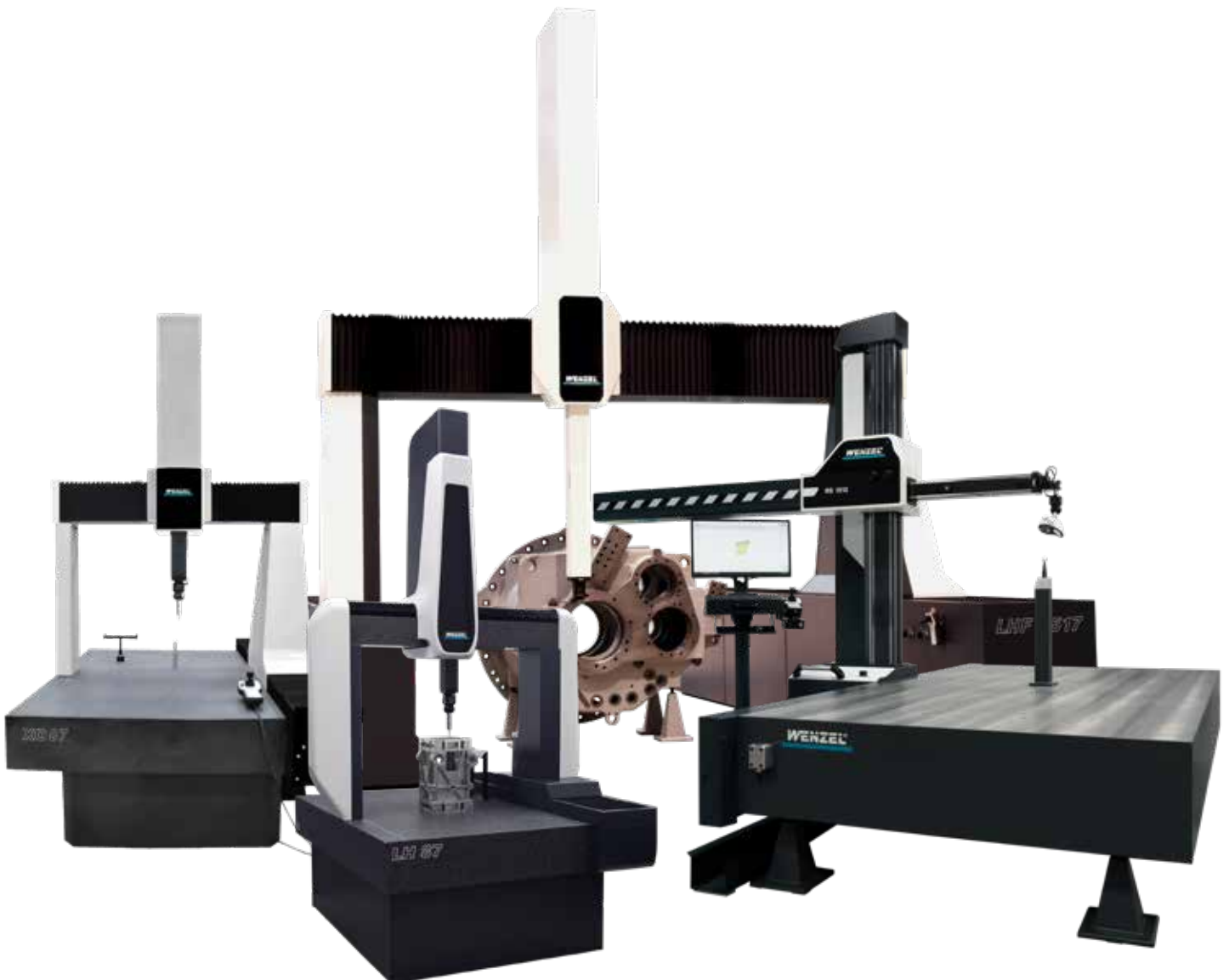


FIRST-CLASS CMMs  
**WENZEL CMMs**

Precision that pays off



PRODUCT RANGE  
**COORDINATE MEASUREMENT METROLOGY**

# WENZEL – INNOVATION MEETS TRADITION



“With our product range we are able to support all your measuring needs. As a family business, we strive to achieve long-term partnerships with our customers and for this we invest in the outstanding quality of our machines and offer you excellent service.

Dr. Heike Wenzel and Prof. Dr. Heiko Wenzel-Schinzer  
Management of the WENZEL Group

## WENZEL FACTS

### About WENZEL:

Founded in 1968  
100 % family owned business in 2nd Generation

### Subsidiaries and agencies

in more than 50 countries

### Installed machine base worldwide:

> 10.000

### Number of employees worldwide:

> 600

### Headquarters:

Wiesthal, Germany

Total area:	54.000 m <sup>2</sup>
of which buildings:	15.500 m <sup>2</sup>
of which air-conditioned:	5.000 m <sup>2</sup>

The WENZEL Group GmbH & Co. KG is a leading Manufacturer of innovative measuring technology solutions. The success of the largest family-run company in the industry is based on German quality, technology, flexibility and strong partnerships.

Founded in 1968, the name WENZEL stands today primarily for the highest precision, reliability and technological competence.

In recent years, measurement technology has changed a lot. The measuring tasks are performed in production as well as in the measuring room. In addition to high-precision tactile measurement, optical sensors as well as new technologies such as computed tomography have found their place in metrology. We as WENZEL have brought numerous innovative solutions onto the market in recent years so as to offer our customers the right products. In addition to the product itself, we also supply you with turnkey solutions. This makes us flexible experts for innovative measurement solutions.

# WENZEL SOLUTIONS VERSATILE APPLICATIONS

## OUR APPLICATIONS



## OUR PRODUCT LINES

## OUR FOCUS INDUSTRIES

The success of our CMM series is based above all on a coherent overall concept and unconditional perfection in detail. The principle behind the success of this series is mechanical accuracy and top mechanical engineering. The machines of the XO series are the ideal entry-level models for coordinate measuring technology. They combine speed, straightforward operation and an excellent price-performance ratio. The bridge machines of the LH series have air bearing guide elements in all axes which ensure wear-free and smooth operation. The roller-bearing horizontal arm measuring machines of the R series offer a large measuring volume and perfect accessibility from all sides. Both types of design ensure a maximum of flexibility and dynamics.

High precision and user-friendly operation, all rounded off by an intelligent service package - WENZEL thinks ahead. The machines can be equipped with a variety of swivel head and stylus combinations, from rigid heads to motorized rotary heads, from simple probes to high-precision measuring probe systems.

The optimal solution for every measuring task!

### TYPICAL BUSINESS AREAS

- Quality assurance
- Product development
- Surface testing
- Prototype creation
- First article inspection
- Fabrication

### TYPICAL APPLICATION AREAS

- Mechanical engineering
- Automobile manufacturers and suppliers
- Aerospace
- Foundry technology
- Metal and plastics processing industry
- Medical technology
- Mold and tool making
- Electrical engineering/electronics
- Inspection services
- Research and Science
- ...and many more

# WENZEL SOLUTION FINDER

## THE RIGHT SOLUTION FOR EVERY TASK

WENZEL offers you the appropriate solutions for your different requirements. But which one suits you? On this double page we want to give you a qualified overview. Of course, we would also be happy to advise you on a detailed analysis and examination.

**1. Installation location:** Here we differentiate whether the machine is fundamentally designed for the measuring room or for production, i.e. without any special precautions.

**2. Component size:** Here we roughly distinguish between small, medium and large components.

**3. Accuracy:** Here we differentiate roughly into very accurate, accurate or less accurate.

**4. Application:** Here we make a rough distinction between geometry, free-form surfaces, non-destructive testing and defect detection.

**5. Mobility:** The main issue here is the amount of work required for the measuring instrument to be able to work at a different location.

**6. Speed:** The higher the speed, the lower the achievable cycle times.

**7. Financials:** In addition to the acquisition costs, this also includes maintenance and service costs as well as operating costs (e.g. simple operation). Of course, all our solutions have a very good price/performance ratio, but require investments in different amounts. We differentiate between lower, medium and higher investment.

LOCATION	Measuring room
	Production
PART SIZE	Small
	Medium
	Large
ACCURACY	Very high
	High
	Medium
APPLICATION	Geometry
	Surface
	NDT + defect
MOBILITY	High
	Medium
	Low
SPEED	Very high
	High
	Medium
FINANCES	Acquisition
	Maintenance
	Ease

\*depending on the material of the component



XO 5-5/8-7		LH 6-5/8-7		XO 10-7/12-10		LH 10-8/12-10		LH 15-12/20-15		LHF		R-Series	
TACTILE	OPTICAL	TACTILE	OPTICAL	TACTILE	OPTICAL	TACTILE	OPTICAL	TACTILE	OPTICAL	TACTILE	OPTICAL	TACTILE	OPTICAL
●	●	●	●	●	●	●	●	●	●	●	●	●	●
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# BRIDGE MEASURING MACHINES

PRECISION THAT PAYS OFF





# PRECISION THAT PAYS OFF

## WENZEL BRIDGE CMMs

### RANGE OF SERVICES AND FIELDS OF APPLICATION AN OVERVIEW

---

With the help of coordinate measuring technology, dimensional measured variables of standard geometric elements or free-form surfaces of individual parts, moulds, models and tools can be recorded. The elements are picked up at the workpieces and their measuring points are then processed further on computer. The development of coordinate measuring machines has made it possible to perform measuring tasks faster and with very high accuracy. Coordinate measuring technology is therefore indispensable in today's industrial production process.

Measurement technology has been WENZEL's profession since 1968 and in 1980 the first coordinate measuring machine developed by WENZEL was introduced. Since then, WENZEL has been one of the world's leading suppliers of coordinate measuring machines and the largest family-run company in the industry. Today, the name WENZEL is synonymous with highest precision and innovation in the fields of coordinate measuring technology, computer tomography and high-speed scanning.

With coordinate measuring machines from WENZEL almost all measuring tasks can be mastered. The success of WENZEL's customers depends on the performance of its products and services. Their demands for quality and precision are constantly increasing. WENZEL takes up this challenge every day with the aim to convert the needs of the different industries into efficient products.

The offer extends far beyond the machine configuration: For special requirements WENZEL has tailor-made solutions ready: From the conception and planning to the turnkey handover. In addition to the production and installation of the measuring instruments, this includes,

for example, the necessary static calculations as well as the complete installation of the measuring room including the control and safety technology. Starting with the floor construction up to the software configuration - WENZEL makes almost everything possible.



# OVERVIEW

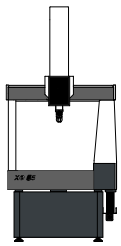
## CMM PRODUCT RANGE

### COORDINATE MEASURING METROLOGY „MADE BY WENZEL“

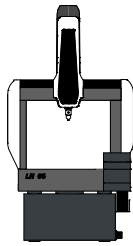
WENZEL offers well-engineered coordinate measuring machines (CMMs) which have proven themselves many times in the market. In this brochure we present the XO and LH series of CMMs. The LH series bridge CMMs have air bearing guide elements in all axes which ensure wear-

free and smooth operation. The LH base plates as well as traverses and quills are made of granite. Granite's physical properties make it the perfect material for measuring instruments. The LH series distinguishes itself by its high accuracy and high measuring speeds.

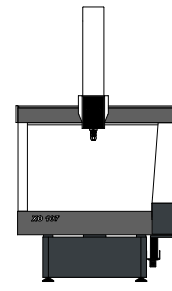
### OUR SIZES SUITABLE FOR YOUR MEASURING TASKS



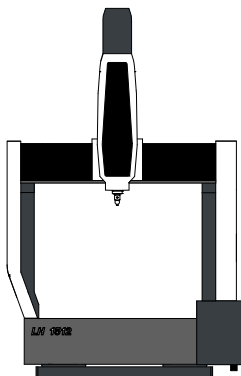
XO 55...



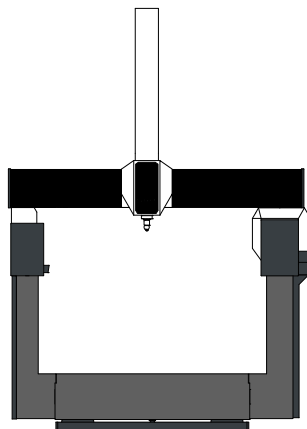
LH 65...



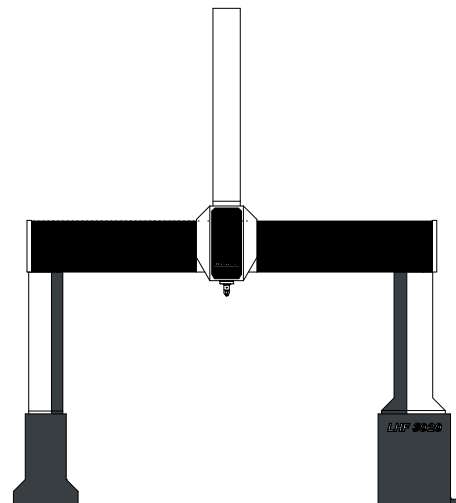
XO 107...



LH 1512...













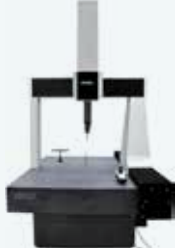



LH 2015...



LH 3020...

# ACCURACY | GENAUIGKEIT [µm]

<1		 0,8 + L/ 450		 0,8 + L/ 450	
1	 1,5 + L/ 350	 1,0 + L/ 400   1,2 + L/ 350	 1,5 + L/ 350	 1,0 + L/ 400   1,2 + L/ 350	
2	 2,0 + L/ 300		 2,2 + L/ 300		
3					
					
XO 55	LH 65	XO 87	LH 87		

**PS** 1,0+  
L/ 450

**P** 1,2+  
L/ 400

**S** 1,4+  
L/ 350

**P** 1,8+  
L/ 350

**PS** 1,9+  
L/ 450

**P** 2,1+  
L/ 400

**S** 2,3+  
L/ 350

**PS** 2,0+  
L/ 450

**P** 2,2+  
L/ 400

**S** 2,5+  
L/ 350

**S** 2,6+  
L/ 300

**PS** 2,8+  
L/ 450

**P** 3,0+  
L/ 350

**S** 3,3+  
L/ 300



XO 107



LH 108



LH 1210



LH 1512



LH 2015

# ACCURACY CLASSES

## THE RIGHT SOLUTION FOR EVERY REQUIREMENT STANDARD | PREMIUM | PREMIUM-SELECT

WENZEL LH coordinate measuring machines are available for different accuracy requirements in three accuracy classes:

**Standard | Premium | Premium Select**

The already high-precision standard version coordinate measuring machines are surpassed by the Premium and Premium Select models due to even more precisely machined mechanical components, selected materials, optimized acceptance procedures and additional options.

