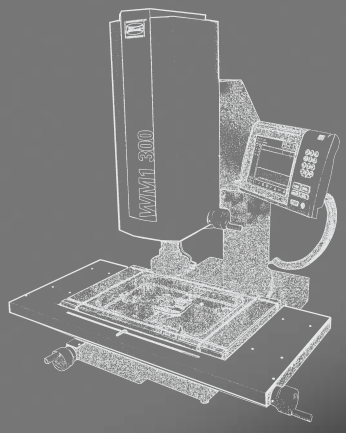
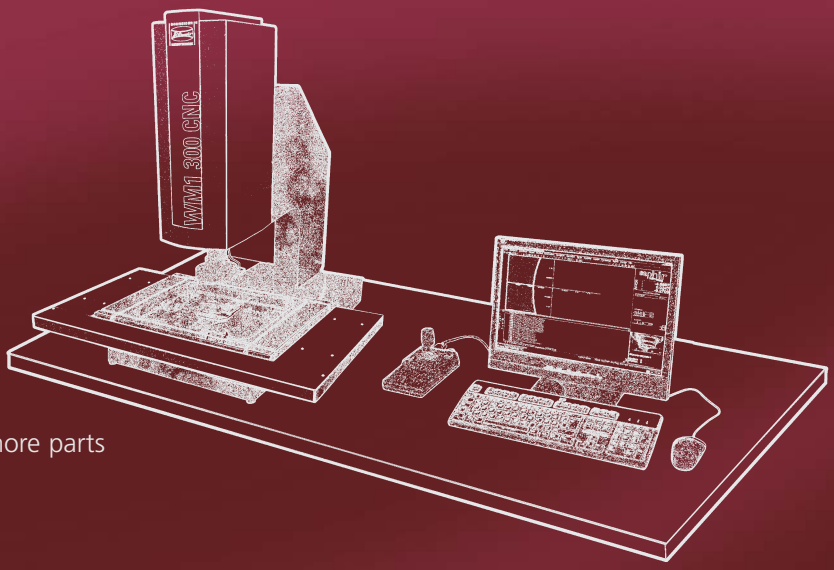
WM1 Series

Workshop Microscope



High Tech – Low Budget, with integrated image analysis ideal for measuring

- punched parts
- plastic parts
- rubber parts
- tools
- seal
- profiles
- and many more parts



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MESSTECHNIK

SIMPLY PRECISE

WM1 Series

Three tailor-made solutions to your measuring task.

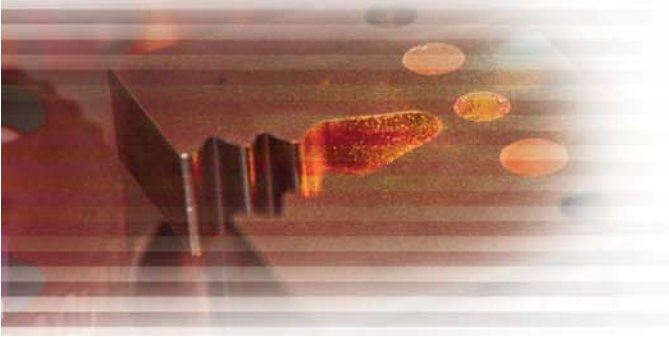
Regardless of whether you opt for the manual model equipped with either Multicount 3000, which features an integrated image analysis module, or with SAPHIR, an accurate measuring and analysis software – or whether you choose the CNC-operated model, which can be optionally expanded into a 'small' multi-sensor device: the WM1 series ensures tailor-made solutions designed to match your needs and budget, 100% and no less.

Your benefits at a glance

- Camera-based acquisition of measurement data
- Precise edge detection in transmitted and incident light thanks to intelligent image analysis algorithms
- Small size – great performance
- Fast and easy handling combined with impressive measurement precision

WM1 250 / WM1 300

- Multicount 3000
- High-resolution CCD camera
- 1.5x magnification
- Incident light illumination through LED ring light,
- 4 sectors and 1 ring – separately switchable
- Needle-bearing supported precision measuring stage with quick-adjustment feature for axes X and Y
- Diode laser indicating camera position



A wide range of accessories are available.

For more detailed information, please visit our
Website: www.dr-schneider.de

WM1 250 S / WM1 300 S

- Measuring and analysis software SAPHIR
- CCD camera with ultra-high resolution
- 1.5x magnification
- Incident light illumination through LED ring light
- 4 sectors and 1 ring – separately switchable
- Needle-bearing supported precision measuring stage with quick-adjustment feature for axes X and Y
- Diode laser indicating camera position
- Colour inkjet printer
- 19″ TFT flat screen monitor

WM1 250 CNC / WM1 300 CNC / WM1 400 CNC

- Measuring and analysis software SAPHIR
- 3-axis CNC control
- CCD camera with ultra-high resolution
- 1.5x magnification
- Incident light illumination through LED ring light, 4 sectors and 1 ring – separately switchable
- Needle-bearing supported precision measuring stage for axes X and Y
- Diode laser indicating of camera position
- Colour inkjet printer
- Joystick for axis motion control, with fast/slow speed selection
- 19″ TFT flat screen monitor
- **Optional: touch-trigger probe TP200**

A valuable option: Touch-trigger probe ***TP200***

SAPHIR measuring and analysis software

The foundations for efficient and cost-conscious work are already laid at the early stage of programme development. Since "Schneider" is the German word for "tailor", you can rightly conclude that SAPHIR is a truly "tailor-made" measuring software that will leave nothing to be desired: from "A" as in "axis alignment" to "Z" as in "zero-point administration" - SAPHIR offers a wealth of useful features. Further details are provided in our "SAPHIR" brochure, which we will be pleased to send to you, free of charge, upon request.

Geometry measurement computer Multicount 3000 - brings data to life

For the first time ever, MC 3000 combines recorded position data with the live image of the object being measured in one device. Whereas formerly either digital display elements or readouts such as Multicount 200/2000 were used on measuring projectors, the new Multicount 3000 device is a real "all-rounder", offering all the advantages of Multicount 200/2000 with the added benefits of image analysis, live imaging and automatic edge detection. Further details can be gleaned from our "MULTICOUNT" brochure, which we will be pleased to send to you, free of charge, upon request.

Technical Specifications of the WM1 Series

Type Multicount 3000		**WM1 250**	**WM1 300**	**–**
SAPHIR manual model		**WM1 250 S**	**WM1 300 S**	**–**
SAPHIR CNC model		**WM1 250 CNC**	**WM1 300 CNC**	**WM1 400 CNC**
Measuring range	**X x Y mm**	250 x 125	300 x 200	400 x 300
	Z mm	200	200	200
Objective		other objectives available upon request		
Magnification		**1.5 x**	**3 x**	
Image field	mm	4.3 x 3.2	2.1 x 1.6	
Working distance	mm	77	77	
Resolution	**mm**	0.0001		
Max. workpiece weight				
on glass plate	kg	20		
Length measurement uncertainty1 [1]		E_1 = (1.9+L/100 mm) µm		
DIN EN ISO 10360-2		E_2 = (2.9+L/100 mm) µm		
VDI/VDE 2617		E_{1Z} = (3.9+L/100 mm) µm		
		measuring length L in mm		
Our measurement is based on		β [2] **= 1.5** ≙ objective 1.5 x (image field 4 x 3 mm) – *smaller image fields (3 x, 5 x, 10 x) enable greater accuracy*		
Dimensions	**mm**	W 520	W 900	W 1200
		D 650	D 950	D 1200
		H 750	H 950	H 1000
Weight	**kg**	110	140	500
Electric power supply		220-240VAC, 50-60Hz, 1kW		

[1] **Prerequisites: Admissible ambient conditions** 20 °C ± 1 K, **Temperature gradient** Δ_{th} = 0.5 K/h, Δ_{td} = 4.0 K/d

[2] β **= Magnification factor**

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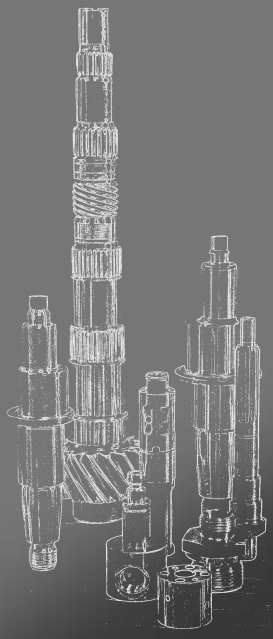
WMM 100/200

Shaft Measuring Machines
WMM 100/200



As easy as it gets.

Diameters

Lengths

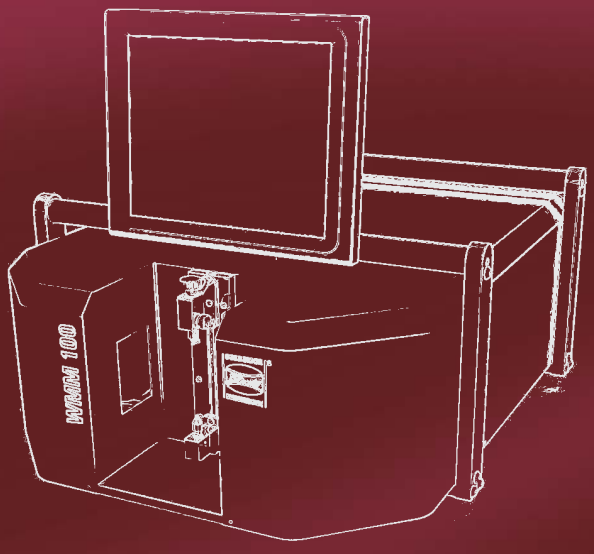
Radii

Chamfers

Threads

Fast as a flash, safe,

accurate, precise



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WMM 100/200

As easy as it gets.

Fields of application of WMM 100/200

The newest member in the family of shaft measuring machines has all it takes to be a star. Its large image field of 100*60mm ensures accurate, precise and reliable measuring results. Quality counts in our world, and so does time. We therefore do not need to go back to ancient wisdom to discover that time is the most valuable thing we can spend – and save. Since the WMM machine is equipped with a powerful 16-megapixel CCD camera, quality measurement becomes a matter of seconds. What easier way could there be to save time without compromising quality! Thanks to the intuitive user interface, which is backed by the proven measurement and analysis software SAPHIR, even newcomers to the world of metrology can rest assured that their quickly and easily obtained measurement results will leave nothing to be desired in terms of reliability.

WMM – As easy as it gets.

For further information,
please visit our website:
www.dr-schneider.de

Benefits of WMM 100/200

- Easy and fast measurement providing results within seconds
- Intuitive user interface
- No instruction required
- Portable design
- Accurate and precise measurement

Standard features of WMM 100/200

- Image field 100*60 mm
- 16-megapixel camera
- Touch-screen PC
- Table-top design

Optional features of WMM 100/200

- Rotary axis
- 200 mm measuring length

Technical Specifications of WMM 100/200

Model		**WMM 100**	**WMM 200**
Measuring range	**mm**		
Length		100	200
Diameter		60	60
Objective			
Magnification	mm	0.3x	
Image field	mm	100x60	
Workpiece weight max.	**kg**	3	
Length measurement uncertainty [1]		E2 = (2,0+L/100 mm)µm measuring length L in mm	
DIN EN ISO 10360-2, VDI/VDE 2617			
Our measurement is based on		β **= 0,3** ≙ objective 0.3x (image field 100 x 60mm) – *the measurement uncertainty value is valid for the indicated image field*	
Machine dimensions [2]	**mm**	**W**=1000 **D**=750 **H**=800	**W**=1000 **D**=750 **H**=900
Weight	**kg**	100	120
Power supply		220-240VAC, 50-60Hz, 1kW	

[1] **Ambient conditions** 20 °C ± 1 K, **Temperature gradient** Δ_{th} = 1 K/h, Δ_{td} = 4.0 K/d,
measured with a calibrated standard, working conditions: 15…35 °C.

[2] **Height incl. touch screen**

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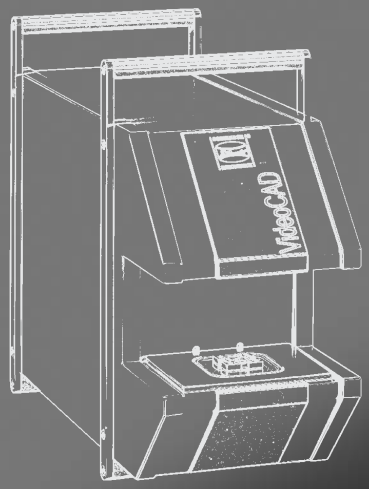
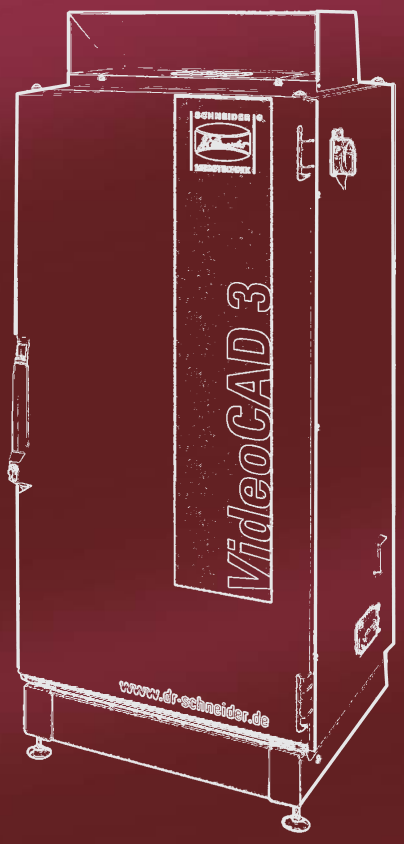
VideoCAD Series

2D Optical Measuring Device



For fast and accurate measurement
of two-dimensional geometries



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VideoCAD Series

2D optical area measurement device – for objects of up to 230 mm in size.

Fields of operation

The products of the VideoCAD series developed by Dr. Heinrich Schneider Messtechnik ensure precise and fast measurement of two-dimensional geometries. They come in three sizes (VideoCAD 1, 2 and 3) and are ideally suited for measuring profiles made of plastic, aluminium, wood, rubber, rubber-metal and metal, as well as for measuring stamped / punched parts of any kind, templates, seals, layouts and many more objects – also in serial production.

The high-resolution optics of all VideoCAD measuring devices ensure distortion-free measurement with excellent depth of field over the entire calibrated measuring range. In this way, even workpieces of up to 60 mm in height can be measured in different planes.

VideoCAD 1 is a portable video measuring device for acquisition of data relating to two-dimensional objects of up to 60 x 80 mm in size.

