# KOERZIMAT® 1.097 MS

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## MS Measuring Systems

proof

# KOERZIMAT® 1.097 MS PRODUCT INFORMATION

**During the production process of steel, hard metals and powder metallurgical components magnetic values such as coercive field strength HcJ, weight-specific saturation polarization σs and the volume-specific saturation polarization Js correlate to a variety of important process parameters and material properties.**

**With the KOERZIMAT® 1.097 MS FOERSTER offers a measuring system for the precise, automatic and economic measurement of the weight-specific saturation polarization σs and the volume-specific saturation polarization Js. As the measurement is geometry-independent it enables especially for testing of specimen with complex shape.**

## TESTING METHOD

- Withdrawal method in accordance with IEC-60404-14

## MEASUREMENT

- Weight-specific saturation polarization σs (T*m3/kg)
- Volume-specific saturation polarization Js [Tesla]
- Magnetic portion MA [% i.e. of Ni,Fe,Co]
- Dissolved tungsten in cobalt W [%] = (σs_Original – σs) *100 / σs_Original * 1.67
- Magnetic dipole moment j [Vsm / T*m3]
- Theoretic magnetic phase of high-alloy steels MP % = 100 % * σs/ σm

## APPLICATIONS

- Hard metal testing acc. to ASTM B886
- Quality control of sintering process of hard metals
- Determination of carbon content [Eta-Phase] in hard metals
- Determination of the portion of dissolved tungsten in cobalt in hard metals
- Determination of the free iron, cobalt or nickel content in metal powder or hard metals
- Determination of the saturation polarization Js in Tesla for soft magnetic components designed for magnetic circuits
- Indirect density control of powder-metallurgically produced soft-magnetic materials
- Research and development of new alloys and magnetic materials
- Determination of the theoretic magnetic phase of alloy steel according to Hoselitz
- Indirect determination of martensite/austenite or ferrite in stainless steel/dual phase steel

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## MODE OF OPERATION

The KOERZIMAT 1.097 MS systems consist of a strong permanent magnet (Halbach array) with a large air gap for loading the test specimen.
A pneumatic or manual test specimen feeder provides the specimen into the homogenous area of the magnet. By withdrawing the specimen the magnetic dipole moment j is measured by means of the Helmholtz coils and a fluxmeter.
To determine the weight- or volume-specific saturation polarization, a precision scale is needed. The mass of the specimen is determined and directly be transferred to the KOERZIMAT controller. For the determination of the volume-specific saturation polarization Js the volume/density of the specimen is additionally required.

### Specimen mass and sensitivity of the measuring system

Depending on the measurement range selected following maximum specimen mass can be measured:

| | | |
|---|---|---|
| Pure Cobalt [Co] | 16g [standard] | 40g [extended] |
| Pure Iron [Fe] | 12g [standard] | 30g [extended] |

The smallest possible specimen mass is:

| | | |
|---|---|---|
| Pure Cobalt [Co] | 0.5mg [MS 31x69] | 0.1mg [MS 26x60] |

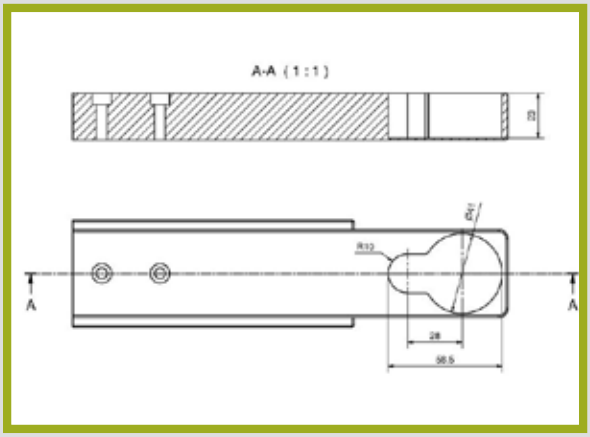
# KOERZIMAT® 1.097 MS PRODUCT INFORMATION


## KOERZIMAT 1.097 MS 31x69

### FEATURES

- High sensitivity for small test specimen ≥ 1g
- Measurement of large test piece weights up to 200g
- Compact, lightweight design by Halbach array
- Pneumatic test specimen feeder incl. slide
- Geometry-independent measurement
- Automatic slide compensation
- Loading and fitting of the test specimen by test inserts
- Calibration traceable to national standards [PTB]
- Accessory kit with inserts for test piece fitting

