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# Digital Coating Thickness Gauge

Model No. PTG-4000





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## **Features:**

### **Automatic substrate recognition (Fe, NFe)**

The PTG-4000 is capable of measuring the thickness of non-magnetic coatings (e.g. Paint, Plastic, enamel, copper, zinc, aluminum, chrome, etc) on magnetic materials (e.g. Iron, Nickel, etc.) It is often used to measure the thickness of a galvanized layer, lacquer, porcelain, phosphide, copper tile, aluminum tile and some alloy tiles, paper, etc.

The 4000 is also capable of measuring the thickness of non-magnetic coatings on non-magnetic metals. It is used on anodizing, varnish, paint, enamel, plastic coatings, powder, etc. applied to aluminum, brass, and non-magnetic stainless steel, etc.

- This unit is suitable for laboratories or out in harsh field conditions.
- Utilizing a state of the art micro computer circuitry, this gage will deliver high accuracy measurements along with quick reading response time.
- This model has a wide measuring range coupled with high resolution
- Digital FLIP display eliminates guessing and /or errors when reading upside down or other angle
- The PTG-4000 is made of a durable light weight ABS plastic housing assuring maintenance free performance for many years.

## **Specifications:**

- **Measuring range:** 10-1,250  $\mu$  m max. or 0.4-50 mils
- **Resolution:** 1 $\mu$  m / 0.1mils
- **Accuracy:** +/- 3% + 2 $\mu$ m ( +/-3%+0.1 mil )
- **Display:** 3 digit color LCD
- **Statistics:** Min/Max, Average, Std Deviation
- **Single or Continuous Measurement(Selectable)**
- **Min. measuring area:** 0.2" x 0.2" (5mm x 5mm)
- **Min. radius of curvature:** Convex: 0.12" (3mm)  
Concave: 1.2" (30mm)
- **Min. substrate thickness:** Ferrous: 20 mils (0.5mm)  
Non-ferrous: 2 mils (50  $\mu$  m)
- **Max. Surface temperature of test object:** 302 degrees F  
(contact time max is 2 seconds)
- **Power source:** 2-AAA batteries
- **Dimensions:** 100 x 52 x 29mm
- **Weight:** 2.4oz. (w/o Batteries)

**PTG-4000 comes complete with  
set of calibration foils, 2 substrates, 2-AAA batteries and carry case.**

• Machine Accessories • Precision Tools • Cutting Tools • Material Testing Instruments



1)	Main LCD Display
2)	Inch/Metric and Increase Value
3)	Memory Recall and Calibration
4)	Flip Screen, Subtract Value and Reset
5)	Contact Probe


## Measuring Procedure:

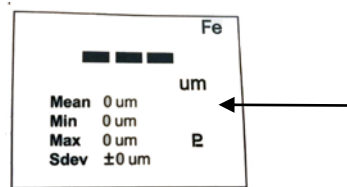
### Important Note:


Be sure not to slide the probe tip against a rough surface as this will scratch and possibly damage your probe.

When performing multiple tests, please be sure to lift the probe off the surface for 2 seconds after each test result is obtained.

### 1) Measuring Range:


The PTG-4000 is capable of measuring coating or plating from 10  $\mu\text{m}$  to 1,250  $\mu\text{m}$ . If you are testing an item that is out of range, you will see the following symbol  along with "---" appear on the display as shown below.




The symbol  means that your measurement is out o range OR the instrument failed to obtain a reading such as;

- a) *Non-Metal Substrate*
- b) *Material has very strong magnetic force*
- c) *Base material is too thin*
- d) *Surface area is too small*
- e) *Possible hardware error caused by a substance on the probe tip*

### 2) Battery Indicator:

The PTG-4000 uses 2-AAA batteries and its capacity level is shown on the bottom right corner of the display. 

The battery symbol will appear red once capacity is drained. 

### 3) Unit of measure: Inch/Metric

Press the " $\mu\text{m}/\text{mil}$ " button to toggle between mil (inch) and  $\mu\text{m}$  Micron(metric)

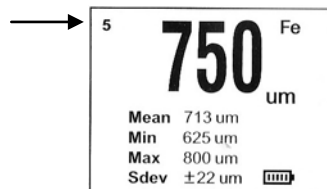
### 4) Flip Display

Press the "Flip" button to initiate the screen to flip 180-degree(upside down) which is useful when testing an application from the bottom.