Outstanding features

- Unsurpassed measuring speed: The acquisition and analysis of measured data only takes a few milliseconds
- Two-dimensional geometries are captured in one image
- Monochrome ultra-high definition camera ensures resolutions in the µm range

For more detailed information, please visit our Website at: **www.dr-schneider.de**

Special features of the VideoCAD series

- Ultra-high resolution camera with high-precision telecentric objectives
- Distortion-free calibrated measuring range
- Both the level of geometrical resolution and the measuring range depend on the camera/objective combination used (cf. table for details).

Further assets of the VideoCAD series

- 2D digitisation and BestFit function included in the basic scope of supply
- Axis movement is not required, which enables data acquisition within fractions of a second
- Mobile integration into the manufacturing process is an option

VideoCAD 2 and VideoCAD 3 are stationary models designed for integration into the manufacturing process. They serve to measure two-dimensional objects of up to 225 x 168 mm in size. If you require a customised design tailored to your personal needs, this can also be implemented at a reasonable price. Please feel free to ask any specific questions you may have.

Combined with the measuring and analysis software SAPHIR, the devices offer a comprehensive, well-rounded range of applications.

The machine configuration shown here is equipped with optional features that are not included in the basic scope of delivery

SAPHIR measuring and analysis software
The foundations for efficient and cost-conscious work are already laid at the early stage of programme development. Since "Schneider" is the German word for "tailor", you can rightly conclude that SAPHIR is a truly "tailor-made" measuring software that will leave nothing to be desired: from "A" as in "axis alignment" to "Z" as in "zero-point administration" – SAPHIR offers a wealth of useful features. Further details are provided in our "SAPHIR" brochure, which we will be pleased to send to you, free of charge, upon request.

Technical Specifications of the VideoCAD Series

Type		**VideoCAD 1**	**VideoCAD 2**	**VideoCAD 3**
Measuring range	**mm**	X 80	X 144	X 225
		Y 60	Y 108	Y 168
		other measuring ranges upon request		
Object height	**max. mm**	60		
Objective		Telecentric special objective		
Magnification		0.1x	0.06x	0.036x
Camera		**5 mega pixel b/w CCD matrix camera**		
Max. workpiece weight				
on glass plate	kg	20		
Length measurement uncertainty [1]		E_2 = (4.0+L/50 mm)µm	E_2 = (6.0+L/50 mm)µm	E_2 = (10.0+L/50 mm)µm
DIN EN ISO 10360-2		Measuring length L in mm		
VDI/VDE 2617				
Dimensions	**mm**	W 290	W 650	W 650
PC workstation not included		D 720	D 680	D 680
		H 550	H 1800	H 1800
Weight	**kg**	50	150	150
Electrical power supply		220-240VAC, 50-60Hz, 1kW		

[1] **Prerequisites: Admissible ambient conditions** 20 °C ± 1 K, **Temperature gradient** Δ_{th} = 0.5 K/h, Δ_{td} = 4.0 K/d

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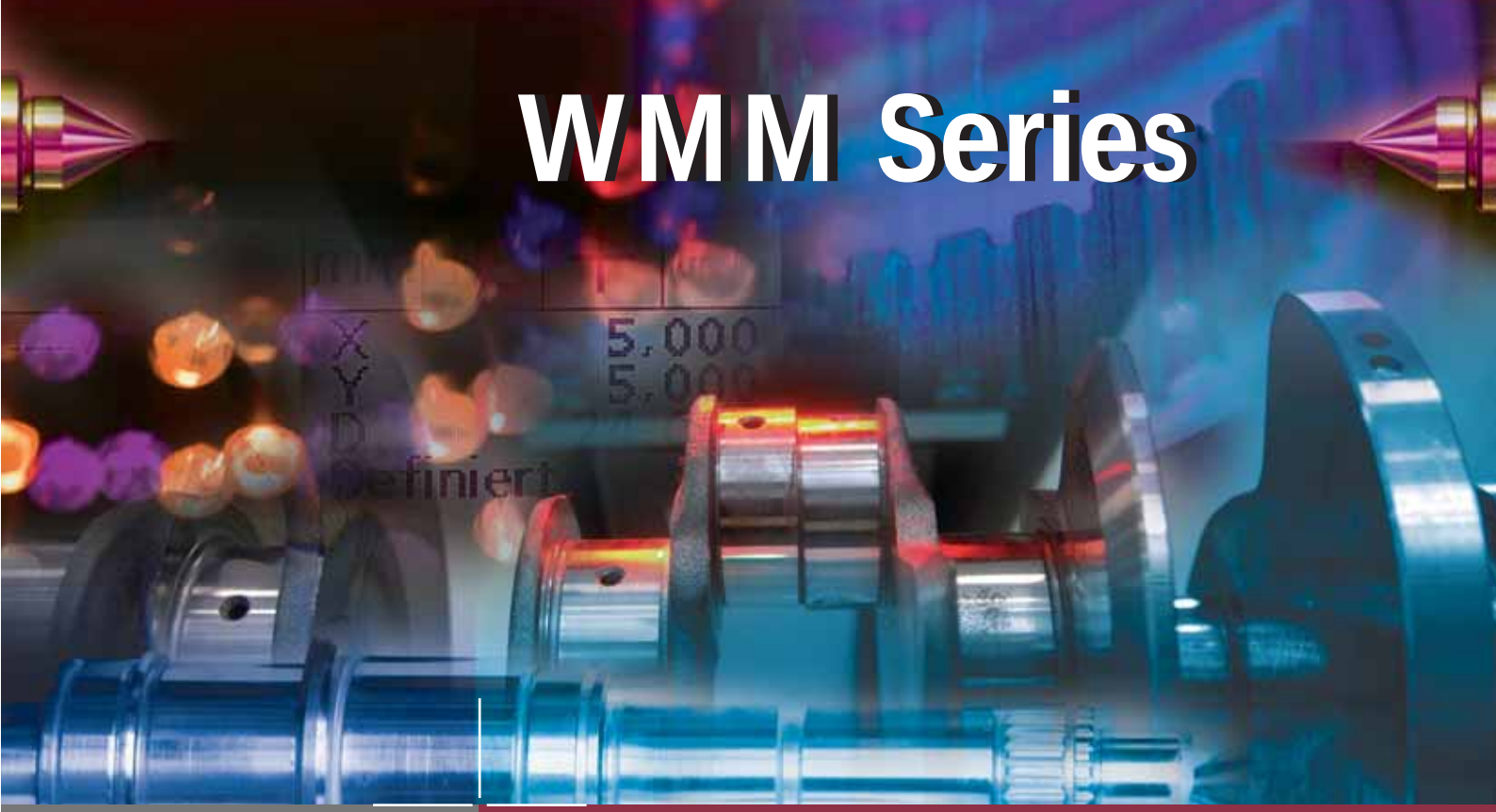
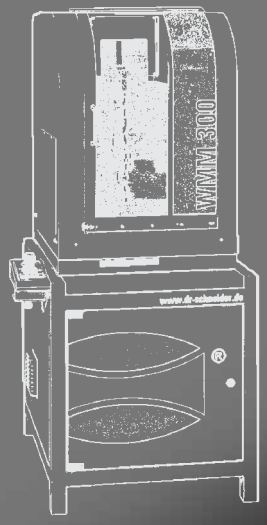
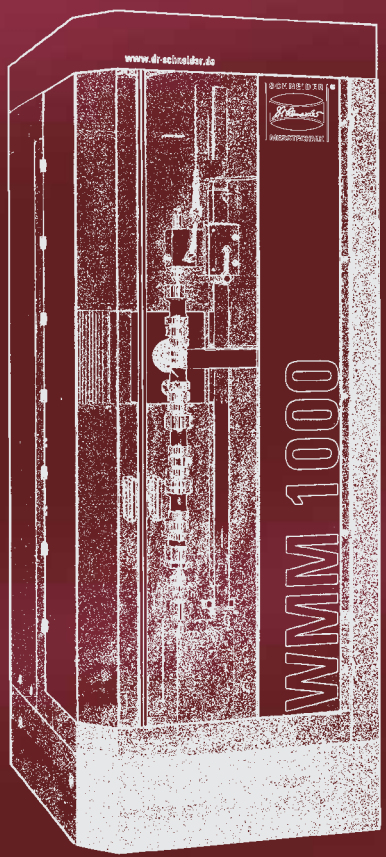
WMM Series



Shaft Measuring Machines



Precise measurement of lengths, diameters, radii, angles, chamfers, as well as of concentricity and coaxiality – for reduced cycle times on workpieces of up to 1000 mm in length.



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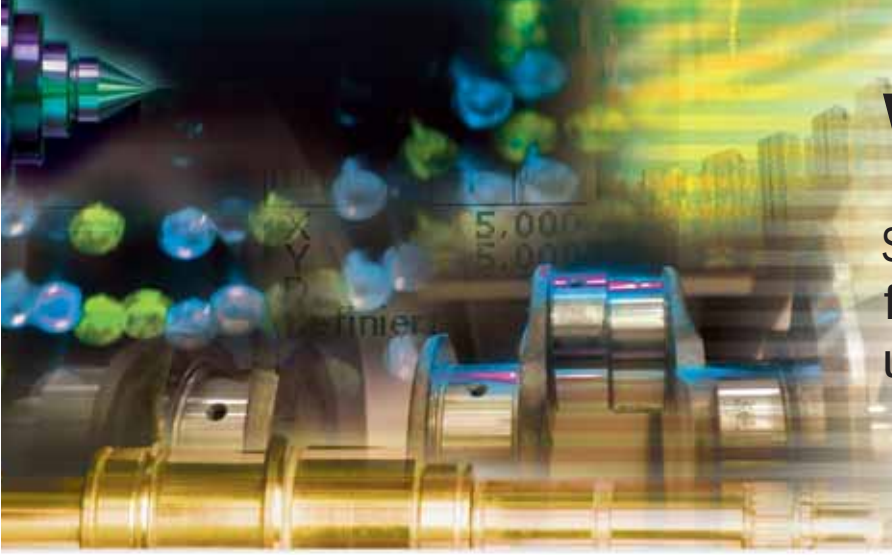


WMM Series

Shaft measuring machine for measuring of objects up to 1000 mm in length

The WMM series is specially designed for measuring shafts up to 1000 mm in length

The machines of the WMM 300 line are designed for measuring shafts of up to 300 mm in length and 80 mm in diameter.

The machine configuration shown here has optional features that are not included in the basic scope of delivery.

Fields of application of the WMM series

The machines of the WMM series provide an ultra-fast solution for the precise measurement of rotationally objects of up to 1000 mm in length and 400 mm in diameter. Lengths and diameters, as well as radii, angles, and chamfers can be measured in one single operation.

The WMM programme will help you to reduce your cycle times.

Thanks to its exceptionally high measuring speed, easy operation, as well as SAPHIR-based measurement and analysis features, this system is particularly appropriate for use in the workshop and in the measuring room.

It's main advantages over comparable systems are it's high accuracy and precision not only in the measurement of diameters, but also of lengths, small contours, radii, as well as of grooves in rotationally symmetric measuring objects. Another benefit of the machine is its ability to perform incident-light measurements on bottomed holes/blind holes, grooves as well as on other elements and contours that are not suitable for measurement in transmitted light.

Highly efficient additional options, such as a fully integrated CNC rotation axis and precise measurement in sectoral incident illumination, make this system an indispensable, time- and money-saving asset for a wide variety of measuring tasks.

The modular design of the WMM series ensures customised solutions for almost any application

Do you require longer measuring lengths, a special clamping device, or do you need a device with features that goes beyond the standard configuration? No problem for us: All machines of the WMM series can be equipped with features tailored to your specific needs.

Optional features of the WMM series

- Fully integrated CNC rotation axis SK40, SK50 or HSK63
- Incident illumination for the measurement of grooves, oil gallery bores, blind holes, and milling contours
- Touch-trigger or scanning probe allowing measurement of special shapes, such as gear teeth, non-cylindrically symmetric contours, impeller wheels etc.
- Digitisation and BestFit
- Wide variety of clamping devices, such as dead and live centres, precision jaw chucks, precision collet chucks, hollow centres, etc.

Standard features of the WMM series

- Measuring range of up to 1000 mm in length, and up to 400 mm in diameter
- Ultra-fast measuring technique due to triggered data acquisition by means of a high-resolution CCD matrix camera
- Highly accurate measurement also of lengths by means of a contour focussing element, even beyond the central axis
- Teach-in programming
- Automatic generation of measurement reports, graphical measurement reports, and first-sample test reports in accordance with VDA (Association of the German Automotive Industry)

Special assets of the WMM series

- High measuring accuracy and precision
- Easy operation
- Outstanding measuring speed
- Excellent data reporting
- Ergonomic design with optimum accessibility

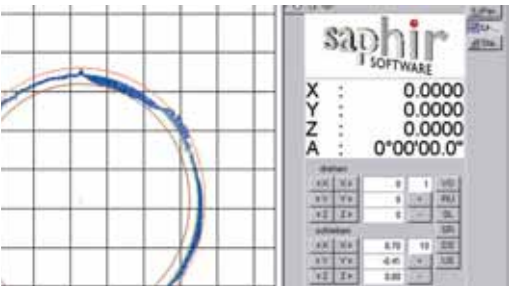
The premium class of measuring systems for turned parts and shafts has been newly defined with the developent of WMM 1000. "Everything from one source" is the principle applied in the design of the WMM series.

A touch-trigger or scanning probe for the measurement of special shapes, such as gear teeth, non-cylindrically symmetric contours, impeller wheels etc., is optionally available.

Now you can also reduce your cycle times.

Because WMM will help you capture the smallest detail quickly and reliably.

For further information, please visit our
Website: www.dr-schneider.de



Measuring software SAPHIR

Efficiency and cost-effectiveness at work begins at the stage of machine programming. Since "Schneider" is the German word for "tailor", you can rightly conclude that with SAPHIR you have a truly "tailor-made" measuring software at your disposal that will leave nothing to be desired: from "A" as in "axis alignment" to "Z" as in "zero-point administration" – SAPHIR offers a wealth of useful features. Further details are provided in our "SAPHIR" brochure which we will be pleased to send to you, free of charge, upon request.