## WENZEL ACCURACY CLASSES AT A GLANCE





- Perfect interaction of the machine components
- Identical thermal behavior of the granite in all axes
- Manual temperature compensation
- High-resolution scales
- State-of-the-art Sensors (tactile, scanning, optical)
- Innovative drive, bearing and guidance technologies
- Modular design for retrofitting



- Online temperature compensation
- More elaborate premium acceptance procedure with tighter tolerances for better CAA Compensation (Computer Aided Accuracy)



- Use of the highest quality granite for the base plate, cross-beam and sleeve
- WENZEL-specific air bearing technology
- Grinding and lapping processing up to the mechanically feasible limit
- Higher resolution length measuring systems
- Premium Select Acceptance Procedure for optimal CAA Compensation (Computer Aided Accuracy)
- Inherent mechanical accuracy

# WENZEL XOrbit Series

## YOUR ENTRY INTO COORDINATE METROLOGY

The WENZEL XOrbit is the ideal coordinate measuring machine for when the essential elements of measurement are important and when speed and ease of operation are required. The XOrbit coordinate measuring machine offers an excellent price-performance ratio and can be equipped with multiple changeable measuring sensors. Its flexibility and suitability for a wide range of applications

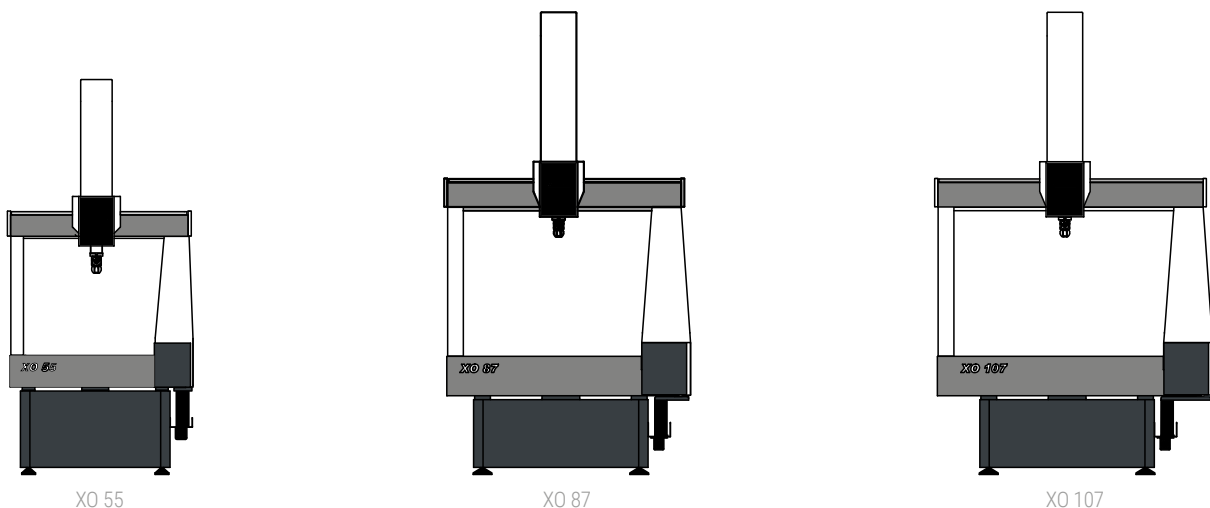
make the XOrbit an effective all-rounder. The consistent approach and intelligent machine concept makes it an economical entry into coordinate measuring technology. Simple measurement - simply good. CMMs of the XOrbit series are available in the accuracy classes Standard and Premium.

## FEATURES

- **Economical to use** due to a favorable price-performance ratio
- Emphasis on **unlimited functionality** from WENZEL's decades of experience
- **Use of granite** in all axes ensures identical thermal behavior
- **Excellent long-term stability** due to air bearing guides incorporated into the granite base plate and high-precision lapped guide surfaces
- **Good accessibility** facilitates maintenance work

## FIELDS OF APPLICATION

The XOrbit is the all-rounder for every field of application when it comes to measuring standard geometries and free-form surfaces. The XOrbit fulfills all important roles from use in incoming goods through to final inspection. For single or serial parts - the XOrbit is universally applicable.







## MEASURING ACCURACY

Typ	Measuring ranges X x Y x Z (mm)	Volumetric length measuring uncertainty $E_{L, MPE}$ (µm) Premium
XO 55	500 x 500/700/1000 x 500	1,5 + L / 350
XO 87	800 x 1000/1500 x 700	1,6 + L / 350
XO 107	1000 x 1500/2000 x 700	1,8 + L / 350

Value  $E_{L, MPE}$  is only valid with the respective touch probe. Further information can be found in the technical data sheets. Other Y-lengths on request. Subject to changes in design and scope of delivery as well as further technical development.

## YOUR ADVANTAGES AT A GLANCE

- Cost-effective introduction to coordinate measuring technology**  
 Excellent price-performance ratio | WENZEL High quality
- High mechanical precision**  
 Granite base | Hand-lapped base plate (DIN 876/0) |  
 Air bearing guide elements in all axes
- Low operating costs**  
 Low air consumption | RENISHAW sensors |  
 Reliable and inexpensive spare parts
- High flexibility**  
 Bellows covers for protection against contamination |  
 Data compatibility with other WENZEL systems |  
 Automation solutions
- Versatile sensor options**  
 Changeable sensor systems | 3-axis scanning |  
 Optical sensors

# WENZEL LH SERIES

## THE FAST AND EASY WAY TO EXACT MEASUREMENT RESULTS

With the LH you benefit from an extremely functional, effective and flexible measuring machine that is reliable and easy to operate. The success of our coordinate measuring machines is based on a proven holistic concept consisting of first-class mechanical engineering, intelligent software and accessory options and a comprehensive service package. Stable, reliable and fully dynamic, the LH is a universal and flexible measuring

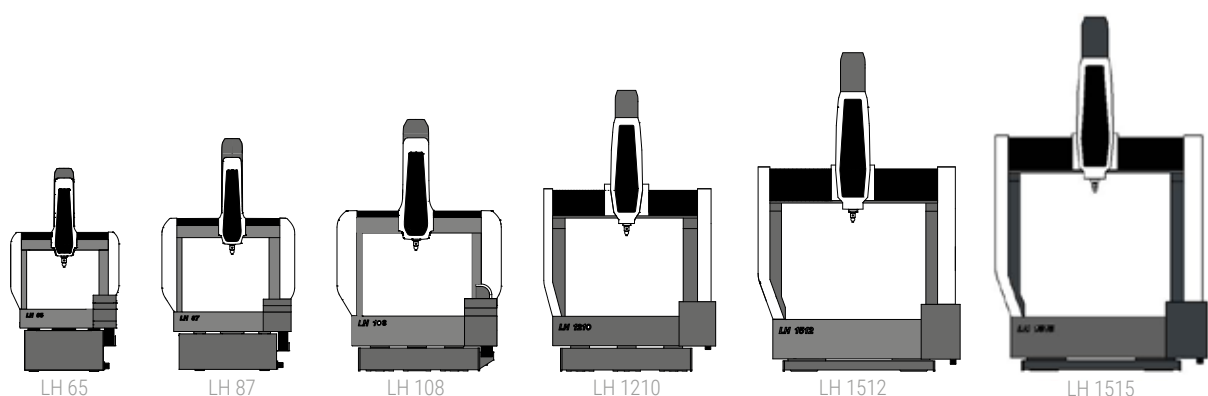
instrument for a wide range of applications. With the current generation of air-bearing bridge machines, WENZEL continues the progress in precision, efficiency and longevity. With its revolutionary design, the LH impresses with high mechanical accuracy, perfect ergonomics and increased dynamics. CMMs of the LH series are available in the accuracy classes Standard, Premium and Premium-Select.

## FEATURES

- **High-quality machine components** harmonize in perfect interaction and ensure long machine running times
- **Excellent long-term stability** due to air bearing guides incorporated into the granite base plate and high-precision lapped guide surfaces
- **Identical thermal behaviour** of granite in all axes
- **High-resolution scales** ensure exact positioning and precise measurement results
- **Innovative sensor technology** ensures precise detection of free-form surfaces and geometric elements
- **Perfect working ergonomics** for comfortable and safe operation
- **Highest investment security:** Modular design ensures future upgrade of the CMM

## FIELDS OF APPLICATION

The LH is ideal for all applications requiring high accuracy and high throughput. The LH series is used in almost all areas of industry and measures components in detail from watch manufacture through to the production of large engines. The Y-axis can be customized in length for special sizes.





## MEASURING ACCURACY

Type	Measuring ranges X x Y x Z (mm)	Volumetric length measuring uncertainty $E_{L, MPE}$ (µm) Premium Select
LH 65	650 x 750/1200 x 500	0.8 + L / 450
LH 87	800 x 1000/1500/2000 x 700	0.8 + L / 450
LH 108	1000 x 1200/1600/2000/3000 x 800	1.0 + L / 450
LH 1210	1200 x 1600/2000/2500/3000 x 1000	1.9 + L / 450
LH 1512	1500 x 2000/2500/3000 x 1200	2.0 + L / 450
LH 1515*	1500 x 2000/3000/4000 x 1500	2,5 + L / 450

Value  $E_{L, MPE}$  is only valid with the respective touch probe. Further information can be found in the technical data sheets.  
 Other Y-lengths on request. Subject to changes in design and scope of delivery as well as further technical development.  
 \* Estimated value | Machine currently under redesign

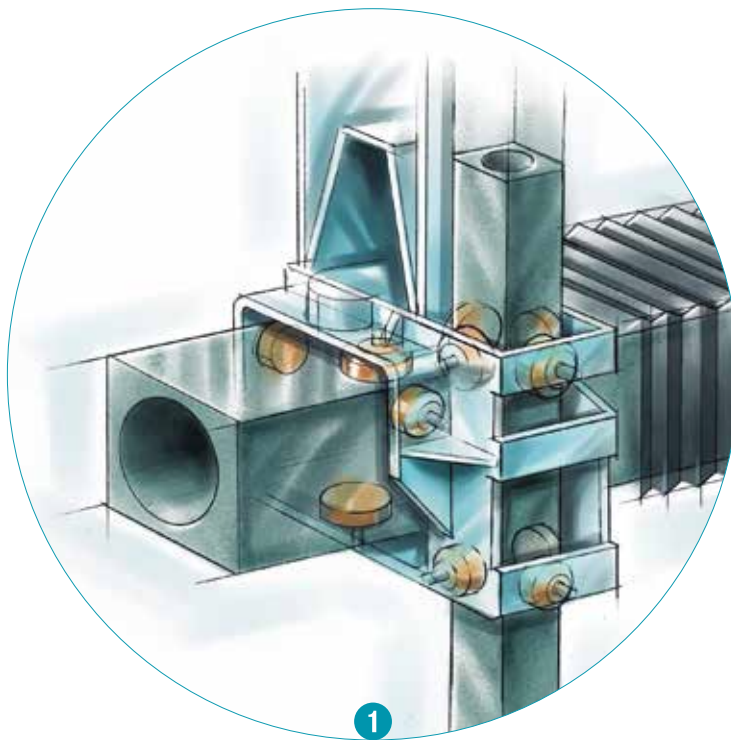
## YOUR ADVANTAGES AT A GLANCE

- Highest mechanical precision**  
 Granite in all axes | Handcrafted |  
 Unique mechanical precision
- Low operating costs**  
 Low air consumption | Fast availability of reliable spare parts
- High flexibility**  
 Customer-specific measuring volume |  
 Data compatibility | Suitable for automation
- Versatile sensor options**  
 Changeable sensor options | 3- or 5-axis scanning |  
 Optical sensors
- Ergonomic design**  
 Easy to operate | Ease of maintenance |  
 Aesthetic design

# THE LH-FEATURES

## PRECISE IN DETAIL

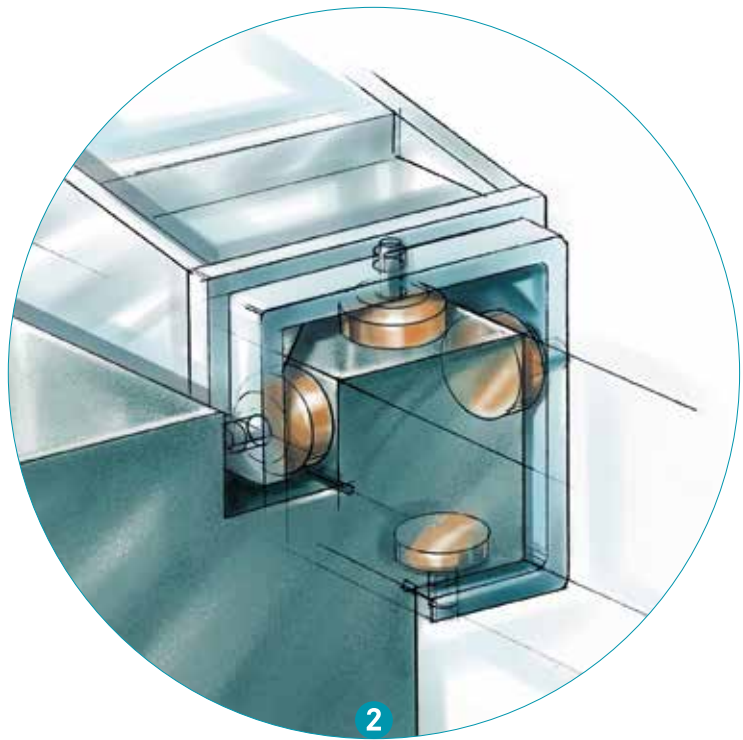
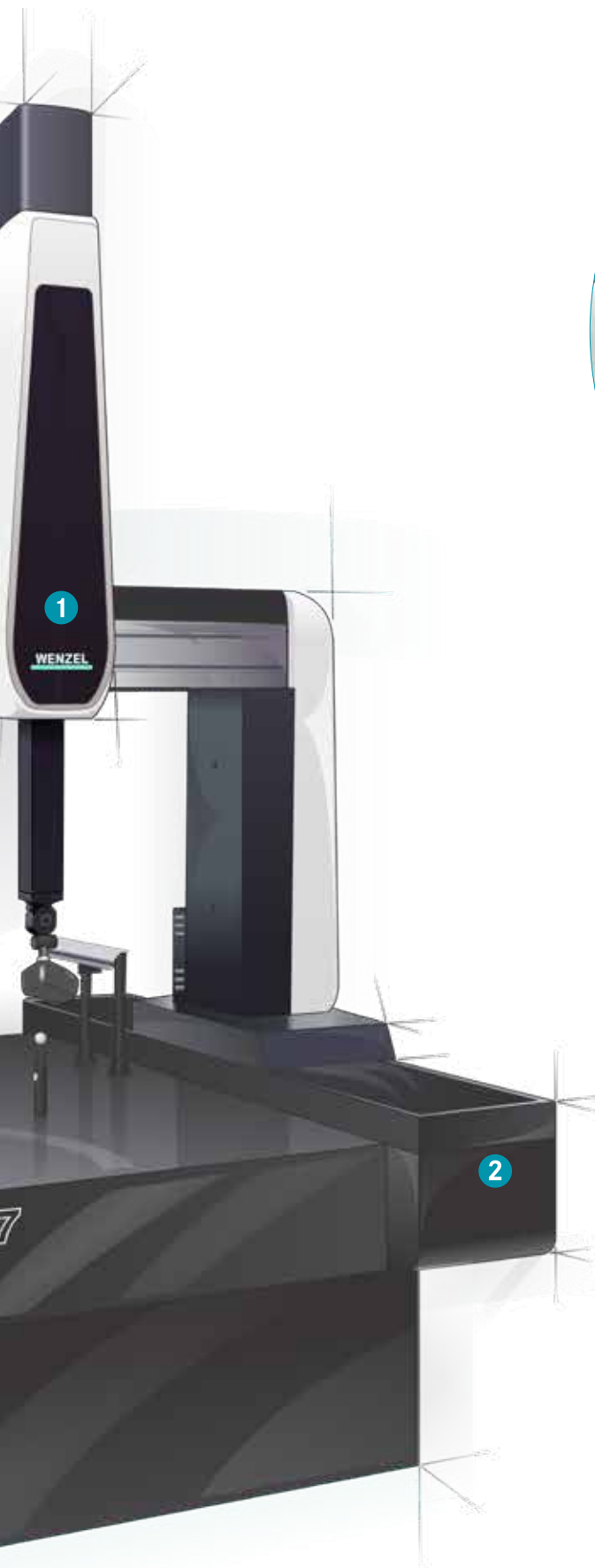
- Base plate, traverse and quill made of dark natural hard stone, thus ensuring identical thermal behaviour on all axes
- Y-axis guide system integrated directly into the base plate
- Weight compensation of the Z quill by means of a controlled pneumatic cylinder
- Available with active vibration damping
- Air bearing guide elements in all axes for wear-free, smooth-running operation
- Usable surface of the base plate machined according to DIN 876/0
- X- and Y-axis guidance with bellows cover
- CNC control of all axes
- Compact size
- Good accessibility for maintenance work



Components optimized by FEM/CAD guarantee maximum rigidity with reduced moving masses.

