



SANKO Coating Thickness Meter
SAMAC—FN、SAMAC—Pro
Instruction Manual



CAUTION

- Read the manual thoroughly and use the meter correctly.
- Keep the manual with care and refer to it when necessary.

SANKO ELECTRONIC LABORATORY CO., LTD.

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Attention for safety (to use safely and correctly)

To prevent you and your properties from damaging please take some time to read thoroughly this “Attention for Safety” and use this unit correctly. And keep these instructions attentive to read when necessary.













Warning

-  ● Do not dump nor wet the gauge unit in water, otherwise it may cause damage.
Prohibition Please contact our distributor or sales office should submerged water into the unit.
-  ● Keep metals or foreign substances from the unit, otherwise it may cause damage.
Prohibition Please contact our distributor or sales office should put any materials or foreign substances in the unit.
-  ● Do not insert a screwdriver into the connector, otherwise that it may cause damage.
Prohibition
-  ● Do not throw, smash, drop the unit, otherwise it may cause damage.
Prohibition
-  ● Never dismantle or modify the gauge unit by yourself, otherwise it may cause errors or damage.
Prohibition

Attention for safety (to use safely and correctly)







Warning

-  ● Never fail to remove batteries from the unit when not in use for a long time.
Must Leakages occurred from deterioration of batteries may cause erroneous reactions or damage.
-  ● Be sure to read this book on the item of 「How to fit batteries」 to replace batteries.
Must
-  ● Store batteries in a place where children and pets are incapable of handling them.
Must Please call a doctor like in a case that a battery is swallowed.
-  ● Do not put batteries into fire or water. Store them in a cool, dry and dark place avoiding flames, high temperature and moisture.
Must
-  ● Do not get batteries shocked and dismantled, and soldered for processing
Must
-  ● Do not short or recharge batteries and handle with metallic tools like pliers.
Must
-  ● Replace with new (live) batteries according to the procedure of this Operating Instructions.
Must
-  ● Be sure of paying attention on battery polarity marks, (+、-) to place the batteries.
Must
-  ● In case a battery has leakage please clean up the place with clothes to replace batteries.
Must And do not touch the leaked liquid and wash skins or clothes in case they are contaminated.
-  ● Comply to regulations and laws in your neighbors when disposing of them.
Must

Attention For Safety (to use safely and correctly)



Attention

-  ● Do not use Benzene or Thinner for cleaning and spray pesticides on the meter, otherwise it may cause cracks or malfunctions.
Prohibition
-  ● Do not store the meter in places getting high in temperatures such as in a car in strong sunlight or near heaters, otherwise it will be hazardous to the meter and may cause malfunctions.
Prohibition
-  ● Do not step, trample down nor put anything on the meter. Or it may cause breakdowns, injuries.
Prohibition
-  ● Keep the meter away off rubber-made articles or vinyl articles. A lengthy contact between meter and them may cause stickiness and it may be difficult to get rid of them.
Prohibition

Notes:

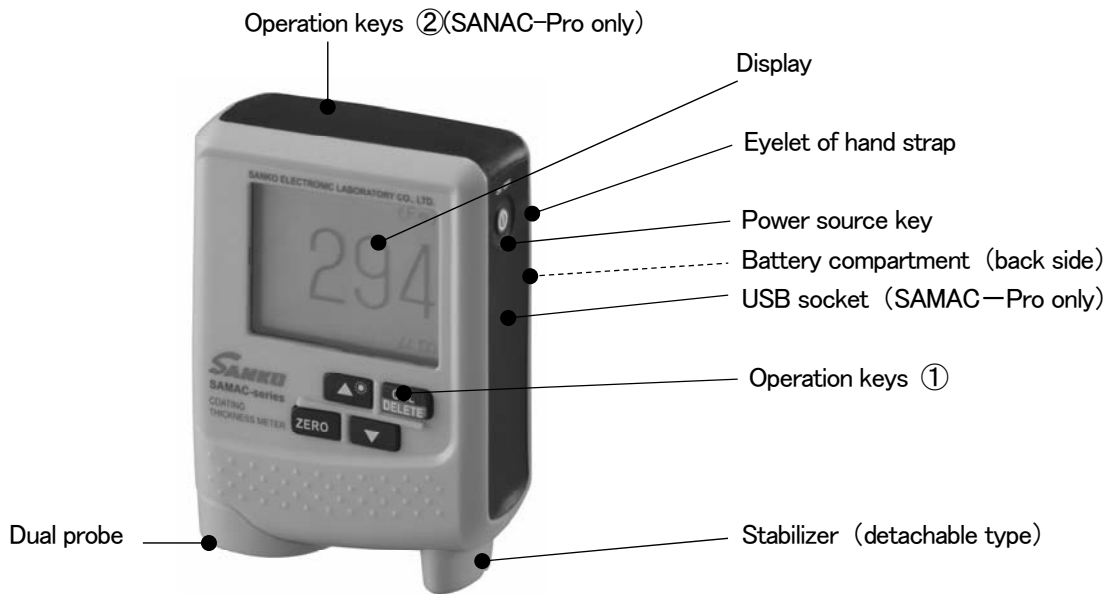
- Please read this manual thoroughly for correct operations before getting started.
- This meter is a precision gauge. Please handle with care.
- Do not knock or scratch objects with the tip of a probe.
- Keep the tip of a probe clean. A slight amount of dust may cause errors in measurements.
- Clean the meter and store it in free from dust and moisture after operation.
- To keep precision with a gauge please contact us for a periodical inspection.
- Keep the meter away off electric noises, shocks or magnetic fields when in a use.
Or it may cause malfunctions.

Get started

◆ Contents in a package Please make sure if the following items are included.

- Main unit
 SAMAC-FN or, SAMAC-Pro
 - ◇ SAMAC series integrates with a dual probe (one for both electromagnetic/eddy current use).
- Dry batteries LR03 (2 pieces)
- Carrying case for main unit
- Instruction manual (this manual)
 Instruction manual for SAMAC-Pro (supplied with CD)
- Inspection sheet (warranty) –cum– user registration sheet
 (This warranty is valid only in Japan)
- Zero plates for test : (each Fe substrate, NFe substrate)
- Thickness standard (film : 2 pcs, Bakelite : 1 pc)
- Carrying case for Zero plates/Thickness standards
- USB cable (2m) (SAMAC-Pro only)
- USB driver (CD) (SAMAC-Pro only)
- Hand strap cord

◆ Names of parts



- Dual probe
Capable of measuring film thicknesses of both Fe and NFe metal substrates with Auto setting and selection by a built-in probe.

- Display
Indicates measuring values, operation guides, malfunction states, etc., with backlight.

- Power source key
A key to switch ON/OFF.

- Operation keys ① (for both SAMAC-FN & Pro use)

(1) 「ZERO」key

Set a Zero point before measuring.

(2) 「▲☀」key, 「▼」key

ON/OFF of backlight, setting numerical values when adjusting calibration standard.

(3) 「CAL/DELETE」key

CAL: Key to initiate or finish for calibration standard.

DELETE: Delete incorrect or unnecessary measuring results when adjusting.

(works only when 「ZERO」, 「CALIBRATION」 is processed with combination of 「▼」key.)

※Power source key/Operation keys can be activated for setting of each function with combination of other keys.

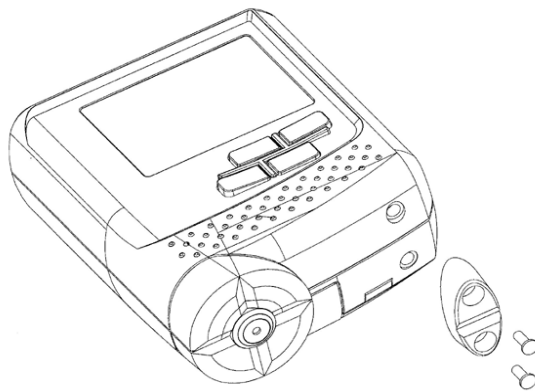


- ◆ Operation keys ② (SAMAC-Pro only)



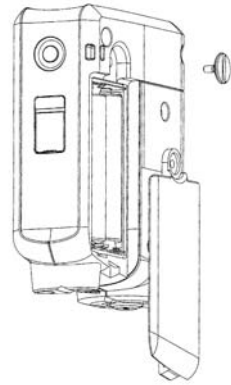
- 「Cal No. 」key
To select a calibration no.
- 「H/L」key
To set High/low limit values.
- 「STATISTICS」key
A key to process statistic data stored in memory.
- 「MEM. SEL. 」key
A key to select memory to store data.

- (8) 「COM. ENABLE」key
A key to select for data transfer.
 - (9) 「TRANSMIT」key
A key to activate transferring data.
 - (10) 「MEM. CLEAR」key
A key to delete data stored.
 - (11) 「DATA ERASE」key
A key to erase one of data indicated on display.
 - (12) 「CANCEL」key
A key to interrupt 「Zeroing」, 「Calibration Standard」 and high functional operation to return the process to usual measuring operation.
- Battery compartment
It contains 2 pieces of dry battery (LR03)
 - Eyelet of hand strap cord
Hang the meter through a strap over your wrist never to drop it.
 - USB socket (SAMAC—Pro only)
A socket connected to a USB cable (accessory).
 - Stabilizer (detachable type)
It is possible to take measurements without the stable leg depending on the measuring spot.
Detach the leg when it is necessary to adjust for proper measurement positioning.
(Removing 2 screws from the leg)
Be careful that measuring is not becoming unstable.



