tool and the fully-automatic measurement process then starts.

## **5 | Automatic Measurement, Evaluation and Labeling of Tools**

After the measurement process, the tools are classified and sorted automatically in accordance with the tolerance check. Tools that lie within the tolerance indication are immediately labeled on the »roboMark« and are then placed in the "good pallet".

## **6-7 | Measuring, Inspecting, Correcting**

The actual data for measured cutting edge preparation of each individual tool are transferred back to the rounding machine for correction.

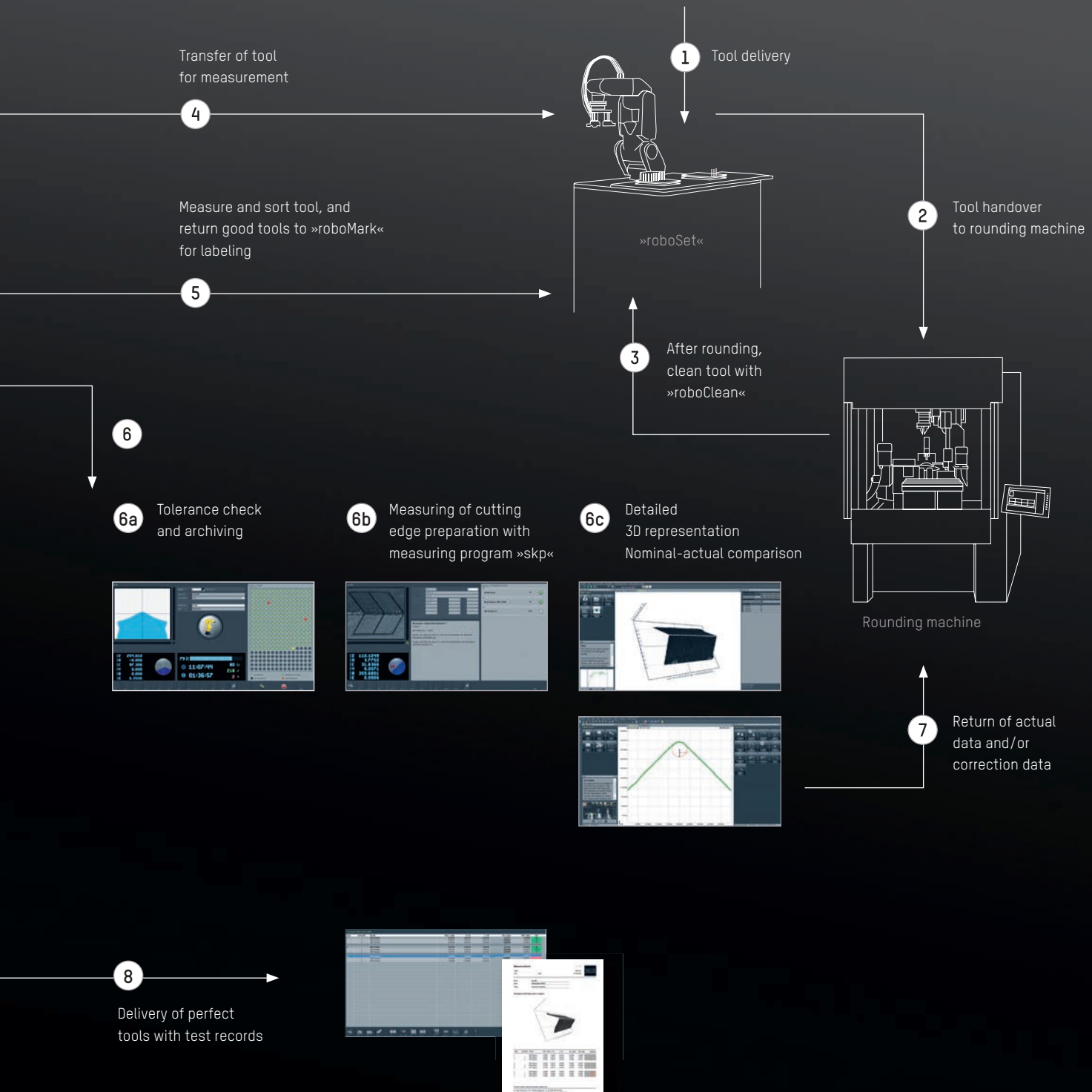
## **8 | Final Delivery Including Test Records**

Delivery of finished tools in the "good pallet" includes detailed ZOLLER test records.



