

SIMPLY PRECISE



## WM1 Series

Optical & Multisensor Measuring Microscopes



SCHNEIDER®



MESSTECHNIK

WM1

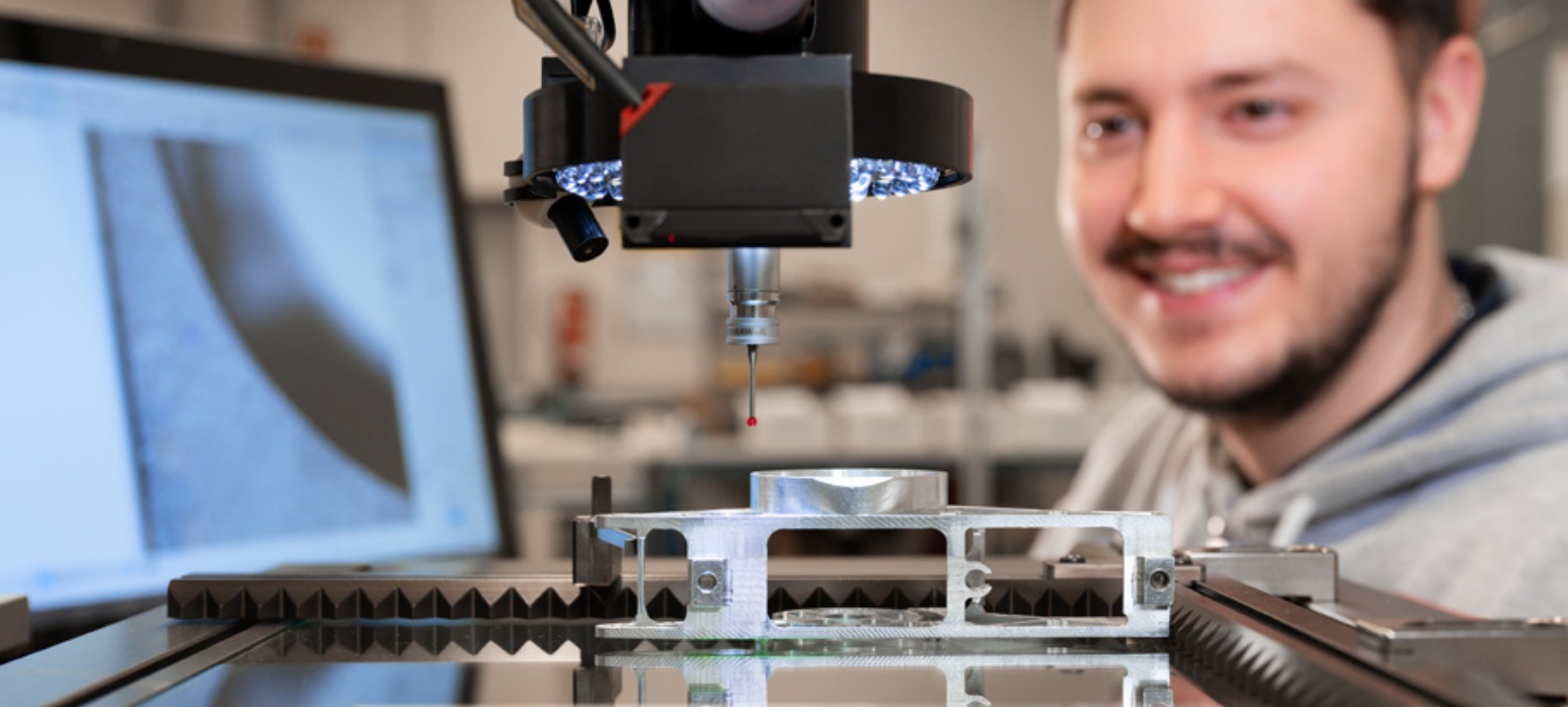
300 CNC



Translate sober requirements into smart ideas, transfer smart ideas into accurate solutions, transform accurate solutions into measurable results – ambitious goals can only be achieved if everyone pulls in the same direction. We call this **SIMPLY PRECISE**







## The WM1 series – precision as flexible as it gets

### Your perfect all-rounders for the shop floor and the measurement room

Schneider's WM1 measuring microscopes excel across the board: They measure up to exacting standards not only in large groups of companies, but also score high in medium-sized enterprises and in small businesses. This is far from surprising because they come in many different sizes with variable technical features, optional equipment\* and a favourable price/performance ratio so that they can be perfectly configured to suit specific customer needs. All devices in the WM1 series are robust, precise and designed with attention to the last detail.