◆ How to fit batteries

- ① Open the battery lid on the back of the unit.
Remove the screw from the lid and lift the upper side a little.
Slide it down to remove.
(Do not lift the lid too much or it may snap the pick.)
 - ② Insert batteries.
Ensure the correct battery polarity ⊕、⊖ for placement
 - ③ Close the lid and fasten the cover with the screw.
- ※ It is not a breakdown that power becomes ON during replacement of batteries.



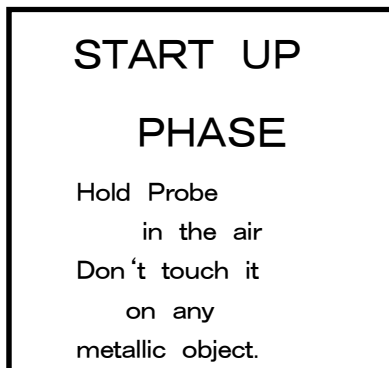
Caution

- Use designated and new (check battery-life) batteries or ones supplied in this package.
- An incorrect use of batteries may cause leakages, bursts. Do not intermingle new with old ones.
- Take out batteries to store when not in use for a long absence. Or that may cause leakages.
- Keep batteries off children and pets.
- Comply to the laws and rules in your local authorities when disposing of batteries.

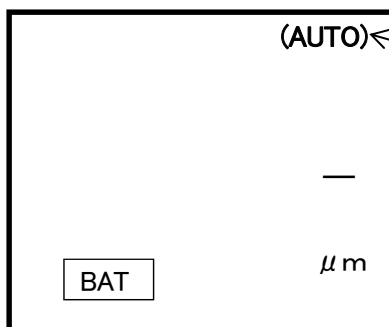
◎ About reading display



When placing batteries in the unit, the messages and warning below on the screen may be indicated.
And these are not breakdowns, wait until the reading disappears with a beeping sound.



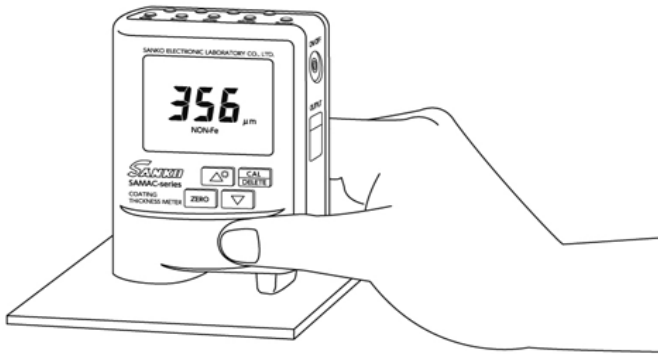
Batteries have run out when the display on the unit indicates the mark BAT listed below.
Replace with new batteries.



Auto selection mode displays (AUTO).

When setting exclusively for ferrous, or nonferrous substrate at the corresponding mode to substrate, Fe or NFe is displayed.

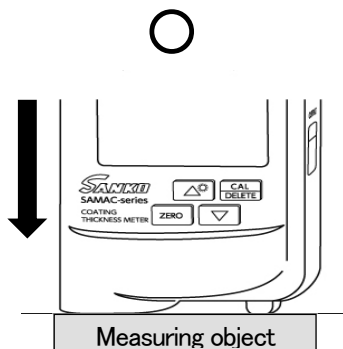
◆How to hold a unit



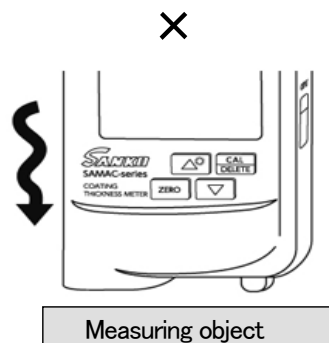
Hold the lower part of SAMAC unit as illustrated. Quickly and calmly press the probe perpendicularly to the object. It beeps and indicates the measuring result on the screen display. When it does not beep, lift it up 5~7 cm high above and try again to take measurements.

◆How to press a probe to an object

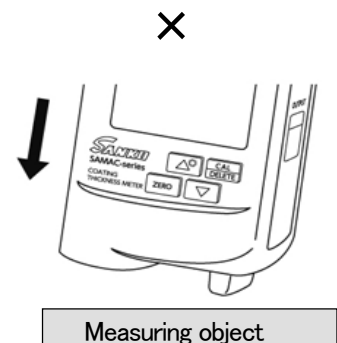
- keep the probe 5 cm or over away off metallic objects when not in use of measuring.
- SAMAC is a built-in probe type. When it tilts, that may cause errors.
- Press the probe perpendicularly against the measuring object
- A slow pressing may cause large measuring errors.



Press the probe swiftly (swishing press) against the measuring object.



Do not press slowly. Or it may result in measuring errors.



Do not tilt the probe against the object. Or it may make measuring errors.



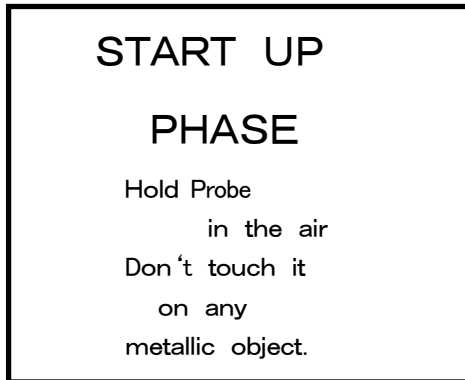
Caution

- ◆ Do not smash or hit the probe against objects, or it may cause damages to probes and to objects.
- ◆ Do not scrape, scrub objects with the probe except in a special measurement. Or it may break the tip of the probe and cause damages to the tip and surface of objects.

How to operate

(1) How to switch Power source

Press **ON/OFF** key.



The buzzer beeps.

This message lasts for about 3 seconds.

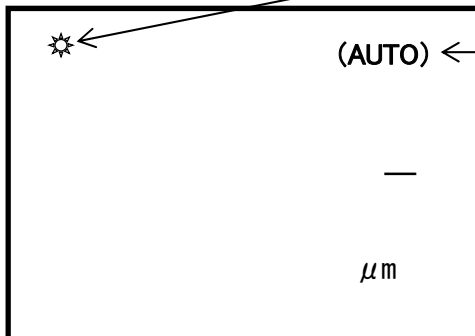


Caution

Hold the probe in air without touching when the reading is on display. Or it may indicate 「ERROR」 and automatically switch off Power.



The Backlight mark is indicated when ON.



Auto-selection mode displays (AUTO) just after Power switched ON.

When setting exclusively for ferrous, or Non-ferrous substrate at the corresponding mode to substrate.

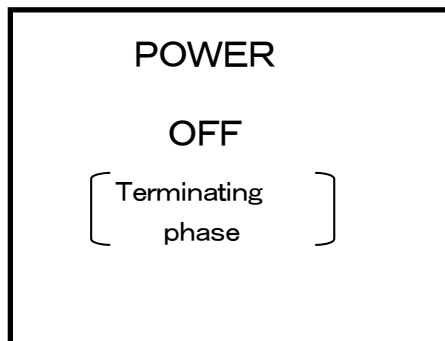
Fe or **NFe** is displayed.

It becomes possible to take measurements or adjustments.

(2) How to switch off

Press **ON/OFF** key.

The buzzer beeps.



The message lasts for about 2 seconds.



The buzzer beeps and this unit is switched to OFF.

(3) Zeroing

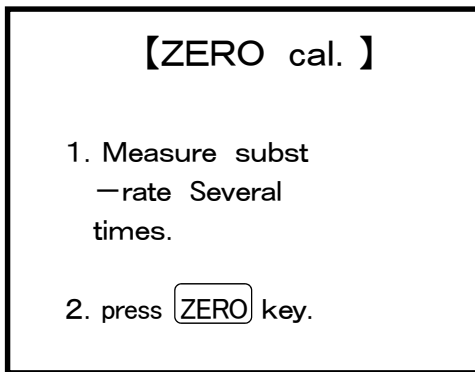
It is capable of getting started on measurements and adjustments immediately after the message of 「START UP PHASE.....」has disappeared.

- ※ Generally, the meter makes errors depending on material formation and shapes to be measured.
To minimize measurement errors and obtain as accurate results as possible please be sure of carrying out 2 kinds of adjustments of 「Zeroing」 and 「Calibration standard」 before measuring process.
- ※ Please prepare for a Substrate plate the identical material, quality and size to a measuring object.
(This substrate plate should be designated as a 「Zero plate」)

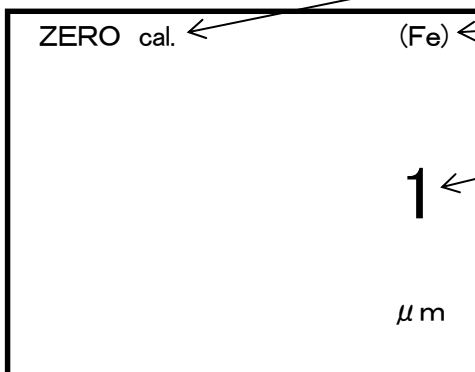
◆ Press **ZERO** key.