ZOLLER »titan«





# Measurement of New Tools

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

### 1 | Data Communication / Programming / Definition

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

### 2 | Producing and Measuring Tool

The new tool will be ground on the CNC grinding machine. Immediately after that, this is measured fully automatically on the ZOLLER »titan«. A time-consuming programming process is eliminated on the ZOLLER universal measuring machine.

### 3 | Transferring Back the Measured Actual Values

The actual tool data are repatriated to the programming system by the ZOLLER »titan«.

### 4-5 | Volume Production with Corrected Actual Data

Due to the actual tool data, the optimized NC program can be transferred back to the machine, and volume production can be started with actual tool data accurate to the nearest micron.

### 6 | Random Sample Measurement including Test Report

Volume production tools are measured on the »titan« using a specified test report and the measuring results are printed out in a test report.

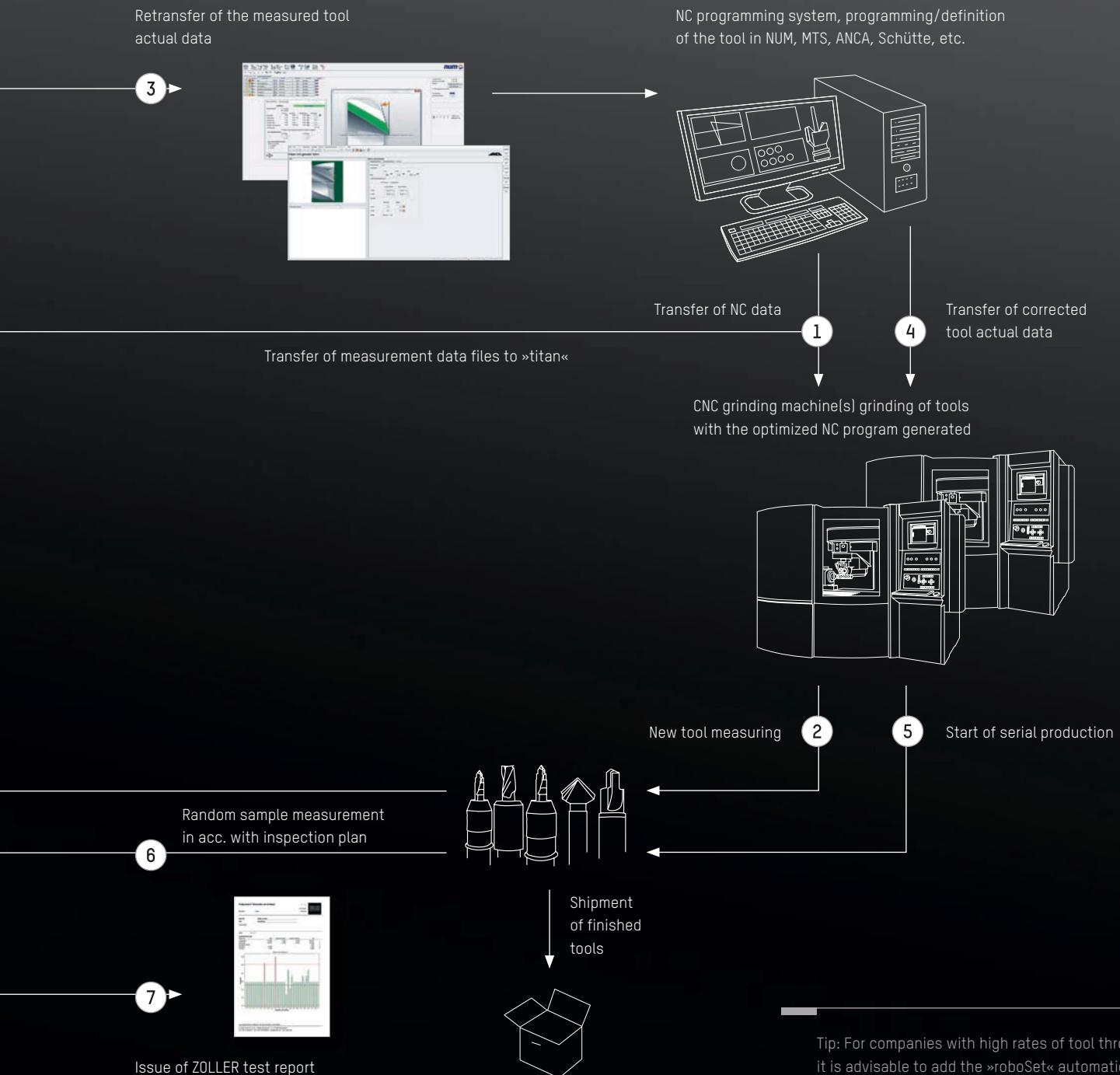
### 7 | Final Delivery including Test Reports