Symmetrical guide profiles with reduced wall thicknesses: optimum for predictable expansion behaviour at changing operating temperatures. Bellows protect the traverse as well as the Y-guide against environmental influences.





Preloaded air bearing guides in the Y-axis with high-precision lapped guide surfaces incorporated into the granite base plate: a guarantee for excellent long-term stability.

# WENZEL LH GANTRY SERIES

## PRECISE RESULTS WHEN MEASURING LARGE COMPONENTS

The LH Gantry is a CNC coordinate measuring machine with air bearings in all axes. It offers all the advantages and application possibilities of the LH Series and has also been specially designed for the inspection of large-volume and heavy workpieces. The raised guides in the Y-axis also ensure maximum stability and rigidity, even with dynamic movements. Overall, the machine body forms an inherently stable, homogeneous unit with optional integrated active vibration damping, which does

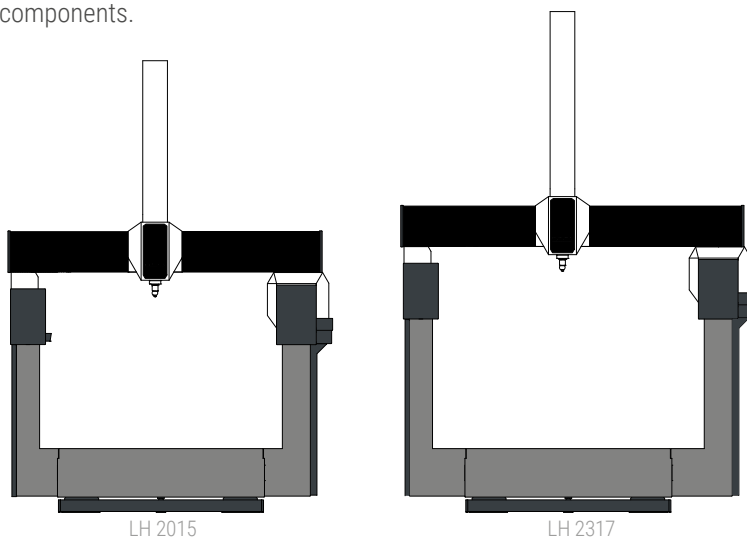
not require a separate foundation. Thermal environmental influences affecting the workpiece and the CMM can be corrected by means of automatic temperature compensation (optional). The optional use of a rotary table means that even large rotationally symmetrical components can be measured flexibly and accurately. LH Gantry series measuring machines are available in Standard, Premium and Premium Select accuracy classes.

## FEATURES

- **Long-term stability** and high mechanical precision due to granite machine structure
- **Homogeneous machine structure** and integrated vibration damping (optional), no need for a separate foundation
- **Highest stiffness** and stability due to high drive, bearing and guide components in the Y-axis
- **High dynamics** due to double drive (LH 2015 / LH 2317) in the Y-axis and backlash-free friction drives
- **High wear resistance** and freedom from residual stress due to robust granite design
- **Maintenance-friendly** thanks to maximum spare parts availability and easily accessible replacement components

## FIELDS OF APPLICATION

Stable, reliable and fully dynamic, LH Gantry machines are universally and flexibly applicable for a wide range of applications. Typical areas of application are, for example, the measurement of large engines, large gears or heavy machine components.



LH 2015

LH 2317



## MEASURING ACCURACY

Type	Measuring ranges X x Y x Z (mm)	Volumetric length measuring uncertainty $E_{L, MPE}$ (µm) Premium Select
LH 2015	2000 x 3000/4000/5000 x 1500	2,8 + L / 450
LH 2317	2300 x 4000/5000/6000 x 1750	3,0 + L / 450

Value  $E_{L, MPE}$  is only valid with the respective touch probe. Further information can be found in the technical data sheets. Other Y-lengths on request. Subject to changes in design and scope of delivery as well as further technical development.

## YOUR ADVANTAGES AT A GLANCE

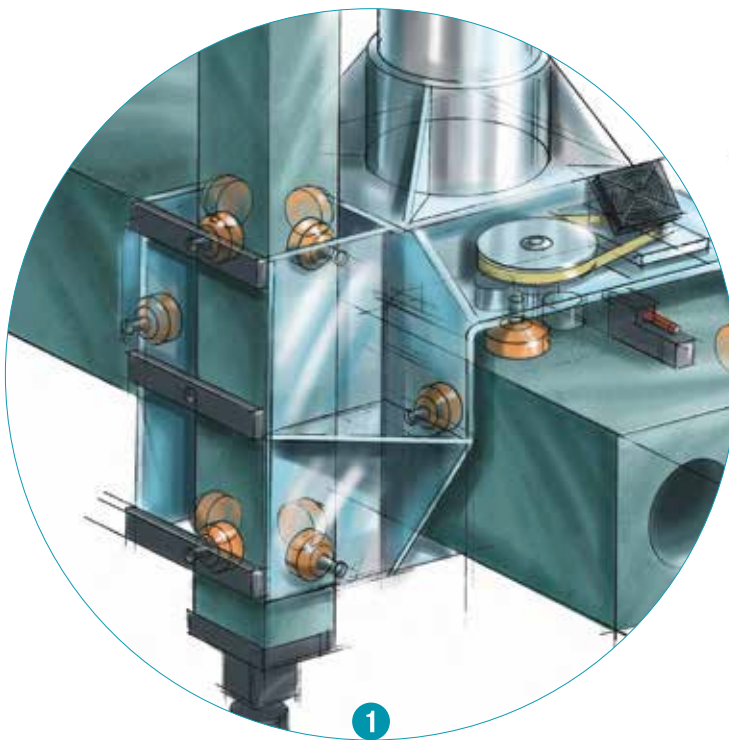
- Air bearing guide elements in all axes**  
 High mechanical precision | Granite base | Handcrafted
- Low operating costs**  
 Low air consumption | Reliable and inexpensive spare parts
- High flexibility**  
 Customer-specific measurement volume | Data compatibility with other WENZEL systems | Automation solutions
- Versatile sensor options**  
 Switchable sensor systems | 3- or 5-axis scanning | Optical sensors
- Ergonomic design**  
 Simple operation | Simple maintenance | No foundation necessary

# THE LH GANTRY-FEATURES

## GUIDANCE FROM ABOVE FOR STABLE DYNAMICS

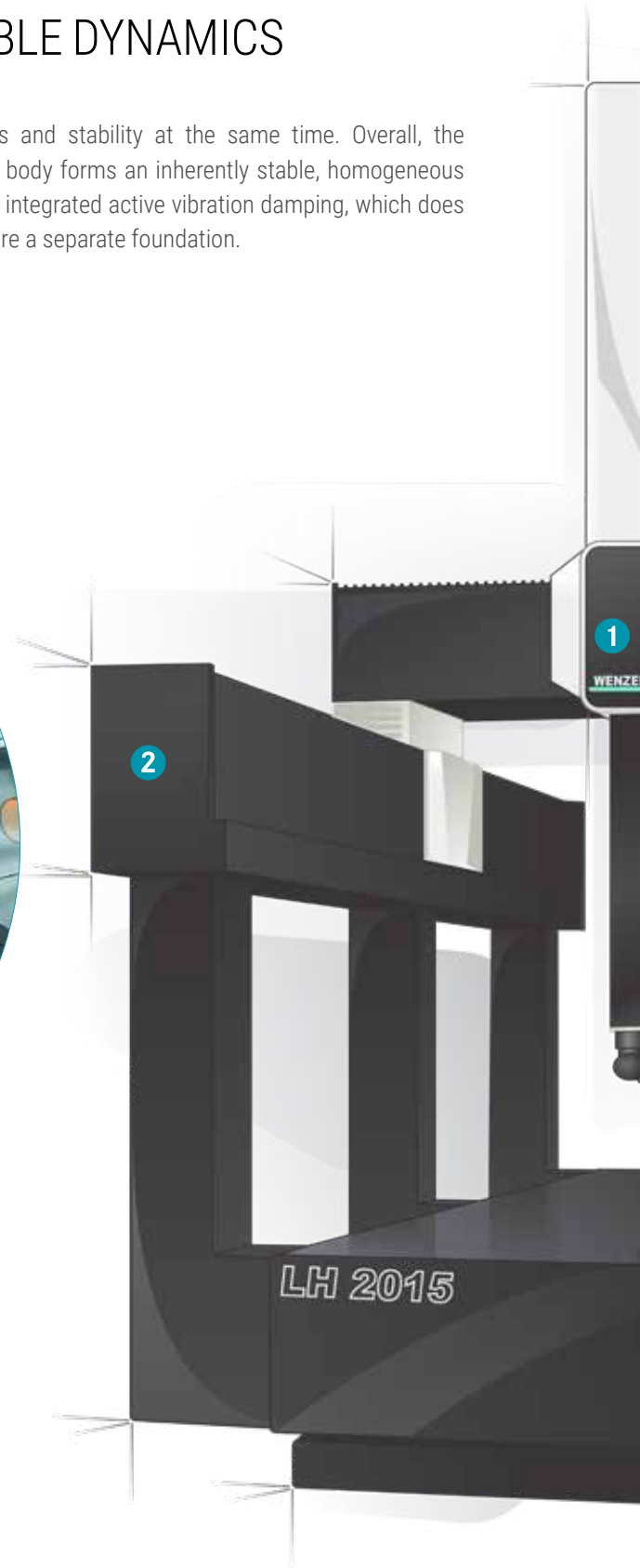
Air bearing guide elements in all axes of the LH Gantry ensure wear-free operation and optimum guidance characteristics. The same thermal behaviour of all axes is guaranteed by a base plate, traverse and quill made of dark natural hard stone. The stiff construction in combination with a double drive of the Y-axes guarantees highest

dynamics and stability at the same time. Overall, the machine body forms an inherently stable, homogeneous unit with integrated active vibration damping, which does not require a separate foundation.

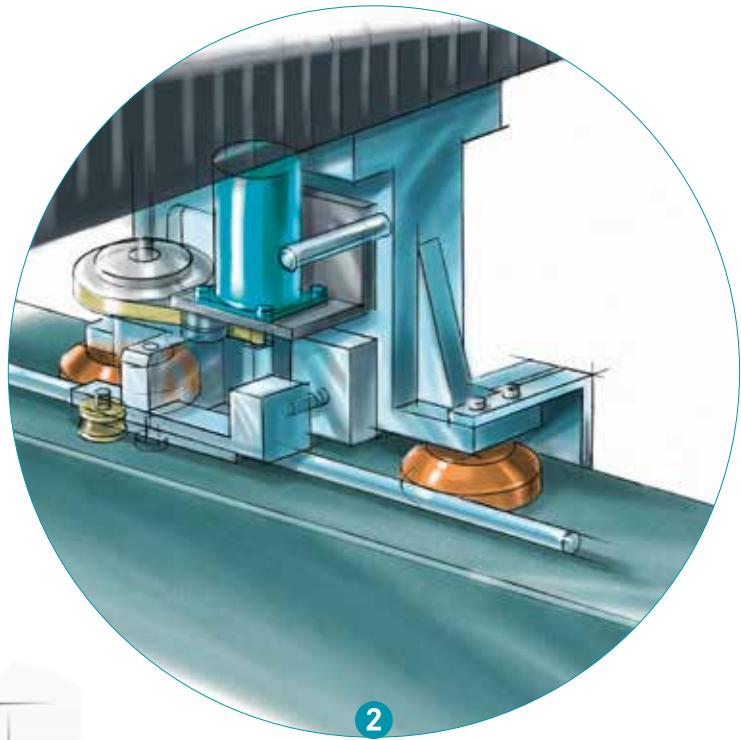


### Symmetry everywhere

- Optimized air bearing with "broad base"
- Perfection in detail
- Service friendliness
- Thermal stability







**Double drive in the Y-axis for LH 2015**

- High dynamic

# WENZEL LHF SERIES

## LARGE MEASURING RANGE AND EXCELLENT ACCESSIBILITY

Wide measuring range and excellent accessibility. The LHF is a CNC coordinate measuring machine with air bearings on guide beams, which has been designed for high-precision measurement of large-volume and complex workpieces. Its ground-level design allows excellent access to a large measuring range with maximum freedom of movement. The measuring range in the Y-axis is available in the standard version up to a length of

12 meters. A double drive in the Y-axis of the LHF makes it unbeatable in terms of dynamics. The thermal influences of the environment on the machine and workpiece can optionally be corrected by means of automatic temperature compensation. LHF series measuring machines are available in the accuracy classes Standard, Premium and Premium Select.