#### + Certified high-tech solutions – customised!

The WM1 range extends from affordable small-scale models to high-capacity devices for large-surface measurement.

#### + Robust granite base

Granite features an extremely low thermal expansion coefficient, thus ensuring accurate measurement results in any environment – whether in the incoming goods inspection department, right on the shop floor or in an air-conditioned measurement room.

#### + Measuring stages: CNC or manually controlled

The measuring stage is available with CNC control for fully automatic measurement in all three axes.

The pallet measurement option boosts throughput, thus saving time and money.

#### + New high-resolution camera

The field of view is now 9 times larger and takes measurement speed to new heights.

#### + High-performance software SAPHIR

An invaluable added value: All our measurement technologies are equipped with high-tech measurement and analysis software SAPHIR. This technological gem helps in making manufacturing businesses fit for the future, enabling them to expand and scale up their fleet of machinery at any time with only minimum induction and training effort.

#### Perhaps the most valuable extra feature

From initial consultation to after-sales support and the development of smart solutions designed to tackle special measurement tasks or challenges: With Schneider, you can rely on a personal approach to your needs and a dedicated person to get in touch with. As our liaison officers work in close contact with our technology, support and development teams, your personal consultant will be uniquely familiar with your needs so that you can count on them to provide advice and assistance in all metrological questions that matter to you – fast, to the point and with a view to providing the best value for money.

\* Please also refer to the summary table on the last double page of this brochure.



Video: WM1

- + Camera-based, user-independent acquisition of measurement data
- + Precise edge detection thanks to smart image processing algorithms
- + Multitouch panel PC equipped with either measurement and analysis software SAPHIR, SAPHIR smart (intuitive) or M3
- + Scalable and upgradable to a 2.5D multisensor measuring microscope



- Standard field of view 13.9x9 mm
- Manual or motorised zoom objective lens (optional)

- High-resolution matrix camera
- Continuously adjustable, dimmable LED incident light illumination with both separately and simultaneously switchable segments
- Touch-trigger probe TP200 and/or triangulation laser for height/contour measurement (optional)

- High-precision measurement stage (X/Y), available in five sizes
- 3-axis CNC operation or manual design with quick adjustment feature



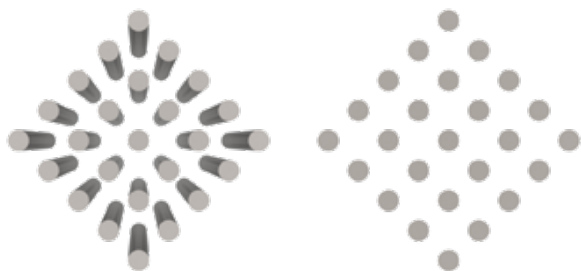
## The optics (ac)counts for quality

### Experience, know-how and high-end technology

Accurate measurement results can only be obtained if the objective lens, the camera and the light source are perfectly calibrated and synchronised to one another. Therefore, it is important to understand and remember that objective lenses are not all alike! For example, black-and-white images are much easier to evaluate with the required precision than colour images. And when it comes to illumination, physical details and wise positioning of each LED matter to the point of making a big difference. Every single model in the WM1 series is designed with all these aspects in mind, based on extensive technological know-how that is cast into top-notch components.

### Reliable measurement results thanks to telecentric imaging

The choice of the right objective lens is crucial for the precision of your measuring microscope! Ordinary, entocentric lenses (i.e. lenses with a fixed focal length) should not be used on a microscope because they tend to produce a distorted image of the measurement object and/or will change the degree of magnification. Therefore, we use telecentric objective lenses on our WM1 microscopes: Since the optical rays passing through the telecentric lens are strictly parallel to the lenses' optical axis (so-called collimated ray bundles), the objects to be measured are captured and represented in the image without the least perspectival distortion and in their original magnification.



**Left:** 25 cylindrical objects, viewed through an entocentric objective lens (with a focal length of 50 mm). The image is distorted and thus unsuitable for measurement purposes.

