



SaveCoat C-1

Manual

Gauge description



Instruction manual

Coating thickness gauge ®SaveCoat C-1

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Introduction

The following operating manual is intended for coating thickness gauge @SaveCoat C-1 with separate exchangeable probes.

The gauge conforms to the following standards for coating thickness measurement:

Magnetic method: DIN EN ISO 2808
 DIN EN ISO 2178
 ASTM B499
 ISO 19840

Eddy current method: DIN EN ISO 2808
 DIN EN ISO 2360
 ASTM D7091

About this manual

The well-proven menu technique is applied to the use of this coating thickness gauge. This manual informs you step by step about the correct operation of the gauge @SaveCoat C-1. If you follow these step-by-step instructions, it will only take a few minutes before you are able to carry out the first measurements.

Meaning of keys

The operation of @SaveCoat C-1 is carried out by means of the five buttons below the display.



Switching the gauge on and off.



The arrow keys have several functions. Depending on the menu item you are currently at, by using these keys you will:

- browse through the main menu and submenus
- set calibration values, limit values and zero offset value
- browse through stored single readings.

Use this key to:



- confirm the choice of a menu item, e.g. *Statistics* and then reach the corresponding submenu, e.g. *Transfer of statistics*
- close a setting action, e.g. *Measuring unit μm* , or confirm the calibration or limit value settings.

This key enables you to:



- go back to the next higher menu level up to the start screen - - - -
- delete the last reading immediately after the measurement
- delete readings and statistics quickly (see chapter 5.6)
- abort a setting action, e.g. when setting calibration and limit values.

1. Measuring gauge, probes and their applications

Depending of the used probe the @SaveCoat C-1 is a coating thickness gauge for non-destructive coating thickness measurement according to the magnetic induction principle and the eddy current principle.

- The magnetic induction principle is used for all non-magnetic coatings, such as varnish, paint, enamel, chromium, copper, zinc... coatings on steel and iron (F probes)
- The eddy current principle is used for all electrically insulating coatings, such as varnish, paint, anodising coatings... on non-ferrous metals, even on austenitic stainless steels (N probes)

FN probes are dual probes for measurements on steel and non-ferrous metal (F = Ferrous und N = Non-Ferrous).

The following probes can be connected to the gauge @SaveCoat C-1:

Probe	Range	Application	Accuracy (referred to SAVECOAT/INNOTEST standards) ¹ works calibration ² 1-point calibration ³ 2-point calibration
FN1.5	0 ... 1500 µm	dual probe for measurements on steel/iron and on non-ferrous metals	¹ ± 3 µm or 3 % of reading; whichever is greater ² ±(1 µm + 2 % of reading) ³ ±(1 µm + 1 % of reading)
F1.5	0 ... 1500 µm	for measurements on steel/iron	as FN1.5
N1.5	0 ... 1500 µm	for measurements on non-ferrous metals	as FN1.5
FN1.5/90°	0 ... 1500 µm	angled dual probe for measurements on steel/iron and on non-ferrous metals in tubes or grooves	as FN1.5
FN1.5R	0 ... 1500 µm	angled dual probe for measurements on steel/iron and on non-ferrous metals	as FN1.5
F1.5R	0 ... 1500 µm	angled probe for measurements on steel/iron	as FN1.5
FN0.2	0 ... 200 µm	high-precision combination probe for thin layers on steel/iron and on non-ferrous metals	¹ ± 2,5 µm or 2,5 % of reading; whichever is greater ² ±(0,7 µm + 1,5 % of reading) ³ ±(0,7 µm + 1 % of reading)

FN3.5	F: 0 ... 3.5 mm N: 0 ... 3.0 mm	angled dual probe for measurements on steel/iron and on non-ferrous metals with extended range	¹ ± 5 µm or 3 % of reading; whichever is greater ² ±(2 µm + 2 % of reading) ³ ±(2 µm + 1 % of reading)
F3.5	0 ... 3.5 mm	angled probe for measurements on steel/iron with extended range	as FN3.5
F10	0 ... 10 mm	angled probe for measurements on steel/iron with large range	¹ ± 10 µm or 3 % of reading; whichever is greater ² ±(5 µm + 2 % of reading) ³ ±(3 µm + 1 % of reading)
F30	0 ... 30 mm	probe for measurements on steel/iron with very large range	¹ n.a. ² ±(10 µm + 4 % of reading) ³ ±(10 µm + 2 % of reading)

You can identify the present probe and its working principle by the colour of the plug's reinforcing sleeve:

green FN dual probes (magnetic induction and eddy current principle)

blue F probes (magnetic induction principle)

yellow N probe (eddy current principle)

Please avoid bending or too tight reeling of the probe cable. Cable breaks due to this are excluded from warranty.

