



ELECTROMAGNETIC TYPE
DIGITAL COATING THICKNESS METER

S M - 1 1 0 0

I N S T R U C T I O N M A N U A L

CAUTIONS:

Before using the Meter, read this INSTRUCTION MANUAL thoroughly and use the Meter correctly.

Keep this INSTRUCTION MANUAL carefully and refer to this, when necessary.

In the event of any doubt arising, the original INSTRUCTION MANUAL in Japanese is to be final authority.

Sensitivity of the probe of this Meter has been adjusted so as to deal with the measurement of a thicker film thickness.

When the probe is left on a metal e.g. steel desk etc. the Meter may indicate a certain value or 「HHH」 occasionally.

CONTENTS

ITEM	PAGE
1 . PRINCIPLE -----	2
2 . APPLICATIONS -----	2
3 . SPECIFICATIONS -----	3
4 . PARTS IDENTIFICATION -----	4
5 . PREPARATION -----	5
5-1 . Preparation of the zero plate -----	5
5-2 . Connecting (Disconnecting) the probe -----	5
6 . OPERATING INSTRUCTIONS -----	6
6-1 . Power ON -----	6
6-2 . Power OFF -----	6
6-3 . Zero adjustment -----	7
6-4 . Standard calibration(CAL) -----	8
6-5 . Resetting the working curve -----	10
6-6 . Measurement -----	11
7 . ADDITIONAL FUNCTIONS -----	12
7-1 . Converting the key lock mode -----	12
7-2 . Setting the upper and lower limit values -----	13
7-3 . Releasing the upper and lower limit values -----	14
7-4 . Statistical function -----	15
7-4-1 . Starting of the statistical function and alteration of the indicating data -----	15
7-4-2 . Statistical measurement mode -----	15
7-4-3 . Indication of the measured numbers -----	16
7-4-4 . Indication of the mean value -----	16
7-4-5 . Indication of the maximum value -----	16
7-4-6 . Indication of the minimum value -----	17
7-4-7 . Indication of the standard deviation value -----	17
8 . INDICATING /RELEASING THE MEMORIZED DATA ON THE LCD ---	18
8-1 . Indicating the data on the LCD -----	18
8-2 . Releasing the indication of the data to the LCD -----	19
8-3 . Erasing the data while indicating on the LCD -----	19
9 . ERASING THE MEMORIZED DATA -----	20
9-1 .Erasing all the data -----	20
9-2 .Erasing the last data -----	21
1 0 . REPLACING THE BATTERY -----	22
1 1 . MAINTENANCE AND INSPECTION -----	22
1 2 . CARES TO RAISE AN ACCURACY OF THE MEASUREMENT -----	23



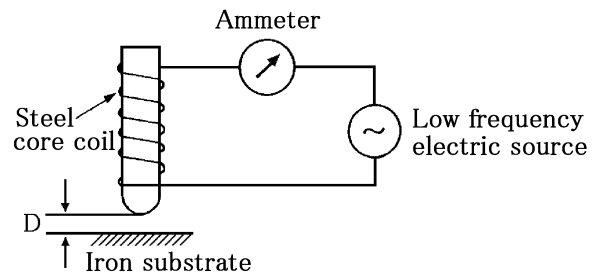
Before using the Meter, read this INSTRUCTION MANUAL thoroughly and use the Meter correctly.

Keep this INSTRUCTION MANUAL carefully and refer to this, when necessary.

1 . PRINCIPLE

When an iron is moved toward or away from a steel core coil, self-inductance of the coil changes in accordance with a slight changes of its distance.

This principle is utilized to measure the thickness (D) of non-magnetic surface treated coating on iron substrate.



2 . APPLICATIONS

The Meter is used for non-destructive measurement of the thickness of a non-conductive film such as coating, lining, etc. applied to iron substrate including steel and ferritic stainless steel (SUS 430 etc).

The Meter can be applicable for various domestic and foreign standards and rules.

Paints ----- Machines, Appliances, Automobiles, Steel furniture, Bridges,
Ships, Cast iron tubes, Steel structures, etc.

Linings ----- Resin, Tar epoxy, Rubber, Enamel, etc.

Platings ----- Nonmagnetic platings such as Chrome, Zinc, Copper, Tin, Electroless nickel
excluding Electrolysis nickel plating

Metallikon, Phosphoric acid film, Oxidation acid film, Spray deposit, etc.

Resin film, Nonmagnetic metal foil

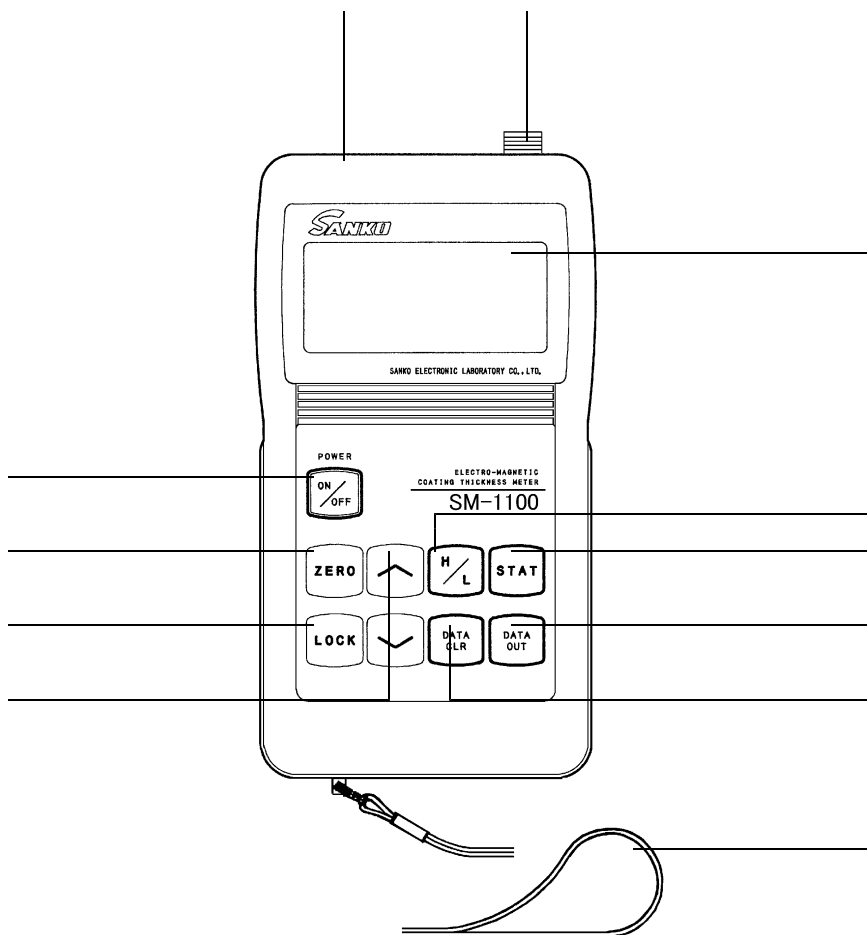
(Thickness is measured on the basis of a steel plate placed underneath of the film or foil.)

