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Instruction Manual Digital Coating Thickness Gauge

SAUTER TF, TG

Version 1.2
07/2016
GB

Model TF 1250-1.1FN



Model TG 1250-1.1FN



PROFESSIONELLE MESSUNGEN

TF_TG -BA-e-1612



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Instruction Manual

Digital Coating Thickness Gauge

Thank you for buying a SAUTER digital Coating Thickness Gauge. We hope you are pleased with your high quality Thickness Gauge with its big functional range.

If you have any queries, wishes or helpful suggestions, do not hesitate to call our service number.

Models available:

- TF 1250-0.1 FN
- TG 1250-0.1 FN

Summarize:

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This coating thickness gauge is small in size, light in weight and easy to carry. Although it is complex and advanced, it is convenient to operate. Its ruggedness will allow many years of use if all the instructions are followed carefully.

Please keep this instruction manual always within reach!

Annotation: It is strongly recommended to adjust the new instrument before the first use, as described in paragraph 9. By doing this, you will achieve a much better measurement result right from the start.

1 Features

» This instrument meets the standards of both, ISO 2178 and ISO 2361, and DIN as well as ASTM und BS. It is suitable for the laboratory and for use in `harsh field conditions`.

» The F-mode measures the coating thickness of nonmagnetic materials, e.g. paint, plastic, porcelain enamel, copper, zinc, aluminium, chrome, lacquer layers etc. These layers should be located on magnetic metals e.g. steel, iron, nickel etc. It is often used to measure the thickness of galvanizing layer, lacquer layer, porcelain enamel layer, phosphate layer, copper tile, aluminium tile, some alloy tile, paper etc.

» In N-mode, the coating thickness of non-magnetic coatings is measured which are located on non-magnetic metals. It is used to measure anodizing, varnish, paint, enamel, plastic coatings, powder etc. These layers are located on non- magnetic metals e.g. aluminium, brass, non magnetic stainless steel etc.

» Automatically base material recognition

» Manual or automatical "auto power off" to conserve batteries.

» Two measurement modes: - single and continuous

» Metric/ imperial unit conversion

» Wide measuring range and high resolution

» Digital backlight display enables exact reading with no guessing or errors

» Can store up to 99 measurements

» Statistic function available

» Can communicate with PC for statistics and printing per RS 232. Cable and software are available as optional accessory (ATC-01).

2 Specifications

Display: 4 digits, 10mm LCD, with backlight

Range: 0 up to 1250 μm / 0 up to 50 mil (Standard) (another range may be specified)

Resolution: 0.1 μm (0 up to 99.9 μm)
1 μm (above 100 μm)

Accuracy:

- Standard: 3% of the measured value or min. $\pm 2.5 \mu\text{m}$

This is valid within a tolerance range of $\pm 100 \mu\text{m}$ around the typically measured range, if a two-point calibration was performed within this tolerance range.

- Off-Set Accur Mode: 1% of the measured value or min. $\pm 1.0 \mu\text{m}$

this is valid within $\pm 50 \mu\text{m}$ around the *Off-Set Accur* point.

PC connection: by RS-232C interface

Power supply: 2 x 1.5V AAA (UM-4) batteries

Operating conditions:	Temperatures	0 up to 50°C
	Humidity	< 95 %

Dimensions: 126 x 65 x 35 mm (5.0 x 2.6 x 1.6 Inch)

Weight: ca.81g (without batteries)

Scope of delivery: - Carrying case

- Operation manual

- TF 1250-0.1FN: Inbuilt sensor F as well as inbuilt sensor N
(base material is recognized automatically)

- TG 1250-0.1FN: External sensor FN extern
(base material is recognized automatically)

- 1 Set calibration foils, is delivered in standard at each model

- Base plate (iron)

- Base plate (aluminium)

