Sauter GmbH
Ziegelei 1
D-72336 Balingen
e-mail: info@kern-sohn.com
Phone : +49-[0]7433- 9933-0
Fax: +49-[0]7433-9933-149
Internet: www.sauter.eu

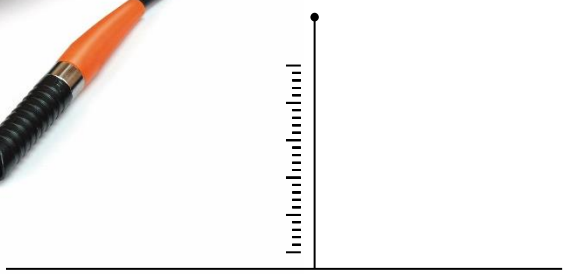
Instruction Manual Digital Coating Thickness Gauge

SAUTER TG/TF

Version 2.0
04/2020
GB

TF 1250-0.1FN

TG 1250-0.1FN



PROFESSIONAL MEASURING

GB

SAUTER TG/TF

V. 2.0 04/2020

Instruction Manual Digital Coating Thickness Gauge

Thank you for purchasing a digital coating thickness gauge from SAUTER. We hope you will be very satisfied with the high quality of this measuring device and its extensive functionality. For any questions, wishes and suggestions please do not hesitate to contact us.

Table of contents:

1. Introduction

1.1 General description

This coating thickness gauge is small, light and handy. Although it has complex and advanced equipment, it is convenient and easy to use.
Its robustness allows it to be used for many years, provided that all instructions in this manual are carefully followed.
Therefore please keep them always within reach!
Note: It is strongly recommended to adjust the new meter before first use, as described in chapter 6. This will result in a higher measurement accuracy from the beginning.

2. Functions

"This device complies with ISO 2178 and ISO 2361, as well as DIN, ASTM and BS standards. This means that it can be used both under laboratory conditions and under rough environmental conditions "in the field".
"In F mode, the thickness of non-magnetic layers, e.g. paint, plastic, enamelled porcelain, copper, zinc, aluminium, chrome, lacquer layers etc., is measured.
These layers should be on magnetic materials such as steel, iron, nickel, etc. This test method is often used to measure the thickness of galvanised layers, lacquer layers, enamelled porcelain layers, phosphorescent layers, copper plates, aluminium plates, alloys, paper etc.
"In the N- mode, the layer thickness of non-magnetic layers on non-magnetic metals.
It is used to measure anodizations, lacquer layers, glazes, colours, enamel, plastic layers, powder coating etc. These should be on non-magnetic substrates such as aluminium, sheet metal, non-magnetic stainless steel and others.
"Automatic recognition of the carrier material
"Manual or automatic switch-off to conserve battery power.
"Two measurement modes: -single and continuous
"Metric/imperial unit conversion
"Wide measuring range and high resolution
"The backlit display allows accurate reading
"Up to 99 measured values can be stored.
"A statistics function is available
" Can be connected to a PC for data transfer via RS 232 interface for statistical purposes. Cable and software are available as optional accessories (ATC-01).

3. Technical data

	TE 1250-0.1F	TE 1250-0.1FN	TE 1250-0.1N
Display	4 digits, 10mm LCD display with backlight		
Measuring range	0 to 1250 µm / 0 to 50 mil (standard)		
Resolution	0,1 µm (0 to 99,9 µm), 1 µm (over 100)		
Measurement uncertainty	3 % of the measured value or Min ± 2,5 µm. Applies within the tolerance band of ± 100 µm around the typical measuring range if a two-point calibration was also performed within this tolerance band		
off-set accuracy	1 % of the measured value or min. 1,0 µm Applies within ± 50 µm around the *offset Accur* Point		
PC connection	RS-232 interface		
Power supply	2x1.5 AAA batteries		
Ambient temperature	0°C to 50°C		
Air humidity	≤ 80%		
Dimensions	126 x 65 x 35mm		
Weight	Ca 81g (without batteries)		
Scope of delivery	- Carrying case - Operating instructions <u>- TF 1250-0.1FN:</u> Built-in measuring probe F and built-in measuring probe N (carrier material is automatically detected) <u>- TG 1250-0.1FN:</u> Measuring probe FN external (carrier material is automatically detected) - 1 set of adjustment foils, available for each model - Zero plate (aluminium) - Zero plate (iron) Optional accessories: - Software and cable RS-232C: ATC-01 - RS 232 to USB Adapter: AFH 12 - Calibration foils (replacement order): ATB-US07 - External measuring probe FN (For TG 1250-0.1FN): ATG 01		

<u>Attention:</u> All accuracy specifications apply after adjustment!

4. Front panel description

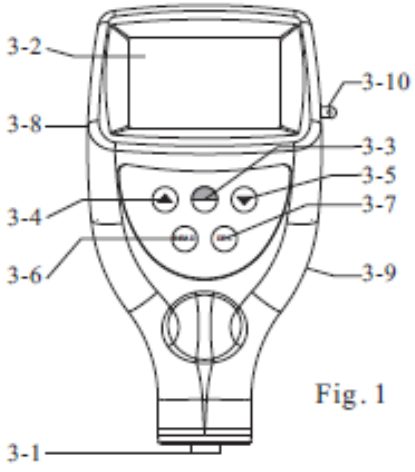


Fig. 1

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

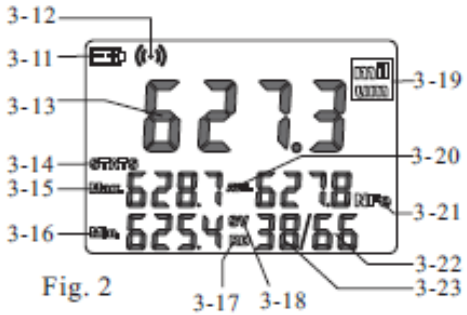


Fig. 2

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

5. 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.

6. 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.

7. 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.

8. 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.

9. 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.

10. 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.

11. 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.

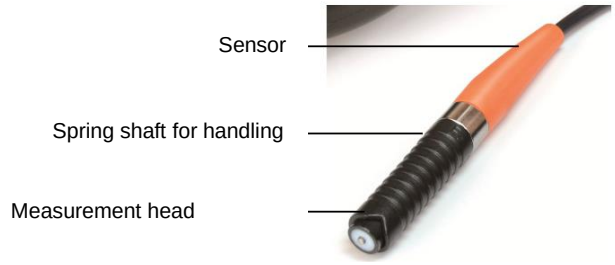
10.3 The batteries (2x1.5V AAA/UM-4) are to be installed correctly into the case, taking care of polarity.

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

12. Adjustment foils

This instrument has included in delivery a set of adjustment foils with different foils and thicknesses, whereupon the measurement range of 20 up to 2000µm will always be covered. These adjustment foils are also available as an optional accessory, article number ATB-US07.

13. 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.

14. 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.

15. 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.

16. 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.

Annotation:
To have a look at the CE Declaration of Conformity, please click onto the following link:
https://www.kern-sohn.com/shop/de/DOWNLOADS/