SANKO

EDDY CURRENT TYPE
DIGITAL COATING THICKNESS METER

EDY-5000

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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(株式会社 サンコウ電子研究所)

CONTENTS

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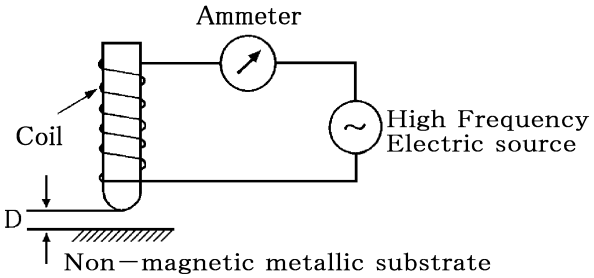
1. PRINCIPLE

The thickness of non-conductive films treated on non-magnetic metallic substrate can be measured non-destructively, simply, speedily, and accurately utilizing the electric correlation between the eddy current induced on metal surface by a high frequency electric field and the thickness of the surface film.



When a metal is moved toward or away from a coil which carries electric current supplied by a high frequency electric source, the current increases or decreases in accordance with a distance from the coil.

This principle is utilized to measure the thickness (D) of non-conductive film on non-magnetic metallic substrate.

2. APPLICATIONS

The Meter is used for non-destructive measurement of the thickness of a non-conductive film e.g. ALMITE, paintings, linings, etc. applied to non-magnetic metallic substrate e.g. aluminum, aluminum alloy, copper, etc. and austenitic stainless(non-magnetic stainless) steel substrate.

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

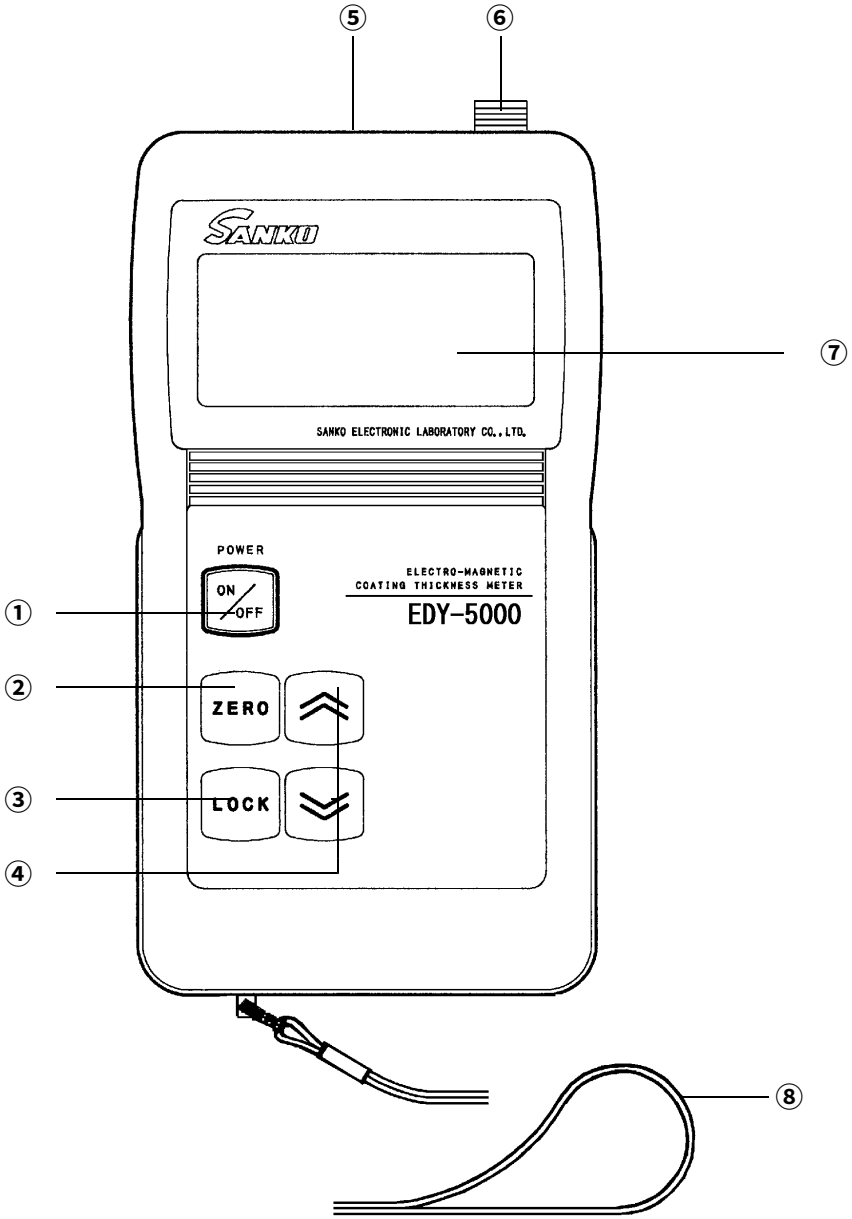
- Anodic oxide films -- Measurement of the thickness of ALMITE(anodic oxide films) applied to aluminum sashes, kitchen utenciles, electric appliances, etc.
- Paintings ---------- Measurement of the thickness of coatings applied to housing materials, machines, tanks, etc. made of aluminum or stainless steel.
- Linings ---------- Measurement of the thickness of linings applied to machines, parts, chemical plants, etc.
- Resin films -------- Measurement of the thickness of films, papers, etc. based on aluminum plate.

