

POSI TECH 6000 COATING THICKNESS GAUGE

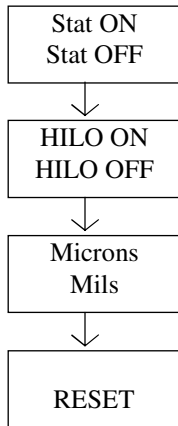
The model 6000 - FS2 thickness gauge is designed for use with ferrous (iron bearing) substrates (underlying layer/substance) and non-magnetic coatings. The ferrous probe will not read correctly on aluminum and non-magnetic substrates.

Terms Defined

1. Substrate: This is the underlying layer or substance. When referring to a “similar uncoated substrate” the definition includes the wash/pretreatment process. This is because the wash/pretreatment adds a coating on top of the metal surface.
2. Similar Uncoated Substrate: This refers to the calibration and verifying the calibration. If the part being measured has been blasted, washed and painted then the similar uncoated substrate is a part that has been blasted and washed. It does not mean that the part being used to calibrate the gauge must be identical to the part being measured. It is the process that must be the same (i.e.: blasted and washed).
3. Microns: One-millionth of a meter (0.000001).
4. Mil: One-thousandth of an inch (0.001).
5. Tolerance: This refers to allowing for the existence of variability.
The mill thickness parameters of Flexi-Coil allow for the following tolerances:
 - Gauge tolerance (fixed & variable)
 - Calibration tolerance (0.1 mil)
 - Blasting profile variability among parts.

Statistics and Options

The following options are available:



1. To access the menu . . .

- a) Turn gauge ON
- b) Press \oplus and \ominus simultaneously

Answer the options as they appear on the display with \oplus (yes) or \ominus (no).

Note: The order in which the menu cycles through may vary depending on the functions that are currently selected. Once the menu has been initiated it must cycle through all the options before returning to measurement mode. (Unless a mode has been entered or begun.)

2. STAT ON/OFF (Statistics mode) Symbol: \bar{x}

This mode will automatically accumulate readings and average them when required. HILO must be OFF in order to activate STAT mode.

- a) Turn STAT mode ON
Select \oplus when STAT ON is displayed.
Display will show \bar{x} and the counter NO when in STAT mode.
- b) As each measurement is taken the display counter is incremented.
To erase the previous reading from the batch press \ominus .
- c) To get the average press \oplus and the following statistics will be displayed.
x = average
s = standard deviation of readings
n = number of readings.

Warning: Once \oplus has been pressed the batch is complete and no more readings can be added to that batch. If more readings are necessary a new batch can be started by taking another reading.

- d) To turn STAT OFF select \oplus when STAT OFF is displayed on the menu.

3. HILO (Hi Lo mode)

This mode/function will alert the user to readings that are outside a defined parameter - these parameters are defined by the operator.

a) Turn HILO ON

Select \oplus when HILO ON is displayed

Display will show $\uparrow\downarrow$ when in HILO mode

b) Set the L0 parameter

i) Adjust the L0 parameter by the \oplus and \ominus buttons

ii) Press \oplus and \ominus simultaneously to accept the L0 parameter

c) Set the H1 parameter

i) Adjust the H1 parameter by the \oplus and \ominus buttons

ii) Press \oplus and \ominus simultaneously to accept the H1 parameter.

d) Readings within the defined parameters will be accompanied by the normal two beeps. Readings outside the parameters will be accompanied by the following

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i) L0 reading: Single low beep and a down arrow on the display.

ii) Hi reading: Single high beep and an up arrow on the display.

e) To turn HILO OFF select \oplus when HILO OFF is displayed on the menu.

4. MICRONS/MILS Conversions

a) Selecting \oplus when the option is displayed will keep the gauge in the conversion shown.

Selecting \ominus when the option is displayed will change the conversion to the one not shown.

5. RESET function (this function should not be used as continued use will wear out the gauge faster).

Selecting RESET will . . .

- Turn all modes/functions OFF
- All readings in memory are erased.
- A zero reading is displayed and N.I.S.T. calibration is restored (° is displayed when N.I.S.T. factory zero is activated).

RESET should be used when unsure of the adjustments that have been made.

a) Select \oplus when RESET is displayed to RESET gauge.

b) When display indicates "Probe \searrow " place probe on an uncoated part.

c) When "Probe \nearrow " appears, lift probe from the part. Gauge is now reset to factory (N.I.S.T.) zero.

Calibration

The model 6000 instantly and automatically calibrates itself to N.I.S.T. calibration data. (N.I.S.T. stands for the National Institute of Standards and Technology.) The gauge may then need to be adjusted according to the substrate (surface of metal prior to paint coating) being used (we call this calibration).

Quality: When calibrating be sure to calibrate the gauge to the expected range of thickness of the coating to be measured. Be sure to calibrate the gauge using a similar uncoated substrate to the coated part being measured.