## FEATURES

- **Optimum stability** due to intrinsically stable guide beams and precisely dimensioned air bearings
- **High performance** even with large extensions, eccentric loads and scanning with REVO at high speed
- **Best position stability** due to incremental displacement measuring systems with precision scales and excellent contamination tolerance
- **High dynamics** due to double drive in the Y-axis and backlash-free friction drives
- **Easy maintenance** due to high availability of spare parts and easily accessible replacement components

## FIELDS OF APPLICATION

The WENZEL LHF is designed for high-precision measurement of large-volume and complex workpieces. It is used by innovative medium-sized companies as well as world-famous large corporations - or simply everywhere where high measuring requirements define the requirement.





## MEASURING ACCURACY

Type	Measuring ranges X x Y x Z (mm)	Volumetric length measuring uncertainty $E_{L, MPE}$ ( $\mu\text{m}$ ) Premium Select
LHF 2517	2500 x 4000/5000/6000 x 1700	3,5 + L / 400
LHF 3020	3000 x 4000/5000/6000 x 2000	4,3 + L / 400
LHF 3025	3000 x 5000/6000 x 2500	5,2 + L / 400
LHF 4025	4000 x 5000/6000 x 2500	7,0 + L / 400

Value  $E_{L, MPE}$  is only valid with the respective touch probe. Further information can be found in the technical data sheets. Other Y-lengths on request. Subject to changes in design and scope of delivery as well as further technical development.

## YOUR ADVANTAGES AT A GLANCE

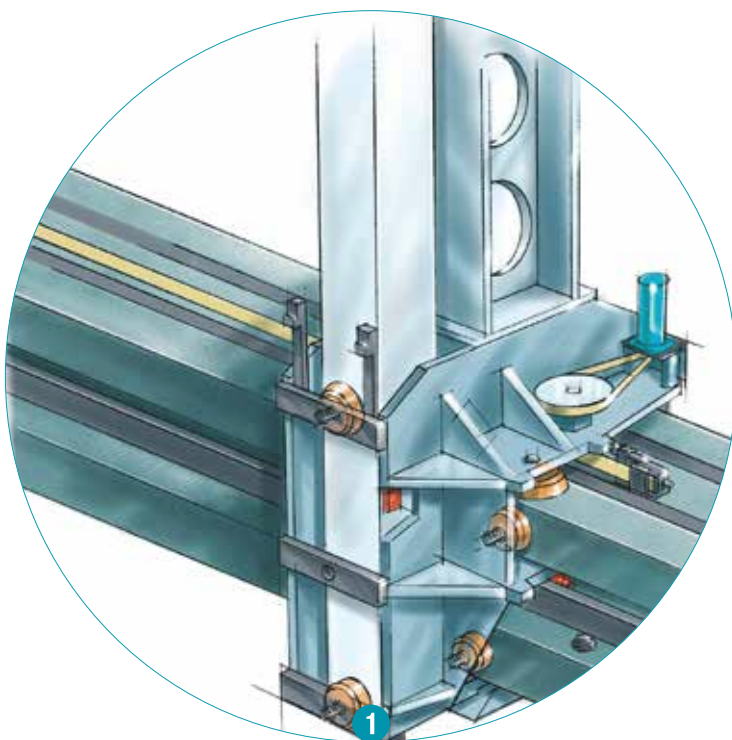
- Long term, mechanical accuracy**  
 Temperature stable structure | Hand finished |  
 Air bearing guide elements in all axes
- Low cost of ownership**  
 Low air consumption | Reliable and cheap replacement  
 parts | Less effort in recalibration
- High flexibility**  
 Special measuring sizes on request | Data compatibility  
 with other WENZEL systems | Loading systems |  
 Automation solutions
- Various sensor options**  
 Touch trigger probes | 3- or 5-axis scanning |  
 Optical sensors
- Ergonomic design**  
 Easy to use | Easy to service | Easy to load

# THE LHF-FEATURES

## EASY ASSEMBLY FOR LARGE PARTS

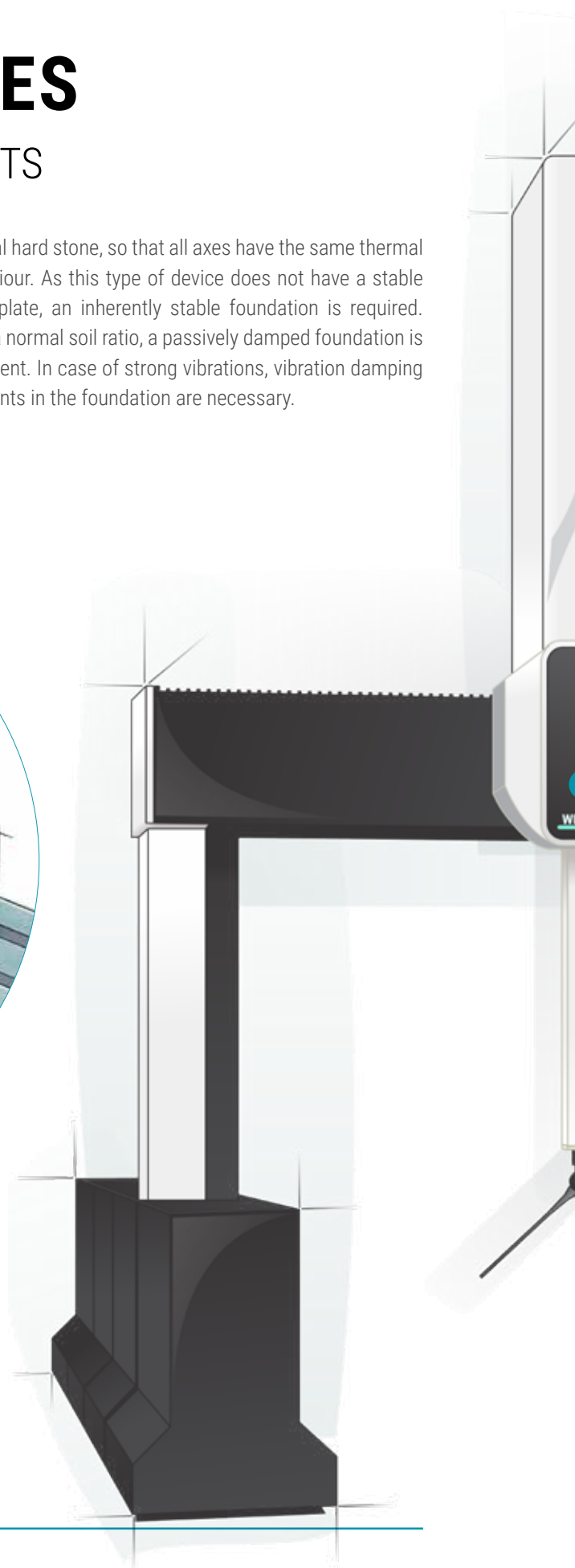
Air bearings on the guide beam in the Y-axis. The ground-level design of the LHF allows excellent access to a large measuring range with maximum freedom of movement. A double drive in the Y-axis of the LHF makes it unbeatable in terms of dynamics; and that with unique stability of the guides. Similar to the LH-Gantry, the LHF air bearing guide elements also guarantee wear-free operation with precise guidance. Crossbeam and guide beam are made of dark

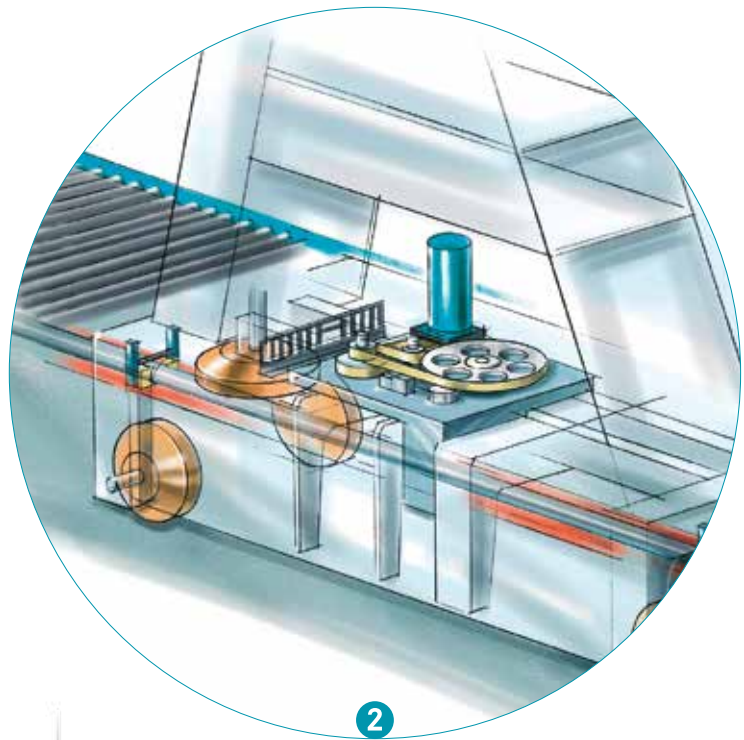
natural hard stone, so that all axes have the same thermal behaviour. As this type of device does not have a stable base plate, an inherently stable foundation is required. With a normal soil ratio, a passively damped foundation is sufficient. In case of strong vibrations, vibration damping elements in the foundation are necessary.



### Symmetry everywhere

- Optimized air bearing with "broad base"
- Perfection in detail
- Service friendliness
- Thermal stability
- Optimized air bearing guidance in double T-shape





2



1

ENZEL

**Double drive in the Y-axis**

- High dynamic
- Stability of the guide (base)
- Self-stable guide beams
- Backlash-free friction drive for maximum Acceleration/Speed

2

LHF 2517

# THE LH SERIES WITH ROTARY TABLE

## FULL FLEXIBILITY FOR EVERY MEASURING TASK

All measuring machines of the LH series can be configured with an additional integrated rotary table. This enables both the precise 4-axis measurement of rotationally symmetrical components and the reliable measurement of the entire spectrum of prismatic components. The base plate and linear axes are made of temperature-stable materials. This ensures excellent temperature behavior

of the entire measuring system. In order to guarantee the highest precision, air bearings are used in all axes. The optimum measuring system can be configured according to component size, component weight and measurement requirements. Different mounting heads and touch probes allow an optimal adjustment to your measuring requirements.

## FEATURES

- **High accuracy** due to identical thermal behavior of the granite in all axes
- **Excellent long-term stability** due to air bearing guides incorporated into the granite base plate and high-precision lapped guide surfaces
- **Extreme wear resistance** and freedom from residual stresses thanks to high-quality granite components
- **Excellent durability** based on innovative drive, bearing and guidance technologies
- **High-resolution scales** ensure exact positioning and precise measurement results
- **WM | Gear Analyzer** software based on the open GDE standard allows numerous measurement and evaluation options

## FIELDS OF APPLICATION

The LH series with rotary table quickly and reliably measures rotationally symmetrical as well as prismatic precision components. The numerous models and equipment options allow optimum adaptation to your measuring requirements.

Gears

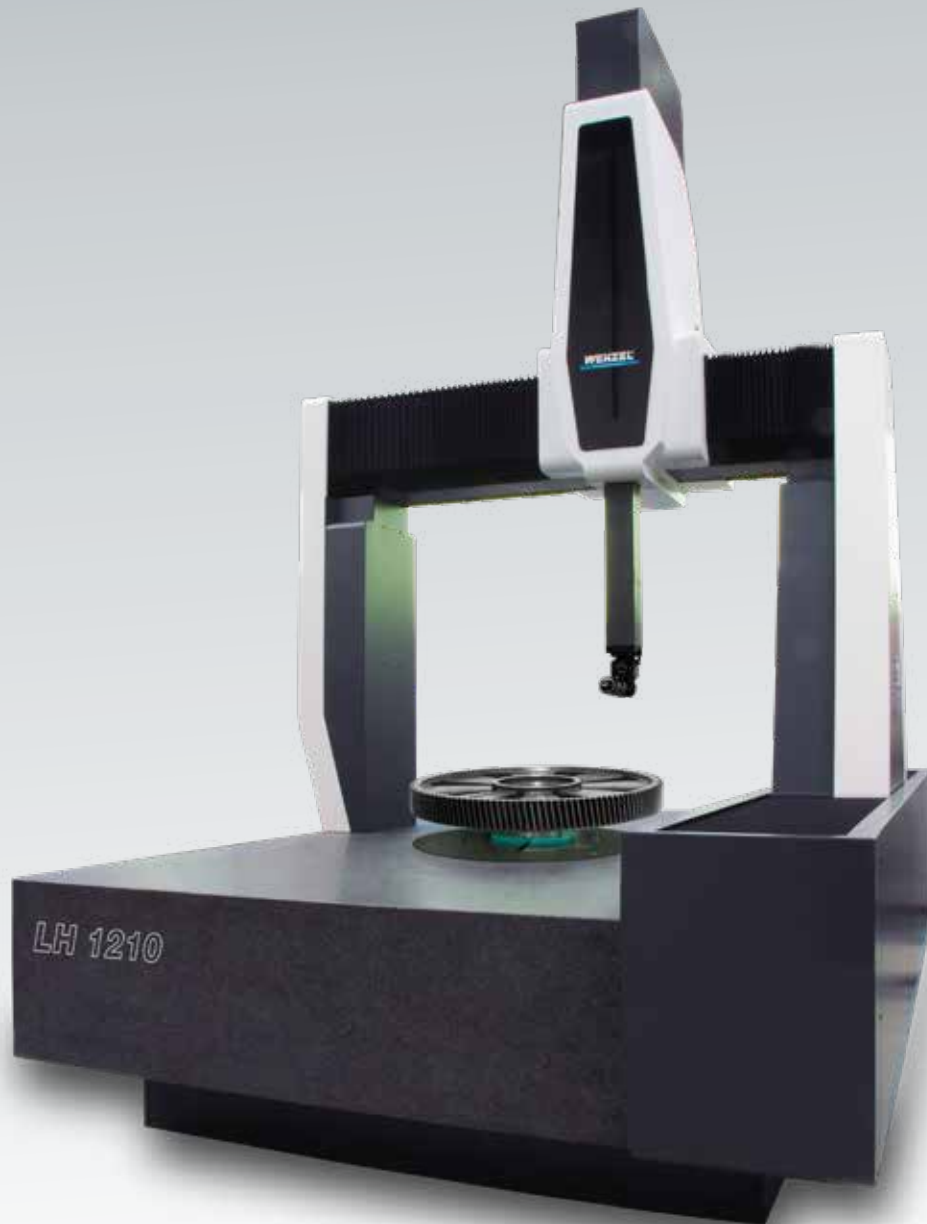


Bearings and couplings



Shafts and axes





## YOUR ADVANTAGES AT A GLANCE

### ■ High mechanical precision

Granite base | Handcrafted | Precise air bearings in the linear axes

### ■ Low operating costs

Low air consumption | Reliable and inexpensive spare parts

### ■ Impressive speeds

4 axes for ultimate speed and precision | Fully automatic probe changing systems

### ■ High flexibility

Measurement of rotationally symmetrical as well as prismatic components with just one system | Numerous sizes and configurations

### ■ High reliability

High-quality components | Many years of development experience | Renishaw sensor systems

# 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 CMM 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

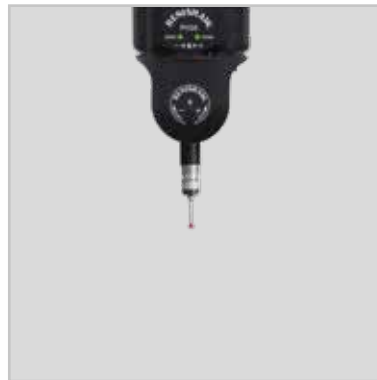
heads. With suitable touch trigger, scanning and optical measurement systems LH CMM offers outstanding results for various applications.