3 . SPECIFICATIONS

- Name and type Electromagnetic type digital coating thickness meter SM-1100
- Measuring method Electromagnetic induction type
- Measuring range 0 to 8.00 mm
1.00 to 8.00 (mm unit)
0 to 999 (μm unit)
- Accuracy $\pm 0.01\text{mm}$ on uniform surface or $\pm 3\%$ of reading
- Indication Digital display on large size Liquid Crystal Display (LCD)
With hold function
- Resolution 0.01 mm (1.00 to 8.00 mm)
1 μm (0 to 999 μm)
- Probe One point contact constant pressure type with V-groove
18 \times 55 mm
- Additional functions
 - 1) Conversion of the key lock mode
 - 2) Setting of the upper/lower limit values
 - 3) Memory of 1800 measurement values
 - 4) Statistical calculating functions such as measurement numbers, mean value, maximum value, minimum value, standard deviation value
 - 5) Auto power off (after about 5 minutes)
- Power source Dry batteries R03 (1.5V) \times 4 pcs.
With auto power off function
- Operating temp. 0 to 40 (except dew condensing condition)
- Dimensions 80(W) \times 35(H) \times 150(D) mm
- Weight approx. 330g (including batteries)
- Accessories Standard thickness plate, Zero plate for checking the Meter, Dry battery, Carrying bag

Specifications and appearance are subject to modify for improvement without prior notice.

4 . PARTS IDENTIFICATION



POWER key	Key for power ON/OFF
ZERO key	Key for zero adjustment
LOCK key	Key for locking all keys except ON/OFF key
• key	Key for standard calibration with the standard thickness plate and setting the upper/lower limit values
H/L key	Key for setting the upper/lower limit values
STAT key	Key for converting the normal measurement mode and statistical measurement mode
	Also, for converting the indicating kinds of statistical data in the statistical measurement mode
DATA OUT key	Key for outputting the stored data to the connected printer in the statistical measurement mode
DATA CLR key	Key for erasing all or part of the stored data in the statistical measurement mode
Printer connector	Connector for connecting the printer
Probe connector	Connector for connecting the probe
LCD display	Indicating part of the measured values
Hand strap	



Be sure to pass the hand strap around the wrist to prevent the Meter from dropping.

5 . PREPARATION

5-1 . Preparation of the zero plate



Prepare the substrate which is the same kind, thickness and shape with an object to be measured.

The attached zero plate for checking the Meter, SUS 430 Ferrite stainless steel, is used for the operation check of the Meter.

Prepare the substrate of an actual object to be measured.

- Same kind ----- The same kind of material as the substrate of an object to be measured
- Same thickness ----- Nearly the same thickness as the substrate of an object to be measured
- Same shape ----- The same shape in pipe diameter, curvature, geometrical shape, etc. as the substrate of an object to be measured
- Size ----- Substrate with an enough area on which the probe can be easily operated
- Surface condition --- Untreated (unoxidized etc.) substrate having smooth surface Remove rust, dirt or dust, if any.

5-2 . Connecting(Disconnecting) the probe

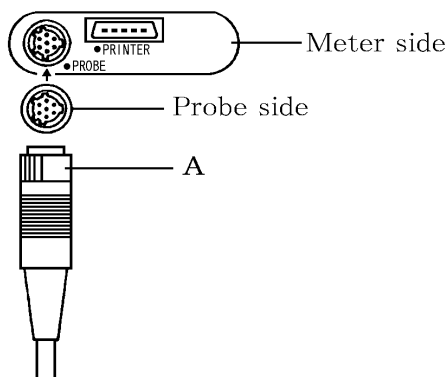
Carry out the connection (disconnection) of the probe by the following procedures.



• Be sure to keep the Power OFF.

• The probe cannot be substituted with other probe.

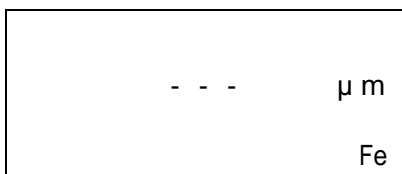
Use the probe which is the same number with the Meter number.



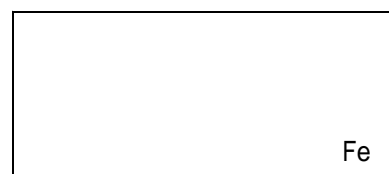
<p>⊙ Connecting method</p> <p>Insert the probe into the probe connector keeping the wide cut right ward and tighten it by turning A clockwise.</p>
<p>⊙ Disconnecting method</p> <p>Release by turning A counter-clockwise and calmly pull the probe out of the connector.</p>
<p> Don't pull the cord as it causes breaking of cord.</p>

When the probe is not connected to the Meter or any system is out of order even if the probe is connected, the indication changes as follows after turning ON the power key.