The buzzer beeps.

CAL/DELETE key changes to one data “deletion” function.



Press the probe to the Zero plate.
The buzzer beeps.



Zeroing is in process.

Testing object is set for ferrous metal substrate.

Measured mean value.

When the mean value results in largely off the “0”, press **CAL/DELETE** + **▼** key to delete the latest data out of measured values. It indicates “-” to delete all data.

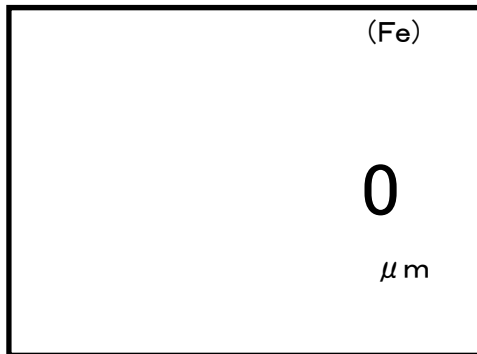
Remove the probe from 「Zero plate」

- Repeat a measuring process 1~20 times by pressing the probe to 「Zero plate」. (A mean value is displayed whenever a probe is pressed)
- ◆ When a measuring process reaches the 20th time, the buzzer beeps, beeps 2 times and afterward new entry is no more accepted.

After press of certain times or 20 times,
press **ZERO** key.

The buzzer beeps.

“Deletion” function of CAL/DELETE key stops.



The reading 「Zeroing」 in the upper left disappeared and Completed.

Zeroing completed and it becomes possible to take measuring and adjusting operations.

- Press the probe to the 「Zero plate」 several times and make sure the measuring result indicates 「0」 or in the neighborhood of 「0」. When the measured value results in largely off 「0」 μm , please try again zeroing from the beginning. There is a case when calibration is not correctly made.
- [LLLL] indicated on display during a time of zeroing means that the calibration point heavily deviates from the standard. Please make sure that the metal substrate is not processed or plated with other materials and repeat the zeroing until a stable 「0」 is obtained.

※After performing Zero calibration, the previous 「Zero adjusting value」 is deleted, and the last entry of 「Zero Adjusting value」 is stored.

(4) Calibration standard (CAL)

- Prepare 「Zero plate」 used for 「Zeroing」.
- Prepare 「Thickness standard」 that are the same thick as the measuring film or thicker than that.
- Place the 「Thickness standard」 on the 「Zero plate」.
- Press the **CAL/DELETE** key.

The buzzer beeps.

CAL/DELETE key changes to one data “deletion” function.

↓

【 Cal. w. foil】

1. Measure thick-ness of foil several times.
2. With ▼ or ▲, Adjust just to thickness of foil
3. press **CAL** key.

Press again **CAL/DELETE** key to interrupt Calibration standard (CAL).

Press the probe to the Thickness standard on the Zero plate.
It beeps whenever pressing.

↓

cal. w. foil (Fe)

102

μm

Calibration standard is in process.

The testing object is set for ferrous metal substrate.

Measured mean value

When the mean value results in largely off the “0”, press **CAL/DELETE** + ▼ key to delete the latest data out of measured values.

It indicates “—” to delete all data.

- Repeat a measuring process 1~20 times by pressing the probe to 「Zero plate」. (A mean value is displayed whenever a probe is pressed)
- ◆ When a measuring process reaches the 20th time, the buzzer beeps, beeps 2 times and afterward any new entry is no more accepted.

Adjust the displayed value to Thickness standard (in this case, 100 μm) by pressing ▲, ▼ key.

↓

cal. w. foil (Fe)

100

μm

Pressing ▲ or ▼ key interrupts the delete function of **CAL/DELETE** key.

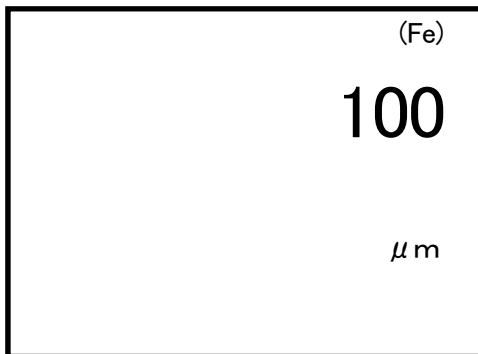
Pressing ▲ key increases the displayed value.

Pressing ▼ key decreases the displayed value. (Press and holding key turns to fast forwarding.)

Adjust the reading value to the Thickness standard.

After adjusting the reading value to the Thickness standard,
press **CAL/DELETE** key.

The buzzer beeps, displayed **【cal. w. foil】** goes out and it returns to a measuring mode.

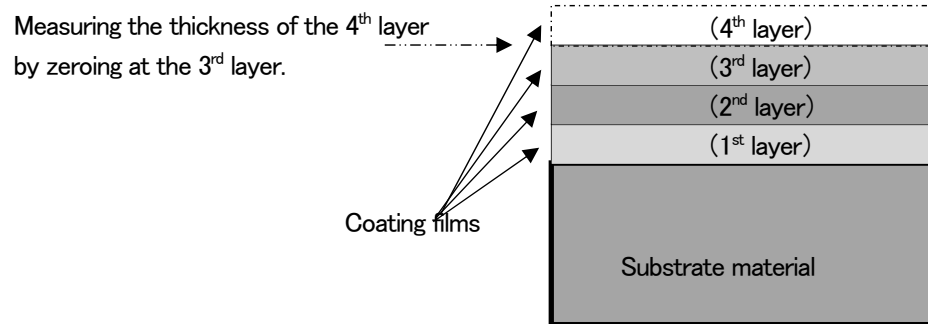


This is a measuring mode.

- It is correct that numerical values measured by pressing the probe a few times to the 「Thickness standard」 on the 「Zero plate」 indicates the thickness in the neighborhood of the 「Thickness standard」.
 - When the measured value results in largely off the 「Thickness standard」 please try again the 「Calibration standard」 from the beginning.
- ※After performing Calibration standard , the previous 「Calibration standard adjusting value」 is deleted, and the last entry of 「Calibration standard adjusting value」 is stored.

(5) Zeroing in special cases (Multi-layers)

- ◎ In case of being painted as shown with multi-layers on the substrate there may be needs to measure thicknesses of each layer. For example, measuring only the thickness of the 4th layer please zero as an assumed ZERO at the surface of the 3rd layer stacked on the substrate and take 「Zeroing」, 「Calibration standard」 as the aforementioned (3), (4).



◆ Releasing of special-case zeroing

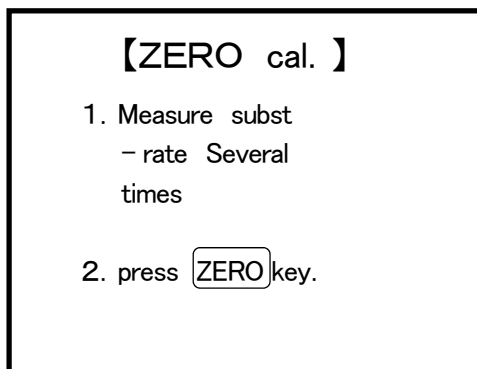
When zeroing again on the substrate after having finished the above measurements and if the combined thickness of 3 coating layers from 1st to 3rd exceeds $50\ \mu\text{m}$, please zero the meter on the following procedures.
If the thickness of 3 combined layers is bellow $50\ \mu\text{m}$, take the same procedure as usual zeroing to release.

- Prepare the identical material quality, plate size to a measuring object.
(This is designated as a Zero plate)

Press **ZERO** key.

The buzzer beeps.

CAL/DELETE key changes to one data “deletion” function.



Press the probe to the Zero plate.

The buzzer beeps, beeps, beeps 3 times.



OFFSET.

To continue.
press **ZERO** twice.

Press **ZERO** key .
The buzzer beeps.



Press **ZERO** key again.
The buzzer beeps.



【ZERO cal.】

1. Measure subst
-rate Several
times.

2. press **ZERO** key.

Press probe to Zero plate.
The buzzer beeps.



ZERO cal. ← (Fe)

1

← μm

Zeroing is in process.

Measured mean value

When the mean value results in largely off
the "0", press **CAL/DELETE** + **▼** key to
delete the latest data out of measured values.
It indicates "-" to delete all data.