The compatible automatic exchange units turn the measuring instruments into homogeneous and versatile measuring systems.



### PH10T PLUS / PH10M PLUS / PH10M iQ PLUS

Automatically indexable probe head PH10M: 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-2

The revolutionary 5-axis probe system REVO™ coupled with WM | 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.



### TP200

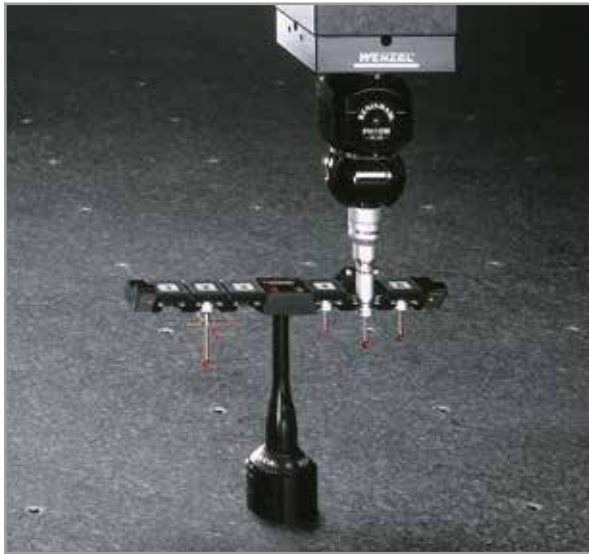
Compact, module changing touch trigger probe particularly suitable for measuring tasks with tight dimensional tolerances for 3D free-form surfaces with longer styli.



### SP25M

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





### Changer Rack SCR200

With the SCR200 change magazine, up to six TP200 stylus modules can be changed quickly and automatically. The SCR200 is controlled by a separate interface (PI 200) and has collision protection against mechanical damage.



### Changer Rack ACR3

The ACR3 probe changing system allows automatic probe change without the need for recalibration. Although the ACR3 is a unit with four memory locations, several systems can be connected to each other in such a way that further different measuring probes and probe extensions can be accommodated in it.



### Changer Rack FCR25

Flexible changing system for automatic changing of SP25M scanning and probe modules with 3 stations (6, 9, 12 and 15 stations possible).



### MRS2 modular rack system

MRS2 is available with different column and rail lengths to allow configurations for a variety of applications. When the CMM workspace is tight, or when a large number of probes and styli are needed, additional rails can be attached to the MRS2 to configure a multi-stage magazine. The rail is compatible with the following interchangeable systems: ACR3, FCR25, memory module and roughness probe SFA for REVO probes.

**WENZEL®**

**RS 1512**

# **HORIZONTAL ARM MACHINES**

**LARGE, FAST, PRECISE**



# WENZEL

## HORIZONTAL ARM MACHINES

### PRODUCT RANGE AND FIELDS OF APPLICATION AN OVERVIEW

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The roller-bearing horizontal arm measuring devices of the R series offer maximum measuring volume for medium to large and particularly overhanging workpieces. Combined as duplex version or by their arbitrarily extendable measuring range, the WENZEL horizontal arm measuring devices can be adapted individually to the measuring requirements and offer solutions, which go far beyond the standard. The superior

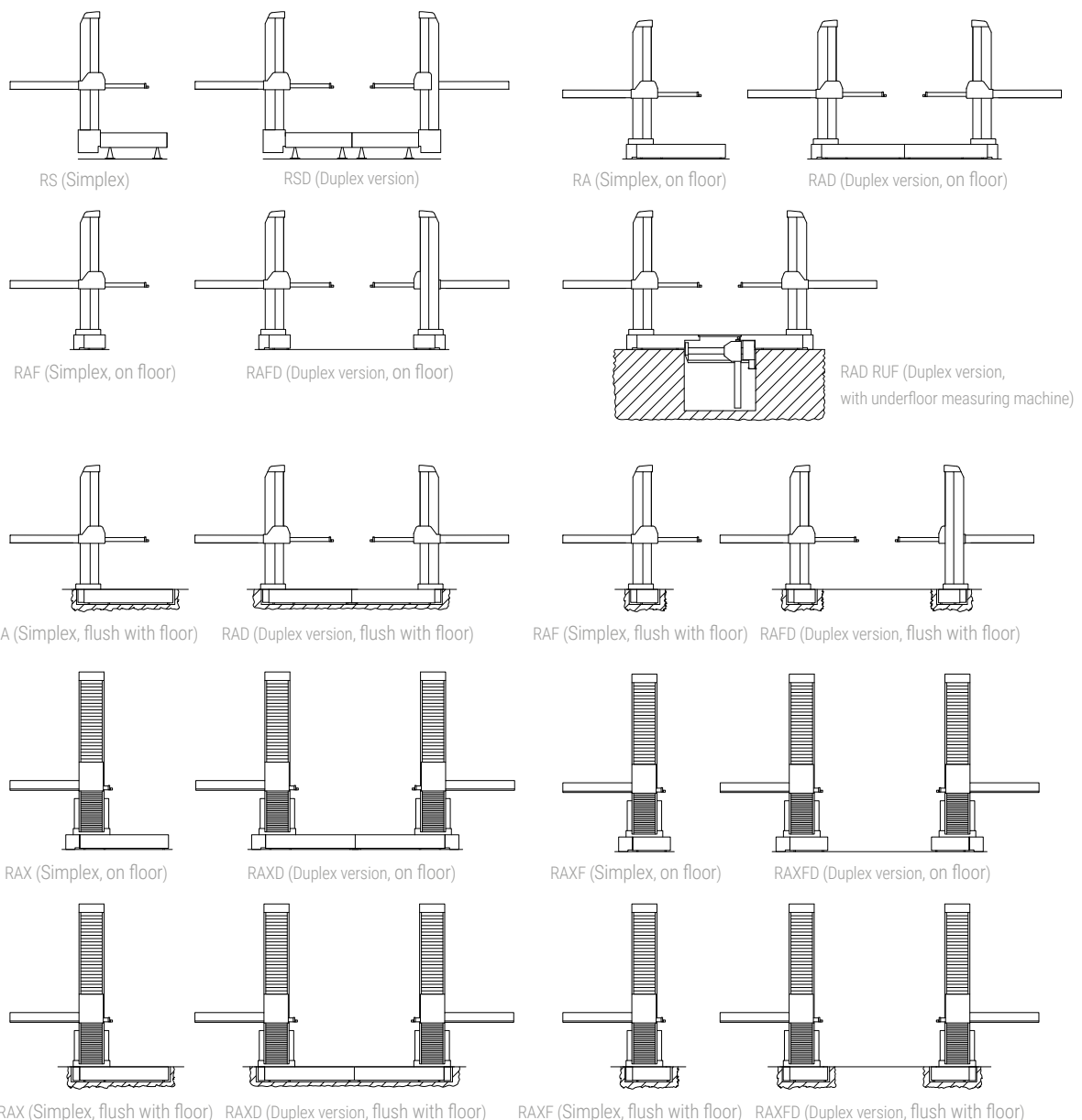
design and the compact arrangement of the guide elements allow perfect accessibility from all sides and provide maximum flexibility and dynamics. The R Series CMMs can be equipped with a variety of swivel head and probe combinations, from rigid heads to motorized rotary and swivel heads, and from simple probes to high precision scanning touch probes and optical sensors.



# VARIANTS AND DESIGNS SUITABLE FOR YOUR MEASURING TASKS

- The universally applicable **RS (roller-bearing side)** stand-alone measuring device with guide elements attached to the base plate at the side can be easily integrated into existing room concepts.
- Defining characteristics of the **RA (roller bearing on base plate) / RAF (roller bearing on guide beam)** series are the floor-level base plates on which the guidance systems are mounted. Due to this design, the coordinate measuring machine can be easily equipped with heavy components up to complete vehicles.
- The **RAX (roller bearing on base plate, XL measuring range)** with its far above-average measuring range was specially developed for the needs of the automotive industry.
- The **RUF underfloor measuring machine** is the ideal supplement to the measuring centers when work pieces are also measured from below.

To extend the Y measuring range, all machines can be supplied as duplex version.



# WENZEL RS SERIES

## FAST, PRECISE MEASUREMENT OF LARGE COMPONENTS

The machine concept of the RS Series is based on a stable base plate as a measuring table with a lateral guide system. The RS can be integrated extremely flexibly into an existing room concept without a specific foundation and can be moved to a new location if required.

It is available as a manual or CNC device, combined with decouplable drives, as a single, double or multi-column

system, with tactile and optical sensors and also with vibration damping.

The RS allows production-related measurement of individual parts, assemblies, end products such as car bodies and other large-volume workpieces. The RS is available in two accuracy classes - Standard and Premium.

## FEATURES

- **Numerous designs** and operating modes with cast or granite base plate and optional damping
- **Customer-specific measuring volume** in all axes, also available as a duplex system
- **Many configuration options** for probes, sensors, marking tools and software
- **Various application possibilities** in production or in the measuring room – manual or automated
- **High investment security** through retrofitting, longevity and ease of maintenance
- **High ergonomics and safety** due to mobile control unit, ideal working height and portable control panel

## FIELDS OF APPLICATION

The RS Series is mainly used in the automotive industry for measuring, digitizing and scribing individual parts, assemblies or complete car bodies. Typical components are bumpers, seats, instrument panels, welded structures or fixtures.

Car bodies

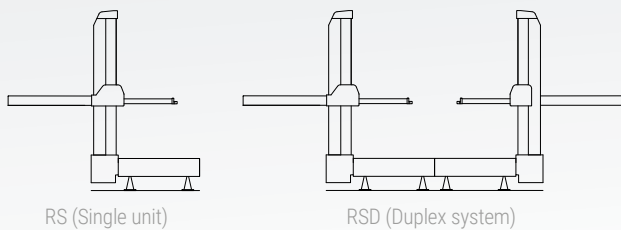
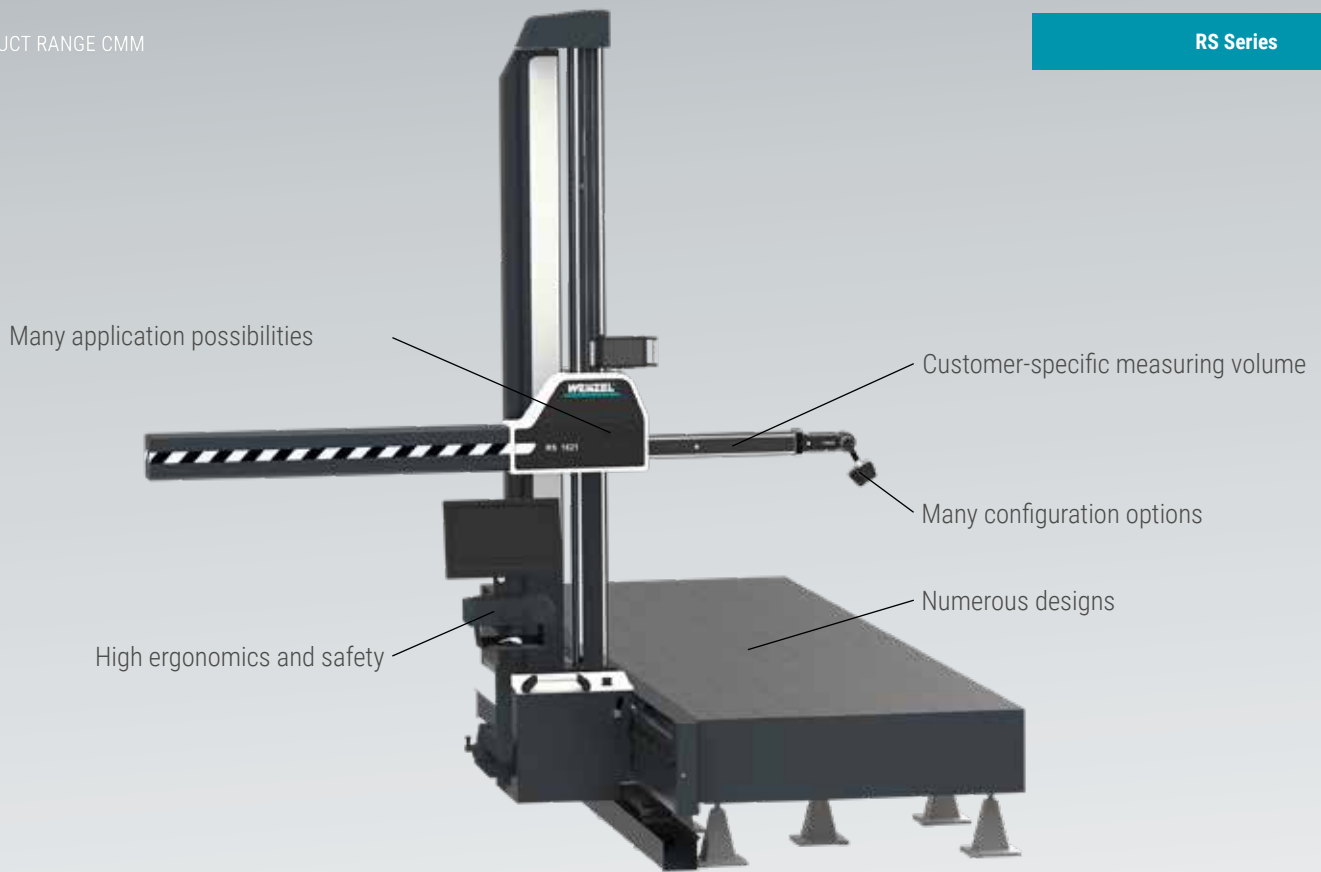


Interior



Wind turbines





## MACHINE PROFILE

Measuring volume X-axis	Custom
Measuring volume Y-axis	up to 2100; Duplex up to 4000 mm
Measuring volume Z-axis	up to 3000 mm
Measurement uncertainty	$E_{L, MPE}$ from $15+L/45 \leq 50$ ( $\mu\text{m}$ )*

\*Depending on machine configuration (Premium, Standard) according to current technical data sheets