If the probe is disconnected in power ON condition, 「PE」 is indicated on the display and power is automatically cut off. (「PE」 is abbreviation of Probe Error.)



The buzzer emits a beeping sound.



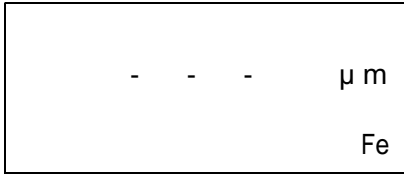
Power is automatically cut off.

6 . OPERATING INSTRUCTIONS

6-1. Power ON

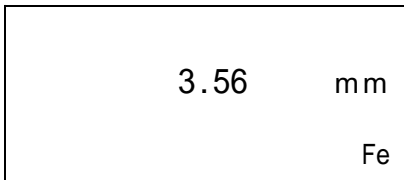
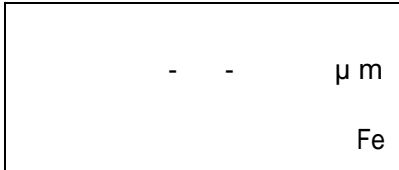
Press the 「 ON/OFF 」 key after connecting the probe.

[Indication on the LCD changes as follows.]



Inside of the Meter is being initialized.

Keep the probe turn towards the air during this period.



The buzzer emits a beeping sound.

The Meter is ready for measurement.

- When power ON, the last measured value of the previous measurement is indicated.
- When the first power ON or all data are erased in the statistical mode, [-] is indicated.

6-2. Power OFF

Press the 「 ON/OFF 」 key .

[Indication on the LCD changes as follows]



The buzzer emits a beeping sound.



The buzzer emits a beeping sound.

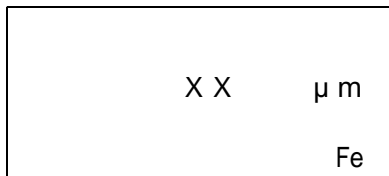
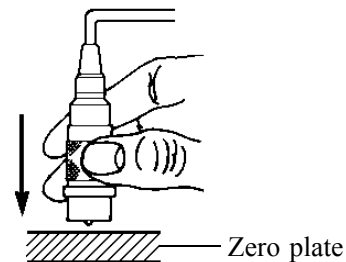
Power is automatically cut off.

6-3 . Zero adjustment

! Carry out the adjustment in surely normal measurement mode.
 (Unit [μ m] and [mm] are indicated non blinking.)

Press the probe against the substrate for adjustment (zero plate).
 [Indication on the LCD changes as follows.]

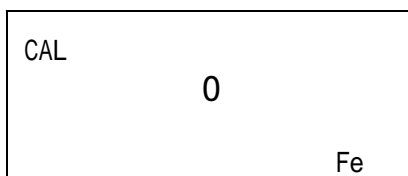
The buzzer emits a beeping sound.



Measured value [XX] is indicated on the LCD .

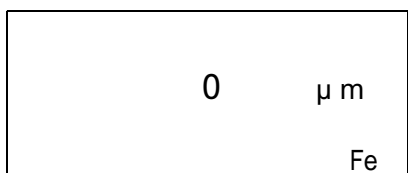
Press the 「ZERO」 key .
 (Both the probe contact to zero plate or not is possible.)

The buzzer emits a beeping sound.



[CAL] is indicated on the upper left of the LCD .
 [0] is indicated.

The buzzer emits a beeping sound.



Press the probe against the zero plate several times, when closed values to [0] are indicated on the LCD , the adjustment is acceptable.

When the indications are away from [0], repeat above procedures several times.

※When 「LLL」 is indicated while zero adjusting, its adjusting point is widely deviated from a right position.

Repeat the zero adjustment 2 to 4 times after confirming no coating is applied to the substrate and confirm zero is stably indicated.

【NOTICE】

Normal measurement mode : Units [μ m] and [mm] are indicated non blinking on the right hand of the LCD .

Statistical measurement mode : Units [μ m] and [mm] are indicated blinking on the right hand of the LCD .

Carry out the adjustment in surely normal measurement mode.

When the zero adjustment is carried out in the statistical measurement mode, [0] data while adjusting is stored in the memory.

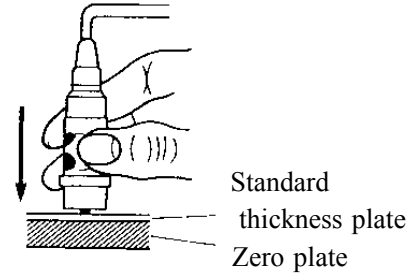
Stored 1 data is automatically erased by pressing [ZERO] key .

6-4 . Standard calibration (CAL)

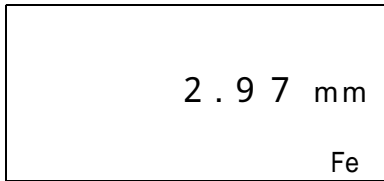


Carry out the calibration in surely normal measurement mode.
 (Unit [μ m] and [mm] are indicated non blinking.)

Place the standard thickness plate on the zero plate,
 and press the probe against it.
 Select a little thicker standard thickness plate than
 a film thickness to be measured.
 [Indications on the LCD change as follows.]



The buzzer emits a beeping sound.

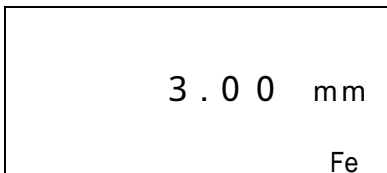


(Example : Standard thickness plate of 3.00 mm th.)

Match the indicated value on the LCD to the thickness of the standard thickness plate
 by pressing the 「 Δ 」 · 「 Δ 」 key .
 (This operation is possible for both the probe is contacting to the standard thickness plate or not.)