Technical Specifications of the WMM Series

Type		**WMM 300**	**WMM 600**	**WMM 1000**	**WMM 1000/400**
Measuring range	**mm**				
Length		300	600	1000	1000
Diameter		80	200	200	400
Objective		telecentric			
Image field	mm	5.6 x 4.1			
Resolution	**µm**	0.1			
Motorised axial adjustment		3 axes, optionally 4 axes			
Workpiece weight [1]	**kg**	50	50	50	50
[1] Optional	kg	–	200	200	200
Length measurement uncertainty [2]		E2 = (2.0+L/200 mm)µm Measuring length L in mm			
DIN EN ISO 10360-2, VDI/VDE 2617					
Our measurement is based on		β [3] **= 1.0** ≙ objektive 1.0 x (image field 5.6 x 4.1 mm) – *with smaller image fields (1.5 x, 3 x, 5 x) greater accuracy can be achieved!*			
Machine dimensions	**mm**	W 620	W 950	W 950	W 1400
		D 640	D 1000	D 1000	D 1370
		H 870	H 2200	H 2500	H 2500
Switch cabinet	mm	–	800 x 800		
Weight	**kg**	400	2600	3200	4500
Power supply		220-240VAC, 50-60Hz, 1kW			

[1] **Clamping device included**

[2] **Specified at: Admissible ambient conditions** 20 °C ± 1 K, **Temperature gradient** Δ_{th} = 0.5 K/h, Δ_{td} = 4.0 K/d

[3] β **= Magnification factor**

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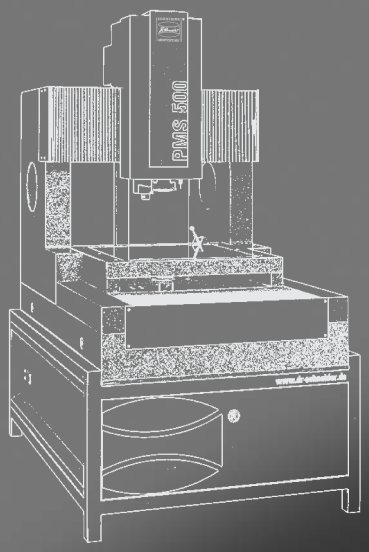
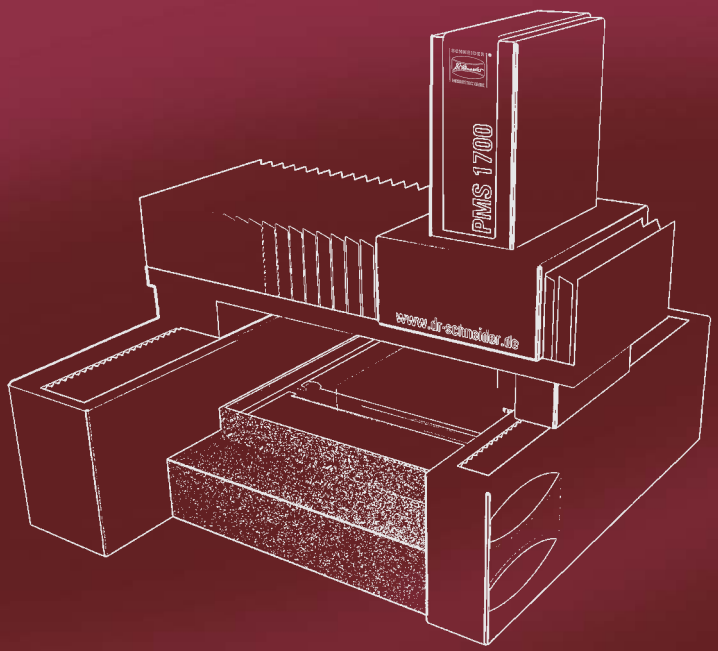
PMS Series

3D Multi-Sensor Coordinate Measuring Machines

Fast, precise, efficient – reliable measurement at your fingertips!





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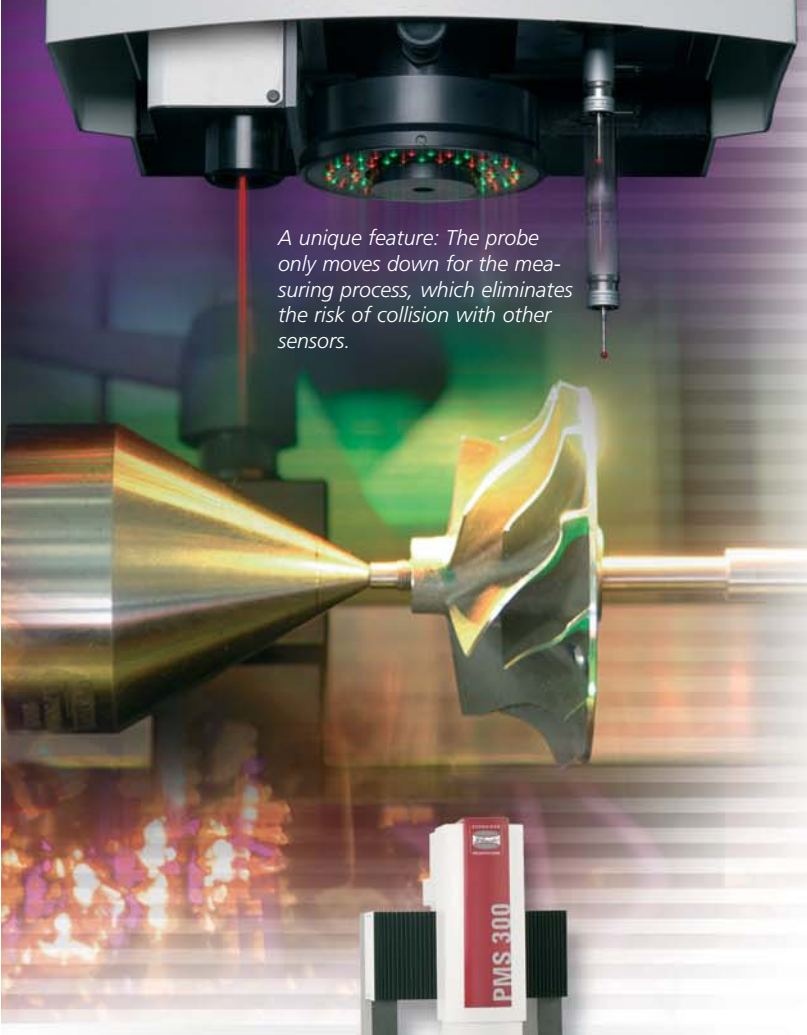


A unique feature: The probe only moves down for the measuring process, which eliminates the risk of collision with other sensors.

PMS Series

3D Multi-Sensor Coordinate Measuring Machines

All products of the PMS series feature a highly flexible design – they are ideal for measuring workpieces of up to 2,000 mm in size.

Fields of operation of the PMS series

This sturdy portal-type measuring machine has not only been conceived for the measuring room, but also for use directly on the shop floor. If measurement is performed in immediate proximity to the point of manufacture, this will considerably reduce idle times, and, in the long term, help to save enormous amounts of money.

The machine features an ultra-high-resolution CCD camera, as well as a touch-trigger or scanning probe and/or an optionally available laser sensor and is thus appropriate for universal use in a wide variety of industries. A rotating/pivoting probe head, which complements the probe systems offered, provides additional options for three-dimensional measurement.

The switch cabinet of model PMS 200 and 300 is space-savingly integrated in the machine chassis.

The measuring machines of the series PMS 200 – 700 are equipped with measuring stages and portals made of granite. This ensures highest stability even under extreme conditions of temperature, shock and vibration.

The machine configuration shown here is equipped with optional features that are not included in the basic scope of delivery.

For more detailed information, please visit our Website at: **www.dr-schneider.de**

Optional features of the PMS series

- Touch-trigger probe TP200
- Scanning probe SP25
- Sectored incident illumination (switchable)
- 2D and 3D digitisation/BestFit
- Conoscopic measuring laser

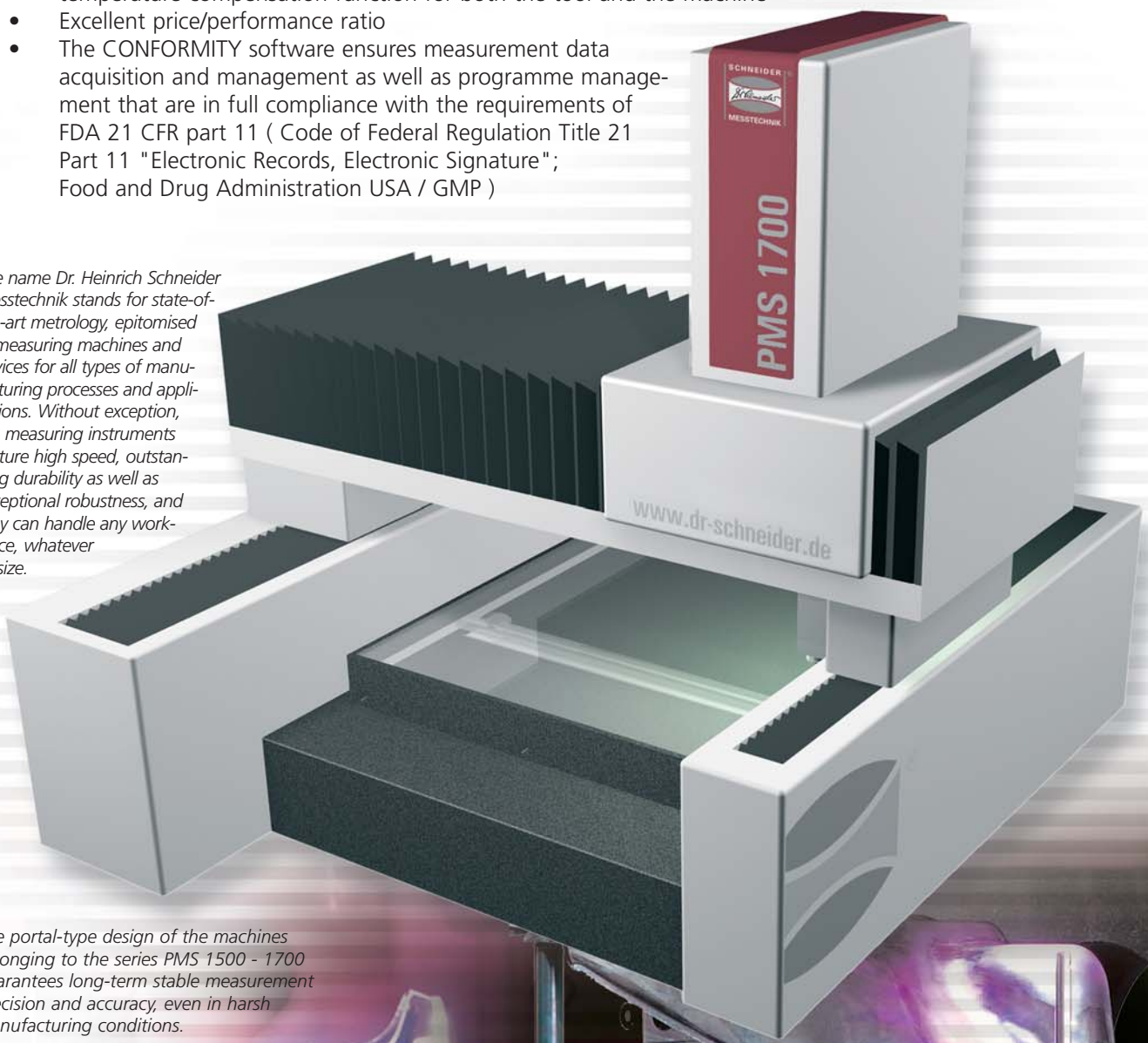
Special features of the PMS series

- Control, measurement, and analysis are performed with the same software
- Dust-protected precision guides (PMS 200 – 700)
- Air bearing technology on all 3 axes (PMS 1500 – 1700)
- Ceramic-coated X axis guide rail (PMS 1500 – 1700)
- Mechanically protected cabling system
- Sturdy granite table with high stiffness
- Highest measuring precision and great speed

Further assets of the PMS series

- Inexpensive, customised solutions can be implemented thanks to the modular design
- Retrofitting with additional sensors is possible at any time
- Temperature stability thanks to the solid, sturdy granite construction and the optionally available temperature compensation function for both the tool and the machine
- Excellent price/performance ratio
- The CONFORMITY software ensures measurement data acquisition and management as well as programme management that are in full compliance with the requirements of FDA 21 CFR part 11 (Code of Federal Regulation Title 21 Part 11 "Electronic Records, Electronic Signature"; Food and Drug Administration USA / GMP)

The name Dr. Heinrich Schneider Messtechnik stands for state-of-the-art metrology, epitomised in measuring machines and devices for all types of manufacturing processes and applications. Without exception, the measuring instruments feature high speed, outstanding durability as well as exceptional robustness, and they can handle any workpiece, whatever its size.



The portal-type design of the machines belonging to the series PMS 1500 - 1700 guarantees long-term stable measurement precision and accuracy, even in harsh manufacturing conditions.

Your Task – Our Solution

An optionally available headstock (rotating spindle support) and tailstock (opposite support) system, designed as a fully integrated, continuously adjustable CNC axis equipped with both standard and customer-specific interfaces, offers a broad spectrum of measurement options.

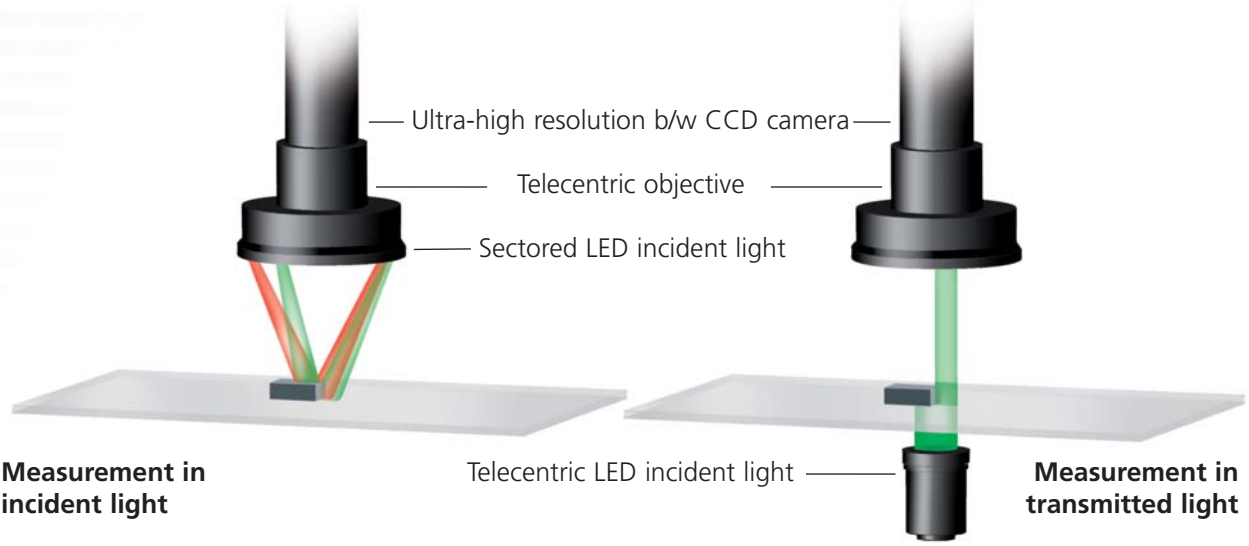
Measurement of rotationally symmetric or amorphous objects (such as shaped parts made of sheet steel) can be easily performed with the help of the PMS product series.

