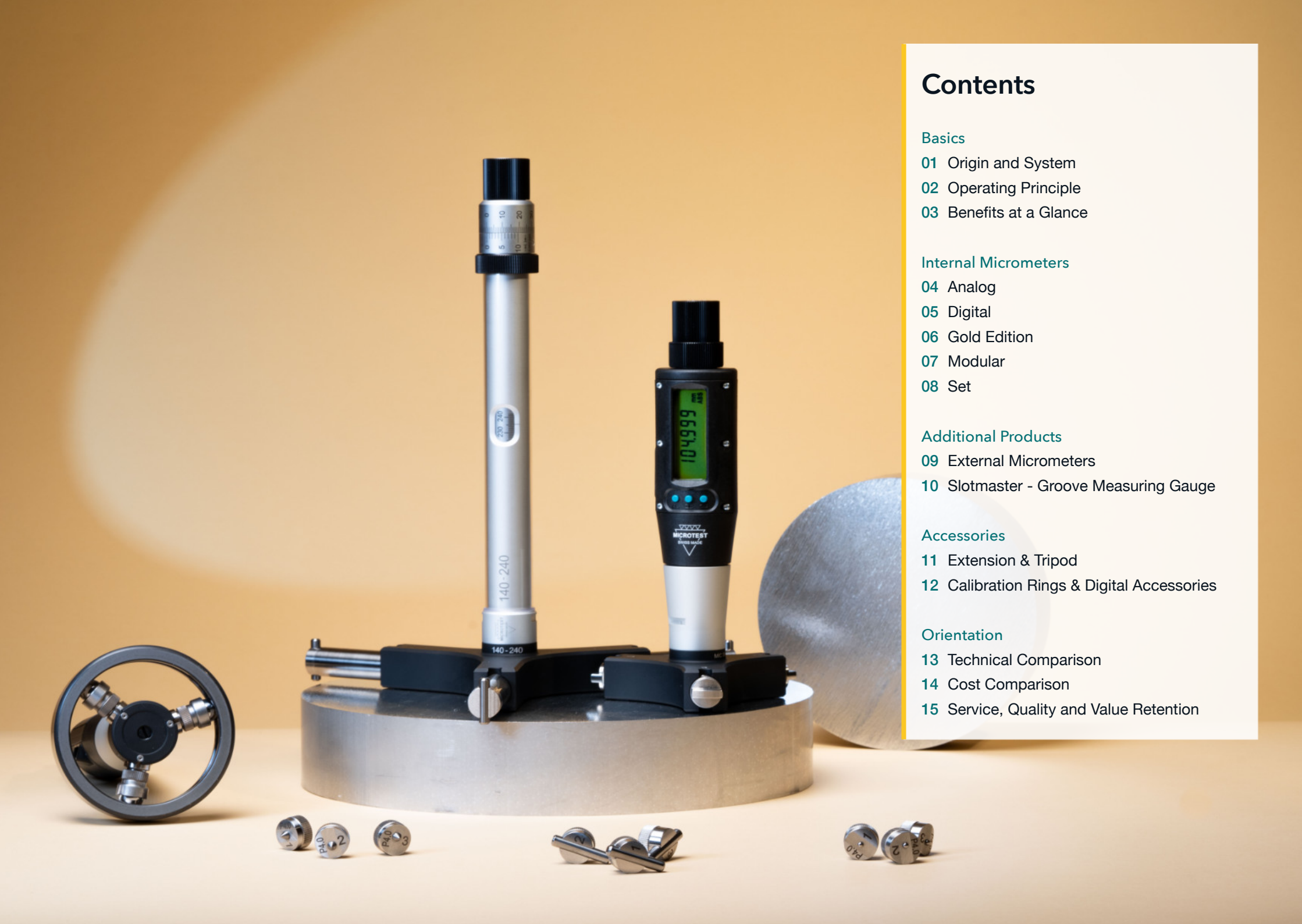
MICROTEST

SWISS MADE



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Precision with Origin

For more than 60 years, Microtest AG has specialised in the precise measurement of internal diameters.

Through continuous development and high quality standards, we create measuring instruments that combine precision, reliability and versatility — meeting the demanding requirements of our customers.

Our products are manufactured in Switzerland, used worldwide and stand for long-term measuring accuracy at the highest level.