Remove the probe from 「Zero plate」



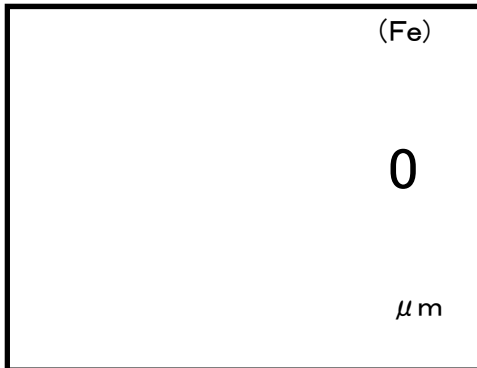
After pressing certain times or 20 times,
press **ZERO** key.



- Repeat a measuring process 1~20 times by pressing the probe to 「Zero plate」.
(A mean value is displayed whenever a probe is pressed)
- ◆ When a measuring process reaches the 20th time, the buzzer beeps, beeps 2 times and afterward the unit does not accept any entry.

The buzzer beeps.

“Deletion”function of CAL/DELETE key stops.



The reading 「Zeroing」 in the upper left disappears. Zeroing completed and the unit becomes possible to take measuring and adjusting operations.

- It is correct that numerical values measured by pressing the probe to the 「Zero plate」 indicates 「0」 or in the neighborhood of 「0」.
When the measured value results in largely off 「0」 μ m, please try again zeroing from the beginning.
 - [LLLL] indicated on display during a time of zeroing means that the calibration point heavily deviates from the standard please make sure that the material is not in process of being built with others and repeat the zeroing in several times until a stable 「0」 is obtained
- ※After performing Zero calibration, the previous 「Zero adjusting value」 is deleted, and the last entry of 「Zero Adjusting value」 is stored.

(6) 2-point calibration when it is difficult to perform 「Zeroing」

In case zeroing is difficult to perform such as measuring the thickness of the film on the rough surface of Blast-steel plates, a calibration method using 『2 different thicknesses of standard plates』 pinching a thickness of the object is defined as 「JIS K5600」 Standard. This calibration method complies to the regulations.



Caution

It is not possible to use both this calibration method and other calibration ones together, or mixing them together. Should were the methods taken, measuring results could be the wrong values.

- Prepare the same blast-steel-plate in material as the objective base or, a rough face on non-ferrous base like aluminum and 2 different thicknesses of Thickness standards.

Please choose the suitable difference of thickness standards from the list below.

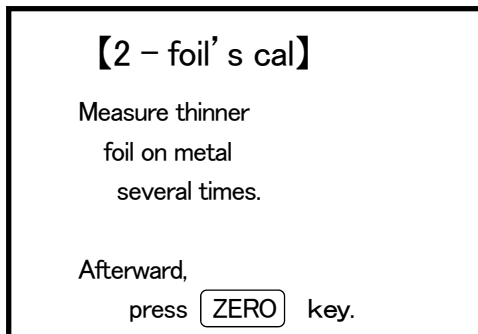
Film thickness to be measured (Predicting film thickness)	Difference of thickness between 2 Thickness standards
~ 49.9 μm	10 μm or over
50.0 ~ 99.9 μm	25 μm or over
100.0 ~ 499.9 μm	50 μm or over
500 ~ 999 μm	199 μm or over
1.0 ~ 2.5mm (Max. 2.0mm for NFe)	0.5mm or over

Press and hold the **ZERO** key for 3 seconds.

The buzzer beeps.

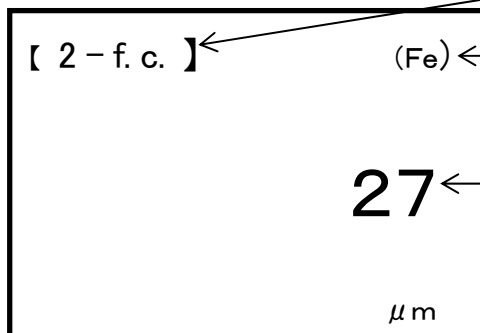


CAL/DELETE key changes to one data “deletion” function.



Stack the thinner 「Thickness standard」 on the substrate and press the probe on it.

The buzzer beeps whenever pressing the probe.



It reads that 2-foil calibration is under process.

It reads that a probe for 「Fe」 is connected to measure on a ferrous substrate.

Measured mean value

In case the mean value abnormally deviates, a press of **CAL/DELETE** key + **▼** deletes the latest entry and displays the mean value of all data except the latest one.

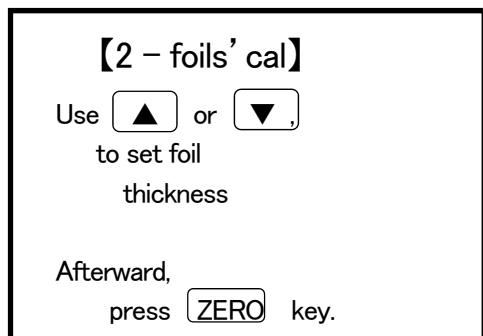
All deletion indicates “-” on the reading.



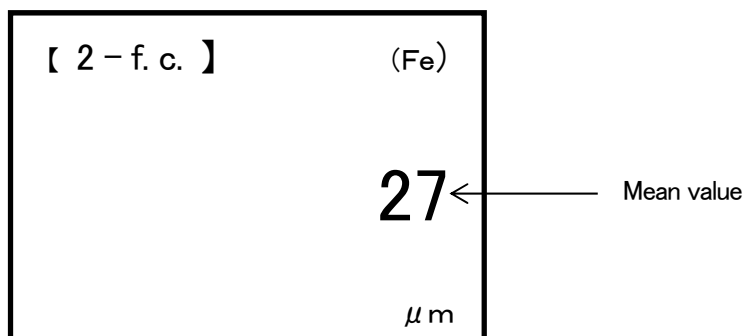
After pressing certain times or 20 times,
press **ZERO** key.

- Try measuring plural times in the range of 1–20 times by pressing the probe on a thinner 「Thickness standard」.
(A mean value is indicated whenever the probe is pressed.)
- ◆ When repeating measurements 20 times, the buzzer beeps, beeps 2 times and afterward new entry is no more accepted.

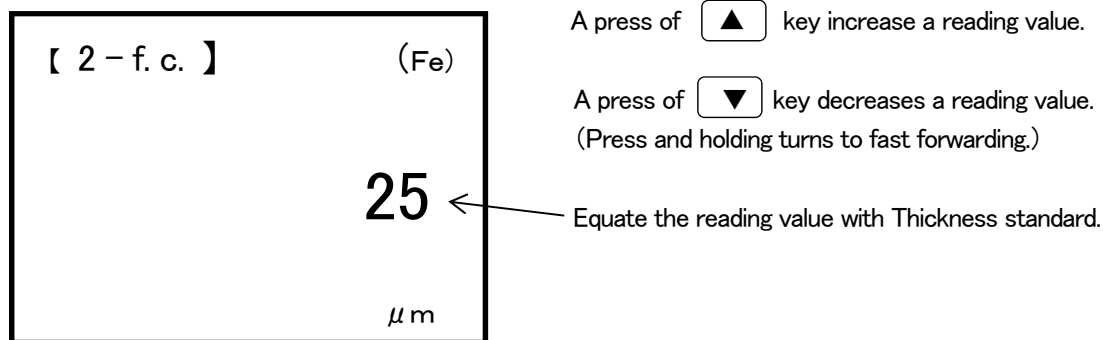
The buzzer beeps, beeps 2 times.



A press of ▲ or ▼ key makes the buzzer
beep and a mean value to the last measurements appears on the reading.



Equate this reading value with Thickness standard (in this example, 25 μm)
by pressing ▲ or ▼ key.



After equating the reading value with the Thickness standard ,
press **ZERO** key.
The buzzer beeps.



【2 – foils' cal】

Measure thicker foil on metal several times.

Afterward, press **ZERO** key.

Press the probe on the thicker 「Thickness standard」 stacked on the substrate.

The buzzer beeps whenever pressing the probe.



【 2 – f. c. 】 (Fe)

198

μm

Measured mean value

In case the mean value abnormally deviates from the Thickness standard, a press of **CAL/DELETE** + **▼** key deletes the latest entry and displays the mean value of all data except the latest one.

All deletions indicates “—” on the reading.

- Try measuring in the range of 1–20 times by pressing the probe on the thicker 「Thickness standard」. (A mean value is indicated whenever the probe is pressed)

After pressing certain times or 20 times, press **ZERO** key.

The buzzer beeps, beeps 2 times.



【2 – foil' s cal】

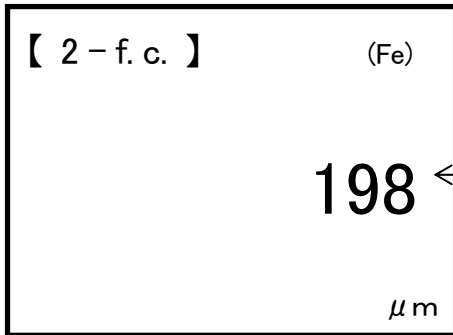
Use **▲** or **▼** ,
to set foil thickness.

Then, ready for measure.



- ◆ When repeating measurements 20 times, the buzzer beeps, beeps and the unit does not accept any entry.