2. Preparing for measurement


Power supply:


@SaveCoat C-1 can be operated using 2 x round cell (AA) 1.5V alkaline batteries or 2 rechargeable batteries (AA) 1.2V.









Empty batteries are indicated by a red, empty battery icon. Please remove used batteries at once and dispose them in an environmentally acceptable manner.

When inserting new batteries, please pay attention to the correct polarity. Wrongly inserted batteries may lead to a destruction of the gauge.

In order to avoid any possible loss of data, please pay attention when exchanging batteries:

- Always switch off the gauge by means of the  button before exchanging batteries.
- Exchange the batteries within 20 seconds.

After inserting the batteries and switching-on for the first time by means of the , the display shows

- English** as proposed language: confirm with , or use the arrow keys   to select another language and confirm with  after which the display shows
- the proposed date and time: confirm with , or use the arrow keys   to change and confirm with  (pay attention to the instructions on the display).

Normally the gauge works in the automatic switch-off mode. It switches off automatically 90 seconds after the last measurement or operation. For permanent operation mode see chapter 7.1.

Connecting the probe/Changing the probe:

Align the red dot on the probe connector with the red dot on the probe socket of the gauge. Insert the connector. To release the connector simply pull back the outer sleeve of the probe connector.






@SaveCoat offers a variety of different probes. @SaveCoat C-1 automatically recognizes the connected probe and sets the specific probe parameters, e.g. measurement range, resolution, measurement method.

Please observe the following points:

- Switch off the gauge before changing the probe.
- If you have carried out measurements you should transfer the data to a PC before changing the probe. The stored measurement values will be deleted after changing the probe and the works calibration will be activated.

3. Menu structure

There are 4 main menu items: **Calibration**, **Statistics**, **Measuring mode** and **Options**. All other menu items or functions are subordinate to these 4 menu items.

The operation is carried out by means of the two arrow keys  and , the confirmation key  and the escape key . The steps to be carried out are displayed on the screen, e.g. "Place probe on foil standard". After pressing  the confirmation is displayed, e.g. „Calibration has been set“.

You can find a diagram of the menu structure at the end of this manual. A single look at this structure is sufficient to recognize the applicable menu items to select a desired function.

4. Calibration (1st menu item)

This section informs you about the different calibration modes and the application cases that they are especially suitable for. To meet the demands of coating thickness measurement tasks the gauge has to be checked by means of the standards included in the supply package before the measurement.

With @SaveCoat C-1 you can directly measure without any further user interaction. Readings, calibration values and settings are stored consecutively in the memory, in case of a FN combination probe either in the F memory or in the N memory. The differentiation between F memory and N memory means also that e.g. setting of limit values has to be done in both measuring modes, if desired. This working principle of @SaveCoat C-1 enables very quick measurements; all readings are stored automatically within one single memory (FN probe: two single memories).





@SaveCoat C-1 and all probes are works calibrated. If the accuracy of the works calibration is not sufficient or if the measurement task makes it necessary you can do some additional calibrations as described below.

A zero calibration on an uncoated specimem reduces measurement errors induced by surface geometry e.g. by curved surface or near edges. Calibration data is preserved during power off. @SaveCoat C-1 uses three different calibration methods (see Technical Data chapter 13).

4.1. Activating the works calibration

This calibration mode is suitable for measurements on flat surfaces larger than 35 mm x 35 mm / 1.4" x 1.4". A calibration that has been carried out previously has to be deleted. You need neither calibration standards nor any uncoated test objects.

Procedure:





1.  press this key; *Calibration* appears on the display.
2.  press this key; *Zero setting* appears on the display.
3.  press this key; *Deletion of calibration* appears on the display.
4.  press this key; *Works calibration activated* appears on the display followed by the start screen with the four dashes - - - - .

You can now measure using the works calibration.

