SANKO Coating Thickness Meter

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.

TOKYO・OSAKA・SENDAI・NAGOYA・FUKUOKA・KAWSAKI

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Contents Pages

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

Prohibition ● Do not dump nor wet the gauge unit in water, otherwise it may cause damage.
Please contact our distributor or sales office should submerged water into the unit.

Prohibition ● Keep metals or foreign substances from the unit, otherwise it may cause damage.
Please contact our distributor or sales office should put any materials or foreign substances in the unit.

Prohibition ● 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.

Attention for safety(to use safely and correctly)

Warning

Must ● Never fail to remove batteries from the unit when not in use for a long time.
Leakages occurred from deterioration of batteries may cause erroneous reactions or damage.

Must ● 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.
Please call a doctor like in a case that a battery is swallowed.

Must ● 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.
And do not touch the leaked liquid and wash skins or clothes in case they are contaminated.

Must ● Comply to regulations and laws in your neighbors when disposing of them.

Attention for safety (to use safely and correctly)

Attention

Prohibition ● 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 breakedowns, 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.

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.

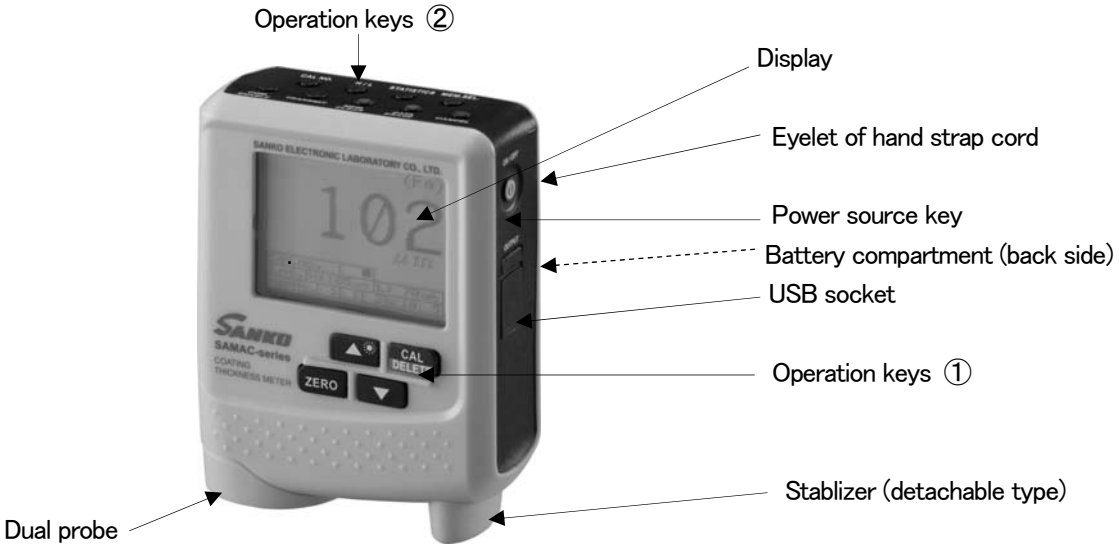
Get started

◆ Contents in a package

Please make sure if the following items are included.

- Main unit
  SAMAC-Pro
- Dry batteries LR03 (2 pieces)
- SAMAC series CD
  - ◆ SAMAC Pro Instruction Manual (this manual)
  - ◆ USB driver
  - ◆ Instllation of USB transfer driver
- Inspection sheet (warranty)-cum-user resistration sheet
  (This warranty is valid only in Japan)
- Carrying case for main unit
- 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)
- 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

(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

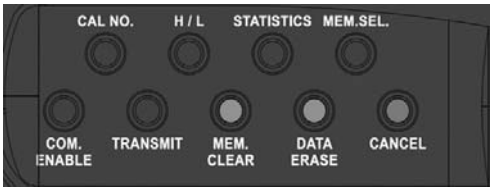
CAL: Key to initiate or finish for calibration standard.

DELETE: Delete incorrect or unnecessary measuring results when adjusting.

(works only when「ZERO」,「CAILIBRATION」 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



(4)「Cal No.」key

To select a calibration no.

(5)「H／L」key

To set High/Low limit values.

(6)「STATISTICS」key

A key to process statistic data stored in memory.

(7)「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

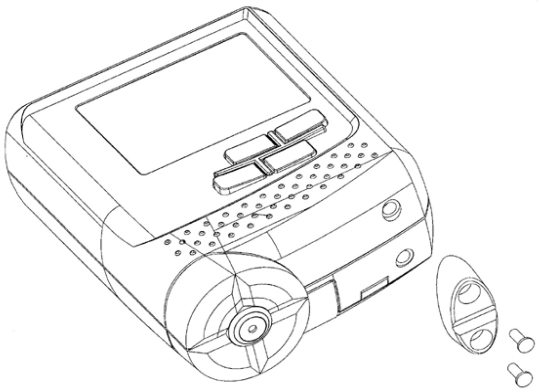
  Hang the meter through a strap over your wrist never to drop it.

- USB socket

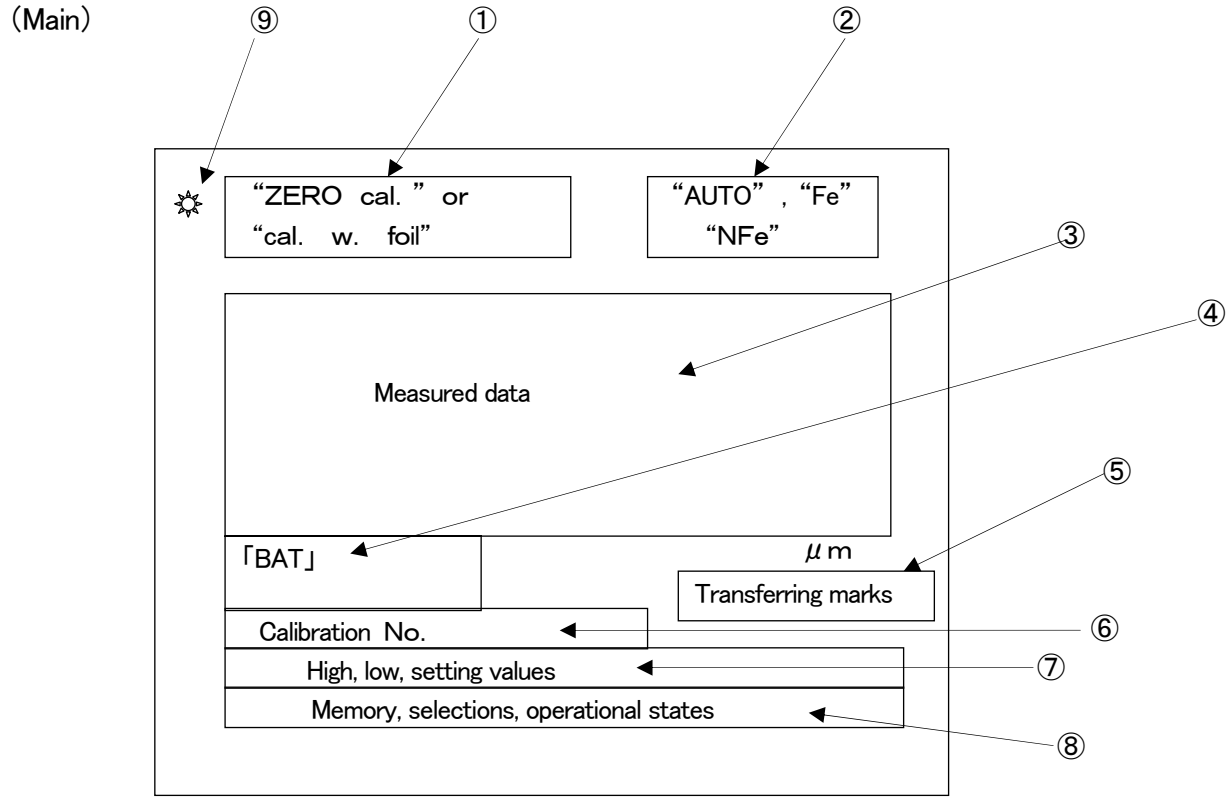
  A socket connected to a USB cable (accessory).

- 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 measument positioning.
  (Removing 2 screws from the leg)
  Be careful that measuring is not becoming unstable.



◆ Items indicated on LCD



① Indicates「ZERO cal.」(Zeroing) or「Cal.w. foil」(Calibration standard),「Special Adj.」when in process.
It never appears on the reading except when in process of these adjustments.

② Indicates「Measuring mode」when the previuous opearation finished.
At Auto Selction mode, one of (AUTO), (Fe). (NFe) is displayed.
At Corresponding mode to substrate, **Fe** is displayed when being set exclusively for Ferrous substrate,
NFe for exclusively Non-ferorous substrate.

③ Measured data is displayed.

④「 BAT 」mark is indicated when battery has run out for replacement with 2 steps

⑤「 USB 」mark is indicated when data is transferred by USB to PC.

⑥ Ajusted values stored in the calibration number and calibration are indicated.

「Cal. No. X ＊」 ＊When mark is【Blank】,
Calibration data is not entered (as calibrated at Ex-factory).
＊When mark is【F__】
Zero adjustment value, Calibration standard value of Ferrous are stored.
＊When mark is【__N】
Zero adjustment value, Calibraton standard value of Non-ferrous are stored.
＊when mark is【F N】
Zero adjustment value, Calibration standard value of both Ferrous and Non-ferrous are storded.
※ Either case indicates Zero adjustment value or Calibration standard only as wel.

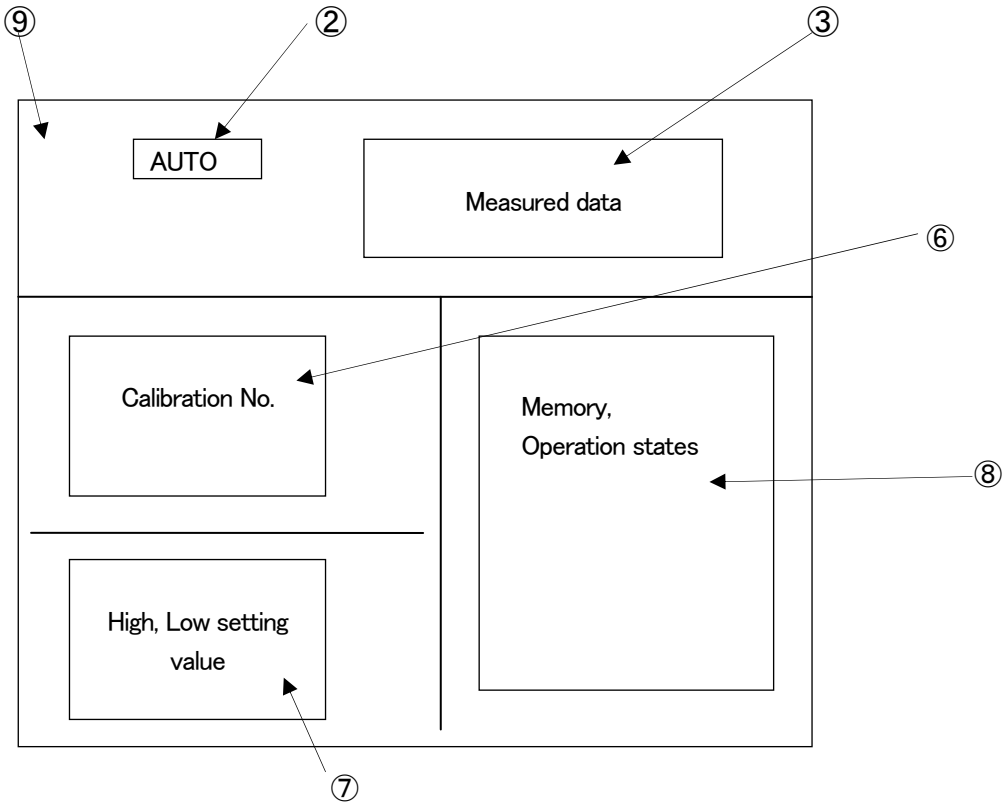
⑦「High limit film thickness value」,「Low limit film thickness value」is indicated when the limit value is set
It flashes when a reading value goes beyond a setting limited value.

⑧ It displays various items of information in memory storing measuring data.
When measuring while storing data into memory, the number of a storing place is displayed.

⑨ Backlight: The light goes on when backlight is set to ON.

(Sub-screen)

When main subjects are 「Calibration curve」, 「High/Low limits」, 「Memory for storing measuring data」, it is possible to enlarge these items to display.



Note: 1. Each number is the same as the forementioed ones of (Main) in its explanation.
2. Items in the ② indicates (AUTO), (Fe), (NFe), **Fe** , **NFe** in English letters.

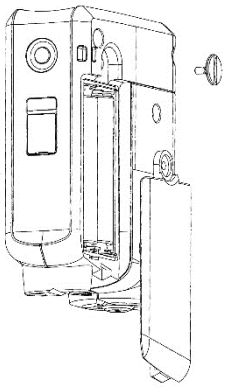
(Switching of Display Type)

- When outgoing from the factory, the (Main) is set in the unit.

- Switching from (Main) to (Sub),
  Press [CAL No.] key and [H/L] key together and hold them for 3 seconds or over.
  The buzzer beeps 「beeps」, 「beeps」 2 times and the (Main) changes to (Sub).

- Switching from (Sub) to (Main).
  Press [CAL No.] key and [H/L] key together and hold them for 3 seconds or over.
  The buzzer 「beeps」, 「beeps」 2 times and the (Sub) changes to (Main).

◆ 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.

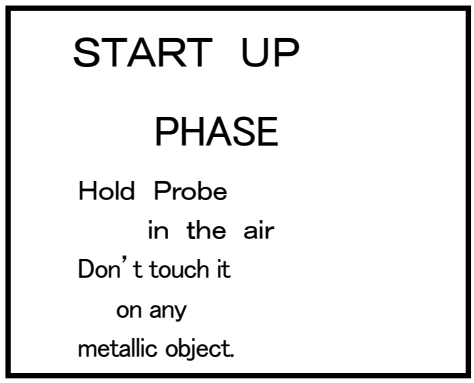
※ It is not a breakdown that power becomes ON during replacement of batteries.

⚠ Caution

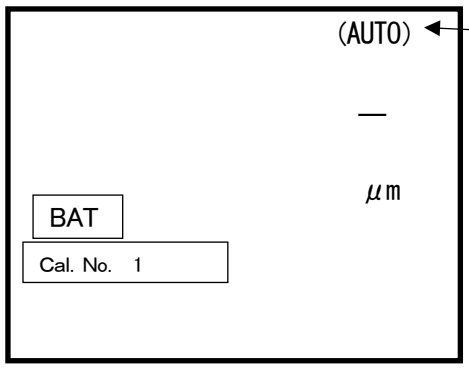
- Use designated and new (check battery-life) batteries or ones supplied in this package.
- An incorrect use of batteries may cause leakages, bursts. Do not intermingle new with old ones.
- Take out batteries to store when not in use for a long absence. Or that may cause leakages.
- Keep batteries off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



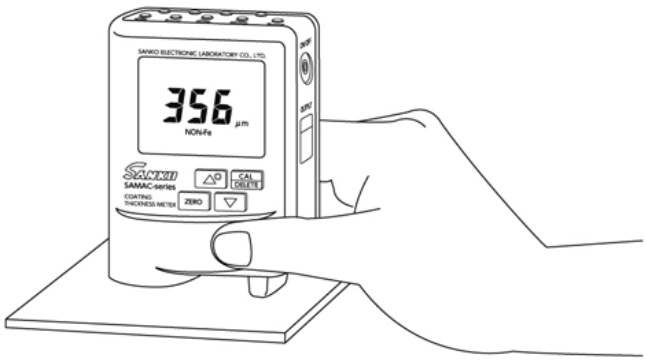
Batteries have run out when the display on the unit indicates the mark [BAT] listed below.
Replace with new batteries.



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

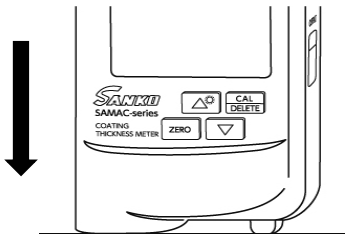


Hold the lower part of SAMAC unit as illustrated.
Quickly and calmly press the probe perpendicularly to the object.
It beeps and indicates a measured result on the screen display. When it does not beep, lift it up 5～7 cm high above and try again to take measurements.

◆ 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 a measurement object.
・A slow pressing may cause large measuring errors.

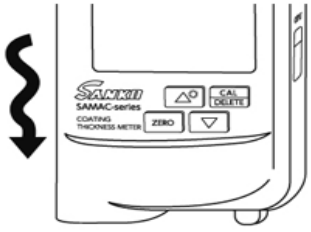
○



Measuring object

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

×



Measuringt object

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

×

Measuring object

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

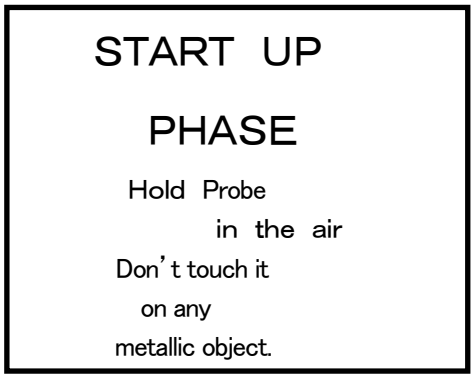
⚠ Caution

◆ 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.

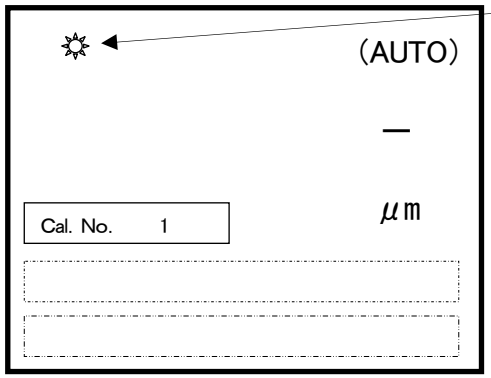


This message lasts for about 3 seconds.

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 buzzer beeps.



The Backlight mark is indicated when ON.

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

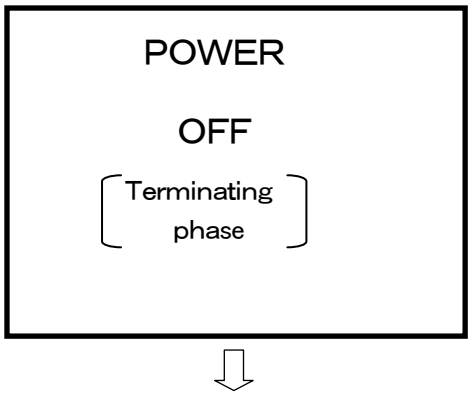
When setting exclusively for ferrous, or Non-ferrous substrate at the corresponding mode to substrate, **Fe** or **NFe** is displayed.

It becomes possible to take measurements or adjustments.

※ 「Cal. No. X 」 A number「1」is indicated at first when switiching power source on. An d from the 2nd on , the last set entry is displayed. And, when 「High limit value」、「Low limit value」 is set, or when memory is used, the setting values and nos. are indicated on each column (chained lined sections).

（2） How to switch off

Press [ON／OFF] key.
The buzzer beeps.



The message lasts for about 2 seconds.

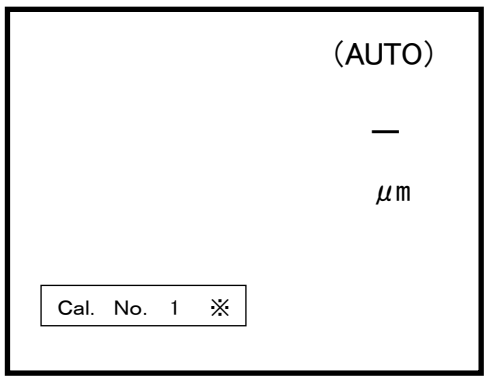
The buzzer beeps and this unit is switched to OFF.

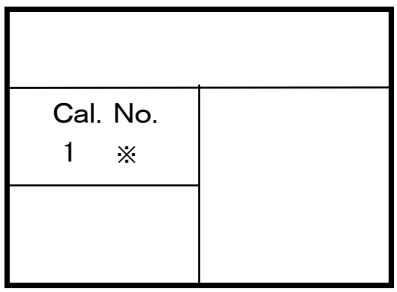
（3） How to select「Cal. No.　」(Calibration data/curve)

After switching OFF, it is capable of getting started on measurements and adjutments when the reading 「START UP PHASE･･･.」disapeared.

※Generally,　thickness meters make errors depending on material formation and shapes to be measured. To minimize measurement errors and obtain as accurate results,【Zeroing】and【Calibration standard】 are imeratively adujusted before measuring operation. Those adjustment is called「Calibration curve」.

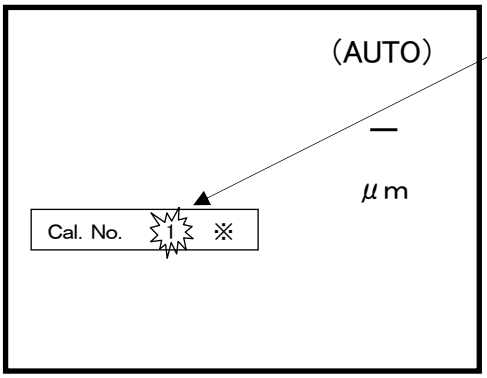
Adjusted Calibration data can be stored up to 10 sets and recalled for use whenever necessary. (The storing place is indicated by Cal. No.)





Indicating positions of (Sub-screen)

Press [CAL No.] key.
The buzzer beeps.



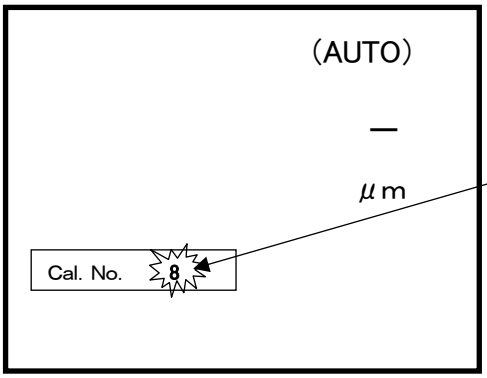
A number on the display flashes.

Press ▲ key or ▼ key to select your desired Calibration Number.

Caution

※F, N, FN marked at the place shows states of adjusted values stored in the calibration curve (refer to page 7)
When that value is no more necessary, take 「Zeroing」, 「Calibration standard」, and stored data can be erased and new data is stored

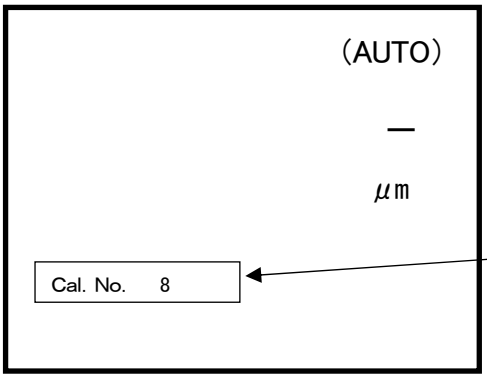
⇩



Your selected number flashes.

Press CAL No. key.
The buzzer beeps.

⇩



The flshing of the selected number stops.
「Cal. No.8」 is selected and set.

It is capable of getting started on measurements and adjutments of this unit after setting「Cal. No. 」.