When the 「 Δ 」 · 「 Δ 」 key is pressed, [CAL]
 is indicated on the upper left of the LCD with a
 beeping sound of the buzzer and indication
 [Y Y Y] of left figure changes.
 The Indicated values traverse quickly by keeping on
 the 「 Δ 」 · 「 Δ 」 key pressing.



When the indication match to the thickness of the
 standard thickness plate, stop the operation of
 the 「 Δ 」 · 「 Δ 」 key .

The Meter is ready for measurement.

Press the probe against the standard thickness plate placed on the zero plate several times.
 When the indication on the LCD is the same thickness or near with the standard thickness plate,
 the calibration is acceptable.
 When the indication deviates from the thickness of the standard thickness plate, repeat above
 procedures several times.

【 NOTICE 】

Wait for 10 to 15 minutes after power ON for the adjustment or calibration to raise the accuracy.

Power is cut off in about 5 minutes by the working of the auto power OFF function.

In this case, turn ON the power key again and fully warm up the Meter.

Carry out the 「 zero adjustment 」 and the 「 standard calibration 」 to confirm the accuracy, even if on the way of the measurement.

Applicable range of the standard calibration(CAL) is 10 μm to 8.00 mm.

When it is out of the applicable range, [LLL] or [HHH] is indicated.

When the indication is in locked condition, operate the Meter according to the next item

「 6-5. Resetting the working curve 」.

When the new values are set for both zero adjustment and standard calibration , the last characteristic of substrate (working curve) is erased and new set value (working curve) is memorized.

If the calibration is carried out with the standard thickness plate in the statistical measurement mode, the data of the standard thickness plate while calibrating are stored in the memory.

The stored 1 data is automatically erased by pressing the 「 」 or 「 」 key .

But, when the 「 」 or 「 」 key is not pressed, the measured data is stored in the memory.

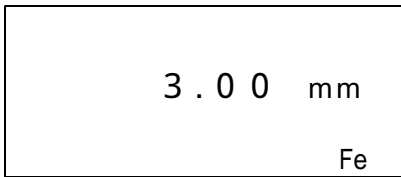
Carry out the calibration in surely normal measurement mode.

Pay attention to avoid mis-operation by using the lock key as shown in item

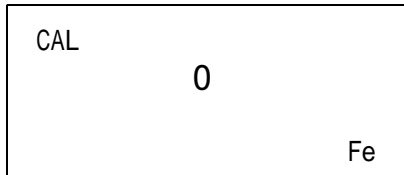
「 7-2. Converting the key lock mode 」 after completing the adjustment or calibration.

6-5 . Resetting the working curve

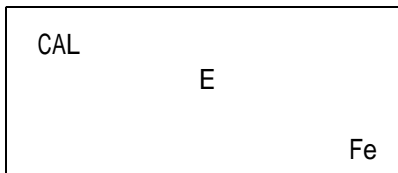
When the batteries were replaced, indication was locked or measurement, zero adjustment, standard calibration (CAL) became impossible for operation, reset the Meter by following method.



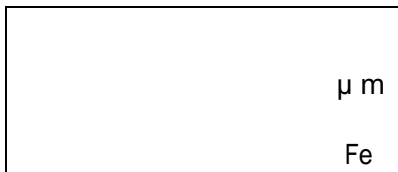
The Meter is in power ON condition.



Press the 「ZERO」 key continuously 5 times while keeping on the 「ZERO」 key pressing.
[CAL] is indicated on the upper left of the LCD , and [0] is indicated blinking. The buzzer emits a beeping sound for every press of the 「ZERO」 key .



The buzzer emits beeping sounds.
[-E-] is indicated for 3 seconds.



The Meter is restored to the possible condition for the measurement.
Carry out the zero adjustment and standard calibration again, if necessary.

【 NOTICE 】



The operation for resetting can not be carried out under the following condition.
Be sure to complete the operation for indicating the statistical values.

- While indicating the statistical values
- While setting the upper and lower limit values

6-6 . Measurement

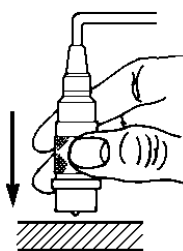


Be sure to pass the hand strap around the wrist to prevent the Meter from dropping.

When the above mentioned zero adjustment and standard calibration are completed, the Meter is ready for the measurement.

2 kinds of the measurement method are applicable.

- Normal measurement mode ----- Indication only, no memory
 - Statistical measurement mode ----- Indication and memory together
- (Refer to item No.7-4-1 and No.7-4-2)



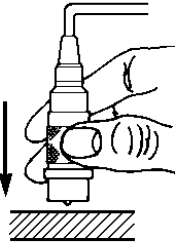
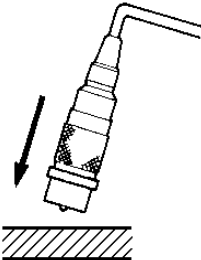
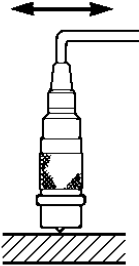
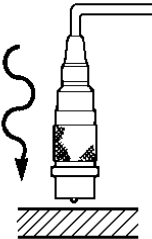
Hold the mid-part of the probe as shown in left figure and press it against the surface of an object to be measured vertically, quickly and calmly. The Meter emits a beeping sound and the measured value is indicated on the LCD .

If no sound is emitted, press again after removing the probe about 20 to 30 cm from the surface.

Make use of the key lock mode function to prevent the mis-operation while measuring.

When the measurement is not carried out for more than about 5 minutes after power ON, the power will be cut off by the working of the auto power OFF function.

The last measuring condition is restored by the working of the resuming function at the succeeding power ON.