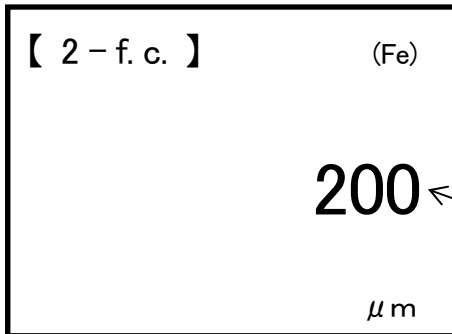
A press of **▲** or **▼** key makes the buzzer beeps, indicating the mean value to the last measurements on the reading.







Mean value


Equate the displayed value with the thickness of Thickness standard
(in this example 200 μ m) by pressing  or  key.



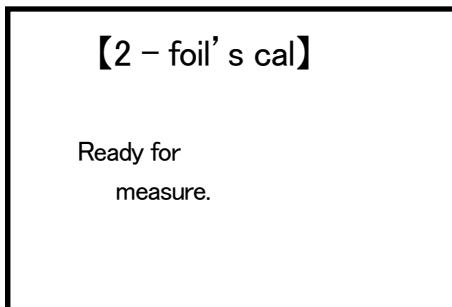
A press of  key increases a reading value.

A press of  key decrease a reading value.
(Press and holding turns to fast forwarding.)

Adjust the value to the Thickness standard.

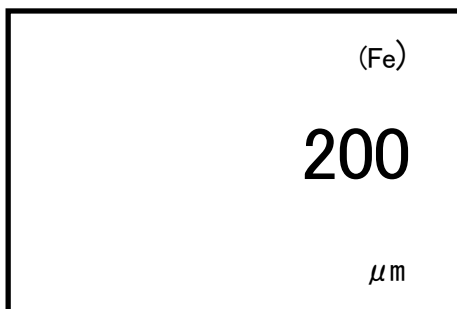
After adjusting to thickness of the Thickness standard,
Press  key.

Then the buzzer beeps, beeps, beeps 3 times.



This is on display for about 0.5 seconds.

The buzzer beeps.



Measuring mode

- Press the probe plural times to the 「Thickness standard」 placed on the adjusted substrate.
It is correct that the reading value displays a thickness in the neighborhood of 「Thickness standard」.
Take the procedure with each 2 sheets of 「Thickness standard」.
- When the measured value results deviate largely from 「Thickness standard」, please try again performing 「2-point calibration」 from the beginning.

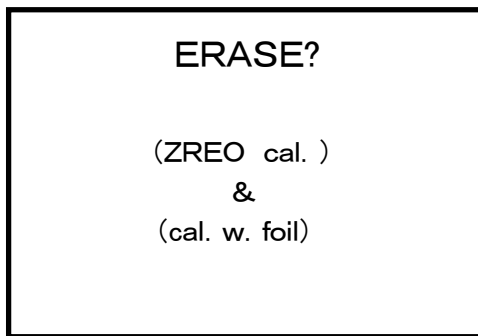
※After performing 2 foil adjustments, all previous data are deleted and the last data measured with 「2-point calibration」 is stored.

(7) How to delete calibration

Take the following procedures to delete calibration when the reading on the screen is locked or after batteries replaced or when it becomes impossible to process 「Zeroing」, 「Calibration standard」(CAL).

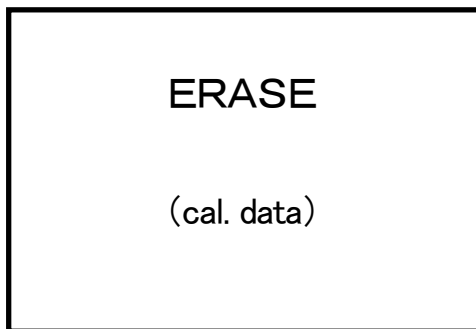
※This operation procedures are taken when SAMAC is faulty. Usually, take adjustments with the old adjusted data stored. Automatically, the old data is deleted and the new data is stored.

Hold key and press key.
The buzzer beeps, beeps 2 times.

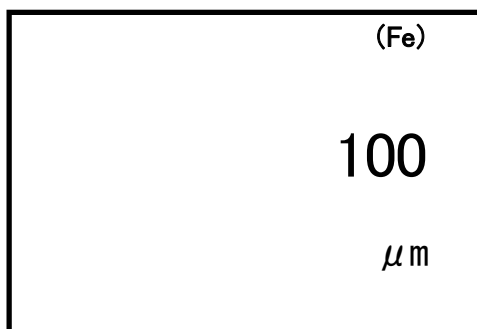


※Switch Power to OFF when interrupting the deletion of calibration.

Press key.
The buzzer beeps, beeps 2 times.



Deletion of calibration data is over and the buzzer beeps, beeps 2 times.



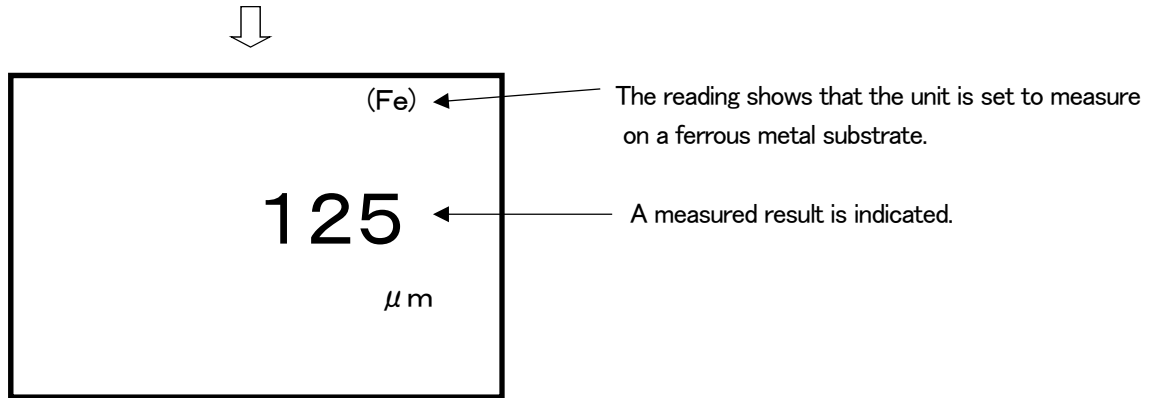
The last measured substrate and value are displayed.
It becomes possible to take measurements and adjustment procedures of this unit.

After deleting, take 「Zeroing」,「Calibration standard」 procedures proceeding to measuring.

Measuring

! Hang the meter through a strap over your wrist never to drop it.

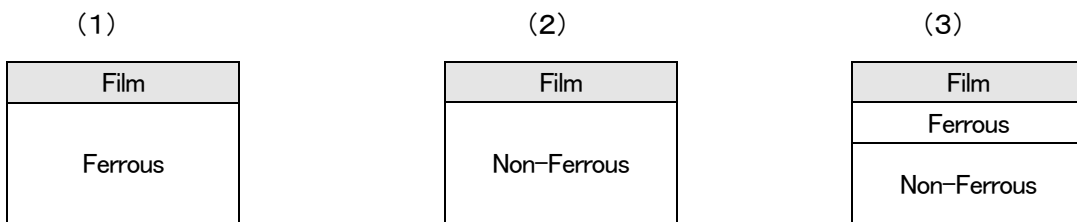
When pressing the probe against the object with Power on.
The buzzer beeps.



Each time a probe is pressed to an object the buzzer beeps and the measuring result is indicated.

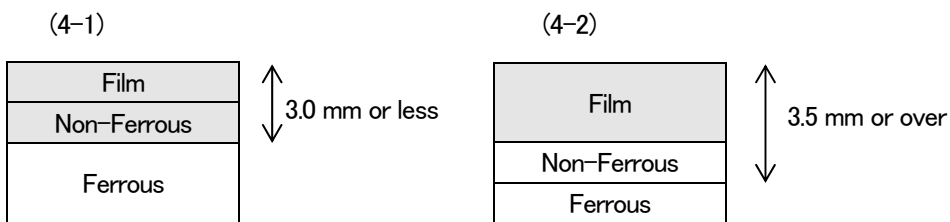
◆ Measuring of Auto-selection by probe

- (1) Ferrous substratemeasure film thickness in Fe mode.
- (2) Non-Ferrous substratemeasure film thickness in NFe mode.
- (3) Ferrous on Non-Ferrous substratemeasure film thickness in Fe mode regardless of Fe thickness.



(4) Non-Ferrous on Ferrous layered substrate

- (4-1) Layered thickness Non-Ferrous and film, 3.0 mm or less[※].....measure thickness of layered Non-Ferrous and film in Fe mode.
- (4-2) Layered thickness Non-Ferrous and film, 3.5 mm or over[※].....measure film thickness in NFe mode.



