SANKO

ELECTROMAGNETIC
COATING THICKNESS METER

Pro-1/2

INSTRUCTION MANUAL

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.

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CONTENTS

● **Before using the Meter, read this INSTRUCTION MANUAL thoroughly and use the Meter correctly.**
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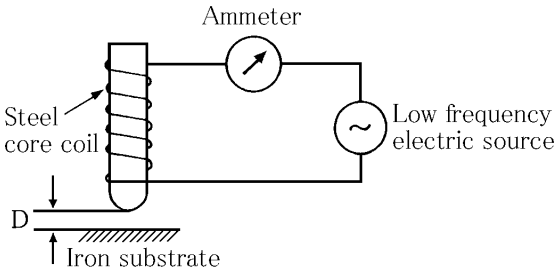
1. PRINCIPLE

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

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



2. FEATURES AND APPLICATIONS

■FEATURES

●Compact body

Light weight and compact body with the Meter vertically arranged.
Most suitable Meter for measurement on site due to fit perfectly in one hand.
The optional dial cover can be provided to protect hands etc. from touching to the dial by mistake after calibration.

●Easy-to-operate

Provide with the zero adjustment and standard calibration system by the dial type used to.
As the dials are arranged so as to be operated with a left hand while operating the probe with a right hand, the operation for the calibration became to so simple.

●Wide range

Measuring range is kept the wide range as in the past.
Available to the measurement from a thin film thickness (μm range) of plating etc. to a thick film thickness of lining (mm range) up to 5 mm.

●Interchange of the data

The probe as same specifications as past instruments is provided.
Enormous data until now can be used without in vain.

●CVD electrode

The electrode treated with ultra anti-abrasive CVD treatment is provided.
In the hard operation, the initial characteristics and high reproducibility are maintained for a long term.

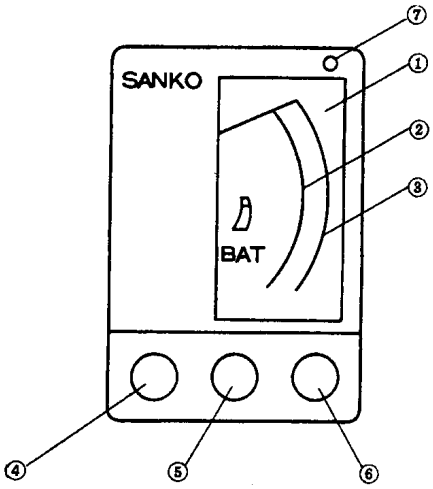
■APPLICATIONS

The Meter is used for non-destructive measurement of non-conductive films such as coatings, linings and non-magnetic metallic films like plaitings applied to iron substrate including steel and ferritic stainless steel (SUS 430 etc.)
2 points adjustment system conforming to the rules and standards etc. in the following various Organizations is adopted.
Standards, standing rules and rules in Domestic public corporations, Organizations, Government and municipal offices, Research institutes and foundations. Foreign standards and rules such as ASTM and ISO.

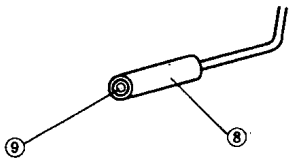
- Paintings --------- Parts, Machines, Steel furniture, Appliances, Automobiles, etc.
  Heavy anti-corrosive coatings applied to Machines, Bridges, Ships, Steel structures, etc.
- Linings ---------- Resin, Tar epoxy, Rubber, Enamel, etc.
- Plating ---------- Non-magnetic plating such as Chrome-, Zinc-, Copper-, Tin-, etc.
  (excluding Electrolysis nickel plating)
- Metallikon, Phosphoric acid films, Oxide films, Spray deposit films, etc.
- Resin films, Non-magnetic metal foils, etc.
  (Thickness is measured on the basis of a steel plate placed underneath of them.)

