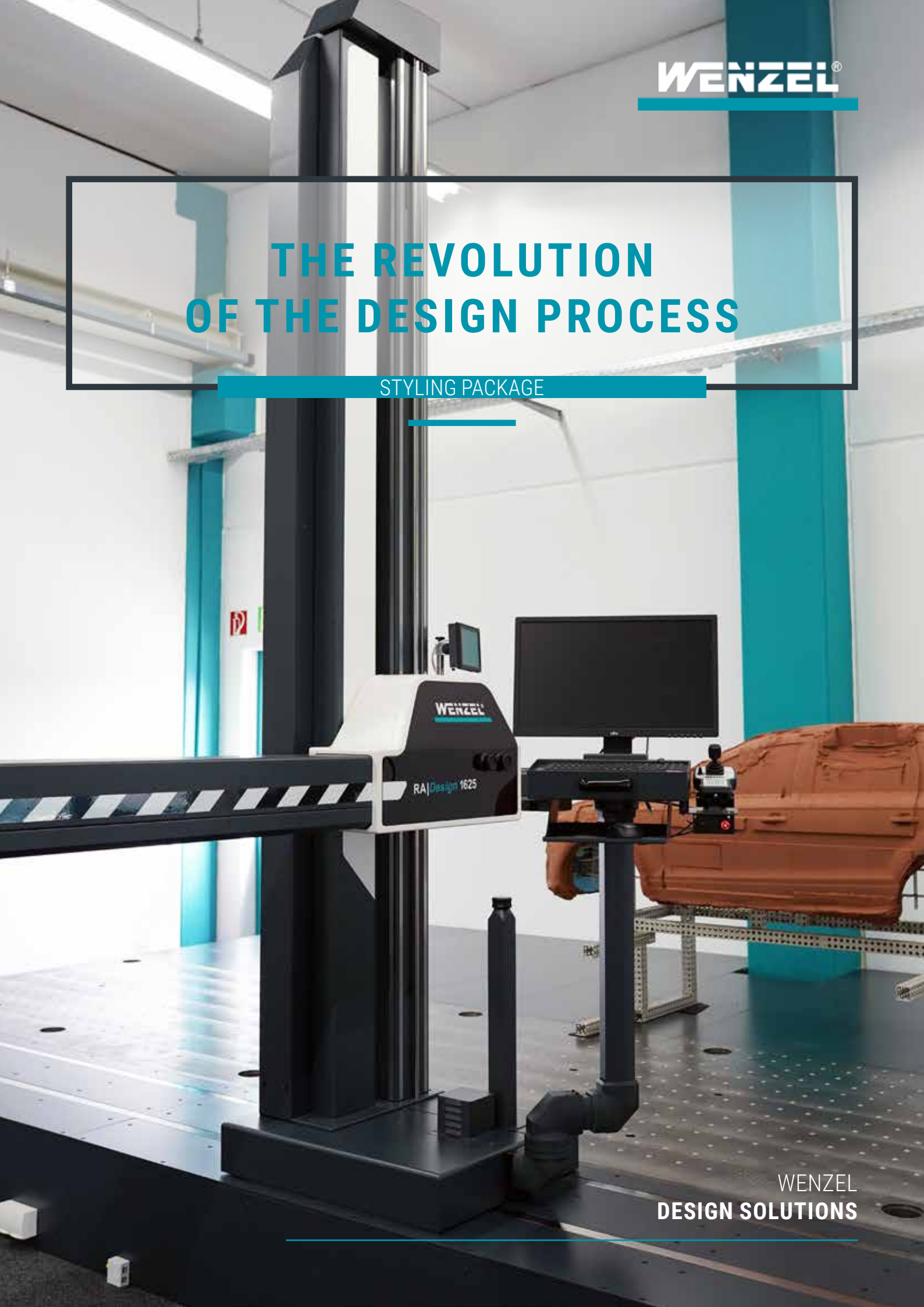


# THE REVOLUTION OF THE DESIGN PROCESS

STYLING PACKAGE



# WENZEL – INNOVATION MEETS TRADITION



DR. HEIKE WENZEL AND PROF. DR. HEIKO WENZEL-SCHINZER

The WENZEL Group GmbH & Co. KG is a leading Manufacturer of innovative design & 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 for the highest precision, reliability, and technological competence.