**Right:** The same objects, viewed through a WM1 high-quality telecentric objective lens. The image is clear and free from perspectival distortion, thus enhancing the quality of measurement results.

## Edge detection in transmitted and incident light

Nothing goes without the right objective lens ... and without the right image-capturing device: Therefore, all models in the WM1 series feature a 6.4-megapixel black-and-white matrix camera! The dedicated camera comes with an extra-wide field of view and produces excellent images for workpiece measurement in both transmitted and incident light.

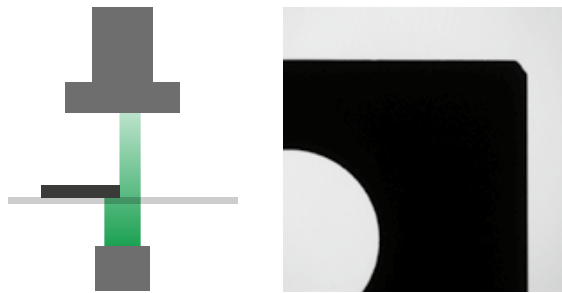
1. The wide field of view boosts measurement speed and captures even the minutest details of the workpiece's contour.
2. The measuring software detects edges and contours based on the brightness information associated with every single image point. Black-and-white images usually provide best results for this purpose. Depending on the measurement task to be performed, WM1 can also be equipped with a colour camera.
3. In transmitted light measurement, the light passes through the glass plate from below, past the object to be measured, and then enters the objective lens and the camera. This method ensures excellent contrast and sharp edge imaging.
4. Conversely, when it comes to measuring contours and features on the top side of a workpiece, measurement in incident light is the method of choice; contrast resolution in this case depends on surface material, texture and colour.

WM1 is thus perfectly equipped to ensure excellent measurement accuracy and clear-cut edge detection.

### Details that make a world of a difference:

#### LED segment ring light for incident illumination

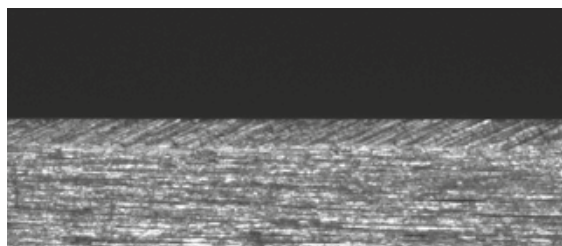
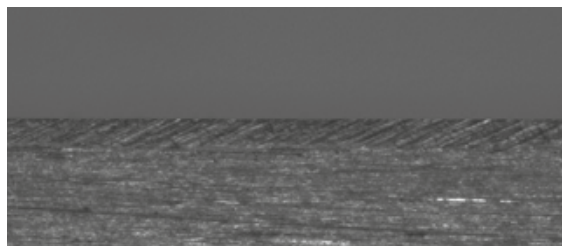
Workpieces differ in many ways, also in terms of shape-specific lighting needs which even the best camera cannot meet or make up for. Each of your workpieces deserves dedicated lighting, so we have divided the incident light source of WM1 into multiple ring-shaped segments. All segments can be switched on and off either separately or combined as needed, thus allowing each workpiece feature to be viewed in optimum lighting conditions.



▲ Principle of transmitted light measurement: The object is imaged with high contrast and crisp edges.



▲ Principle of incident light measurement: The resulting image additionally shows detailed surface features – such as the chamfer of the bore shown in the picture.



▲ Same workpiece feature – different lighting principle: The upper image shows a workpiece illuminated with standard LED incident light. The image below shows the same workpiece under partial illumination with LED segments and longer exposure time. The edge is displayed with significantly higher contrast.





# As you like it: Future-proof options for your device

Measurement microscopes by Schneider are in use across the board in many industries. Our standard models in the WM1 series work perfectly for most of our customers. For those seeking to upgrade or customise their device in a meaningful way, we offer even more high-tech extra features that are designed to help in saving on space, budget and resources.

