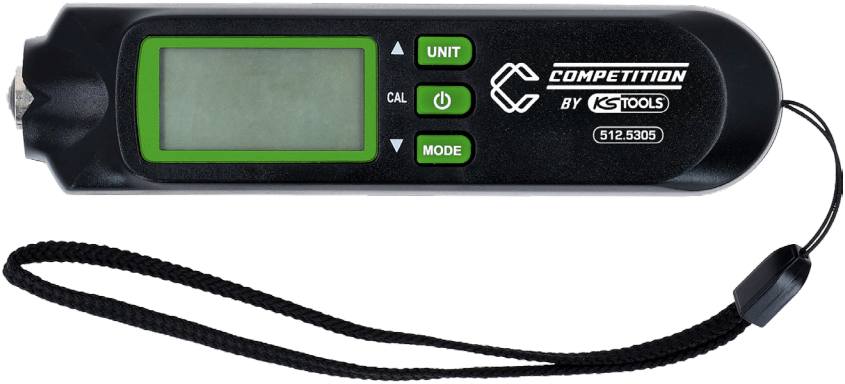
COMPETITION BY KS TOOLS

BEDIENUNGSANLEITUNG - NOTICE D'UTILISATION - OPERATING INSTRUCTIONS



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- **Schichtdicken-Messgerät**
- **Appareil de mesure de l'épaisseur de la peinture**
- **Layer thicknesses measuring instrument**
- **Medidor de espesores**
- **Strumento di misurazione dello spessore dei rivestimenti**
- **Lagtykkelse-måleapparat**
- **Urządzenie do pomiaru grubości warstw**
- **Laagdikte-meetapparaat**
- **Толщиномер покрытия**
- **ءالطلا كمس سايقل زاهج**

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Introduction

Dear Customer,

You have chosen a product from KS Tools. Thank you for your trust. This manual contains all the information you need for the safe and proper use of the product. Please therefore read the instructions thoroughly before use and always follow the guidance provided therein.These instructions form part of the article and should therefore be kept in such a way that they remain undamaged.

If you have any queries or require further information, please contact: customerservice@competitiontools.com

1. Terms of use

The manufacturer accepts no liability for personal injury or damage to property resulting from unauthorised or improper use.

This device is a portable instrument for the non-destructive measurement of coating thicknesses. It can be used to measure non-magnetic coatings (e.g. paint, ceramics, chrome) on magnetic metal substrates, or to measure insulating coatings (e.g. paint, ceramics) on non-magnetic metal substrates. It can be widely used in the manufacturing industry, for measuring paint thickness, etc.

2. Technical specifications

2.1 General specifications

Unit conversion: 1 mil = 0.0254 mm

Accuracy specifications:

Area	Resolution	Accuracy
0 µm to 999 µm	1 µm	± (2% of the measured value + 2 µm)
	0.1 mil	± (2% of the measured value + 0.1 mil)
1000 µm – 2000 µm	1 µm	± (2% of the measured value + 20 µm)
	0.1 mil	± (2% of the measured value + 1 mil)

Temperature coefficient:

0.15 × (specified accuracy)/°C (< 18 °C or > 28 °C)

Automatic substrate identification:

Ferrous metal (Fe) or non-ferrous metal (NFe)

Minimum radius of concave surfaces: 25 mm

Minimum radius of convex surfaces: 1.5 mm

Minimum measurement radius: 3 mm

Minimum thickness of the substrate: 0.5 mm

Calibration procedure: Zero-point calibration; multi-point calibration at skip-able calibration points

Automatic data hold function

Restoring factory settings

When switched on, the meter switches to the last measurement mode used.

Battery: 1.5 V batteries, AAA or equivalent, 2 pieces

Low battery indicator: The battery icon appears on the display

Automatic shut-off:

In single measurement mode and differential measurement mode: no operation for approx. 60 seconds.

In continuous measurement mode: no button presses for approx. 60 seconds.

Operating environment: Temperature: 0 °C to 40 °C

Relative humidity: 80%

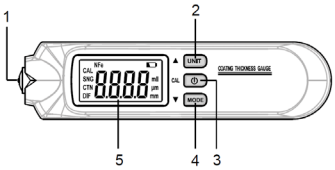
Storage conditions: Temperature: -10 °C to 50 °C

Relative humidity: ≤ 80%

Dimensions: 122 mm x 30 mm x 24 mm

Weight: approx. 66 g (including batteries)

3. Device description



1. test probe

2. ‘UNIT’ button

Used to select the desired unit (mm, µm or mil) in measurement mode.

Used to increase the value of the calibration point in calibration mode.

3. ‘On/Off’ button

When the meter is switched off, you can press this button to switch it on. In any mode other than calibration mode, you can press and hold this button for approximately 1 second to switch off the meter.