（4）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.

⇩

【ZERO cal.】

1. Measure subst
   -rate Several
   times.
2. press [ZERO] key.

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

⇩

ZERO cal. (Fe)

1

Cal. No. 8 μm

Zeroing is in process.

Testing object is set for ferrous metal substrate.

Measured mean value.
When the mean value results in largel off the "0", press [CAL/DELETE] + [▼] keys to delete the latest data out of measured values.
It indicated "-" to delete all data.

「Cal. No. ___」to store values of 「Zeroing」and「Calibration standard」

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）

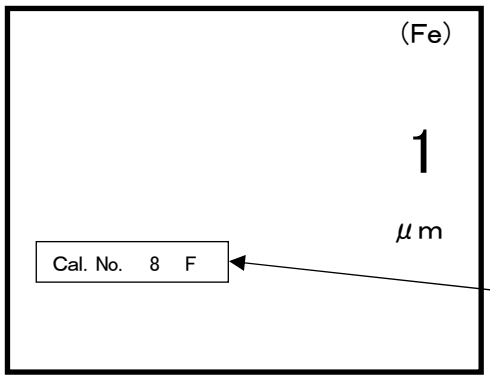
After press of certain times or 20 times, press [ZERO] key.

⇩

◆When a measuring process reaches the 20th time, the buzzer beeps, beeps 2 times and afterward new entry is no more accepted.

The buzzer beeps.

"Deletion" function of CAL/DELETE key stops.



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

The data is stored「No. 8」and displays F (refer page 7)

- 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 mean 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.

(5) 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.

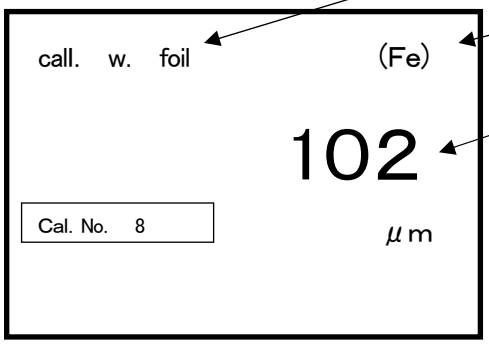
⇩

【 Cal. w. foil】
1. Measure thick
-ness of foil
several times.
2. With [▼] or [▲], Ad
-just to thick
-ness 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.

⇩



Calibration standard is in process.

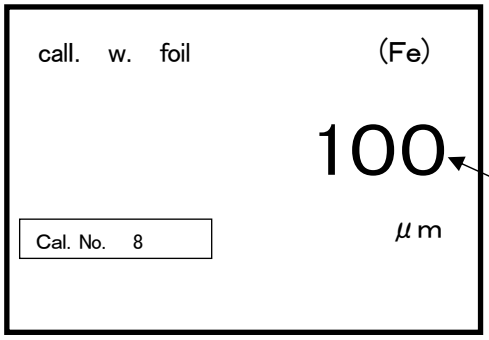
The testing object is set for ferrous metal substrate.

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 the unit does not accept any entry.

⇩

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



Pressing [▲] or, [▼] key interrupts the delete function of [CAL/DELETE] key.

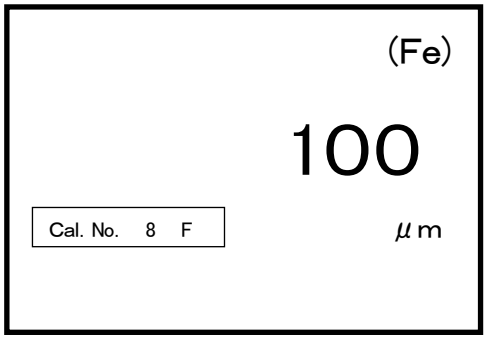
Pressing [▲] key increases the displayed value.

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 measusring mode.

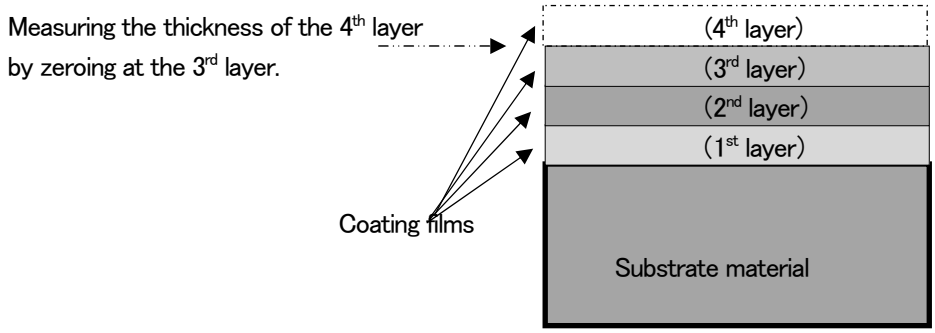
- It is correct that numerical values measured by pressing the probe a few times to the「Thickness standard」on the「Zero plate」indicates the thickness iin the neighborhood of the「Thickness standard」.

- When the measured value results in largely off the「Thickness standard」please try again the「Caliration 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.

(6) 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 (4), (5).



◆ 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 50μm, please zero the meter on the following procedures.
If the thickness of 3 combined layers is bellow 50μm, 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.

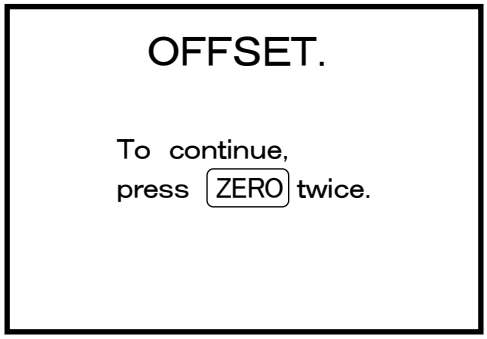
[CAL/DELETE] key changes to one data "deletion" function.

```
【ZERO  cal. 】
1. Measure  subst
  -rate  Several
  times.

2. press [ZERO] key.
```

Press the probe to the Zero plate.
The buzzer beeps, beeps, beeps 3 times.

⇩

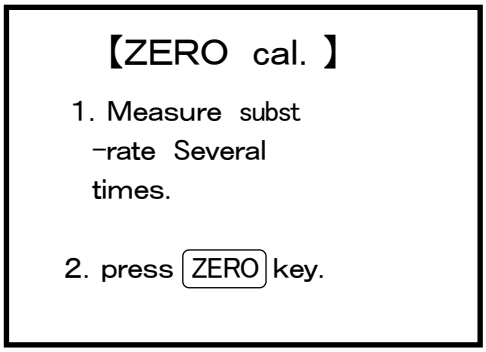


Press ZERO key .
The buzzer beeps.

⇩

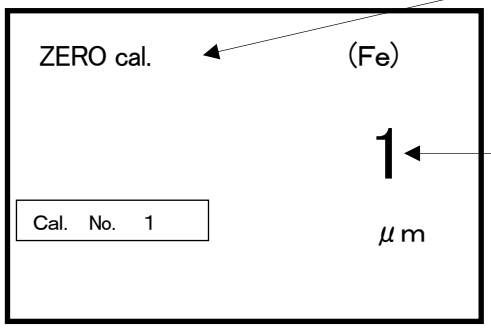
Press ZERO key again.
The buzzer beeps.

⇩



Press probe to Zero plate.
The buzzer beeps.

⇩



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.

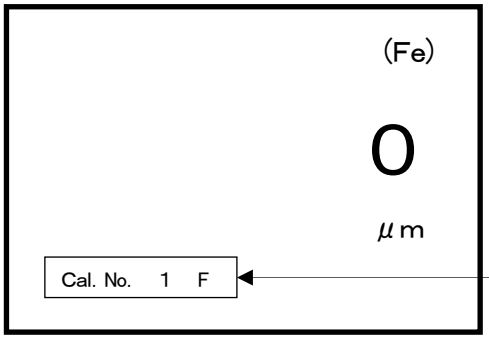
⇩

● 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 dose 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.

「F」is indicated (refer to page 7).

- 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 mean value results in largely off「0」μm, 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.

(7) 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.

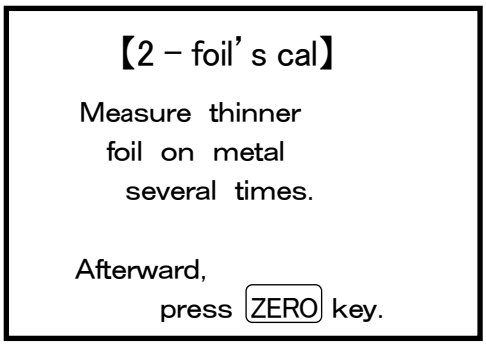
- Prepare the same blast-steel-plate in material as the objective base or, a rough face on non-ferrous base like aluminum and 2 different thicknesses of Thickness standards.
  Please choose the suitable difference of Thickness standards from the list below.

Fiilm 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 ～ 2.5 mm (Max. 2.0mm for NFe)	0.5 mm or over

Press and hold the [ZERO] key for 3 seconds.
The buzzer beeps.

⇩

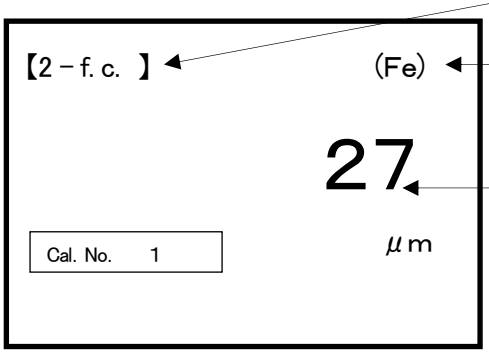
[CAL/DELETE] key changes to one data "deletion" function.



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] + [▼] 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

The buzzer beeps, beeps 2 times.

⇩

【2 – foils' s cal】
Use [▲] or [▼],
to set foil
thickness.

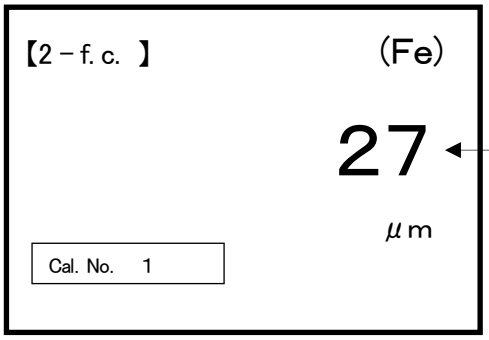
Afterward,
press [ZERO] key.

●Try measuring plural times in the range of 1–20 times by pressiing the probe on a thinner「Thickness Standard」.
(A mean value is indicated whenever the probe is pressed)

◆When a measuring processs reaches 20 times, the buzzer beeps, beeps 2 times and afterward new entry is no more accepted.

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

⇩



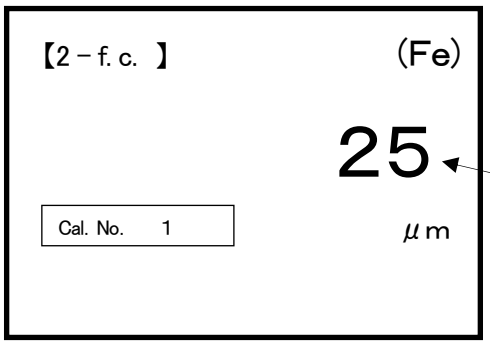
Mean value

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

⇩

A press of [▲] key increase a reading value.

A press of [▼] key decreases a reading value.
(Press and holding turns to fast forwading.)



Equate the reading value with Thickness standard.

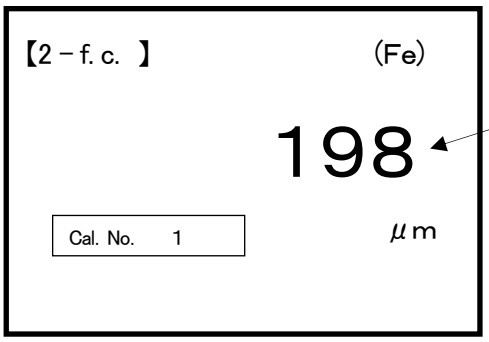
After equating the reading value with the
Thickness standard , press [ZERO] key.
The buzzer beeps.

⇩

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

The buzzer beeps whenever pressing the probe.

⇩



Measured mean value

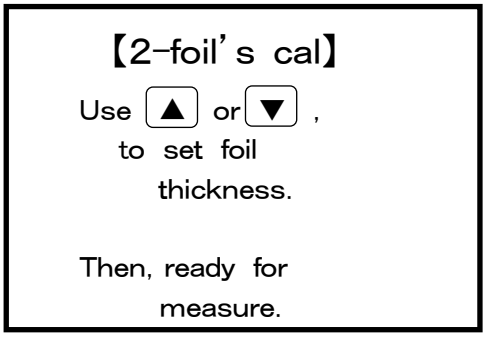
In case the mean value abnormally deviates from the Thickness standard, a press of CAL/DELETE + ▼ key deletes the latest entry and displays the mean value of all data except the latest one. All deletion indicates "–" on the reading.

●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.

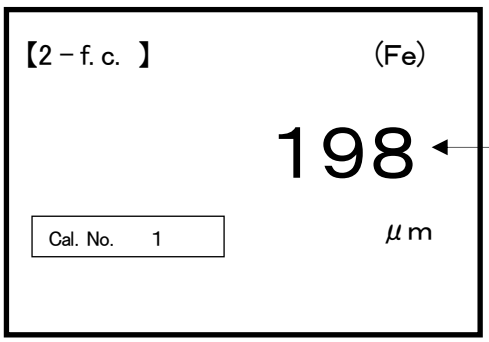
⇩

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



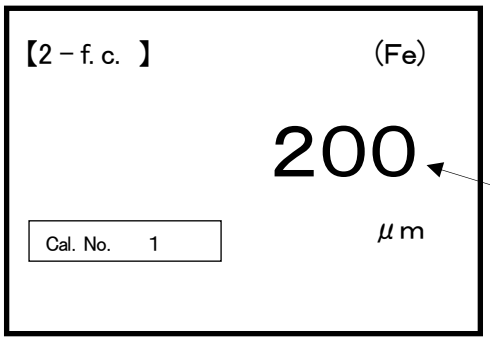
A press of ▲ or ▼ key makes the buzzer beeps,
indicating a mean value to the last measurements on the reading.

⇩



Mean value

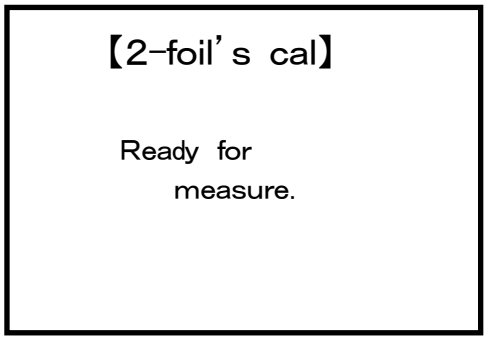
Equate the displayed value with the thickness of Thickness standard
(in this example 200 μm) by pressing ▲ or ▼ key.



A press of ▲ key increases a reading value.

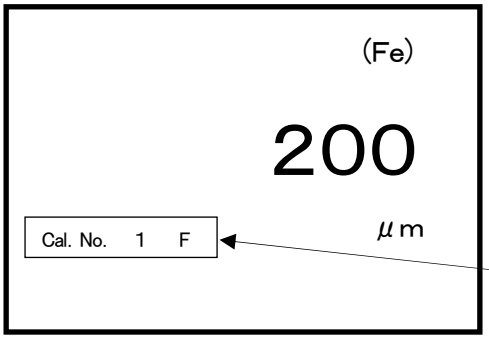
A press of ▼ key decrease a reading value.
(Press and holding turns to fast forwarding.)
Adjust the value to the Thickness standard.

After adjusting to thickness of the Thickness standard, Press ZERO key.
Then the buzzer beeps, beeps, beeps 3 times.



This is on display for about 0.5 seconds.

The buzzer beeps.



Measuring mode

「F」 is indicated. (refer to page7)

●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 perfoming 2 foil adjustments, all previous data are deleted and the last data measured with「2-pointl calibration」is stored.

(8) 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. If "all data →▲" is mistakenly selected, be careful that adjusted values of all calibration data are deleted.
※When a store place is full , adjust a new data with the old data kept in the place. Automatically, the old data is deleted and the new data is stored.

《Collective deletion》

● Delete collectively all adjusted values of all calibration data.

Hold [ZERO] key and press [▼] key.
The buzzer beeps, beeps 2 times.

⇩

ERASE？
All cal. → ▲
or
Reading cal. → ▼

※Switching Power to OFF when interrrupting the deletion of calibrqation.

Press [▲] key. The buzzer beeps, beeps 2 times.

⇩

ERASE
(cal. data)

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

⇩

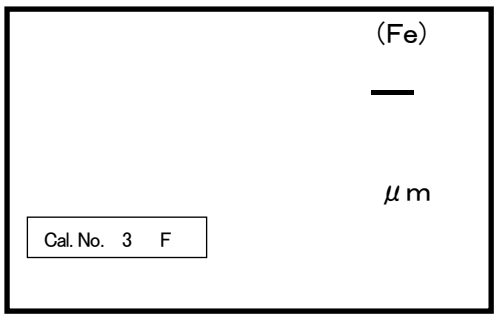
(Fe)
100
Cal. No. 1
μm

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

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

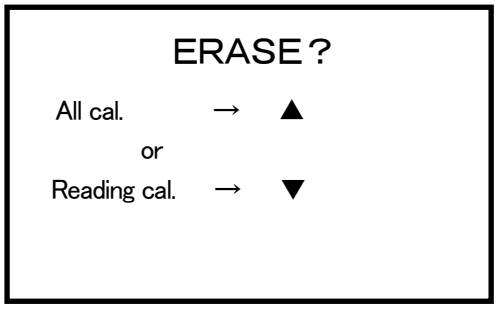
《Selective deletion》

●Delete adjusted value of calibration data being selected now.
Calibration data to be deleted is displayed (refer to page 12)



Hold [ZERO] key and press [▼] key.
The buzzer beeps, beeps 2 times.

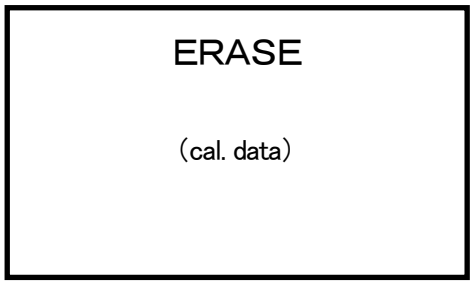
⇩



※When interrupting the deletion of calibration, press [CANCEL] key.

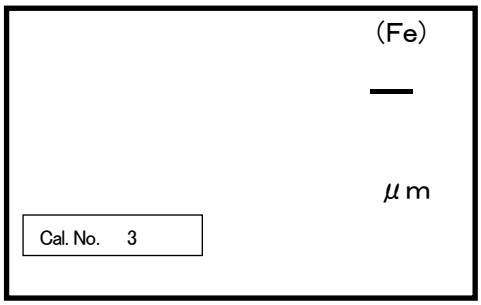
Press [▼] key. The buzzer beeps, beeps 2 times.

⇩



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

⇩



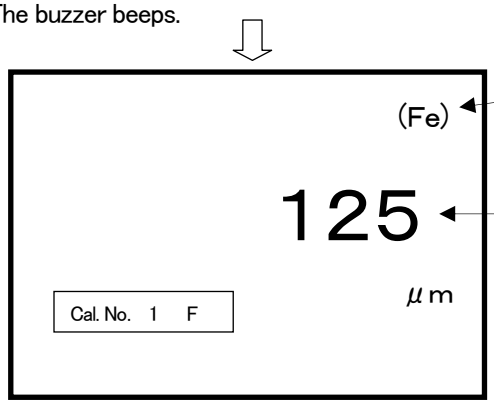
The last measured substrate and value are displayed.
It becomes possible to take measurements and adjustments procedures of this unit.

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.



The reading shows that the unit is set to measure on a ferrous metal substrate.

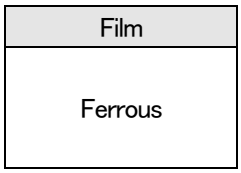
A measured result is indicated.

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

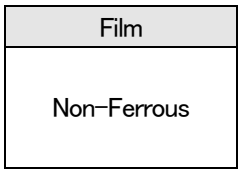
◆Measuring of Auto-selection by probe

(1) Ferrous substrate ····· measure film thickness in Fe mode.
(2) Non-Ferrous substrate ····· measure film thilcness in NFe mode.
(3) Ferrous on Non-Ferrous substrate ····· measure film thickness in Fe mode regardless of Fe thickness.

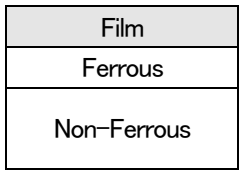
(1)



(2)

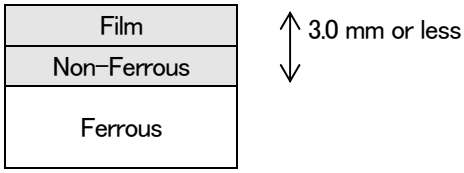


(3)

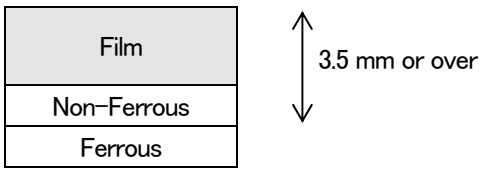


(4) Non-Ferrous on Ferrous layered substrate
(4-1) Layered thickness Non-Ferrous and film, 3.0 mm or less ※··· measure thickness of layered Non-Ferrous and film in Fe mode.
(4-2) Layered thickness Non-Ferrous and film, 3.5 mm or over ※··· measure film thickness in NFe mode.

(4-1)



(4-2)



Note :

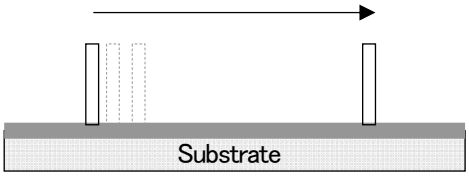
- 「HHHH」 is indicated in a between area of 2 different layers and when special metals unidentified by Auto-selection.
- In case of adjusting by 「Calibration standard」 on Fe-substrate, 「Calibration standard」 foils made of Non-Ferrous metals such as BeCu can be used.
- In case substrates are not identified by Auto-selection mode, change to exclusive mode by 「correponding mode to a metal substrate」(P35).
  Example: In case of an example of (4-1), thickness of film only can be measured at 「Non-Ferrous」 exclusive mode.

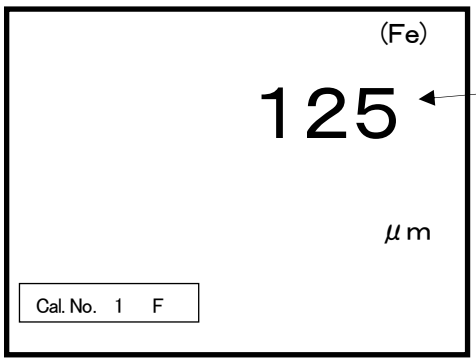
※ They may vary in compositions, characteristics, thicknesses of materials.

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.