4.2. Zero setting (1-point calibration)

For this purpose, you have to use an uncoated test object having similar dimensions and material properties as the coated test object, e.g. when you plan to measure on small cylindrical parts or near edges. The zero plates delivered with your gauge are not intended to be used for zero calibration; instead use these plates together with the calibration foils to check the accuracy of the gauge.

Procedure:





1.  press this key; *Calibration* appears on the display.
2.  press this key; *Zero setting* appears on the display.
3.  press this key; *Place probe on zero* appears on the display, and the ZERO symbol in the display begins to flash.
4. place the probe repeatedly perpendicular to the uncoated surface of the test object.
5.  press this key. *Zero has been set* appears briefly on the display followed by the start screen with the four dashes – – – – . The ZERO symbol is visible permanently.





You can now measure using the 1-point calibration.

4.3. One-foil calibration (2-point calibration)

The one-foil-calibration has to be done on an uncoated test object (as with the zero setting). For the one-foil-calibration choose a calibration foil that comes closest to the expected coating thickness.

Procedure:

1. Carry out ,zeroing' (1-point calibration) as described above (please see chapter 4.2).
2.  press this key; *Calibration* appears on the display.
3.  press this key; *Zero setting* appears on the screen.
4.  press this key one more time; *One-foil calibration* appears on the screen.
5.  press this key; *Place probe on foil standard* appears on the display and the CAL symbol in the display begins to flash.





6. Put the measurement foil on the uncoated test object and place the probe repeatedly on the foil.
7.  press this key; *set standard value* appears on the display.
8.   use the arrow keys to enter the calibration foil thickness as indicated on the standard.
9.  press this key; *One-Foil-Calibration has been set* appears briefly on the display followed by the start screen with the four dashes ---- . The CAL symbol is visible permanently.

You can now measure using the One-foil calibration.

4.4. Deletion of calibration

This menu item allows you to delete the active calibration. However, if you would like to overwrite a calibration, a deletion is not necessary beforehand.

Procedure:

1.  press this key; *Calibration* appears on the screen display.
2.  press this key; *Zero setting* appears on the screen.
3.  press this key once until *Deletion of calibration* appears on the screen display.
4.  press this key; *Works calibration activated* appears briefly on the display followed by the start screen with the four dashes ---- .

You can now measure using the works calibration.

4.5. Measurement

This section describes the suitable application cases of the different probes.

You can use F probes for measurements on all non-magnetic coatings, e.g. varnish, paint, plastics, chrome, zinc, etc. coatings on iron/steel. The display shows **Ferr**.

You can use N probes for measurements on all electrically insulating coatings, e.g. varnish, paint, plastics, anodized coatings, etc. on non-ferrous metals. The display shows **Non-Ferr**.

The FN combination probes allow both measurements and is factory-set to the measuring mode Auto FN identification. The display shows **AUTO FN**. This means that the gauge automatically identifies the base material (iron/steel or non-ferrous metal) after positioning of the probe. Subsequently the gauge switches to the corresponding measuring method, magnetic (F) or eddy current method (N). After each measurement the display shows **Ferr** or **Non-Ferr** to indicate the base material.

Note: In some cases, especially with varnish on zinc on steel, it is nevertheless recommended to use a fixed measuring method setting, e.g. Ferrous mode (F) for measurements on iron/steel or to Non-Ferrous mode (N) for measurements on non-ferrous metals (see chapter 6.1).

5. Statistics (2nd menu item)

After each measurement @SaveCoat C-1 stores the readings in a data memory and calculates a variety of statistic parameters. @SaveCoat C-1 stores up to 2 x 1.000 readings (1.000 in F mode, 1.000 in N mode) in its data memory.

The statistical values are updated after each measurement and stored together with the thickness values. The display shows the number of measurements N, the mean value \bar{x} , the standard deviation σ , the maximum value \uparrow of the series and the minimum value \downarrow .

All readings and statistics can be completely transferred or displayed at the menu item **Statistics**.


5.1. Transfer of statistic values only



The gauge calculates a maximum of 5 statistical values from a measurement series (see above). These can be quickly and simply transferred to a PC in the 2nd menu item **Statistics**. Transfer can be made immediately after the measurement.

Data transfer to a PC is done by means of the USB interface. The data transfer program **SaveCoat Transfer** receives the data and shows it on the screen. **SaveCoat Transfer** is ready for download at www.savecoat.com.