## Optional WM1 technologies – the highlights:

### 1. Motorised zoom objective lens

- + Featuring eight calibrated zoom levels
- + Equipped with coaxial incident light illumination – in addition to the standard LED incident light illumination of WM1
- + For measuring special features (e.g. deep bores)
- + Also available with manual operation

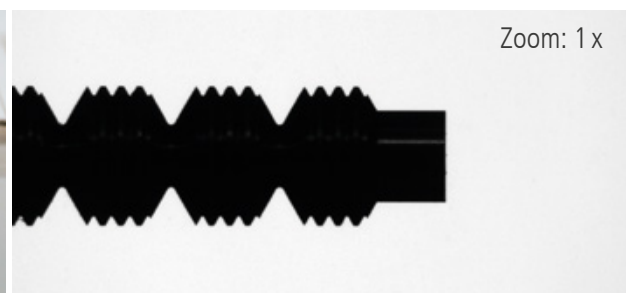
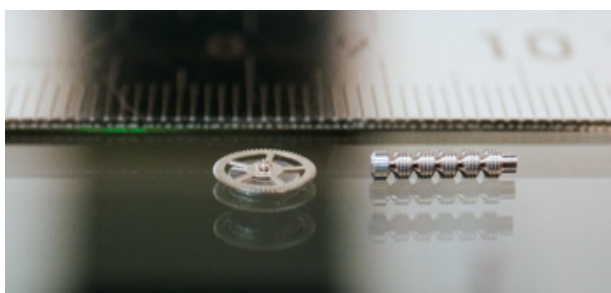
Brilliant performance: The motorised zoom objective lens provides deep insights of the highest quality. When it comes to measuring reflective surfaces, coaxial incidental light illumination is an extremely useful lighting option because it minimises lateral reflections.



- ▲ Coaxial incident light illumination: A beam splitter directs the light, in parallel to the optical beam path, to the workpiece down to the deepest hidden details.



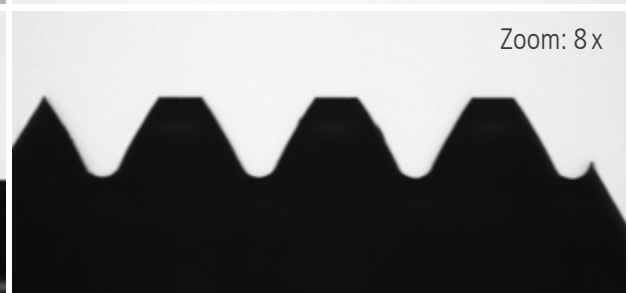
- ▲ Illumination of a deep bore in standard incident light (left) and in coaxial incident light (right). The coaxial incident light illuminates the workpiece down to the bottom of the bore.