SWISS MADE · 47.20°N 8.72°E · WOLLERAU

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Precision by Design

The high-precision Microtest® measuring system is based on three synchronously operating measuring spindles. They reach the measuring point at the same time and ensure very high repeatability — independent of the operator's measuring feel.

A special ratchet generates a defined vibration that automatically centres the instrument and ensures constant measuring pressure. This minimises operator errors.

The protective plastic sleeve protects against spray water, dirt and heat from the user's hand. The temperature-compensated design enables precise measurements even outside the standard temperature of 20 °C, as material expansion is largely compensated.

Microtest® covers unique measuring ranges and replaces several conventional measuring instruments with a single device. It is also the only 3-point system capable of accurately measuring bores from Ø 400 mm to Ø 1150 mm.

MICROTEST
SWISS MADE

02 |

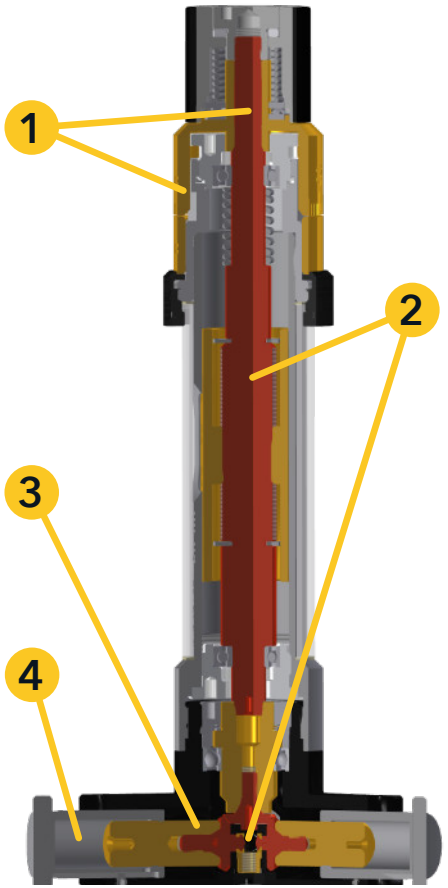
Operating Principle of the Microtest® Measuring System

1. Drive
The ratchet and scale drum generate the rotary motion.

2. Transmission
The motion is transmitted via the central shaft and bevel gear system.

3. Synchronisation
All three measuring spindles are adjusted evenly.

4. Measuring Position
The measuring probes are precisely guided into the measuring position.



Design Benefits
- Constant measuring pressure thanks to the bevel gear system
- Carbide measuring contacts for lasting precision
- Protective sleeve against hand heat, dirt and spray water
- Parallax-free scales with direct full readout
- Extensions up to 15 m without loss of accuracy

03 |

Benefits of Our Internal Micrometers at a Glance

Large Measuring Ranges
Ø 30–400 mm: 6 instruments
Ø 400–1150 mm: 3 instruments

2 µm up to Ø 140 mm
3 µm up to Ø 240 mm
4 µm up to Ø 400 mm

Blind-Hole Measurement (bottom)
Extendable up to 15 m
without loss of accuracy

Cost Reduction
Fewer instruments. Lower calibration and certification costs.

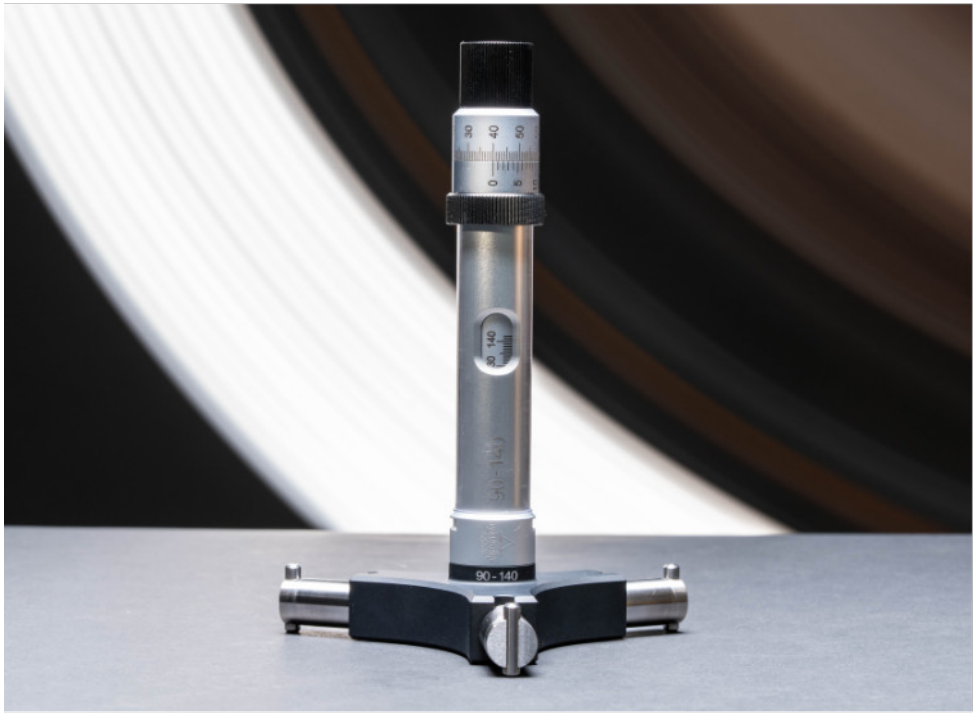
Clear scale engraving (Analog)
High-contrast display (Digital)
0.1 µm display resolution (Gold)