1. Tolerances in calibration

There are several factors to consider when establishing tolerances:

- a) Gauge tolerance. This is divided into 2 areas:
 - i) Variable tolerance (Tolerance dependent on the thickness of the coating).
 $\pm 1\%$ of the reading. If a mil reading is 5.0 then there is a variable tolerance of 0.05 mil ($5.0 \times 0.01 = 0.05$)
 - ii) Fixed tolerance (Accuracy of the gauge itself)
 - Below 2 mils is ± 0.05 mil
 - Above 2 mils is ± 0.1 mil
- b) Shim tolerance (Measuring thickness standard)
 - i) 1 - 5 mil shim is ± 0.2 mil
 - ii) 10 mil shim is ± 0.5 mil
 - iii) 20 mil shim is ± 1.0 mil

Note: Due to the high tolerances (lack of accuracy) of shims they are not to be used in everyday calibrations. When calculating tolerances be sure to add together all the different related tolerances to determine total tolerance.

2. Turn on the gauge as per taking measurements.

3. Ensure all statistics and functions are OFF.

4. Determine type of calibration required

Although normally not required all calibrations may be verified using the appropriate range of shim (readings must be within listed tolerances for shims).

- a) Smooth surface calibration
 - i) Use an uncoated substrate similar to the coated part being measured.
 - ii) Take one reading.
 - iii) Lift probe a minimum of 2 inches from the substrate.
 - iv) Adjust the reading to zero by pushing the appropriate \oplus or \ominus buttons.
 - v) Take another reading
 - If reading is not within 0.05 mils then redo step "iv" and test again.
 - Continue cycle until readings pass the tolerances.
- b) Rough surface calibration
 - i) Use an uncoated substrate similar to the coated part being measured.
 - ii) Select STATS ON (see statistics and options)
 - iii) Take a minimum of 7 readings spread out across the substrate (uncoated surface)
 - iv) Press \oplus for the average.
 - v) Select STATS OFF
 - vi) Adjust the reading to zero by pushing the appropriate \oplus or \ominus buttons.
 - vii) Test calibration by repeating the above process (steps i - iv).
 - If the average is not within 0.1 mils then recalibrate the gauge and test again.

- Continue cycle until readings pass the tolerances.
- c) Shim calibration
- Note:** This can be used with smooth or rough calibration and will verify accuracy to a known thickness (within shim tolerances). **It should only be used if verification is required or accurate film thickness of above 12 mils are required, never for everyday calibrations.**
- i) Take a measurement on the shim using the same substrate that the gauge was calibrated with.
 - ii) If the reading is not within the accepted tolerances as outlined in the tolerances section then . . .
 - Adjust the reading to the known shim thickness using the ⊕ or ⊖ button.
 - Retest to ensure acceptable tolerances.
- Note: If the gauge has been calibrated to high mils be sure to recalibrate to standard mils before attempting to measure mils below 10 mils.

5. Proceed to take required measurements.

Taking a Measurement

1. Turn the gauge ON
 - a) Remove protective cover from probe (Do Not Lose It!)
 - b) Press ⊕ and hold until the display reads “6000 2”. The last reading will then be displayed.

2. Ensure the gauge is calibrated
 - a) Determine the surface to be measured.
 - i) Blasted surface (use a uncoated similar substrate)
 - Take a minimum of 7 readings and average them.
 - Tolerance of ± 0.1 is acceptable.
 - ii) Smooth surface (use a uncoated similar substrate)
 - Take a single reading
 - Tolerance of ± 0.05 is acceptable.

Recalibrate the gauge if readings are not within tolerances.

3. Determine the statistics and options desired (see statistics section).

4. Place the probe FLAT on the measuring surface (for round surfaces use the 2 slots (V-slots) on the edge of the probe to provide an accurate reading).
 - a) Gauge will beep twice and display the measurement.

OR

 - b) Gauge will emit a high fast beeping sound indicating that either
 - i) Gauge is not being held steady or properly.
 - ii) Temperature is out of range.

5. Lift the probe a MINIMUM OF TWO INCHES from the measuring surface between measurements.

OR

Leave the probe on the surface for continuous measurement. **Do not slide the probe tip on the surface of the paint.**

6. When finished taking measurements, recap the probe (Gauge will shut off automatically after 30 seconds of inactivity).

Troubleshooting

1. Battery

The gauge uses a 9 volt battery. The average battery life is: 30 hours continuous.
15,000 readings

A low battery is indicated by a battery symbol on the display or MEM Lost (see below). Do not disconnect the battery while the gauge is ON. If it is disconnected all memory (except N.I.S.T.) will be erased. Calibration will then have to be reinitiated.

2. MEM Lost: This can appear if either the battery has been disconnected while the gauge was ON or it can indicate a low battery.

- a) Take another measurement (recalibration is necessary).
- b) If MEM Lost persists change the battery and RESET the gauge.

3. SERVICE: Gauge must be returned for servicing.

- a) Deliver probe to (Company) Maintenance with a repair tag.
- b) PLM will get it serviced and return the gauge when finished.

4. Miscellaneous

- a) Temperature

Operating range: 0 - 50°C

If the probe and gauge are exposed to temperatures outside this range allow the probe to reach ambient temperature before measuring. Discard the 1st reading. When measuring surfaces much hotter or colder than ambient (around 20°C) allow 1 second between readings.

- b) High fast beeping sound indicates either
 - i) A surface too hot/coldOR
 - ii) Probe is not being held steady.