In measurement mode, press this button three times briefly to enter calibration mode.

In measurement mode, press this button briefly once to start the zero calibration.

In calibration mode, press this button briefly to select the desired calibration point.

In calibration mode, press and hold this button for about 1 second to exit calibration mode.

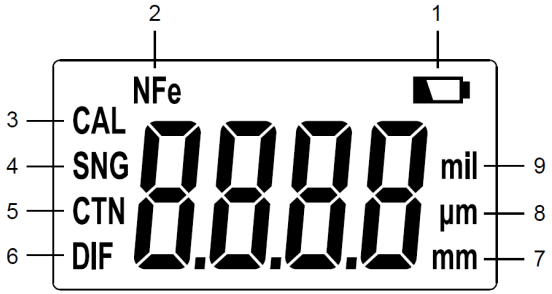
4. “MODE” button

This button can be used to:

- select the desired measurement mode – single measurement mode, continuous measurement mode or differential measurement mode.
- to decrease the value of the calibration point in calibration mode.

5. LCD display

4. Display



1	The batteries are low and need replacing immediately
2	NFe = non-ferrous metal Fe = ferrous metal
3	The meter is in calibration mode
4	The meter is in SINGLE measurement mode
5	The meter is in CONTINUOUS measurement mode
6	The meter is in DIFFERENCE measurement mode
7	Unit: millimetres
8	Unit: micrometre
9	A unit of length equivalent to one thousandth of an inch

5. Safety and User Instructions

Tools must generally only be used for their intended purpose, under the specified conditions and within the limits of their intended use.

6. How it works

MEASURING COATING THICKNESS

1. Switching on the meter

Hold the meter up in the air. Keep the test probe at least 20 cm away from any metal objects and maintain a distance of at least 1 m from strong electromagnetic fields (e.g. an electric fan).

Press the On/Off button once to switch on the meter; it will start a calibration in air as a reference. The display briefly shows all segments, after which the meter switches to the last measurement mode used.

To switch off the meter, press and hold the On/Off button for about 1 second.

Note:

When the device is in calibration mode ('CAL' is displayed), you cannot switch off the meter by holding down the On/Off button.

2. Select the desired unit of measurement

Press the "UNIT" button until the desired unit (mm, µm or mil) appears on the display.

3. Selecting the desired measurement mode

Press the "MODE" button until the desired measurement mode is selected; the display will show the corresponding symbol. The three selectable measurement modes are described as follows:

Single-shot mode SNG:

In single-measurement mode, the meter emits an audible signal when a stable reading is detected during the measurement, and this reading remains on the display until you take the next measurement, change the measurement mode, or the meter switches off.

Note: In single-measurement mode, you must move the meter's probe more than approximately 10 cm away from the test object if you wish to take a new measurement.

Continuous measurement mode CTN:

In continuous measurement mode, the meter takes measurements continuously and displays the readings in real time until you remove the probe from the test object.

Note: If no button is pressed for approximately 60 seconds in continuous measurement mode, the meter switches off automatically.

Differential measurement mode (DIF):

In differential measurement mode, the gauge emits an audible signal when a stable coating thickness value is detected during the measurement, and displays the absolute value of the difference between this coating thickness value and the value obtained during the last measurement in differential measurement mode. This difference value remains on the display until you take a new measurement, change the measurement mode or the meter switches off.

Note:

In differential measurement mode, you must move the meter's probe more than approximately 10 cm away from the test object if you wish to take a new measurement.

If you take the first measurement in differential mode after switching on the gauge, the gauge will display the measured coating thickness value rather than the differential value.

4. Carrying out the measurement

Press the probe of the measuring device vertically against the surface of the object being tested. The test device begins the measurement and displays the result in accordance with the current measurement mode, as described below:

In single measurement mode or difference measurement mode, the meter emits an audible beep when it detects a stable reading, and the measurement result is displayed and held on the screen until you take a new measurement, change the measurement mode, or the meter switches off.

In continuous measurement mode, the meter takes measurements continuously and displays the readings in real time until you move the meter's probe away from the test object.

POINTS TO NOTE WHEN TAKING MEASUREMENTS

1. Thickness of the substrate

Every coating thickness gauge has specific requirements regarding the thickness of the substrate. The following applies to every measuring instrument: If the thickness of the substrate exceeds a certain value, the measurements are not affected by the substrate thickness. The required substrate thickness for this measuring instrument is: 0.5 mm.

2. edge effect

This measuring instrument is highly sensitive to sudden changes in the surface profile of the test specimen. Measurement results near the corners or edges of an object are not reliable.

3. Curvature

The surface curvature of the test object affects the measurement result. This effect increases significantly as the radius of the surface curvature decreases.