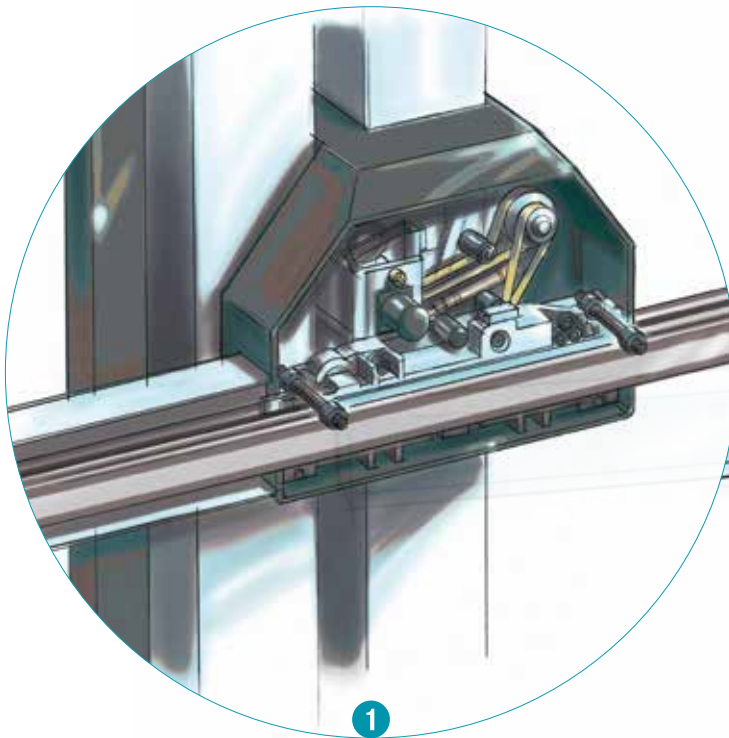
## YOUR ADVANTAGES AT A GLANCE

- **Highly maintenance friendly**  
Original manufacturer service | Optimum accessibility | Low downtimes
- **Long service life**  
Machine design with wear-resistant and optimized components | Investment protection through upgradeability and compatibility
- **High flexibility**  
Simple and flexible integration into existing room and building concepts | adaptive to room, building and process changes
- **Diverse fields of application**  
Ergonomic working height makes it also suitable for small parts | Measuring during production
- **You have the choice**  
Base plate available in cast iron or granite | Optionally with active vibration damping | Different operating modes

# RS-FEATURES

## PRECISE IN DETAIL

- Base plate made of cast iron as standard, for small sizes optionally made of natural hard stone, optionally with damping system
- Surface of the base plate machined to DIN 876/2 as reference surface for the measured object
- Linear bearings in the X-axis and precision roller bearings in the Y- and Z-axis
- Carbon fiber Y-arm for high stiffness and dynamics
- Measuring system protected against dirt and damage
- Smooth-running, rail-mounted weight compensation in the Z-axis for safe and easy handling
- Cover on the Y-arm for safety and as protection against dirt and damage
- Ergonomic working height and access to the workpiece from four sides
- Manual drive using ergonomic handwheels with brakes in each axis, motorized/CNC or combined with decouplable motors



### Guide system Y/Z

- Low maintenance
- High reliability
- Easily adjustable
- Robust guide elements
- Low-wear vibration free belt drive

### Y-arm produced from carbon fibre

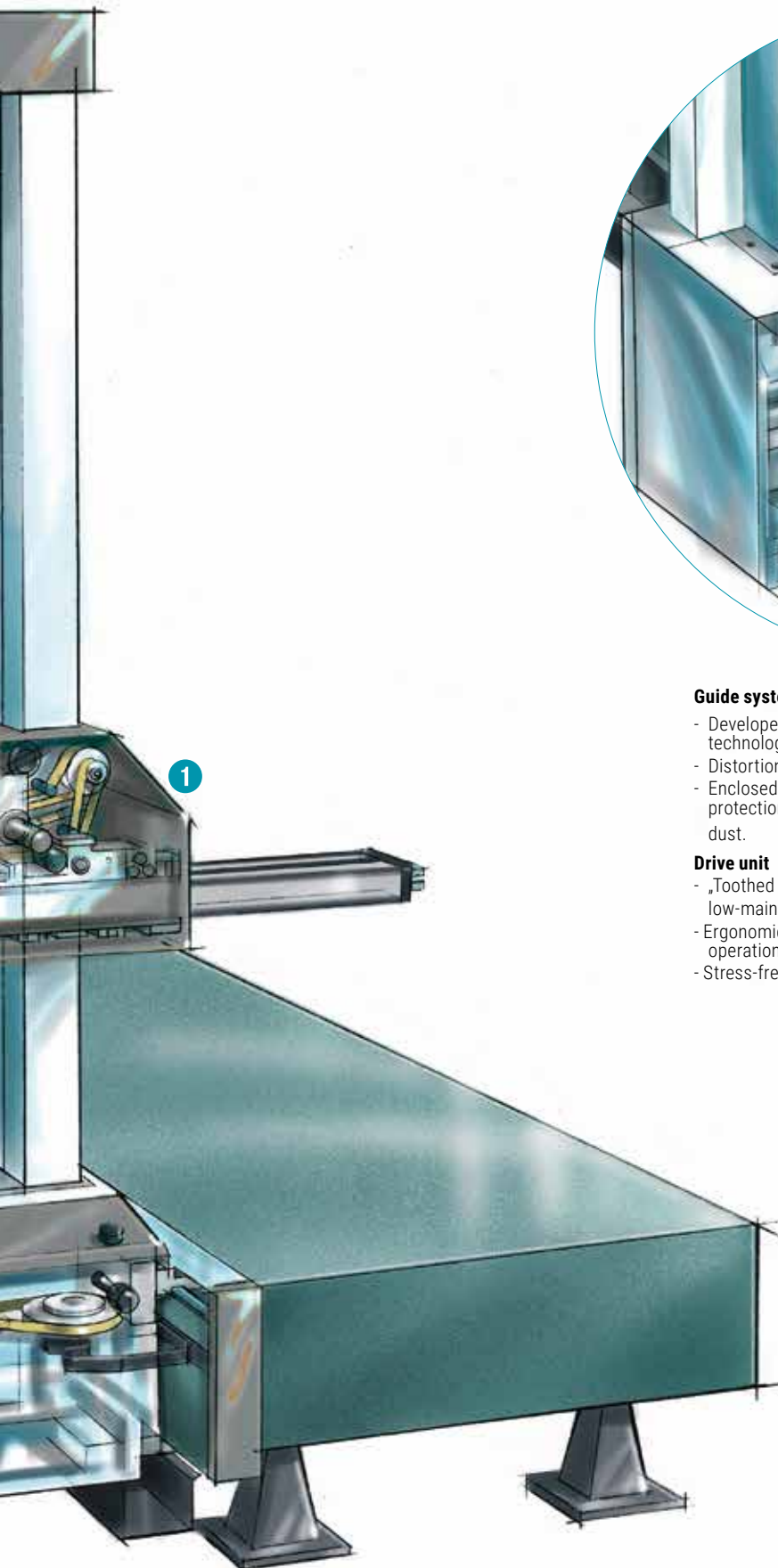
- Reduced weight with improved rigidity

### Scale located underneath the arm

- Protected against contamination







1

2

**Guide system X**

- Developed using high technology FEM methods
- Distortion-stiff X-axis
- Enclosed guideway protections from dirt and dust.

**Drive unit**

- „Toothed drive belt drive, low-maintenance
- Ergonomic for manual operation
- Stress-free operation

**Pneumatically disengageable drives**

- Eliminate undesired heat sources

**Gekapselte Linearführungen**

- Hohe Führungsgenauigkeit
- Geringe Schmutzempfindlichkeit
- Hohe Lebensdauer
- Geringer Wartungsaufwand

**Controller und PC**

- Kompakte Bauweise durch integriertes System (optional)

# WENZEL RA SERIES

## FAST, PRECISE MEASUREMENT OF LARGE COMPONENTS

A characteristic feature of the RA series is the floor-level base plate, into which the guide system is integrated. Due to this design, the coordinate measuring machine can easily be equipped with large and heavy components such as complete vehicles. Whether as a single boom machine, as a duplex or multi-column system with integrated underfloor measuring device - RA measuring devices deliver the desired results precisely, reliably and quickly.

The machine type is available as a manual or CNC machine as well as combined with decouplable drives, with tactile and optical sensor technology and is distinguished by its excellent accessibility, even for workpieces that are difficult to handle. The RA is available in two accuracy classes - Standard and Premium.

## FEATURES

- **Numerous versions** with or without base plate, flush or surface mounted
- **Customer-specific measuring volume** in all axes, also available as multi-column system or with an underfloor measuring system
- **Many configuration options** for probes, sensors, marking tools and software
- **Wide range of applications** in production or in the measuring room - manual or automated
- **Ergonomic and safe machine concept** meets high safety standards

## FIELDS OF APPLICATION

The RA series is used by many customers worldwide in individual operation or as a multi-column system for measuring, scribing and digitizing. The main areas of application are in vehicle construction, plant construction and for construction and agricultural machinery. Whether for individual parts, assemblies or complete bodies, the RA series measures the upcoming measuring task quickly and precisely.

Automotive industry

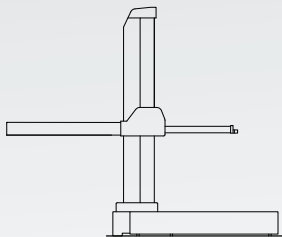
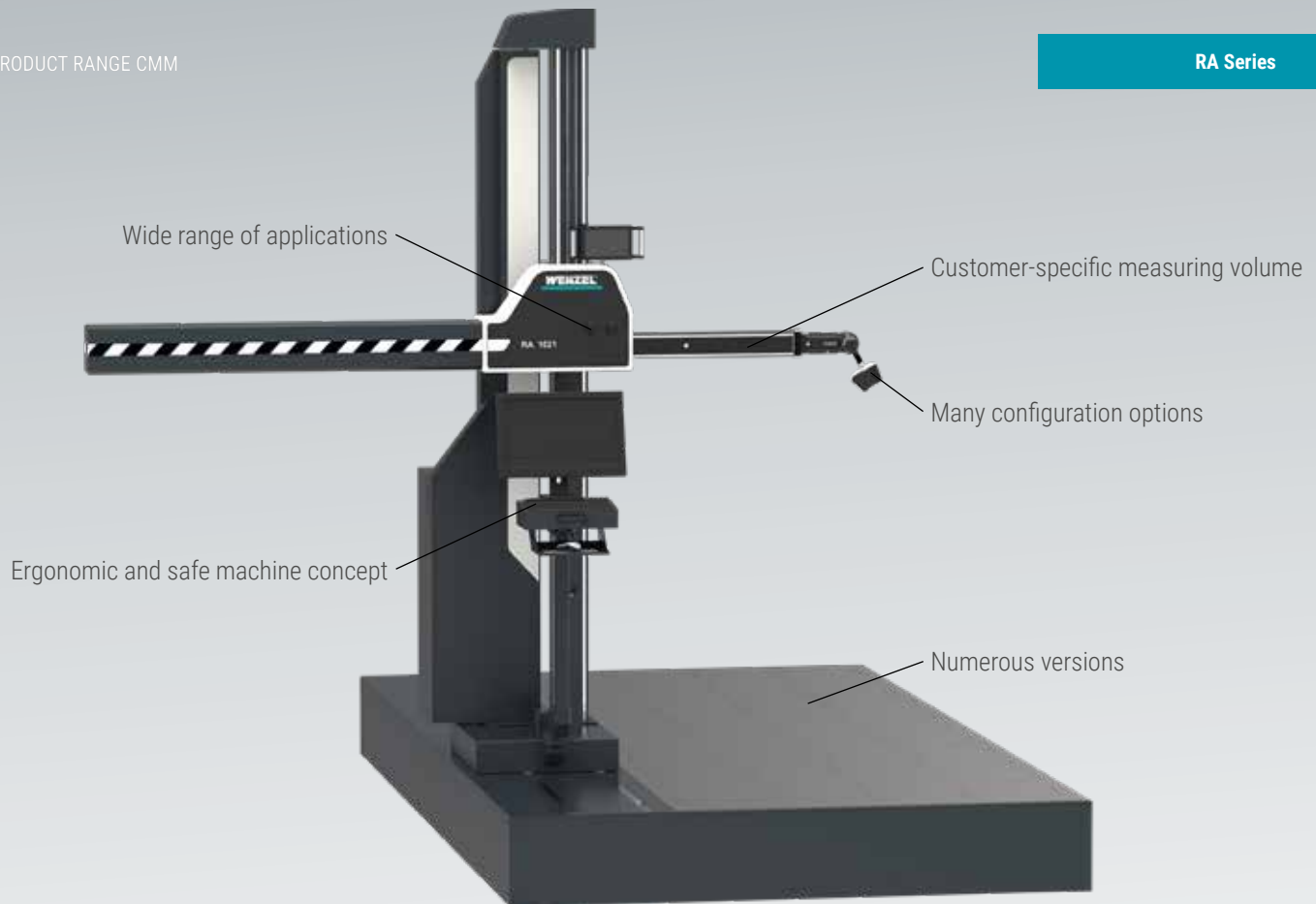


Railroad industry

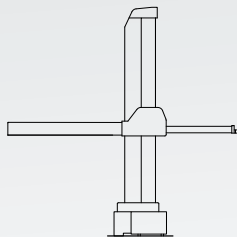


Construction machines

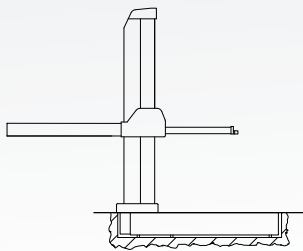




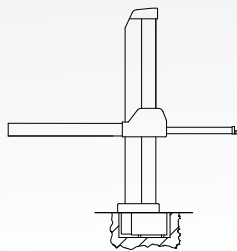
RA (Single unit, onfloor)



RAF (Single unit, onfloor)



RA (Single unit, floor level)



RAF (Single unit, floor level)

Single boom machine, also available as a duplex or multi-column system.