Self-Centring
Automatic wear compensation
Interchangeable measuring heads

Thermally Protected
Water-resistant to IP66
Impact-resistant (digital)

Digital data transfer
Modes: Absolute / Incremental
Metric (mm) / Imperial (inch)

Centred. Stable. Highly precise.



- **Self-centring**
- **Simple adjustment**
- **Clear readout**
- **Cost reduction through extended measuring range**
- **Thermally protected and compensated design**
- **Blind-hole measurement to the bottom**
- **Extendable up to 15 m without loss of accuracy**

Technical Details

Measuring Ranges	Ø 30 – 400 mm in 6 Instruments Ø 400 – 1150 mm in 3 Instruments
Error limit	2 µm up to Ø 140 mm 3 µm up to Ø 240 mm 4 µm up to Ø 400 mm Repeatability max. ± 2 µm
Clear Readout	Direct 1 µm full readout, parallax-free 1 revolution = 1 mm, 0.01 mm / 100 divisions 0.001 mm vernier: no readout errors, no maths

Available Models

Art. No.	Range Ø in mm	Error limit	Repeatability
IM2001	30 – 40	± 2 µm	± 1 µm
IM2002	40 – 60	± 2 µm	± 1 µm
IM2003	60 – 90	± 2 µm	± 1 µm
IM2004	90 – 140	± 2 µm	± 1 µm
IM2005	140 – 240	± 3 µm	± 2 µm
IM2006	240 – 400	± 4 µm	± 2 µm
IM2007	400 – 650	± 5 µm	± 3 µm
IM2008	650 – 900	± 6 µm	± 3 µm
IM2009	900 – 1150	± 7 µm	± 4 µm

Simple. Digital. Reliable.

- **ABS/INC measuring modes**
- **Switchable between mm and inch**
- **Simple adjustment, operation and extension**
- **Data transmission via wireless module or cable**
- **High-contrast display for error-free readout**
- **GFRP housing, impact- and water-resistant (IP66)**

Technical Details

Measuring Ranges	Ø 30 – 400 mm in 6 Instruments Ø 50 – 315 mm in 4 Instruments
Error limit	2 µm up to Ø 140 mm 3 µm up to Ø 240 mm 4 µm up to Ø 400 mm Repeatability max. ± 2 µm
Function and Operation	All functions directly selectable Preset memory for fast adjustment ABS / INC and mm / inch selectable Extensions can be mounted quickly and easily

Available Models

Art. No.	Range Ø in mm	Error limit	Repeatability
IE5001	30 – 40	± 2 µm	± 1 µm
IE5002	40 – 60	± 2 µm	± 1 µm
IE5003	60 – 90	± 2 µm	± 1 µm
IE5004	90 – 140	± 2 µm	± 1 µm
IE5005	140 – 240	± 3 µm	± 2 µm
IE5006	240 – 400	± 4 µm	± 2 µm
IE5021	50 – 75	± 2 µm	± 1 µm
IE5022	75 – 115	± 2 µm	± 1 µm
IE5023	115 – 185	± 3 µm	± 2 µm
IE5024	185 – 315	± 4 µm	± 2 µm

High-Resolution. Precise. Repeatable.