WENZEL have brought numerous innovative solutions into the market in recent years so as to offer our customers the right products. In addition to the product, we also supply you with turnkey solutions. This makes us experts in delivering turnkey design process solutions.

## MANAGEMENT OF THE WENZEL GROUP

**With our product range, we are able to support all your design process needs. As a family business, we strive to achieve long-term partnerships with our customers by investing in the outstanding quality of our machines and offering you excellent service.**

In many design studios, perfect styling takes shape in the form of a clay or foam model to accurately determine the outside skin of the product. The faster this is finalized, the sooner first aerodynamic tests can be performed by the development for example. In addition, the design department can check the technical feasibility of the new styling as early as possible.



### About WENZEL

Founded in 1968, today WENZEL is the largest family-run measurement technology manufacturer.

More than 10,000 machines installed worldwide



### WENZEL Worldwide

More than 600 employees worldwide

Subsidiaries & representatives in more than 50 countries



### Our Headquarters

Wiesthal, Germany

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



The design process from the planning, to the realization of the actual model, is made up of a combination of many diverse steps. From the collection of unknown surface data, to milling from either digital or CAD sources, WENZEL's styling packet offers the perfect working cycle. All components of the WENZEL design solution are modular. To achieve optimal results, both software and hardware, have to work together perfectly. The

WENZEL design package has been used for many years at leading companies, particularly in the automotive industry. By 3D digitizing half models, processing and mirroring of data, a completely symmetric model can be milled. With the design package from WENZEL you can increase the milling throughput and optimize the number of necessary iterations and thus accelerate the overall design process.

#### BUSINESS AREAS OF OUR CUSTOMERS

**Quality assurance  
Manufacturing  
Development  
Surface testing  
Prototyping  
Initial sampling  
Reverse Engineering  
R & D  
... and many more**

#### OUR CORE INDUSTRIES

**Automotive industry  
Railroad gearboxes  
Energy industry  
Conveyor technology  
Industrial gear units  
Agriculture  
Aerospace industry  
Mechanical & plant engineering  
Commercial vehicles  
Wind power  
...and many more**

# WENZEL R | DESIGN SERIES

## HIGHEST DYNAMICS AND PRECISION

In combination with the WENZEL styling equipment, all work stages of the design process can be performed with Coordinate Measuring Machines of the RA- and RSplus series. The RA- and RSplus-Series are perfect for milling soft materials like clay or hard foam. Accurate and dynamically complete models can be milled on a 1:1 scale. The multifunctional CMMs provide large

areas of operations. The machines are available in duplex configuration and with an extended Y-measuring volume. As a result the WENZEL CMMs can be customised to the individual needs of the customer. This provides solutions which are better than the industry standard. The CMM can be used in CNC mode or manually. This allows, for example, the scribing or marking of

### RA SERIES

The RA-Series provides perfect accessibility to position models and work pieces. The guide system of the X-axis is completely protected by accessible covers, allowing installation at floor level.