4. Surface roughness

The roughness of the object/substrate surface affects the measurements. The higher the roughness, the greater the effect. A rough object/substrate surface can cause...cause systematic errors and random errors. To avoid random errors, take several additional measurements at different points on the object. If the substrate of the object under test is rough, you must first perform a zero-point calibration (at the '0 µm' calibration point) at several positions on an uncoated substrate whose material and surface roughness are similar to those of the substrate of the object under test. Or, where practicable, remove the coating from a section of the object under test and calibrate the measuring instrument using the exposed section of the object's substrate.

5. Surface cleanliness

Before each measurement, remove any dust, dirt, grease, etc. from the surface of the object without damaging the coating to be measured. Also, make sure that the probe of the measuring device is clean before each measurement.

6. Surroundings

To avoid interference that could affect the measurement result, keep the meter at least 1 metre away from strong electromagnetic fields (e.g. an electric fan).

CALIBRATING THE MEASURING INSTRUMENT

You must calibrate the meter if you are using it for the first time, if you have not used it for a long time, if the measurement is inaccurate, or if the substrate on which you wish to measure the coatings has changed.

Zero calibration

Once the meter is switched on, set it to single-measurement mode and then press the test probe vertically against the surface of the substrate. When the measurement result is displayed (it should be less than 10.0 µm), briefly press the On/Off button. The display shows 'CAL' and '- - - -', and the meter then emits a beep to indicate that the zero calibration is complete.

Multi-point calibration

The measuring device has 7 calibration points (in µm) for both non-ferrous and ferrous metal substrates, at which you can perform calibrations.

Please ensure you have the substrate required for calibration and the 6 calibration reference sheets supplied, with thicknesses of 45 µm to 55 µm, 90 µm to 110 µm, 225 µm to 275 µm, 450 µm to 550 µm, 900 µm to 1100 µm and 1620 µm to 1980 µm. The material of the substrate used for calibration must be the same as that of the test substrate. And the radius of curvature of the surface of the substrate you wish to use for calibration must meet the relevant requirements set out in the section '**General specifications**" are specified.

The following calibration procedure uses an iron substrate and the supplied 50-µm calibration reference film to demonstrate how to calibrate the meter.

1.

2.

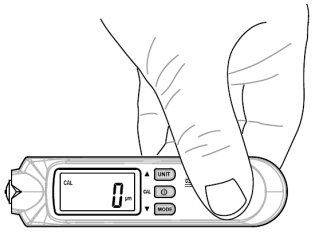
1. iron substrate

2. Calibration reference film

Remove the protective films from the substrate and the calibration reference film.

Make sure the meter is switched on, then hold it up in the air. Keep the probe at least 20 cm away from any metal objects and maintain a distance of at least 1 m from strong electromagnetic fields (e.g. an electric fan). Then press the On/Off button quickly and briefly three times to enter calibration mode. The meter emits a beep and 'CAL' appears on the display, indicating that the meter is in calibration mode. The display shows the calibration point '0 µm' (see Figure A).

A

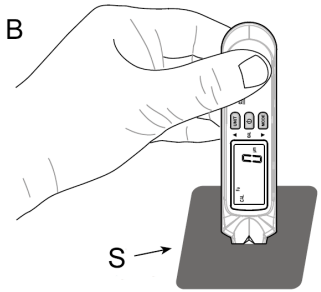


3. Press and hold the meter's test probe vertically against the surface of the substrate (see Figure B). The meter starts the calibration automatically. When calibration is complete, the meter emits an audible signal and the display shows "- - - -" along with the material type ("Fe" or "NFe") of the substrate. Move the meter well away from the substrate and ensure that it is at least 10 cm away

from the substrate and from any other metallic objects. A few seconds later, the meter emits a beep and the display shows the value of the calibration point.

Note:

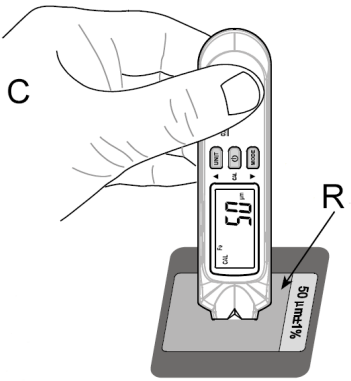
If you wish to use a different type of substrate, you must recalibrate the meter for that type of substrate.



S: Substrate (e.g. iron plate)

4. Place the supplied 50 µm calibration reference film onto the substrate, then briefly press the On/Off button until the calibration point '50 µm' is displayed. Use the "MODE" or "UNIT" button to set this calibration point ("50 µm") to match the actual thickness of the supplied 50-µm calibration reference sheet. Hold the probe of the measuring device perpendicular to this reference film, as shown in Figure C. The meter starts the calibration automatically. Once calibration is complete, the meter emits an audible signal and the display shows "- - - -" along with the material type ("Fe" or "NFe") of the substrate. Move the meter well away from the substrate and ensure that it is at least 10 cm away from the substrate and from any other metallic objects. A few seconds later, the meter emits a beep and the display shows the value of the calibration point.