- **Additional decimal place**
- **Error limit up to ± 1.5 µm**
- **Repeatability ± 0.5 µm**
- **100 nm resolution, equivalent to 10,000 increments/mm**
- **Different measuring modes: ABS/INC, mm/inch**
- **Simple adjustment, operation and extension**

Technical Details

Measuring Ranges	Ø 30 – 140 mm in 4 Instruments Ø 50 – 115 mm in 2 Instruments
Error limit	1.5 µm up to Ø 140 mm Repeatability max. ± 0.5 µm
Gold Edition	For maximum precision and tight tolerances. Finer readout, lower error limits and improved repeatability.

Available Models

Art. No.	Range Ø in mm	Error limit	Repeatability
IE5001-G	30 – 40	± 1.5 µm	± 0.5 µm
IE5002-G	40 – 60	± 1.5 µm	± 0.5 µm
IE5003-G	60 – 90	± 1.5 µm	± 0.5 µm
IE5004-G	90 – 140	± 1.5 µm	± 0.5 µm
IE5021-G	50 – 75	± 1.5 µm	± 0.5 µm
IE5022-G	75 – 115	± 1.5 µm	± 0.5 µm

Interchangeable. Versatile. Customised.

- **Interchangeable measuring inserts**
- **For grooves, ball tracks, flanks and bores**
- **Special inserts available on request**
- **ABS/INC measuring modes**
- **Wireless or cable data transmission**
- **IP66, coolant-resistant**

Technical Details

Measuring Ranges	Ø 45 – 415 mm in 6 Instruments
Inserts	Bores, Slots, Threads
Error limit	3 µm up to Ø 155 mm 4 µm up to Ø 255 mm 5 µm up to Ø 415 mm Repeatability max. ± 2 µm
For Special Measurements	With interchangeable inserts, different requirements can be covered flexibly.

Available Models

Art. No.	Range Ø in mm*	Error limit**	Repeatability
IW7001	45 – 55	± 3 µm	± 1 µm
IW7002	55 – 75	± 3 µm	± 1 µm
IW7003	75 – 105	± 3 µm	± 1 µm
IW7004	105 – 155	± 3 µm	± 1 µm
IW7005	155 – 255	± 4 µm	± 2 µm
IW7006	255 – 415	± 5 µm	± 2 µm

*Depending on the insert, measuring range and linear accuracy may vary.
**The stated accuracy applies to inserts for bore measurement.

08 | Set Case

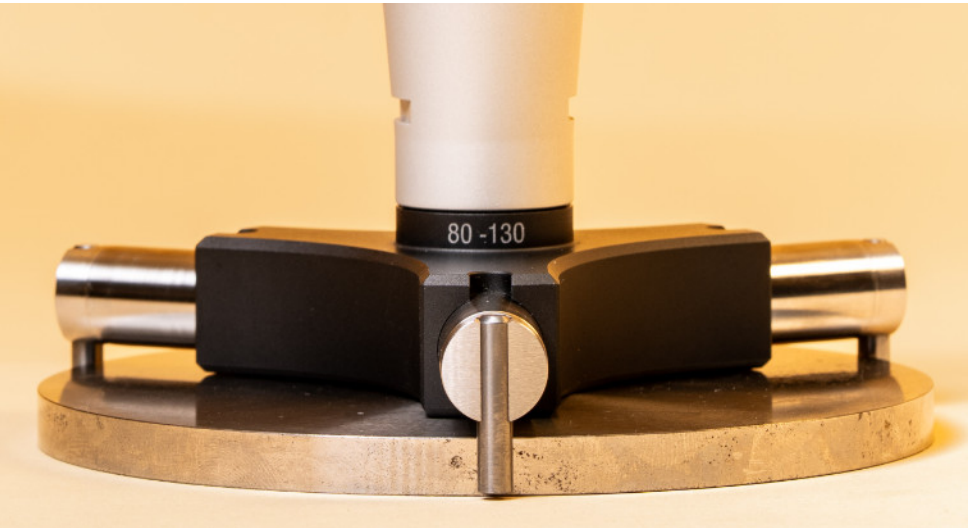
Compact. Complete. Ready to use.

Art. No.	Type	Range Ø in mm	Number Devices	Setting Rings / Master Gauge	Extension
IMS001	Analog	30 – 90	3	2 Rings Ø 40 / 90	200 mm
IMS002	Analog	90 – 400	3	1 Gauge Ø 40 / 90 / 240	200 mm
IMS003	Analog	30 – 400	6	1 Gauge Ø 40 / 90 / 240	200 mm
IES001	Digital	30 – 140	4	2 Rings Ø 40 / 90	200 mm

Digital sets can be individually configured
and offer excellent value for money thanks to a set discount.