Procedure:

1. Connect @SaveCoat C-1 with a PC by means of a USB interface cable.





2.  press this key twice until *Statistics* appears on the display.

3.  press this key; *Transfer of statistics* appears on the display.
4.  press this key. Data is transferred and *In progress...* appears briefly on the display, followed by the start screen with the four dashes ----.

5.2. Transfer of readings and statistics

The statistical values can also be transferred together with the single readings



Procedure:





1. Connect @SaveCoat C-1 with a PC by means of a USB interface cable.
2.  press this key twice until *Statistics* appears on the display.
3.  press this key; *Transfer of statistics* appears on the display.
4.  press this key; *Transfer of statistics and readings* appears on the display.
5.  press this key. Data is transferred and *In progress...* appears briefly on the display, followed by the start screen with the four dashes ----.

5.3. Display of statistics

This section explains how to display the different statistical values on the screen.

Procedure:





1.  press this key twice until *Statistics* appears on the display.
2.  press this key; *Transfer of statistics* appears on the display.


3.  press this key twice until *Display of statistics* appears on the display.
4.  press this key. *Number of readings* appears on the display.
5.  press this key repeatedly; the sequence of statistics appears on the display as follows: *Mean value, Standard deviation, Maximum, Minimum*.
6.  press this key to continue measuring. The start screen with the four dashes *----* is displayed.

5.4. Display of readings

This section explains how to display the stored single values on the screen at any time.

Procedure:





1.  press this key twice until *Statistics* appears on the display.
2.  press this key; *Transfer of statistics* appears on the display.
3.  press this key three times until *Display of readings* appears on the display.
4.  press this key; the first value appears on the display.

press this key repeatedly. The following values with a consecutive number are displayed. If there are limits set: a **green** number indicates a reading within the limits, **red** numbers indicate readings out of the limits. The symbols **LIMIT ↓** or **LIMIT ↑** show whether the reading is lower or higher than the corresponding limits.
6.  press this key to continue measuring. The start screen with the four dashes *----* is displayed.

5.5. Deletion of statistics and readings

This section explains how to delete the readings and statistics in the data memory.




Procedure:

1.  press this key twice until *Statistics* appears on the display.
2.  press this key; *Transfer of statistics* appears on the display.
3.  press this key until *Deletion of statistics and readings* appears on the display.
4.  press this key. The statistics are deleted together with the single values. *Readings and statistics deleted* appears briefly on the display followed by the start screen with the four dashes ----.

5.6. Quick deletion of statistics and readings

This procedure offers a simple and fast way to delete all readings and statistical values by circumventing the menu structure.

Procedure:

1.  press this key repeatedly until the start screen with the four dashes ---- appears on the display.
2.  press this key once more; *Delete readings and statistics?* appears on the display.
3.  press this key; *Readings and statistics deleted* appears briefly on the display followed by the start screen with the four dashes ----.

6. Measuring mode (3rd menu item)

This section describes the activation of







- the measurement method (only possible with FN probes),
- the upper and lower limit value,
- the zero offset function.

6.1. Setting of measurement methods: Automatic FN identification, Ferrous mode and Non-Ferrous mode

When using FN combination probes the display shows **Auto FN**. This indicates the automatic base material recognition after positioning of the probe and the activation of the appropriate measuring method.

In some cases, e.g. when measuring paint on zinc on steel, it may be useful to select the measuring method manually, e.g. selecting **Ferrous** when measuring the total coating thickness, and **Non-Ferrous** when measuring the paint thickness on zinc.

Procedure:

-  press this key three times until *Measuring mode* appears on the display.
-  press this key; *Autom. Detection FN, F, N* appears on the display.
-  press this key; *Automatic identification (FN)* appears on the display.
-   use these keys to select the desired method: *Automatic identification (FN), Ferrous (F) or Non-Ferrous (N)*.
-  press this key to confirm your choice. The chosen mode is displayed, e.g. *Measuring mode FN selected*, followed by the start screen with the four dashes *----*.

6.2. Setting of limit values












This section describes the setting of limit values. To monitor your readings, you can set an upper and a lower limit value. This setting is useful:

- during the measurement
- for the evaluation of readings later on when displaying the single values
- during the analysis of the readings with the PC.