### 5) Memory Recall

Press the "MEM" button to view the last 99 measurements and a "0" in white will appear on the top LEFT area of the display. Press the "+" or "-" buttons to toggle through all 99 values one at a time.

The "5" shown in this picture means that it's the 5<sup>th</sup> test.



## 6) Single or Continuous Measurement

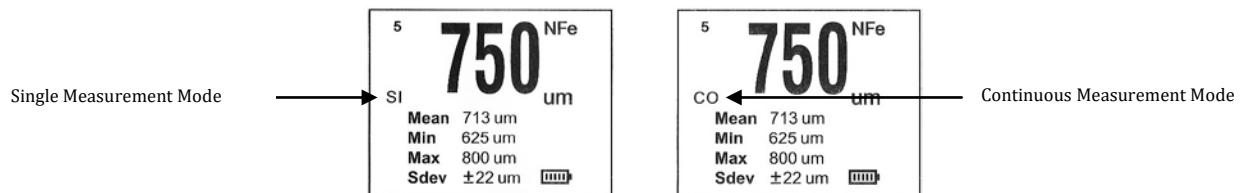
The PTG-4000 will always default to the Single measurement mode upon start up.

**Single measurement mode** means that you can take a measurement, lift the probe off the surface, wait 2 seconds and place the probe back on the surface for another measurement.

**Continuous measurement mode** means that you can slide the probe across the surface (be sure surface is smooth or damage to the probe may occur) and the unit will acquire data from 10 readings and will be shown on the display.

To use Continuous mode, press the "+" and "-" buttons at the same time and "CO" will appear on the display. Place the probe on the surface of your part and slide for a short distance. Lift the probe up to see the acquired values.

Press the "+" and "-" buttons to return to single mode.



## 7) Zero-in Procedure

The PTG-4000 must always be "zeroed" out on an uncoated metal substrate prior to taking coating measurements. The carry case contains a bare steel and aluminum plate for just this purpose. Power the unit on by touching one of the plates. The display should read "0".

If the display shows anything other than 0, you must perform a zero-in before you begin testing.

Press the "+" button for 2 seconds and "000" will blink on the display. Press the probe against the plate to zero in the gauge.

After this procedure, the unit can be used to accurately measure coating thickness. If you find that the unit is giving erroneous values the you should perform a calibration with the supplied plastic reference shims.

## 8) Calibration using reference shims

The PTG-4000 is supplied with 4-plastic calibrated reference shims. Choose the shim that is closest in thickness to your actual application. Accuracy of your results should be +/-3%+2 µm.

**Example:** If your reference shim is 50 µm then your obtained readings should be between 46-54 µm

- Make sure the unit is zeroed in
- Place a reference shim on top of one of the metal plates in the carry case and take a measurement. Assuming that your reading is outside of the stated tolerance you should follow instructions below.
- Press and hold the "MEM" button for 2 seconds to enter calibration mode.
- Press the "+" button to increase the displayed value to match the value on the shim.
- Press the "-" button to decrease the displayed value to match the value on the shim.
- Once the displayed value matches the value on the shim, Press the "MEM" button to save calibration.