Both the scanning probe and the touch-trigger probe can be optionally equipped with the motorised, rotating/pivoting probe head PH10. Thanks to 3D continuous path control, even inclined holes can be easily measured.

A variety of probe configurations provide even more options for customised combination and thus qualify for complex tasks.

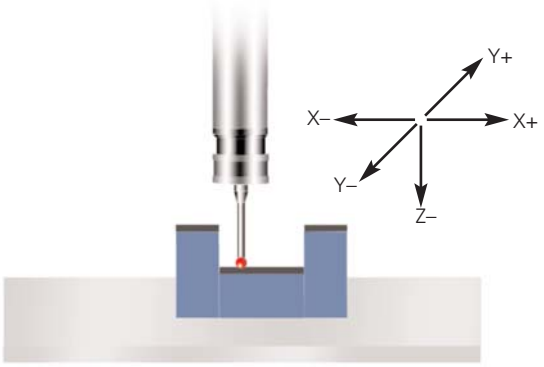
PMS Sensor Technology at a Glance

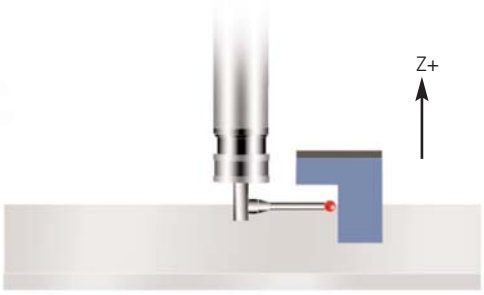
State-of-the-art multi-sensor measuring machines made by Dr. Heinrich Schneider Messtechnik offer a wide variety of options to suit individual customer needs with regard to optimum sensor configuration.



Measurement in incident light

Measurement in transmitted light

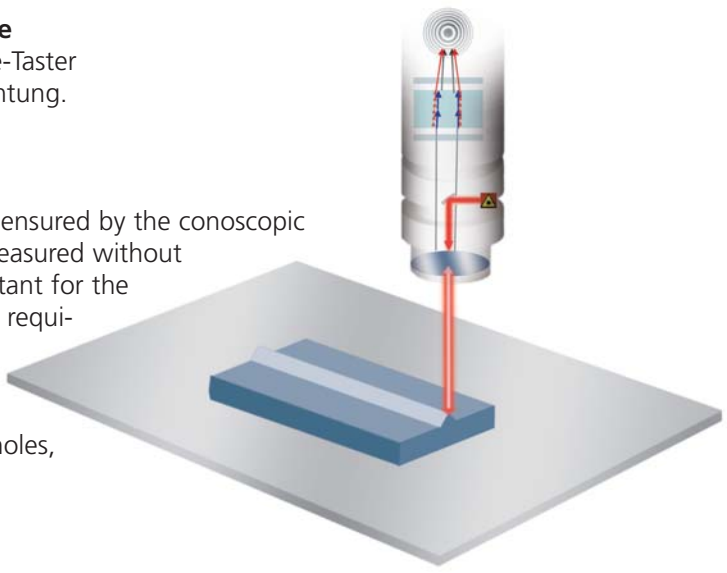




SP25 – Scanning measuring probe
The scanning probe SP25 opens a broad spectrum of measurement options. It is ideal for continuous surface scanning and also enables measurement of individual points.

TP200 – Touch-trigger measuring probe
Viele Wege führen nach Rom; der 6-Wege-Taster TP200 kennt sie alle und misst in jede Richtung.

Conoscopic measuring laser
Precise three-dimensional measurement is ensured by the conoscopic measurement principle. Workpieces are measured without being touched, which is particularly important for the measurement of soft parts and for objects requiring non-contact measurement. In addition to enabling an exact determination of planes, it also allows smooth measurement and geometric assessment of blind holes, grooves and surface characteristics.



SAPHIR measuring and analysis software

The foundations for efficient and cost-conscious work are already laid at the early stage of programme development. Since "Schneider" is the German word for "tailor", you can rightly conclude that SAPHIR is a truly "tailor-made" measuring software that will leave nothing to be desired: from "A" as in "axis alignment" to "Z" as in "zero-point administration" – SAPHIR offers a wealth of useful features. Further details are provided in our "SAPHIR" brochure, which we will be pleased to send to you, free of charge, upon request.

Technical Specifications of the PMS Series

Type		**PMS 200**	**PMS 300**	**PMS 400**	**PMS 500**	**PMS 600**	**PMS 700**	**PMS 900**	**PMS 1200**	**PMS 1500**	**PMS 1700**
		Fixed bridge							Moving bridge		
Measuring range	X **mm**	200	300	400	500	600	700	900	1000	1000	1500
	Y **mm**	200	300	400	500	600	700	700	1200	1500	1700
* optional 600 mm	Z **mm**	200	300	300	300	300*	300*	300*	300*	300*	300*
		other measuring range available upon request									
Objektive		telecentric									
Magnification					1,5x	3x	5x	10x			
Image field	mm				4x3	2x1.5	1.2x0.9	0.6x0.45			
Working distance	mm				80	80	50	24			
Resolution	**mm**	0.0001									
Max. travel speed	**mm/s**	100									
Max. acceleration	**mm/s²**	400									
Positioning accuracy	**mm**	0.0001									
Max. workpiece weight											
on glass plate	kg	20									
Length measurement uncertainty [1]		E_1 = (1.0+L/300 mm)µm Measuring length L in mm									
DIN EN ISO 10360-2		E_2 = (2.0+L/300 mm)µm Measuring length L in mm									
VDI/VDE 2617		E_3 = (2.8+L/300 mm)µm Measuring length L in mm									
Our measurement is based on		β [2] **= 1.5** ≙ objective 1.5 x (image field 4 x 3 mm) – *smaller image fields (3 x, 5 x, 10 x) enable greater accuracy*									
		W 600	W 700	W 800	W 1100	W 1200	W 1600	W 2000	W 2400	W 2700	W 2900
Dimensions	**mm**	D 750	D 850	D 950	D 1400	D 1600	D 2500	D 2900	D 2700	D 2900	D 3200
		H 1950	H 1950	H 1950	H 1950	H 1950	H 1950	H 2320	H 2700	H 3100	H 3100
Switch cabinet	mm	–			800 x 800						
Weight	**kg**	450	680	1000	1550	3670	4500	8500	10000	11000	13000
Electric power supply		220-240VAC, 50-60Hz, 1kW									

[1] **Prerequisites: Admissible ambient conditions** 20 °C ± 1 K, **Temperature gradient** Δ_{th} = 0.5 K/h, Δ_{td} = 4.0 K/d

[2] β **= Magnification factor**

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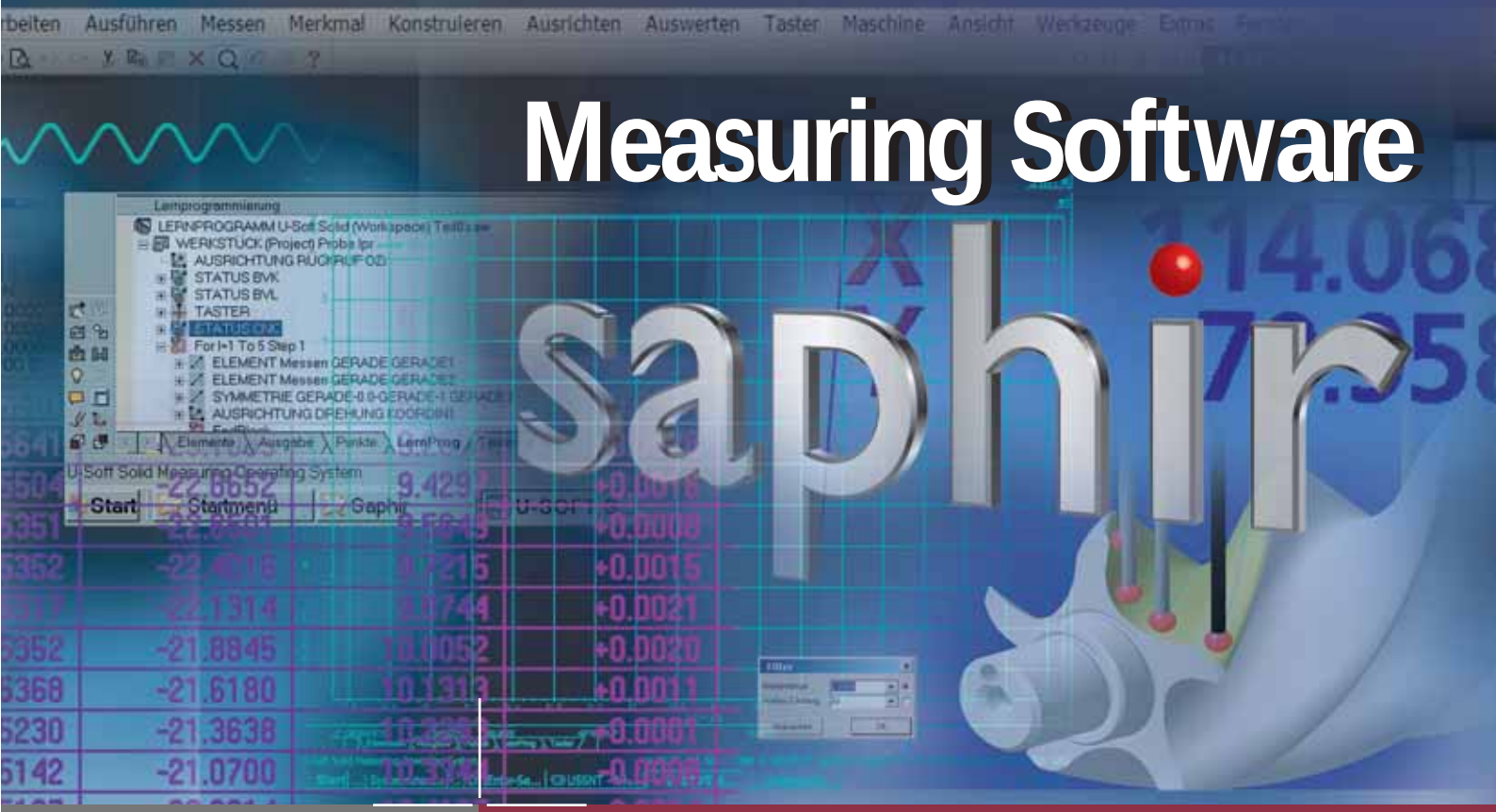
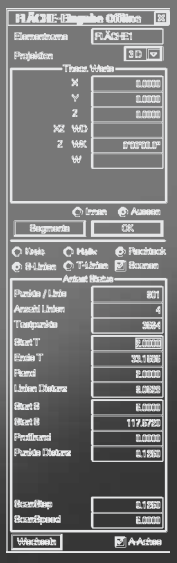
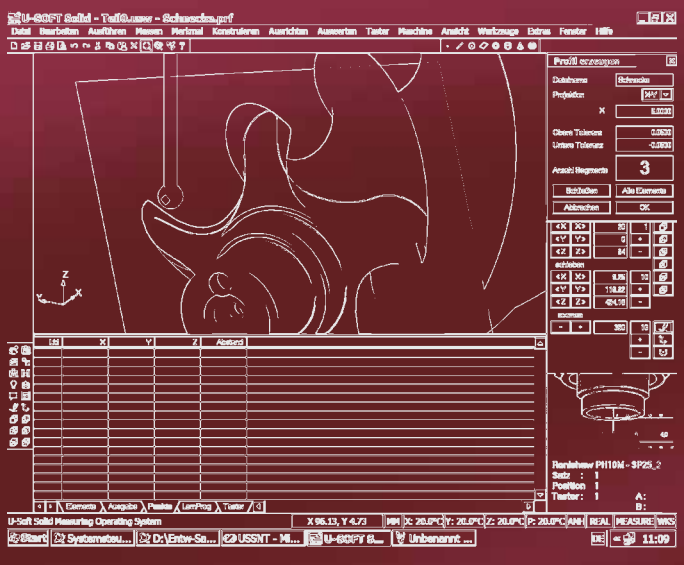
Measuring Software



SAPHIR – 3D Measuring- and Analysis Software.

The Central Control Station
For Your Quality Assurance





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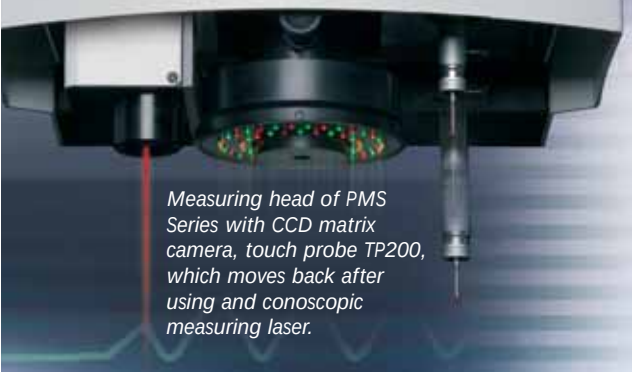


Measuring head of PMS Series with CCD matrix camera, touch probe TP200, which moves back after using and conoscopic measuring laser.

3D Measuring- and Analysis Software SAPHIR

The interface between human and machine.

The view of sophisticated software tools as an essential link between humans and their machines has guided the development of the 3D measuring software SAPHIR from its earliest stages of design. The seamless integration of the software into existing environments more than ever testifies to its outstanding flexibility and adaptability.

For fifteen years, our forward-looking team of expert developers has been continuously dedicated to preparing SAPHIR for evolving market requirements. Thanks to the reliable integration of ever-increasing functions, SAPHIR is fit for the future. It counts among the most renowned products for this field of application worldwide.

Among the main appeals of the measuring software, which has received certification from the German National Metrology Institute PTB, are its clear architecture and easy operation. Thanks to its specific structure in terms of control, sensor technology and data exchange, SAPHIR is multi-sensor capable and can also manage multiple control axes.