Correct usage	Incorrect usage		
 <p>Hold the mid-part of the probe and press it down vertically and calmly against the surface of an object to be measured. The measured value is indicated with a beeping sound. If no sound is emitted, measure again after removing the probe about 20 to 30cm from the surface.</p>	 <p>Don't tilt the probe against an object to be measured. The accurate measured value can not be obtained.</p>	 <p>Don't slide the probe side ways while pressing. Both the probe and an object to be measured will be damaged.</p>	 <p>Don't press the probe against an object to be measured too slowly. Measurement error will cause to be enlarged.</p>

When the probe is left on a magnetic metal such as a steel desk etc. after measurement a certain value or [HHH] will be indicated occasionally.

It comes from the characteristics that the probe try to read the film thickness applied to a magnetic metal.

Not to make the Meter indicate above value, leave the probe keeping above 50mm or more away from a magnetic metal. (Example: Leave the probe on a magnetic subject such as a wood 50mm or more in thickness.)

Moreover, even if a certain value or [HHH] is indicated, the Meter can be used normally by proceeding the measurement again.

7 . ADDITIONAL FUNCTIONS

7-1. Converting the key lock mode

Press the 「 LOCK 」 key in power ON condition.

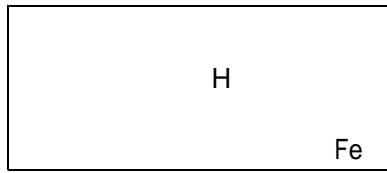
Then the buzzer emits 3 beeping sounds.

All keys except the 「 power 」 key can not be operated to prevent from mis-operation.

To release the key lock mode, power OFF once and power ON again.

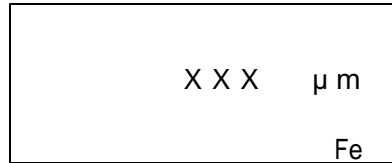
7-2 . Setting the upper and lower limit values

Press the 「 H/L 」 key in power ON condition



The buzzer emits a beeping sound.

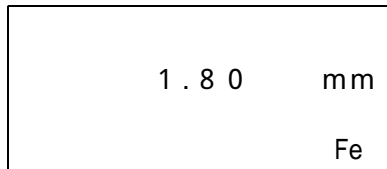
[H] is indicated blinking for about 3 seconds.



Indication changes after about 3 seconds.

- 1) When the upper limit value has not been previously set ;
[- - -] is indicated blinking in place of [XXX].
- 2) When the upper limit value has been set ;
Previously set value is indicated blinking in place of [XXX].

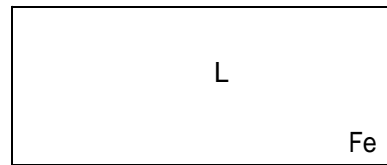
In case the upper limit value is set.



Match the indication of the LCD to the upper limit value by pressing the 「 」 key .
• 「 」 key .
(Ex.Upper limit value is 1.80mm)
[1.80mm] is indicated blinking.

In case the upper limit value is not set in case 1).
In case the upper limit value is not changed in case 2).

Press the 「 H/L 」 key .



The buzzer emits a beeping sound.

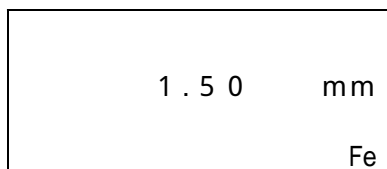
「 L 」 is indicated blinking for about 3 seconds.



Indication changes after about 3 seconds.

- 3) When the lower limit value has not been previously set ;
[- - -] is indicated blinking in place of [YYY].
- 4) When the lower limit value has been set ;
Previously set value is indicated blinking in place of [YYY].

In case the lower limit value is set.



Match the indication of the LCD to the lower limit value by pressing the 「 」 key .
• 「 」 key .
(Ex.Lower limit value is 1.50mm)
[1.50mm] is indicated blinking.

In case the lower limit value is not set in case 3).
In case the lower limit value is not changed in case 4).

Press the 「 H/L 」 key .

The Meter is restored to the possible condition for the measurement with a beeping sound.

7-3 . Releasing the upper and lower limit values

Press the 「 H/L 」 key in power ON condition.

The mode proceeds to the previous item mode 「 7-2 Setting the upper and lower limit values 」 .

Press the 「 DATA CLR 」 key .



The buzzer emits a beeping sound.

[EHL] is indicated blinking.

When erase the upper and lower limit values,
press the 「 DATA CLR 」 key again.



The buzzer emits a beeping sound.
Blinking of [EHL] stops and
the upper and lower limit values
are erased.

In case of cancelling
the erasing.



The Meter is restored to the
possible condition for the
measurement.

Press the 「 H/L 」 key



The buzzer emits a beeping sound.
Erasing the upper and lower limit values are cancelled.
(No set upper and lower limit values are erased.)
The Meter is restored to the possible condition for the
measurement.

【 NOTICE 】

In case of setting the upper and lower limit values, set the maximum setting value of the lower limit value so as to surely satisfy with the following conditions:

- Lower limit value in the range of 1 mm or less : [Upper limit value -1μm]
(Keep the difference between upper limit value and lower limit value **1μm or more**)
- Lower limit value in the range of 1mm or more : [Upper limit value-0.01mm]
(Keep the difference between upper limit value and lower limit value **0.01mm or more**)

7-4 . Statistical function

7-4-1 . Starting of the statistical function and alteration of the indicating data

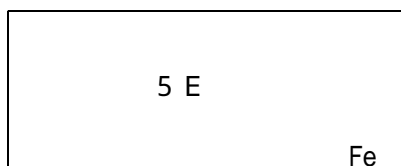
↓	【 Normal measurement mode 】	Press the 「 STAT 」 key . (1st time)
	【 Statistical measurement mode 】	Press the 「 STAT 」 key . (2nd time)
	【 Indication of measured numbers 5E 】	Press the 「 STAT 」 key . (3rd time)
	【 Indication of mean value E 】	Press the 「 STAT 」 key . (4th time)
	【 Indication of Max. value H 】	Press the 「 STAT 」 key . (5th time)
	【 Indication of Min. value L 】	Press the 「 STAT 」 key . (6th time)
	【 Indication of standard deviation value P 】	Press the 「 STAT 」 key .