Zoom: 1 x

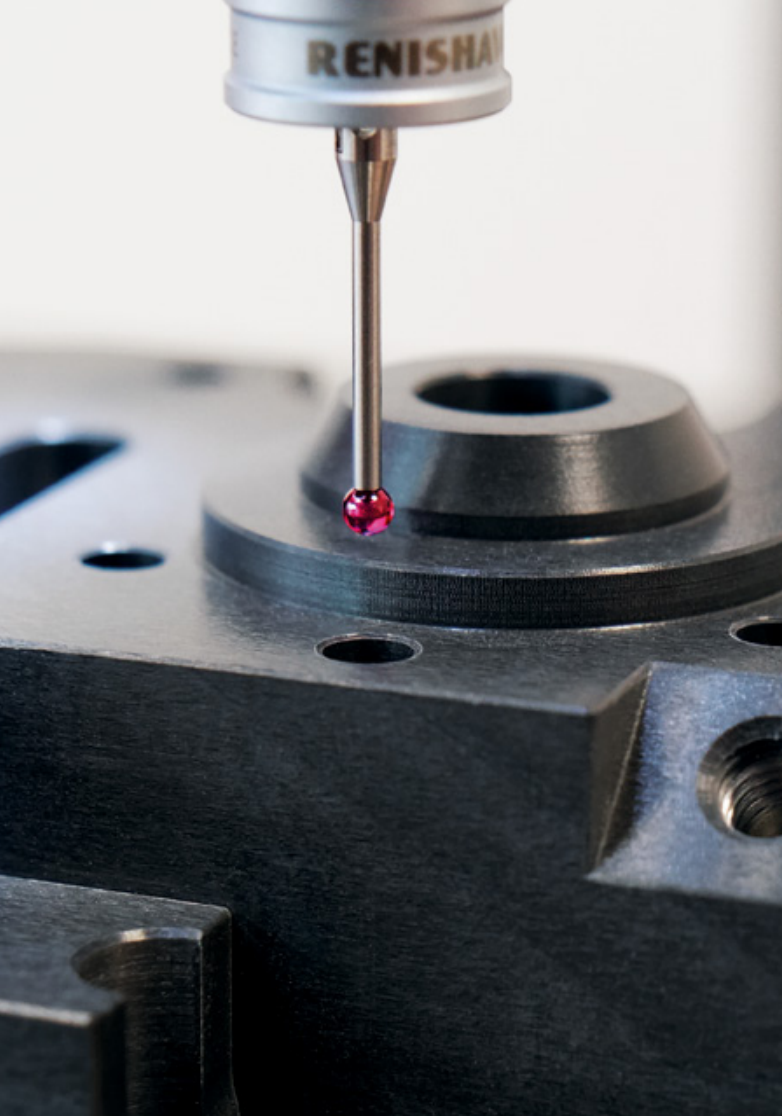


Zoom: 5 x



Zoom: 8 x





## 2. Touch-trigger probe TP200

- + 6-way touch-trigger probe for measurements along the three coordinate axes (X/Y/Z) in both directions
- + Multiple-height measurement (e.g. of stepped bores arranged in different planes)
- + Acquisition of features that cannot be measured by optical means (e.g. undercuts)

Sense and sensitivity – a perfect match: When it comes to measuring soft or delicate workpieces, a low-force module exerting less stylus pressure is available to complement the standard probe.



## 3. Triangulation laser

- + Ideal for fast, reproducible height and contour measurement
- + Automatic scanning of height contours
- + Combinable with touch-trigger probe TP200 and/or the coaxial zoom objective lens

Wear-free: The triangulation laser is the solution of choice for touch-sensitive height and contour measurement.

### 100% user-focused

Each measurement task requires its own strategy. Therefore, camera-based measurement is only one of the many strengths WM1 has to offer. When equipped with a probe or laser, WM1 turns into a 2.5D multisensor measuring microscope. All sensors can be freely combined to suit your needs, thus boosting process flexibility and efficiency.



Video:  
Example of a WM1  
automation solution.

To watch this video (and  
more), please visit our  
"Schneider Messtechnik"  
YouTube channel.

## Colleagues without faults and flaws: robot and cobot

If you are looking for powerful assistance in the handling of recurring measurement tasks, in the meticulous sorting of measured parts and in sensitive 100% workpiece testing, why not hook up with the future and upgrade to a robot? Your Schneider measuring microscope is fit for the future because it has all it takes to interface with a robot and even with a collaborating one (cobot)! Anyone thinking that automation is a worthwhile move on a large scale only, is way off track: It is also and especially on a smaller scale that robots can make a profitable difference as they accomplish even the most monotonous and tedious tasks in consistent quality, i.e. reliably error-free and without tiring. Robots provide valuable support in workflow optimisation, ensuring high process stability and significant time savings.

Talk to us and learn about your specific options for WM1 robot integration. If you wish, we can also check interfacing options with your existing robot systems.

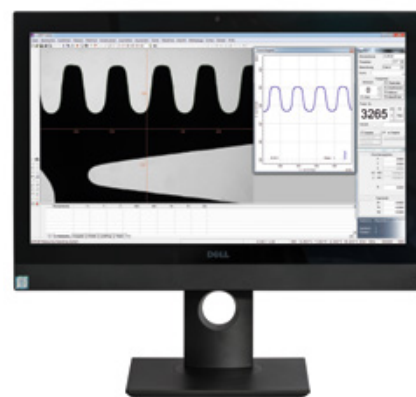


## Smart customisation is key

The design concept of the WM1 series is as simple as savvy: Top-notch modular packages – customised to perfection. Our series-manufactured high-tech measuring microscopes form the solid foundation of our range on which we build to offer a wide array of sizes, equipment, accessories as well as extension and upgrade options. This approach enables us to provide the practice-proven leeway our customers need and to deliver cutting-edge technology tailored to suit each customer's preferences and requirements at an affordable price.