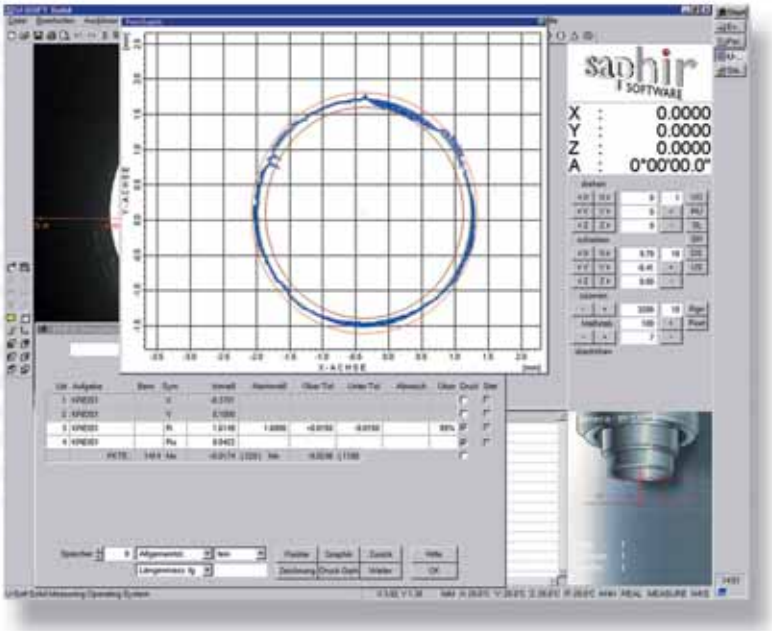
Lower costs thanks to multi-sensor technology

Attention to detail is crucial in the world of measurement because detail has a cumulative effect on the accuracy of the whole. This is why the selection of the proper sensor is so essential for efficient measurement.

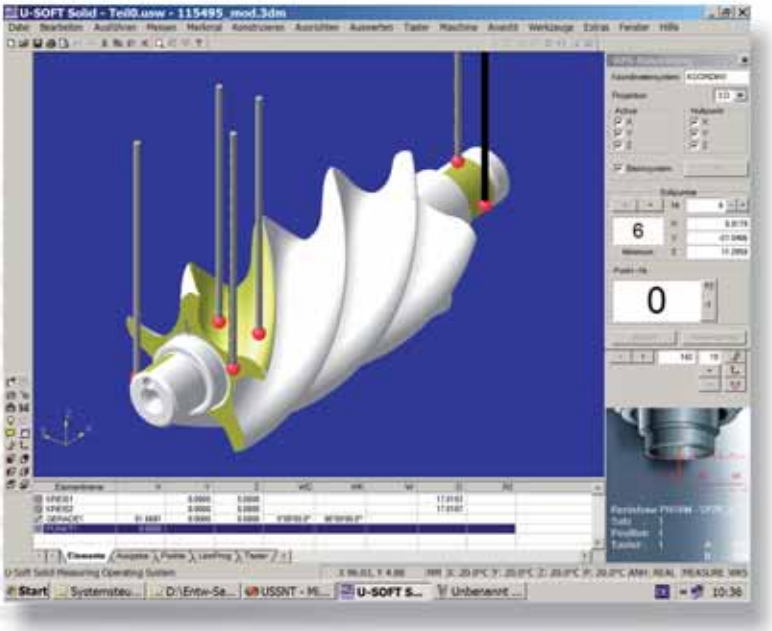
The 3D measuring software SAPHIR, which has been specially designed for this type of fine-tuned application, uniquely combines the use of a wide range of different sensors in one software package. No matter whether you wish to measure parts manufactured to loose or tight tolerances, parts with matte or glossy surfaces, light or dark parts, the sensor which best suits your measurement needs is always available. An integrated black and white or colour camera for measurements in incident or transmitted light with programmable 16-sector incident illumination, touch-trigger or scanning probes, optionally equipped with a swivel head system, or a high-precision measuring laser system will allow you to use your measuring machine in a targeted and cost-effective way.

All sensors can be automatically swapped and inserted during the measuring process without stopping or changing the selected programme.

One software solution for all types of sensor: efficient and user-friendly because human attention can be fully dedicated to the measuring task proper.



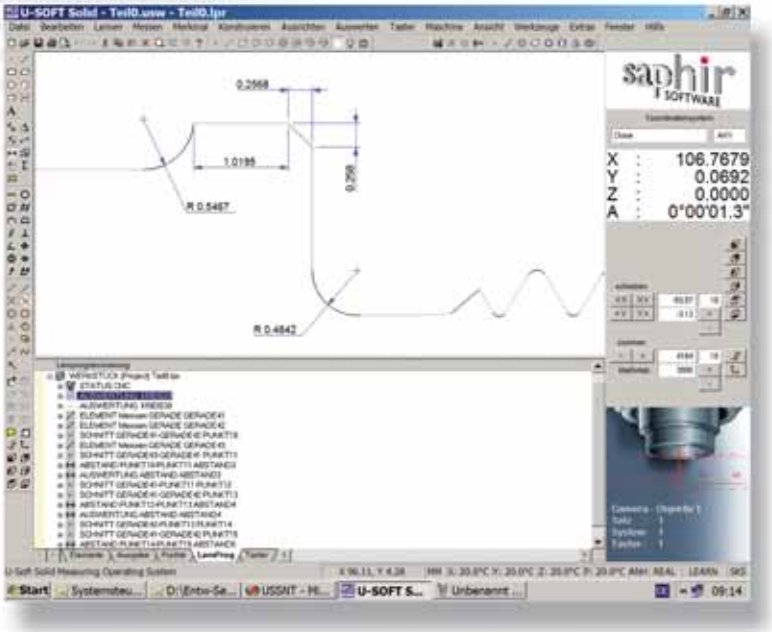
The accurate point graphic depicts an exact representation of critical workpiece areas.



The perfect fit!

In the rear too short, in the front too long – those gloomy days are over: Thanks to the 2D and 3D BestFit feature, your measurements will always "cut a good figure". The actual measured values are optimally aligned with the 2D target values delivered in DXF and IGES format. The best possible exploitation of tolerances is thus guaranteed. Optionally, formats such as CATIA, AutoCAD (DWG), 3D Studio (.3ds), Lightwave (.lwo), Step (.stp, .step), Raw Triangles (.raw), STL (.stl), VDA (.vda), VRML (.vrml, .wrl), Wavefront (.obj), PDF (.pdf, .ai, .eps) as well as TXT (.txt) can be processed.

Thanks to the wide range of import formats, even complex shapes can be easily programmed.



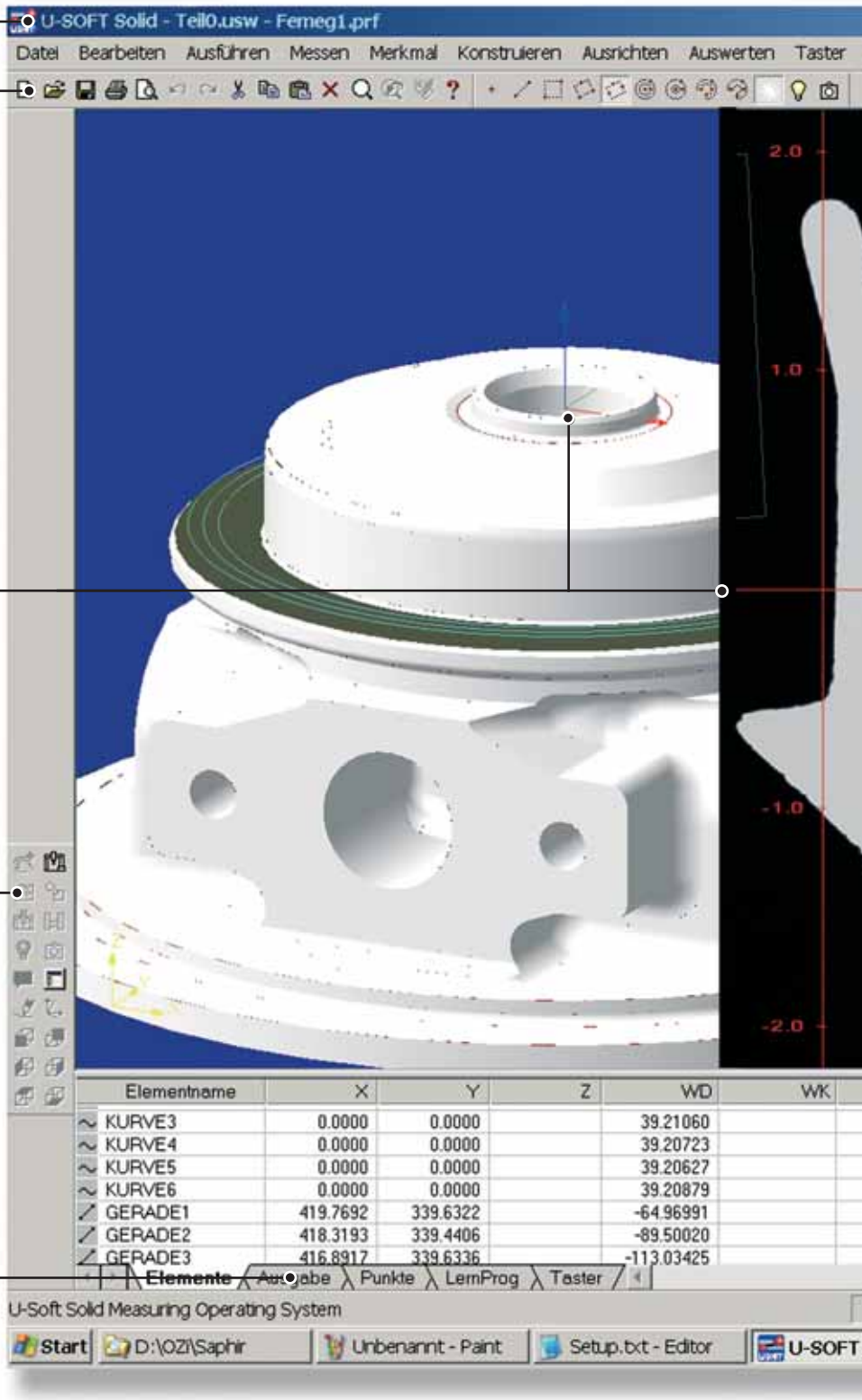
Paperless quality assurance

You know of it from hearsay, but have never seen it implemented? Then don't miss out on your chance. Automated reporting ensures documented quality in each measuring operation, without the hassle of paper! The results can immediately be sent via network to the predefined server locations, where they can be stored in the form of PDF files for further processing.
Automated reporting includes:

- First sample test report
- Graphic record
- Inspection record

After each measuring operation you are provided with paperless, environmentally friendly quality documentation as a PDF file.

Title bar
The expanded title bar displays not only the usual information, but also provides data regarding the workpiece, the working position of the sensor and the selected mode.



Tool bar
The tool bar offers typically arranged functions such as “Open”, “Save”, “Print”, “Copy” etc. that are known from other Windows applications.

Coordinate system of the workpiece
Spatially disoriented? – No way! One look, and you know where exactly your workpiece is in relation to the measuring machine.

To illustrate this, we composed the 3D- and 2D-image in one screen-design.

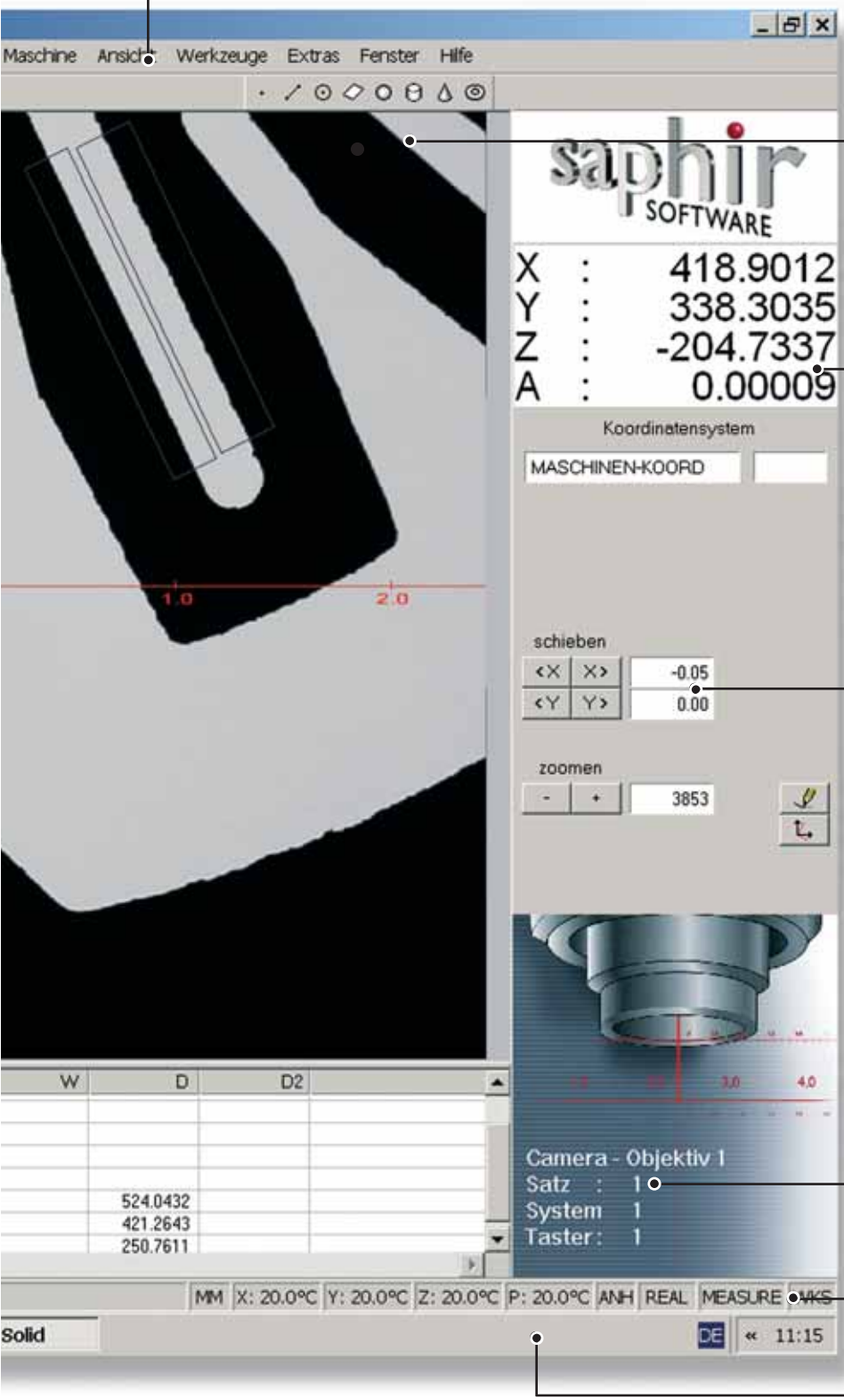
Control bar
The control bar displays selected icons for quick access. These may include:

Displacement of the measuring machine’s arm by mouse control, virtual workpiece illumination, freely selectable workpiece views, or whatever you consider important features to speed up your work flow.

