



## THE LH SERIES

You can rely on WENZEL!

WENZEL presents a new generation of coordinate measuring machines. We have expanded our successful LH series with interesting features and innovative industrial design. It means that the LH CMM from WENZEL gives you the edge over your competitors today and in the future. With the WENZEL LH, you benefit from an extremely functional, effective and flexible measuring machine that is reliably and easily to operate.

The success of our CMMs is based on a proven holistic concept consisting of first-class engineering, intelligent software and accessory options and a comprehensive service package. Stable, reliable and full of dynamics, the LH is a universal and flexible instrument for different applications.

Find additional product details and advantages of the LH Series on the following pages.



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## Machine Concept



### **Economical and powerful 3D coordinate measuring machine**

- First-class concept with innovative design, intelligent software and accessory options
- Relevant precision machine components that work in perfect harmony
- Investment protection through robust, modular and innovative engineering
- High serviceability guarantees low downtime and reduced overall costs

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## Technology and Support



### **Perfection in detail by high-quality components**

- Granite: CMM material No. 1
- Accurate positioning thanks to the optimal path-measuring system technology
- International services

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## Sensors and Changer Racks

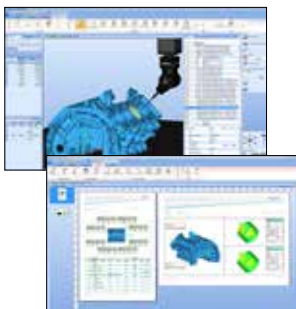


### **Probe heads, probe systems and optical sensors**

- Manual, motorized and continuously or indexable probe heads
- Touch trigger, scanning and optical measurement systems
- Changer racks

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## Software



### **Accurate data for meaningful results**

- Intelligent 3D software solutions based on years of expertise
- Full integration of the hardware in the software environment
- Clear documentation capabilities and interfaces
- Efficient surface reconstruction
- Virtual CMM

## MACHINE CONCEPT

### Accurate measurements results quick and easy

The complete products of WENZEL CMMs stands for precision and performance in 3D measurement. With the new generation of air-bearing coordinate measuring machines WENZEL continues the improvement in precision, efficiency and longevity.

The revolutionary design of the LH Series offers high mechanical accuracy, perfect ergonomics and high dynamics.

### Precision

#### High precision through overall concept

- Relevant precision machine components work in perfect harmony.
- Identical thermal behavior of granite in all axes ensures the intrinsic accuracy of the LH CMMs.
- High resolution scales provide accurate positioning and precise results.
- Accurate detection of free-form surfaces and geometric elements with an innovative sensor technology.
- Intelligent algorithms and interconnection technologies of the WENZEL controller transmit large amounts of data very quickly.

### Ergonomics and usability

#### Just measure

- The easy to use WENZEL measurement software generates fast accurate measurement results.
- Individual user training enables a fast and efficient application.
- Perfect ergonomics for comfortable and safe operation.
- Ease of use with the multifunctional hand box.





## Robustness and durability

### Investment protection through robust, modular and innovative engineering

- WENZEL CMMs manufactured from granite are free of internal tensions and extremely wear resistant.
- The guide ways of the X- and Y-axes are fitted with bellow type covers to protect against contamination from dust and dirt.
- The use of high-quality components ensures high machine availability.
- An innovative drive system, bearing and guide way technologies provides low wear of the base material.
- The modular design of the CMM ensures the subsequent upgrading of the LH and offers full security of your investment for the future.

## Serviceability

### Reduced downtime due to high serviceability

- Long and costly maintenance intervals can be avoided by easy accessibility to maintenance components.
- WENZEL Online Service (WOS) allows quick online diagnosis for help.
- High availability of spare parts due to extremely high level of vertical manufacturing.

### Sizes of the LH Series

Overview measuring range (in mm)

	X-Axis	Y-Axis	Z-Axis
LH 65	650	750/1200	500
LH 87	800	1000/1500/2000	700
LH 108	1000	1200/1600/2000/3000	800

Further Y-lengths on request. Subject to technical modification and to changes in scope and design.