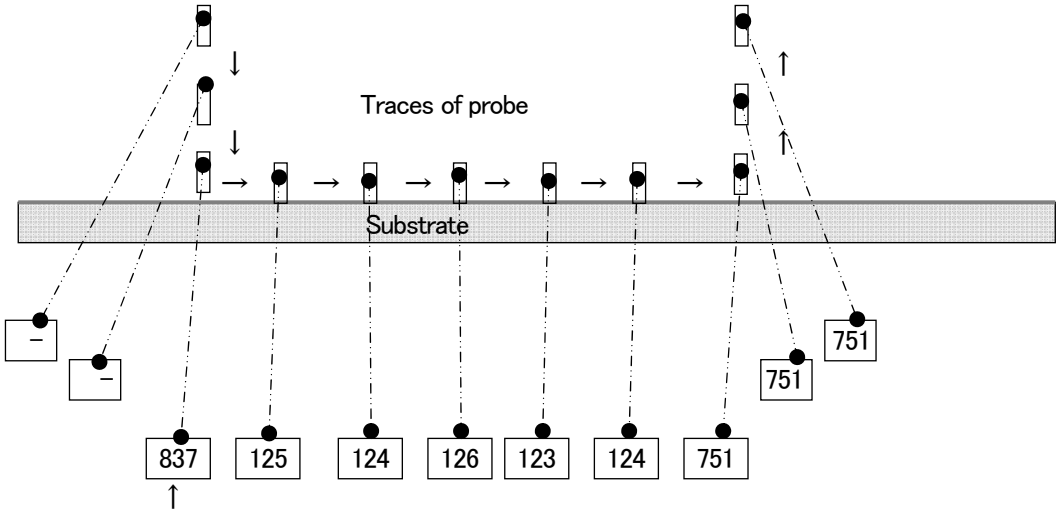
A measuring value is held (displayed) when pressing a probe at standard mode, but in Non-Interrupt mode measuring values are taken/displayed about every 0.5 seconds interval while pressing a probe.

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》

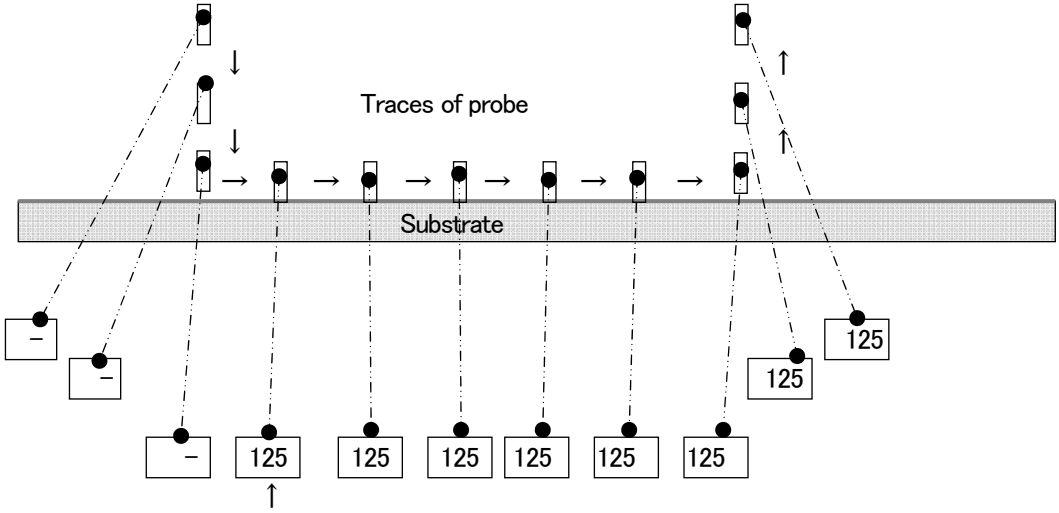
To return 「Non-Interrupt Measurement Mode」 to the beginning take the same procedures as at the initial setting.

Hold [ZERO] key and press [▲] key.

The buzzer beeps, beeps 2 times.

⇩

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



Measured values are stored until a next measurement is taken.

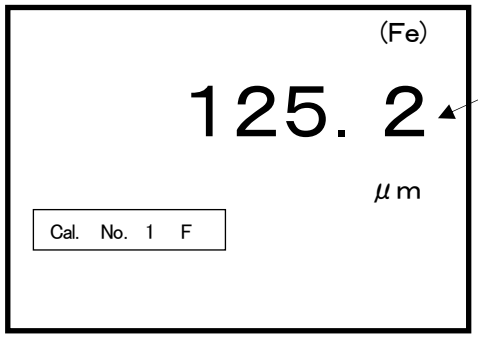
(2) Setting of Resolutions

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 proceures of "Returning to the beginning" as below.

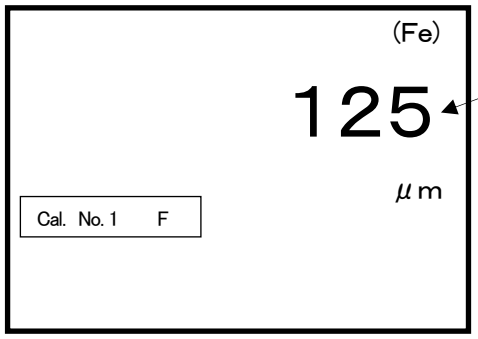
《Returning to the beginning》

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.

⇩



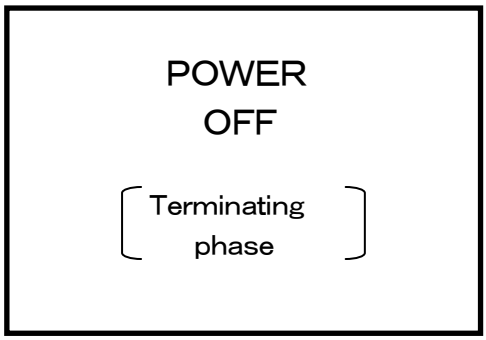
No indication under a decimal place.
(The data is rounded off to nearest whole digit.)

（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.

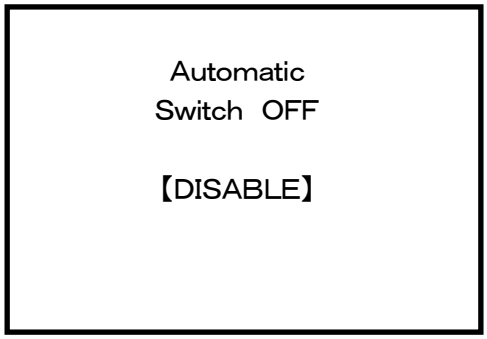
《To Disable Auto-Power-OFF function》

●Switch to OFF when Power is ON.

While pressing and holding [▲] key, press [ON/OFF] key for 5 seconds or over.

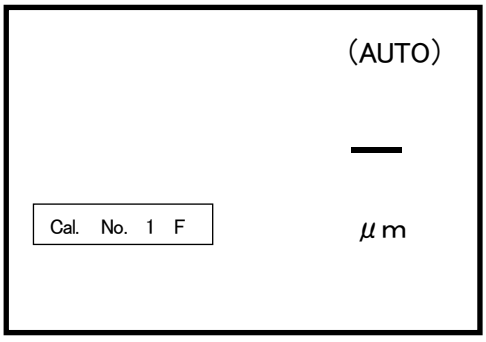
The buzzer beeps, beeps 2 times.

⇩



It indicates 5 seconds.

⇩



It returns to a measurable mode.

Power switches to OFF when [ON/OFF] key is pressed.

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

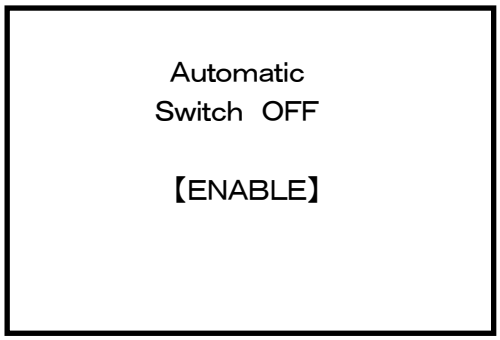
To enable it, take the operation procedures of “To Enable Auto-Power-OFF function”.

《 To Enable Auto-Power-OFF function》

●Switch to OFF when Power is ON.
While pressing and holding [▼] key, press [ON/OFF] key for 5 seconds or over.

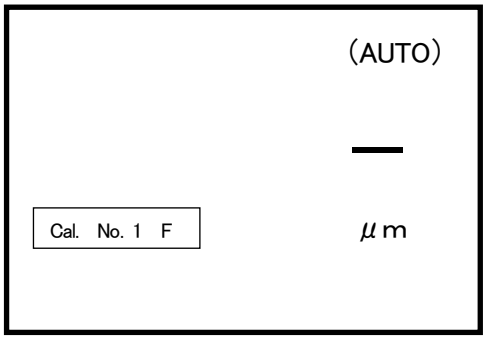
⇩

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 of "To Disable Auto-Power-OFF function".

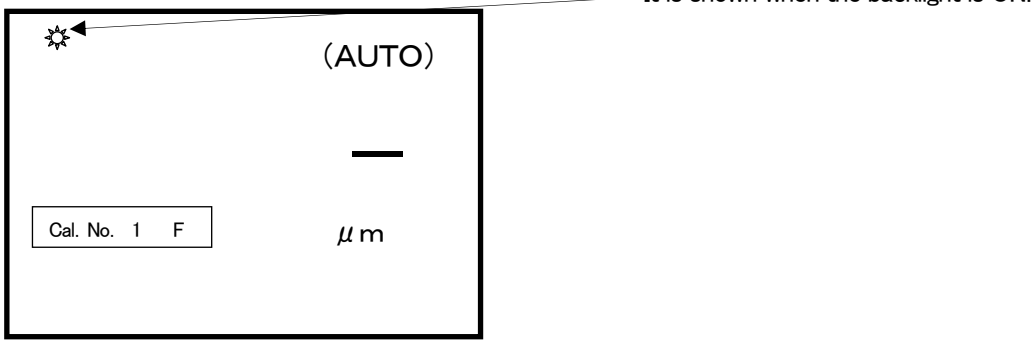
(4) Setting of Backlight

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》

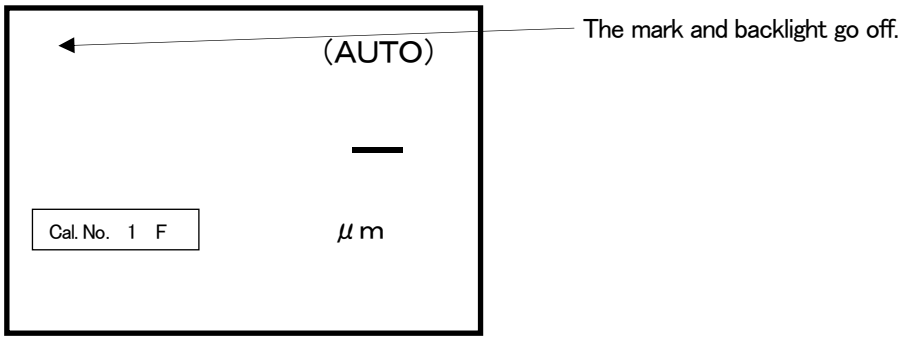
Press and hold [▲☼] key for 3 seconds or over.

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



《Switching off the Backlight》

Press and hold [▲☼] key for 3 seconds or over.
The buzzer beeps, beeps 2 times and the backlight goes off.



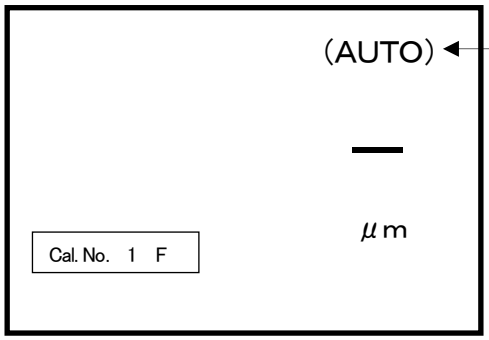
※This function is kept alive even if the Power source is switched to OFF.

(5) Setting of 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 subsrate 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】

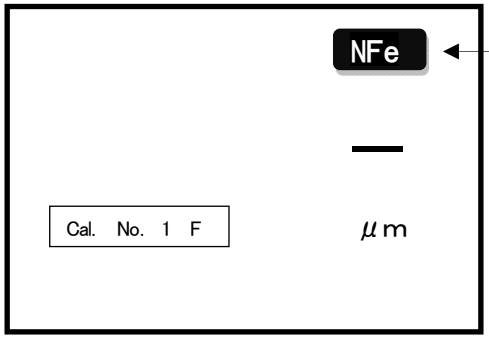


Indications of Ferous/Nonferrous, Auto-selection mode are displayed by one of (AUTO), (Fe), (NFe) respectively.

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.

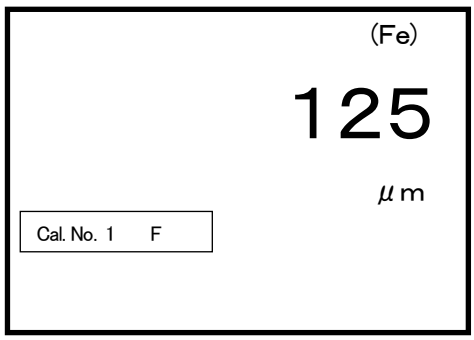
By press and holding CAL/DELETE key for 3 seconds or over,
it switches : **AUTO → Fe → NFe → AUTO → Fe ・・・・・**

Setting High/Low limits value

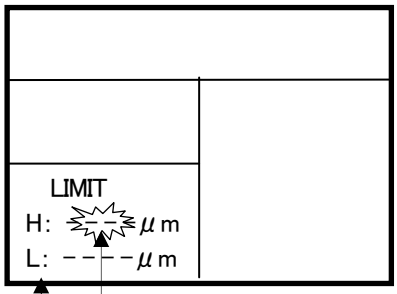
To judge quickly if the coated film thickness of a product stays within a range of thicknesses corresponding to management standards and controls, it is necessary to set high/low limits beforehand and if the numerical value on display exceeds the limits, the number flashes and emits a warning sound.

※ A set of both limit values can be set to a「Cal. No. 」(calibration curve)

（1） Setting a High Limit value



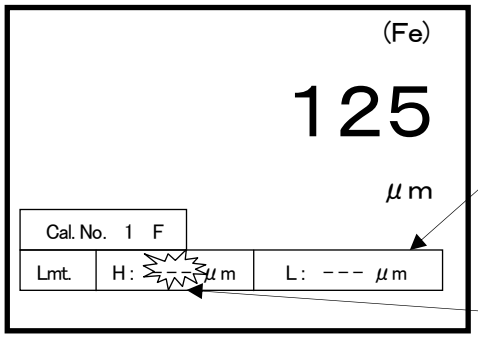
(Indication of Sub-Screen)



The high limit value flashes.

Press [H/L] key.
The buzzer beeps.

⇩



Data for setting high/low limit values is indicated.

The high limit value flashes.

Press [▲] or [▼] key to enter a high limt value to the flashing column「---」.

Press [H/L] key. The buzzer beeps to set the high limit value.

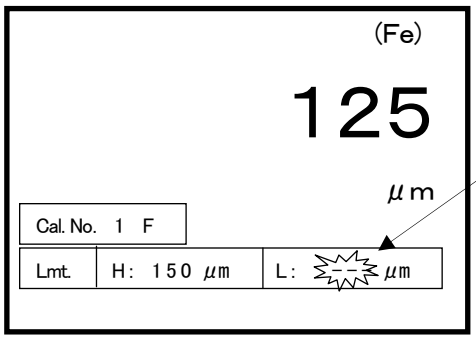
⇩

Note: When no high limit value setting is needed, press [H/L] key without pressing [▲], [▼] key. Flashing「H: --- μm」stops and it moves a next to set low limit value.

Then setting of a low limit value follows.

（2） Setting a Low Limit value

（following a high limit value setting without interruption）

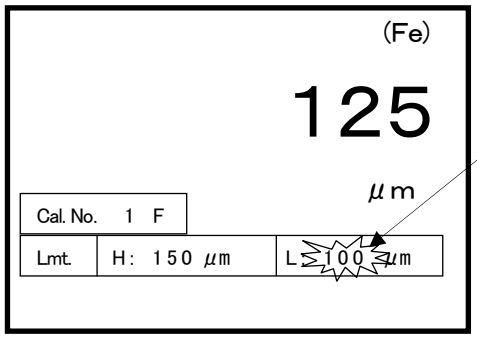


The low limit value flashes.

Press ▲ or ▼ key to enter a low limit value to the flashing column 「－－－」.

Note：When no low limit value setting is needed, press H/L key without pressing ▲ , ▼ key. Flashing 「L: －－－ μm」 stops and a high limit value only is set, and it becomes possible to take mesurements and adjusttments.

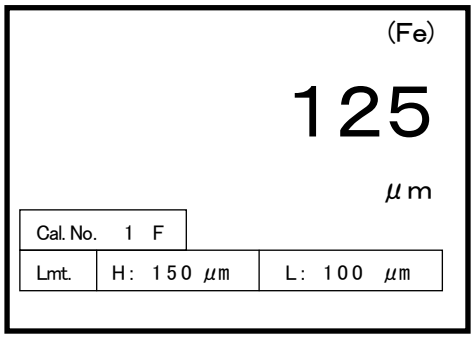
⇩



The low limit value flashes.

Press H/L key.
The buzzer beeps.

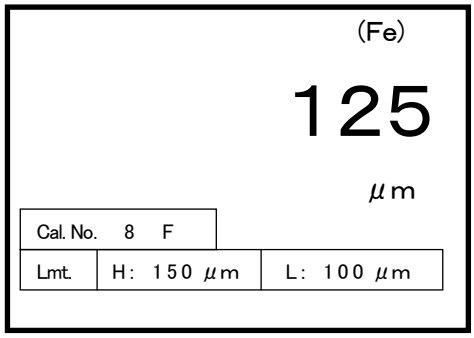
⇩



The flashing low limit value stops and the high/low limit values are set. It becomes possible to take mesurements and adustments.

(3) Deletion of set High/Low limit values

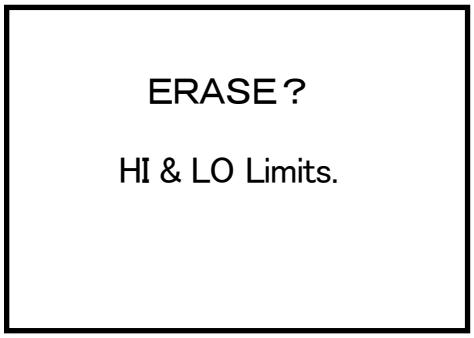
Select a「Cal. No.　」(calibration curve) storing limit values to be deleted. (refer to page12)



Hold [H/L] key and press [DATA ERASE] key.

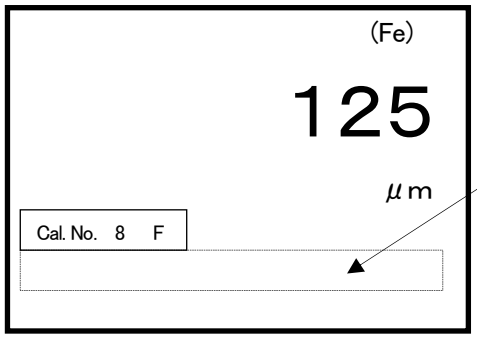
The buzzer beeps, beeps 2 times.

⇩



Press [DATA ERASE] key.
The buzzer beeps, beeps 2 times.

⇩

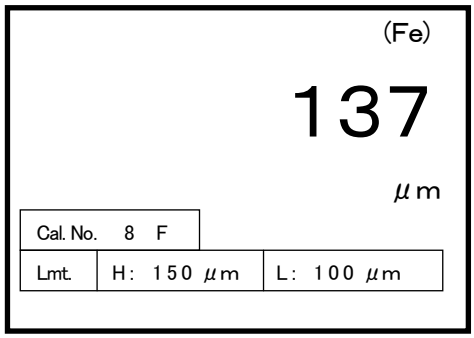


A set limited value is deleted and at the same time a displayed column of the limit value also disappears.

Measurements with High/Low limit values

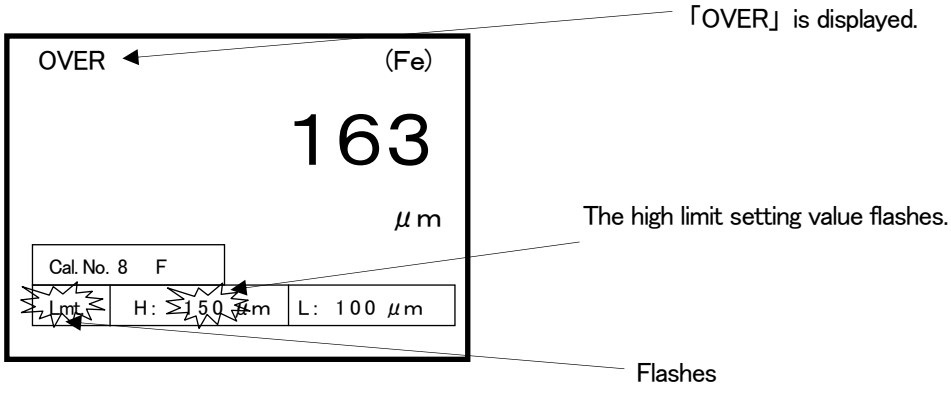
1） When measured value within a range of limit value (including a setting value)

The buzzer beeps and indicates the measuring value.



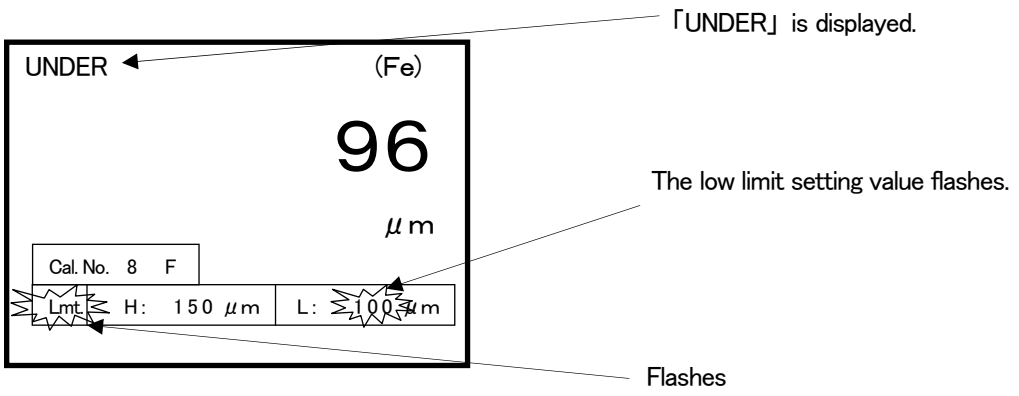
（2） When measured value over a high limit value

The buzzer 「beeps」「beeps」「beeps」, 「beeps」「beeps」「beeps」 2 times with 3 sucessive sounds.



（3） When measured value below a low limit value

The buzzer 「beeps」「beeps」「beeps」, 「beeps」「beeps」「beeps」 2 times with 3 sucessive sounds.