Index
Here you will find the tabs relevant for the respective programme status. They include:

- Elements - Display of all measured geometrical elements in list form
- Protocol - set of measurement records
- Points - Depending on the elements measured, a list of their respective measuring points is displayed
- LearnProg - The suitable programme is recorded during manual measurement
- ProbeCfg - List of calibrated probe and stylus data.

Menu bar
SAPHIR offers several menus allowing access to essential programme functions. The various pull-down menus lead to further features.



View port
2D or 3D representation of the workpiece or measuring process, depending on the selected active probe.

Position display
Information about the current probe position for a maximum of 5 axes.

Virtual workpiece position
It is up to you to decide how you want to move the workpiece: either by button press or mouse click.
Use the right-hand mouse button to rotate the workpiece, the left-hand mouse button to push it, and press both mouse buttons simultaneously for zooming.

Probe information
Just one look, and all relevant parameters on the active probe, the stylus used and probe configuration are available.

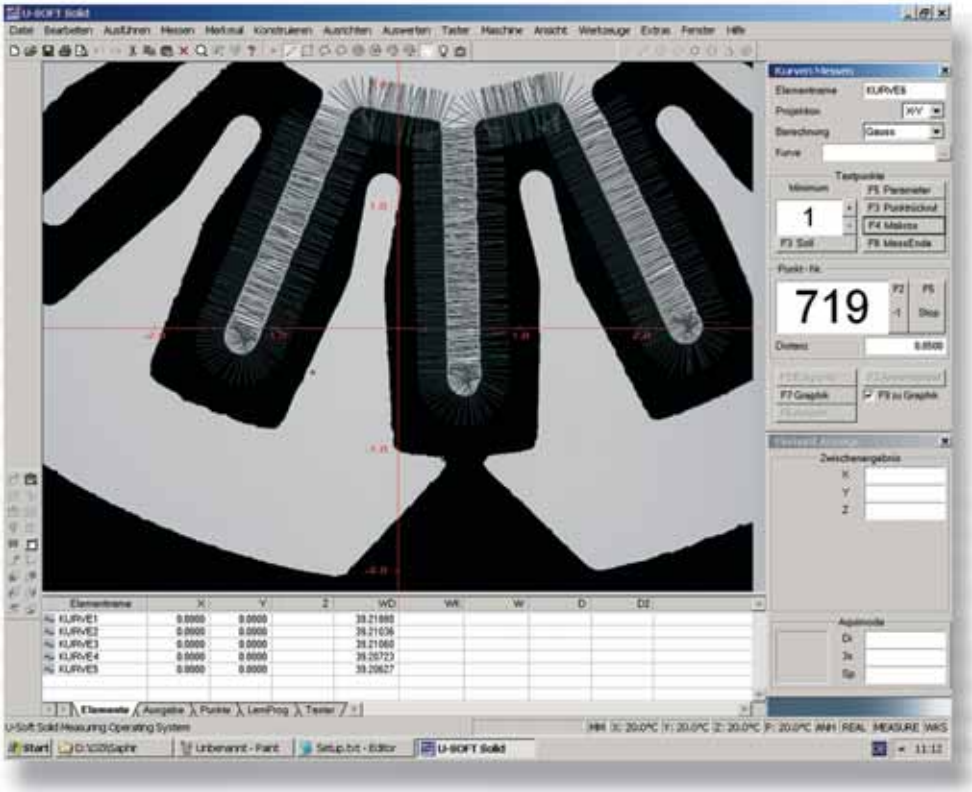
Status bar
Clear display of the current programme status.

Task bar
SAPHIR is, of course, capable of multi-tasking. Use the task bar to change to another opened programme at any time.

Travelling unknown paths ...

... may prove a risky venture, yet not so for SAPHIR: The 3D measuring software automatically recognises and scans not only known, but also unknown contours. 2D contours are scanned by means of a camera, 3D contours with a scanning probe – a powerful tool that is complemented by 2D and 3D BestFit features.

Fast, precise and accurate in all circumstances – thanks to the contour recognition feature, workpiece dimensions can be determined even without a drawing.



Fast familiarisation with the measuring software SAPHIR thanks to shopfloor-oriented measuring

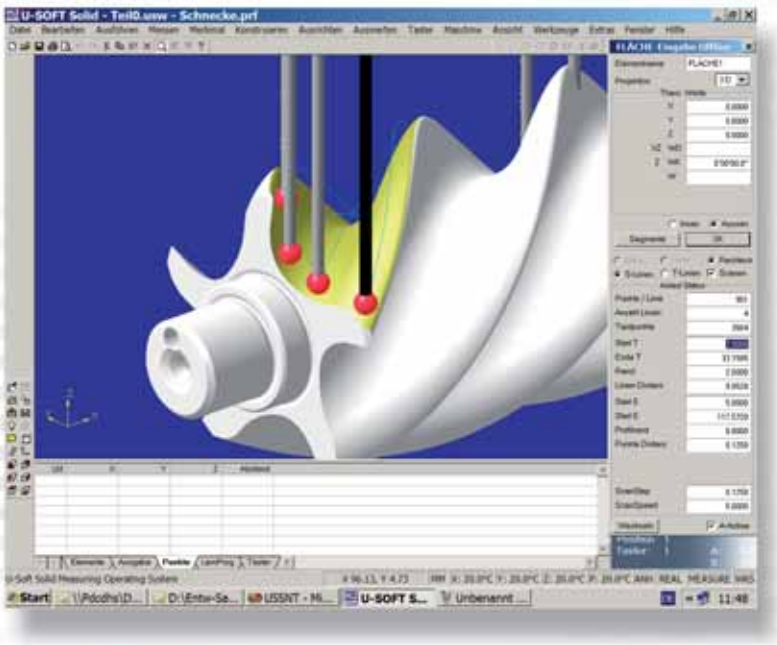
- Results are available in only a few steps.
- Intuitive operator guidance facilitates familiarisation with the software.
- Automatic measuring of unknown contours.
- Automatic recognition of circles and straight lines.
- Clearly structured user interface for convenient measurement.
- Fast generation of automatic measuring programmes.
- No previous programming knowledge is required for programme creation.
- Measuring programmes are displayed in plain text tree format.
- Macros, sub-programmes as well as loop programming features facilitate programme compilation for continuous measurement tasks.
- All elements can be represented graphically; individual elements can be linked up with each other so that new, composite elements can be constructed.
- Graphic and inspection record.

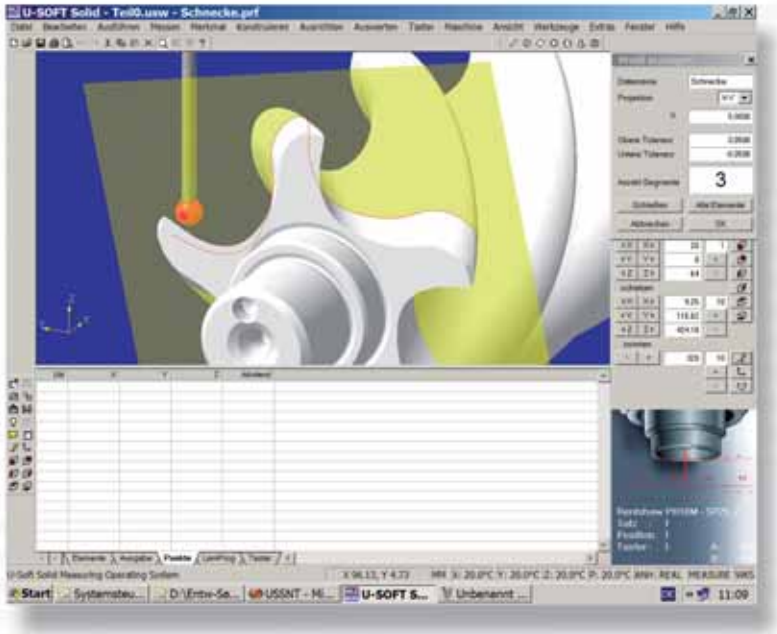
Multi-axis control with SAPHIR

Central control is the key to success in measurement! The simultaneous control of the different axes of a coordinate measuring machine is an essential prerequisite for path-optimised programme configuration. The measuring software SAHPHR not only handles axis control, but also mathematically incorporates all measuring points into the measuring task.

For universal operation of the measuring machine, it is also possible to provide SAPHIR with an integrated rotating and / or swivelling axis, besides the three coordinate axes.

With the RPS adjustment also work pieces with no or rather a small number of ruled geometries can be adjusted. Thanks to predefined measuring points which, at the best, are related to the 3D model, the work piece afterwards has the same coordinate system as the model. Also the reference point relation can be carried out on high distance. So the reference point of the unit or the finally assembled product can be in 1,2,5 m or rather higher distance.

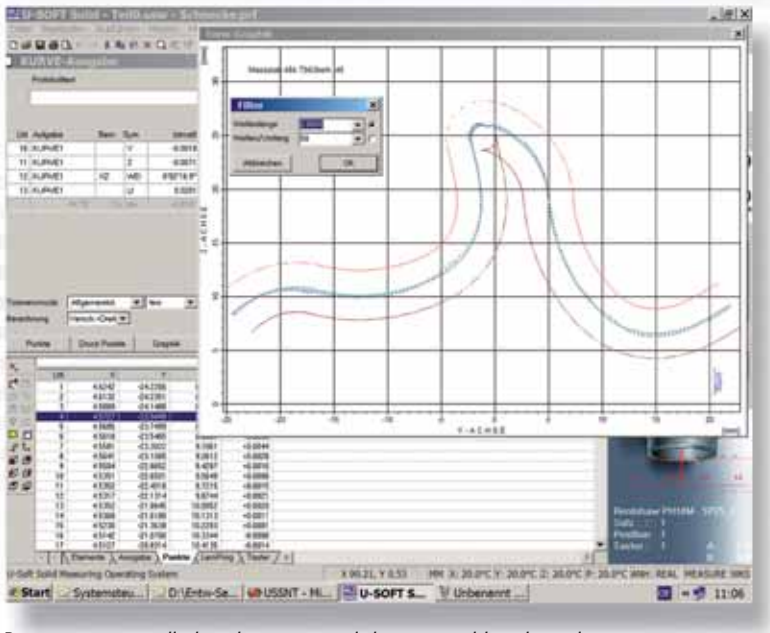




No matter how complex your workpiece may be, the 5-axis control detects every measuring point.

Offline programming with SAPHIR

Programming times = machine downtimes? This equation no longer holds. Thanks to the offline programming option, you can now compile programmes in your office, in parallel to the manufacturing operations, which means that no machine downtimes need to be feared. The programmes are then loaded onto the machine via network so that they can be directly opened and started from the machine. Especially when it comes to measuring complex 2D contours and / or 3D models, this type of programming pays off very fast. The import of DXF and IGES files facilitates the comparison of measured values with the respective 2D target values. Should an error have, nevertheless, crept in along the way, it will be detected and corrected very fast in the integrated simulation mode. The file formats of this powerful software tool can be tailored to your requirements.



Programme compilation does not result in any machine downtimes. Thanks to the offline programming feature, you can take your time and create programmes right from your desk.

Network-capable and compatible

Windows is among today's most widely used operation systems. The SAPHIR measuring software puts this benefit to use in a unique way; it is fully network-capable and easily communicates with CAD or SPC systems. The interfaces required for these systems are already provided in the SAPHIR standard version.

Programme Characteristics

Standard features (▸) and Options (▸)

- ▸ Element linkage and construction of composite elements*, also at the graphical level
- ▸ Processing of theoretical elements
- ▸ Intersections (polygon)
- ▸ Integrated CAD functions
- ▸ Flexible setup of inspection records
- ▸ First sample test report after VDA, Version I & II
- ▸ 2D CAD data import/export (DXF, IGES)
- ▸ Graphic and inspection record
- ▸ Graphical representation of elements*
- ▸ Automatic vertex generation
- ▸ Administration of measuring sensors such as optics, laser system, touch-trigger and scanning probes
- ▸ Spatial alignment
- ▸ Axial alignment
- ▸ Alignment of the rotation axis
- ▸ Shape and position tolerances
- ▸ Pitch measurement
- ▸ Macro and sub-programme technology
- ▸ Loops and conditional jumps
- ▸ Integrated tolerance table
- ▸ Programme simulation
- ▸ Probe calibration with readout of calibration quality
- ▸ Eight different image processing probes
- ▸ Debug and editing functions for programme optimisation
- ▸ Coordinate system memory
- ▸ Fine positioning via mouse functions
- ▸ SPC interface for ASCII, Excel and qs-STAT, Böhme & Weihs, customer-specific about layout function
- ▸ Automatic following of known and unknown contours
- ▸ Offline programming with CAD linkup
- ▸ SPC module for quality management system evaluation
- ▸ User administration
- ▸ Measurement of palletised workpieces
- ▸ 2D digitisation and BestFit function
- ▸ 3D digitisation and BestFit function
- ▸ User access and managementsoftware in compliance with 21 CFR part 11 by the FDA (Food and Drug Administration)
- ▸ Parameter programming
- ▸ CAD import: CATIA, AutoCAD (DWG), 3D Studio (.3ds), Lightwave (.lwo), Step (.stp, .step), VRML (.vrml,.wrl), Raw Triangles (.raw), STL (.stl), VDA (.vda), Wavefront (.obj), PDF (.pdf, .ai, .eps) as well as TXT (.txt)

* Elements are points, straight lines, circles, cones, sphere, cylinder, plane, torus, ellipse.