### Measurement and analysis software – your preference counts:

The WM1 series comes standard-equipped with SAPHIR smart (shown on the left), an intuitive measuring software that features a self-explanatory user interface. The full-fledged SAPHIR version (shown on the right) as well as Schneider's M3 multi-touch application are also available. The pleasure of choice is yours because you are entirely free to decide which application best suits your work needs!



### Wide range of equipment and accessories for customised configuration – including, for example:

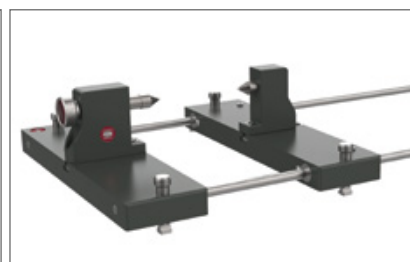
▼ Workstations (various models)



▼ Square with magnetic holder



▼ Pair of centre supports



▼ Stylus change rack SCR200



▼ Alignment square



▼ Reference sphere





## WM1 G series: Compact power for your biggest tasks

The same tried and tested technology – incorporated into a larger-scale version and featuring yet another sensor option: This is our WM1 G series. With a respectable measurement range of up to 700 mm x 1,500 mm x 200 mm (X/Y/Z), the measuring microscopes in the G series are mainly conceived for efficient measurement of large workpieces.

### Space-saving by design

No doubt: G-series measuring microscopes are of greater size than those in the WM1 series. And there should be no doubt either that “G” is far from referring to the devices’ “greater size”, but that it rather stands for “gantry”! In other words, the models in the G series feature an ingeniously designed portal structure characterised by a fixed high-precision granite measuring stage and CNC-operated sensor technology in all three axes. The big benefit: The moving parts of the machine will not travel beyond the measurement range distance so that the space requirement of the portal is beneficially modest.

### Fit for any challenge

The measuring microscopes in the WM1 G series are equipped to the same high technological standards as the “small” WM1 series. The G series, too, can be additionally equipped with touch-trigger probe TP200, the

triangulation laser and/or the motorised zoom objective lens with coaxial incident light illumination. By the way, the motorised zoom lens available for the G series can be optionally designed as a 4-step zoom lens with extra-large fields of view. This equipment feature is ideal when it comes to measuring sizeable workpieces because large fields of view enable integral rather than mere segmental workpiece imaging and inspection; they are also extremely helpful in capturing structures in minute detail.

### Easy, fast, profitable: The stitching technique

Another option afforded by the G series is the stitching technique. Combined with the 4-step zoom lens, the machine flash-captures individual segments in motion and then joins (“stitches”) the captured segments together into a coherent whole, like pieces in a jigsaw puzzle. Once the stitching is complete, evaluation of the integral image is performed immediately – in a matter of seconds.

