PosiTector®*6000*

Coating Thickness Gages

Instruction Manual

DeFelsko®
The Measure of Quality

Introduction

The **PosiTector** *6000* hand-held, electronic instrument non-destructively measures the thickness of coatings on metals, quickly and accurately. It consists of a body (Standard or Advanced) and probe.

Quick Start

Press the ☰ button to power up the Gage. To conserve battery life, the gage will automatically go to sleep after 5 minutes of inactivity. While in **Sleep Mode**, the gage powers up significantly faster— convenient when moving between parts or locations. The gage will completely power off after 4 hours of inactivity. Alternatively, select **Power Off** from the main menu. All settings are retained.

1. Remove the protective rubber cap (if supplied) from probe.
2. Power-up Gage by pressing the center navigation button ☰.
3. Verify accuracy and adjust if necessary (pg. 3).
4. Place the probe FLAT on the surface to be measured.
   HOLD STEADY. When a valid measurement is obtained,
   the Gage BEEPS twice and the measurement is displayed.
5. Lift probe AT LEAST 2 INCHES (5 cm) from the surface
   between measurements - OR - leave probe on the surface
   in the same location for continuous measurements.

Menu Operation

To access the Menu, power-up the gage, then press the center navigation button ☰. Either the keypad or touch screen can be used to navigate the menu. If desired, touch screen functionality can be disabled within the Setup menu (See **Touch**, pg. 8).

Select a menu option by touching it, or use the ▲ and ▼ buttons to highlight the desired option and press ☰ to select it.

On menus longer than one page, the current page number is displayed below the menu name. Navigate between pages using ▲ when the first menu item is selected, or ▼ when the last menu item is selected. If using touch, navigate between pages by touching ← or →, or by swiping up or down.

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Press the ⊖ button or swipe right to return to a previous screen.
Select **Exit** to close the Menu.
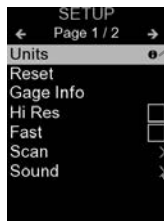
When a Menu option is highlighted, the 🛈 icon indicates on-gage help is available. Press ⊕ or touch the 🛈 icon to display the help.

NOTE: Update your gage to ensure that you have the latest on-gage help information.

❯ indicates that a sub-menu exists for the Menu option. Select the option to display its sub menu.

Probes

When powered-up, the **PosiTector** automatically determines which probe is attached and does a self-check.

To disconnect a probe from a body, slide the plastic probe connector horizontally (in the direction of the arrow) away from the body. Reverse these steps to attach a different probe. It is not necessary to power-down the Gage when switching probes.

The **PosiTector** gage body accepts a wide variety of probe types including magnetic, eddy-current, and ultrasonic coating thickness, surface profile, environmental, hardness, salt contamination, and ultrasonic wall thickness probes.

Calibration, Verification, and Adjustment

The **PosiTector** *6000* non-destructively measures the thickness of coatings on metals.Three steps ensure best accuracy…

1. Calibration: typically performed by the manufacturer. All probes include a Certificate of Calibration.

2. Verification of Accuracy: typically performed by the user on known reference standards such as the included plastic shims or optional coated thickness standards.

3. Adjustment: Adjustment, or Cal Adjustment is the act of aligning the Gage's thickness readings to match that of a known sample in order to improve the accuracy of the Gage on a specific surface or in a specific portion of its measurement range. 1-point or 2-point Cal Adjustments are possible.

Probes are factory calibrated and perform an automatic self-check each time a measurement is taken. For many applications no further adjustment is necessary after a **Reset** (pg. 6). Just check ZERO on the uncoated substrate, then measure. However, sometimes readings can be influenced by changes in substrate, such as shape, composition, and surface roughness. That is why Cal Adjustments are made possible. The symbol disappears whenever a Cal Adjustment is made to the Gage.

Where a Cal Adjustment method has not been specified, use a 1-point method first. If measuring the included shims on your surface reveals inaccuracies, use the 2-point method. Factory Cal settings can be restored at any time by performing a **Reset** (pg. 6), creating a NEW Cal setting (See **Cal Memory**, pg. 5), or by DELETING the adjustments made to the Cal 1 calibration setting (pg. 5). The symbol appears on the display whenever factory Cal settings are in use.

For "**FN**" gages, calibration adjustments are made independently to the "**F**" or "**N**" modes, and are stored together within a particular Cal.