## MACHINE PROFILE

Measuring volume X-axis	Custom
Measuring volume Y-axis	up to 2100; Duplex up to 4000 mm
Measuring volume Z-axis	up to 3000 mm
Measurement uncertainty	$E_{L, MPE}$ from $15+L/45 \leq 50$ ( $\mu\text{m}$ )*

\*Depending on machine configuration (Premium, Standard) according to current technical data sheets

## YOUR ADVANTAGES AT A GLANCE

### ■ Best accessibility

Easy loading, positioning and accessibility of workpieces | Floor level and protected guide systems free of tripping hazards

### ■ High reliability

Technology proven over many years even in tough applications | High availability | Economical operation | Long service life

### ■ High flexibility

Modular design | Various system concepts possible | Duplex use possible

### ■ Precise results

Friction-locked power transmission | Combined recirculating ball and roller bearing guide technology | Optimized ratio of movement to precision

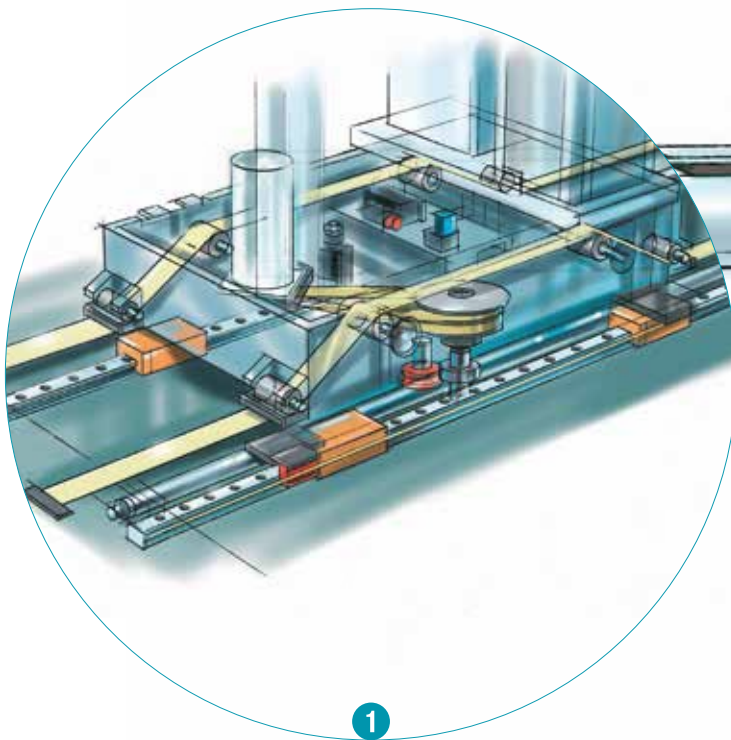
### ■ Many years of project competence

Consulting experience already from the plant planning stage | Design of measurement rooms and foundations | Definition and implementation of efficient measurement processes

# RA-FEATURES

## PRECISE IN DETAIL

- Base plate of the RA or guide beam of the RAF made of cast iron, floor-level as standard, for floor-level access to the measuring volume and workpiece, optionally on floor
- Guide system and transition to base plate covered without gaps, can be walked on or driven on, guide groove protected with stainless steel strips
- Surface of the base plate machined to DIN 876/2 as reference surface for the measured object
- Linear bearings in the X-axis and precision roller bearings in the Y- and Z-axis
- Carbon fiber Y-arm for high stiffness and dynamics
- Measuring system protected against dirt and damage
- Smooth-running, rail-mounted weight compensation in the Z-axis for safe and easy handling
- Cover on the Y-arm for safety and as protection against dirt and damage
- Manual drive using ergonomic handwheels with brakes in each axis, motorized/CNC or combined with decouplable motors



### Führungssystem X

- Developed using high technology FEM methods
- Distortion-stiff X-axis

### Drive unit

- Collision and Overload protection by means of frictional wheel drive

### Pneumatically disengageable drives

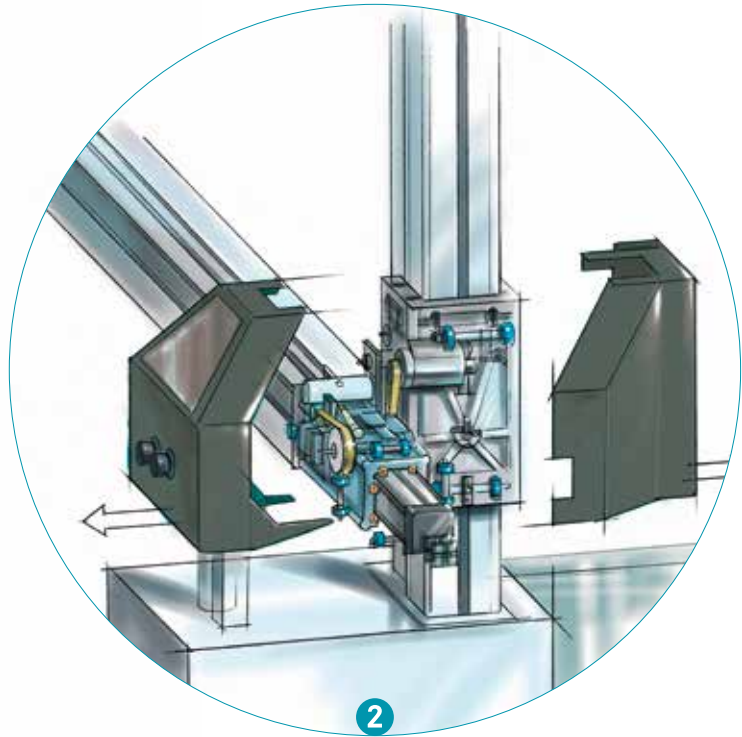
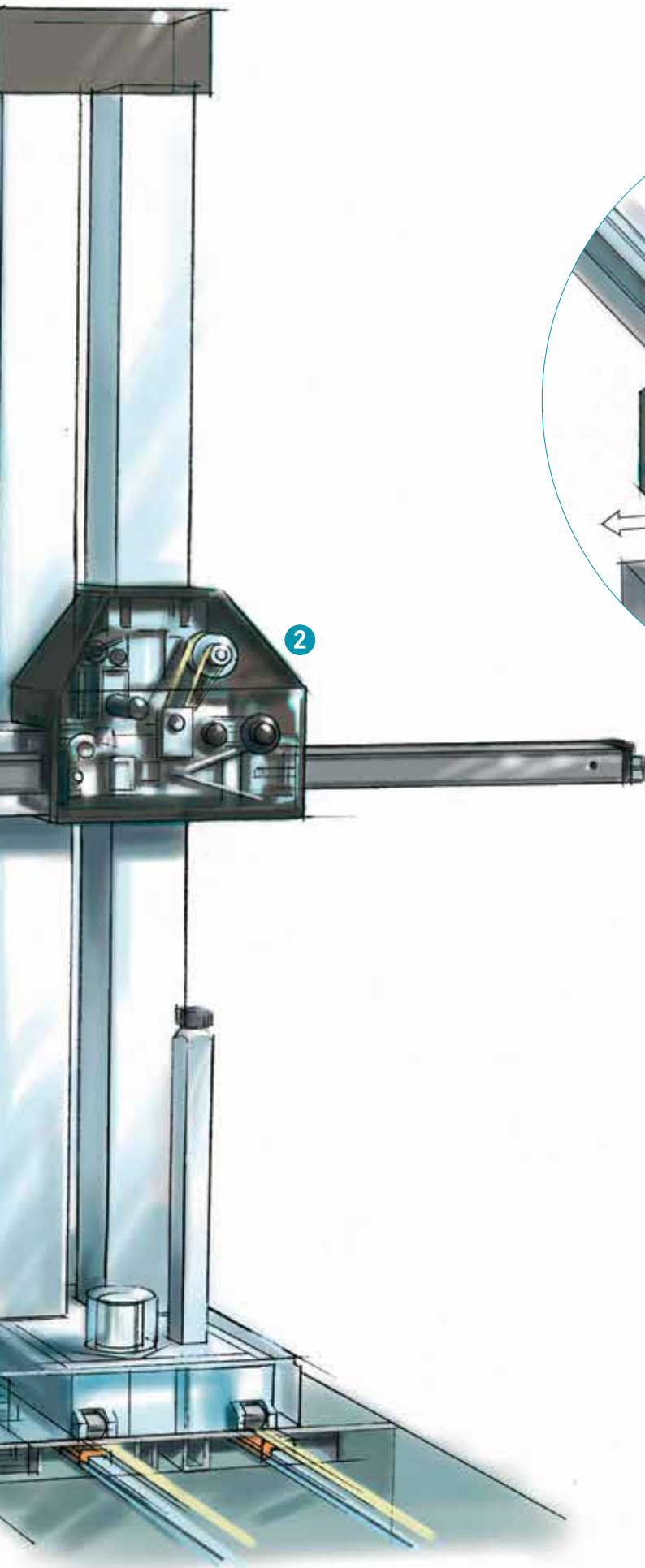
- Eliminate undesired heat sources

### Encapsulated linear guides

- High precision
- Low sensitivity to contamination
- Long life
- Low Maintenance

### Steel band covers

- Steel covers on the X-axis (accessible)
- Stainless steel drive bands
- Optimally self cleaning



**Führungssystem Y/Z**

- Rapid replacement design providing – minimal down time
- Easily adjustable
- Robust guide elements

**Y-arm produced of carbon fibre**

- Y-arm produced of carbon fibre

**Scale located underneath**

- Protects against contamination

# WENZEL RAX Series

## FAST, PRECISE MEASUREMENT OF LARGE COMPONENTS

The RAX is the newest CNC horizontal arm measuring device from WENZEL and was developed for the needs of vehicle technology and large machine construction. With its particularly large measuring volume, the RAX is especially designed for the very precise measurement of high and large volume components. Thanks to

the special design, the measuring range starts immediately above the the base plate. With its particularly high Z-axis, the RAX has an extremely large measuring volume. The highest rigidity and smooth-running drive and guide elements guarantee high-precision measurement results.

## FEATURES

- **Numerous versions** with or without a base plate, flush or flush with floor, simplex or duplex
- **Customer-specific measuring volume** in all axes, also as multi-column system
- **Multiple configuration options** for probes, sensors, software and accessories
- **Wide range of applications** due to high precision, large measuring volume and high dynamics
- **Ergonomic, safe and reliable** for single measurement and series monitoring

## APPLICATION AREAS

The RAX series is used by many customers worldwide in individual operation or as a multi-column system for measuring and digitizing. The main fields of application are in the following areas: Aerospace, shipbuilding, transport and construction and agricultural machinery. Whether for individual parts or assemblies, the RAX series performs the task at hand quickly and precisely.

Aerospace



Shipbuilding



Construction machines



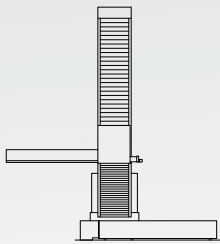
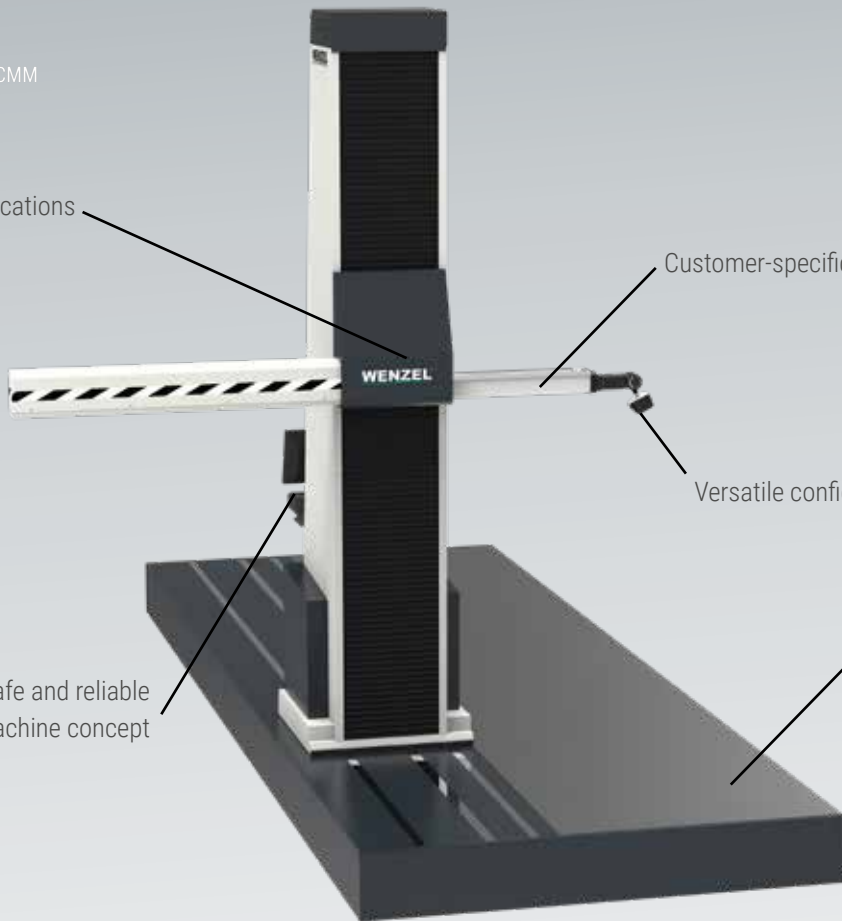
Wide range of applications

Customer-specific measuring volume

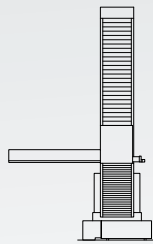
Versatile configuration options

Ergonomic, safe and reliable machine concept

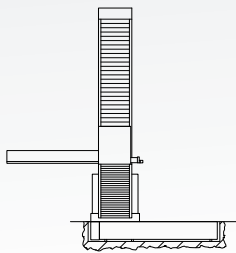
Numerous versions



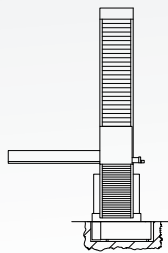
RAX (Simplex, on floor)



RAXF (Simplex, on floor)



RAX (Simplex, flush with floor)



RAXF (Simplex, flush with floor)

Machine, also available as Duplex- or multi-column-system.

## MACHINE PROFILE

Measuring volume X-axis	Custom
Measuring volume Y-axis	up to 2000; Duplex up to 3800 mm
Measuring volume Z-axis	up to 4200 mm
Measurement uncertainty	$E_{L, MPE}$ from $18+L/40 \leq 60$ ( $\mu\text{m}$ )*

\*Depending on machine configuration (Premium, Standard) according to current tech. Datasheets

## YOUR ADVANTAGES AT A GLANCE

- **Large measuring range**  
Up to 4200 mm in the Z-axis | Start directly above the base plate | Optimum utilization of the measuring range due to mirror image construction
- **High precision**  
Rigid machine body | Selected linear guides in all axes
- **High flexibility**  
Various system concepts | Various Probes and sensors | Duplex insert possible
- **High measuring performance**  
High dynamics | High speed in combination with safety technology
- **Ergonomics during operation and assembly**  
Control units on wheels | Safety options | Optimum access for loading and operation | Flush with the floor | Free of tripping hazards

# THE R SERIES

## CUSTOMIZED SOLUTIONS

Horizontal arm machines are used for the various tasks and the different machine types can be adapted very individually to every challenge and configured customer-specific in their high variability.

From different axis lengths, the number and arrangement of the individual machines, the integration into the existing infrastructure via various operating modes, different probes, sensors and changers, software modules, automation, as well as additional equipment such as lifting and rotary tables, the possibilities are almost unlimited.

Whether in development, prototype construction, material handling or molding, for sampling, analysis or series monitoring automated in the line, in the measuring room or in the production environment, whether individual parts or large assemblies such as commercial vehicle bodies, our stand machines provide reliable measuring results without time-consuming preparation and reworking, even of hard-to-reach elements and undercuts, but can also be used for marking and scribing.

In addition to the classic designs as single and double column systems in table and floor-level versions, triplex systems with underfloor measuring equipment or in a triangular arrangement are used, as well as systems with several columns on one side up to long multi-column systems.