3. SPECIFICATIONS

• Name and type	Eddy current type digital coating thickness meter EDY-5000
• Measuring method	Eddy current type
• Measuring range	0 to 5.00 mm
• Accuracy	±0.01mm on uniform surface or ±2 % of reading
• Indication	Digital display on large size Liquid Crystal Display (LCD) With hold function
• Resolution	0.01mm (1.00 mm to 5.00 mm) 1 μm (0 to 999 μm)
• Range of CAL	10 μm to 5.00 mm
• Probe	One point contact constant pressure type with V-groove Φ 18 × 55mm
• Additional function	1) Conversion of key lock mode 2) Auto power off (about 5 minutes)
• Power source	Dry batteries R03(1.5V) × 4 pcs With auto power off function
• Operating temp.	0 to 40 ℃ (except dew condensing condition)
• Dimensions	80(W) × 35(H) × 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



① POWER key	Key for power ON/OFF
② ZERO key	Key for zero adjustment
③ LOCK key	Key for locking all keys except ON/OFF key
④ ⩓ • ⩔ key	Key for standard calibration with the standard thickness plate
⑤ Printer connector	Connector for connecting the printer
⑥ Probe connector	Connector for connecting the probe
⑦ LCD display	Indicating part of the measured values
⑧ 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

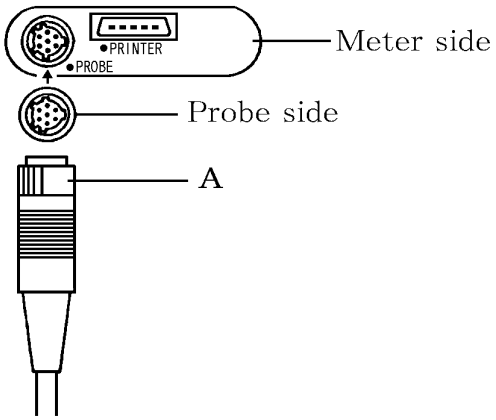
Prepare the substrate which is the same kind, thickness and shape with an object to be measured.
The attached zero plate for checking the Meter, Aluminum 1050, is used for the operation check of the Meter.
Prepare the substrate of an actual object to be measured.

- 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

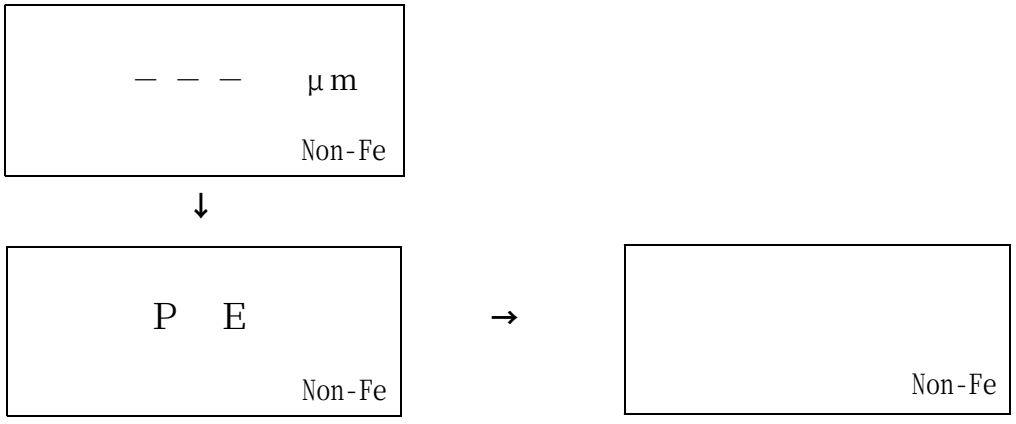
Carry out the connection (disconnection) of the probe by the following procedures.