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Cal Settings Menu

1 Pt Adjust ⸱1⸱

A **1-Pt Cal Adjustment,** also known as an offset or correction value, can be performed in **five ways**:

(i) Simple Zero Adjustment- Measure the uncoated part. Lift the probe and adjust to "0" using the ⊕ and ⊖ buttons.

> **NOTE:** A **Simple Zero Adjustment** cannot be performed when **Calibration Lock** is enabled (default). Disable **Calibration Lock** (pg. 5) to perform this adjustment.

(ii) Average Zero Adjustment **Zero** A preferred method to **(i)** is to average 3 to 10 measurements on the uncoated part.

(iii) Simple Adjustment to a Known Thickness- Measure a shim of known thickness placed on the uncoated part. Lift the probe and adjust to the shim thickness using the ⊕ and ⊖ buttons.

> **NOTE:** A **Simple Adjustment to a Known Thickness** cannot be performed when **Calibration Lock** is enabled (default). Disable **Calibration Lock** (pg. 5) to perform this adjustment.

(iv) Average Adjustment to a Known Thickness **1 Pt Adjust** A preferred method to **(iii)** is to average 3 to 10 measurements of a shim of known thickness placed on the uncoated part.

(v) Zero Offset- Useful when measuring coating thickness over rough or blasted substrates without access to the uncoated representative substrate. Predefined **Zero Offset** values can be selected according to the blast profile height in accordance with ISO 19840. Alternatively, a custom Zero Offset can be entered. The Zero Offset value is subtracted from each reading.

> **NOTE:** If the uncoated representative substrate is available, performing an **Average Adjustment to a Known Thickness** (above) is recommended for best accuracy.

2 Pt Adjust ⸱2⸱

Provides greater accuracy within a limited, defined range.
Measure known coating thicknesses that are thinner (often zero) and thicker than the expected thickness range.

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Cal Lock ✓

When enabled (default), the Calibration Lock icon Ⓒ will appear on the display. This prevents an adjustment from being performed inadvertently if the ⊖ or ⊕ buttons are pressed.

Cal Memory *(Advanced models only)*

The current **Cal Setting** (ex. Cal 3) is displayed in the upper right corner of the display. A stored **Cal Setting** can be selected when returning to a particular part. Cal 1 can be adjusted but never deleted, and is always made active with factory settings after a **Reset** (pg. 6). A new **Cal Setting** cannot be created if a batch is open with readings present.

Edit

Create meaningful **Cal Memory** names directly on the Gage using the onscreen QWERTY touch keyboard — helpful when storing multiple **Cal Memory** adjustments.

N Lock ✓ *(FN ferrous/non-ferrous combination probes only)*

Use when operating regularly on non-ferrous substrates. The Ⓝ icon appears and the probe will only use the eddy current principle to shorten measurement time and extend battery life. Also useful when measuring coatings over plated or partially magnetic grades of stainless steel.

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Setup Menu

Units

Converts the display from metric to imperial and vice versa.

Reset

Reset (menu Reset) restores factory settings and returns the Gage to a known condition. The following occurs:

- All batches, stored measurements, batch names and screen captures are erased.
- Calibration adjustments are returned to factory settings.
- Menu settings are returned to the following:

Memory = OFF	**Bluetooth & Stream** = OFF
Hi Res = OFF	**WiFi & Access Point** = OFF
Statistics = OFF	**USB Keyboard & Stream** = OFF
Hi Lo Alarm = OFF	**BLE Keyboard** = OFF
Scan Mode = OFF	**Display** = None
Auto Dim = ON	**N Lock** = OFF
Cal Lock = On	

Perform a more thorough **Hard Reset** as follows:

1. Power down the Gage and wait 5 seconds.
2. Simultaneously press and hold the ⊕ and ☰ buttons until the **Reset** symbol ↻ appears.

This returns the Gage to a known, "out-of-the-box" condition. It performs the same function as a menu **Reset** with the addition of:

- Bluetooth Pairing info is cleared.
- Menu settings are returned to the following status:

Units = Metric	**Fast Mode** = OFF	**Battery Type** = Alkaline
Touch = ON	**Sound** = Medium	**Bluetooth Smart** = OFF
Flip Lock = OFF	**Language** = English	**USB Drive** = ON
Auto Sync .net = ON	**Backlight** = Normal	

NOTES:

- Keep the gage away from metal during a **Reset.**
- Date, Time and WiFi settings are not affected by either **Reset**.