### RS SERIES

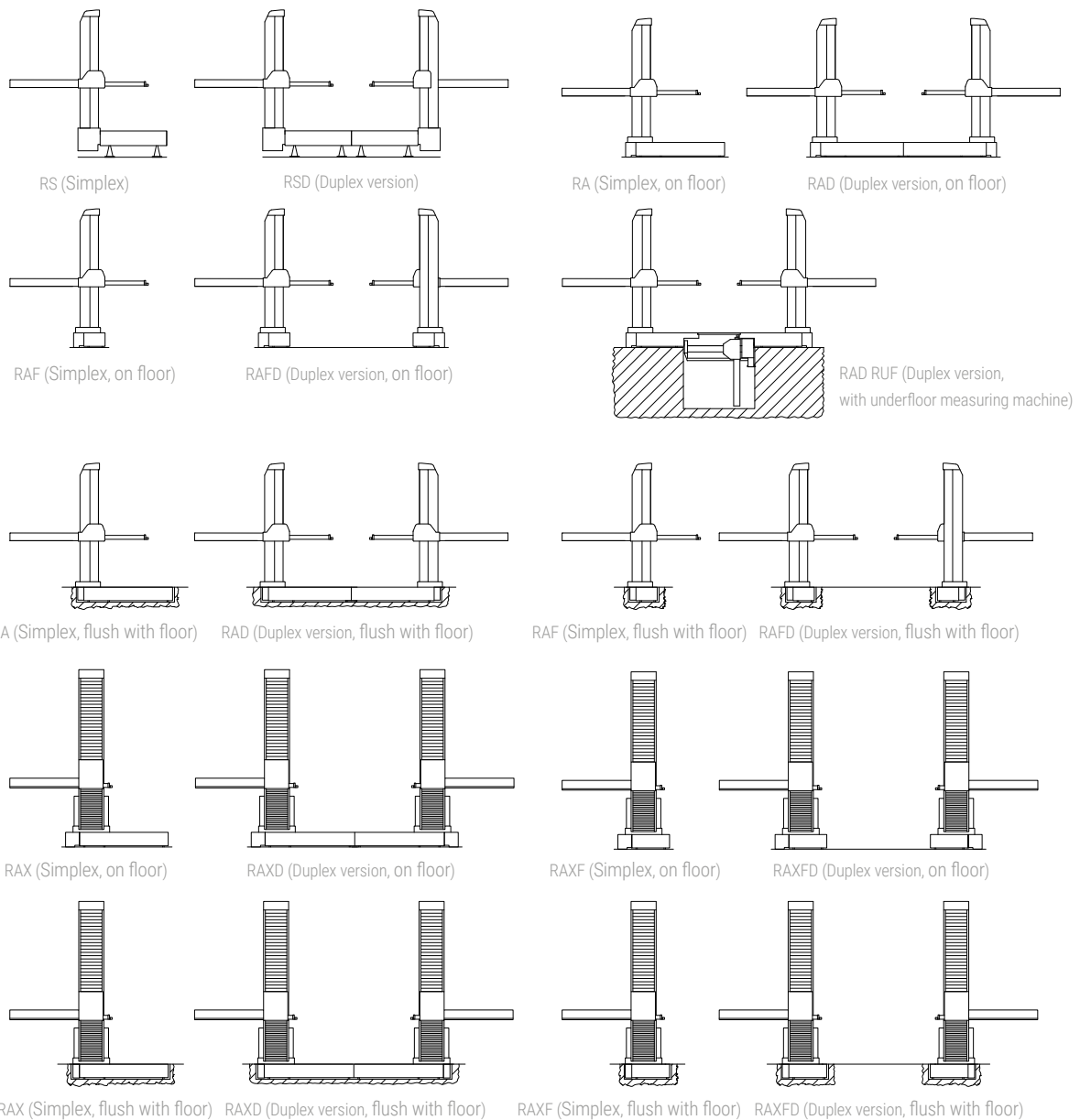
The RS-Series with its collateral X-axis guide ways does not need extra foundations. The RS can be integrated flexibly into an existing room concept or can be moved to a new location if needed.



the design models. Optionally the CNC version is available with pneumatic drives, which can be decoupled. Individual prefabrication such as grid holes, T-slots, shallow grooves, power lines, etc.

in the base plate surface of the R-Series could be made without any problems.