Depending on type, environment and task, the systems can be installed on existing flooring, on or in a separate or specific foundation and, if required, with vibration damping. No matter what the task is.

Challenge us and benefit from our decades of experience.

On the basis of our state-of-the-art products and our countless completed projects, from small businesses to large international corporations, we can advise you on the design and configuration of the system, support you in the planning, design, scheduling and project management, even beyond installation and commissioning, e.g. also for foundations, safety engineering, automation and integration into existing infrastructure and processes.







# SENSORS AND CHANGE RACKS

## FOR HORIZONTAL ARM MACHINES

The R series can be equipped with manual, motorized, infinitely variable or indexable probes and swivel heads. These can be combined with an extensive range of touch trigger, scanning and optical measuring systems.



### PH10T PLUS / PH10M PLUS / PH10M iQ PLUS

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



### PHS2 servo positioning head

Can be swiveled continuously. Minimum probe calibration efforts. Extensions of up to 750 mm possible.



### SP600

A universal robust probe with scanning functions. Ideal for scanning forms and fine surface details.



### TP20

Touch trigger probe. Extremely robust and flexible touch trigger probe with stylus change modules.



### Universal mounting head

The mounting head allows the mounting of probe systems and marking tools for all axial directions in a fast, secure and user-friendly way.



### Scribing tool

The manual mode of operation of the R series allows the scribing of models in metalworking, mould making, tooling, tooling, etc. and design area.



**ACR2 Autochange rack**

ACR2 can store up to six probe extensions or probe adaptors. It makes a change of probe extensions or probe adaptors possible so that the measuring tasks do not have to be carried out manually.

The pick-up heads and probes shown here are only a small selection from our extensive product range.

For further information please contact your WENZEL contact person.



**Change rack ACR3**

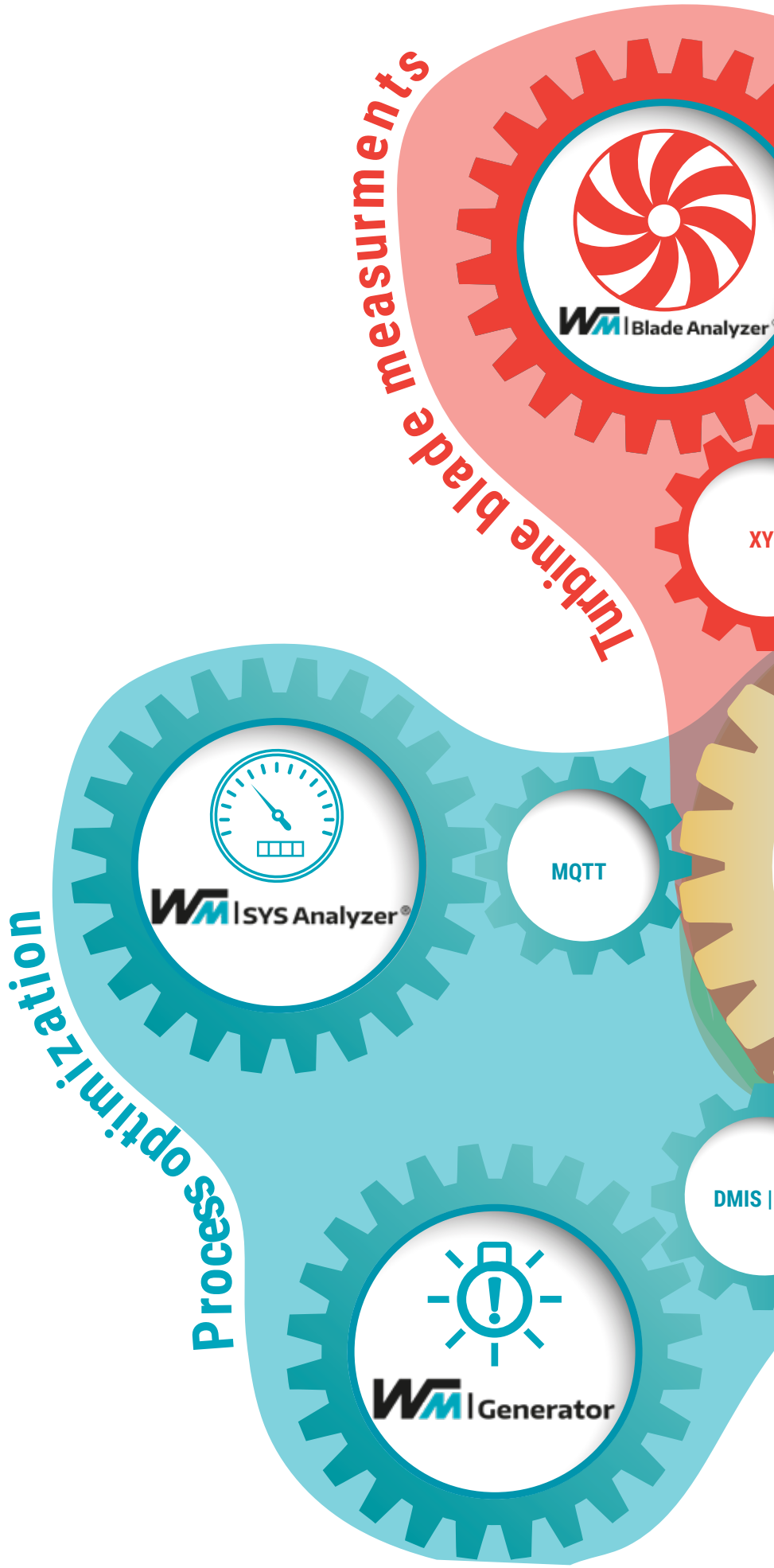
The ACR3 is a four port unit, two can be linked together so that eight different probes or extensions can be stored in the rack - sufficient for any measurement task.



**Change rack MCR20**

Module change rack enabling automated changing of TP20 stylus modules. The MCR20 module changing rack can store up to six TP20 probe modules for automatic changing under measurement program control.

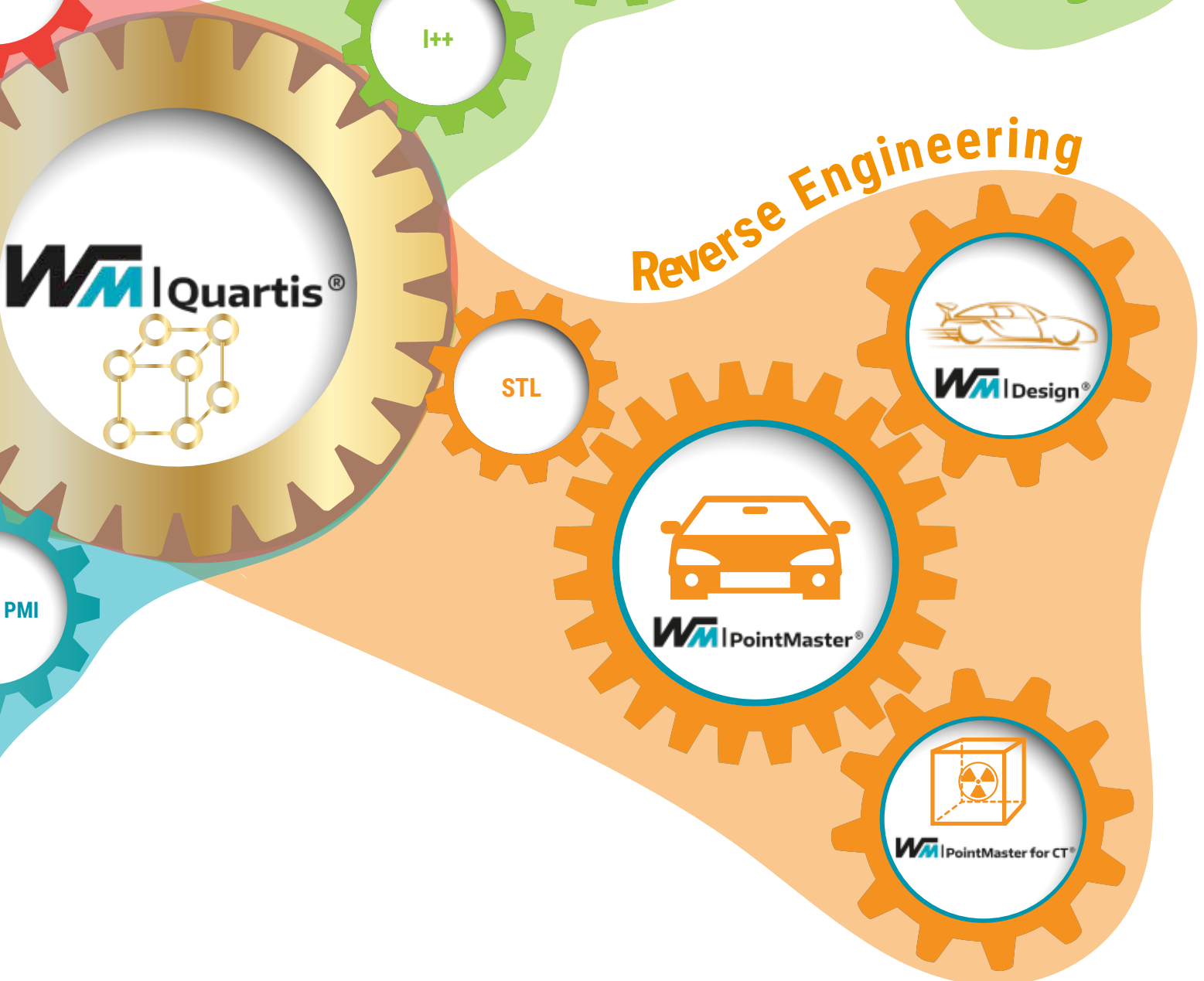
# WM | Software Solutions®



## Gear measurement



## Reverse Engineering



## EVALUATION SYSTEMS AND ACCESSORIES

### PRECISION IN DETAIL



#### WENZEL Evaluation Station

- Compact workstation with integrated media supply
- Mounting the WENZEL CNC-Controller
- Housing of the evaluation PC system in desk form (120 cm x 90 cm) 19" technology

#### WENZEL evaluation system CNC

- Optimized machine performance
- Optimized for WENZEL & Renishaw sensors
- Scanning button possible via option cards

#### Interfaces WPC2040

- Ethernet
- RS232
- Readerhead input (5V TTL)
- Push-button input (5V TTL)
- Motor connections



#### Standard control panel HT400, wired

- Ergonomic shape for one-handed operation
- 1 joystick for all axes
- Multifunction pad
- Stepless adjustment of the CNC travel speed
- Emergency stop function according to EN 60204 and EN ISO 13850

#### Wireless control panel HT400RC

- Wireless control panel HT400RC incl. receiver
- 1 charging cable each 0.5 and 6.0 m
- Charging station and spare battery
- Power supply



#### Styli

Comprehensive range of styli for every application

The accessories shown here are only a small selection from our extensive product range.

For further information please contact your local WENZEL representative.

# TECHNOLOGY AND SUPPORT

## WENZEL CMMs IN DETAIL

### Guarantors for stable results



#### Active damping

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

#### Thermal compensation

The LH, XO and R Series can be equipped with automatic temperature compensation. Thus, the measuring device and work piece are protected against the thermal influences of the environment.

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



#### Professional user training

Training can be offered as individual training, group training and seminars. The Training can be performed at your facility or at your WENZEL technical center.

#### 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.

### Customer-specific measurement volumes and solutions



One of our strengths are customer-specific designs and individual solutions. Just as the LH machines are also available in particularly long lengths, all axes and design details of the horizontal arm machines can be individually adapted to customer requirements. We advise and support you from project planning to commissioning.

### High resolution scales






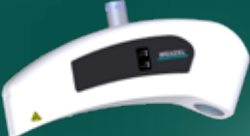















































#### Accurate positioning thanks to the optimal position measuring system technology

The LH Series is equipped with an incremental measuring system, which has very fine scale pitch, and excellent dirt immunity.

Thus, the best position resolution and stability at high speed in all linear axes is possible. The highly precise and robust scale tapes compensate inherent hysteresis.

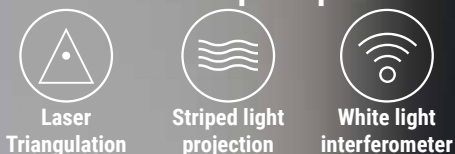
# WENZEL Sensor Program

## THE RIGHT SOLUTION FOR EVERY TASK

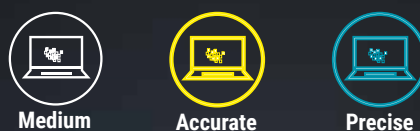
	WM   Shapetracer	WM   LS 70	WM   LS 150	WM   LS 600	WM   DS & WM   HS
<b>Technical principle</b> Basic principle Line length	 120 mm	 70 mm	 150 mm	 600 mm	 40 µm measuring point
<b>Resolution</b>					
<b>Accuracy*</b>					
<b>Part size***</b>	 	 	 		
<b>Typical measuring tasks</b>	 	 	 		
<b>Supported Software</b>	  	  	  	 	
<b>Supported machines</b>	 	  <b>****</b>	 	  <b>*****</b>	

\* based on MPEn-2 according to manufacturer  
 \*\* available from 10/20  
 \*\*\* depending on cycle time & measuring speed  
 \*\*\*\* WM | MMA with accessories  
 \*\*\*\*\* from LH 2010  
 \*\*\*\*\* under development

### Basic technical principle




















































### Resolution



### Accuracy





<p>WM   MLS 100 WM   MSL 100 P WM   MLS 200</p> 	<p>WM   AS 3036**</p> 	<p>Nikon LC 15 Dx</p> 	<p>Nikon XC65 Dx</p> 	<p>WM   RS-C</p> 
 <p>100-200 mm</p>	 <p>300x360 mm</p>	 <p>18 mm</p>	 <p>3 lines offset by 120°</p>	
				
				
 			 	
 	 	 	 	
  		 	 	 
				 <p>*****</p>

### Part size



Small



Medium



Large

### Typical measuring tasks



Surfaces



Features



Gap and flush

### Supported Software



WM | Quartis



WM | PointMaster



Metrolog



Polyworks

## INNOVATION MEETS TRADITION

The WENZEL Group is a market leader in innovative Metrology. WENZEL offers a comprehensive product portfolio in the fields of Coordinate Metrology, Computed Tomography and Optical High Speed Scanning. The technology of WENZEL is used in all industries, including the automotive sector, aeronautics, power generation and

medicine. WENZEL looks at today on an installed base of more than 10,000 machines worldwide. Subsidiaries and agencies in more than 50 countries support sales and provide after-sales service for our customers. The WENZEL Group today employs more than 600 people.



## YOUR LOCAL CONTACT PERSON

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We are there for you worldwide. You can find our subsidiaries, sales and service partners at [www.wenzel-group.com](http://www.wenzel-group.com).

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