Note:

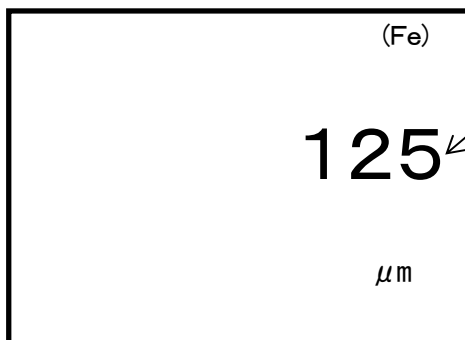
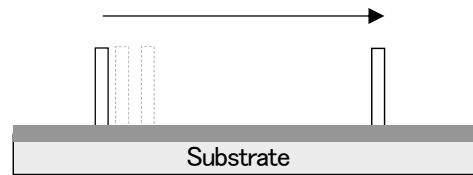
- 「HHHH」 is indicated in a between area of 2 different layers and when special metals unidentified by Auto-selection.
- In case of adjusting by 「Calibration standard」 on Fe-substrate, 「Calibration standard」foils made of Non-Ferrous metals such as BeCu can be used.
- In case substrates are not identified by Auto-selection mode, change to exclusive mode by 「corresponding mode to a metal substrate」(P30). In case of an example of (4-1), thickness of film only can be measured at 「Non-Ferrous」 exclusive mode.

※They may vary in compositions, characteristics, thicknesses of materials.

Function setting

(1) Setting of Non-Interrupt Measurement Mode

As illustrated on the right figure, this mode is used when taking non-interrupt measurements for painting surfaces etc. Film thickness values are taken/displayed while press/ holding probe on the object.



A measuring value is held (displayed) when pressing a probe at standard mode, but in Non-Interrupt mode measuring values are taken/displayed about every 0.5 seconds interval while pressing a probe.

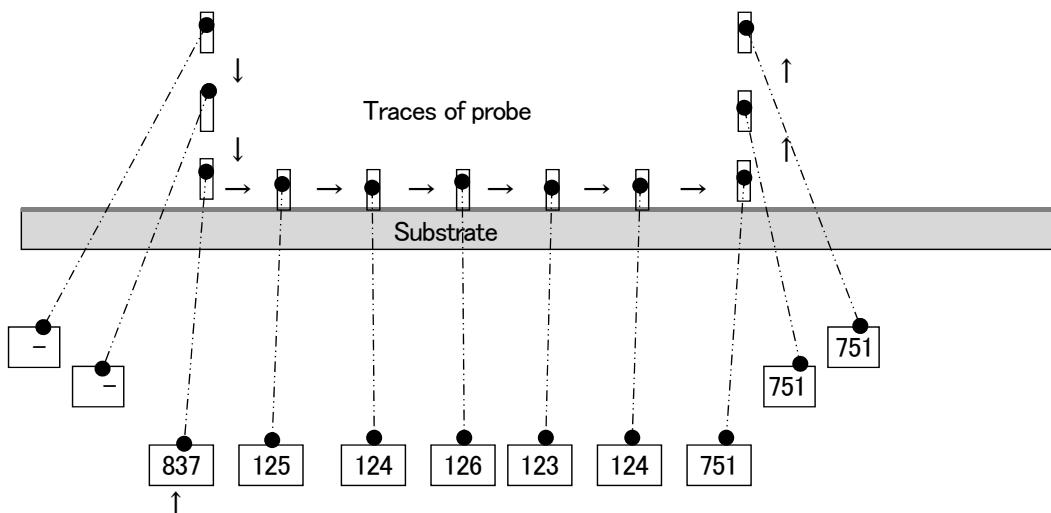
Hold **ZERO** key and press **▲** key.

The buzzer beeps, beeps 2 times.



This unit has turned into 「Non-Interrupt Measurement Mode」.

Data can be successively measured about 0.5 second intervals and the data is indicated with a beeping sound.



Reaching to a measurable distance, the probe indicates the distance/thickness at the spot.
Measuring values on display (indicated successively each 0.5 second interval).

※The Non-Interrupt function is stored when switching Power to OFF.

To return to the beginning, take the procedure of “Returning to the beginning” listed on the following page.



Caution

The moving measuring method at “Non-Interrupt Measuring Mode” may damage the measuring surface or the probe tip because of frictions made by sliding the probe on the surface.

Please try fewer to take this method to minimize the frictions.

《Returning to the beginning》

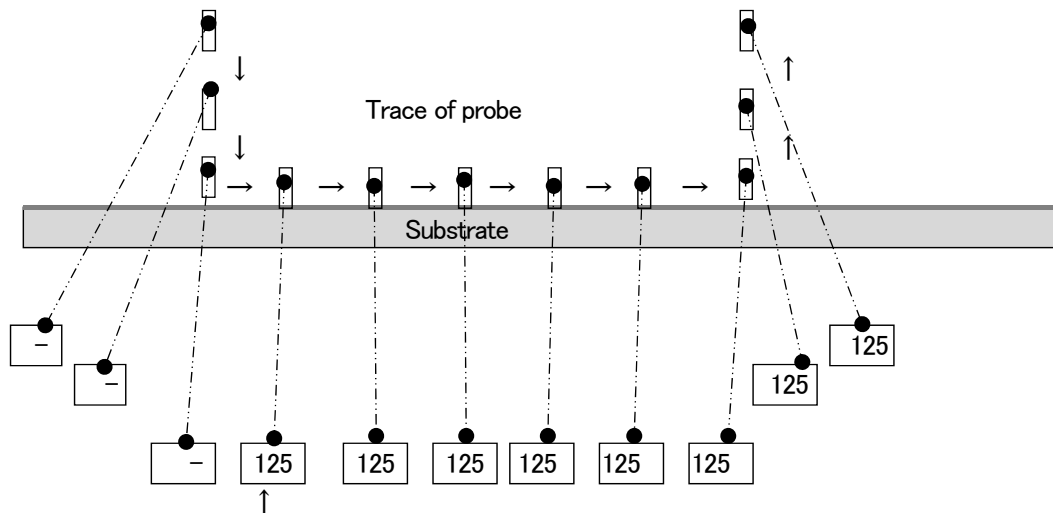
To return 「Non-Interrupt Measurement Mode」 to the beginning take the same procedures as at the initial setting.

Hold **ZERO** key and press **▲** key.

The buzzer beeps, beeps 2 times.



「Non-Interrupt Measurement Mode」 has been released and returned to the beginning.



(2) Setting of Resolutions

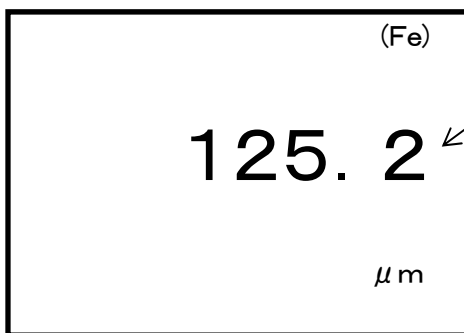
The reading values up to 500 μm can be switched in resolutions as below.

It is possible to read resolution measurement results by the 0.1 μm unit in the thickness of (0~400 μm), and by the 0.5 μm unit in the thickness of (400 ~ 500 μm).

- Switch Power to OFF when Power switch is ON.

Hold **CAL/DELETE** key and press **ON/OFF** key for 3 seconds or over until the buzzer beeps 2 times.

The buzzer beeps, beeps 2 times.



Indicated :

0~400 μm by the 0.1 μm unit,

400 μm ~500 μm by the 0.5 μm unit.

※This function is not released if the Power source is switched to OFF.

When returning, take the operation procedures of “Returning to the beginning” as below.

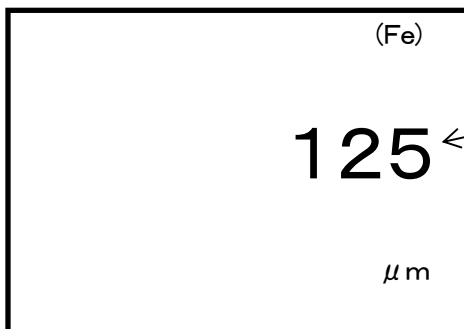
《Returning to the beginning》

To return 「0.1 μm /0.5 μm 」 displayed resolutions to the beginning, take the same procedures as the above.

- Switch Power to OFF when Power is ON.

Hold **CAL/DELETE** key and press **ON/OFF** key for 3 seconds or over until the buzzer beeps 2 times.

The buzzer beeps, beeps 2 times.



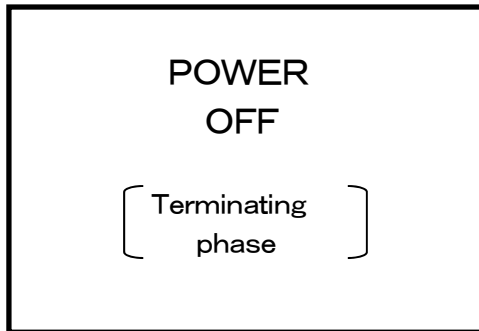
No indication under a decimal place.

(The data is rounded off to nearest whole digit.)

(3) Setting of Auto-Power-OFF function

When no entry of key operations and measuring procedures lasts for 3 minutes, the unit switches automatically to OFF to save battery. This function can be released by the following operations.

No entry for 3 minutes lasts, and then the buzzer beeps.



The message is indicated for about 5 seconds.