If the reading is outside of the limit values, you will hear a characteristic beep, the reading is displayed in **red** and an indicator **LIMIT ↑** or **LIMIT ↓** at the top of the display shows whether the reading fell below or exceeded the limit values. Readings within the limit values are displayed in **green**.

6.2.1. Setting of limit values

Procedure:


1.  press this key three times until *Measuring mode* appears on the display.
2.  press this key; *Autom. Detection FN, F, N* appears on the display.
3.  press this key; *Limits* appears on the display.
4.  press this key; *Limits setting* appears on the display.
5.  press this key; *Set lower limit* appears on the display and a number as suggestion for the lower limit value.
6.   use these keys to adjust the lower limit value; with continued pressing of these keys the set value increases or decreases faster.
7.  press this key; *Set upper limit* appears on the display and a number as suggestion for the upper limit value; the upper limit value must be at least 10 μm higher than the lower limit value.
8.   use these keys to adjust the upper limit value; with continued pressing of these keys the set value increases or decreases faster.
9.  press this key; *Limits have been set* appears briefly on the display followed by the start screen with the four dashes - - - - .






The limit values are set for the measuring method (Ferr, Non-Ferr) which was activated last. When the base material changes the limit values have to be set again, if desired.

When transferring the readings to a PC a "<"-sign in front of the thickness value indicates a reading below the lower limit value; a ">"-sign indicates a reading above the upper limit value.

6.2.2. Deletion of limit values

Procedure:

1.  press this key three times until *Measuring mode* appears on the display.

2.  press this key; *Autom. Detection FN, F, N* appears on the display.
3.  press this key; *Limits* appears on the display.
4.  press this key; *Limits setting* appears on the display.
5.  press this key; *Deletion of Limits* appears on the display.
6.  press this key. *Limits deleted* appears briefly on the display followed by the start screen with the four dashes ----.

6.3. Zero offset mode



With this mode you can set a constant positive or negative value (zero offset value). This value will be added automatically to the reading after each measurement. The sum of original reading and zero offset value is then shown on the display. Moreover, the zero offset value is always displayed at the top of the display as a reminder (OFFSET).







This measuring mode is useful when it comes to determining the upper layer in a coating system consisting of several layers. If the lower layer(s) is (are) known and show(s) an adequately uniform thickness, the coating thickness of this (these) layer(s) can be set as a negative offset value. After measuring of the total coating thickness the thickness of the lower layer(s) is subtracted (addition of a negative offset value) and the thickness of the top layer is displayed.

This mode can also be selected for measurements on coated rough metal surfaces. The influence of the roughness is determined by measuring the uncoated rough metal surface. Set the measured thickness value as a negative zero offset value. The gauge will then indicate the coating thickness across the peaks of the rough surface.

6.3.1. Setting the zero offset value

Procedure:

1.  press this key three times until *Measuring mode* appears on the display.
2.  press this key; *Autom. Detection FN, F, N* appears on the display.

3.  press this key; *Zero offset* appears on the display.
4.  press this key; *Zero offset setting* appears on the display.
5.  press this key; *Set zero offset value* appears on the display.
6.   use these keys to adjust the zero offset value; with continued pressing of these keys the set value increases or decreases faster.
7.  press this key; *Zero offset set* appears briefly on the display followed by the start screen with the four dashes *----*. As indicator the zero offset value can be seen at the top of the display (*OFFSET*).






After this all readings will be corrected by the zero offset value.


Example: with a real coating thickness of 100 μm and a zero offset value of $-10 \mu\text{m}$ the display shows 90 μm . With a real coating thickness of 100 μm and a zero offset value of $+10 \mu\text{m}$ the display will show 110 μm .

The zero offset value is only set for the measuring method (Ferr, Non-Ferr) which was activated last. When the base material changes the zero offset value has to be set again, if desired.

6.3.2. Deleting the zero offset value

Procedure:

1.  press this key three times until *Measuring mode* appears on the display.
2.  press this key; *Autom. Detection FN, F, N* appears on the display.
3.  press this key; *Zero offset* appears on the display.
4.  press this key; *Zero offset setting* appears on the display.
5.  press this key; *Deletion of zero offset* appears on the display.

6.  press this key; *Zero offset deleted* appears briefly on the display followed by the start screen with the four dashes ----. The zero offset value indicator (OFFSET) disappears.