Storing measured data

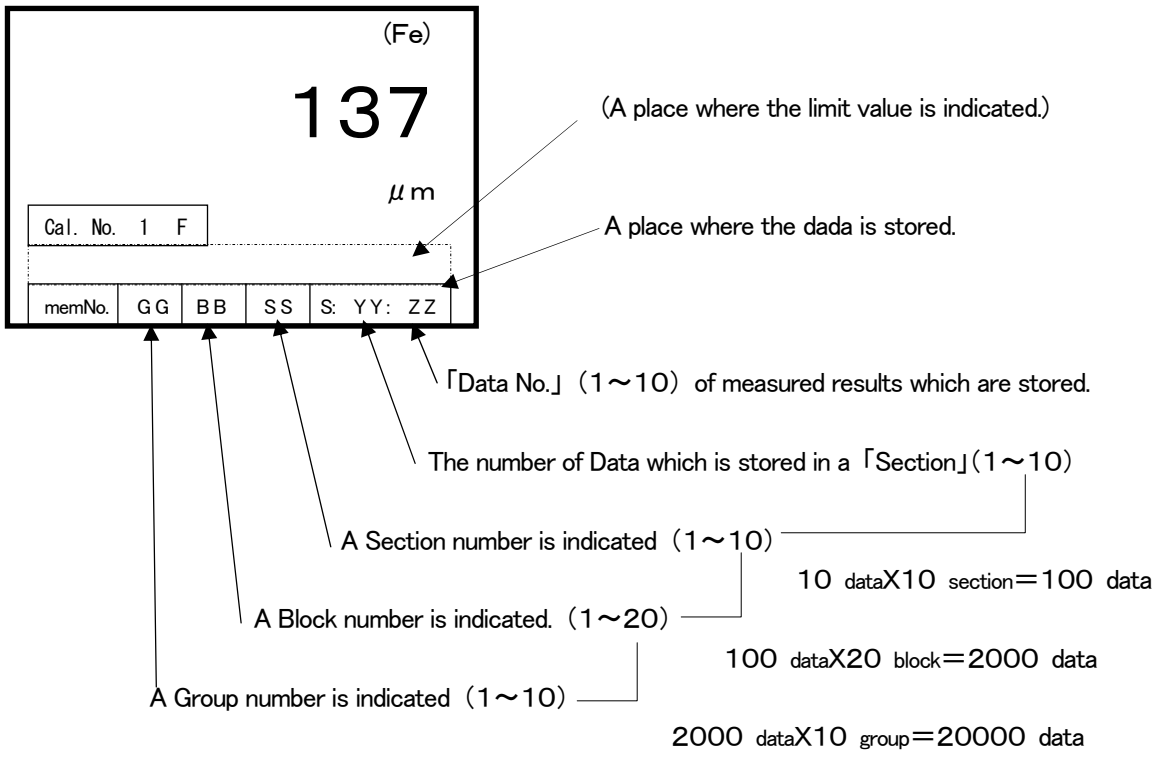
SAMAC-Pro can store Max. 20,000 data.
Places to store are listed as below.

Sections: A section stores 10 data. There are numbers indicated in each「Places to store data」.

Blocks: A block contains 10「Sections」. Each section has each independent number.

Groups : A group contains 20「Blocks」. Each block has each independent number.
SAMAC-Pro has 10 groups.

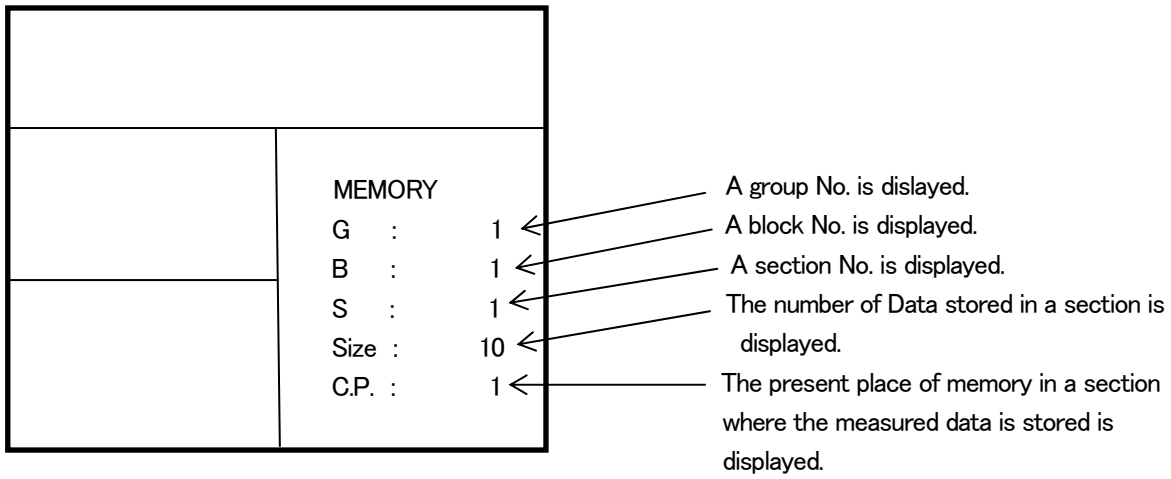
※ Data-Memory information indicated on LCD



※ When delivered at EX-Factory. The indictions are as follows.

mem No.	1	1	1	s: 10 : 1

The indications of memory position of (Sub-Screen)



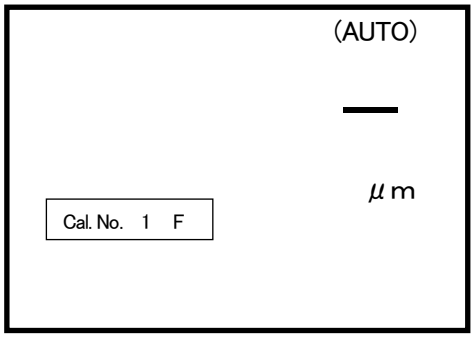
（1） How to select a data storing place

※For example, settings are made as follows:

Group No.:「3」

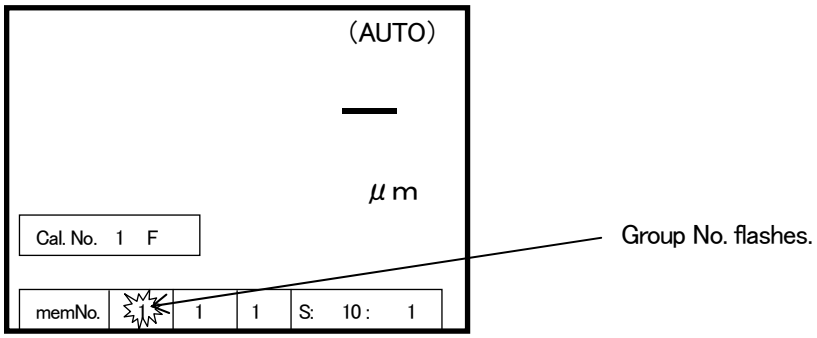
Block No.:「12」

Section No.:「1」, Data storng numbers「8」/ section



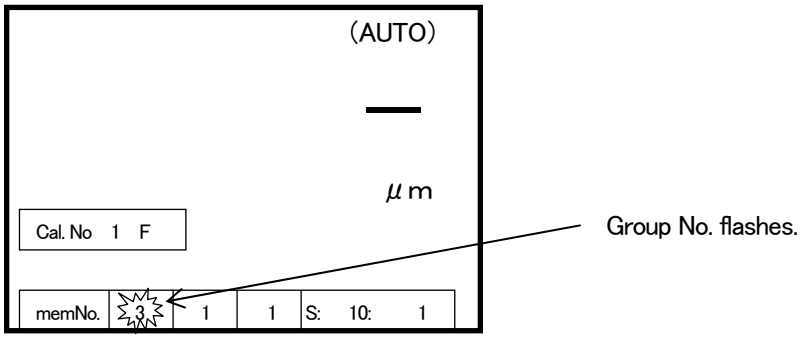
Press [MEM. SEL.] key.

The buzzer beeps.



Press [▲] or [▼] key.

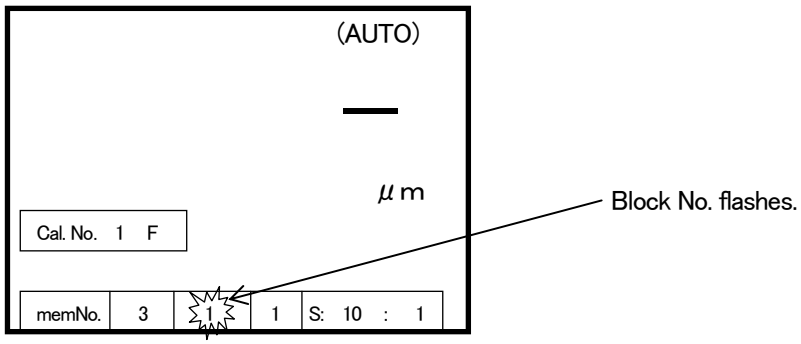
Select a Group No.「3」.



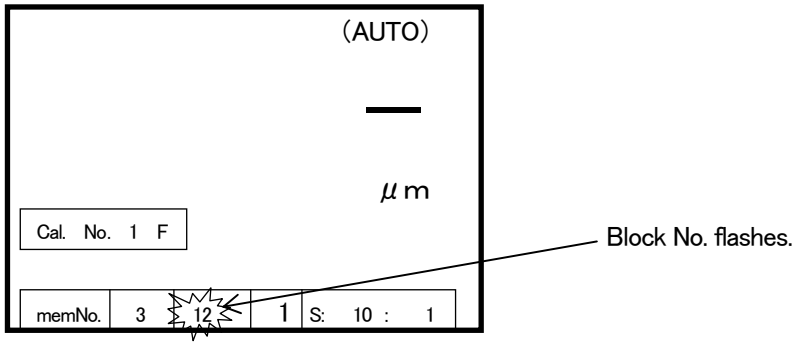
Press [MEM. SEL.] key.

The buzzer beeps.

※A Group No.「3」 is set.
Then moving on to setting a Block No.

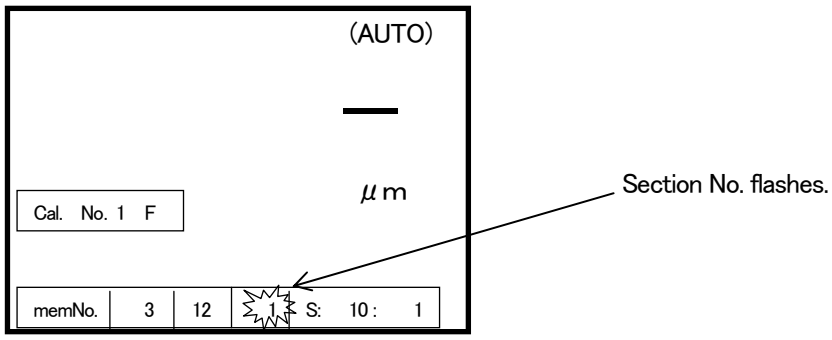


Press ▲ or ▼ key to select a Block No.「12」.



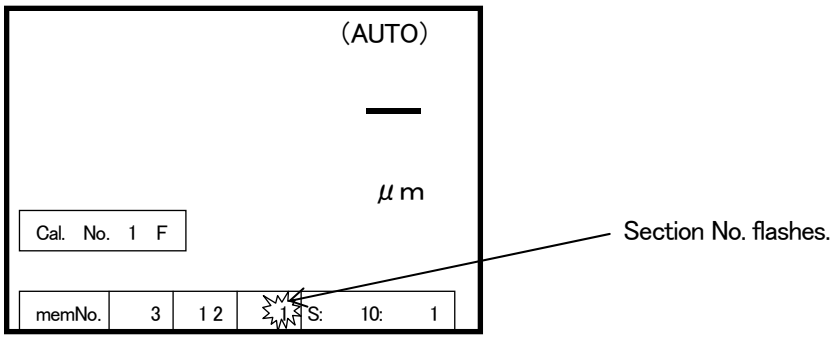
Press MEM. SEL. key.
The buzzer beeps.

※A Block No.「12」 is set.
Then moving on to setting a Section No.



Press ▲ or ▼ key to
select a Section No.「1」.

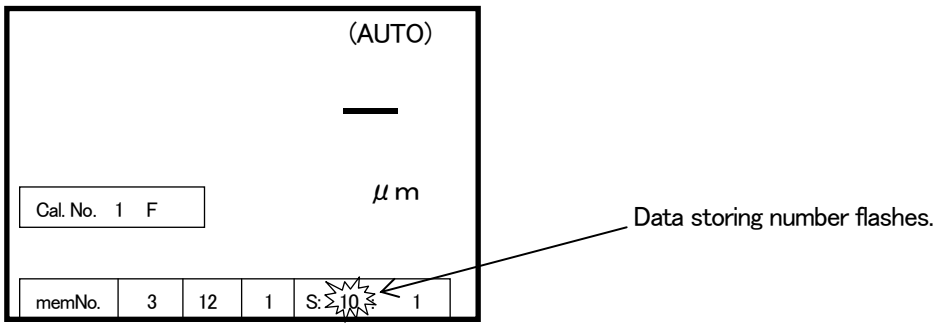
(In this example, as Section No. is 1, so it moves on to the next as it is.)



Press [MEM. SEL.] key.
The buzzer beeps.

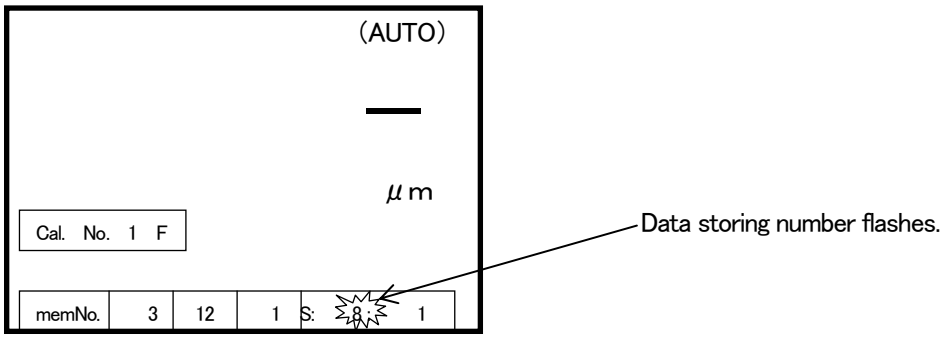
⇩

※A Section No.「1」 is set.
Lastly, move on to setting a data storing number per Section.



Press [▲] or [▼] key
to select a storing number「8」.

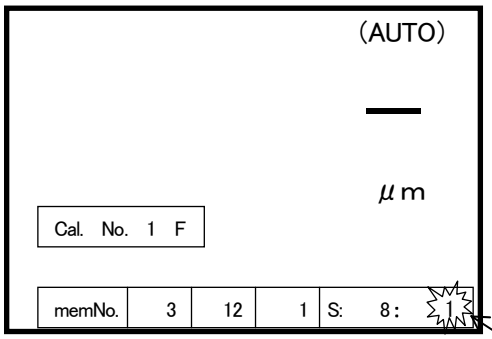
⇩



Press [MEM. SEL.] key.
The buzzer beeps.

⇩

※Then, select the first storing place in a 「Data storigng section」.



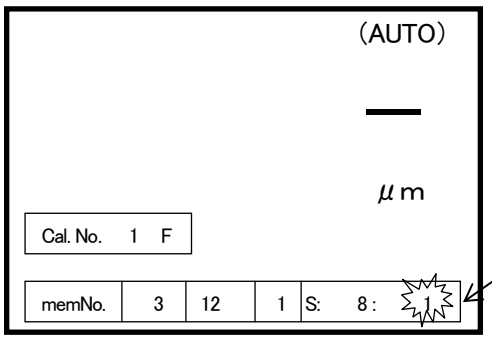
In this example, start storing from 「the first (1) in Section」.

Press ▲ or ▼ key to select the first storing place 「1」.

Starting storing palce flashes.

(In this example, storing place is 1, so it moves on to next as it is.)

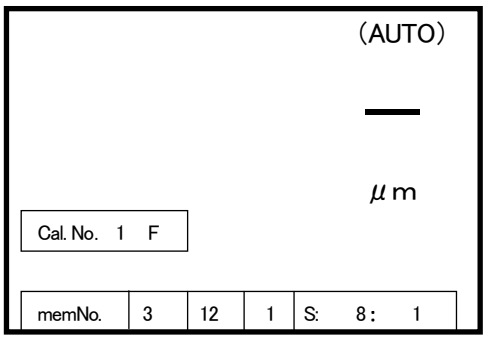
⇩



Starting storing place flshes.

Press MEM. SEL. key.※
The buzzer beeps.

⇩

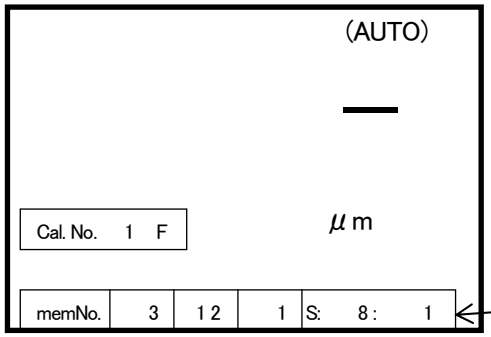


※Note
Pressing twice MEM. SEL. key turns the screen to a state of 「Data is not stored」 and then 「Data storing place」 disappears on the screen.
To store measured data press MEM. SEL. key 6 times successively so that it turn to a state of 「Data storing is displayed and all setting data do not flash」.

Flashing of all numbers stopped and setting of 「Data storing place」 has completed.
It becomes possible to take「Measurements and adjustments」procedures.

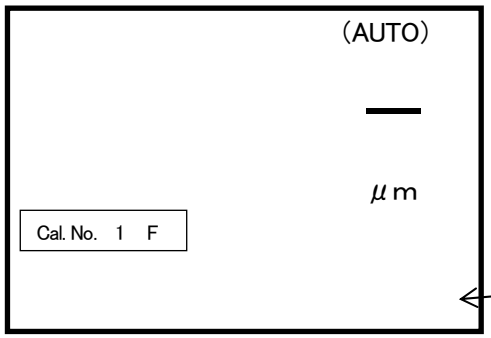
（2） How to keep data from being stored

※It is in a state of「Storing data」.



A state of Non-Flashing of all items.

Press [MEM. SEL.] key.
The buzzer beeps.

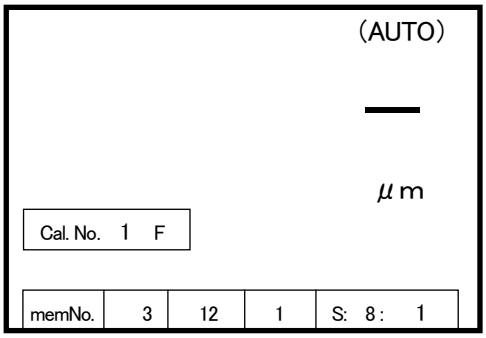


The screen disappeares and turns
to a stage of「Data is not stored」.

Measurements of storing data

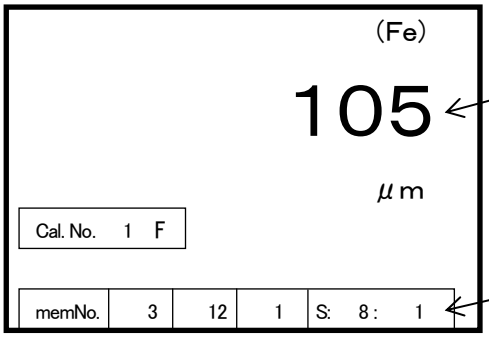
● Prepare this unit for measuring in storing data with 「Data is stored」 on the screen.

※For example, store 「8」 pcs of measuring data in order from
「Storing place 1」 in a 「Group No. 3」,
a 「Block No.12 」, a 「Section No.1」.



● According to explanations on page 10, quickly press a probe to a measuring object.

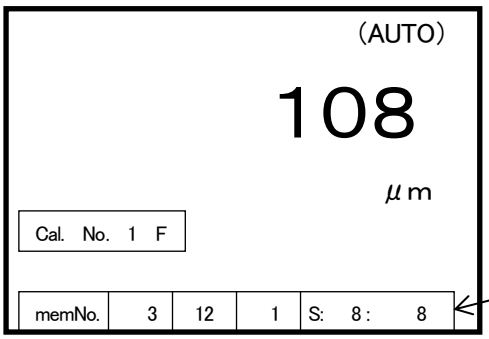
The buzzer beeps.



A measured result is indicated.

A data measured now is stored in a 「1」.
(A number advances by one each time measured.)

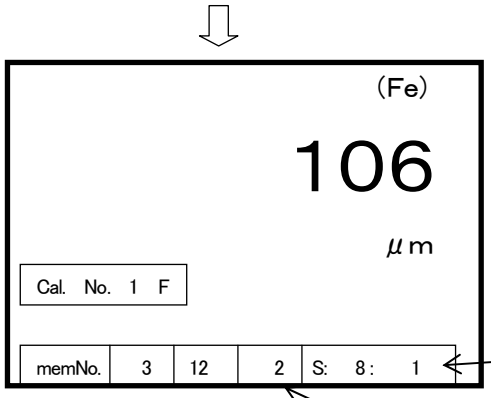
.
.
.



A screen when the 8th measurement was finished.

A number in a storing place advances to「8」.
8 pieces of Data measured are stored in the places from the numbers of 「1」 to 「8」.

When storing data is processed and reaches to the 8th measurement,
the buzzer beeps, beeps 2 times, warning that data is stored in the last end of this section and advances by one with the following measurement.

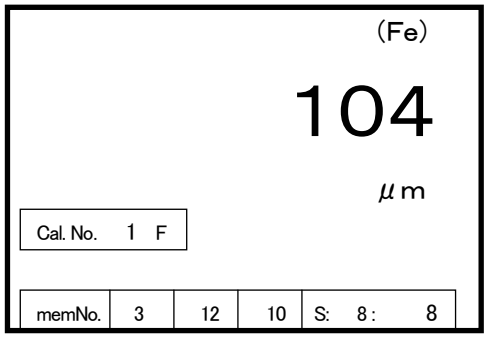


The 9th measured result is indicated.
The 9th measured data is stored in「1」 in「Section 2」.

The number in a storing place returns to「1」.

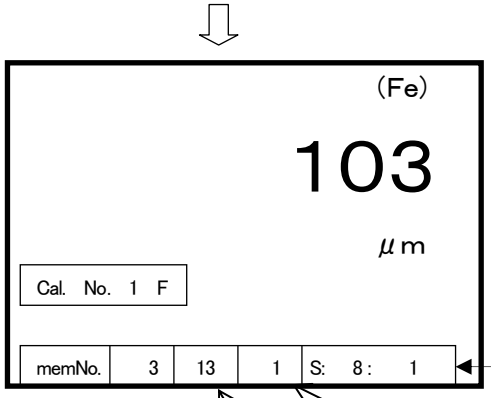
Data storing moves to「Section No. 2」.

As measurement data have been stored and they reach to the last end of「Last Section 10 in Block 12」, the buzzer beeps, beeps 2 times, warnig that it moves to「New block」 at the next measuring.



This is a screen when the last data is stored in Section 10 in Block 12.

※In「Block 12」, 8 data/section X 10 section, total 80 of measuring data are stored.



As measuring continues, the following data is stored from a storing place 1 in Section 1 in Block 13.