## OUR VARIANTS



# WENZEL DESIGN SOLUTIONS

TOP CLASS DESIGN PRODUCTS

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# THE NEW WENZEL SH 3+2

## TOP CLASS MILLING HEAD

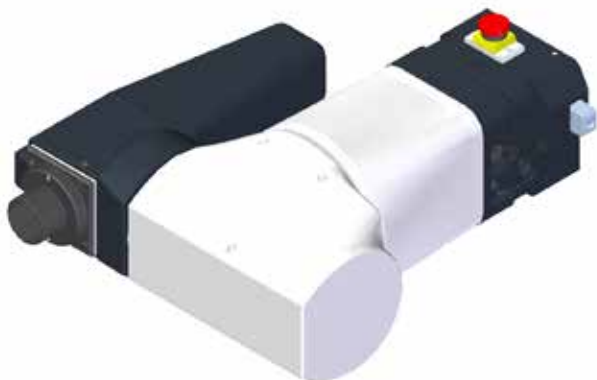
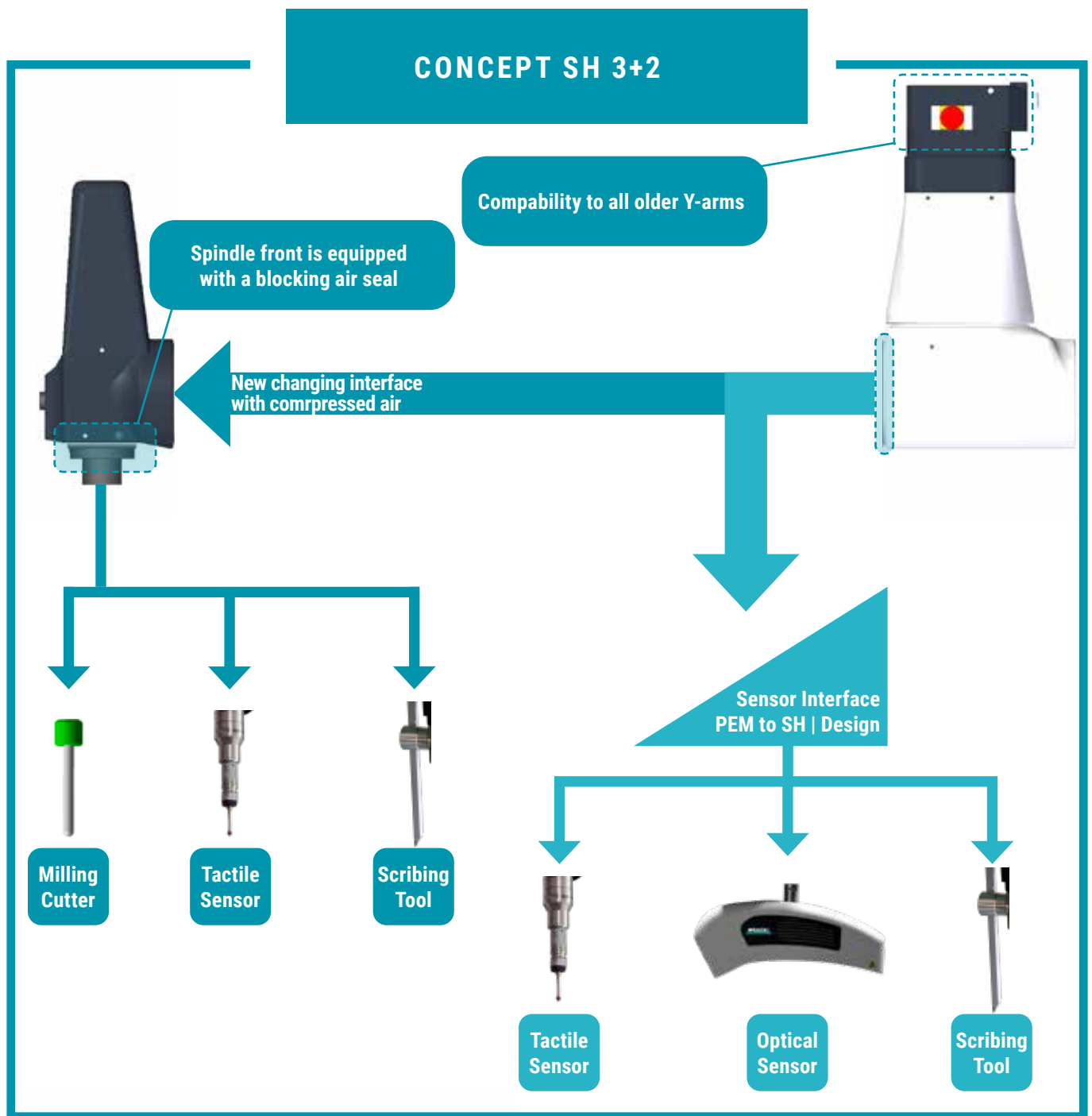
Complex free-form surfaces can be milled directly on the Coordinate Measuring Machine with the SH 3+2 2-Axis-Milling Head. The simple adaptation to the measuring machine and integrated controller inside the milling head enables a user-friendly operation. The new WENZEL SH 3+2 CNC Milling Head has excellent repeatability its rotary axes (0,002 Degree) and tool tip (0,01 mm), an infinitely variable speed range up to 8.500 revolutions per minute, and an adjustable pivoting range in both axes in

0,01 mm steps. The controller can automatically handle multiple programs sequentially and also allows unmanned operation. The new SH 3+2 can be used with 3, 6, 10 and 16 mm milling cutters. The HSK-32 mounting provides excellent repeat accuracy. Due to the all new changing interface optical sensors and tactile probes such as the TP20 can be mounted directly. Also the new designed front is equipped with a blocking air seal preventing dirt and clay abrasion from entering the milling head.