Note: The value displayed corresponds to the actual thickness of the reference film.



A: 50 µm calibration reference film

5. Repeat step 4 to complete the calibration for the remaining five calibration points (100 µm, 250 µm, 500 µm, 1000 µm, 1760 µm).

Note: The calibration reference film placed on the substrate must correspond to the calibration point shown on the display.

6. To exit calibration mode:

Hold down the On/Off button during calibration.

Press the On/Off button briefly when the calibration point “1760 µm” is displayed.

Note: If no operation is performed for more than 1 minute, the meter will automatically exit calibration mode.

Once you have carried out the calibrations at all 7 calibration points for the desired substrate type, you can check the meter’s measurement accuracy by taking readings in measurement mode; and if the meter has not been calibrated accurately at a particular calibration point, you can return to calibration mode and recalibrate the meter at that calibration point.

Note:

1. The actual thickness of a calibration reference film can be determined by measuring the reference film using a precision measuring instrument.

2. The material of the substrate used during calibration must be identical to that of the substrate of the object whose coatings you wish to measure.

3. For measurements taken on the test object near the edges or corners, calibration should be carried out at the same position on the substrate.

4. Regardless of whether calibration or measurement is being carried out, each substrate or test specimen must meet the relevant requirements set out in the section ‘GENERAL SPECIFICATIONS’.

5. In addition to calibrating at all 7 calibration points, you have the option of calibrating specific points within a selected range. For example, if the selected calibration range is 0 µm to 100 µm, you only need to calibrate at the calibration points 0 µm, 50 µm and 100 µm.

RESETTING TO FACTORY SETTINGS

Make sure the meter is switched off. Press and hold both the ‘MODE’ button and the power button. When the display shows “- - -”, release the “MODE” button.

The display shows “0”, “00”, “000” and “0000” in succession, then the meter emits a beep and switches to single measurement mode (“SNG” is displayed), with the unit “µm” shown. The factory settings have now been restored. Release the on/off button.

BATTERY REPLACEMENT

If the low-battery indicator remains on the display, the batteries are low and mustbe replaced immediately. If the battery charge continues to drop, the meter will switch off automatically after three beeps.

Before replacing the batteries, make sure the meter is switched off. Remove the battery cover by sliding it in the direction of the arrow on the cover. Replace the old batteries with new ones of the same type, making sure the polarity is correct. Refit the battery cover.

ACCESSORIES

- User manual
- Calibration substrates and reference films

Note: The value marked on the reference sheet supplied is the actual thickness of that reference sheet.

7. Maintenance

Faulty or defective spare parts may cause damage.

8. Control

All tools must be checked for damage.

9. Disposal

The tool must be disposed of or recycled in accordance with the relevant national legislation.

10. Warranty and Service

The KS Tools Werkzeuge und Maschinen GmbH warranty applies to all tools used under normal operating conditions.

The following are excluded from the warranty:

- Consumables, e.g. all types of cutting tools, grinding inserts and discs, cutting and scraping tools, brooms, brushes, files, batteries, rechargeable batteries, bits or bit sockets, rotor blades in pneumatic tools, insulators on heating coils, all types of fuses, carbon brushes, etc.
- Malfunctions of parts subject to wear and tear resulting from use or other natural causes, as well as defects in the tool attributable to wear and tear resulting from use or other natural causes.
- Defects in the tool resulting from failure to follow the operating instructions, improper use, use under abnormal environmental conditions or inappropriate operating conditions, overloading, or improper maintenance. This also includes damage to tools caused by the use of accessories or other parts that are not genuine KS Tools parts.
- Tools to which changes or additions have been made.
- Minor deviations from the specified quality, which are, however, of no significance to the value and serviceability of the tool.

The warranty period is 12 months in the case of commercial use or use of a similar nature. The warranty period begins on the date of purchase by the commercial end customer. The date on the original receipt is decisive. For technical products covered by a limited warranty (Types A, B and C), the user must always provide proof of purchase, stating the serial number of the device, if available.

The warranty is valid, subject to the type of warranty, for the period specified in the price list valid on the date of purchase of the product.

WARRANTY STATEMENT

If the product is not covered by the warranty (due to the warranty period having expired or exclusion from the warranty for the reasons listed above), but repair is possible, it will only be carried out once the user has approved the quote.

Any claims other than the right to have defects rectified, as set out in this warranty, are expressly excluded from this warranty.

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