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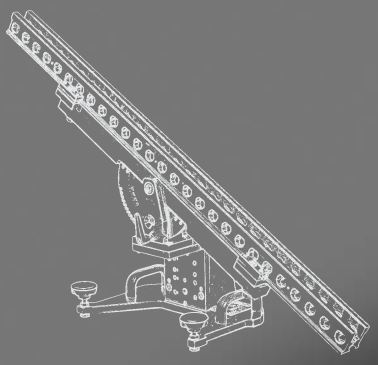
Series PMS LL

Ultra-Accurate 3D Multi-Sensor Portal Measuring Machines

High-end device for sophisticated measurement tasks



Accurate

Precise

Flexible

Fast

SCHNEIDER ®

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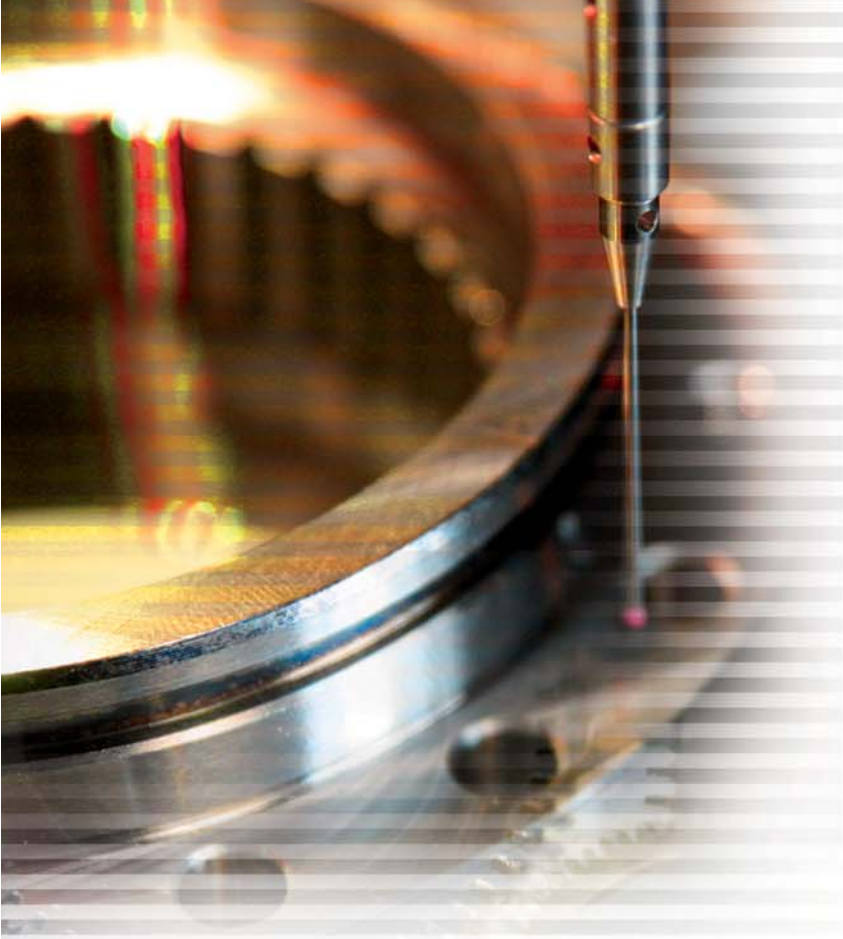
SIMPLY PRECISE



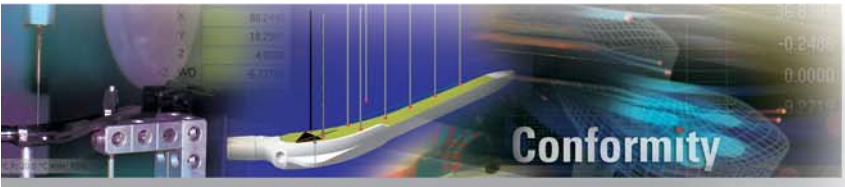
Series PMS LL

Ultra-accurate 3D multi-sensor portal measuring machines

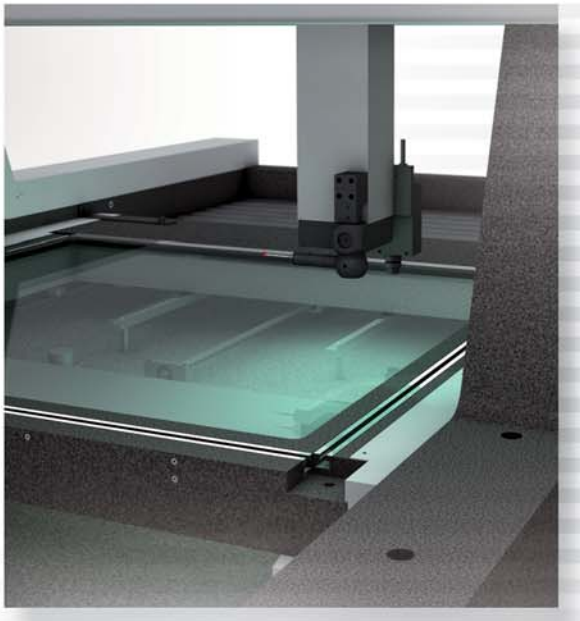
Fields of application of the PMS LL series

With the creation of the series PMS LL, the development team from Bad Kreuznach has set yet another milestone in the world of metrology. Each sensor of this innovative machine provides highest accuracy and precision over a large measurement volume designed into a compact construction. PMS LL uniquely combines maximum reliability with speed and flexibility. It is a high performer with low space requirement!

The products of the series PMS LL offer a perfect blend of maximum precision, outstanding flexibility and optimum measuring speed.



PMS LL is at home also in the world of medical engineering: The CONFORMITY software ensures both programme and measurement data management in full compliance with 21 CFR Part 11 FDA (Code of Federal Regulations, Title 21 Part 11 "Electronic Records, Electronic Signature"; Food and Drug Administration USA/GMP).



The machine shown here includes some optional features that are not part of the standard scope of delivery

The modular design of the machines which affords customised configuration options leaves nothing to be desired. Whether you require a high-resolution 1.4-megapixel CCD matrix camera, a telecentric precision objective with fixed focal length, an LED incident light illumination system, a multi-sector LED transmitted light illumination system, an indexing probe head (PH10) either equipped with a 6-way touch-trigger probe (TP200) or with a scanning probe (SP25), a conoscopic laser sensor, or a fully integrated CNC rotary axis – the multi-faceted features of PMS LL and its wide variety of software options will help you make the best choices in terms of cost and efficiency for your particular measuring task.

Optional features of the PMS LL series

- 5-axis computer numerical control (CNC)
- Renishaw touch-trigger probe TP200 with SCR200 stylus change rack
- Motorised indexing probe head PH10 allowing workpiece positioning at a precise angle or interval of rotation
- Segmented (multi-sector) LED incident light
- Coaxial scanning point laser
- Active temperature compensation function for the workpiece and the machine
- 2D and 3D digitisation/BestFit

Special features of the PMS LL series

- Air-bearing guideway system in all axes
- Torsion-resistant, high-precision granite construction
- Total height of 2300mm affording 600mm of Z axis travel

Benefits of the PMS LL series

- Well-conceived modular system
- Compact design
- Customised measuring ranges upon request

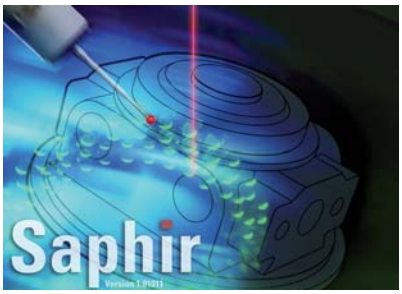
Standard features of the PMS LL series

- 3-axis computer numerical control (CNC)
- 1.4-mexapixel CCD camera
- Telecentric precision objective
- Telecentric LED transmitted light illumination system
- High-performance software package SAPHIR

Optimum space utilisation: Maximum measuring range meets minimum floor space. The ergonomically designed workstation also offers plenty of benefits because it integrates the control cabinet of the machine, thus helping to save even more space and cost.

The machine shown here includes some optional features that are not part of the standard scope of delivery.

For more detailed information, please visit our website at: **www.dr-schneider.de**



Measuring and analysis software SAPHIR

Efficient workflows are essential to successful business operations, and so is consistent cost optimisation. It is, therefore, not by coincidence that choosing the right machinery with the right software is a key part of any corporate streamlining process. Since "Schneider" is the German word for "tailor", you can rightly conclude that SAPHIR is a truly "tailor-made" measuring software that leaves nothing to be desired: from "A" as in "axis alignment" to "Z" as in "zero-point administration" – SAPHIR is a valuable resource with invaluable features. For further information, please request our free "SAPHIR" brochure.

Technical Specifications of the PMS LL Series

Model		**PMS 600 LL**	**PMS 700 LL**	**PMS 900 LL**	**PMS 1200 LL**
Measuring range	**mm**	X 600	X 700	X 900	X 1200
		Y 600	Y 700	Y 700	Y 1200
		Z 600	Z 600	Z 600	Z 600
Objective[1]					
Magnification		1.0x			
Image field	mm	5.6x4.2			
Working distance	mm	190			
Resolution	**mm**	0.0001			
Travel speed max.	**mm/s**	100			
Acceleration max.	**mm/s**	400			
Positioning accuracy	**µm**	0.1			
Workpiece weight max.					
on glass plate alone	kg	20			
with granite stage support	kg	100			
Length measurement uncertainty [2]		E1 = (0.9+L/600 mm)µm Measuring length L in mm			
DIN EN ISO 10360-2		E2 = (1.2+L/500 mm)µm Measuring length L in mm			
VDI/VDE 2617		E3 = (1.9+L/400 mm)µm Measuring length L in mm			
Our measurement is based on		**β = 1,0** ≙ objective 1.0x (image field 5.6 x 4.2mm) – *the measurement uncertainty value is valid for the indicated image field*			
Dimensions	**mm**	W 1750	W 1850	W 2050	W 2350
		D 2700	D 2800	D 2800	D 3800
		H 2350	H 2350	H 2350	H 2350
Control cabinet	mm				
Workstation desk 130	mm	1300 x 900			
Weight	**kg**	4500	5500	7500	10500
Power supply		220-240VAC, 50-60Hz, 1kW			

[1] **Other objectives are available upon request**

[2] **Ambient conditions** 20 °C ± 1 K, **Temperature gradient** Δ_{th} = 1K/h, Δ_{td} = 4.0 K/d, **measured with a calibrated standard;** 15…35 °C, **we recommend use of an air-conditioned control cabinet if ambient temperatures are** >25°C.

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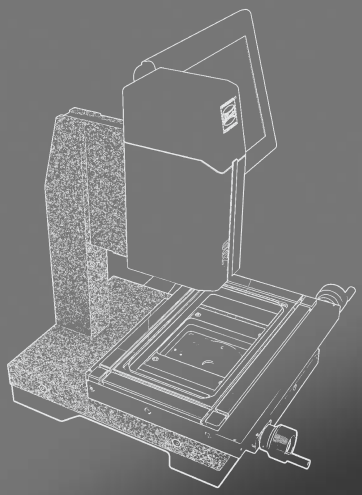
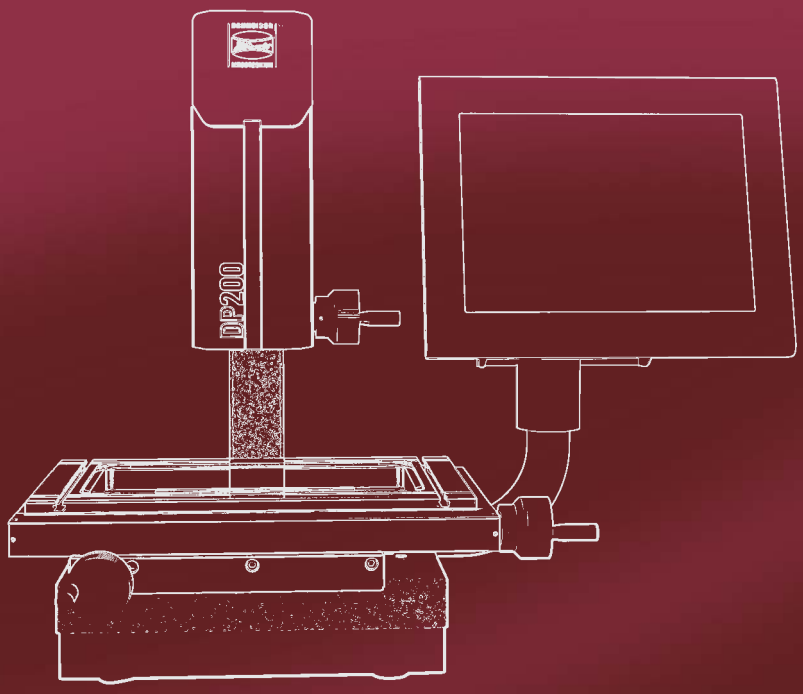
Digital Projector DP

Digital Projector for Fast and Easy Measurement and Comparison of 2D Workpiece Contours





SCHNEIDER ®

MESSTECHNIK

SIMPLY PRECISE

Digital Projector DP

Fields of application of DP

The administration of templates and overlays takes time and money. The new digital projector developed by Schneider Messtechnik combines the many advantages of the proven projector with the digital image processing and analysis. All you have to do is load your DXF drawing onto the screen and position it accurately over the image of your workpiece. Once the drawing is aligned with the workpiece, it will move in synchrony with table motion so that the user always have in focus the relevant section of the drawing. Another key feature allows the user to define circles, lines and angles directly at the device, which ensures high-quality measurement at top speed. The device is of course also equipped with many other powerful functions, for example with a feature for accurate edge detection.

For more detailed information, please visit our website at: **www.dr-schneider.de**

Your benefit

- Integrated overlays, e.g. crosshairs and concentric circles
- User-definable elements such as radii, circles, chamfers, angles
- Reading in of DXF files on a scale of 1:1
- Display of different drawing layers
- Comparison processes complete within seconds
- Intuitive user interface
- Portable design
- Available with different fixed objectives
- LED incident light illumination system
- **No instruction required**

Special features of DP

- DP software with CCD camera and touch screen PC
- Digital scales in all travel axes
- Upper cross slide with 4 T-grooves
- Table-top design
- Sturdy granite construction
- High-precision measuring stage with non-corroding frame

Technical Specifications of Digital Projector DP

Model		**DP 200**					
Measuring range	**mm**						
X-Y		200 x 100					
Z		60					
Objective		1.5x	1.0x	0.5x	0.33x	0.25x	0.20x
Magnification monitor	mm	62-fold	41-fold	21-fold	14-fold	10-fold	8-fold
Image field	mm	4.3x3.4	6.5x5.2	13.2x10.5	20.0x16.0	26.5x21.2	33.0x26.5
Workpiece weight max.	**kg**	20					
Dimensions [1]	**mm**	**W**=780 **D**=570 **H**=700					
Weight	**kg**	80					
Power supply		220-240VAC, 50-60Hz, 1kW					

[1] **Height incl. touch screen**

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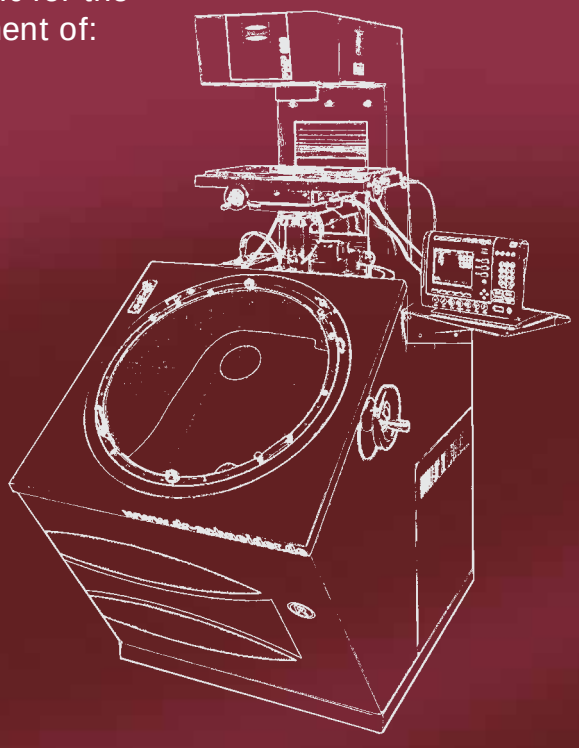
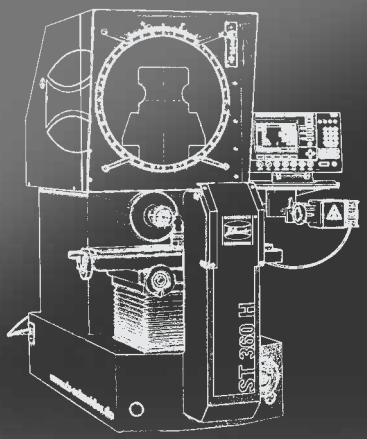
Measuring Projectors

Vertical and Horizontal Measuring Projectors

High-end projectors for the reliable measurement of:

- Stamped parts
- Plastic parts
- Tools
- Seals and gaskets
- Turned parts
- Profiles
- Punches
- Dies
- Pipes and tubes
- Shafts
- … and many more





SCHNEIDER ®

MESSTECHNIK

SIMPLY PRECISE

Measuring projectors

For vertical and horizontal measurement – available as bench-top or floor models

Thanks to an integrated edge sensor, an optional CCD matrix camera and exactly defined measurement uncertainty values in accordance with ISO 10360-2, these projectors ensure reliable measuring results both in the manufacturing environment and in the measurement room.