### TECHNICAL DATA

Technical data	SH 3+2
Speed	max. 8.500 min <sup>-1</sup>
Power Input	200 W
Swivel Range A-Axis	+/- 105°, 0,01° steps
Turning/Rotate Range B-Axis	+/- 170°, 0,01° steps
Resolution of the measuring system based on milling cutter with 200 mm length	0,01 mm
Repeatability of the position with 200 mm cutter length	0,01 mm
Mounting Type	HSK-32 mounting with Standard 3 - 16 mm Spanner
Adaption as Measuring Head	WENZEL Quick-Change System
Electrical Connection	Internal Cable
Adaption as	New Wenzel Multiwire plus sealing air, Styling Interface (pneumatic & electrical)





# CLAY PROCESSING

## STEP BY STEP TO SUCCESS

Industrial clay has a long tradition in design model making. State of the art hardware and software tools from WENZEL make it possible to produce a physical model from clay.

### **Raw model – The original state**

- Heated Clay is applied by hand to the model carcass
- The shapeless mass is ready for the mechanical milling process

### **Skeletal Milling – Quick safety check**

- Milling of individual lines for testing
- Quick analysis of adequate Clay coating

### **Roughing - Highest milling throughput**

- The main body is milled using high-performance milling heads
- High immersion depth and great step distance can be easily achieved
- Processing step with the highest removal of material for a quick design process

The WENZEL styling package mills an extremely fine surface out of the raw model. In a few steps a meaningful design model is created.

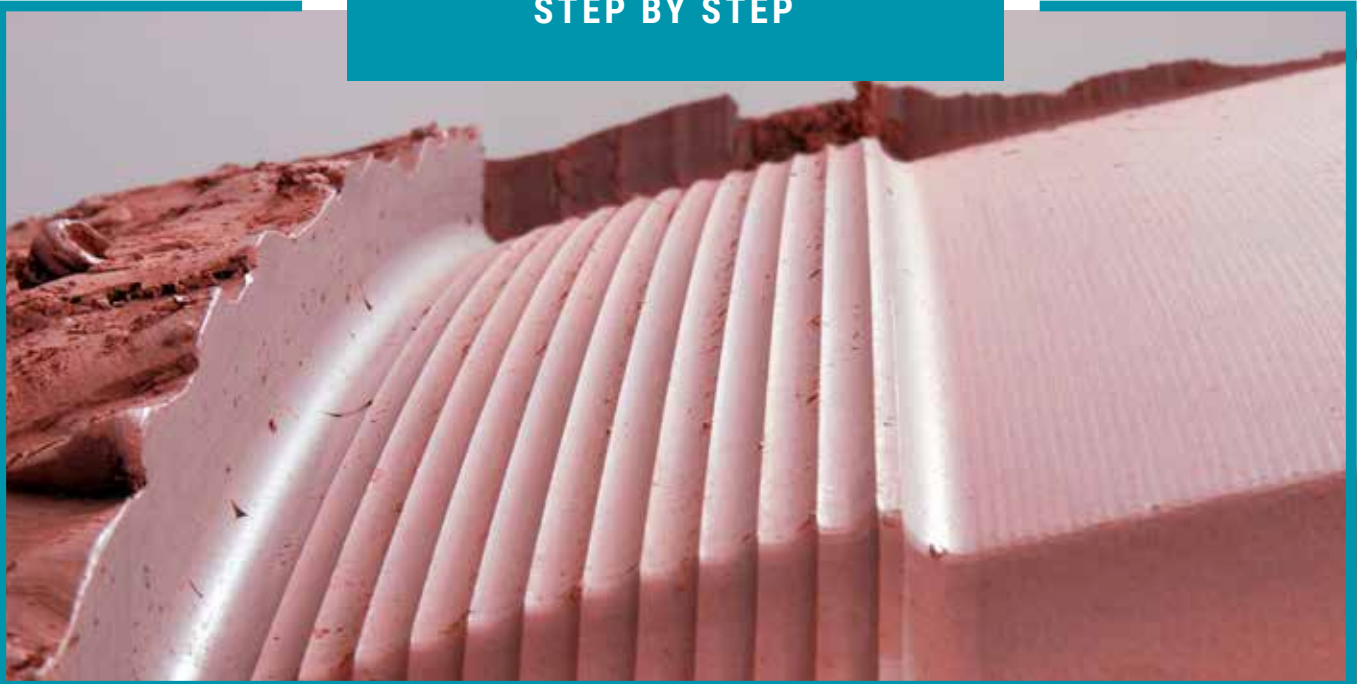
### **Finishing - Finest surface**

- Finishing the model by precise milling
- Developing accurate contours with finest surfaces and sharp edges
- Low effort for manual pulling