Delivery of manufactured tools includes ZOLLER test reports.



ZOLLER »titan«





Tip: For companies with high rates of tool throughput, it is advisable to add the »roboSet« automation solution for the measurement of tools.

# Ultimate Precision — All Automatically

The automation solution from ZOLLER — ideal for companies with high levels of tool throughput: »roboSet« loads your »titan« automatically right around the clock. Even complex measuring tasks can be processed fully automatically with 100% checking guaranteed.

ZOLLER »roboSet« can load shank tools on »titan«, and on to almost every CNC-controlled ZOLLER measuring machine equipped with automatic power clamping and »pilot 3.0«. Operation is remarkably easy: press the »pilot 3.0« start button and the automatic mode starts up. The autonomous path correction of the robot every time a part is placed in chucks enables »roboSet« to

provide great process reliability and, by virtue of being mechanically disconnected from the measuring instrument, it can also offer ultimate standards of measuring precision. Optionally, the system can be expanded with »roboClean« for automatic cleaning of the tools, and with »roboMark« for automatic inscription after the measuring process.



Fit for every requirement with »pilot 3.0« — fast and simple. As though created just for the fully automatic CNC-controlled measuring instruments with the »roboSet«.



Online status display: status on view for 24 hours.

# ZOLLER INSPECTION SOLUTIONS



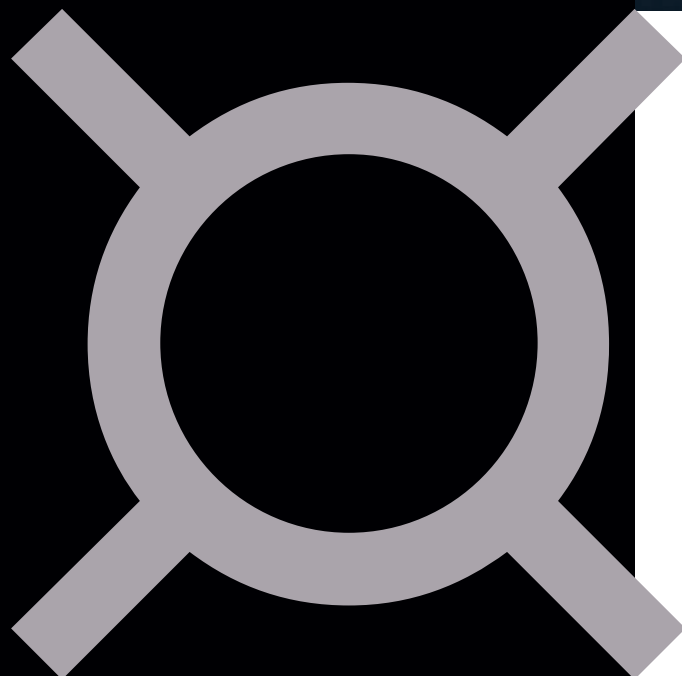
Technical Data	Range	Positioning Accuracy	Maximum Load	Maximum Tool Length	Number of Pallets
»roboSet«	920 mm	±0,03 mm	7 kg without gripper	230 mm	8 pieces
Subject to technical modifications. The machines shown here may include options, accessories, and control variants.					



# ZOLLER service

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Faster, more flexible, more operationally reliable – your goal is to achieve maximum efficiency in your production operations. Our goal is to help you with this by providing well-conceived system solutions. We also provide comprehensive service and support that may involve an on-site consultation or development of made-to-measure solutions to suit individual requirements. Choosing ZOLLER means choosing superlative products and unique manufacturing expertise. Needless to say, you have access at all times to experts that will answer your questions – for the entire lifetime of your ZOLLER products. Use ZOLLER know-how to optimize your production operations.