Areas of use

State-of-the-art measuring projectors developed by Dr. Heinrich Messtechnik have come to play a prominent role in the field of metrology, setting new standards in terms of accuracy and precision. The well thought-out rigid overall structure of the machines in tandem with standard feature Multicount 2000 and an ultra-accurate and precise edge sensor are an ideal technological combination and thus constitute a winning team when speed and precision are key on the shopfloor and in the measuring room.
All projectors have been designed to provide easy and intuitive operation to a broad range of users. Since they allow measurement operations to be performed in close proximity to the manufacturing area, efficiency is maximised whilst idle times are greatly reduced. What better way could there be to save money?

Horizontal Measuring Projector ST 360 H

An ideal choice for reliable measurement of
- turned parts
- pipes/tubes
- tools
- shafts
- and many more

The picture includes some optional machine features that are not part of the standard scope of delivery.

Especially when it comes to measuring turned parts, projector ST 360 H shows its particular strengths: Simply place the object to be inspected on the stage of the device vertically, and measurement can begin.

Outstanding benefit

- Easy measurement of heavy workpieces of up to 50 kg

Standard equipment

- 360 mm screen with engraved crosshairs (graticule)
- Edge sensor incorporated into the light path
- Transmitted and incident illumination, 150 Watt each, halogen bulbs with cold-light filter
- Beam deflection mirror for incident illumination

Optional features

- Incident illumination via four-core optical fibre with cold-light source
- Swivelling light arm for transmitted illumination
- Multicount 3000 (geometric readout with image analysis function) equipped with a CCD camera
- Dual-objective changer (nosepiece)

For more detailed information, please visit our website at:
www.dr-schneider.de

Vertical Measuring Projector ST 360 V

An ideal choice for reliable measurement of
- seals and gaskets
- plastic parts
- dies
- profiles
- and many more

The picture includes some optional machine features that are not part of the standard scope of delivery.

Standard equipment

- 360 mm screen with crosshairs
- Edge sensor integrated into the beam path
- Transmitted and incident illumination, 150 Watt each, halogen bulbs with cold-light filter
- Beam deflection mirror for incident illumination

Additional standard equipment

- Triple revolving nosepiece for fast objective change

Outstanding benefits

- Quick adjustment of the measuring stage
- Measuring range 300 x 200 mm

Available options

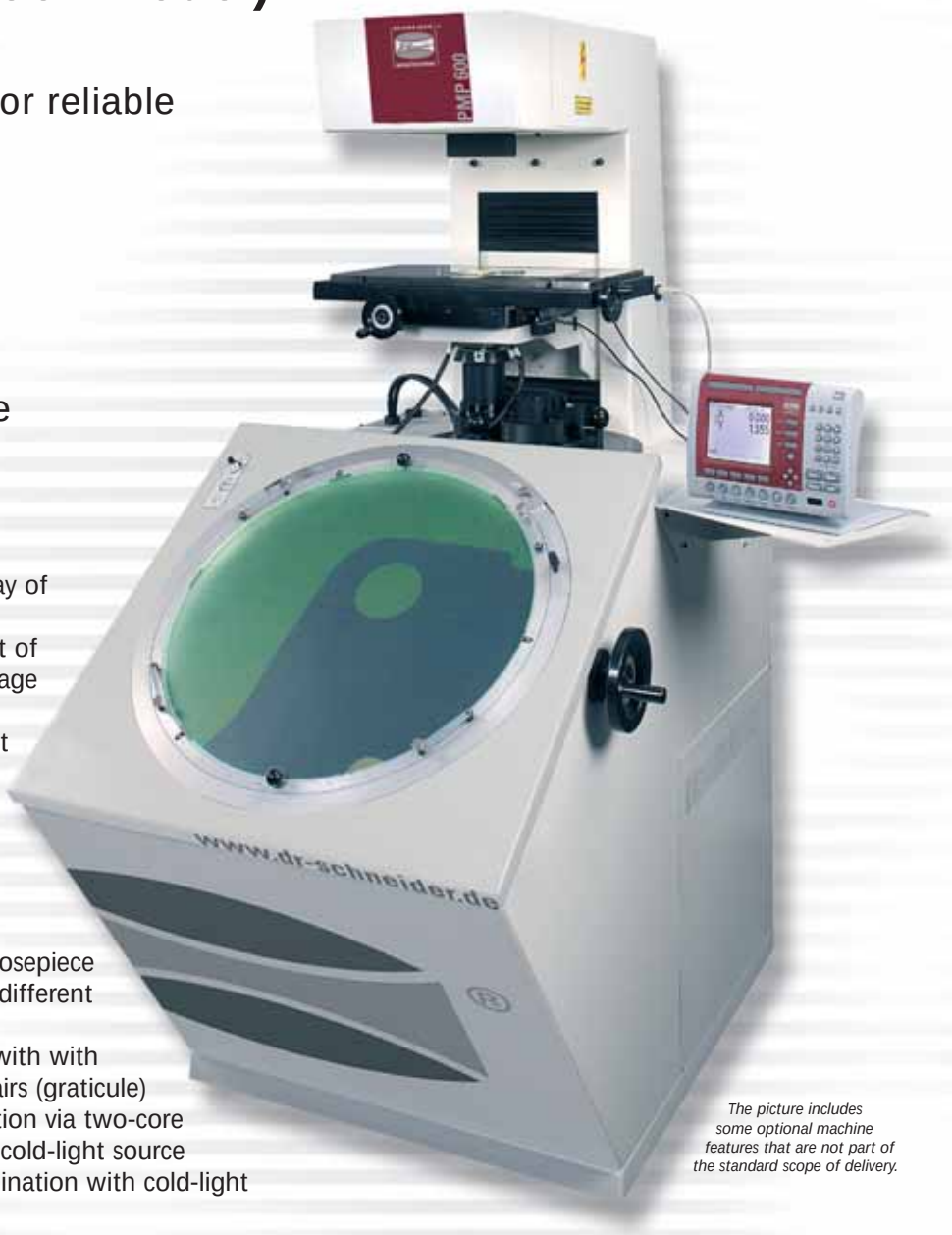
- Measuring and analysis software SAPHIR in manual or CNC configuration
- Helix-type swivel option thanks to a pivot-mounted plate superposed on the measuring stage
- Multicount 3000 (geometric readout with image analysis function) equipped with a CCD camera
- Digital angle indicator
- Further options are available upon request

Available accessories

- Centre support block
- Precision spindle support block SK40
- Stop bracket
- Precision vice
- Adjustment plate ± 6°

Vertical Measuring Projector PMP 600 (Floor Model)

An ideal choice for reliable measurement of
- stamped parts
- profiles
- punches
- dies
- tools
- and many more



The picture includes some optional machine features that are not part of the standard scope of delivery.

Outstanding benefits

- Large-scale display of the workpiece
- Quick adjustment of the measuring stage
- Triple revolving nosepiece for fast objective change

Additional standard equipment

- Triple revolving nosepiece accommodating different objectives
- 600 mm screen with with engraved crosshairs (graticule)
- Incident illumination via two-core optical fibre and cold-light source
- Transmitted illumination with cold-light filter

A laterally displaced lifting column in tandem with an SK50 manual swivelling axis allow measurement of tools with large diameters. A glass stage with an SK50 tool holder, is, of course also optionally included in the scope of delivery.

Available options

- Multicount 3000 (geometric readout with image analysis function) equipped with a CCD camera
- Digital angle indicator
- Laterally displaced lifting column and manual swivelling axis SK50 for measurement of tools with large diameters
- Motorised adjustment of the 3 axes
- Telecentric objectives from 5x to10x magnification
- Further options are available upon request

Available accessories

- Adjustment plate ± 6°
- Standardised reference measuring plates
- Darkening device
- Pair of precision Vee blocks

Common features of all measuring projectors:

Outstanding benefits

- High acutance (sharpness of contours) for reliable measurement
- Smooth and easy operation
- Consistent quality of measurement results
- No readjustment required
- Measurement of cylindrical and cubic work-pieces with consistent accuracy and precision
- Reproducible, repeatable and documentable workpiece quality and measurement results
- Measurement results can be recorded immediately

Standard equipment

- Template holder
- Protractor, rotatable through 360°, Nonius 1'
- Needle-bearing supported X, Y, and Z axes
- Transmitted and incident illumination
- 0.001 mm resolution scales
- Edge sensor integrated into the light path
- Calibration to DIN EN ISO 10360-2 and VDI/VDE 2617
- Digital readout with geometric functions Multicount 2000
- 2D calibration across the entire measuring surface as a complement to the linear correction function

Options

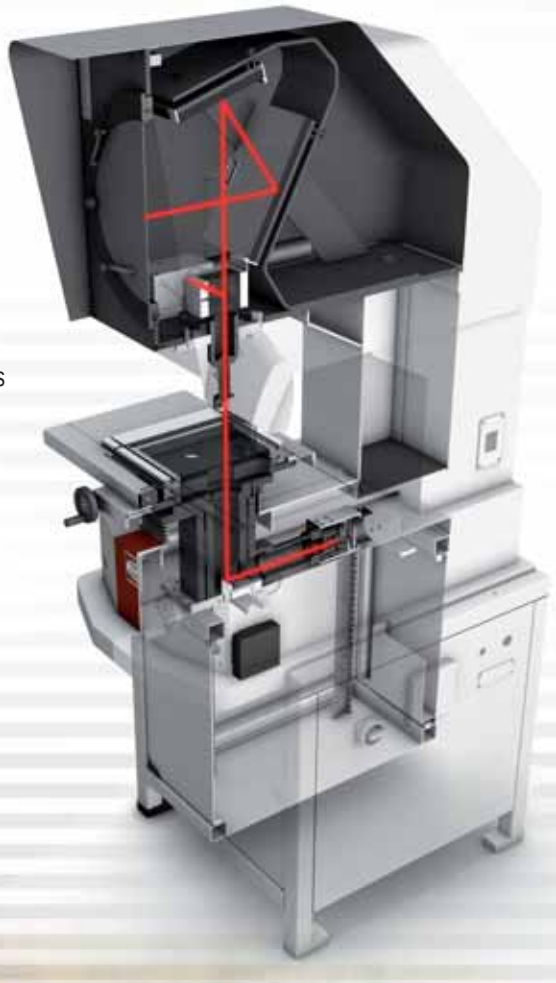
- Motorised adjustment of all 3 axes
- Multicount 3000 (geometric readout with image analysis function) equipped with a CCD camera
- Digital angle indicator
- Telecentric objectives
- Readout computer equipped with measuring and analysis software SAPHIR
- Further options are available upon request

Accessories

- Darkening device
- Rotary table
- Precision vice
- Pair of centre support blocks or spindle support SK40/50
- Roller block
- Precision jaw chuck with angle indicator
- Base cabinet
- Further accessories are available upon request

Integrated edge sensor

An edge sensor built into the projector's light path ensures reliable measuring results under any ambient light conditions.



Digital readout with geometric functions Multicount 200 (MC 200) and Multicount 2000 (MC 2000)
Geometric elements of any type can be measured fast and with consistent reliability: Multicount 200/2000, which provides easy and intuitive operation, in conjunction with either an optionally available outside edge sensor (MC 200) or with an edge sensor built into the projector's beam path (MC 2000) ensures fast edge detection and offers every user smart analysis functions.

Geometric readout with image analysis function Multicount 3000 (MC 3000)
Digital readout MC 3000 is a powerful tool which for the first time combines in one device value recording and imaging functions: Measurement points obtained from a position indicator are recorded, while a live image of the object to be measured is simultaneously displayed on the screen. The device unites in itself all the qualities of Multicount 200/2000 along with the benefits of image processing, live imaging as well as automatic edge detection and thus marks a new milestone in high-quality metrology.

Technical Specifications of the Measuring Projectors

Type		ST 360 H				ST 360 V				PMP 600				
Measuring range	**mm**	250 x 150				300 x 200				250 x 125				
Magnification		**10**	**20**	**50**	**100**					**5**	**10**	**20**	**50**	**100**
Image field	mm	36	18	7,2	3,6					100	50	25	10	5
Working distance	mm	115	97	53	45					258	134	128	90	45
Screen diameter	**mm**	360				360				600				
Projection accuracy														
for transmitted light	%	0.10				0.10				0.08				
for incident light	%	0.15				0.15				0.10				
Distortion max.	‰	0.1				0.1				0.2				
Resolution	**mm**	0.0001												
Workpiece weight	**kg**	50												
on glass plate	kg					20				20				
Length measuring uncertainty1 [1]		E_1 = (2.5+L/75 mm)µm*												
DIN EN ISO 10360-2, VDI/VDE 2617		E_2 = (2.8+L/75 mm)µm*												
		**Measuring length L in mm*												
Dimensions	**mm**	W 1000**				W 1000**				W 1120**				
		D 1170				D 1000				D 1350				
		H 1115				H 1249				H 1850				
		***Inclusive of Multicount*												
Stage size	**mm**	500 x 135				520 x 325				520 x 325				
Weight	**kg**	230				270				480				
Electric power supply		220-240 VAC, 50-60 Hz, 1 kW												

[1] **Prerequisites: Admissible ambient conditions** 20 °C ± 1 K, **Temperature gradient** Δ_{th} = 0.5 K/h, Δ_{td} = 4.0 K/d

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