### **Result - Meaningful design model**

- The meaningful design model allows accurate assessment of physical proportions and forms

## STEP BY STEP



# STYLING ACCESSORIES

## FOR MORE COMFORT AND BETTER MILLING RESULTS

WENZEL offers varied innovative design accessories like the WM | LS 600 Line Scanner, ergonomic operation elements, marking tools, angle adapter, or the tool setter

for quick and easy calibration to simplify the working day of the users. The right accessories are our icing on the cake.



**WM | Shapetracer**

The WENZEL SHAPETRACER II is a highly flexible 3D line scanner for the acquisition and processing of point clouds on a multi-sensor coordinate measuring machine.



**WM | LS 50 & WM | LS 150**

The WM | LS 50 & WM | LS 150 3D line scanners turn your coordinate measuring machine into the ideal tool for capturing and processing point clouds.



**WM | LS 70**

Developed for demanding applications, the WM | LS 70 enables the most accurate and fast measurements in various industrial and application areas.

## WM | LS 600



### TECHNICAL SPECIFICATIONS

#### Optische Daten\*

Working range Z	min. 300 - max. 1.000 mm
Measuring range Z	700 mm
Measuring range X	min 280mm - max. 600mm
Linearity deviation	up to 175µm
Resolution Z	up to 27 µm
Resolution X	up to 181 µm
Laser line color	Blue

\*Guidelines subject to technical developments and changes in Sign and scope of delivery.

The optical sensor WM | LS 600 with a line width of 280 mm up to 600 mm allows an extended field of application for large portal CMMs as well as for horizontal arm machines from WENZEL. Additionally the WM | LS 600 can be combined with the well-known WM | Shapetracer II from WENZEL on a cmm. This combination forms an unbeatable DUO and turns your coordinate measuring machine into an all-purpose weapon with which even the most complex workpieces can be measured quickly and easily.

## HAND TOUCH TERMINAL

The Hand Touch Terminal allows the easy and comfortable operation of the brakes and clutches. Current status and position of the machine are displayed in real time. Touching and marking functions can be performed easily. The machine can be operated without any special knowledge of complex software.



## ANGLE ADAPTOR & TOOL SETTER

### Angle Adaptor

Extension for a better accessibility for milling within the sill area.

### Tool Setter

Comfortable and fast calibration, especially for duplex systems as well as reduction of offset for combined milling programs.



## MOUNTING DEVICE WITH WHEELS TBR32

The Mounting Device allows exchanging the tools easily and carefully within the reproducing tool exchange fixture.



## UNIVERSAL MOUNTING HEAD

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



# STYLING ACCESSORIES

## AT A GLANCE

Hand wheels for manual movement and braking of the Y-Axis and Z-Axis

Hand Touch Terminal 4.3" for operating brakes & clutches displaying status & current position

Mobile equipment holder for Laptop with swivel mount on the machine frame

Hand wheels for manual movement and braking of the X-Axis

Mobile power strips  
115/230 V  $\pm$  10%



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# WM | DesignMaster

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## UNIVERSAL SOFTWARE FOR THE COMPLETE DESIGN PROCESS

WM | DesignMaster is a powerful software tool for modellers and designers. All daily design job tasks are covered. Essential elements of WM | DesignMaster are digitizing of geometric elements and surfaces on work pieces and models with touch triggers, optical and multipoint scanning sensors as well as the seamless import and export of this data into modern computer-aided systems like CAD, CAM or CAQ.

The system enables users to generate milling programs as well as milling on the measuring machine and basic generation of surfaces. The modular software architecture offers a simple and clear user interface for all software functions. Moreover DesignMaster provides multicore support with full 64-Bit performance and is compatible with Windows 10.