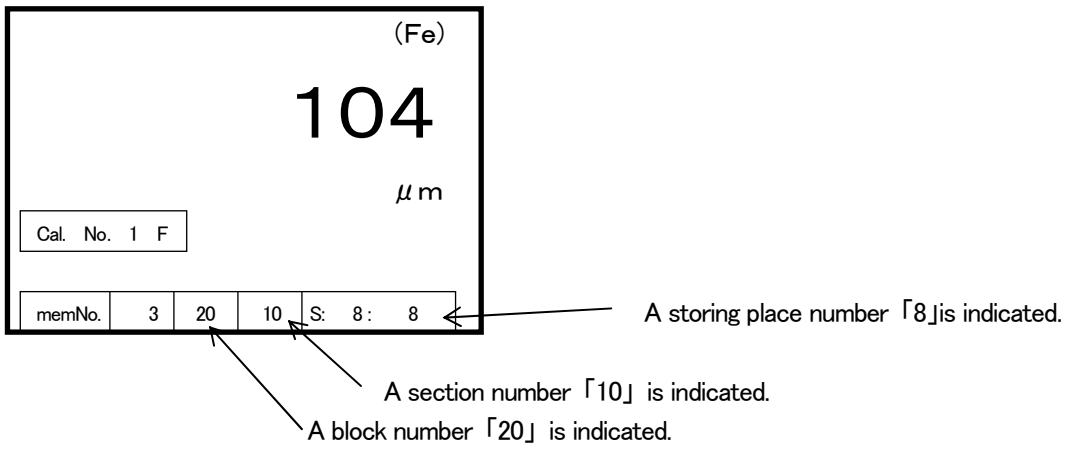
The number in a storing place returns to「1」.

A section number returns to「1」.

A block number advances by one to「13」.

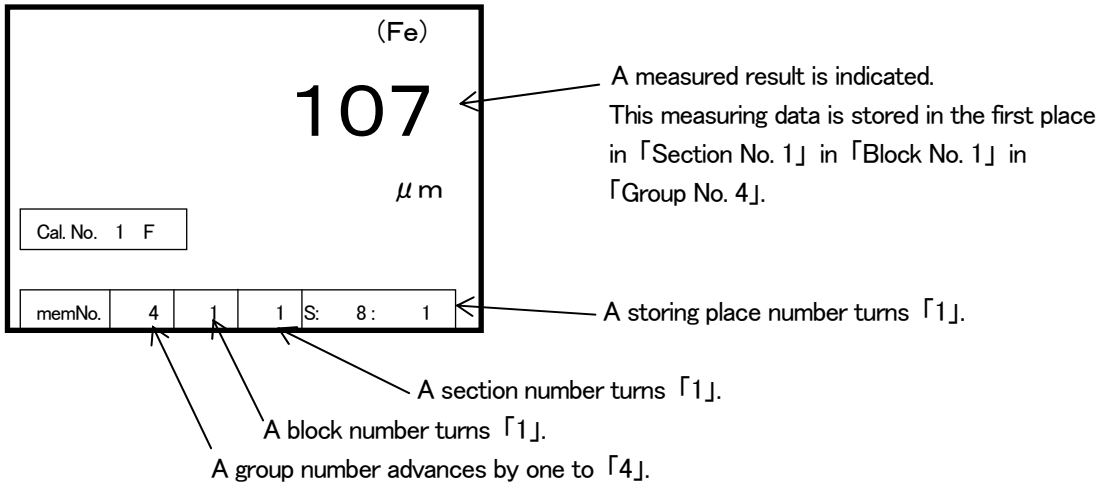
● In case of reaching to the last Block (20)

Measuring data has been stored and its state is displayed
as「Measuring data : 104 μm」 stored in「Storing place 8」
in「Section No. 10」 in「Block No. 20」 in「Group No. 3」.



The following measuring data is stored in Block 1 in Group 4.

A measurement is taken.
The buzzer beeps.

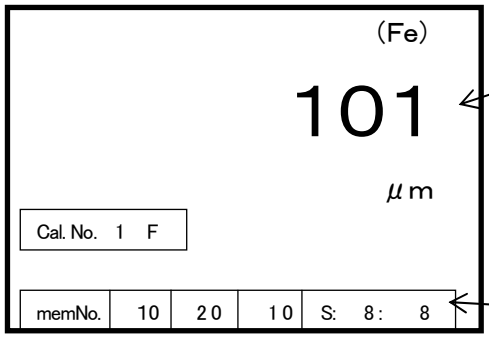


※ In「Group No. 3, 8 data／section × 10 section／block × 9 block, total 720 of measuring data are stored.

※ It becomes 9 Block as started stroing from 12 Block.

● In case of reaching to a 「Group No. 10」

Measuring data has been stored and its state is displayed
as 「Data No. 8」 stored in 「Section No. 10」,
in 「Block No. 20」 in 「Group No. 10」.



Measuring result is indicated.
This measuring data is stored at the 8th place in 「Section No. 10」 in 「Block No. 20」 in 「Group No. 10」.

A storing place 「8」 is indicated.

⇩

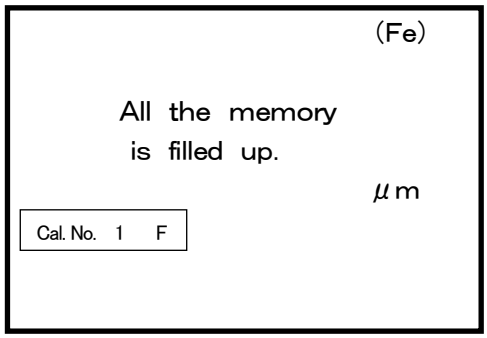
A measurement is taken.
The buzzer beeps.

※This time the mesurering data is not displayed.

⇩

The buzzer beeps, beeps 2 times.

⇩



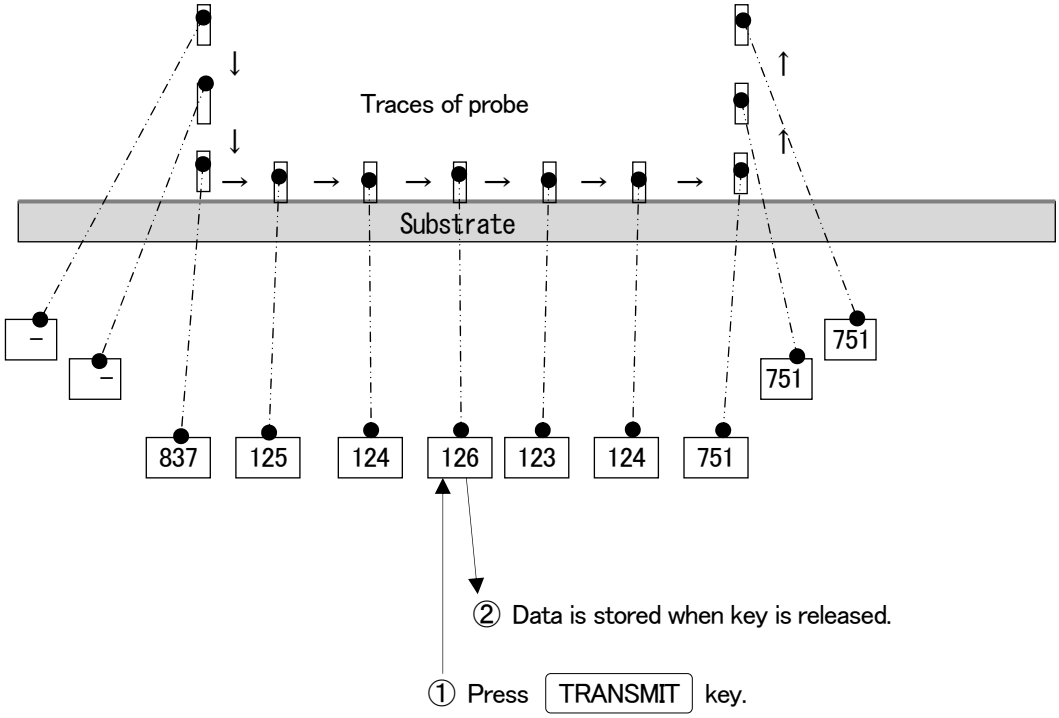
Storing data has been completed.

※It is possible to continue measurements, but measuring data only is displayed.

Storing measured data at Non-Interrupt Measuring Mode

When this unit is set at 「Storing measured data」 and mesurements are taken at 「Non-Interrupt Measuring Mode」, it is capable of storing data on the following procedures.

- Select a place to store data as described in 「(1) How to select a data storing place」 at page 42.
- Start Non-Interrupt measuring.



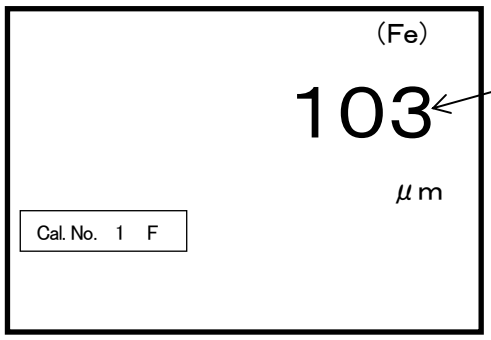
◆ Three kinds of measurement methods 「when no memory is empty」

（1） Keep on measuring

● Measuring

The buzzer beeps.

⇩



A measured value is indicated.

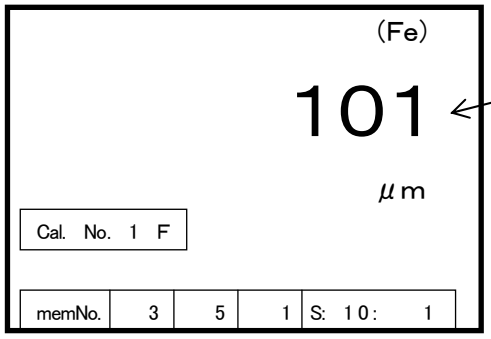
Caution

Measuring can be continued but data can not be stored.

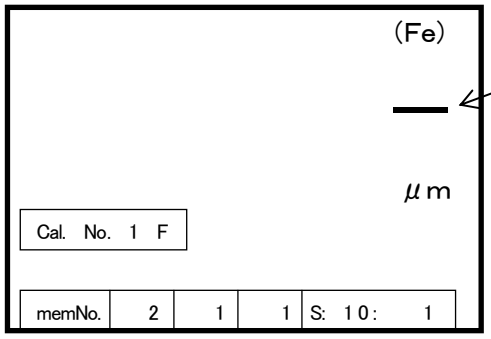
（2） Look for an empty storing place

● Interrupt measuring.

● Select a place to store data as described in 「(1)How to select a data storing place」 at page 42.



In case data is stored in a selected place, the value is indicated.



In case a selected place is unoccupied, 「—」 mark is indicated.

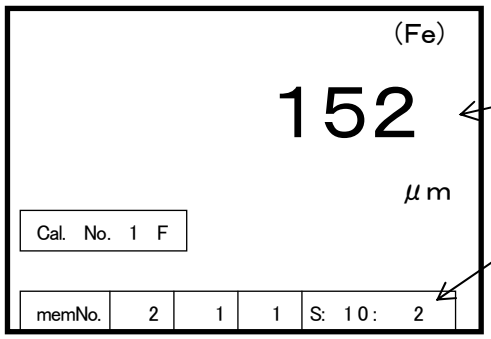
Caution

Depending on measurement quantities, 5～6 blocks (500～600 : storing quantity) recommended for selecting as empty places to store successively.

Measuring is resumed.

The buzzer beeps.

⇩



A measured value is indicated.

A measured value is stored and advances the number of a storing place by one.

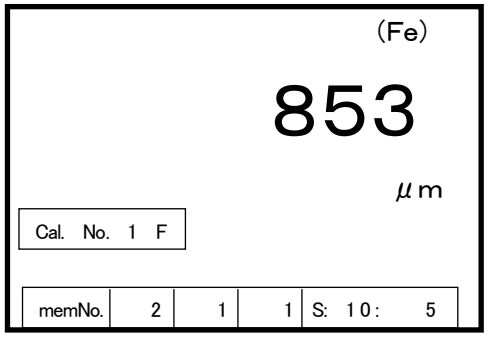
(3) Deleted unnecessary data

- Delete an unnecessary data in a storing place and store there new data which is to be taken.
- Delete all of unnecessary data afterward, referring to each knid of deletion method.
- Resume「Measurements while storing data」after deleting data.

Deletion of one data

Data inadvertently by pressing a probe against objectives, poor and unstable pressing on objects and erroneous data which are stored can be deleted.

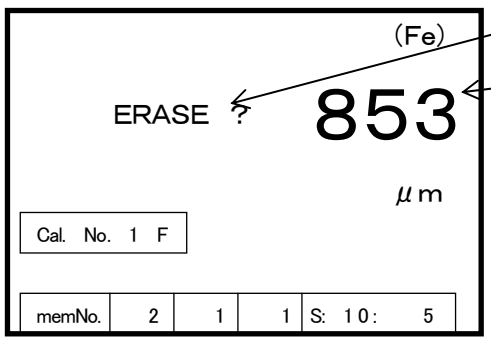
Erroneous value is indicated.



Press DATA ERASE key.

The buzzer beeps.

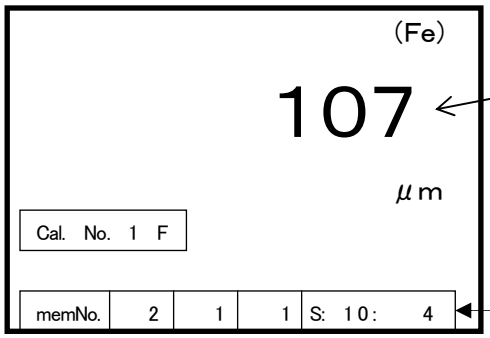
⇩



「ERASE？」is displayed.

The measured value flashes.

Press [DATA ERASE] key.
The buzzer beeps.



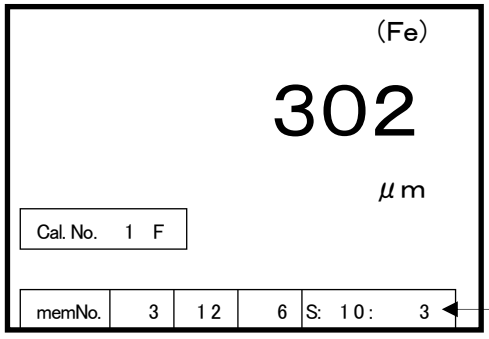
The reading value is deleted.
A last data (one step before) is indicated.

A storing place number returns to the last one.

When data storing places are running short and stored data is no more necessary, it is possible to delete all data collectively and delete data of each storing place.

Deletion of all data

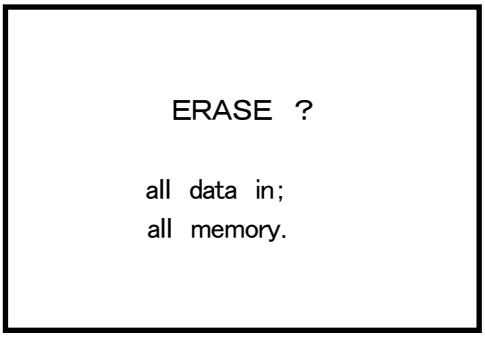
『all data』 stored are collectively deleted.



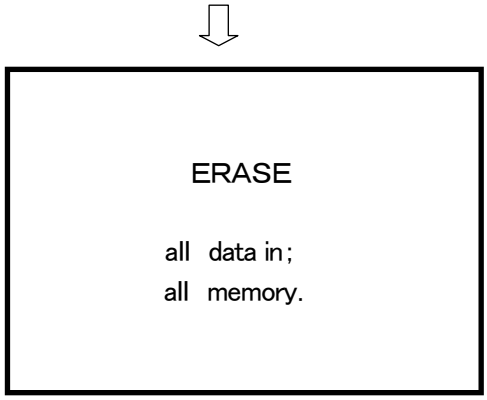
Caution

This operation can not be activated when data column of data storing place is not displayed. When it is not displayed, press [MEM. SEL.] key 6 times to activate the column with all the numbers displayed.

Press [MEM. CLEAR] key.
The buzzer beeps, beeps 2 times.

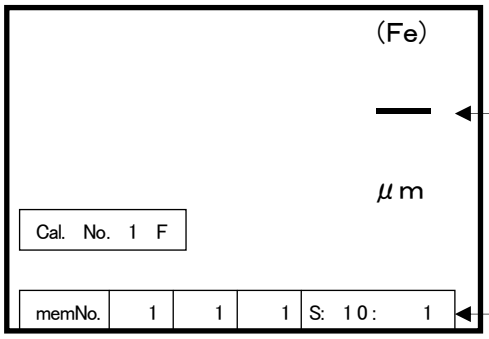


Press [MEM. CLEAR] key.
The buzzer beeps, beeps 2 times.



All stored data are deleted.

The buzzer beeps.



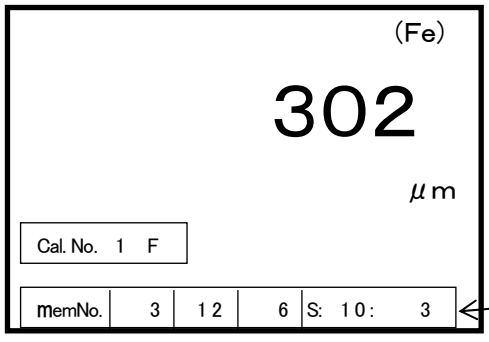
「 — 」mark is indicated.

In the data column, Section becomes 10 and
All others are「1」.

Deletion of group data

※ Data stored in group numbers of 1～10 is deleted.

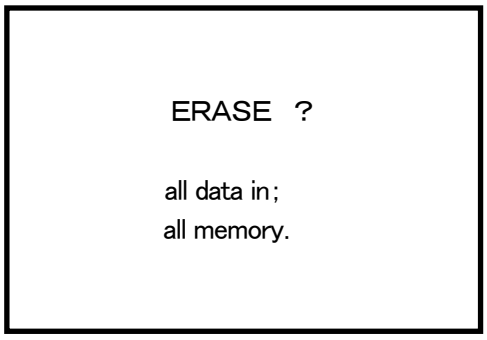
● For operation exsample, data stored in Group No.「5」is deleted.



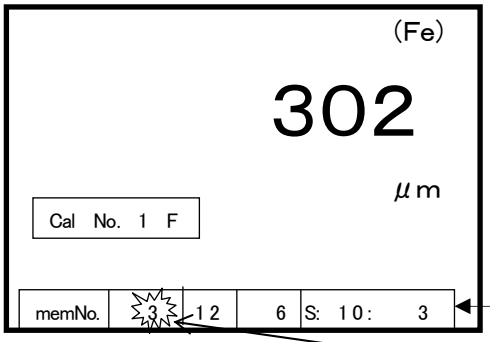
Press [MEM. CLEAR] key.
The buzzer beeps, beeps 2 times.

Caution

This operation can not be activated when data column of data storing place is not displayed. When it is not displayed, press [MEM. SEL.] key 6 times to activate the column with all the numbers displayed.



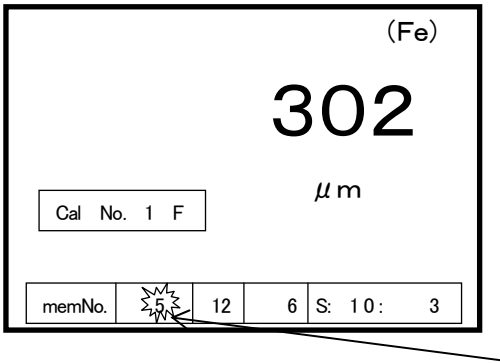
Press [MEM. SEL.] key.
The buzzer beeps.



Data storing place is displayed.

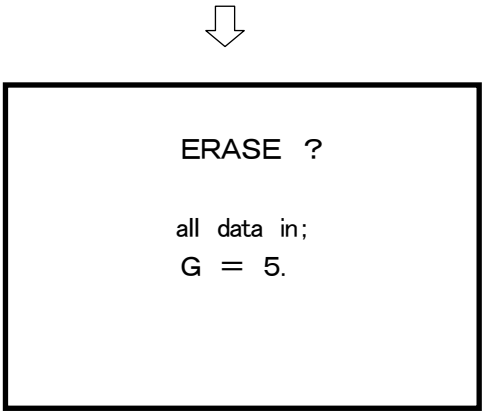
「Group No.」 flashes.

Press [▲] or [▼] key to adjust to a group number in which to delete data.

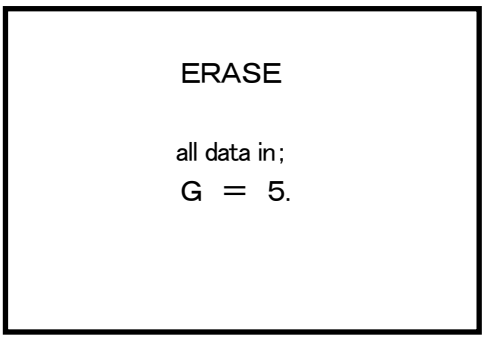


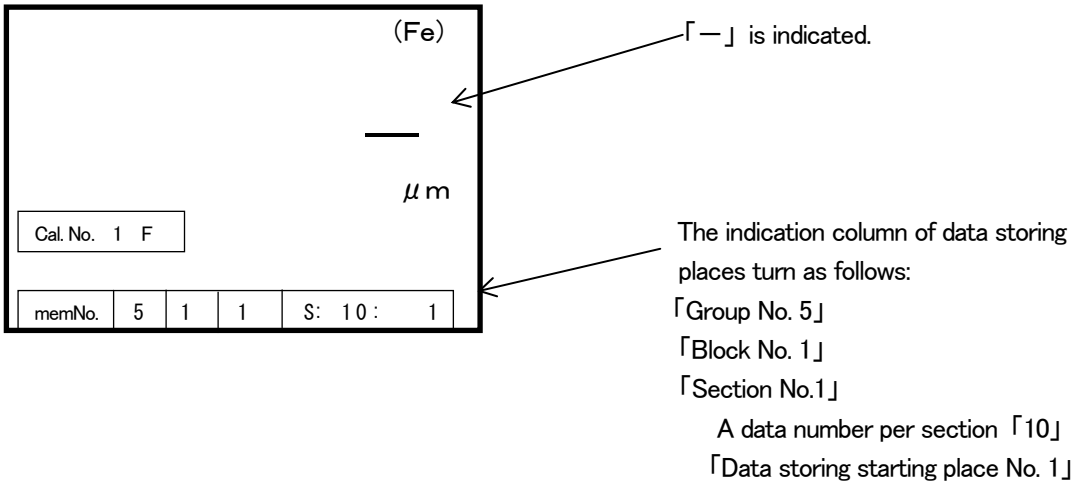
Adjust to Group No.「5」.

Press [MEM. CLEAR] key.
The buzzer beeps, beeps 2 times.



Press [MEM. CLEAR] key.
The buzzer beeps.

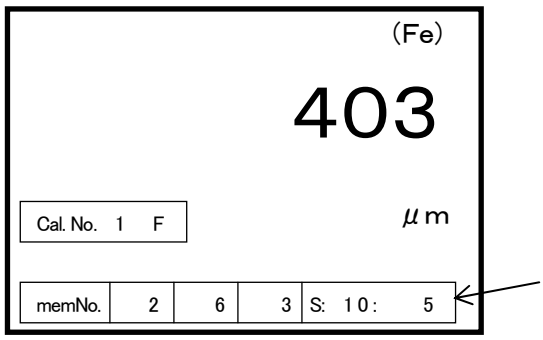




Deletion of block data

※ Data stored in a block in block numbers of 1～20　is deleted.

● For operation example, data stored in Block No.「12」in Group No.「1」is deleted.