Optional accessories: - Software and cable for RS-232C: ATC-01

- RS-232 to USB adapter: AFH 12

- Calibration foils (replacement order): ATB-US07

- External sensor FN (for TG 1250-0.1FN): ATG 01

3 Front panel description

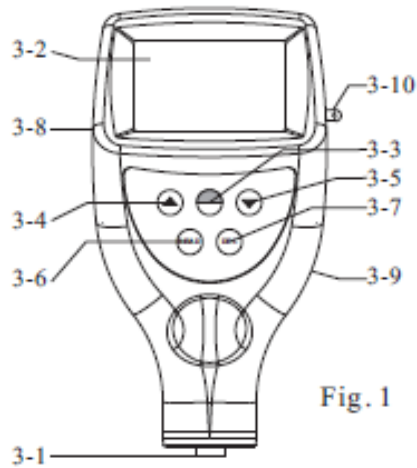


Fig. 1

here: Model TF, with inbuilt sensor

- 3-1 Sensors inbuilt at model TF (F and N) or at model TG with external sensor FN
- 3-2 Display
- 3-3 Power-key/Zero- key
- 3-4 Plus- key (arrow button up)
- 3-5 Minus- key (arrow button down)
- 3-6 Reading key (READ- key)
- 3-7 Delete key (DEL-key)
- 3-8 Socket for RS-232 interface
- 3-9 Battery cover
- 3-10 Wrist ring

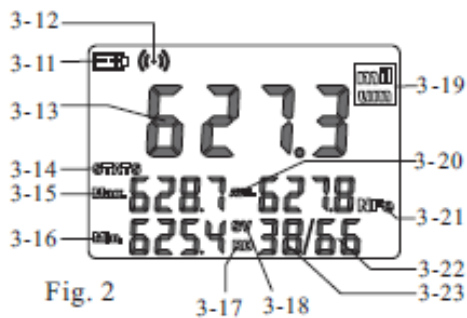


Fig. 2

- 3-11 Battery indicator
- 3-12 Symbol for ongoing measurement
- 3-13 Last reading/browsing value
- 3-14 Indication for single measurement mode
- 3-15 Max. value indicator
- 3-16 Min. value indicator
- 3-17 Browsing state
- 3-18 Measuring state
- 3-19 Unit
- 3-20 Average indicator
- 3-21 Base material indicator
- 3-22 Counter for stored measurement values
- 3-23 Counter for statistics

4 Measurement procedure

4.1 The power key 3-3 has to be pressed to switch on the instrument. `0` appears on the display 3-2.

Both instruments, TF and TG, will recognize the mode of the last measurement itself by the symbol appearing in the display `Fe` (= F) for ferrous metals or `NFe` (= N) for non-ferrous metals. The instrument changes into the automatic measurement mode, which also is able to recognize and assign also the zeroing plate or any other base material.

4.2 The sensor 3-1 has to be placed onto a coating layer to be measured. The reading on the display is the thickness of the coating layer. This can be corrected by pressing the Plus- key 3-4 or the Minus- key 3-5. For doing this, the sensor should be kept away from the measured object or the base plate for at least 5 cm.

4.3 To perform the next measurement, the sensor 3-1 has to be lifted for more than 1cm, "0" will be displayed and step b) has to be repeated. The instrument memorizes the continuous measured value automatically with statistic measurement times. Meanwhile, the Max, Min and average value will be displayed.

4.4 To avoid any appearing incorrect measurement values, we recommend adjusting the instrument before starting with the measurements, as described in chapter 9.

4.5 To change the measurement unit from „µm“ to “mil” or vice verse, the Power-key 3-3 has to be pressed and not released until “UNIT” is shown on the display. Then the same key 3-3 (this time Zero-key) has to be pressed.

4.6 To change the measuring mode from `single` to `continuous` or vice verse, the Power-key / Zero –key 3-3 has to be pressed and not released until `SC` appears on the display. Then the Zero- key 3-3 (the same one) has to be pressed.

The symbol “STATS” represents the continuous mode and `S` represents the single mode.