Test Specimen Chamber approx. 41 x 58.5 x 23 mm

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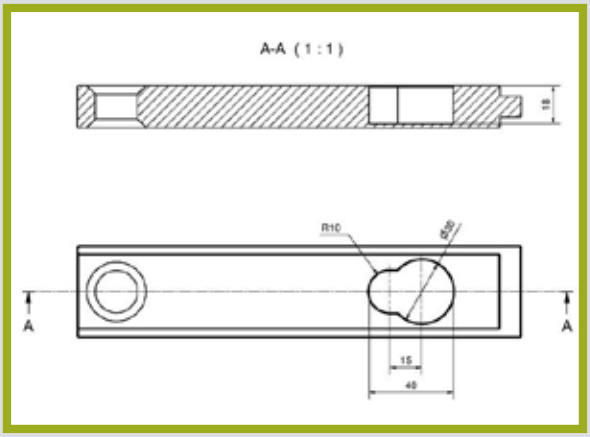
# KOERZIMAT 1.097 MS 26x60

## FEATURES

- Highest sensitivity for very small specimen ≥ 0.5g
- Measurement of large test piece weights up to 50g
- Compact, lightweight design by Halbach array
- Manual operation of the test specimen slide
- Test specimen slide for round bars Ø 3-10mm /
- 10-15mm
- Geometry-independent measurement
- Automatic slide compensation
- Loading and fitting of the test specimen by test inserts
- Calibration traceable to national standards [PTB]
- Accessory kit with inserts for test piece fitting

Test Specimen Chamber approx. 30 x 40 x 18 mm




# KOERZIMAT® 1.097 MS PRODUCT INFORMATION

## KOERZIMAT CONTROLLER / SOFTWARE MS

The compact KOERZIMAT Controller with MS Software forms a unit as a display and user interface for the MS measuring. The KOERZIMAT MS Software runs under Windows 8 Pro. Intuitive touchscreen functionalities are available and assist the handling of the measuring control. All measuring data are stored in a database and can be printed in a report or exported in a text file for further processing.

## FEATURES

- User interface language: GERMAN, ENGLISH, JAPANESE
- WINDOWS 8 country settings/languages online selectable
- Touchscreen operation
- Clearly structured display elements for measuring adjustments, value output in listed form
- Series measurement graphics, histogram, sorting groups and statistics
- Generating, print out and export of measured values/ statistics
- Password protected user levels for administration of functions and user access

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## TECHNICAL SPECIFICATION

# KOERZIMAT 1.097 MS 31x69

| | |
|---|---|
| Display elements | 8 LEDs for status display |
| Maximum specimen mass | approx. 200 g |
| Dimensions of the test specimen chamber (W x L x H) | 41 x 57 x 23 mm |
| Magnetic flux density | 1.15 T |
| Homogeneous area | Ø = 32 mm, h = 21 mm |
| Temperature coefficient | 12.5·10-8 T·m³/kg·K ≈ 0.625 mg Co/K |
| Noise | 5·10-8 T·m³/kg ≈ 0.25 mg Co |
| Sensitivity | 1·10-7 T·m³/kg ≈ 0.5 mg Co<br><br>i.e. 1g specimen with 10 % cobalt content (100 mg) provides a measuring value 200 times higher than the sensitivity limit of the system |
| Measurement uncertainty when calibrating with Ni standard | < 0.5 % of measured value |
| Linearity (% of full range) | ± 0.1 % |
| Temperature range | +5 °C to +45 °C |
| Measuring time | approx. 10 s (without weight determination) |
| Interface LAN | 100 MBit |
| Interface I/O-Port | 15-pin (Start button and 4 PLC input/outputs, 24 V) |
| Power supply | Plug-in power supply unit 100 to 240 VAC, 50/60 Hz |
| Power consumption | approx. 2 W |
| Compressed air connection | By quick-coupling with filter regulating unit 6 bar |
| Dimensions measuring system (W x H x L) | approx. 265 x 280 x 460 mm |
| Mass | approx. 29 kg |
| Protection class | IP53 |
| Testing standard / testing method | IEC 60404-14 / ASTM B886 |