### **WM | DesignMaster basic package**

- Generation of B-splines and polylines
- Moving, rotating, scaling and mirroring objects
- Transforming objects using matrices
- Alignment: coarse/fine, automatically BestFit, discreet BestFit
- Alignment of standard geometries and RPS
- Triangle meshes: smooth, reduce, cut, copy, split, delete and merge
- Extracting point clouds, components, edge lines and feature lines from a triangulated mesh
- Creating sections on a triangular mesh

### **Comprehensive CAD functionality**

- Turning surface orientation
- Surfaces: extend sew, trim, fillet, copy, split, delete
- Extracting triangle mesh and regular geometry out of surfaces
- Extracting polylines out of curves and corners

### **Optical high speed scanning**

- Scanning with optical scanners
- Calibrating positions
- Definition of scan ranges

### **Measuring & Digitizing – fast, accurate, flexible**

- Measuring geometric elements: point, vector, circle, plane, sphere, cylinder, polyline
- Processing of geometric elements: connection, projection, section, symmetry

### **Verification – accurately, quickly, clearly**

- Surface measurement (target/actual-comparison)
- Section measurement
- Wall thickness measurement
- Profile form tolerance
- Calculate area and volume content
- Dimensioning

### **Reverse Engineering – interactive and quick**

- Creating surface mesh
- Creating and editing nodes and edges
- Creating and edit surfaces
- Surface preview

### **Writer – Informative documentation**

- Documentation of a project with headings, text and graphical views
- Exporting and printing as PDF

### **Milling program generation**

- Creating milling blank cubes and cylinders
- Z-Constant finishing and roughing
- Foam milling
- Skeletal milling
- Roughing
- Bore milling
- Finishing
- Milling contour- and meander-design

### **Calibration & Alignment – made easy**

- Reference system calibration: tool setters, calibration sphere, preset tooling
- Tool and probe calibration
- 3-2-1-Alignment
- Alignment over 1/3 points
- Displacement and rotation of the orientation

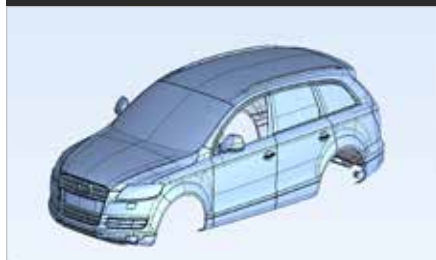
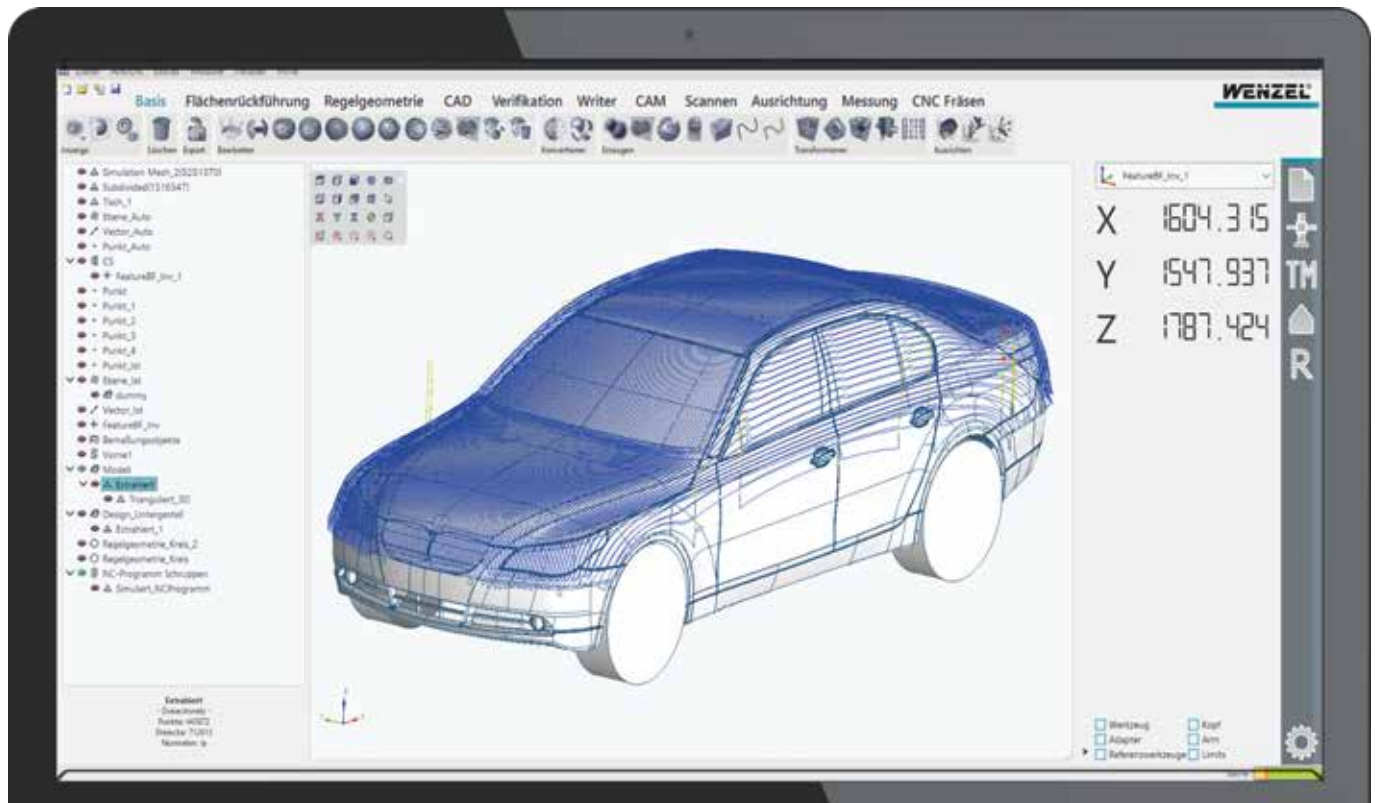
### **Milling with high-throughput**