5 Statistics

This instrument calculates and displays a statistical analysis of readings while the measurements are taken.

The statistics available are:

- Last value
- Average value, marked by AVE
- Highest reading marked by Max
- Lowest reading marked by Min
- Number of measurements taken

To clear the statistical data before starting a new set of data, the Zero-key 3-3 just has to be pressed and released. In measurement mode, which is marked by SV, the last value can be deleted by pressing the DEL-key. Statistics is re-calculated and displayed again.

6 How to store and recall readings

6.1 The measurements taken are automatically saved in the memory of the instrument. The memorized data can be shown and browsed by pressing and releasing the READ-key to enter into the browsing state, which is marked by "READ" on the display.

6.2 In browsing state, all the readings memorized can be recalled on the display by pressing the Plus-key 3-4 or the Minus-key 3-5.

6.3 To delete only one memorized value in the memory; the reading to be deleted just has to be located on the display by the Plus-key or the Minus-key. Then the DEL-key has to be pressed and released. If "Err0" appears on the display, it means that there is no reading to delete any more.

6.4 The Zero-key 3-3 has to be pressed to quit the measurement state.

7 How to delete readings

7.1 To delete a reading on the display, the DEL-key has to be pressed, no matter whether you are located in the measurement state marked "SV" or in browsing state marked "RD". Browsing state can be entered by pressing the READ-key and measurement state is entered by pressing the Zero-key.

7.2 To delete all measurements taken (readings) in the memory, the DEL-key has to be pressed in measurement state marked by "SV" on the display for about 4 seconds until the number of readings memorized becomes 0.

8 Transfer of readings to a PC

8.1 ATC-01 software has to be installed on the PC. During the installing process the "continue"-button always has to be clicked.

8.2 The instrument has to be connected to the PC using the optional cable.

8.3 The Coating Thickness Gauge has to be switched on to ensure that the reading screen is displayed.

8.4 The software has to be started and the instructions included with the software Demo. EXE. have to be followed.

9 Calibration

9.1 Zero adjustment

Zero adjustment for `Fe` and `NFe` should be carried out separately. The iron base plate has to be used if `Fe` is being displayed. The base plate of aluminium has to be used if `NFe` is shown on the display. The sensor 3-1 has to be placed carefully onto the base plate. Zero-key 3-3 has to be pressed and "0" will be displayed, without lifting the sensor before.

Attention: The calibration is invalid if the sensor is not directly placed onto the base plate or another uncoated material.

9.2 An appropriate calibration foil has to be selected according to the measurement range.

9.3 The selected standard foil has to be placed onto the base plate or the uncoated standard material.

Annotation: Please place the sensor at least with 3mm distance from the border of the base plate.

9.4 The sensor 3-1 has to be pressed carefully onto the calibration foil and then lifted. The reading on the display is the value measured.

This can be corrected by pressing the Plus- key 3-4 or the Minus- key 3-5 while the sensor is removed from the base plate or the measured object.

9.5 Step 9.4 has to be repeated until the desired accuracy is achieved.

10 Battery replacement

10.1 If the battery symbol ``+/-`` appears on the display, batteries should be replaced.

10.2 The battery cover 3-9 has to be removed and batteries have to be taken off.

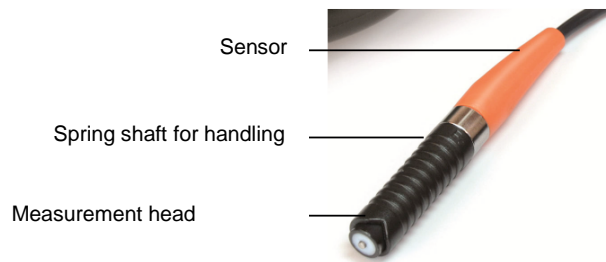
10.3 The batteries (2x1.5V AAA/UM-4) are to be installed correctly into the case, taking care of polarity.