## MACHINE CONCEPT

Large measuring range and excellent accessibility

### Sizes of the LH Series

Overview measuring range (in mm)

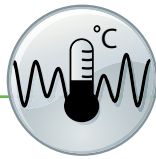
	X-Axis	Y-Axis	Z-Axis
LH 1210	1200	1600/2000/2500/3000	1000
LH 1512	1500	2000/2500/3000	1200

Further Y-lengths on request. Subject to technical modification and to changes in scope and design.



TECHNOLOGY AND SUPPORT

The LH CMM in detail



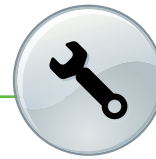
**Guarantors for stable results**

**Active damping**

The LH CMM can be optionally equipped with a pneumatic active damping system, which protects the CMM from external vibrations and kinematic influences.

**Thermal compensation**

LH can be equipped with an automatically temperature compensation. Thus, the measuring device and workpiece is protected against thermal influences of the environment.



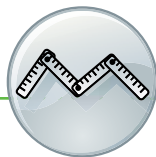
**Service and application support - We are there for you**

**Professional user training:**

Training will be offered as individual training, group training and seminars. The training can be performed at your place or at your WENZEL technical centre.

**Qualified service team**

Our service team is there to assist you: for repairs, maintenance, retrofitting and telephone support or with WENZEL Online Service (WOS) - the internet-based remote diagnostics and remote maintenance service. More information can be found in our Service Brochure.

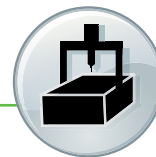


**High resolution scales**

**Accurate positioning thanks to the optimal path-measuring system**

The WENZEL LH is equipped with an incremental measuring system, which has a fine grating period, and excellent dirt immunity.

As a result best position resolution and stability at high speed for all linear axes are possible. The highly precise and robust scale tapes contain a very small compensating inherent hysteresis.



**Granite: CMM material No. 1**

Its physical characteristics makes granite the perfect material for metrology. WENZEL conducts all process steps from cutting to milling and grinding. The first impression that aluminum is much lighter than granite proves wrong. The specific weight of granite is insignificantly above the weight of aluminum. However, the expansion coefficient of aluminum is almost four times larger. All relevant measuring machine parts are made of granite. As the base plate, cross-beam and sleeve are made of the same material a homogeneous thermal behavior is achieved.



**Physical characteristics of materials in metrology**

Material	Specific Weight [kg/dm <sup>3</sup> ]	Expansion Coefficient [1/K]	Temperature Diffusionrate [W/mK]	Elasticity Module [10 <sup>3</sup> N/mm <sup>2</sup> ]
Steel	7,25	10,4*10 <sup>-6</sup>	42-63	90-180
Aluminum	2,7	23,8*10 <sup>-6</sup>	210	72
Ceramic (Al2O3)	3,85	8*10 <sup>-6</sup>	28	370
<b>Granite</b>	<b>2,8</b>	<b>6,5*10<sup>-6</sup></b>	<b>3,5</b>	<b>NIL</b>

## SENSORS AND CHANGER RACKS

### Probe Heads, Probe Systems and Scanners

When combined with a variety of innovative sensors the LH Series is a flexible solution for a number of different applications. From the smallest injection molded parts up to large sheet metal forming dies – the LH CMMs meets your needs! The LH Series can be equipped with both, manual and motorized probe heads as well as continuously recording systems and indexable probe

heads. With suitable touch trigger, scanning and optical measurement systems LH CMMs offer significant results for various applications. Module change racks enable automated changing of stylus modules.



#### PH10T/PH10M PLUS

Automatically indexable probe head  
PH10: Fast probe replacement (auto joint) with the corresponding change systems.



#### PH20

The 5-axis PH20 and LH are an efficient solution for measuring 3D and prismatic components. The 'Head Touch' function takes measurement points very quickly and reduces cycle times.