- Milling operation
- Volume milling
- Processing of NC programs: inversion, interpolation, separation, extraction of a point cloud

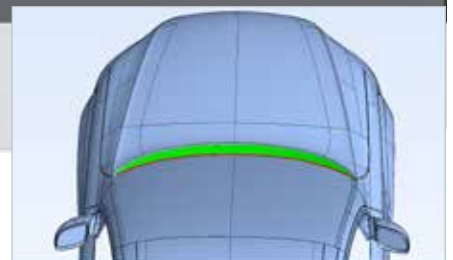
### **Milling with high-throughput**

- Creating point, vector, circle, plane, sphere, cylinder
  - Converting standard geometry into CAD object
  - Turning vector information
-

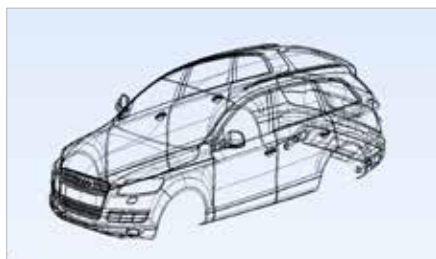




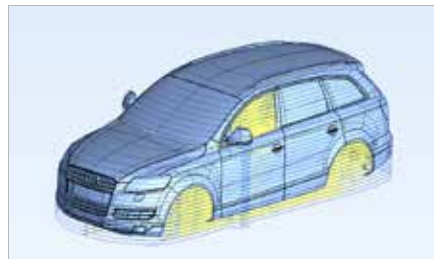
Importing CAD surface data



Processing and repairing of surface data



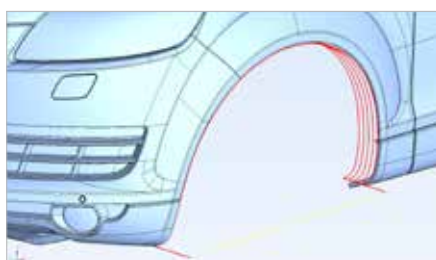
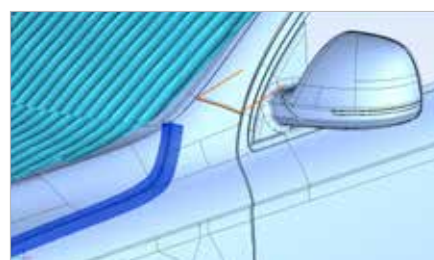
Model building: surface model as wire frame model



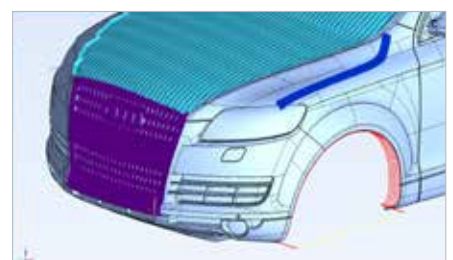
Milling program: layered model building and preparation



Milling simulation: finishing and milling simulation in detail

Beginning of milling operation with the CMM:  
infedding contour milling

Bead and groove milling in detail



Finishing, milling simulation, contour and bead milling

## 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, aerospace, power generation, and

medical devices. Over the years WENZEL has installed 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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