Alexander Zoller | Christoph Zoller

## ZOLLER Solutions

From us, you get more than superior products. You obtain individual system solutions for every aspect of your tools. To achieve this for you, we combine hardware, software, and service support. All from a single source. All for your success. We call that ZOLLER Solutions.

# At Home in Germany – at Your Call Worldwide

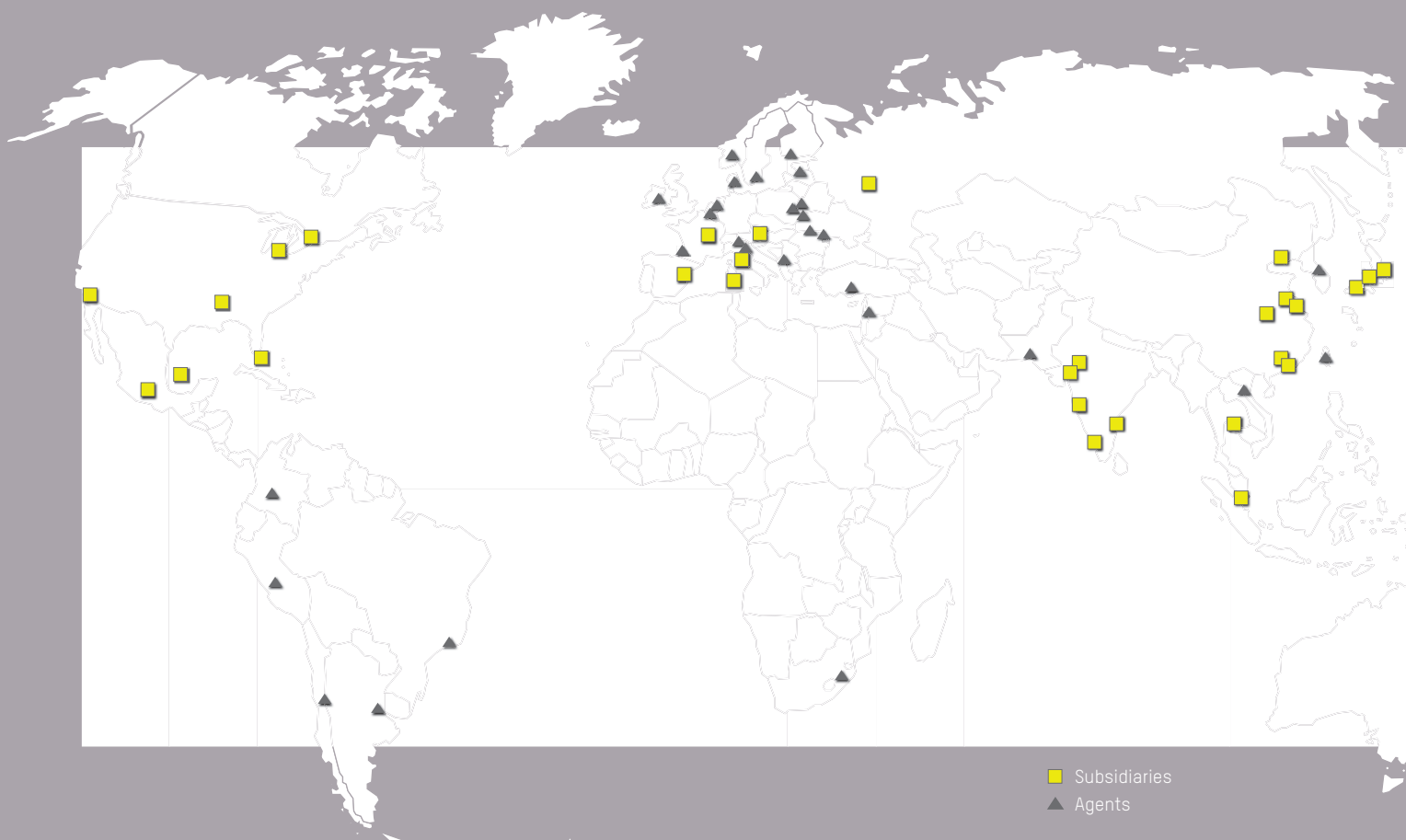
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