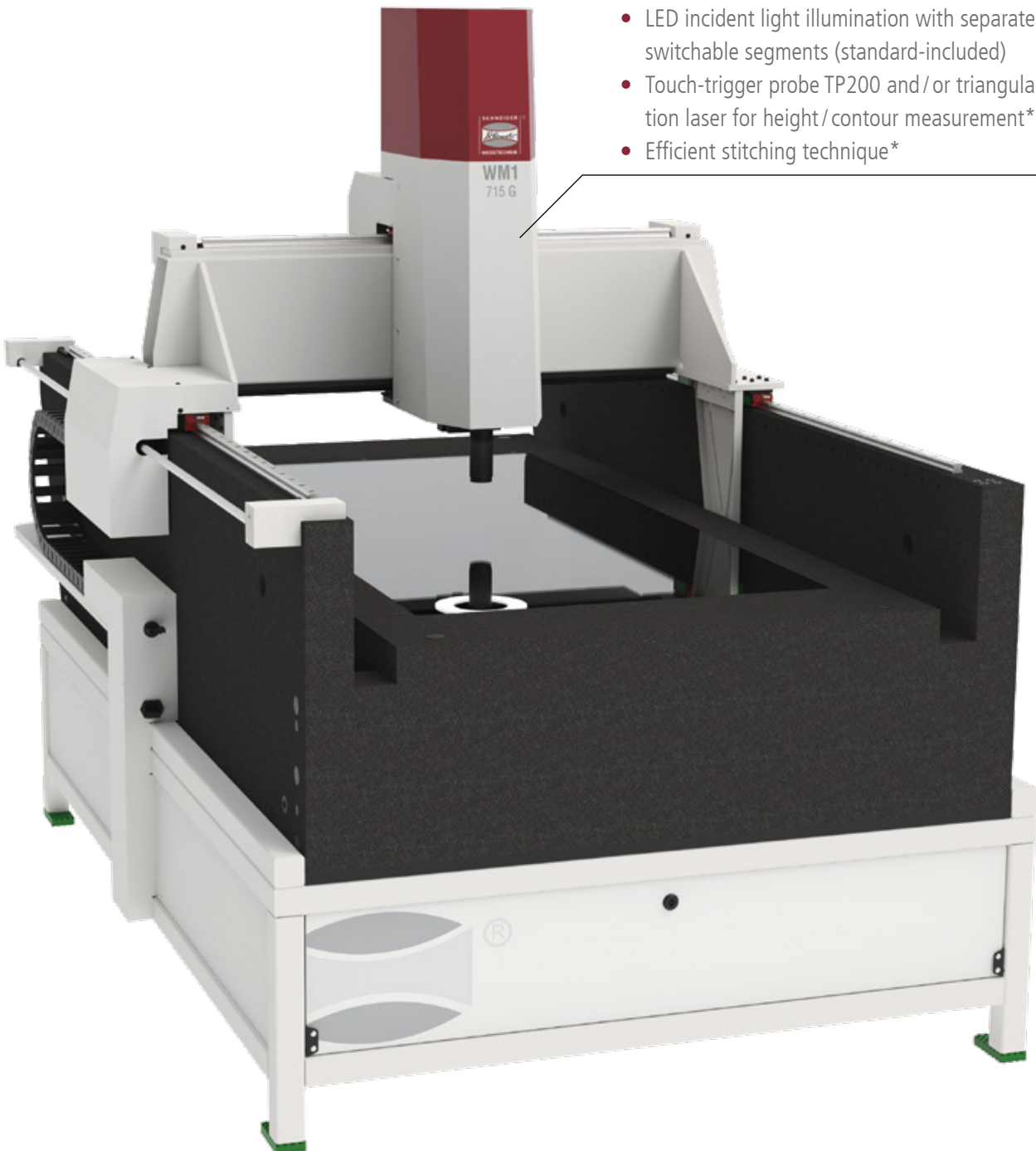




Video: WM1 G

- + WM1 G includes the whole range of features and benefits afforded by the WM1 series, plus many options for needs-based device adjustment as well as scalability and upgradability to a 2.5D multisensor measuring machine
- + Ideal for measuring extra-large workpieces
- + Ingeniously conceived gantry structure in a compact, space-saving design

- Measurement range of up to 700 x 1,500 mm
- Standard 1.5-fold objective lens magnification
- Various zoom objective lenses to choose from\*
- 3-axis CNC operation
- LED incident light illumination with separately switchable segments (standard-included)
- Touch-trigger probe TP200 and / or triangulation laser for height / contour measurement\*
- Efficient stitching technique\*



\* optional

# Technical Specifications of the WM1 Series

Model		WM1 200	WM1 300	WM1 400 (400x200)	WM1 400 (400x300)	WM1 500
SAPHIR CNC		✓	✓	✓	✓	✓
SAPHIR (manually controlled)		✓	✓	✓	–	–
M3 CNC		✓	✓	✓	✓	✓
M3 (manually controlled)		–	✓	✓	–	–
<b>Measurement range</b>						
XxY mm		200x100	300x200	400x <b>200</b>	400x <b>300</b>	500x200
Z mm		100	200	200	200	200
<b>Objective lens</b>		Other objective lenses available upon request				
Magnification		0.5x		1.5x	3.0x	
Field of view	mm	13.9x9.0		4.6x3.0	2.3x1.5	
Working distance	mm	97		97	77	
<b>Zoom objective lens</b>		Manual operation			8-step motorised zoom	
Magnification		0.7x – 4.5x (6 steps)			0.58x – 7x (8 steps)	
Field of view	mm	9.9x6.4 – 1.5x1.0			11.0x7.1 – 1.1x0.7	
Working distance	mm	86			86	
<b>Resolution</b>		mm				
		0.0002				
<b>Max. workpiece weight</b> (on glass plate)		kg				
		15				
<b>Length measurement error<sup>1)</sup></b>		Measurement length L in mm				
optical (1D), DIN EN ISO 10360-7 <sup>2)</sup>		$E_{UX, MPE}, E_{UY, MPE} (1.9 + L / 100 \text{ mm}) \mu\text{m}$				
optical (2D), DIN EN ISO 10360-7 <sup>2)</sup>		$E_{UXY, MPE} (2.9 + L / 100 \text{ mm}) \mu\text{m}$				
tactile (1D), DIN EN ISO 10360-2 <sup>3)</sup>		$E_{OZ, MPE} (3.9 + L / 100 \text{ mm}) \mu\text{m}$				
<b>Dimensions (mm)</b>						
	Width	700	950	1,150	1,200	1,250
	Depth	650	950	950	1,300	900
	Height	850	1,050	1,050	1,750	1,050
<b>Weight</b>		kg				
		80	140	170	600	180
<b>Electric power supply</b>		220-240VAC, 50-60Hz, 1 kW				