When no statistical data have been stored or the data have been erased, [5E] is indicated blinking with a beeping sound, and the mode proceeds to the normal measurement mode.

7-4-2 . Statistical measurement mode

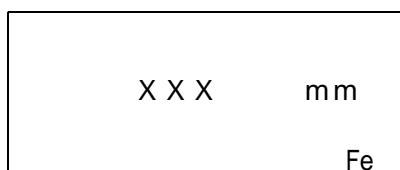
Measured data up to maximum 1800 points can be stored in memory in the measurement order, and Measured numbers, Mean value, Maximum value, Minimum value, Standard deviation value can be indicated in order on the LCD .

Press the 「 STAT 」 key . (1st time from the normal measurement mode)



The buzzer emits a beeping sound.

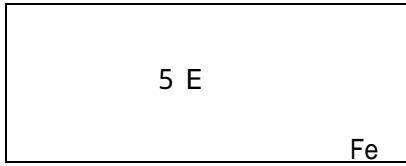
[5E] is indicated blinking for about 3 seconds.



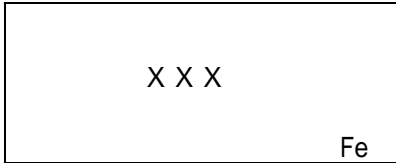
The Meter becomes the possible condition for the memory measurement in the statistical measurement mode, and every time of the measurement the data are stored in the memory. Indication of the unit [μm] or [mm] is blinking during the statistical measurement mode. [XXX] is the last measured data stored in the memory. When no data have been stored in the memory, [-] is indicated.

7-4-3 . Indication of the measured numbers

Press the 「STAT」 key . (2nd time from the normal measurement mode)



The buzzer emits a beeping sound.
[5E] and the measured numbers [XXX] are indicated alternately.
Indicating time of [5E] : about 0.5 seconds
Indicating time of [XXX] : about 2 seconds

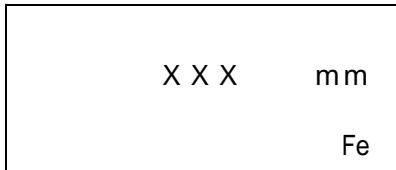


7-4-4 . Indication of the mean value

Press the 「STAT」 key . (3rd time from the normal measurement mode)

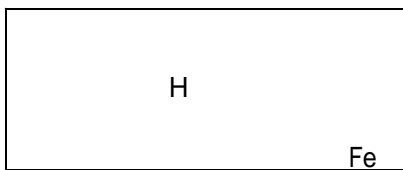


The buzzer emits a beeping sound.
[E] and the mean value [XXX] are indicated alternately.
Indicating time of [E] : about 0.5 seconds
Indicating time of [XXX] : about 2 seconds

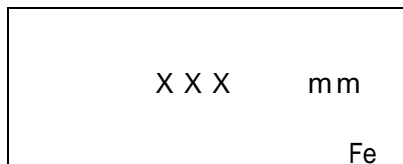


7-4-5 . Indication of the maximum value

Press the 「STAT」 key . (4th time from the normal measurement mode)

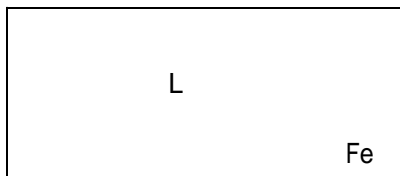


The buzzer emits a beeping sound.
[H] and the maximum value [XXX] are indicated alternately.
Indicating time of [H] : about 0.5 seconds
Indicating time of [XXX] : about 2 seconds



7-4-6 . Indication of the minimum value

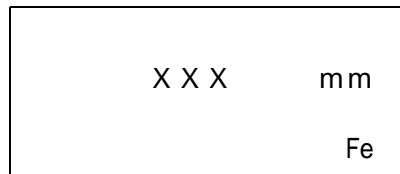
Press the 「STAT」 key . (5th time from the normal measurement mode)



The buzzer emits a beeping sound.
[L] and the minimum value [XXX] are indicated alternately.

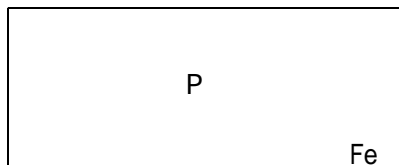
Indicating time of [L] : about 0.5 seconds

Indicating time of [XXX] : about 2 seconds



7-4-7 . Indication of the standard deviation value

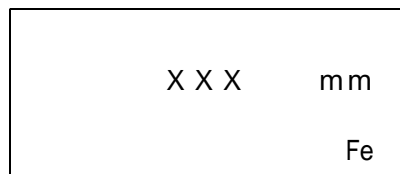
Press the 「STAT」 key . (6th time from the normal measurement mode)



The buzzer emits a beeping sound.
[P] and the standard deviation value [XXX] are indicated alternately.

Indicating time of [P] : about 0.5 seconds

Indicating time of [XXX] : about 2 seconds



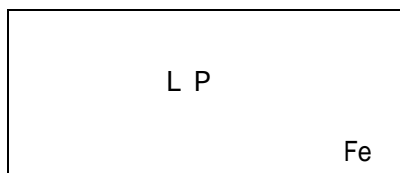
8 . INDICATING/RELEASING THE MEMORIZED DATA ON THE LCD

8-1 . Indicating the data on the LCD

As mentioned in the previous item 7-4-2, the measurement data stored in the memory in the statistical measurement mode can be indicated on the LCD .

Press the 「 DATA OUT 」 key in the statistical measurement mode.

In other mode, [EEO] is indicated blinking and returns to the last mode.