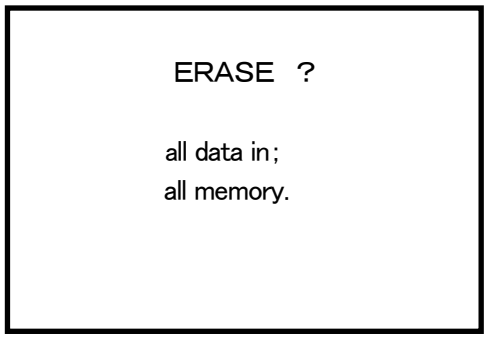


Caution

This operation can not be activated when data column of data storing place is not displayed. When it is not displayed, press [MEM. SEL.] key 6 times to activate the column with all the numbers displayed.

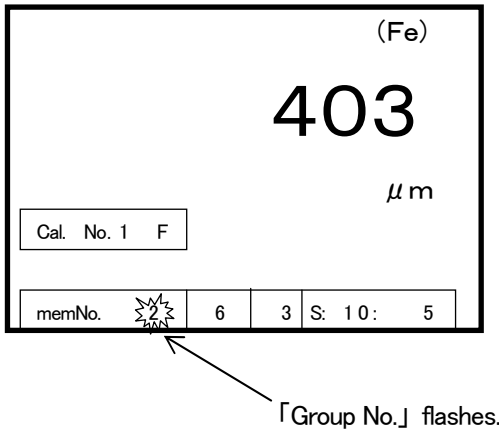
Press [MEM. CLEAR] key.
The buzzer beeps, beeps 2 times.

⇩

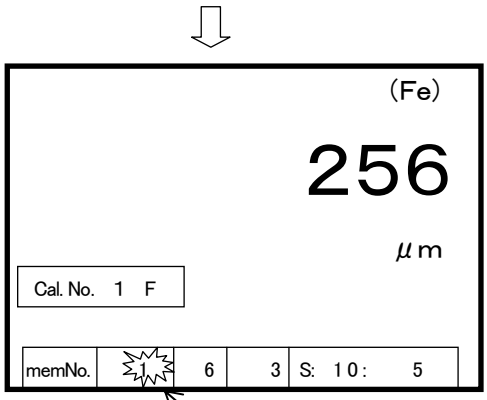


Press [MEM. SEL.] key.
The buzzer beeps.

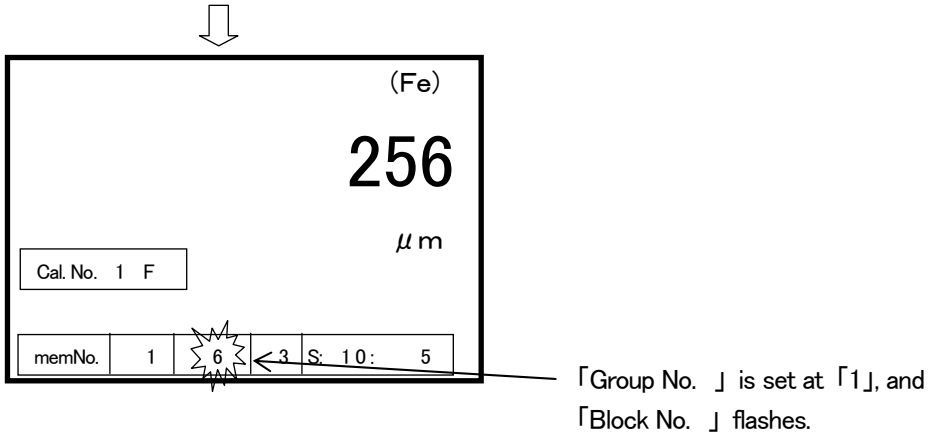
⇩



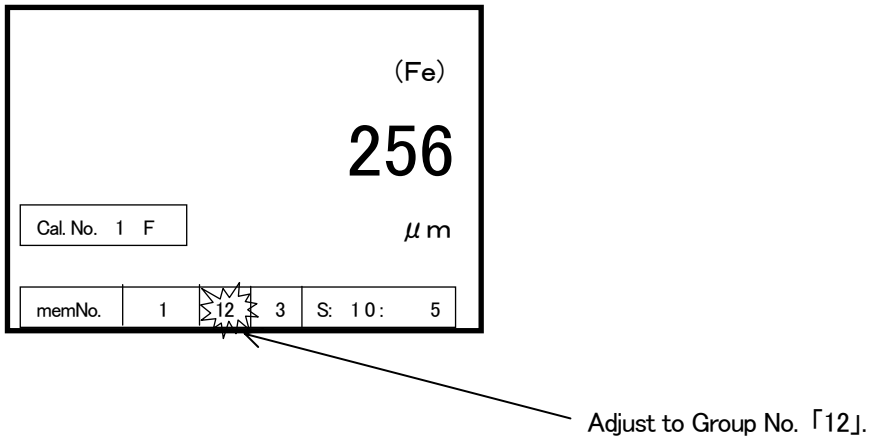
Press [▲] or [▼] key to adjust to a group number where there is Block No. to be aimed at.



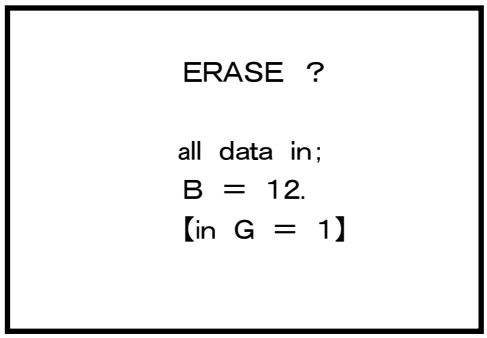
Press [MEM. SEL.] key.
The buzzer beeps.



Press [▲] or [▼] key to adjust to a group number where there is Block No. to be aimed at.

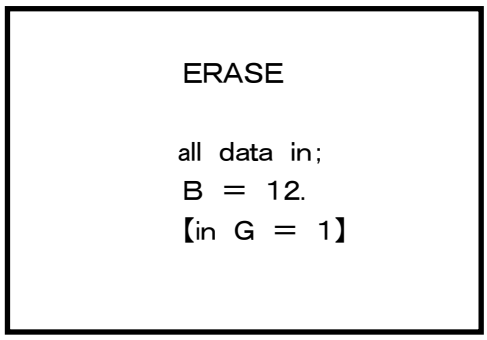


Press [MEM. CLEAR] key.
The buzzer beeps, beeps 2 times.

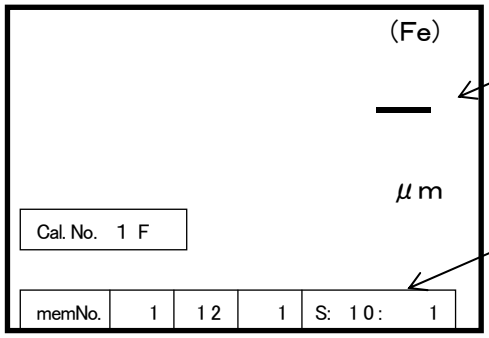


Press [MEM. CLEAR] key.
The buzzer beeps.

⇩



⇩



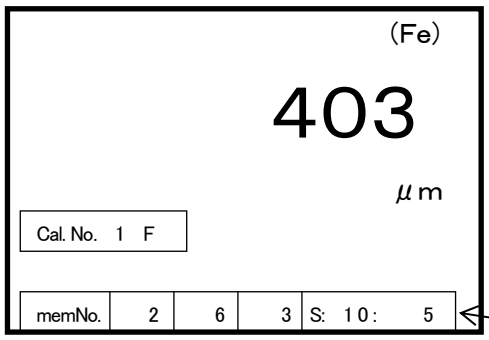
「－」 mark is indicated.

The indication column of data storing places turn as follows:
「Group No. 1 」
「Block No. 12」
「Section No. 1」
A data number per section「10」
「Data storing starting place No. 1」

Deletion of section data

※Data stored in a section in section numbers of 1～10 is deleted.

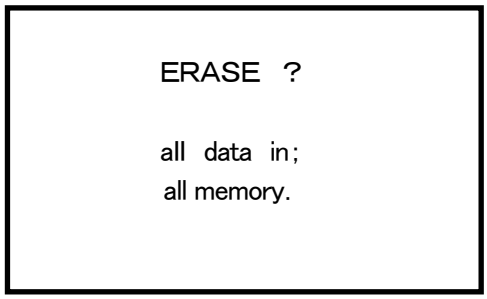
● For operation example, data stored in Section No.「5」in Block No.「7」in Group No.「3」is deleted.



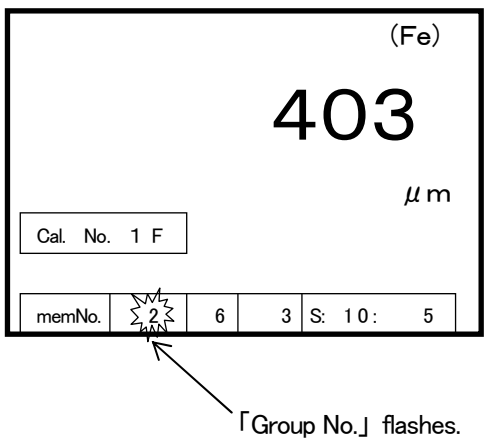
Caution

This operation can not be activated when data column of data storing place is not displayed. When it is not displayed, press MEM. SEL. key 6 times to activate the column with all the numbers displayed.

Press MEM. CLEAR key.
The buzzer beeps, beeps 2 times.

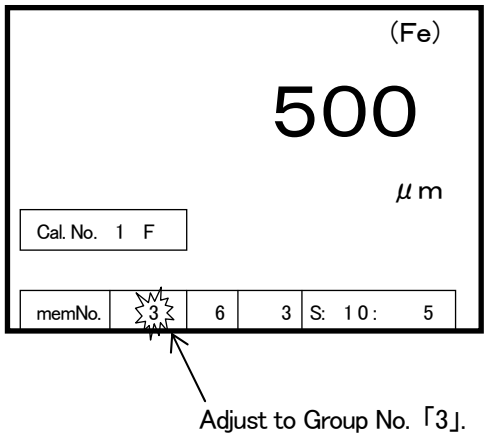


Press MEM. SEL. key.
The buzzer beeps.

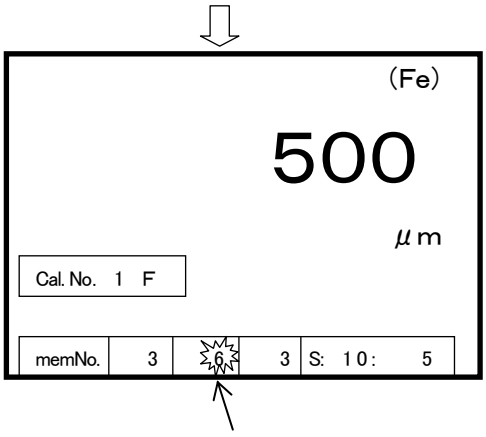


「Group No.」flashes.

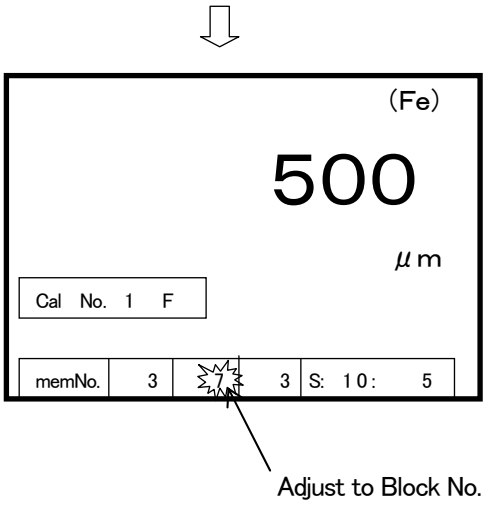
Press [▲] or [▼] key to adjust to a group number
where there is Block No. to be aimed at.



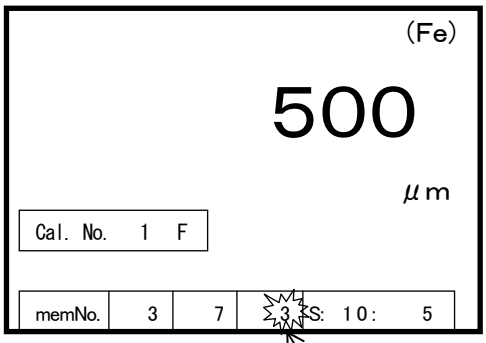
Press [MEM. SEL.] key.
The buzzer beeps.



Press [▲] or [▼] key to adjust to
a block number where there is Section to be aimed at.

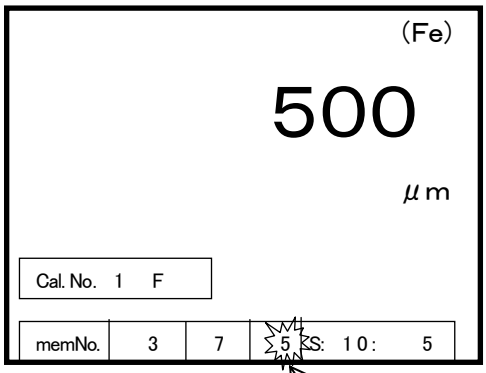


Press [MEM. SEL.] key.
The buzzer beeps.



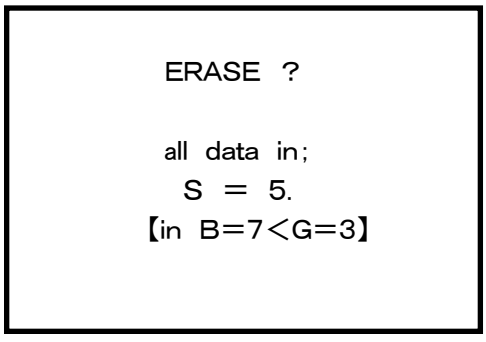
「Block No. 」is set at「7」, and「Section No. 3」flashes.

Press [▲] or [▼] key to adjust to
a section number to be aimed at.

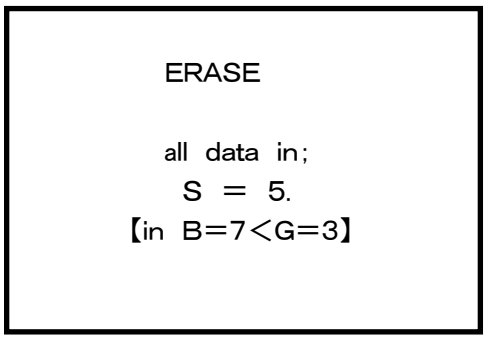


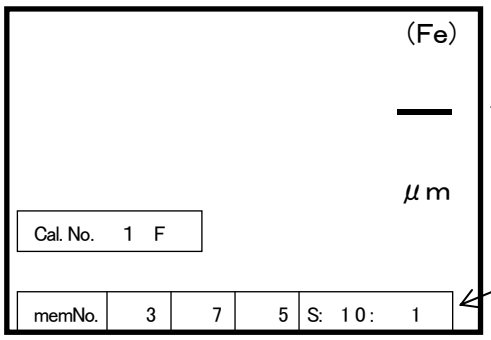
Adjust to Section No.「5」.

Press [MEM. CLEAR] key.
The buzzer beeps, beeps 2 times.



Press [MEM. CLEAR] key.
The buzzer beeps.



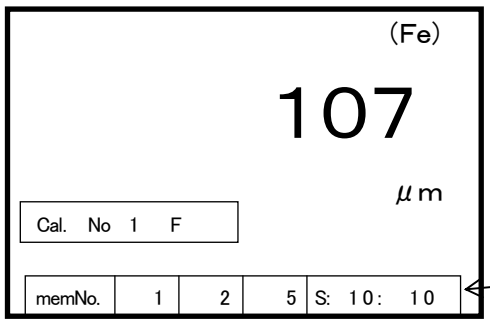


「－」 mark is indicated.

The indication column of data storing places turns as follows:
「Group No. 3 」
「Block No. 7 」
「Section No. 5 」
A data number per section「10」
「Data storing starting place No. 1」

Statistics (Statistical calculation value of chosen data is indicated)

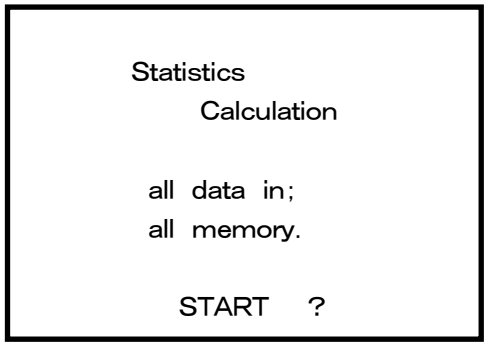
(1) Statistics of stored in 『all data』



Data in storig places are indicated.

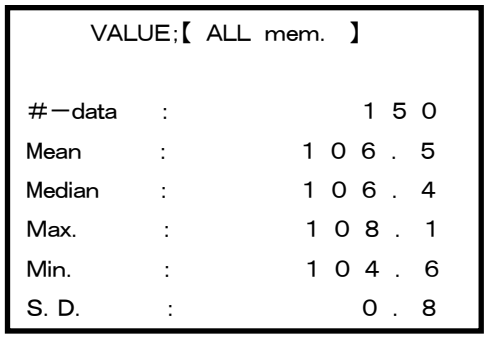
Press [STATISTICS] key.
The buzzer beeps, beeps 2 times.

⇩



Press [STATISTICS] key again.
The buzzer beeps, beeps 2 times.
(Displayed as being under process of calculation)
The buzzer beeps.

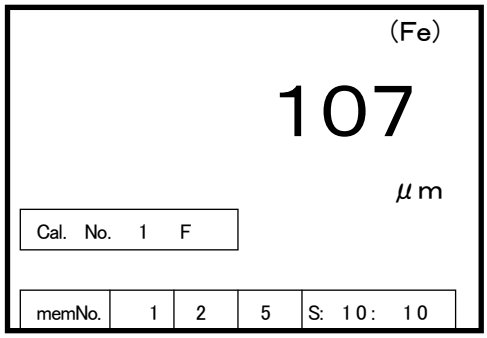
⇩



Note: Keeping [STATISTICS] key from being pressed and left alone , this screen remains unchanged until Power switches off.

Press [STATISTICS] key.
The buzzer beeps.

⇩

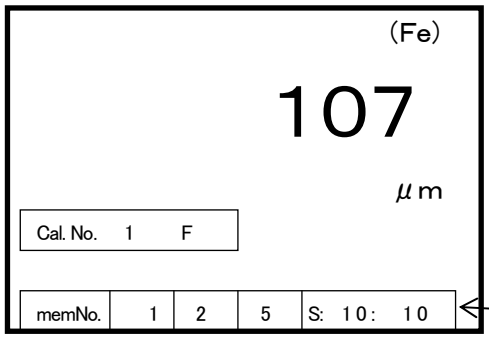


The screen returns to the state before statistical calculation.

(2) Statistics of data stored in 『Group No.』

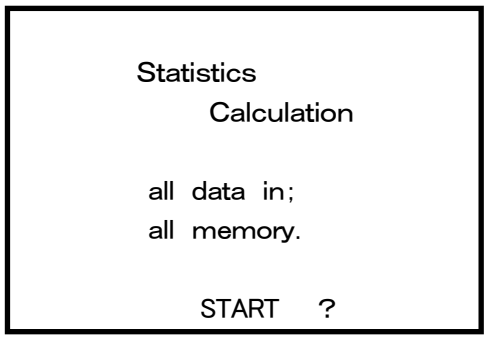
※ Data is stored in one of Group No.1～10.

● For operation example, statistical calculation of data stored in Group No.「3」 is operated as follows.



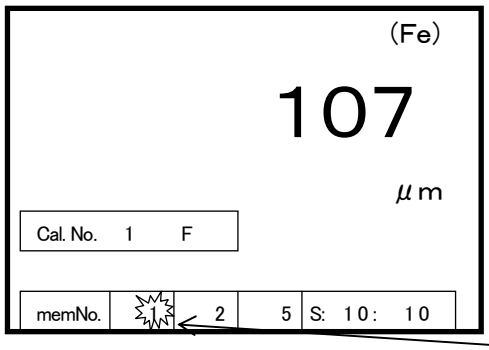
Press [STATISTICS] key.
The buzzer beeps, beeps 2 times.

⇩



Press [MEM. SEL.] key.
The buzzer beeps.

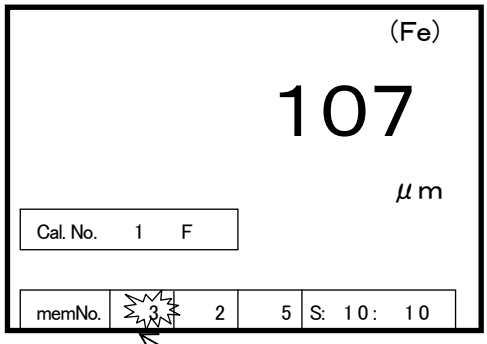
⇩



「Group No.」 flashes.

Press ▲ or ▼ key to adjust to the Group No.
to calculate statistics.

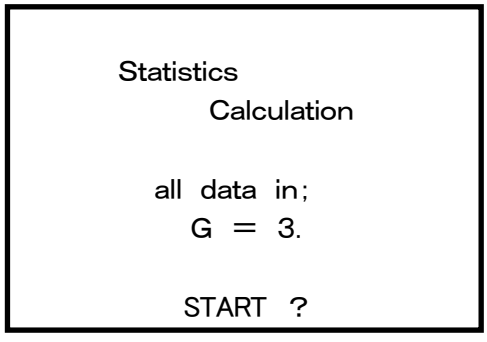
⇩



Adjust to Group No.「3」.

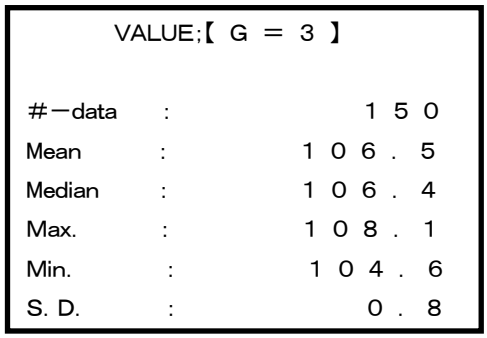
Press STATISTICS key while the Group No. is flashing.
The buzzer beeps, beeps 2 times.

⇩



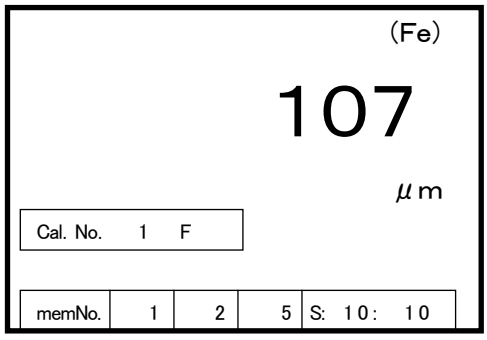
Press STATISTICS key.
The buzzer beeps, beeps 2 times.
(Displayed as being under process of calculation)
The buzzer beeps.

⇩



Note: Keeping STATISTICS key from being pressed and left alone, the screen remains unchanged until Power switches off.

Press STATISTICS key.
The buzzer beeps.

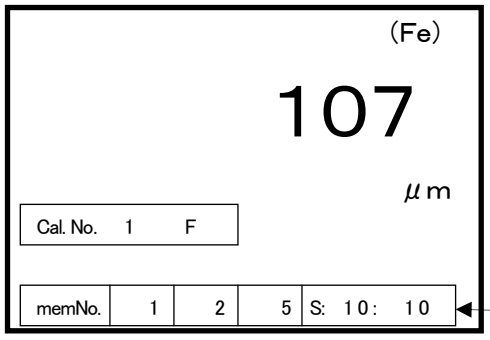


The screen returns to the state before statistical calculation.

