

Operating Instructions for the Coating Thickness Gauges

**MiniTest
650E F
650E FN**

**MiniTest
650B F
650B FN**

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Field of Applications

Small and portable gauge for quick and easy on-site use, for example by surveyors, car dealers or on your construction site.

MiniTest 650E F and MiniTest 650B F work according to the principle of magnetic induction to measure non-magnetic coatings on iron and steel substrates.

MiniTest 650E FN and MiniTest 650B FN use a dual sensor working on two principles: magnetic induction and eddy currents to measure non-magnetic coatings on iron and steel as well as insulating coatings on non-ferrous metal substrates.

The dual FN sensor automatically identifies the substrate material and switches to the appropriate measuring principle accordingly.

All models conform to:
DIN EN ISO 1461, 2178, 2360, 2808, 3882;
ASTM B244, B499, D7091, E376

Scope of delivery

- MiniTest 650E or MiniTest 650B
- 1 or 2 zero reference plate(s)
- 1 calibration foil
- 3 batteries AAA (Micro)
- Operating instructions German/ English/ French
- Soft pouch

A. Start-up

Inserting the batteries

MiniTest 650 is delivered including 3 batteries. Place the gauge front side down onto an even surface. Loosen the screw of the battery compartment, remove the lid and insert the three batteries (AAA). Make sure to respect correct polarities, following the markings in the battery compartment.

Replacing the batteries



The following events require a battery change:

BATT flashing after switch-ON, E6 is shown and the gauge shuts down after one second: Change batteries immediately.

BATT flashing during measurement:

You may continue measurement. Then switch the gauge off and change batteries.

Otherwise, the battery symbol will continue to flash after you switch OFF and ON again and the gauge will shut down after a second.

Caution:

Please respect polarities when changing batteries! Make sure to insert the fresh batteries within 30 seconds after removing the old ones. Otherwise, the calibration values will get lost.

B. Operation

Control keys

MiniTest 650E F and E FN are operated via one single control key, the models MiniTest 650B F and B FN are operated via three keys.



1. Switch ON

Briefly press ON. The last reading is shown along with the matching measuring principle ("Ferr" or "Non-Ferr").

2. Switch OFF

MiniTest 650 is programmed to switch off automatically approx. 90 sec. after the last measurement or key action. Alternatively, use the ON/ OFF button for switching off.

3. Calibration

MiniTest 650E F and MiniTest 650E FN are factory-calibrated. No further calibration is required. After switch-ON you can directly proceed on measurement.

3.1 Zero-point calibration

MiniTest 650B F and B FN are also factory-calibrated and directly ready for measurement after switch-ON. Their factory calibration is sufficient for simple and quick measurement and if larger tolerances are acceptable. To increase the measuring accuracy, you should use the zero-point calibration. It is also recommended for substrates of a nature other than the one of the reference zero plates or for curved or rough samples.

During measurement, MiniTest 650B FN automatically identifies the substrate. In the calibration mode, however, the automatic switch to the appropriate measuring principle becomes inactive. Therefore, prior to calibration, it is requested to take a reading on the uncoated sample (ferrous or non-ferrous), if calibration is to be done for a measuring principle other than the one used for the last measurement. Place the sensor on the sample. "Ferr" or "Non-Ferr" will be shown accordingly.

If, later on, you wish to measure on both substrates (ferrous and non-ferrous), make sure to calibrate for both substrates. On that purpose, please use an uncoated sample for each substrate.

For zero-point calibration, please proceed as follows:

MiniTest 650B F or B FN are switched ON.

1. Press ZERO-key to initialize calibration. 'ZERO' flashing and 'MEAN' is shown to indicate that a mean value will be shown.
2. Take your uncoated sample (coating thickness = zero) and place the sensor onto it. Wait for the signal tone to sound and lift the sensor. Repeat this procedure several times. The mean value calculated from your set of measurements is shown. If you wish to abort the zero-point calibration, press CLEAR-key.
3. Press ZERO-key to complete zero-point calibration. "ZERO" (non-flashing) will be shown on display.

Now you can take readings!

The calibration needs to be effected for each principle of measurement ("Ferr" or "Non-Ferr") individually.