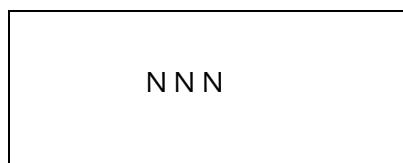


The buzzer emits a beeping sound.

[LP] is indicated blinking.

Find out the memory No. of needed data by pressing 「 」 · 「 」 key and stop the key operation at the indication No.

[Memory No. traverse quickly by keeping on 「 」 · 「 」 key pressing.]

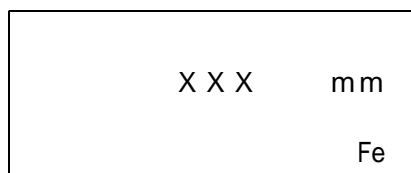


Notice:

When 「 」 key is pressed, the indication of the data move up like No.1,2,3 · · · .

When 「 」 key is pressed, the indication of the data move down from the last memory No.

When 「 」 · 「 」 key is pressed again after suspending the key operation, No. starts from the suspended memory No.



Memory No. [NNN] and data [XXX] are indicated alternately on the LCD .

Indicating time of memory No. [NNN] :
About 0.5 seconds

Indicating time of data [XXX] :
About 2 seconds

Moreover, when the upper and lower limit values have been set, the indication will be as follows:

In case of a normal value:

Indicating time of memory No. [NNN] :
About 0.5 seconds

Indicating time of data [XXX] :
About 2 seconds

In case in excess of a normal value :

Indicating time of Memory No. [NNN] :
About 0.5 seconds

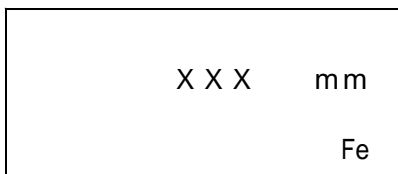
Indicating time of [HHH] or [LLL] :
About 0.5 seconds

Indicating time of data [XXX] :
About 2 seconds

8-2 . Releasing the indication of the data on the LCD

For releasing the indication of the memorized data on the LCD , press the 「 DATA OUT 」 key .
By this operation, the mode returns to the last statistical measurement mode just before this operation.

Press the 「 DATA OUT 」 key .



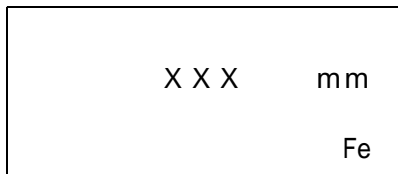
The buzzer emits a beeping sound.
Blinking indication of the memory No. [NNN] and data [XXX] close and the mode returns to the last statistical measurement mode.
Unit [mm] or [μm] is indicating blinking.

8-3 . Erasing the data while indicating on the LCD

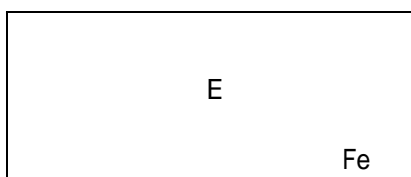
Data can be erased even while indicating the memorized data on the LCD .
(Refer to the later item 10-2 Erasing the last data, together.)



Memory No. [NNN] and data [XXX] are indicated alternately on the LCD .
When the upper and lower limit values have been set and exceed them, [HHH] or [LLL] is indicated also.



Press the 「 DATA CLR 」 key .



The buzzer emits beeping sounds, and [-E-] is indicated on the LCD for about 1 second.
Indicated memory No. and data including the signal of the upper and lower limit are erased.
Next data are passed on for the erased part and memory No. [NNN] and data [XXX] including signal of the upper and lower limit are indicated alternately on the LCD .

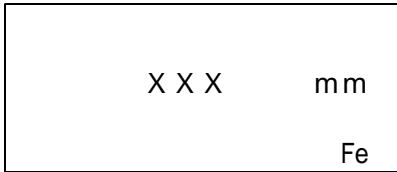
9 . ERASING THE MEMORIZED DATA

9-1 . Erasing all the data

Press the 「 DATA CLR 」 key keeping on the 「 STAT 」 key pressing in power ON condition.



The buzzer emits a beeping sound.
[EEE] and memorized last measured value [XXX] are indicated on the LCD alternately.



In the normal measurement mode and statistical measurement mode, the mode transfers to the erasing of all data mode by pressing the 「 DATA CLR 」 key keeping on the 「 STAT 」 key pressing.

Press the 「 DATA CLR 」 key .



The buzzer emits a beeping sound.

While executing the erase of the memorized data, [EEE] is indicated.



After erasing, the mode returns to the possible condition for the memory measurement in the initial condition of the statistical measurement mode.
「 μm 」 is indicated blinking.

In case of cancelling of the erasing all memorized data.

Press the 「 STAT 」 key .



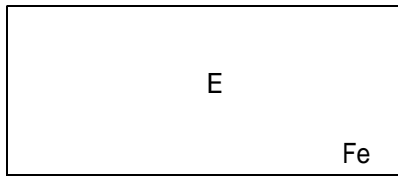
The buzzer emits a beeping sound.
Erasing of the data is cancelled, the memorized last measured value is indicated and the mode returns to the possible condition for the memory measurement.
Units [μm] or [mm] is indicated blinking.

【 NOTICE 】

When the erasing of all memorized data is executed in the normal measurement mode, mode returns to the original normal measurement mode and units [μm] or [mm] is indicated non blinking.

9-2 . Erasing the last data

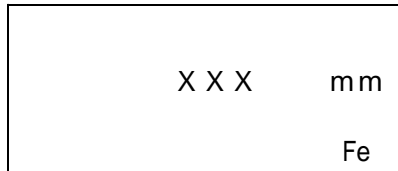
Press the 「 DATA CLR 」 key .



The buzzer emits a beeping sound.