7. Options (4th menu item)

With this menu item you can define the settings described below. They are kept after the gauge switch-off. At the delivery state or after a total reset, always the first menu item of the corresponding menu is set (e.g. $\mu\text{m}/\text{mm}$).

7.1. Selection of switch-off modes

With this menu item you can choose between permanent operation of the gauge or auto-shut-off after 90 seconds without measurement or handling.



Procedure:






1.  press this key twice; *Options* appears on the display.
2.  press this key; *Switch-off mode* appears on the display.
3.  press this key.
4.   use these keys to select the desired mode: *Auto switch-off after 90 sec.* or *Permanent operation*.
5.  press this key for confirmation; your choice, e.g. *Permanent operation selected*, appears briefly on the display followed by the start screen with the four dashes ----.

7.2. Beeper on/off

With this menu item you can choose between silent operation of the gauge or a short beep after each reading and operation.

Procedure:








1.  press this key twice; *Options* appears on the display.
2.  press this key; *Switch-off mode* appears on the display.

3.  press this key; *Beeper* appears on the display.
4.  press this key.
5.   use these keys to select the desired mode: *Beeper ON* or *Beeper OFF*.
6.  press this key for confirmation; your choice, e.g. *Beeper switched ON*, appears briefly on the display followed by the start screen with the four dashes *----*.

7.3. Measuring unit $\mu\text{m}/\text{mils}$

With this menu item you can choose the measuring unit. The readings can be displayed using the metric system ($\mu\text{m}/\text{mm}$) or alternatively the imperial system (*mils*).








Procedure:

1.  press this key twice; *Options* appears on the display.
2.  press this key; *Switch-off mode* appears on the display.
3.  press this key twice; *Measuring unit* appears on the display.
4.  press this key.
5.   use these keys to select the desired mode: *$\mu\text{m}/\text{mm}$ unit* or *mils unit*.
6.  press this key for confirmation; your choice, e.g. *Unit $\mu\text{m}/\text{mm}$ selected*, appears briefly on the display followed by the start screen with the four dashes *----*.

7.4. Welcome screen on/off

With this menu item you can deactivate the welcome screen which appears after power on.








Procedure:

1.  press this key twice; *Options* appears on the display.
2.  press this key; *Switch-off mode* appears on the display.
3.  press this key three times; *Welcome screen* appears on the display.
4.  press this key.
5.   use these keys to select the desired mode: *Welcome screen ON* or *Welcome screen OFF*.
6.  press this key for confirmation; your choice, e.g. *Welcome screen switched ON*, appears briefly on the display followed by the start screen with the four dashes *----*.

7.5. Setting of date and time

With this menu item you can set the real time clock of the gauge.

Procedure:

1.  press this key twice; *Options* appears on the display.
2.  press this key; *Switch-off mode* appears on the display.
3.  press this key twice; *Date + time* appears on the display.
4.  press this key; the actual date and time appears on the display and *Adjust?*
5.  press this key; *Set year* appears on the display.
6.   use these keys to select the desired year.



7. press this key.

8. repeat step 6. and 7. four times to adjust month, day, hour and minute. At the end *Date + time have been set* appears briefly on the display followed by the start screen with the four dashes - - - - .

After battery replacement and switching on for the first time an initial menu item appears on the display with

- a) **English** as suggested language: confirm with or select another language with the arrow keys ; confirm with ; then appears
- b) a suggestion for **Date** and **Time**: confirm with or adjust date and time with the arrow keys ; confirm with ; (see above).

7.6. Selecting the language

With this menu item you can choose the menu language. Normally you can choose from English, German, French, Italian, Spanish, Turkish, Czech and Chinese; more languages are available on request.

Procedure:



1. press this key twice; *Options* appears on the display.



2. press this key; *Switch-off mode* appears on the display.



3. press this key; *Language* appears on the display.



4. press this key; the actual language appears on the display, e.g. *English*.



5. use these keys to select the desired menu language, e.g. *Deutsch*.



6. press this key for confirmation; your choice, e.g. *Sprache Deutsch ausgewählt*, appears briefly on the display followed by the start screen with the four dashes - - - - .




8. Total-Reset to factory settings (Total Reset)

With this function you can reset the gauge to factory settings. The selected language as well as date and time remain unchanged.