3.2 Delete calibration

Press ZERO followed by CLEAR. The ZERO-calibration will be deleted. Note: The factory calibration for use on flat and even surfaces will be enabled automatically.

C. Trouble Shooting

The following list of error codes explains how to identify and eliminate faults. All error codes start with an "E" for "Error".

Errors causing the gauge to shut-down:

- E 3: Sensor failure. This error code appears at switch ON.
- E 4: Sensor providing unstable readings (due to strong magnetic fields in close proximity or if readings are taken on soft coatings).
- E 5: At switch-ON, the sensor was held in close proximity to metal.

E 6: Low battery.

E11: Remove batteries for 2 minutes

Failures without any error code shown:

- The gauge will not switch off automatically
- The gauge is unable to take any further readings
- Keys are without function
- Illogical readings

Remedy with MiniTest 650B: Total Reset

Note: A Total Reset will delete all calibration values!

Switch the gauge off. If the gauge will not switch off via the ON/OFF-key, please remove batteries prior to the Total Reset.

Press and hold CLEAR and ZERO key, then press the ON-key simultaneously.

A long bleep sounds to confirm the Total Reset. The last reading and the calibration values have been deleted.

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D. Technical Data

Gauge type	MiniTest 650E F	MiniTest 650E FN
Measuring range	F: 0...3 mm / 120 mils	F: 0...2 mm / 80 mils N: 0...2 mm / 80 mils
Measuring principle	magnetic induction	magnetic induction / eddy current
Measuring uncertainty*1	± (3 µm + 5 % of reading) / ± (0.12 mils + 5 % of reading)	± (3 µm + 5 % of reading) / ± (0.12 mils + 5 % of reading)
Low range resolution	2 µm / 0,08 mils	2 µm / 0,08 mils
Min. curvature radius, convex	50 mm / 2"	50 mm / 2"
Min. curvature radius, concave	100 mm / 4"	100 mm / 4"
Min. area for measurement*2	∅ 50 mm / ∅ 2"	∅ 50 mm / ∅ 2"
Min. substrate thickness*2	F: 0.70 mm / 28 mils	F: 0.70 mm / 28 mils N: 0.1 mm / 4 mils
Measuring units:	according to model: µm/mm or mils/inch	
Calibration	factory calibration (no calibration required)	factory calibration (no calibration required)
Operating temperature	gauge: 0...50 °C / 32 °...122 °F sensor: -10 °...70 °C / 14 °...158 °F	
Power supply	3 Micro-AAA batteries for more than 10,000 readings	
Standards	DIN EN ISO 1461, 2178, 2360,2808, 3882 ASTM B 244, B 499, D7091, E 376	
Dimensions	housing: 70 mm x 122 mm x 32 mm / 2.7" x 4.8" x 1.26" sensor: ∅ 15 mm x 62 mm / ∅ 0.60" x 2.44";	
Weight including batteries	approx. 225 grams / 7.93 ozs	

Gauge type	MiniTest 650B F	MiniTest 650B FN
Measuring range	F: 0...3 mm / 120 mils	F: 0...2 mm / 80 mils N: 0...2 mm / 80 mils
Measuring principle	magnetic induction	magnetic induction / eddy current
Measuring uncertainty*1	± (2 µm + 3 % of reading) / ± (0.08 mils + 3 % of reading)	± (2 µm + 3 % of reading) / ± (0.08 mils + 3 % of reading)
Low range resolution	1 µm / 0.04 mils	1 µm / 0.04 mils
Min. curvature radius, convex	10 mm / 0.4"	10 mm / 0.4"
Min. curvature radius, concave	50 mm / 2"	50 mm / 2"
Min. area for measurement	∅ 50 mm / ∅ 2"	∅ 50 mm / ∅ 2"
Min. substrate thickness	F: 0.70 mm / 28 mils	F: 0.70 mm / 28 mils N: 0.1 mm / 4 mils
Measuring units:	according to model: µm/mm or mils/inch	
Calibration	factory calibration , zero-point calibration	factory calibration , zero-point calibration
Operating temperature	gauge: 0...50 °C / 32 °...122 °F sensor: -10 °...70 °C / 14 °...158 °F	
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*1 acc. to DIN 55350 part 13