[-E-] and the last measured value to be erased [XXX] are indicated on the LCD alternately.

The Meter does not operate in the normal measurement mode.



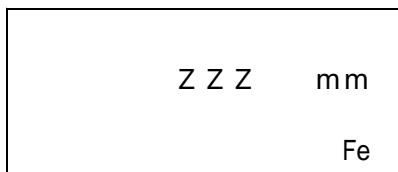
Press the 「 DATA CLR 」 key again.



The buzzer emits a beeping sound.

While executing the erasing memorized data, [-E-] is indicated for an instant.

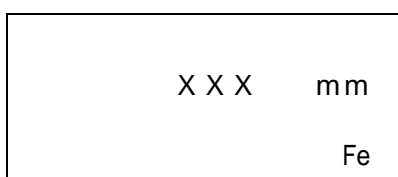
In case of cancelling of the erasing memorized data.



Data just before erased data is indicated and the mode returns to the possible condition for the memory measurement. Unit [μm] or [mm] is indicated blinking.

The data just before erased data can be erased one after another by each press of the 「 DATA CLR 」 key .

Press the 「 STAT 」 key .



The buzzer emits a beeping sound.

Erasing of the data is cancelled, the memorized last measured value is indicated and the mode returns to the possible condition for the measurement.

Unit [μm] or [mm] is indicated blinking.

【 NOTICE 】



The operation for erasing the last data can not be executed in the following conditions.

Be sure to execute the operation for erasing after operation for measuring.

- Just after power ON
- While indicating statistical values

1 0 . REPLACING THE BATTERY

When the battery closes to the limit of use due to consumption, 「 LOBAT 」 is indicated on the lower left of the LCD .

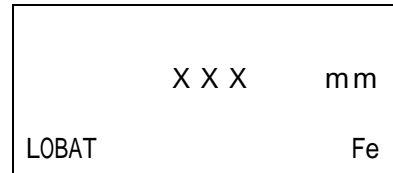
As it causes malfunction under this condition, replace the batteries earlier.

Replace the batteries after surely power OFF.

When the batteries are replaced under power ON, it causes out of order of the Meter.

Replace all 4 batteries with fresh specified dry batteries.

(Battery : Dry battery R03(1.5V) × 4 pcs)



(Indication of battery's voltage drop)

1 1 . MAINTENANCE AND INSPECTION

Use the Meter within the range of 0 to 40 .

Avoid to expose the Meter to dew condensation, wet with water, dust, intense heat, vibration, etc. in use.

Handle the probe cautiously not to damage on its tip.

Avoid to close a magnet etc. to the probe to prevent from magnetizing.

- Keep the Meter in a dust-free place where high temperature and high humidity can be avoided.

In case the Meter is left on no use for 1 month or more, take the batteries out of the Meter.

To ensure accurate measurement, regular inspection of the Meter at least once a year is recommended.

1 2 . CARES TO RAISE AN ACCURACY OF THE MEASUREMENT

Zero plate

For use in the zero adjustment and standard calibration(CAL), prepare the zero plate which is same kind, thickness and shape as the substrate of an object to be measured.

It will result in an inaccurate measurement to use the zero plate which is different specifications from an object to be measured.

Attached zero plate (For electromagnetic type, SUS 430 Ferritic stainless steel) for test is for operation test of the Meter. Prepare the substrate of an object to be actually measured.

Standard thickness plate

Carry out the standard calibration (CAL) with a little thicker standard thickness plate than a film thickness of an object to be measured.

It will cause an erroneous measurement to use a too thicker or too thinner standard thickness plate than a film thickness of an object to be measured.

When the standard thickness plate has been damaged or bent, renew with a new plate.

In case the standard thickness plates other than the attached plates are necessary, please contact us. (15 μm th. or more)

Characters of a film

The measurement of the film having a magnetic metal substance causes a measurement error.

When extremely a large quantity of carbon is included, it can not be measured occasionally.

With respect to an elastic film, place a standard thickness plate with about 0.5 mm on it and subtract the thickness of the standard thickness plate from the total thickness, then the measurement error due to film dent can be prevented.

Effect of edge and corner

The edges, corners and their surroundings of an object to be measured are the places where the condition of a magnetic flux is not uniform.

Generally, measure inside taking 60 mm or more away from the edges.

The same care is needed for a projection, bend, sharp deformed portion and surrounding.

Effect of surface roughness

The surface roughness of both substrate and film of an object to be measured affects the measurement results. Take several spots to measure and calculate the mean value.

Effect of rolling

In some cases, rolling strains exist in a substrate and it causes an incorrect measurement depending on the spots to be measured. Then take several spots to measure and calculate the mean value.

Effect of the temperature

The range of the operating temperature is within 0 to 40 .

Especially, when the temperature of the probe much differs from the Meter, it causes an erroneous measurement.

Effect of residual magnetism and stray magnetic field

Residual magnetism in a substrate produced by an electromagnet type conveyer or a strong magnetic field created by an arc welding may cause an incorrect measurement.

Show rooms:

You are welcomed to the show rooms located at the following places.

- Tokyo show room near the Otemachi station of the subway
- Osaka show room at Tenjinbashi-kitazume
- Nagoya show room near the Kurokawa station of the subway
- Fukuoka show room near the Gofukucho station of the subway

Products sold:

Sales of Coating thickness meter, Pinhole detector, Condensator, Viscosity cup, Moisture meter, Needle detector, Iron piece detector

Manufacturer:

Sanko Electronic Laboratory Co., Ltd.

Tokyo branch Shibata Bldg., 2-6-4, Uchikanda, Chiyoda-ku,
Tokyo 101-0047, Japan

Tel 81-3-3254-5031 Fax 81-3-3254-5038

Osaka branch Konishi Bldg., 2-3, Sugawara-cho
Kita-ku, Osaka 530-0046, Japan

Tel 81-6-6362-7805 Fax 81-6-6365-7381

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