That means:




- Readings, statistics, calibration settings, limit values and zero offset values will be deleted (both F- and N-mode)
- works caillbration is activated (both F- and N-mode)
- the gauge is set to automatic FN identification (if available)
- reset of all options to the first menu item, e.g. $\mu\text{m}/\text{mm}$ or **Beeper ON**

Procedure:

-  switch off the gauge; a probe has to be connected.
-  press this key and keep it pressed.
-  switch on the gauge; you will hear a longer lasting beep; the welcome screen comes up followed by the start screen with the four dashes ---- .

9. Display of firmware version number and serial numbers of gauge and probe


Procedure:

-  switch off the gauge; a probe has to be connected.
-  press this key and keep it pressed.
-  switch on the gauge; after releasing the keys you will see the version number of the firmware and its release date, the serial number of the gauge and probe and at last the start screen with the four dashes ---- .

10. Status information, error messages und malfunctions

Different status information and error messages are shown on the display.

PC Remote Control

This message appears when the instrument is switched on with no probe connected or when the probe is damaged or not correctly connected. During this operational state (**PC Remote Control**) the automatic switch-off function is deactivated. Switch off the gauge with the power button .

Batteries empty

Preferably replace empty batteries immediately to avoid battery leakage. Mind the polarity. Replace the batteries within 20 seconds to preserve your data.

Probe too close to metal

This message comes up if the probe was too close to metal during power on. During this phase some internal balancing measurements are done, and the probe may not be in close distance to metal. Keep the probe away from metal during power on. If this message comes up anyway this may be an indication for a damaged probe.

Magnetic interfering field

There are strong magnetic fields near by the gauge (e.g. transformer, power supplies etc.) Use the gauge in an environment without interfering fields. If this message comes up anyway this may be an indication for a damaged probe or gauge.

Probe defective




This message indicates a damaged probe. The probe together with the gauge should be sent for repair to your dealer or to the manufacturer.

Other Errors

- the gauge does not measure anymore
- the readings are implausible
- the keys are locked
- the gauge can't be switched on or off




In these cases normally a total reset provides remedy (see chapter 8).

Do this as follows:

- remove the batteries for a short time and insert them again
- perform a total reset (switch off the gauge , press  and keep it pressed, switch on the gauge ; you will hear a longer lasting beep)
- maybe the batteries have to be replaced .

11. Display

Beside the reading and the menu structure the display shows other useful information icons and notes. The following characters and icons appear on the display:

  	a red or empty battery symbol indicates low battery voltage
ZERO	zero calibration has been carried out
ZERO flashing	zero calibration has begun but not yet finished
CALIF	one-foil-calibration has been carried out

CALIF flashing	one-foil-calibration has begun but not yet finished
LIMIT	limit values are set
LIMIT flashing	setting the limit values has begun but not yet finished
LIMIT ↑, LIMIT ↓	reading exceeds or falls below the limit values
AUTO FN	Automatic FN identification is active
Ferr	Ferrous mode is active (for iron/steel)
Non-Ferr	Non-Ferrous mode is active (for non-ferrous metals)
µm	measuring unit is µm
mm	measuring unit is mm
mils	measuring unit is mils

12. Maintenance / Service

The @SaveCoat C-1 gauge requires no special maintenance. However, it should be handled with care just as any other gauge. Please avoid bending or too tight reeling of the probe cable. Remove the batteries before longer lasting nonuse. Remove used batteries at once and dispose them in an environmentally acceptable manner.

Please send a damaged gauge or a gauge showing faulty operation to your dealer or to the manufacturer SaveCoat.

13. Technical Data

Resolution	0,1µm or <0,2% of reading (probes with ranges up to 1.5 mm) 1µm or <0,2% of reading (probes with ranges larger than 1.5 mm)
Display	high resolution color graphic display, backlight
Operator guidance	menu-driven, language selectable from English, German, French, Italian, Spanish, Turkish, Czech, Chinese; more languages on request
Memory	max. 1.000 readings each in F-mode and N-mode
Calibration	Works calibration Zeroing (One-point calibration) Foil calibration (Two-point calibration)
Zero offset	Addition of a constant value to the reading
Statistics	N, \bar{x} , σ , Max, Min
Online- Statistics	N, \bar{x} , σ , Max, Min
Limit values	adjustable with acoustic signal and indicator in the display
Interface	USB 2.0
Ambient temperature	0...50 °C
Power supply	2 x Batteries AA 1,5V or 2 x Rechargeable Batteries AA 1,5V 1,2V
Sizes / Weight	137 mm x 66 mm x 23 mm (H x B x T) 150g (incl. Batt.)
Type of protection	IP 52 (Protection against dust and dripping water)