3. NAME OF PARTS AND GRADUATIONS

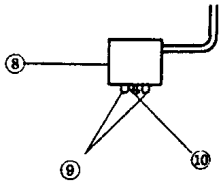
◎NAME OF PARTS



Probe Pro-1



Probe Pro-2



NAME OF PARTS	FUNCTIONS
① METER	The inside scale is for thick film and the outside scale is for thin film
② mm SCALE	0.2 to 5mm scale
③ μm SCALE	0 to 500μm scale
④ ZERO ADJUSTMENT DIAL	For zero point adjustment
⑤ STANDARD CALIBRATION DIAL	For standard calibration with the attached standard thickness plate (around 200μm or around 2mm)
⑥ SOURCE/RANGE CONVERSION SWITCH (BAT, OFF, μm, mm)	・「 OFF 」: Power source is cut off. ・「 mm 」・「 μm 」: Range of 「 mm 」 and 「 μm 」 is converted. ・「 BAT 」: For checking battery's voltage
⑦ PILOT LAMP	
⑧ PROBE	
⑨ CVD ELECTRODE	
⑩ SUPPORTING LEG	For supporting the probe stably (Pro-2 only)
OPTION : DIAL COVER	For protect the dial from touching by mistake after completion of calibration. Remove the cover when calibrate the Meter.

※ NOTE: THE PROBE IS NOT COMMON TO METERS, EACH METER HAS ITS OWN PROBE.

GRADUATIONS

TYPE Pro-1

TYPE Pro-2

4. PREPARATION

4-1 Preparation of the zero plate

▶Prepare the substrate (same kind, same thickness, same shape) of an object to be measured.

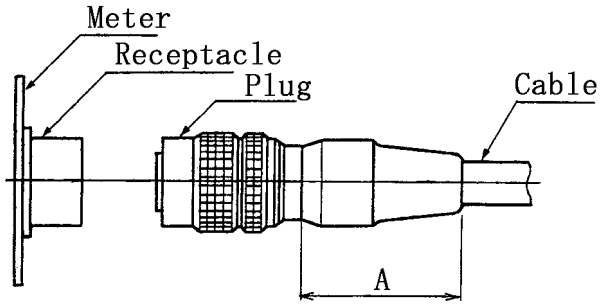
- Same kind ---------- The same kind of material as the substrate of an object to be measured.
- Same thickness -------- Nearly the same thickness as the substrate of an object to be measured. When the thickness is less than 1 mm, just the same thickness.
- Same shape ---------- The same shape in pipe diameter, curvature, geometrical shape, etc. as the substrate of an object to be measured.
- Size ---------- Enough area on which the probe can be easily operated.
- Surface condition ------- Untreated (non-plating, unoxidizing, etc.) and smooth surface. Remove rust, dirt or dust, if any.

4-2 Zero adjustment and Standard calibration

▶Connect the probe to the receptacle on side of the main body.

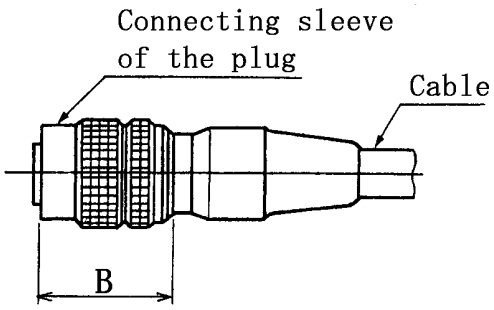
●Handling method of the connector

1. Connection



Insert the plug in the receptacle straight matching the guide of the plug and receptacle holding part A, then the probe can be connected smoothly.

2. Disconnection



Pull the plug out of the receptacle straight holding the connecting sleeve part B of the plug, then the probe can be disconnected easily.

Don't pull or bend the cord as it causes breaking of cord.

●Turn the power source switch to「mm」or「μm」keeping up with an expected coating thickness of an object to be measured.