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Hi Res ✓

Increases the displayed resolution. Accuracy is not affected.

Fast ✓ ▶▶

Increases measurement speed. Useful for quick inspection or when measuring large areas with thick coatings where proper probe positioning is not critical. Swift up/down probe movement is required. Reduced accuracy may be noted.

NOTE: For **FN** probe models, the **N** mode is disabled in **Fast Mode**.

Scan ✓ *(Advanced models only)*

By default, the **PosiTector** *6000* takes approximately 1 reading per second. **Scan** mode allows the user to take multiple readings in rapid succession (3 readings per second) without lifting the probe. Choose from 3 **Scan** modes:

•**Normal -** continuously measures when placed on the surface
•**Statistics** - displays real-time scan statistics when placed on the surface. Average, max., min., and standard deviation are displayed.
•**Limited # Avg.** - continuously measures until user-specified number of readings is reached, then displays the average for the scan.

When **Memory** is on (pg.9), **Scan** measurement data is recorded. However, in **Statistics** and **Limited # Avg. Scan** modes, only the statistics and/or avergage is saved, not individual readings. Note that performing a scan may reduce the life of the probe and is recommended for smooth surfaces only.

Sound

Adjusts the volume of built-in speaker (Off, Low, Medium, High).

Flip Lock ✓

Disables the **Auto Rotate** feature by locking the display in its current orientation.

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| Touch | ✓ |

Allows the touch screen functionality to be disabled. All gage functions can also be controlled using the navigation buttons.

| Set Clock |

All measurements are date and time stamped (24-hour format) when stored into memory. It is therefore important to set the correct date and time. Use the ▲ and ▼ buttons to select a value, and the ⊖ and ⊕ buttons to adjust it. The current date and time setting can also be viewed at the top of the main menu.

| Battery Type |

Selects the type of batteries used in the Gage from a choice of "Alkaline", "Lithium" or "NiMH" (nickel-metal hydride rechargeable). The battery state indicator symbol is calibrated for the selected battery type. No damage will occur if the battery type used in the Gage does not match the selected battery type.

Statistics Mode

| Statistics | ✓ X̄ |

A statistical summary will appear on the display. Remove the last reading by pressing the ⊖ button. Press ⊕ to clear statistics.

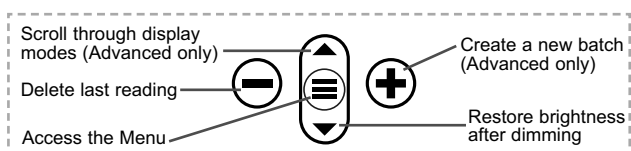| X̄ – Average | σ – Standard Deviation |
| ↑ – Maximum Value | ↓ – Minimum Value |

| HiLo Alarm | ✓ ↕ |

Allows Gage to visibly and audibly alert the user when readings exceed user-specified limits.

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Memory Management

The **PosiTector** *6000* has internal memory storage for recording measurement data. Stored measurements can be reviewed on-screen or accessed via computers, tablets and smart phones. All stored measurements are date and time-stamped. The ▯ symbol appears when the Gage is set to store measurement data.

**Standard models** store up to 1,000 readings in one batch.

**Advanced models** store 250,000 readings in up to 1,000 batches. "New Batch" closes any currently opened batch and creates a new batch name using the lowest available number. New batch names are date-stamped when they are created.

Scroll through display modes (Advanced only)

Delete last reading

Access the Menu

Create a new batch (Advanced only)

Restore brightness after dimming

Screen Capture
Press both ⊖ and ⊕ buttons simultaneously to save an image of the current display. The last 100 screen captures are stored in memory and can be accessed when connected to a computer (see **PosiSoft USB Drive** pg. 10).

New PA2

Helps determine if film thickness over a large area conforms to user specified min/max levels.

New 90/10

Helps determine if a coating system complies with the IMO performance standard for protective coatings.

New 19840

Helps determine if a protective coating system complies with the ISO 19840 acceptance criteria for measuring coating thickness on rough substrates.

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Accessing Stored Measurement Data

DeFelsko offers the following free solutions for viewing, analyzing and reporting data:

PosiSoft USB Drive - Connect the Gage to a PC/Mac using the supplied USB-C cable. View and print readings and graphs using universal PC/Mac web browsers or file explorers. No software or internet connection required.

