

7. CONSIDERATIONS

1. In order to weaken the influence of the measured material on the accuracy of measurement, it is recommended that the calibrations should be done on the uncoated material to be measured.
2. Probes will eventually wear. Probe life will depend on the number of measurements taken and how abrasive the coating is. Replacement of a probe can be fitted by qualified persons only.

8. RESTORE FACTORY SETTINGS

1. When to restore?

It is recommended to restore factory settings in the one of following cases.

- A. The gauge does not measure any more.
- B. Measurement accuracy is degraded caused by the abraded probe or by environmental conditions changed greatly.

2. How to restore?

Restore factory settings includes `Fe` setting and `NFe` setting. You can restore one of them or both of them respectively. Please follow procedures below to restore factory settings.

1. Please note the symbol on the display is `Fe` or `NFe`. If `Fe` is on the display, the operation below is restoring the factory setting for `Fe` type. And if `NFe` on the display, the operation below is restoring the factory setting for `NFe` type.
2. Depress Power key and not release it till `CAL` appears on the display. It is about 6 seconds from starting depressing Power key.
3. When F:H or nF:H is on display, lift the probe to more than 5 centimetres. Then press the Zero key again and the gauge returns to measurement state. The factory setting is restored.

9. HOW TO IMPROVE THE ACCURACY OF FULL RANGE BY LN

1. It is strongly recommended that no changes should be made to the value of Ln which will seriously affect the accuracy. Its value can be adjusted by professional person only.
2. To call the Ln, just depressing the Power key and not release it until Ln shows on the display. It takes about 13 seconds from starting depressing Power key. After Releasing the Power key, the Ln value shows on the display.
3. The Ln value can be changed by Up/Down key in Fig. 2. Generally, the larger the Value of Ln, the smaller the reading on a same thickness. A little variation of value of Ln will cause a great change in reading at high end (e.g. at 500 $\mu\text{m}/20\text{mil}$). The rules to adjust the value of Ln are as follow:
 - A. Reading at low end can be adjusted to the exact value by the Up or Down key.
 - B. To enlarge the Ln, if readings at low end (e.g. at 51 μm) is ok but reading at high end (e.g. at 432 μm) is too large. On the contrary, to decrease the Ln, if reading at low end (e.g. at 51 μm) is ok but reading at high end (e.g. at 432 μm) is too small.
 - C. Repeat procedures from A to B till the readings on every standard foil are satisfying the accuracy.

Operation Manual

SaluTron® ComBi D1000



This Coating Thickness Gauge is small in size, light in weight, easy to carry. Although complex and advanced, it is convenient to use and operate. Its ruggedness will allow many years of use if proper operating techniques are followed.

Please read the following instructions carefully and always keep this manual within easy reach.

1. FEATURES

- It meets the standards of both ISO 2178 and ISO 2360 as well as DIN, ASTM and BS. Suitable for the laboratory and for use in harsh field conditions.
- The Fe probes measure the thickness of nonmagnetic materials (e.g. paint, plastic, porcelain enamel, copper, zinc, aluminium, chrome etc.) on magnetic materials (e.g. iron, nickel etc.). Often used to measure the thickness of galvanizing layer, phosphate layer, copper tile, aluminium tile, some alloy tile, paper etc.
- The NFe probes measure the thickness of nonmagnetic coatings on non-magnetic metals. It is used on anodizing, varnish, paint, enamel, plastic coatings, powder etc. applied to aluminium, brass, non-magnetic stainless steel etc.
- Automatic substrate recognition
- Manual or automatic shut down
- Two measurement mode:
 - Single and Continuous
- Wide measuring range and high resolution
- Metric/imperial conversion
- Digital display gives exact reading with no guessing or errors

2. SPECIFICATIONS

Display:	4 digits, 10 mm LCD
Range:	0 ~ 1250 μm / 0 ~ 50 mil other ranges may be specified
Resolution:	0.1 μm (0 ~ 99.9 μm) 1 μm (over 100 μm)
Accuracy:	$\pm 1 \sim 3\%$ or 2.5 μm or 0.1 mil (Whichever is the larger)
Power supply:	4 x 1.5 AAA(UM-4) battery
Operating condition:	Temp. 0°C ~ 50°C, Humidity <80%
Size:	126 x 65 x 27 mm (5.0x2.6x1.1 inch)
Weight:	about 81 g (not including battery)