①In case the μm range scale is used:

Turn the range conversion switch to μm, the pilot lamp goes on showing the supply of power. Proceed to the next adjustment/calibration after waiting for 2 to 3 seconds until the circuit become stable.

▶Zero (ZERO) adjustment

Press the probe lightly against the zero plate so as to make a close adhesion and turn the zero adjustment dial to make the Meter needle coincide with「 0 」of the μm scale.

▶Standard (STD) calibration

Place the attached 200μm standard thickness plate on the zero plate, press the probe against it and turn the standard calibration dial to make the Meter needle coincide with「 200 」of the μm scale.

Repeat the zero adjustment and standard calibration 2 to 3 times and finally complete with the standard calibration.

②In case the mm range scale is used:

Turn the range conversion switch to mm, the pilot lamp goes on showing the supply of power. Proceed to the next adjustment/calibration after waiting for 2 to 3 seconds until the circuit become stable.

▶Zero (ZERO) adjustment

Place the attached 200μm (0.2 mm) standard thickness plate on the zero plate, press the probe against it and turn the zero adjustment dial to make the Meter needle coincide with「 0.2 」of the mm scale.

▶Standard (STD) calibration

Place the attached 2 mm standard thickness plate on the same zero plate, press the probe against it and turn the standard calibration dial to make the Meter needle coincide with「 2 」of the mm scale.

Repeat the zero adjustment and standard calibration 2 to 3 times and finally complete with the standard calibration.

5. MEASUREMENT

- After completion of item 4-2 Zero adjustment and Standard calibration, the Meter becomes possible condition for measurement.
- Don't forcibly press the probe against the surface film of an object to be measured while measuring.
- Keep the same geometrical related position between the probe and the substrate while measuring as the condition in which the zero adjustment and standard calibration have been made.
- The Meter's needle points at the film thickness by only pressing the probe lightly against the film of an object to be measured.
- Be sure to cut off the power source switch after completion of the measurement.

6. REPLACING THE BATTERY

6-1 Checking battery's voltage

- In case the Meter's needle points at green zone or more when the power source switch is turned to 「BAT」, battery's voltage is in normal condition.
- When Meter's needle points at red zone or under, battery's voltage is not enough.
  Replace all 6 batteries with fresh specified dry batteries.
  (Battery : Dry battery R03 (1.5V) × 6 pcs.)
  ※ Attention to the limit of use.
  Don't use mixing the different aged and/or kinds of batteries together.

7. MAINTENANCE AND INSPECTION

- Avoid to expose the Meter to dew condensing, 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.

- After completing the measurement, confirm the power OFF and keep the Meter in a dust-free place where high temperature and high humidity can be avoided.

- In case the Meter is left on without using for 1 month or more, take the batteries out of the Meter.

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

8. CARES TO RAISE AN ACCURACY OF THE MEASUREMENT

(1) 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.

(2) 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.
When the standard thickness plate has been damaged or bent, renew with a new plate.

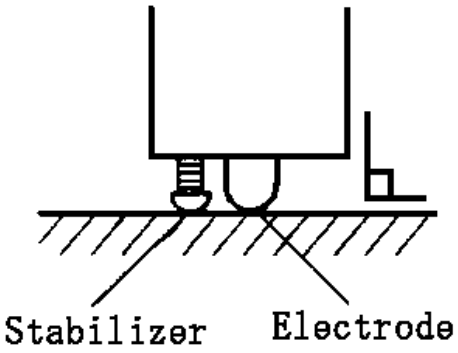
(3) Operating method of the probe

① 2 electrodes type:
Press the probe lightly so as to 3 points, 2 electrodes and 1 supporting leg, contact stably against an object to be measured.
1 point contact constant pressure type:
Press the probe lightly so as to 1 electrode at center and the edge of the guide or V groove contact stably against an object to be measured.

