ElektroPhysik

Operating Instructions

for

MiniTest
70F

MiniTest
70FN

Coating Thickness

Gauges

Operating Instructions
MiniTest 70F
MiniTest 70FN

The gauges conform to the following norms and standards:
DIN EN ISO 1461, 2064, 2178, 2360, 2808, 3882
ASTM B 244, B 499, D7091, E 376

A. Start-up
B. How to operate the gauge
C. Initial functions
D. Error messages
E. Technical specifications

Application
Designed for quick and precise non-desctrucitve measurement, the coating thickness gauges of the MiniTest 70 Series feature ElektroPhysik's SIDSP® digital sensor technology. This technology stands for high precision and interference immunity.

The MiniTest 70 Series is available in two models:

The **MiniTest 70 F** model works on the **magnetic induction principle (F)** allowing to measure any non-magnetic coatings such as paint, enamls, rubber, aluminium, chrome, copper, zinc, etc. applied on iron and steel (also on alloyed or tempered magnetic steel, except on austenitic or weakly magnetic steel).

MiniTest 70 FN incorporates a dual sensor for automatic identification of the substrate material. The gauge upon contact with the surface automatically switches to

---

the suitable measuring principle based on your application: magnetic induction or eddy currents.

The **N**-part of this dual probe works on the **eddy currents principle** allowing to measure any insulating coatings such as paint, plastics, Eloxal, ceramics etc. applied on any non-ferrous metal bases (such as aluminium, copper, zinc die-cast, brass, etc.) or applied on austenitic steel.

Scope of delivery

- MiniTest 70 (F or FN model)
- 1 zero plates (for F model)
- 2 zero plates (for FN model)
- 2 precision standards
- 1 AA battey
- Gauge tether
- Operating instructions in German / English
- Soft pouch with belt clip

A. Start-up
First remove battery protection strip!
The gauge comes with a battery inside the battery compartment. Before switching on, remove the battery protection strip. Push battery lid in the direction of arrow and lift. Remove the battery protection strip and close lid.
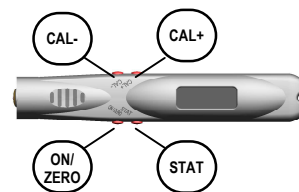
➔
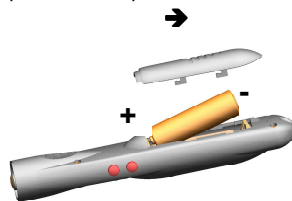
Changing batteries:
If the BAT-symbol flashes, the battery must be changed. Insert fresh battery into the battery compartment. Use the same type

---

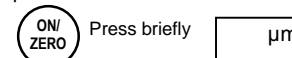as the original one (AA). Respect +/- polarities. Close battery lid.

B. How to operate the Gauge / Control Buttons

Four buttons are available to operate the gauge:

1. Switch on
Press ON/ZERO button briefly. µm is shown.

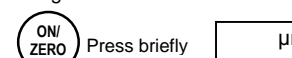(ON/ZERO) Press briefly | µm

2. Switch off

(ON/ZERO) Press ON/ZERO for a second. Wait for the signal to sound and release key.

3. One-point Calibration
Gauge is switched on.

(ON/ZERO) Press briefly | µm

µm flashing
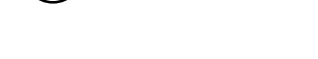
Put the sensor on an uncoated calibration sample. The sample should have the same shape as the coated object to be measured. Wait for the bleep to sound and lift sensor. Repeat this proce-

---

dure several times. The gauge calculates and shows the mean value $\overline{x}$. Using the mean value is to improve the precision of calibration.

(ON/ZERO) Press button briefly to store the calibration point.

4. Two-point Calibration
This calibration method is more precise than the one-point calibration and is essential for measuring curved surfaces. To ensure most accurate results, choose a precision standard with a thickness close to the sample thickness to be expected.

Press ON/ZERO briefly

(ON/ZERO) | µm

µm flashing
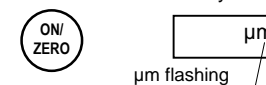
Put the sensor on an uncoated calibration sample. The sample must have the same shape as the coated object to be measured. Wait for the bleep to sound and lift sensor. Repeat this procedure several times. The gauge calculates and shows the mean value $\overline{x}$. Using the mean value is to improve the precision of calibration.

(ON/ZERO) Press button briefly to store the calibration point.

Take a calibration standard and place it on the uncoated sample.
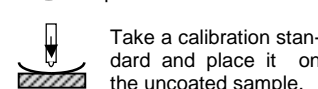
Put the sensor on the calibration standard. Wait for the bleep to sound and remove sensor.

(CAL+) Use CAL+ or CAL- keys to adjust to the thickness of the precision standard.
(CAL-) Now take reading!

Note: Calibrating the first point (zero) will automatically delete the 2nd calibration point.

5. Recalibrate
If measuring conditions have changed, it may be necessary to recalibrate accordingly. This can be done at any time.

If you first change the one-point calibration, as a consequence, you also have to recalibrate for the second calibration point (the one with the precision standard).

If recalibration is not started at the one-point calibration, it is also possible to change solely the second calibration point.

6. MiniTest 70 FN
The FN model incorporates a dual sensor for automatic identification of the substrate material. It switches to the suitable measuring principle according to your application.

The activated measuring principle is shown after the gauge has been switched on and a reading has been taken. It is also shown if the meauring principle has changed. Before any reading is shown, **F** appears for the magnetic-induction principle, **N** for the eddy currents principle.

| F | | ⊓ |

You have to calibrate for the two prinicples separately. This may be a one-point or a two-point calibration for each principle.

The statistics is always calculated for the measuring principle that was active when the first reading of a series has been taken.