10.4 If the instrument is not to be used for an extended period of time, batteries have to be extracted.

11 Justierfolien

Dieses Instrument enthält im Lieferumfang ein Justierfolien-set mit verschiedenen Folien und Messbereichen, wobei aber immer der Messbereich von 20 bis 2000µm abgedeckt ist. Diese sind ebenso erhältlich als optionales Zubehör, Artikel ATB-US07

12 Correct handling at Coating Thickness Measurement with external sensors



The sensor has to be touched at the lower pole segment and it has to be pressed slightly onto the test object.

The black chequered pole segment is movably seated on a spring. By means of the spring, the sensor tip presses onto the test object with a defined force. This way, measurement errors can be avoided.

It is recommended to perform several test measurements before the first use of the instrument. In this way, further measurement errors can be avoided.

13 Trouble shooting

13.1 The instrument should always be calibrated on the uncoated base material to be measured instead of the base plate included in the delivery. Like this, accuracy is more precise from the beginning.

13.2 Sensors will eventually wear off. Life of the sensor will depend on the number of measurements taken and how abrasive the coating is. Replacement of a sensor should only be performed by qualified staff.

14 Restore factory settings

14.1 In the following cases it is recommended to restore factory settings:

- The instrument does not measure any more.
- Measurement accuracy is degraded caused by the abraded sensor or affected by environmental conditions.
- After the replacement of a new sensor.

14.2 Procedure:

To restore factory settings includes both, setting of „Fe“ (F) and of „NFe“ (N).

It can be only performed one after another. The procedure is as follows:

14.2.1 It is always differentiated between the symbols „Fe“ and „NFe“. If „Fe“ is displayed, factory settings will be done for „Fe“ type, and if „NFe“ is displayed, it will be done for „NFe“ type.

14.2.2 The Power-on/ Power-off key 3-3 has to be pressed and not released until `CAL` appears on the display. This lasts about 12 seconds from starting pressing the Power-key.

14.2.3 If now NF:H appears in the display, the sensor has to be lifted for more than 5cm. Then the Zero- key has to be pressed and the instrument returns into measurement mode. With this, factory setting is restored.

Comment: This procedure should always be finished within 6 seconds. Otherwise it will be automatically cancelled and the restoration is invalid.

15 Annotations

15.1 All settings, including restoring factory setting, unit setting, S/C setting should be finished within 6 seconds. Otherwise this procedure will be cancelled by the instrument, it will quit and keep the status as before.

15.2 The linearization of the instrument, which is given by the calibration, can be changed with the **Ln- function**. Linearization is commanded by the Power-on/ Power-off key and it lasts about 14 seconds from starting to press this button.

Nevertheless, it is strongly recommended not to perform any alterations of the value of Ln, because those alterations might lead to deviations the measurement results.

Any adjustment of the value of Ln will seriously affect the accuracy. This value should only be adjusted by professional persons.

Generally said:

The bigger the value of Ln, the smaller the reading on the display for the same (coating) thickness. Only a small change on the value of Ln causes a big change in the reading of the upper measurement range (at 500µm/20 mil).

The value of Ln has to be adjusted as follows:

Press the Power-key: It lasts about 14 seconds from starting pressing this key. This value can be changed by pressing the Plus- respectively the Minus- key after `Ln` appears on the display and the Power-on/ Power-off key is released. This value is saved and then the Zero-key has to be pressed.

- A. The reading at low end is to be adjusted by pressing (confirming with) the Plus-/ or the Minus-key.
- B. The value of **Ln** is enlarged if the reading at low end (e.g. 51µm) is o.k., but the reading at high end (e.g. 432µm) is too big.
In contrast with this, the value of Ln is to be decreased, if the reading at low end (e.g. 51µm) is o.k., but at high end (e.g. 432µm) it is too small.
- C. This procedure from A. and B. has to be repeated, until the reading for every calibration foil is satisfactory in its accuracy.