09 | Digital External Micrometer

External. Direct. Controlled.



Art. No.	Range Ø in mm	Error limit	Repeatability
AE5001	28 – 38	± 4 µm	± 2 µm
AE5002	38 – 58	± 4 µm	± 2 µm
AE5003	54 – 84	± 4 µm	± 2 µm
AE5004	81 – 131	± 4 µm	± 2 µm
AE5005	131 – 231	± 6 µm	± 3 µm
AE5006	231 – 391	± 8 µm	± 4 µm
AE5021	46 – 71	± 4 µm	± 2 µm
AE5022	69 – 109	± 4 µm	± 2 µm
AE5023	106 – 176	± 6 µm	± 3 µm
AE5024	176 – 306	± 8 µm	± 4 µm

Grooves. Slots. Distances.

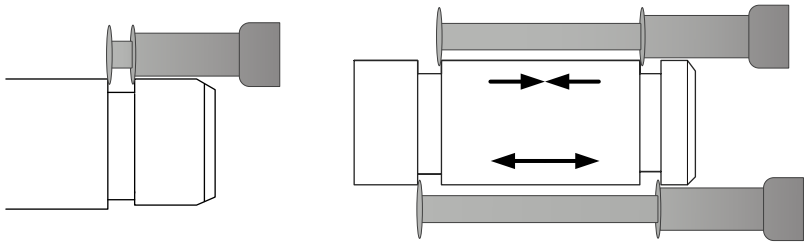
- **Measurement of grooves and slots**
- **Internal and external measurements**
- **Measuring range up to 60 mm**
- **Inserts can be changed quickly**
- **Impact- and splash-water resistant**

Technical Details

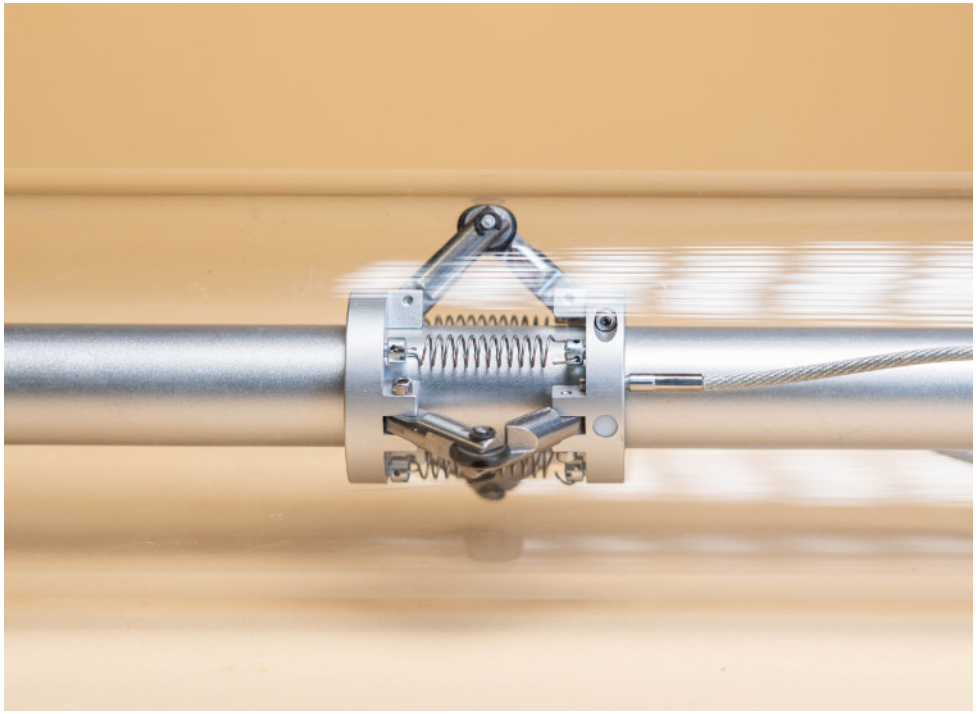
Measuring Ranges	0 / 1.2 – 30 mm 30 – 60 mm with Extension
Accuracy	± 0.02 mm 0.01 mm dial gauge readout
Function and Handling	Developed for fast distance measurements on grooves and slots. The compact design supports safe handling. Measuring inserts can be changed and extended easily.