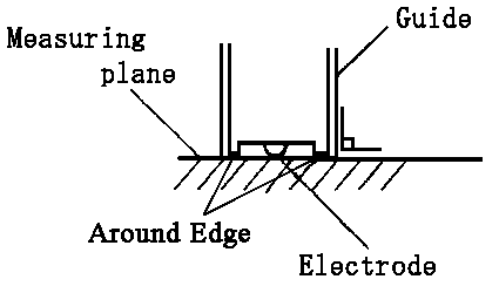
② It is important to press lightly against an object for the probe.
When the probe is pressed too strongly against an object, various bad influences appear as follows:
(a) Film to be measured is dented or damaged.
(b) The standard thickness plate is dented or damaged easily.
(c) It causes deformation of the tip of the probe.
(d) Pressing force becomes uneven due to fatigue of the hand.

③ Don't slide the probe fore and after wards or side ways while pressing as it causes to make the tip of the electrode accelerate abrasion and deformation.

● Contact method of the probe



(2 electrodes type)



(1 point contact constant pressure type)

(4) Characters of a film

The measurement of the film having magnetic metal substances cause a measurement error.
Also when extremely a large quantity of carbon is contained, the film thickness can not be measured occasionally.

(5) 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 the inside a little away from the edges.
The same care is needed for a projection, bend, sharp deformed portion and surrounding.

(6) Effect of rolling

In some cases, uneven magnetism exists in a substrate.
As it causes an incorrect measurement depending on the spots to be measured, take several spots to measure and calculate the mean value.

(7) Effect of residual magnetism and stray magnetic field

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

(8) 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.

(9) 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.

9. SPECIFICATIONS

Measuring method	Electromagnetic induction
Applications	Non conductive film and non magnetic metallic film applied to iron substrate (including steel and ferritic stainless steel such as SUS430 etc.)
Measuring range	0 to 500 μm・0.2 to 5 mm (2 row scales)
Measuring accuracy	±2μm against uniform surface or ±5% of reading
Probe	Pro-1 : 1 point contact constant pressure type Dia. and length of electrode : φ 17 × 66mm with V groove Electrode : CVD treated ultra anti-abrasive electrode Pro-2 : 2 electrodes type Diameter of electrode : φ 6mm with support leg Distance of 2 electrodes : 16mm Curvature of contact surface : 5R Electrode : CVD treated ultra anti-abrasive electrode
Power source	DC : Dry batteries R03 (1.5V) × 6 pcs. AC : AC100V 50/60Hz (With optional AC adapter)
Operating temperature	0 to 40 ℃ (except dew condensing condition)
Dimensions and weight	105 (W) × 48 (H) × 165 (D)mm, 500g
Accessories	Standard thickness plate, Carrying case
Option	Dial cover, AC adapter

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

10. TROUBLE SHOOTING

Following articles show the conditions which are generally apt to be mis-judged as out of order. Survey the causes in accordance with conditions and take the proper measures after thoroughly read the INSTRUCTION MANUAL again.

1. Pilot lamp does not go on.
   ① The batteries are short of the voltage.
   ② The batteries are set incorrectly.

2. Zero adjustment can not be carried out.
   ① The probe is pressed against the standard thickness plate without using the zero plate.
   ② Quality of the zero plate is not iron (magnetic substance).
   ③ The conversion switch is positioned incorrectly.

3. Zero adjustment can be carried out but standard calibration can not be carried out.
   ① The Meter needle of the standard calibration dial is being coincided with the different value from the value of the standard thickness plate.
   ② The batteries are short of the voltage.
   ③ The conversion switch is positioned incorrectly.

4. Indicated value deviates extremely from expected thickness.
   ① Alien substances are sticking on the electrode.
   ② Calibration was carried out mixing μm with mm.
   ③ The conversion switch is positioned incorrectly.
   ④ The substrate of the film to be measured is nonferrous material.

When the conditions are seemed with anxiety or other causes, please contact to the nearest our branch or head office with the data such as the concrete condition, name of product, purchased day, and so on.

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:

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