<sup>1)</sup> Permitted ambient conditions: 20 °C ± 1 K, temperature gradient  $\Delta t_h = 0.5 \text{ K/h}$ ,  $\Delta t_d = 4.0 \text{ K/d}$ , measured with a calibrated standard

<sup>2)</sup>  $\beta$  = magnification factor = 1.5  $\hat{=}$  objective lens 1.5x

<sup>3)</sup> Probe measurement: TP200, straight probe, stylus ball  $\varnothing$  2 mm, length 30 mm (touch probe with CNC models only)

# Technical Specifications of the WM1 G Series

Model		WM1 707 G	WM1 710 G	WM1 715 G	
Measurement range	XxY mm	700x700	700x1,000	700x1,500	
	Z mm	200	200	200	
<b>Objective lens</b>		Other objective lenses available upon request			
Magnification		0.5x	1.5x	3.0x	
Field of view		mm	11.2x8.2	3.7x2.7	1.9x1.4
Working distance		mm	97	97	77
<b>Zoom objective lens</b>		4-step motorised zoom		8-step motorised zoom	
Magnification		0.125x – 1x (4 steps)		0.58x – 7x (8 steps)	
Field of view		mm	65.4x54.3 – 8.2x6.8	8.9x6.5 – 0.9x0.6	
Working distance		mm	150	86	
<b>Resolution</b>		mm	0.0002		
<b>Max. workpiece weight</b> (on glass plate)		kg	20		
<b>Length measurement error<sup>1)</sup></b> optical (2D), DIN EN ISO 10360-7 <sup>2)</sup> tactile (1D), DIN EN ISO 10360-2 <sup>3)</sup>		Measurement length L in mm E <sub>UXY, MPE</sub> (2.9 + L / 100 mm) μm E <sub>OZ, MPE</sub> (3.9 + L / 100 mm) μm			
<b>Dimensions</b> (mm)	Width	1,500	1,500	1,500	
	Depth	1,500	1,800	2,300	
	Height	1,900	1,900	1,900	
<b>Weight</b>	kg	1,100	1,400	2,000	
<b>Electric power supply</b>		220-240VAC, 50-60 Hz, 1 kW			

<sup>1)</sup> Permitted ambient conditions: 20 °C ± 1 K, temperature gradient Δth = 0.5 K/h, Δtd = 4.0 K/d, measured with a calibrated standard

<sup>2)</sup> β = magnification factor = 1.5 ≙ objective lens 1.5x

<sup>3)</sup> Probe measurement: TP200, straight probe, stylus ball ø 2 mm, length 30 mm (touch probe with CNC models only)

## We are at your service!

Would you like more information? Do you have any questions? Or would you like to see our products live and in action? Then please let us know! Your personal consultant will be happy to take care of your request and arrange a personal appointment with you.

*Dr. Schneider*

**Dr. Heinrich Schneider Messtechnik GmbH** | Rotlay-Mühle | 55545 Bad Kreuznach | GERMANY  
Tel. +49 671 291 02 | Fax +49 671 291 200 | [info@dr-schneider.de](mailto:info@dr-schneider.de) | [www.dr-schneider.de](http://www.dr-schneider.de)

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