Available Sets

Art. No.	Range in mm	Ø measuring disc in mm
SL1001	Set 0 / 1.2 – 60	11
SL1002	Set 0 / 1.2 – 30	11
SL1003	Set 30 – 60	11



Extended. Guided. Precise.



Extension for Deep Bores and Extended Reach

- **Measurement remains in the workpiece plane**
- **Accuracy remains unchanged**
- **Available up to Ø 400 mm, combinable beyond 15 m**

Tripod for Safe Centring in Deep Bores

- **Pre-centring in deep bores**
- **Scratch-free guidance on rubber rollers**

Available Extensions

Art. No.	Range Ø in mm	Measuring depth in mm
VL3001	30 – 400	50
VL3002	30 – 400	100
VL3003	30 – 400	200
VL3004	30 – 400	350
VL3005	30 – 400	500
VL3006	30 – 400	750
VL3007	30 – 400	1000
VL3008	30 – 400	1500
VL3101 (Elbow)	30 – 400	50

Available Tripods

Art. No.	Range Ø in mm
VL3203	60 – 90
VL3204	90 – 140
VL3205	140 – 240
VL3206	240 – 400
VL3222	75 – 115
VL3223	115 – 185
VL3224	185 – 315

Calibrated. Connected. Reliable.

Calibration Rings for Precise Adjustment and Reliable Reference Values

- **DIN 2250-1 Type C**
- **Hardened gauge steel, 60–62 HRC**
- **Deep-freeze treated for long-term dimensional stability**

Digital Accessories for Reliable Transmission and Efficient Evaluation

- **Wireless data transmission up to approx. 100 m**
- **Secure coded data transmission**
- **USB or RS232 interface**

Available Calibration Rings

Art. No.	Nominal diameter Ø in mm
KR0030-E	30
KR0040-E	40
KR0060-E	60
KR0075-E	75
KR0090-E	90
KR0140-E	140
KR0185-E	185
KR0240-E	240
KR0300	300
KR0400	400
KR0650	650
KR0900	900

Available Digital Accessories

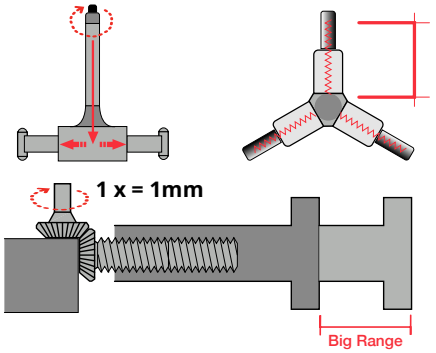
Art. No.	Description
IE5101	Wireless module
IE5102	USB receiver
IE5103	Interface cable, 2 m

Measuring Range and Accuracy

Microtest® System

The Microtest spindle measuring system combines the highest accuracy with a significantly larger measuring range.

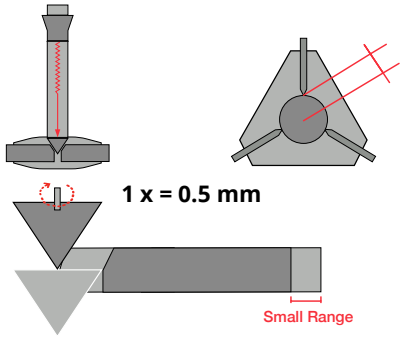
Depending on size, a single instrument can replace 2 to 6 conventional ones.



Cone System

Conventional 3-point internal micrometers are usually based on a cone system.

This strongly limits measuring range and accuracy. The measuring spindle at the top transfers the motion through the shaft to the cone, which extends the measuring probes.

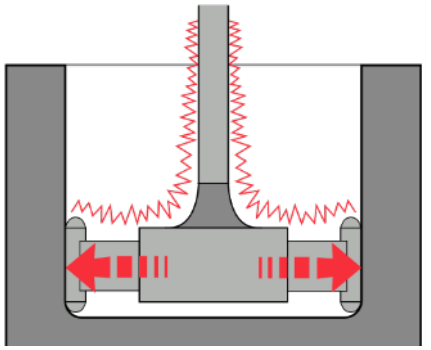


Centring

Microtest® System

The line contact of the probes enables optimal 3D centring. Vibrations from the firm ratchet at the scale head centre the instrument quickly and reliably.