#### REVO™

The revolutionary 5-axis probe system REVO™ coupled with Metrosoft QUARTIS® provides an extremely fast high scanning speed solution with a high degree of measurement flexibility, and thus an extremely high throughput.



#### TP20

Touch trigger probe. Extremely robust and flexible touch trigger probe with stylus module.



#### TP200

Compact, module-changing touch trigger probe particularly suitable for measuring tasks with tight dimensional tolerances for 3D free-form surfaces with longer styli.



#### SP25M

The most compact and versatile probe system for scanning on a global scale.



#### SP80

Passive probe, equipped with a high resolution digital length-measuring system (0.02  $\mu\text{m}$ ), which ensures outstanding measuring precision even when using long stylus inserts (up to 500 mm).



#### PHOENIX

The optical 3D sensor PHOENIX captures geometry elements and surfaces on different materials in only one working cycle and can be used in combination with tactile probes.



#### WENZEL SHAPETRACER

The 3D Line Scanner changes your coordinate measuring machine into the ideal machine to record and handle point clouds. Perfect for all who need to record and work on surfaces and outlines of physical objects.



## Changer Racks



### Changer Rack SCR200

The SCR200 provides automatic, high speed changing between up to six TP200 stylus modules. The SCR200 is powered by the separate probe interface, PI 200, and provides features to facilitate safe stylus changing.



### Changer Rack ACR3

The changer rack ACR3 provides a passive means to automatically exchange probes without the need for requalification. Although the ACR3 is a four port unit, systems can be linked together so that more different probes or extensions can be stored in the rack - sufficient for any measurement task.



### Changer Rack FCR25

Flexible change racks for automated changing of SP25M scanning and touch-trigger modules with 3 stations (6, 9, 12 and 15 stations also possible).



### Changer Rack SCP80

Docking port for SH80 stylus holder, mounted on modular rack system (MRS) for use with the SP80 probe.



The illustrated accessories are a small selection from our extensive product range. For more information, please contact your local WENZEL representative.

## WENZEL SOFTWARE

# The intelligent software for your application

The LH Series bridge-type measuring machine - together with the software from the WENZEL Group is a measurement system that allows you to comfortably solve your daily measurement tasks. The powerful

measurement software Metrosoft QUARTIS® is the ideal measurement software for dimensional evaluation of geometry and free-form surfaces.

### Metrosoft QUARTIS®: Significant measurement results – quickly and easily!



Metrosoft QUARTIS® is the measuring software that allows you to generate precise measurement results, impressive inspection reports and meaningful statistics even faster and easier. Thereby achieving large time gains and significant financial savings in your measurement process.

#### **Ease of use with Fluent User Interface**

The ribbon can save a lot of time. Functions are logically grouped according to working steps. Thus, it is easy to solve measurement tasks. There with you can solve your measurement task easily and efficiently.

#### **One measurement software for all tasks**

You can probe individual points and scan with Metrosoft QUARTIS® - using ruled geometry as well as free-form elements. Even roughness can be measured with the Renishaw REVO SFP1 sensor. All major CAD formats are supported, of course.

#### **Integrated Statistics**

Metrosoft QUARTIS® lets you have full control over your process at all times. It provides you with the most important statistical data for the evaluation of your machine or process capability. The direct data transfer to external statistics software, e.g. qs-STAT from Q-DAS, is guaranteed with the standard interface.

#### **Create meaningful measurement reports intuitively**

Create meaningful measurement reports in no time with Metrosoft QUARTIS® by using the template library and report generator. Colored displays identify and visualize relevant areas. The free creation of format templates allows a variety of reporting forms, for example language and layout variations.