7. Statistics Overview

If you are in measuring mode, press STAT-key to call the statistics of the current measuring series. Press STAT-key repeatedly. Statistics values are shown in the following order:

1. $(STAT)$ $[n]$ number of readings, 999 max.

2. $(STAT)$ $[\bar{x}]$ mean value

3. $(STAT)$ $[s]$ standard deviation

4. $(STAT)$ $[Min]$ Minimum reading

5. $(STAT)$ $[Max]$ Maximum reading
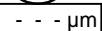
There are three options to quit the statistics:

- Take a reading
- Start one-point calibration
- Swich the gauge off.

A maximum of 999 values can be stored into the statistics. If this number is exceeded, you have to delete the statistics before any new reading can be stored for statistics calculation.

8. Delete Statistics

The gauge must be switched on.

$(STAT)$ Press for about 3 sec. to delete statistics.

$[- - - \mu m]$ is shown on display.

The calibration is kept in memory.

C. Initial Functions

1. Auto-OFF
2. Measuring system
3. Reset
4. Info

How to set an initial function:

- Switch the gauge off.
- Press key combination for the initial function you request as under 1. to 4. and keep the keys pressed down.
- Release ON/ZERO first.
- Press relevant selection key to go to the requested setting.
- As soon as the settig you request appears, wait for about three seconds. After the 3 sec. delay time your setting is automatically stored and the gauge switches to measuring mode. Your setting is kept in memory even after switch off.

1. Auto-OFF

$(ON/ZERO)$ + $(CAL-)$
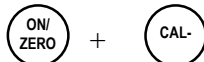
Release ON/ZERO first. Press selection key CAL- repeatedly until the requested setting option appears:
0 (Auto off disabled), 1, 3, 10 or 30 (minutes). Once the option you request appears, wait for about three seconds. Your setting is stored.

2. Measuring system

$(ON/ZERO)$ + $(CAL+)$
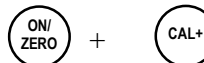
Press selection key CAL+ to switch from metric to imperial and vice versa. Wait for about three seconds. The gauge switches to measuring mode. Your setting is stored.

3. RESET

$(ON/ZERO)$ + $(STAT)$
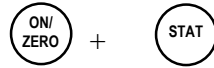
Any existing calibration or statistics will be deleted and the the factory calibration is restored.
Wait for about 3 seconds until the gauge switches to measuring mode.

4. Info

$(ON/ZERO)$ + $(CAL-)$ + $(CAL+)$

All display segments are shown. Check whether all segments are working properly.

The following data are shown subsequently (Note: long serials are displayed in two steps):

- Serial number of gauge (e.g. "100" followed by "284" to give you the serial "100284".
- Software version: e.g. "1.01"
- Gauge model: e.g. "Fn"
- Serial of sensor, e.g "100" followed by "856" to give you the serial "100856".
- Software version of sensor: e.g. "1.07"

Wait for about 3 seconds until the gauge switches to measuring mode.

D. Error Messages

E01 Communication failure between sensor and display unit.

E02 At switch on, gauge was held close to metal parts. Make sure a sufficient distance is kept from any metal parts. Switch the gauge off, then switch on again.
 If E02 reappears on display once you lift the gauge from the sample, hold the gauge into the air and press CAL+ to take a new "infinite value".

E03 The number of readings for creating a statistics is insufficient. The statistics calculation requires a minimum number of two readings.

E04 Calibration: Reading is inappropriate for calibration. During the calibration procedure, you have changed to another substrate material and the gauge has automatically switched to another measuring principle.

E05 Two-point calibration: no reading available. CAL- or CAL+ key have been pressed before any reading has been taken.

E06 The setting limits for a two-point calibration have been exceeded. Limits are as follows: Min: 9.5µm
Max (N) : 2.51mm
Max (F) : 3.01mm

BAT Battery exhausted.

E. Technical Specification

Properties \ Model	MiniTest 70 F	MiniTest 70 FN
Measuring range	0... 3 mm/ 120 mils	F- range: 0...3 mm / 120 mils N- range: 0...2.5 mm / 100 mils
Measuring principle	Magnetic induction	Magnetic induction / eddy currents
Signal processing	sensor-integrated digital 32-Bit-signal processing (SIDSP®)	
Accuracy*1	± (1.5 µm + 2 % of reading) for two-point calibration*2 ± (0.06 mils + 2 % of reading) for two-point calibration*2	
Repeatability*1	± (1 µm + 1 % of reading) / ± (0.04 mils + 1 % of reading)	
Low range resolution	0.5 µm / 0.02 mils	
Minimum curvature radius, convex	5 mm / 0.2"	
Minimum curvature radius, concave	40 mm / 1.60"	
Min. measuring area *2	30 mm dia. / 1.18"	
Min. substrate thickness *2	F: 0.5 mm / 0.02" N: 0.04 mm / 0.0016"	
Measuring systems	metric / mils (switchable)	
Statistics	n, $\bar{x}$, s, Min, Max	
Calibration modes	one-point calibration, two-point-calibration	
Operating temperature range	-10℃ ...+60℃ / 14℉ ...140℉	
Storage temperature range	-20℃...+70℃ / -4℉...158℉	
Power supply	1 x AA battery / rechargeable battery	
Norms and standards	DIN EN ISO 1461, 2064, 2178, 2360,2808, 3882 ASTM B 244, B 499, D7091, E 376	
Dimensions	Approx. 157 mm / 5.2" length, Ø 27 mm / 1.06"	
Weight including battery	Approx. 80 g / 2.8 oz	

*1 according to DIN 55350, part 13

*2 related to ElektroPhysik precision standards and if calibration is done close to the thickness to be expected.