- **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.



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

※ 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 power ON .
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.

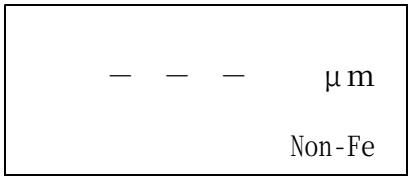
Power is automatically cut off.

6. OPERATING INSTRUCTIONS

6-1. Power ON

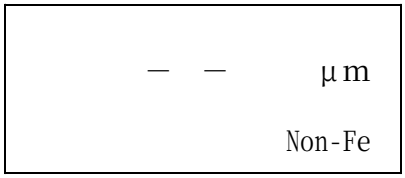
Press the 「ON/OFF」 key ① after connecting the probe.
[Indication on the LCD ⑦ changes as follows.]

↓



↓

Inside of the Meter is being initialized.
Keep the probe turn towards the air during this period.



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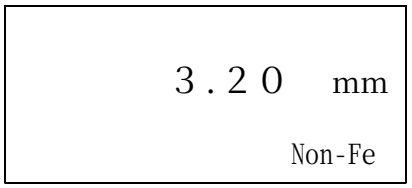


← The buzzer emits a beeping sound.
The Meter is ready for measurement.

- When power ON, the last measured value of the previous measurement is indicated.
- When the first power ON or no measured data is in the Meter, [–] is indicated.

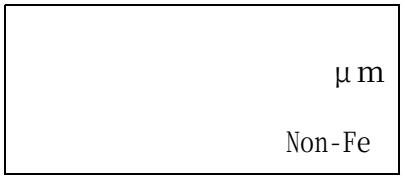
6-2. Power OFF

Press the 「ON/OFF」 key ①.
[Indication on the LCD ⑦ changes as follows]

↓

← The buzzer emits a beeping sound.

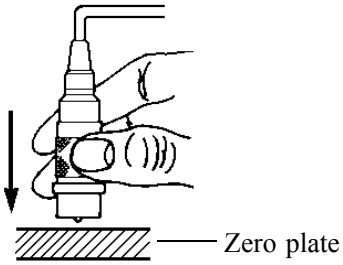
↓



← The buzzer emits a beeping sound.
Power is automatically cut off.

6-3. Zero adjustment

Press the probe against the substrate for adjustment (zero plate).
[Indication on the LCD ⑦ changes as follows.]



↓ ← The buzzer emits a beeping sound.

```
XX      μm
Non-Fe
```

Measured value [XX] is indicated on the LCD ⑦.

↓

Press the 「ZERO」 key ②.
(Both the probe contact to zero plate or not is possible.)

↓ ← The buzzer emits a beeping sound.

```
CAL
0
Non-Fe
```

[CAL] is indicated on the upper left of the LCD ⑦, [0] is indicated.

↓ ← The buzzer emits a beeping sound.

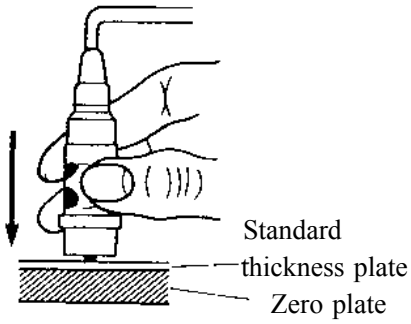
```
0       μm
Non-Fe
```

Press the probe against the zero plate several times, when the [0] or closed values are indicated on the LCD ⑦, 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.

6-4. Standard calibration (CAL)

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 ⑦ change as follows.]



↓

2．15 mm Non-Fe

← The buzzer emits a beeping sound.

(Example: Standard thickness plate of 2.00 mm th.)

↓

Match the indicated value on the LCD ⑦ to the thickness of the standard thickness plate by pressing the 「≪」 • 「≫」 key ④.
(This operation is possible for both the probe is contacting to the standard thickness plate or not.)

↓

CAL YYY mm Non-Fe

← When the 「≪」 • 「≫」 key ④ is pressed, [CAL] is indicated on the upper left of the LCD ⑦ with a beeping sound of the buzzer and indication [YYY] of the left figure changes.
The Indicated values traverse quickly by keeping on the 「≪」 • 「≫」 key ④ pressing.

↓

2．00 mm Non-Fe

← When the indication matches to the thickness of the standard thickness plate, stop the operation of the 「≪」 • 「≫」 key ④.

↓

The Meter is ready for measurement.