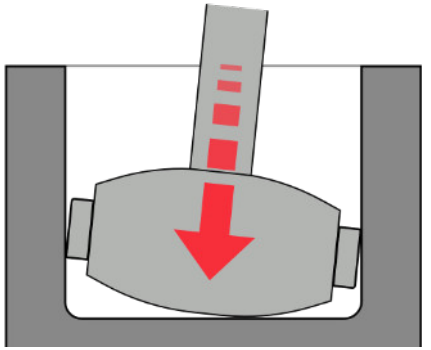
The bevel gear system ensures constant measuring pressure and enables operator-independent repeatability of ± 1–2 µm up to Ø 400 mm.



Cone System

The slip clutch provides constant measuring pressure but offers little support for centring.
Depending on the instrument, misalignment may occur, with increased scatter and reduced repeatability.

The ratchet improves centring, but repeated ratcheting pushes the wedge-shaped cone deeper into the probe system and distorts the measuring result.

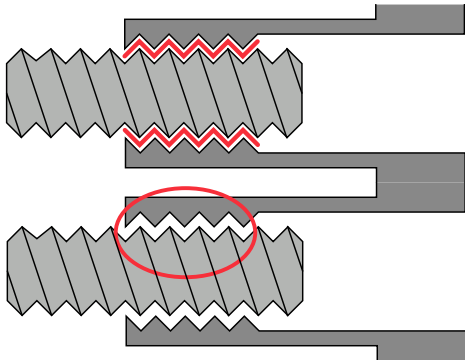


Technical Comparison: Advantages of our internal micrometers

Mechanical Wear

Microtest® System

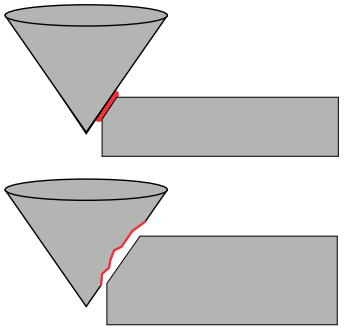
At the measuring nut, a large contact surface is available on the thread flanks. Wear is therefore minimal and acts linearly across the entire measuring range. During each routine adjustment, it is automatically compensated linearly.



Cone System

The probes only touch the cone along a line. This causes stronger, local and non-linear wear.

Since calibration is often performed only at the end of the measuring range, this deviation frequently remains unaccounted for.
Compensation is not possible.

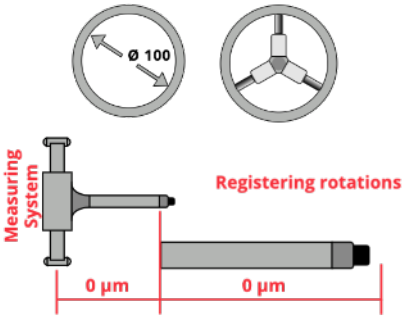


Technical Comparison: Advantages of our internal micrometers

Thermal Influence

Microtest® System

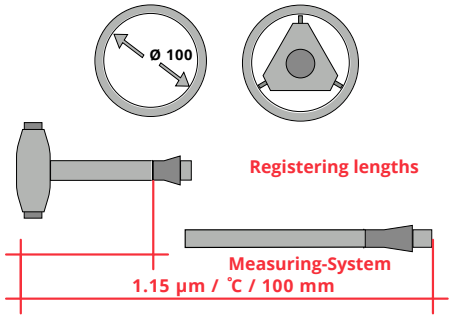
Our system behaves proportionally and linearly. Temperature-related expansion errors are largely compensated, so that near laboratory accuracy can be achieved even outside the nominal temperature of 20 °C.
In addition, all contact points are insulated to reduce unwanted heat transfer from the user's hand.



Cone System

Cone systems react to temperature changes in an undefined and difficult-to-control manner.

The measuring result depends on the expansion of the connecting elements between the cone and the measuring spindle. Protection against hand heat is usually not provided.



$\Delta L = L_0 \times \Delta T \times \alpha \qquad \alpha = 11.5 \cdot 10^{-6}\ K^{-1}$

Technical Comparison: Advantages of our internal micrometers

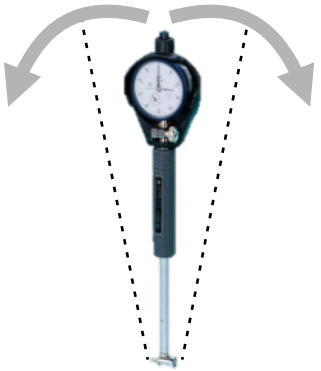
Comparison with 2-Point Measuring Devices

2-point measuring devices usually offer only short measuring ranges and often require conversion, followed by calibration using expensive setting gauges. Demanding handling and temperature sensitivity make reproducible measurements more difficult.