14. Probe overview

Probe	Range	Application	Measuring uncertainty (referred to SAVECOAT/INNOTEST standards) ¹ works calibration ² zero setting ³ foil calibration
FN1.5	0 ... 1500 µm	combination probe for measurements on steel/iron <u>and</u> non-ferrous metals	¹ ± 3 µm or 3 % of reading; whichever is greater ² ±(1 µm + 2 % of reading) ³ ±(1 µm + 1 % of reading)
F1.5	0 ... 1500 µm	for measurements on steel/iron	as FN1.5
N1.5	0 ... 1500 µm	for measurements on non-ferrous metals	as FN1.5
FN1.5/90°	0 ... 1500 µm	angled combination probe for measurements on steel/iron <u>and</u> non-ferrous metals in bores and grooves	as FN1.5
FN1.5R	0 ... 1500 µm	angled combination probe for measurements on steel/iron <u>and</u> non-ferrous metals	as FN1.5
F1.5R	0 ... 1500 µm	angled probe for measurements on steel/iron	as FN1.5
FN0.2	0 ... 200 µm	high precision combination probe for measurements of thin layers on steel/iron <u>and</u> non-ferrous metals	¹ ± 2,5 µm or 2,5 % of reading; whichever is greater ² ±(0,7 µm + 1,5 % of reading) ³ ±(0,7 µm + 1 % of reading)
FN3.5	F: 0 ... 3.5 mm N: 0 ... 3.0 mm	angled combination probe with extended range for measurements on steel/iron <u>and</u> non-ferrous metals	¹ ± 5 µm or 3 % of reading; whichever is greater ² ±(2 µm + 2 % of reading) ³ ±(2 µm + 1 % of reading)
F3.5	0 ... 3.5 mm	angled probe with extended range for measurements on steel/iron	as FN3.5
F10	0 ... 10 mm	angled probe with large range for measurements on steel/iron	¹ ± 10 µm or 3 % of reading; whichever is greater ² ±(5 µm + 2 % of reading) ³ ±(3 µm + 1 % of reading)
F30	0 ... 30 mm	angled probe with very large range for measurements on steel/iron	¹ n.a. ² ±(10 µm + 4 % of reading) ³ ±(10 µm + 2 % of reading)

15. Scope of delivery

- @SaveCoat C-1 gauge. Probes are not part of the standard delivery und have to be ordered separately. Usually they can be stored in the carrying case of the gauge.
- Protective rubber cover
- 2 batteries AA
- Instruction manual
- Manufacturer's certificate
- Data transfer software SaveCoat Transfer (ready for download at www.savecoat.com)
- Carrying case for transport and storage

Optional accessories:

- Probes from @SaveCoat probe program
- Manufacturer's certificate type M DIN 55350 for gauge and probe(s)
- Calibration standards with various thickness values
- Probe guide for precise measurements on small parts
- Compendium on coating thickness measurement

16. Default settings

This section describes the gauge settings

- at initial start-up
- after total reset
- if the batteries have been removed for a longer period of time.

Gauge settings	Condition after first-time switch-on	Condition after total reset
Calibration	Works calibration	Works calibration
Online statistics display	$N, \bar{x}, \sigma, \text{Max}, \text{Min}$	$N, \bar{x}, \sigma, \text{Max}, \text{Min}$
Autom. FN, Ferr, Non-Ferr	Autom. FN (if available)	Autom. FN (if available)
Limit values	off	off
Zero offset	off	off
Switch-off mode	automatic	automatic
Beeper	on	on
Units of measurement	μm	μm
Welcome screen	on	on
Date + Time	has to be set	unchanged
Language	has to be set	unchanged

After a battery interruption lasting more than 20 seconds the gauge behaves as after the total reset. In addition, the user is prompted to select the language and set the date and time.

17. Protect the environment

Your gauge contains a number of different reusable materials.

Please do not throw your instrument away with the normal household waste but bring it to a special waste disposal depot for electrical equipment (material disposal depot).