PosiSoft Desktop - Powerful desktop software (PC/Mac) for downloading, viewing, printing and storing measurement data. Includes a customizable, templated PDF Report Generator. No internet connection required.

PosiSoft.net - Web-based application offering secure, centralized storage of measurement data. Access your data from any web-connected device.

PosiTector App - (*Advanced models only)* App for compatible iOS and Android smart devices. Permits users to create, save and share professional PDF reports. Add images and notes using the smart device's camera and keyboard.

Connect Menu

| **WiFi** | *(Advanced models only)* |

Allows connection to your local wireless network or mobile hot spot. Ideal for using your network's internet connection for synchronizing stored measurements with **PosiSoft.net** (above).

| **USB** |

When **USB Drive** is enabled ✓ , the PosiTector uses a USB mass storage device class which provides users with a simple interface to retrieve stored data in a manner similar to USB flash drives and digital cameras. **USB Drive** is also required to import stored measurements into **PosiSoft Desktop** software (above).

NOTE: While connected, power is supplied through the included USB-C cable. The batteries are not used and the body will not automatically power down.

Keyboard *(Advanced models only)*

When enabled and connected to a computer, the PosiTector will be recognized as a *Keyboard*. Readings are sent to the computer as they are taken, emulating keystrokes, followed by a carriage return.

Stream *(Advanced models only)*

Stream individual readings to a USB connected computer via a serial protocol. Ideal for use with serial compatible SPC data collection software.

Sync .net Now

The above **WiFi** and **USB** menus contain a **Sync .net Now** option. When selected, the Gage immediately synchronizes stored measurement data via its respective communication method (internet connection required). Alternatively, select **Auto Sync .net** from within the **USB** connect menu to automatically synchronize upon connection to a PC. Additional measurements added to memory while connected are synchronized only when the USB cable is disconnected and reconnected, or when the **Sync.net Now** option is selected. **WiFi** connected gages automatically attempt synchronization upon power-up.

NOTE: **PosiSoft Desktop** is required when using **USB** to synchronize measurements with PosiSoft.net.

Bluetooth *(Advanced models only)*

Allows individual readings to be sent to a computer, printer or compatible device as they are taken using Bluetooth wireless technology.

Bluetooth Smart *(Advanced models only)*

Allows communication with a smart device running the **PosiTector App** (pg. 10) via auto-pairing **Bluetooth Smart** (BLE) wireless technology.

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Sync Batches

Select batches to flag them for synchronization to the PosiTector App. **Sync Batches** is useful when connecting a new device to a gage with pre-existing batches, since only batches created while **Bluetooth Smart** is enabled are automatically selected.

Selected batches are synchronized when the next reading is taken in a batch flagged for synchronization, or when the **Sync Batches** option is selected at the bottom of the list of selected batches.

NOTE: If **Bluetooth Smart** is disabled or disconnected, data from batches selected in the **Sync Batches** menu are held in a queue until communication with the PosiTector App is re-established.

Send Batches

Transfers selected batches to the PosiTector App. **Send Batches** is useful when switching between devices, as only readings and batches that have yet to be synchronized with any smart device are synchronized automatically.

The **Send Batches** option is visible in the menu when the Gage is connected to a smart device running the PosiTector App.

BLE Keyboard   *(Advanced models only)*

When enabled and connected to a computer, the **PosiTector** will be recognized as a wireless **Keyboard**. Readings are sent to the computer as they are taken, emulating keystrokes, followed by a carriage return.

Updates

Determine if a software update is available for your Gage.

WARNING: The Gage will perform a **Hard Reset** (pg. 6) after an update. All stored measurements will be erased from memory.

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Returning for Service

Before returning the instrument for service…

1. Install new or newly recharged batteries in the proper alignment as shown within battery compartment.

2. Examine the probe tip for dirt or damage. The probe should move up and down freely.

3. Perform a **Hard Reset** (pg. 6).

4. Place a plastic shim onto bare metal (steel or non-ferrous metal, depending upon whether you have an "**F**" or "**N**" probe) and attempt a measurement. (see **Verification**, pg. 3)

5. If issue is not resolved, **Update** (pg. 12) your **PosiTector** gage body and re-attempt measurements.

IMPORTANT:
If these steps do not resolve the issue and the Gage must be returned for service, please follow the instructions provided at