(3) Statistics of data stored in 『Block No.』

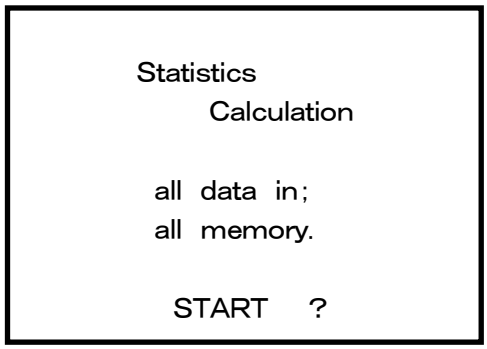
※ Data is stored in one of Block No.1～20.

● For operation example, statistical calculation of data stored in Block No.「14」is operated as follows.

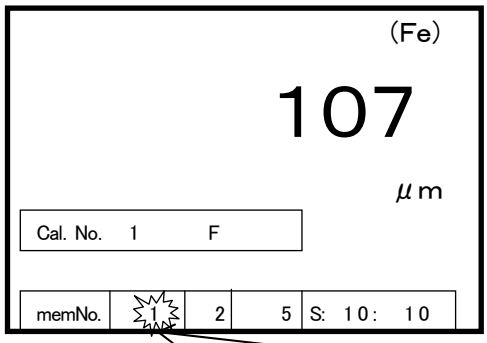


Data in storing places are indicated.

Press STATISTICS key.
The buzzer beeps, beeps 2 times.

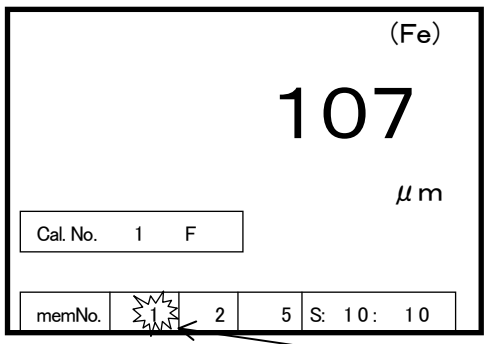


Press [MEM. SEL.] key.
The buzzer beeps.



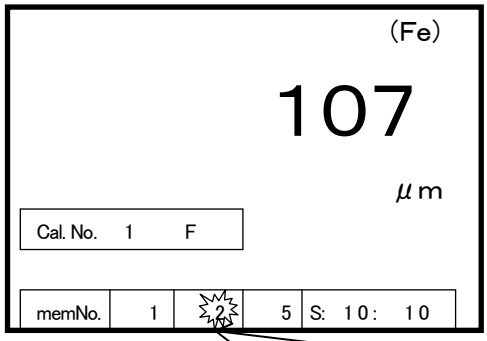
「Group No.」 flashes.

Press [▲] or [▼] key to adjust to
the Group No. where there is Block to calculate statistics.



Adjust to Goup No.「1」.

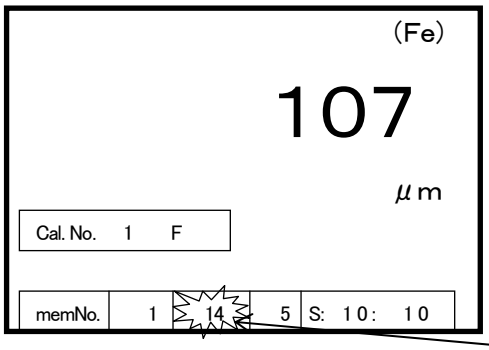
Press [MEM. SEL.] key.
The buzzer beeps.



Group No.「1」 is set and the Block No. flashes.

Press ▲ or ▼ key to adjust
to the Block No. to calculate statistics.

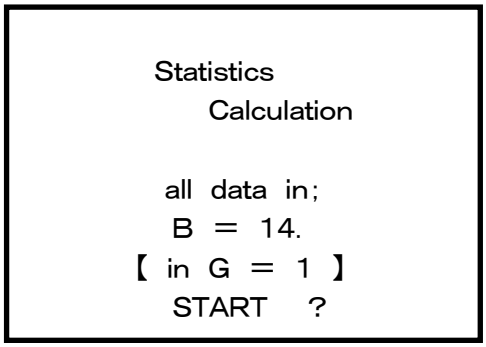
⇩



Adjust to Block No.「14」.

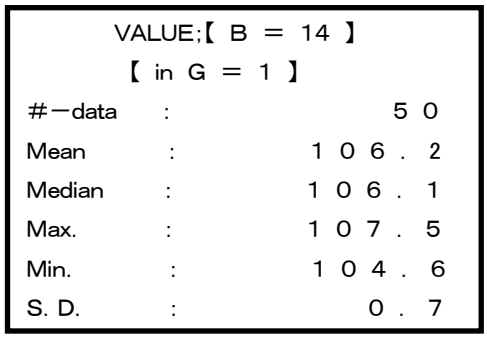
Press STATISTICS key while the Block No. is flashing.
The buzzer beeps, beeps 2 times.

⇩



Press STATISTICS key.
The buzzer beeps, beeps 2 times.
(Displayed as being under process of calculation)
The buzzer beeps.

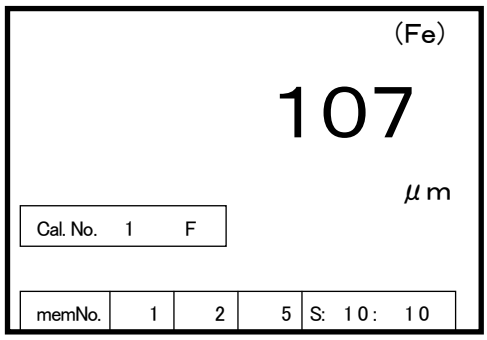
⇩



Note : Keeping [STATISTICS] key from being pressed and left alone, the screen remains unchanged until Power switches off.

Press [STATISTICS] key.
The buzzer beeps.

⇩

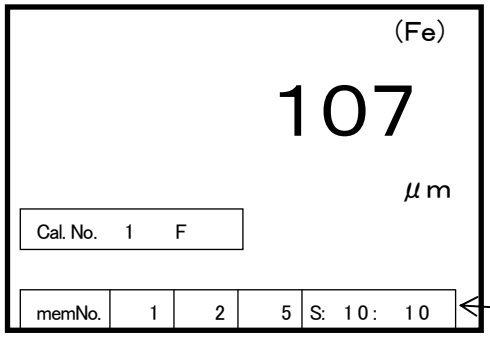


The screen returns to the state before statistical calculation.

(4) Statistics of data stored in 『Section No.』.

※ Data is stored in one of Section No. 1～10.

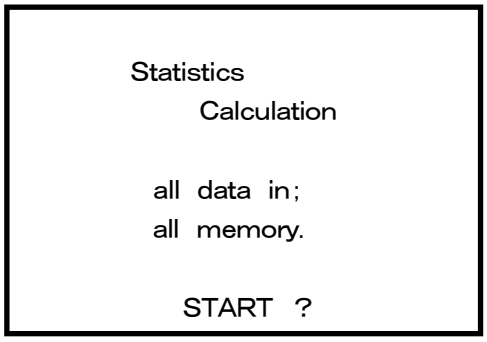
● For operation example, statistical calculation of data stored in Section No.「1」, Block No.「2」, Group No.「5」 is operated as follows.



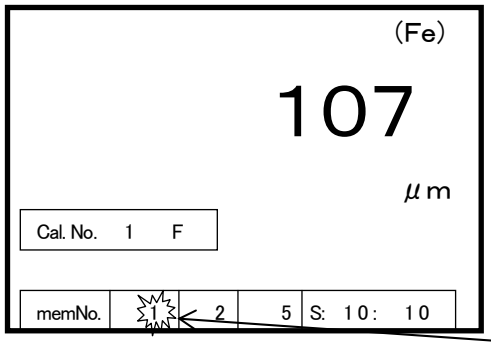
Data in storing places are indicated.

Press [STATISTICS] key.
The buzzer beeps, beeps 2 times.

⇩

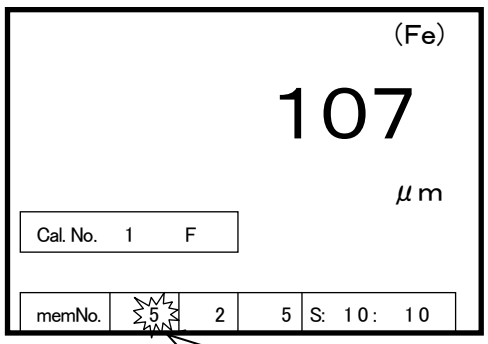


Press [MEM. SEL.] key.
The buzzer beeps.



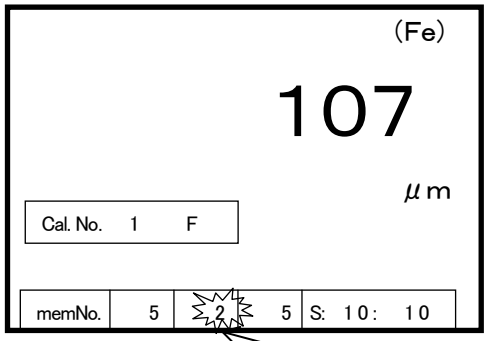
「Group No.」 flashes.

Press [▲] or [▼] key to adjust to
the Group No. where there is Block to calculate statistics.



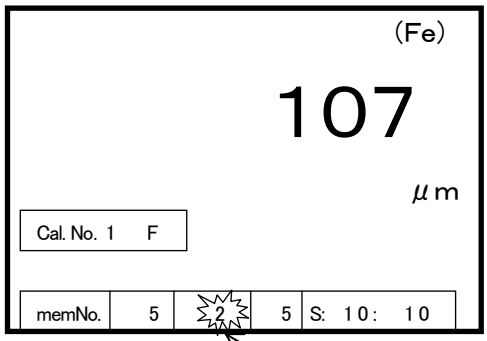
Adjust to Group No.「5」.

Press [MEM. SEL.] key.
The buzzer beeps.



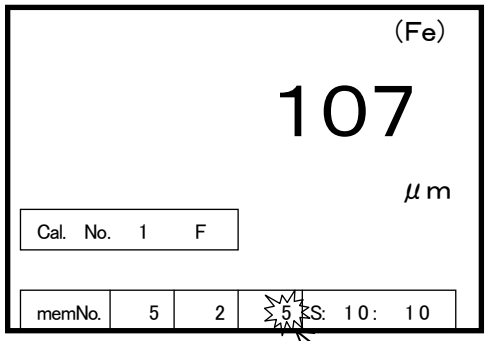
Group No.「5」 is set and the Block No. flashes.

Press ▲ or ▼ key to adjust to
the Block No. to calculate statistics.



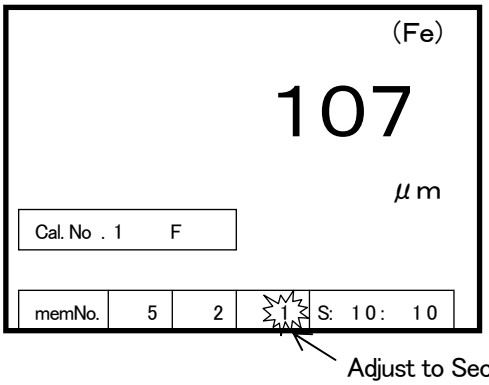
Adjust to Block No.「2」.

Press MEM. SEL. key.
The buzzer beeps.



Block No.「2」 is set and the Section No. flashes.

Press ▲ or ▼ key to adjust to the
Section No. to calculate statistics.



Adjust to Section No.「1」.

Press [STATISTICS] key.
The buzzer beeps, beeps 2 times.

⇩

Statistics
Calculation

all data in;
S = 1.
【 in B=2<G=5 】
START ?

Press [STATISTICS] key.
The buzzer beeps.

⇩

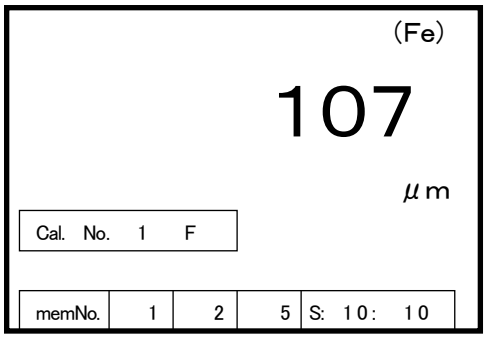
VALUE; 【 S = 1 】
【 in B = 2 < G = 5 】

#−data	:	10
Mean	:	105. 9
Median	:	106. 1
Max.	:	106. 8
Min.	:	104. 6
S. D.	:	0. 7

Note : Keeping [STATISTICS] key from being pressed and left alone, the screen remains unchanged until Power switches off.

Press [STATISTICS] key.
The buzzer beeps.

⇩



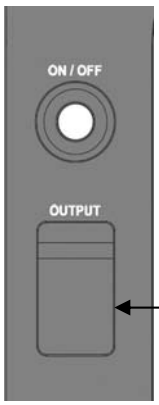
The screen returns to the state before statistical calculation.

Transferring data – Real time transfer

Transfer data to a PC (personal computer) by using a USB terminal.
Refer to separately attached information for a driver installation into a PC side.

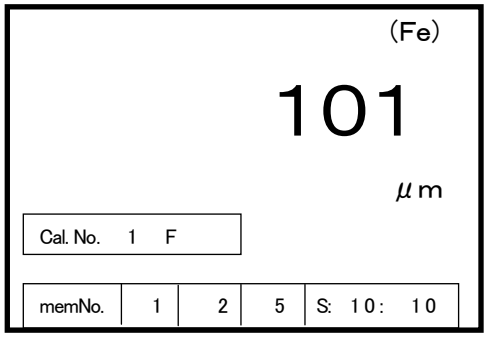
Data can not be transferred when this unit is set to 「Non-Interrupt Measuring Mode」.
Make sure beforehand that the unit is set to 「Normal Operation Mode」.

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

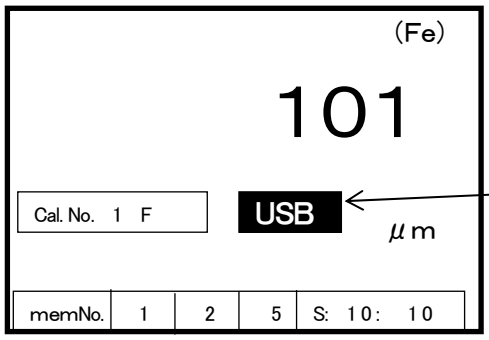


- Prepare for a PC side.
- Connect a USB cable to a PC.

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

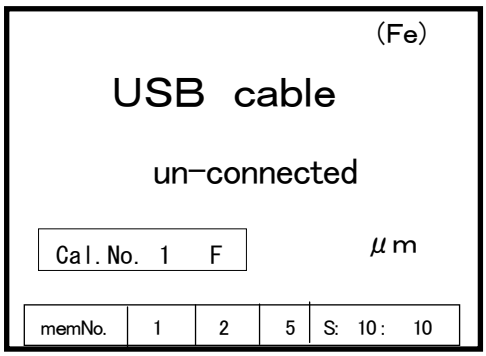


Press [COM. ENABLE] key.
The buzzer beeps.



USB is displayed.

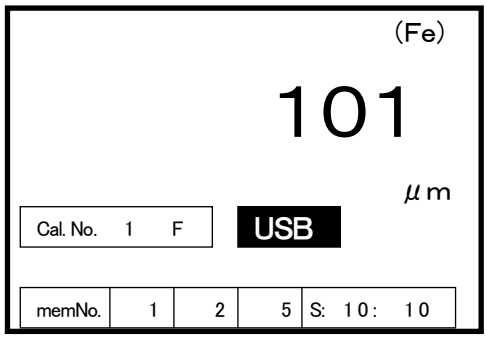
Press [TRANSMIT] key.
The buzzer beeps.
Data is sent out each time a measurement is taken.



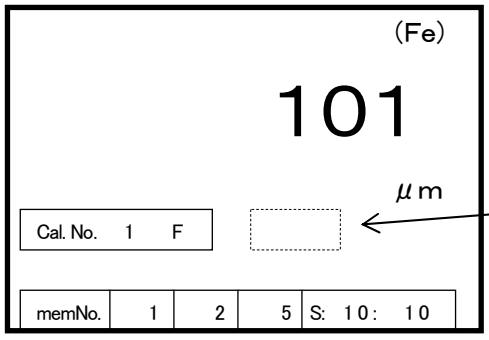
Caution

Pressing COM. ENABLE key without connecting a USB cable , a warning「USB cable un-connected」is indicated. Press again COM. ENABLE key to delete the letters and connect the USB cable.

(2) Interrupt transferring data



Press COM. ENABLE key.
The buzzer beeps.



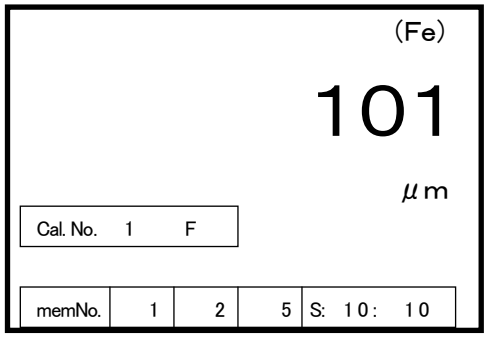
USB disappears on screen.

Data stops being transferred.

Transferring stored data

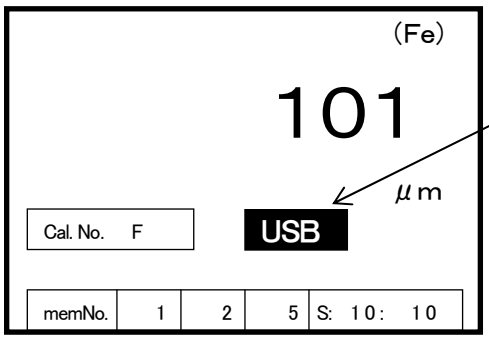
(1) Transferring All data

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



Press [COM.ENABLE] key.
The buzzer beeps.

⇩



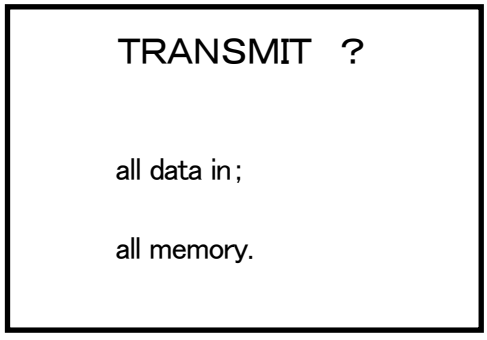
USB is displayed.

Caution

Pressing [COM. ENABLE] key without connecting a USB cable, a warning 「USB cable un-connected」 is indicated. Press again [COM. ENABLE] key to delete the letters and connect the USB cable.

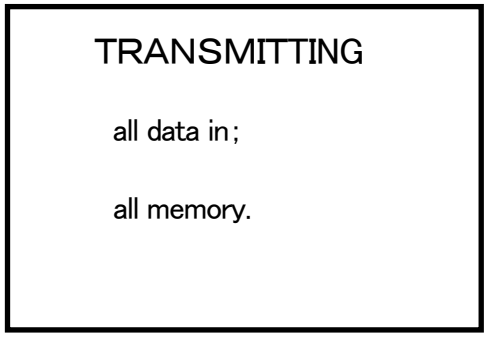
Press [MEM. SEL.] key.
The buzzer beeps, beeps 2 times.

⇩

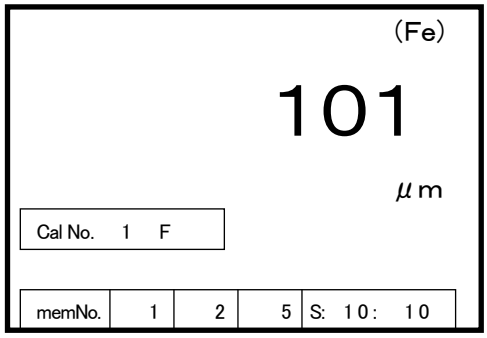


Press [TRANSMIT] key.
The buzzer beeps, beeps 2 times.

⇩



The buzzer beeps.

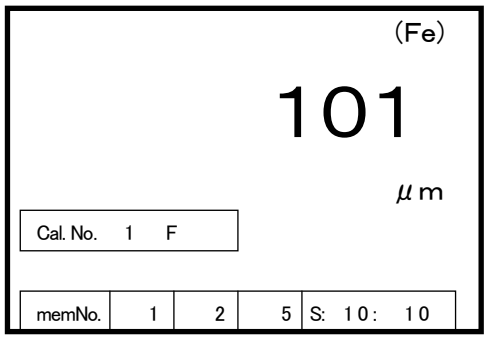


Transferring is completed, returning to the beginning.

(2) Transferring Group number data

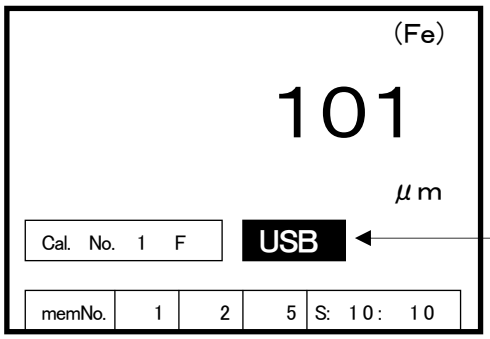
- Prepare for a PC side.
- Connect a USB cable to a PC.

※ For operation example, data stored in Group No.「3」is transferred as follows.



Press [COM. ENABLE] key.
The buzzer beeps.

⇩

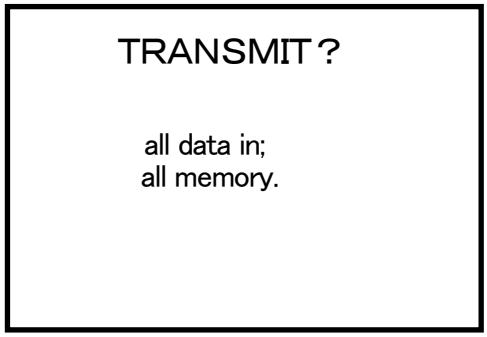


USB is displayed.

> **Caution**
>
> Pressing [COM. ENABLE] key without connecting a USB cable, a warning「USB cable un-connected」is indicated. Press again [COM. ENABLE] key to delete the letters and connect the USB cable.

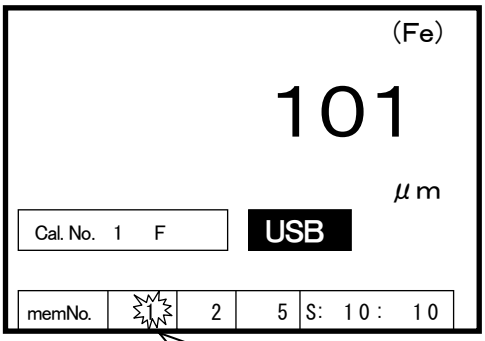
Press [MEM. SEL.] key.
The buzzer beeps, beeps 2 times.

⇩



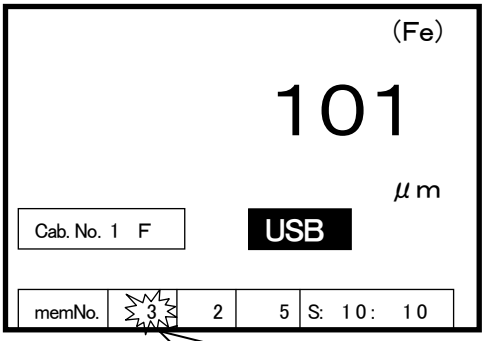
Press [MEM. SEL.] key.
The buzzer beeps.