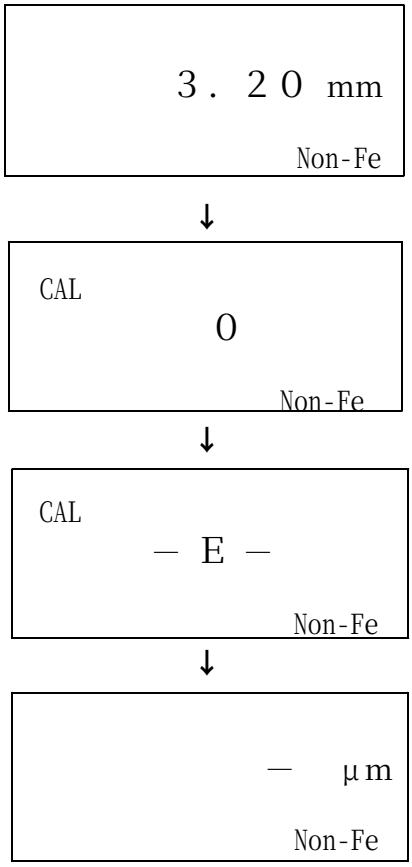
Press the probe several times against the standard thickness plate placed on the zero plate.
When the indication on the LCD ⑦ is the same thickness or near with the standard thickness plate, the calibration is acceptable.
When the indication deviates from the thickness of the standard thickness plate, repeat above procedures several times.

【 NOTICE 】

- Wait 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 ① 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.
- 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.
- Pay attention to avoid mis-operation by using the lock key as shown in item 「7-1. 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 「≫」 key ④ continuously 5 times while keeping on the 「ZERO」 key ② pressing.
[CAL] is indicated on the upper left of the LCD ⑦ and [**0**] is indicated blinking. The buzzer emits a beeping sound for every press of the 「≫」 key ④.

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

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

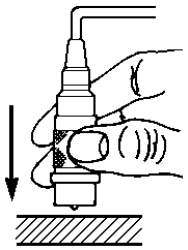
【 NOTICE 】

● Applicable range of the standard calibration (CAL) is 10 μm to 5.00 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 「6-5. Resetting the working curve」 .

6-6. Measurement

Be sure to pass the hand strap ⑧ around the wrist to prevent the Meter from dropping.

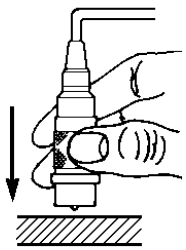
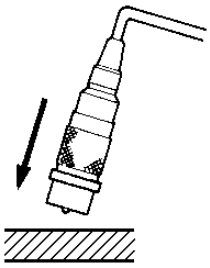
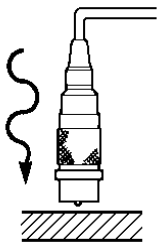
When the above mentioned zero adjustment and standard calibration are completed, the Meter is ready for the measurement.



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 ⑦.
If no sound is emitted, press again after removing the probe about 5 to 10 cm from the surface.

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

◆ When the measurement is not carried out for about 5 minutes or more 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 working of the resuming function at the succeeding power ON.

Correct usage	Incorrect usage		
			
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 5 to 10cm from the surface.	Don't tilt the probe against an object to be measured. The accurate measured value cannot be obtained.	Don't slide the probe side ways while pressing. Both the probe and an object to be measured will be damaged.	Don't press the probe against an object to be measured too slowly. Measurement error will cause to be enlarged.

7. ADDITIONAL FUNCTIONS

7-1. Converting the key lock mode

Press the 「LOCK」 key ③ in power ON condition.

↓

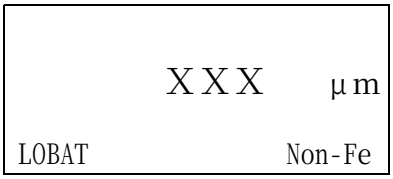
Then the buzzer emits three beeping sounds.
All keys except the 「power」 key ① can not be operated to prevent from mis-operation.

↓

To release the locking function, power OFF once and power ON again.

8. 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 ⑦.
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)

9. 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.
- 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.

10. 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.

※Attached zero plate (For eddy current: Aluminum 1050) for test is for operation test of the Meter.
Prepare the substrate of an object to be actually 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.

※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)

③ Characters of a film

The measurement of the film having a metal substance causes a measurement error.
With respect to an elastic film, place a standard thickness plate with 30 to 50 μm 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.

④ 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 15 to 20 mm or more away from the edges.
The same care is needed for a projection, bend, sharp deformed portion and surrounding.

⑤ 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.

⑥ 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.

⑦ 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.

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.

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Osaka branch Konishi Bldg., 2-3, Sugawara-cho
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