Operating Instructions
for the Coating Thickness Gauges

MiniTest 650E F
650E FN

MiniTest 650B F
650B FN

Table of Contents
A. Start-up
B. Operation
C. Troubleshooting
D. Technical Data

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:
    - ASTM B244, B499, D7091
    - DIN EN ISO 1461, 2178, 2360, 2808, 3882
    - ASMT B244, B909, E376

Scope of delivery
- MiniTest 650E: or MiniTest 650B
- 1 or 2 zero reference plates(s)
- 1 calibration foil
- 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 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 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.
Errors causing the gauge to shut down:
E: 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).

3.2 Deactivate calibration
Press ZERO followed by CLEAR. The DEACTIVATE will be displayed. 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 them. All error codes start with an "E" for "Error." Errors causing the gauge to shut down:
E: 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).

D. Technical Data

<table>
<thead>
<tr>
<th>MiniTest 650E F</th>
<th>MiniTest 650E FN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauge type</td>
<td>F: 0.3 mm / 120 mils</td>
</tr>
<tr>
<td>Measuring range</td>
<td>0.2 mm / 80 mils</td>
</tr>
<tr>
<td>Measuring principle</td>
<td>magnetic induction</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>- 5°C to + 50°C</td>
</tr>
<tr>
<td>Power supply</td>
<td>3 V micro-batteries</td>
</tr>
<tr>
<td>Weight Including batteries</td>
<td>approx. 225 grams</td>
</tr>
<tr>
<td>Dimensions</td>
<td>70 mm x 122 mm x 32 mm</td>
</tr>
<tr>
<td>Standards</td>
<td>DIN EN ISO 1461, 2178, 2360, 3882</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MiniTest 650B F</th>
<th>MiniTest 650B FN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauge type</td>
<td>F: 0.3 mm / 120 mils</td>
</tr>
<tr>
<td>Measuring range</td>
<td>0.2 mm / 80 mils</td>
</tr>
<tr>
<td>Measuring principle</td>
<td>magnetic induction</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>- 5°C to + 50°C</td>
</tr>
<tr>
<td>Power supply</td>
<td>3 V micro-batteries</td>
</tr>
<tr>
<td>Weight Including batteries</td>
<td>approx. 225 grams</td>
</tr>
<tr>
<td>Dimensions</td>
<td>70 mm x 122 mm x 32 mm</td>
</tr>
<tr>
<td>Standards</td>
<td>DIN EN ISO 1461, 2178, 2360, 3882</td>
</tr>
</tbody>
</table>

For zero-point calibration, please proceed as follows:

1. Make sure that the MiniTest 650 B/F or F/N are switched ON.
2. Press ZERO key to initialize calibration. "ZERO" flashing and 'M' is shown to indicate that a mean value will be averaged.
3. The mean value calculated from your set of measurements is shown. If you wish to abort the zero-point calibration, press CLEAR key.
4. 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 performed for each principle of measurement ("Ferr" or "Non-Ferr") individually.

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 automatically press ZERO followed by CLEAR, then press the ON key.

Remedy with MiniTest 650 B/F or F/N:

Switch the gauge off. If the gauge will not switch off automatically press ZERO followed by CLEAR, then press the ON key.

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 automatically press ZERO followed by CLEAR, then press the ON key.

Remedy with MiniTest 650 B/F or F/N:

Switch the gauge off. If the gauge will not switch off automatically press ZERO followed by CLEAR, then press the ON key.

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 automatically press ZERO followed by CLEAR, then press the ON key.

Remedy with MiniTest 650 B/F or F/N:

Switch the gauge off. If the gauge will not switch off automatically press ZERO followed by CLEAR, then press the ON key.

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 automatically press ZERO followed by CLEAR, then press the ON key.

Remedy with MiniTest 650 B/F or F/N:

Switch the gauge off. If the gauge will not switch off automatically press ZERO followed by CLEAR, then press the ON key.

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 automatically press ZERO followed by CLEAR, then press the ON key.

Remedy with MiniTest 650 B/F or F/N:

Switch the gauge off. If the gauge will not switch off automatically press ZERO followed by CLEAR, then press the ON key.

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 automatically press ZERO followed by CLEAR, then press the ON key.

Remedy with MiniTest 650 B/F or F/N:

Switch the gauge off. If the gauge will not switch off automatically press ZERO followed by CLEAR, then press the ON key.

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 automatically press ZERO followed by CLEAR, then press the ON key.

Remedy with MiniTest 650 B/F or F/N:

Switch the gauge off. If the gauge will not switch off automatically press ZERO followed by CLEAR, then press the ON key.