3. FRONT PANEL DESCRIPTIONS



Fig. 1

- 3-1 Probes inbuilt
- 3-2 Display
- 3-3 Zero/Power Key
- 3-4 Battery Compartment/Cover

Accessories:

- Carrying case
- Operation manual
- Fe probe inbuilt
- Nfe probe inbuilt
- Calibration foil-set
- Substrate (Iron)
- Substrate

4. MEASURING PROCEDURE

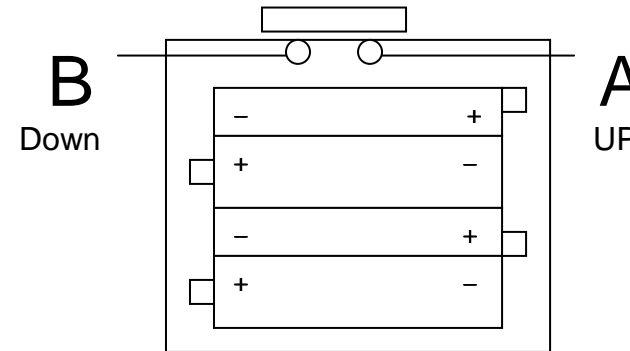
1. Press the power key (3-3) to switch on the Gauge and '0' shows up on the Display (3-2). The gauge will restore the state of last operation itself, with a symbol 'Fe' or 'NFe' indicating on the Display. The gauge enters the auto mode which can automatically recognize the substrate itself.
2. Place the probe (3-1) onto a coating layer to be measured. The reading on the Display is the thickness of the coating layer.
3. To take the next measurement, just lift the probe (3-1) to more than 1 centimetre and then repeat the step 2.
4. If you suspect the accuracy of measurement, you should calibrate before taking the measurements. For the calibration procedures, please refer to the calibration part 5.
5. The gauge can be switched off by pressing the power key (3-3). On the other side, the gauge will power itself off about 50 sec. after the last operation.
6. To change the measurement unit 'μm' or 'mil' by depressing the Power key and not releasing it till 'UNIT' on the display appears. And the unit changed after releasing the power key. It takes about 6 sec. from starting pressing the Power key.
7. To change measurement mode from the single to continuous or vice visa, just depressing the Power key and not releasing it still 'SC' on the Display. The measurement mode changes after releasing the

Power key. It takes about 8 sec. from starting depressing the Power key. The symbol ((•)) represents continuous mode and 'S' represents single Mode. It is about 8 sec. from starting depressing Power key.

5. CALIBRATION


1. Zero adjustment for 'Fe' and 'NFe' should be carried out separately. Take the iron substrate if 'Fe' on Display, and take the aluminium substrate if 'NFe' on the Display. Place the probe (3-1) on the substrate steadily. Press the Zero key (3-3) and '0' will be on the Display before lifting the probe. If pressing the ZERO key but the probe is not placed on the substrate or an uncoated standard. The zero calibration is invalid.
2. Select an appropriate calibration foil according to your measurement range.
3. Place the standard foil selected onto the substrate or the uncoated standard.
4. Place the sensor (3-1) in the middle of the standard foil and lift. The reading on the display is the value measured. The displayed reading can be corrected by pressing the UP button A or down button B (which are located in the battery compartment) while the probe is away from the substrate or the measured body.

See Fig. 2



5. Repeat step 4 until the result is correct.

6. BATTERY REPLACEMENT

1. When it is necessary to replace the battery, i.e. battery voltage less than approx. 4.5v, the battery symbol  will appear on the display.
2. Slide the Battery Cover (Fig. 1, 3-4) away from the instrument and remove the batteries.
3. Install the batteries (4 x 1.5v AAA/UM-4) correctly in the case.
4. If the instrument is not to be used for any extended period, remove batteries.