The buzzer beeps, and the unit is switched to OFF.

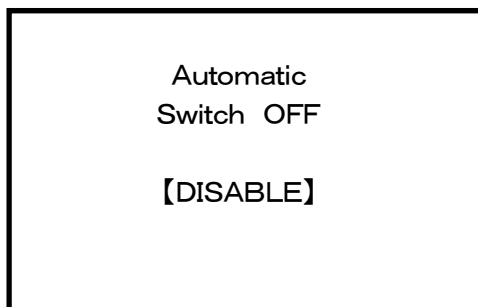
《 To Disable Auto-Power-OFF function》

- Switch to OFF when Power is ON.

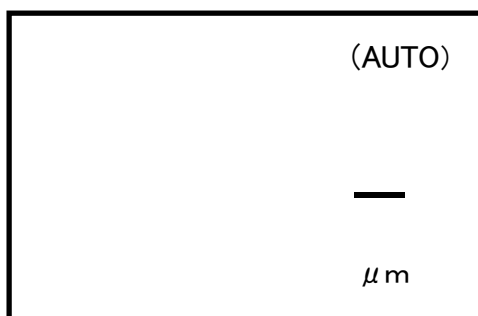
While pressing and holding  key, press  key for 5 seconds or over.



The buzzer beeps, beeps 2 times.



It indicates 5 seconds.



It returns to a measurable mode.

Power switches to OFF when  key is pressed.

※This function is not released even if the Power source is switched to OFF.

To enable it, take the operation procedures of “To Enable Auto-Power-OFF function”.

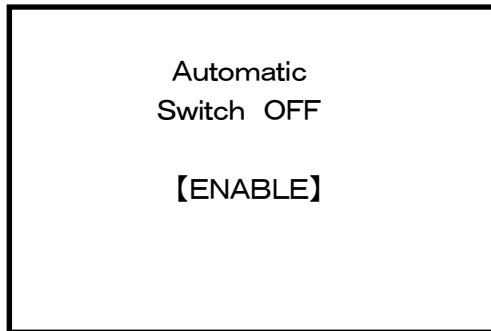
《To Enable Auto-Power-OFF function》

- Switch to OFF when Power is ON.

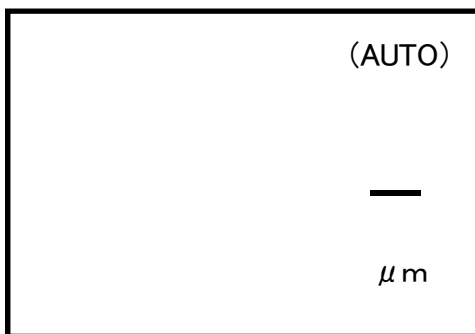
While pressing and holding  key, press  key for 5 seconds or over.



The buzzer beeps, beeps 2 times.



It indicates for 5 seconds.



It returns to a measurable mode.
Auto-Power-OFF function can be functioned.



When no entry of key operations and measuring procedures lasts about for 3 minutes,
the buzzer beeps and the power is switched to OFF.

※ This function is not released even if the Power source is switched to OFF.

To disable it, take the operation procedures “To Disable Auto-Power-OFF function”.

(4) Setting of Backlight

The LCD of this unit has a backlight function.

The backlight can be used at the place which is dark and difficult to read messages on display.

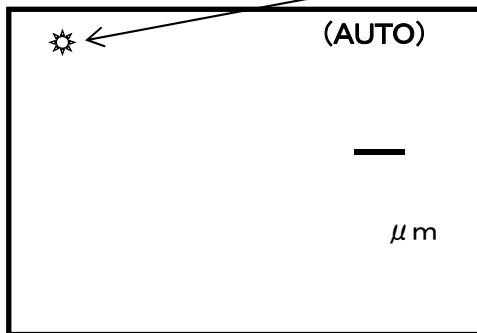
《Lighting the Backlight》

Press and hold  key for 3 seconds or over.

The buzzer beeps, beeps 2 times
and the backlight goes on.



It is shown when the backlight is ON.



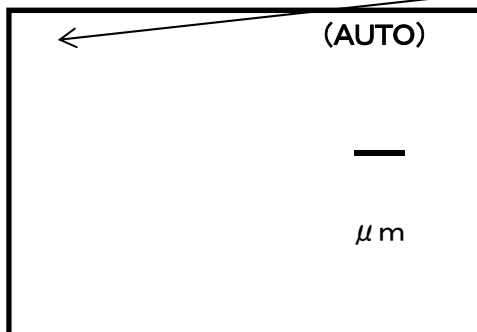
《Switching off the Backlight》

Press and hold  key for 3 seconds or over.

The buzzer beeps, beeps 2 times and the backlight goes off.



The mark and backlight go off.



※This function is kept alive even if the Power source is switched to OFF.

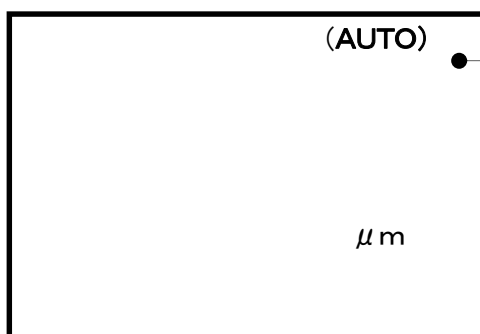
(5) Setting to a corresponding mode to a metal substrate

The unit (SAMAC series) automatically select a substrate for measuring objects, but in addition to the Automatic mode 『Fe substrate exclusive mode』, 『NFe substrate exclusive mode』 are ready to use. In case it is not possible to identify the substrate by Auto-selection mode, change the mode on the following steps to take measurements with procedure as shown below.

※When on EX-factory, the unit was set to 「AUTO MODE」.

※This function is kept alive even if the Power is switched to OFF.

【EX-factory setting】



Indications of Ferrous/Nonferrous Auto-selection mode are displayed by one of (AUTO), (Fe), (NFe) respectively.

Press and hold **CAL/DELETE** key for 3 seconds or over.

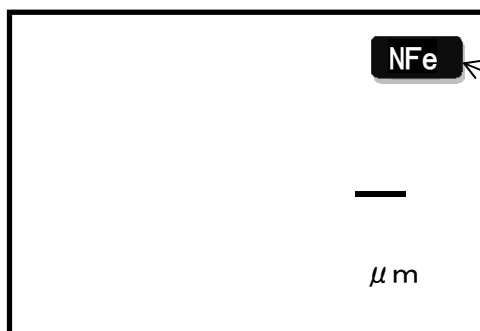
The buzzer beeps, beeps 2 times.



When moving to a ferrous exclusive mode, **Fe** is displayed.

Press and hold **CAL/DELETE** key for 3 seconds or over.

The buzzer beeps, beeps 2 times.



When moving to a non-ferrous exclusive mode, **NFe** is displayed.

By press and holding **CAL/DELETE** key for 3 seconds or over, it switches: AUTO → Fe → NFe → AUTO → Fe

Transferring data – Real time transfer (SAMAC—Pro)

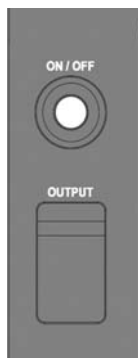
Transfer data to a PC (personal computer) by using a USB cable.

Refer to separately attached information for a driver installation into a PC side.

Data can not be transferred when this unit is set to 「Non-interrupt mode」.

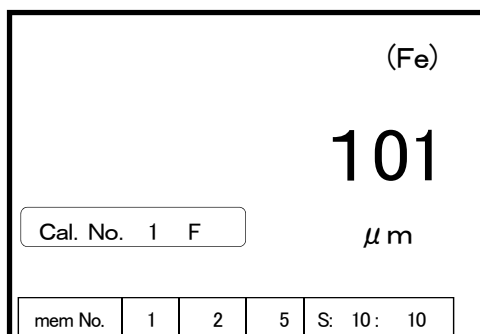
Make sure beforehand that this unit is set to 「Normal mode」

(1) Outright transferring measured data (Real time transfer)



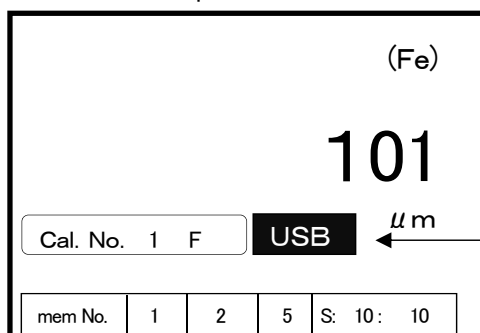
- Prepare for a PC side.
- Connect a USB cable to a PC.

← Pick and peel the cover and connect the USB socket to PC by a USB cable.



Press **COM. ENABLE** key.

The buzzer beeps.



USB is displayed.

Press **TRANSMIT** key.

The buzzer beeps.



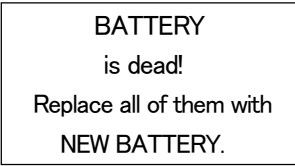

Data is transferred whenever the measurements are taken.