#### **Error prevention through live preview**

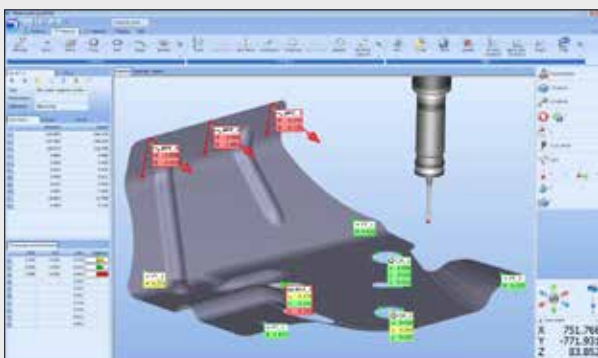
The live preview of each individual work step allows you to intervene in order to correct the measurement process. Therefore, the subsequent work steps are efficiently and proactively accelerated during the creation.

#### **Unlimited possibilities thanks to DMIS**

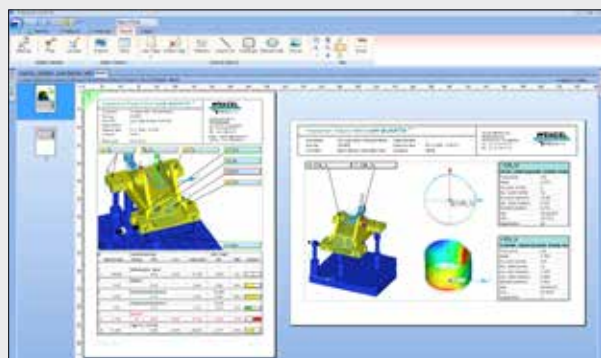
Through its unique design, Metrosoft QUARTIS® is the perfect measuring software for the vendor-neutral DMIS programming language.

#### **Organized data management**

Metrosoft QUARTIS® provides safe data storage within an integrated database. The automatic backup ensures the traceability of your measurement results at all times.



Metrosoft QUARTIS®: Measurement Process



Metrosoft QUARTIS®: Measurement Report



Metrosoft QUARTIS®:

For reverse engineering and surface generation, PointMaster is one of the most efficient software packages available worldwide. Do you want to evaluate your measured surfaces quickly and easy in Metrosoft

QUARTIS®? It's no problem with the 'Virtual CMM' from WENZEL!

### Virtual CMM

The Virtual CMM allows dimensional evaluation of assemblies directly on the 3D model and is the interface between PointMaster and the measurement software Metrosoft QUARTIS®. Consequently surface data is used as the basis for complete measurement programs and reports analog to a common measurement system. If such a measurement program is executed, measuring points are virtually probed on the generated surface data. – The Virtual CMM simplifies the measurement on flexible and sensitive materials. Even hard to reach areas and areas that cannot be reached measured with tactile methods, can be easily evaluated.

**PointMaster:**  
Efficient reverse engineering and surface generation



PointMaster is the successful software from WENZEL with its proven modules: Reverse Engineering, Verification, CAD/CAM and CT.

#### Simple solution of complex tasks

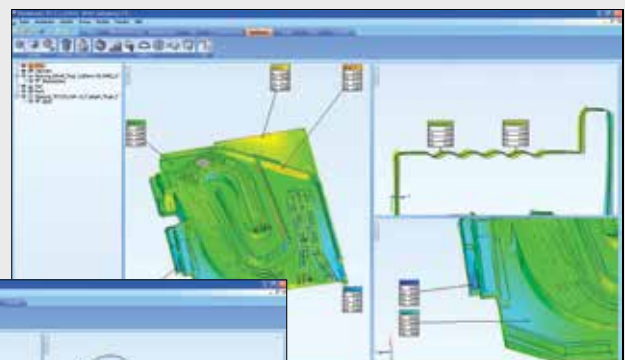
The success of PointMaster is based on a complete object-oriented operation. This allows a simple and intuitive application. Highly complex tasks can be solved easily with only minimal training.

#### Versatile functions and modules

PointMaster offers visual support with the interactive „Shading“ feature. For example, discontinuity is displayed the same way as the form control lines that are important for the construction of the surfaces. Surface trimming with BSpline curves, adoption of CAD data for the reverse engineering as well as ruled geometry recognition complete the range of functionality of PointMaster.



Roughness Measurement



PointMaster: Verification



PointMaster: Reverse Engineering