⇩



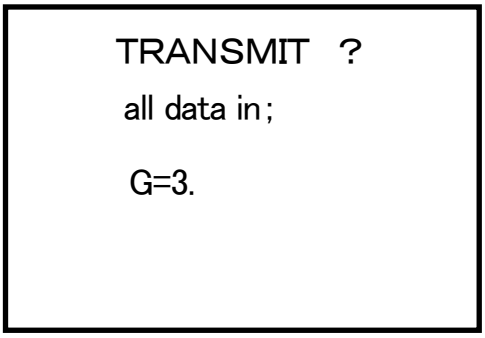
Group No. flashes.

Press ▲ or ▼ key to adjust to Group No.
to transfer data.

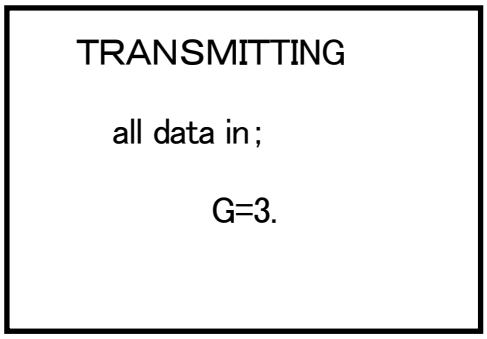


Adjust to Group No.「3」.

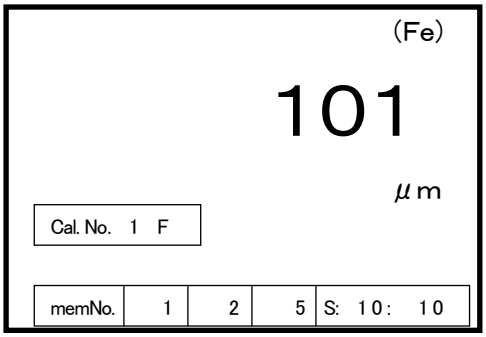
Press TRANSMIT key while Group No. is flashing.
The buzzer beeps, beeps 2 times.



Press TRANSMIT key.
The buzzer beeps.



The buzzer beeps.

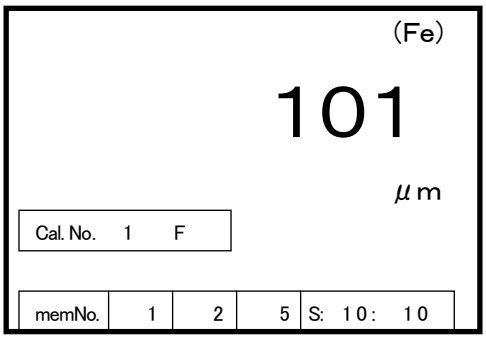


Transferring is completed, returning to the beginning.

(3) Transferring Block number data

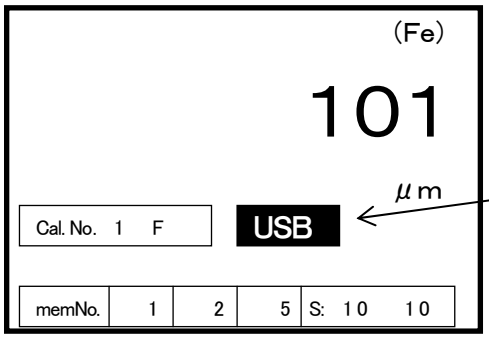
- Prepare for a PC side.
- Connect a USB cable to a PC.

※ For operation example, data stored in Block No.「7」, Group No.「4」 is transferred as follows.



Press [COM. ENABLE] key.
The buzzer beeps.

⇩

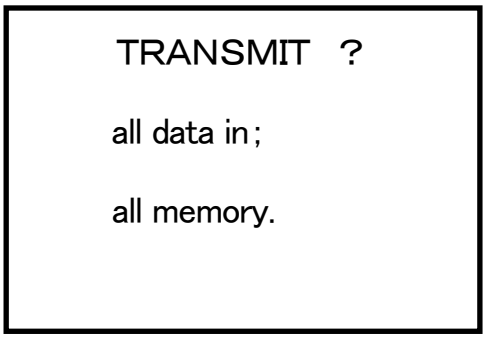


USB is displayed.

> **Caution**
>
> Pressing [COM. ENABLE] key without connecting a USB cable, a warning「USB cable un-connected」is indicated. Press again [COM. ENABLE] key to delete the letters and connect the USB cable.

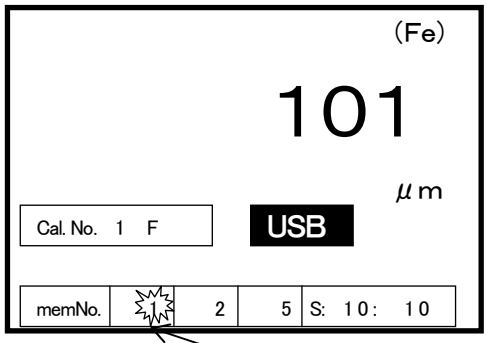
Press [MEM. SEL.] key.
The buzzer beeps, beeps 2 times.

⇩

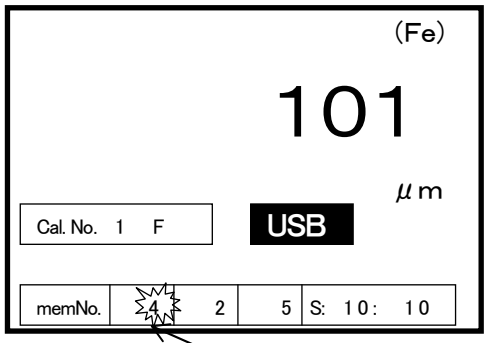


Press [MEM. SEL.] key.
The buzzer beeps.

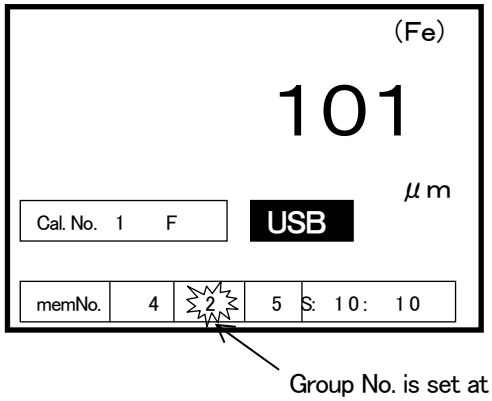
⇩



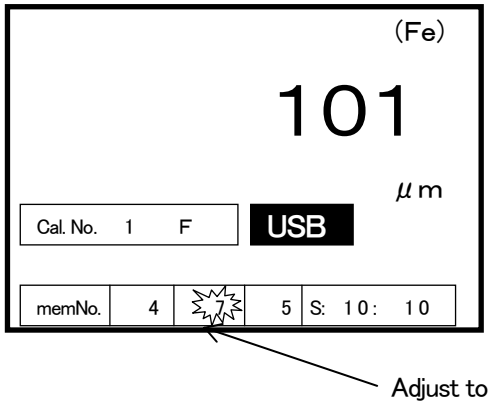
Press ▲ or ▼ key to adjust
to the Group No. where there is Block to transfer data.



Press MEM. SEL. key.
The buzzer beeps.

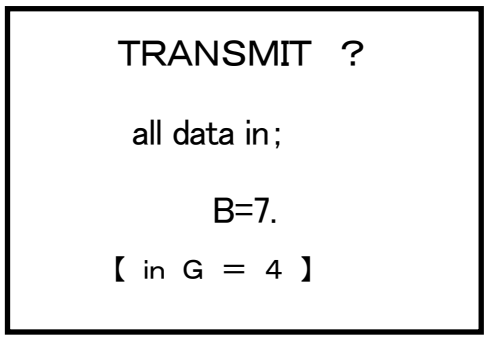


Press ▲ or ▼ key to adjust
to Block No. to transfer data.



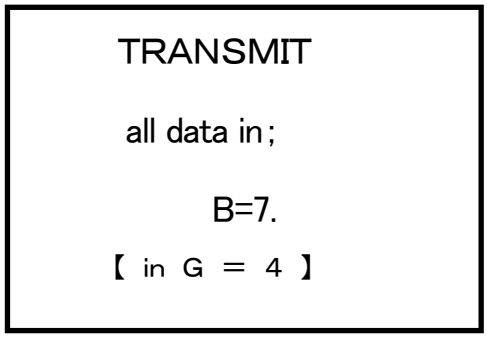
Press [TRANSMIT] key while Block No. is flashing.
The buzzer beeps, beeps 2 times.

⇩

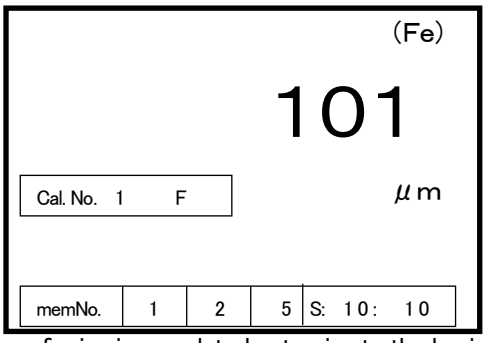


Press [TRANSMIT] key.
The buzzer beeps.

⇩



⇩

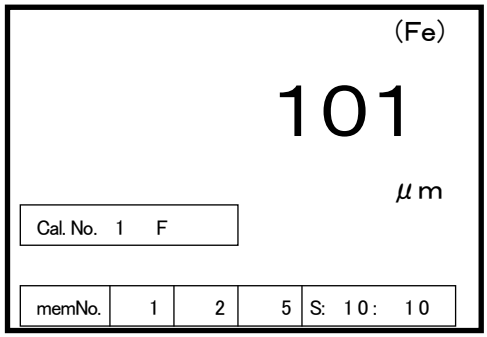


Transferring is completed, returning to the beginning.

(4) Transferring Section number data

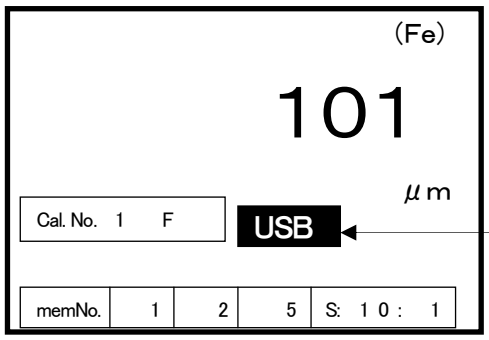
- Prepare for a PC side.
- Connect a USB cable to a PC.

※ For operation example, data stored in Section No.「1」, Block No.「8」, Group No.「5」 is transferred as follows.



Press [COM. ENABLE] key.
The buzzer beeps.

⇩



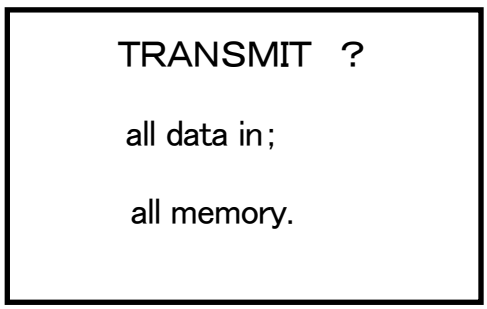
USB is displayed.

Caution

Pressing [COM. ENABLE] key without connecting a USB cable, a warning「USB cable un-connected」is indicated. Press again [COM. ENABLE] key to delete the letters and connect the USB cable.

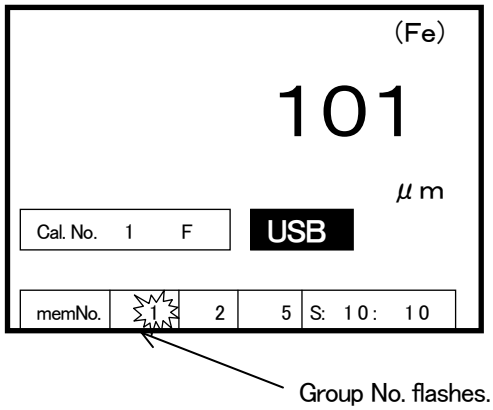
Press [MEM. SEL.] key.
The buzzer beeps, beeps 2 times.

⇩

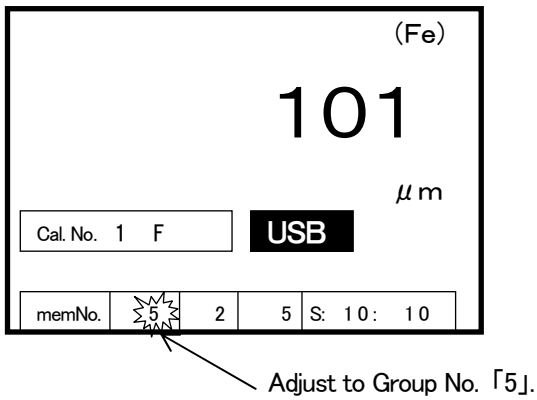


Press [MEM. SEL.] key.
The buzzer beeps.

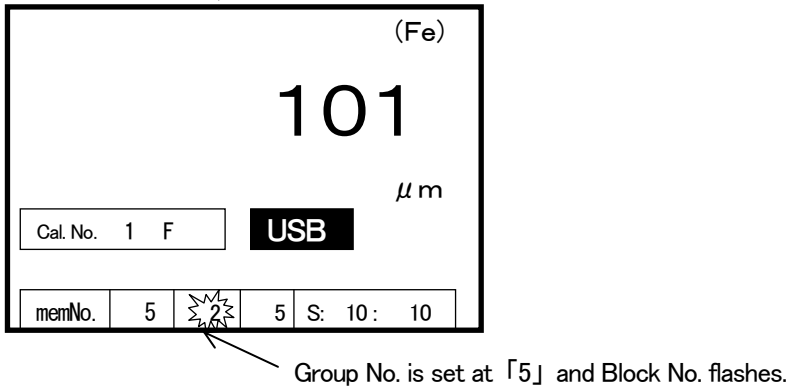
⇩



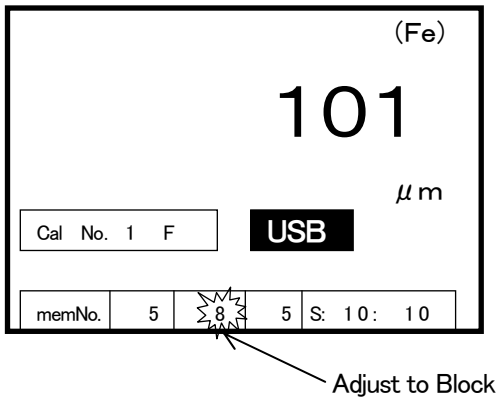
Press ▲ or ▼ key to adjust to Group No.
where there is Section to transfer data.



Press MEM. SEL. key.
The buzzer beeps.



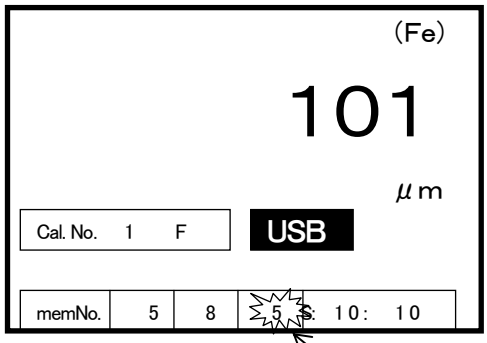
Press ▲ or ▼ key to adjust to Block No.
where there is Section to transfer data.



Adjust to Block No. 「8」.

Press [MEM. SEL.] key.
The buzzer beeps.

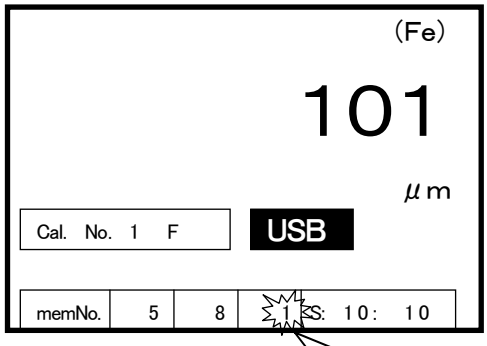
⇩



Block No. is set at 「8」 and Section No. flashes.

Press [▲] or [▼] key to adjust to Section No.
to transfer data.

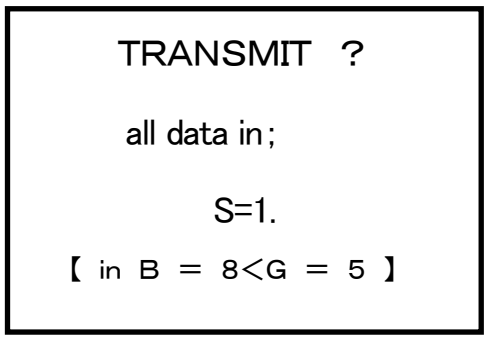
⇩



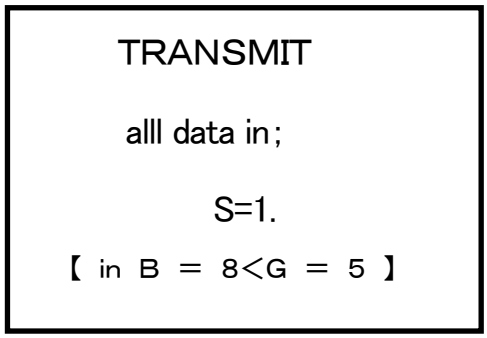
Adjust to Section No. 「1」.

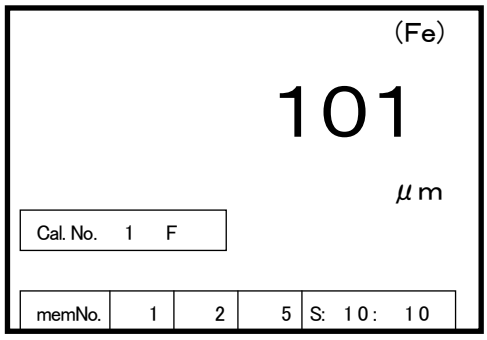
Press [TRANSMIT] key while Section No. is flashing.
The buzzer beeps, beeps 2 times.

⇩



Press [TRANSMIT] key.
The buzzer beeps.





Transferring is completed, returning to the beginning.

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 14)

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

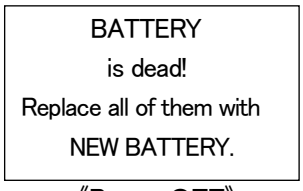
Operating temperature range is 0～40 ℃. Especially, large temperature differences between a main unit and aprobe cause measuring errors.

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.
 《Power OFF》	Out of batteries.	Replace them with new ones.
 《Power OFF》	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
TROUBLE ! The probe may have trouble. 《Power OFF》	Something wrong with probe.	Contact us for repair.
TROUBLE ! The probe and the main unit may have trouble. Repairing needed. 《Power OFF》	Something wrong with probe / main unit.	Contact us for repair.
Data can not be stored in memory.	All spaces are occupied.	Delete unnecessary data to make vacancies.
	A Measurement mode is set at 「Non Interrupt mode」.	Press 「TRANSMIT」 key and release the key to store data.
USB cable Un-connected.	USB cable is not connected.	Connect a USB cable correctly.
Unable to transfer data with USB cable.	① Connections of USB cable. ② Receiver side with PC.	① Ensure connections. ② (1)install attached CD Driver correctly. (2)set Comport No. correctly.
Sudden interruption of transfer with USB cable.	① PC side ② Unless PC faulty, → Something wrong with main unit.	① Check PC ② Contact us for repair.

Specifications

Items	Applications
Model	Probe built-in dual type coating thickness meter SAMAC-Pro
Measuring method	Dual electromagnetic induction/eddy current type (auto-selection for Fe or NFe)
Dispay 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 thickness standard calibration
Resolutions	1μm unit：0～999μm 0.01mm unit: 1.00～2.50mm (Fe) 0.01mm unit: 1.00～2.00mm (NFe) by switching 0.1μm unit：0～400μm 0.5μm unit： 400μm～500μm
Accuracies (to flat, smooth face)	0～100μm: ±1μm or ±2% of reading 101m～2.5mm: ±2% (Fe) 101μm～2.0mm: ±2% (NFe)
Probe (built-in)	One point constant pressure contact type with V cross-cut groove Measuring part φ28mm (probe partφ10mm)
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 ⑥ Setting/storing of calibration curves: Max. 10 pcs ⑦ High/Low limit setting, alarm (setting by each calibration) ⑧ Whole/selective deletions of calibration values ⑨ Measuring data memory： 20,000 data ⑩ Statistics process, indications ⑪ Data output to exclusive data sheet on PC (USB terminals) ⑫ Screen swiching function (Main/Sub)

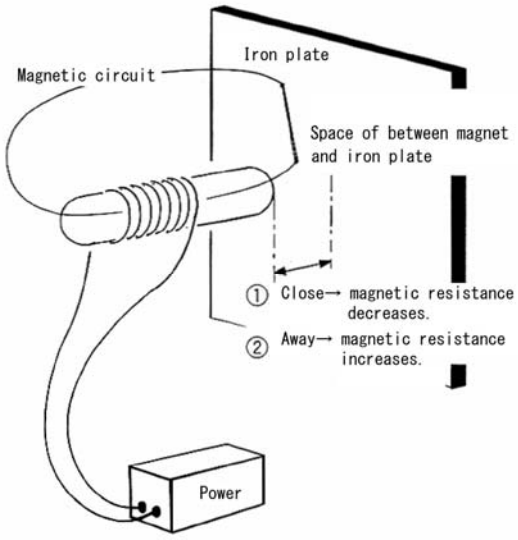
Items	Applications
Keys	ON/OFF , ZERO , ▲☼ , ▼ , CAL/DELETE , CAL No. , H/L , STATISTICS , MEM. SEL. , COM. ENABLE , TRANSMIT , MEM. CLEAR , DATA ERASE , CANCEL
Power source	3V DC Dry Battery(LR03×2), Continuous operation hours: 25 hours
Operating temperature	0～40℃ (Non-condensing)
Accessories	Thickness standards, Zero plates for testing (Fe/NFe), Carrying case for Thiclnesss standards, Carrying case for main unit, Dry batteries, Hand strap cord, USB cable, USB driver (CD)
Dimensions	63 (W) x 84 (H) x 30 (D) mm
Weight	About 125g (including dry batteries)

April, 2015

Reference (Principle of measurements)

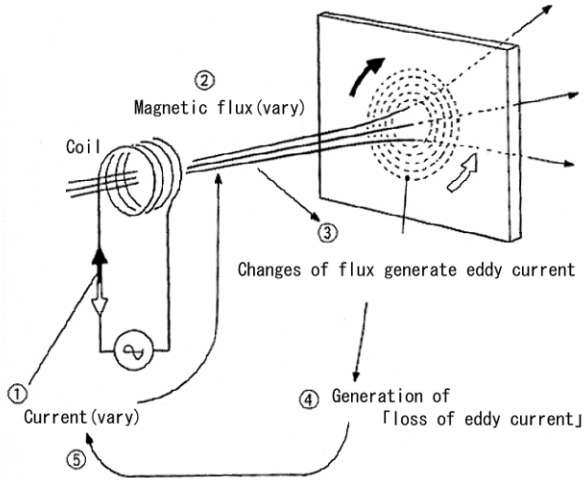
● Electro-Magnetic Induction type (Electromagnetic Type)

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

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

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