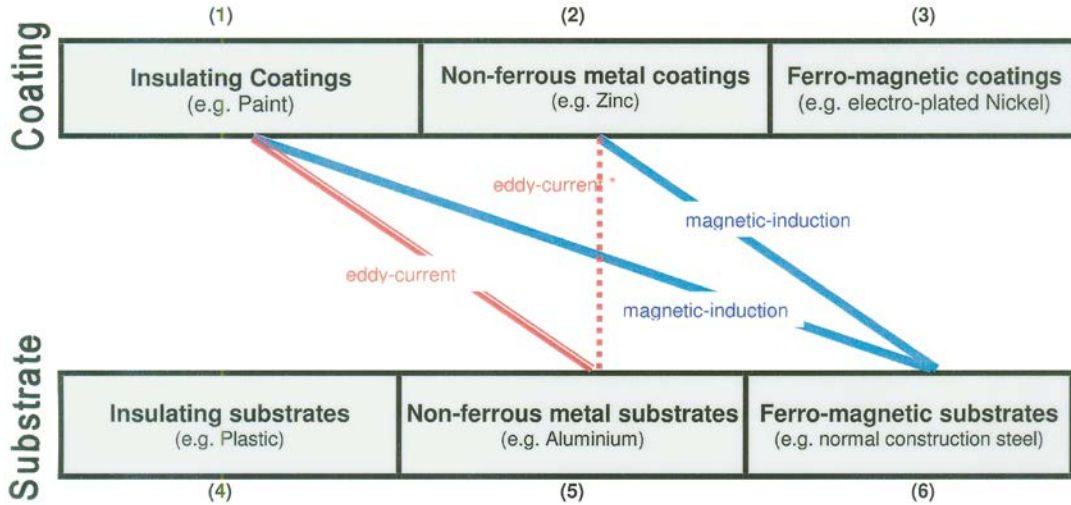
## 9) Factory Reset

Press and hold the "-" button for 2 seconds. "0", "00", "000" will blink in sequence indicating that the reset is complete. Its advised that you perform a Zero-In once this procedure has been completed.

**Typical application for coating thickness measurements using the magnetic-induction and the eddy-current principle**

The picture below shows the various Coating / Substrate – combinations and the necessary measuring principle.

The lines between the upper and lower boxes indicate the measuring principles to be used.



**REMARKS:**

eddy-current \*

**: Restricted application!**

With the eddy current principle

Coating / Substrate – combinations are measurable only:

- Chromium on copper, maximum coating thickness 40µm / 1.6mils

- Chromium on aluminium, maximum coating thickness 40µm / 1.6mils

- Tin on copper, maximum coating thickness 40µm / 1.6mils

NOTE: for the above Coating / Substrate – combinations special marked calibration foils are necessary. Please specify the required Coating / Substrate – combination.





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**Typical coating materials:**

**(1) Insulating coatings**

- Paint
- Plastic
- Enamel
- Anodising (on Alum.)
- Ceramic

**(2) non-ferrous coatings**

- Brass
- Bronze
- Chromium
- Copper
- Lead
- electroless Nickel (with more than 10% phosphor)
- Tin
- Zinc

**(3) ferro-magnetic coatings**

- Electro-plated Nickel

**Typical substrate materials:**

**(4) Insulating substrates**

- Plastic
- Ceramic
- Epoxy
- Glass

**(5) Non-ferrous substrates**

- Aluminium
- Brass
- Bronze
- Copper
- Lead
- Titan
- Zinc

**(6) Ferro-magnetic substrates**

- Steel (St33 – St60 or C15 - C45)
- some kind of stainless steel, which are ferrous

**Special Coating / Substrate – combinations**

- Chromium on copper or on aluminium: see remarks under the picture on page 1.
- Tin over copper: see footnote under the picture on page 1
- Micaceous iron ore coatings (ferromagnetic) over steel: see “Compendium to Coating thickness measurement”

**cannot measure:**

- Electro-plated Nickel on steel or on non-ferrous metal substrates or on insulating substrates
- insulating coatings (as paint) on insulating substrates (as plastic)
- non-ferrous metal coatings on non-ferrous metal substrates, exceptions see remarks on page 1
- non-ferrous metal coatings (as copper) on insulating substrate (as epoxy)

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# Global Connections



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## Warranty /Return Policy

### Warranty Policy:

All portable and stationary material testing instruments manufactured for/by Phase II shall be free from defects in material and workmanship for a period of 1 to 5 full years (depending upon model) from date of purchase. Parts found to be defective shall be replaced or repaired at Phase II's sole discretion.

Products found by Phase II to be misused, abused or neglected are not covered under this warranty. Parts not covered by this warranty are normal wear and consumable items such as (but not limited to) impact balls, impact bodies, diamond indentors, carbide ball indentors, impact springs, cables and connectors, batteries, diamond stylus, contact probes, points and test blocks.

**Consumable (wearable) items such as cables and probes have a 90 day warranty from date of purchase.**

This warranty is exclusive and in lieu of all other warranties whether written, oral or implied, including any implied warranties or merchantability or fitness for a particular purpose. In no event shall Phase II be liable for any incidental, special or consequential damages of any nature.

Any attempts to "open, modify, or tamper with" this device by anyone other than Phase II will result in a voided warranty.

### Return Policy:

All Phase II products must have authorization prior to return.

If product is not acceptable for any reason including application issues and demonstrations, authorization for return must be obtained within 5 days of receipt of product. Unit must be in same new condition it was received.

Failure to do so will result in an automatic 15% restocking fee. Returns after 30 days will not be accepted.