# KOERZIMAT® 1.097 MS PRODUCT INFORMATION

## TECHNICAL SPECIFICATION

## KOERZIMAT 1.097 MS 26x60

| | |
|---|---|
| Display elements | 8 LEDs for status display |
| Maximum specimen mass | approx. 50 g |
| Dimensions of the test specimen chamber (W x L x H) | 30 x 40 x 18 mm |
| Magnetic flux density | 1.15 T |
| Homogeneous area | Ø = 26 mm, h = 16 mm |
| Temperature coefficient | 2.5·10-8 T·m³/kg·K ≈ 0.125 mg Co/K |
| Noise | 1·10-8 T·m³/kg ≈ 0.05 mg Co |
| Sensitivity | 2·10-8 T·m³/kg ≈ 0.1 mg Co<br><br>i.e. 1g specimen with 10 % cobalt content (100 mg) provides a measuring value 1000 times higher than the sensitivity limit of the system |
| Measurement uncertainty when calibrating with Ni standard | < 0.5 % of measured value |
| Linearity (% of full range) | ± 0.1 % |
| Temperature range | +5 °C to +45 °C |
| Measuring time | 3 s (without weight determination) |
| Interface LAN | 100 MBit |
| Interface I/O-Port | 15-pin (Start button and 4 PLC input/outputs, 24 V) |
| Power supply | Plug-in power supply unit 100 to 240 VAC, 50/60 Hz |
| Power consumption | approx. 2 W |
| Compressed air connection | By quick-coupling with filter regulating unit 6 bar |
| Dimensions measuring system (W x H x L) | approx. 172 x 217 x 230 mm |
| Mass | approx. 13.9 kg |
| Protection class | IP 53 |
| Testing standard / testing method | IEC 60404-14 / ASTM B886 |

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## ORDER INFORMATION

| Standard Kits | Order-no. |
|---|---|
| **KOERZIMAT 1.097 MS 26x60**<br>Consisting of:<br>• KOERZIMAT 1.097 MS 26x60 mm<br>• Accessory-Kit 26 x 60 | **1934686** |
| **KOERZIMAT 1.097 MS 31x69**<br>Consisting of:<br>• KOERZIMAT 1.097 MS 31x69 mm<br>• Accessory-Kit 31x69 | **1934643** |
| **KOERZIMAT CONTROLLER + KOERZIMAT MS Software**<br>Consisting of:<br>• 23" Touch screen<br>• Processor: Intel Quad Core, 2.90 GHz Turbo, 6 MB, HD Graphics 2500<br>• Memory : 4 GB (1x4 GB) 1600 MHz DDR3 Non-ECC<br>• Hard drive: 500 GB serial ATA III Hybrid<br>• 4 x USB 2.0 and 4 x USB 3.0 (of which 1 for dongle)<br>• VGA-output<br>• 1 x LAN, 1 x HDMI<br>• CD/DVD-drive<br>• Optical mouse with USB cable<br>• USB keyboard<br>• Language preferences (only for touch keyboard)<br>• Language recognition, if activated<br>• WINDOWS 8.1 PRO 64 BIT operating system<br>• KOERZIMAT MS PC software MS with dongle | **2016893** |

| Additional Software Option | Order-no. |
|---|---|
| **KOERZIMAT MS Software -magnetic phase-<br>[not included in standard KOERZIMAT MS-Software]** | **2016877** |

| Calibration Standards | Order-no. |
|---|---|
| **Calibration standard Ms Nickel with certificate** | **1934988** |
| **Calibration standard Ms Iron with certificate** | **1934996** |

# KOERZIMAT® 1.097 MS PRODUCT INFORMATION

| Precision scales / density kits | Order-no. |
|---|---|
| Precision scale XS 403S with low wind guard<br>Weighing range: 0…400 g<br>Reading precision: 1 mg | **0321567** |
| Density kit XS 403S<br>Wind guard Pro for XS 403S with high wind guard [for Density kit] | **0321583**<br>**0321621** |
| Analytical scale XSE 204 with high wind guard<br>Weighing range: 0…220g<br>Reading precision: 0.1 mg | **0321591** |
| Density kit for XSE 204 | **0321605** |

| Specimen slide for KOERZIMAT 1.097 MS 26 x 60 | Order-no. |
|---|---|
| Specimen slide for round bars with Ø 3-10 mm | **1935046** |
| Specimen slide for round bars with Ø 10-15 mm | **1942891** |