Note to improve measuring accuracy

- ① Zero plate
Prepare the same material, thick and sized plate as the measuring object for Zeroing and Calibration standard (CAL). Different materials may not bring about correct measuring results.
※As accessories to probe, “Zero plates for Zeroing” is **for testing purpose only**.
Select a most suitable Zero plate for actually measuring objects. (please refer to page 10)
- ② Thickness standard (foils)
Take Calibration standard measurements (CAL) using a Thickness standard which is thicker or as thick as the measuring films.
※Use of a calibration standard with a deviant thickness may cause errors.
Replace worn-out or bent plates with new ones. In case non-accessorized plates are necessary (over 16 μm), contact a local sales office.
- ③ Quality of films to be measured
Magnetic metal contained in the films can correctly not be measured. In case of measuring elastic films, place a standard plate of 30~50 μm thick on the object and subtract the thickness from the measuring value to avoid errors caused by elastic dents.
- ④ Measurements of edges or angles
Magnetic fields in the neighborhood of the edges/the angles of a measuring object become uneven. 15~20 mm closer part to the center of the object shall generally be measured.
Pay attention to protruded part, curved part or unexpectedly deformed part.
- ⑤ Measurements of rough faces
Roughness of a substrate, a measuring face affects measuring results.
Take a mean value by measuring several places at a time.
- ⑥ Measurements of stretched part on faces
In some case stretched, rolled part occurred on a substrate, which may cause measuring errors.
Take a mean value by measuring several places at a time.
- ⑦ Temperature
Operating temperature range is 0~40 °C. Especially, large temperature differences between a main unit and a probe cause measuring errors.
- ⑧ Residual magnetism, stray magnetic fields
Pay attention to transportation method of electromagnets, residual magnetism on substrates or arc welding, those of which emit strong magnetic fields to cause measuring errors.



Trouble Shooting (If any problems?)

Before contacting us please check with the following points.

Symptoms	Points to check	Measures to be taken
No response upon press of 「ON/OFF」 key.	Are batteries worn out?	Replace them with new ones (2 ea.).
No response after replacing batteries and pressing a 「ON/OFF」key.	Something wrong inside a meter.	Contact us for repair.
	Batteries is shorting.	They can be used for a while. Prepare for new batteries.
	Batteries have worn out.	Replace them with new ones.
	Out of batteries.	Replace them with new ones.
	Possibly pressing probe to object too soon after switching on.	Hold probe in air, keeping it away off objects, metals during a time of “START UP ...” on screen.

Symptoms	Points to check	Measures to be taken
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center;">TROUBLE !</p> <p>The probe may have trouble.</p> </div> <p style="text-align: center;">《Power OFF》</p>	<p style="text-align: center;">Something wrong with probe.</p>	<p style="text-align: center;">Contact us for repair.</p>
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center;">TROUBLE !</p> <p>The probe and the main unit may have trouble. Repairing needed.</p> </div> <p style="text-align: center;">《Power OFF》</p>	<p style="text-align: center;">Something wrong with probe/ main unit.</p>	<p style="text-align: center;">Contact us for repair.</p>

Specifications

Items	Applications
Model	Probe built-in dual type coating thickness meter SAMAC-FN: (conventional), SAMAC-Pro: (professional)
Measuring method	Dual electromagnetic induction/eddy current type (auto-selection for Fe or NFe)
Display method	Graphic LCD (data/message), Backlight
Measuring range	Fe substrate: 0~2.5mm, NFe substrate: 0~2.0mm
Calibration (CAL)	2-point calibration Zero: metal substrate calibration Calibration standard: metal substrate and standard thickness calibration
Resolutions	1 μm unit: 0~999 μm 0.01mm unit : 1.00~2.50mm (Fe) 0.01mm unit : 1.00~2.00mm (NFe) by switching 0.1 μm unit: 0~400 μm 0.5 μm unit: 400 μm ~500 μm
Accuracies (to flat, smooth face)	0~100 μm : $\pm 1 \mu\text{m}$ or $\pm 2\%$ of reading 101 μm ~2.5mm: $\pm 2\%$ (Fe) 101 μm ~2.0mm: $\pm 2\%$ (NFe)
Probe (built-in)	One point constant pressure contact type with V cross-cut groove Measuring part $\phi 28$ mm (probe part $\phi 10$ mm)
Additional functions	① Switching to Measuring mode (hold/non-interrupt) ② Auto Power Off (3 min.), releasing and reactivating ③ Backlight ④ Switching of display resolutions ⑤ Setting of exclusive substrate mode
Keys	 ,  ,  ,  , 
Power source	3V DC Dry Battery (LR03 \times 2), Continuous operation hours: 25 hours
Operating temperature	0 ~ 40 $^{\circ}\text{C}$ (Non-condensing)
Accessories*	Thickness standards, Zero plates for testing (Fe / NFe), Carrying case for Thickness standards, Carrying case for main unit, Dry batteries, Hand strap cord
Dimensions	63(W) \times 84(H) \times 30(D)mm
Weight	About 125g (including dry batteries)

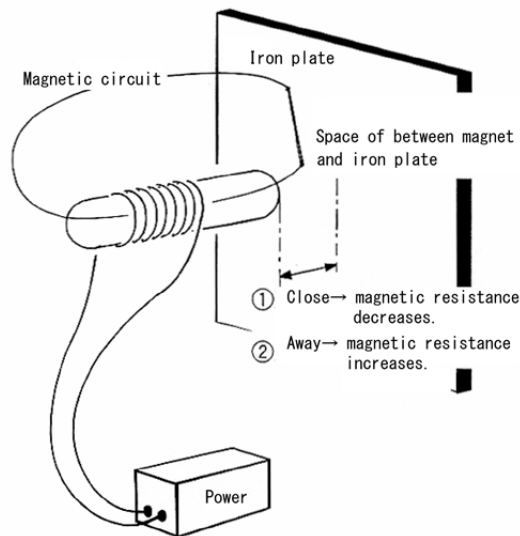
※For SAMAC-Pro refer to the Instruction Manual of CD.

April, 2015

Reference (Principle of measurements)

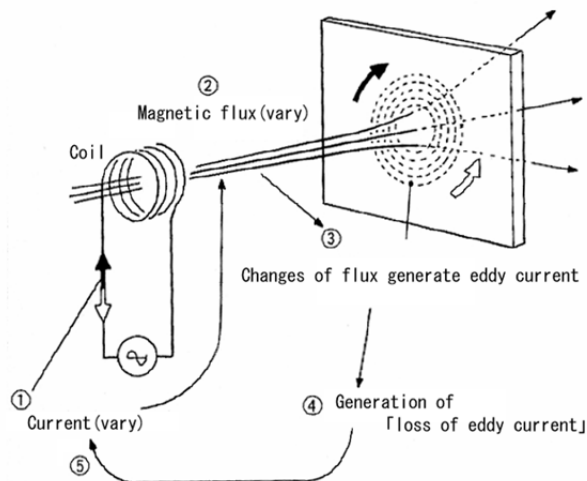
● Electro-Magnetic Induction type (Electromagnetic Type)

When iron (ferrous metals) approaches to the tip of the coil built-in core, the inductance of the coils changes in response to changes of the approaching distances. Electromagnetic Type coating thickness meters take measurements of thicknesses of coating films by using this technical Principle and taking out the changes of the distances in state of electric signals.



● Eddy Current Type

By using correlations of the sizes of Eddy current induced on the metal surface by High frequency wave magnetic field and film thicknesses, Eddy Current Type coating thickness meters take measurements of thicknesses of insulating films on the surface of non-ferrous metals.



Products sold:

Coating thickness meter, Pinhole detector,
Moisture meter, Concrete covermeter, Condensator,
Needle detector, Iron piece detector, Viscosity cup

Manufacturer : 

Sanko Electronic Laboratory Co., Ltd.

Tokyo Branch: Shibata Bldg., 2-6-4, Uchikanda, Chiyoda-ku, Tokyo 101-0047, Japan
Tel. 81-3-3254-5031 Fax. 81-3-3254-5038

Osaka Branch: Konishi Bldg., 2-3, Sugawara-cho, Kita-ku, Osaka 530-0046, Japan
Tel. 81-6-6362-7805 Fax. 81-6-6365-7381

Sendai Branch: 1F Bonheur Est, 2-5, Teppomachinaka, Miyagino-ku, Sendai 983-0868, Japan
Tel. 81-22-292-7030 Fax. 81-22-292-7033

Nagoya Branch: Meihoku Bldg., 3-11-27, Kinjo, Kita-ku, Nagoya 462-0847, Japan
Tel. 81-52-915-2650 Fax. 81-52-915-7238

Fukuoka Branch: 11-11 Naraya-cho, Hakata-ku, Fukuoka 812-0023, Japan
Tel. 81-92-282-6801 Fax. 81-92-282-6803

Head Office: 1677 Hisasue, Takatsu-ku, Kawasaki 213-0026, Japan
Tel. 81-44-751-7121 Fax. 81-44-755-3212

URL <http://www.sanko-denshi.co.jp> E-mail: info@sanko-denshi.co.jp