Swing System

With swing-type internal measuring instruments, the reversal point is determined by pivoting around the fixed measuring bolt.

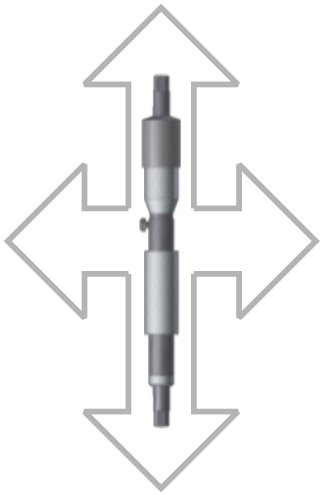
Since only a small measuring range is usually available, correct handling requires a great deal of feel and the manual coordination of two axes.



Rod System

Rod systems are demanding to operate: the measuring spindle must be moved by hand while the instrument is stabilised in two axes.

The centring process requires experience and transfers a lot of hand heat.
The larger the diameter, the more difficult the centring.



Technical Comparison: Advantages of our internal micrometers

Shape Error Detection

Microtest® System

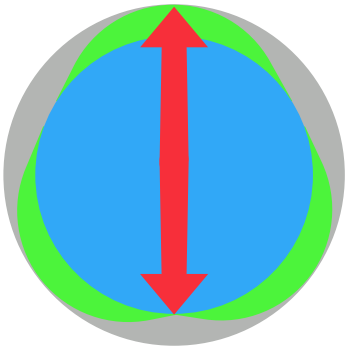
During bore machining, 3-jaw chucks or collets can cause polygonal deformation. 3-point instruments with 120° probe arrangement reliably detect this deformation.

By using different measuring positions, the difference between the largest and smallest diameter is determined.

2-Point System

For egg-shaped or undefined shapes, the 3-point instrument also has an advantage because it centres itself automatically.
Pure ellipses are rare.

A 2-point device often records only an average value due to the 180° probe arrangement. As a result, the bore may appear round even though a significant polygon error is present.



More Measuring Range. Lower Costs.

Example Ø 30 – 300 mm

Microtest® System

6 Instruments
3 Setting Rings

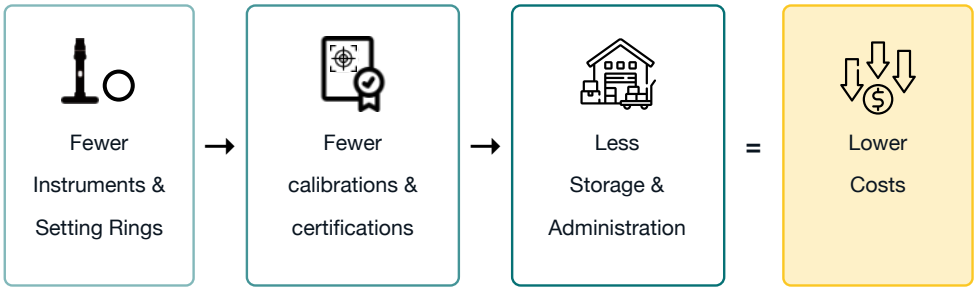
Cone System

16 Instruments
8 Setting Rings

The comparison ends at Ø 300 mm.
The Microtest instrument 240 – 400 mm extends beyond this range.

Depending on size, one Microtest internal micrometer can replace 2 to 6 conventional instruments.

Fewer instruments – less effort – lower costs



Service. Quality. Value Retention.

Care

Microtest internal micrometers are maintenance-free. For a long service life, we recommend keeping the instruments clean. Contamination from coolant or particles can usually be removed easily.

Repair

Damaged instruments are repaired according to quotation. Depending on condition, turnaround time is 2 to 4 weeks; express service by arrangement. Afterwards, the instrument measures precisely again. From 10 years onwards, the linear accuracy limit increases by 1 µm.

Calibration

On request, we recalibrate and certify your instruments and gauges for a small fee. The accuracy certificate documents the error limit across the entire measuring range.

Verification

Our products comply with the relevant standards and our factory standards. The test equipment used is traceable to national length standards. In addition, we provide a 2-year warranty, provided the warranty seal remains undamaged.

Internal Micrometers for bores,
slots and threads.

MICROTEST
SWISS MADE

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