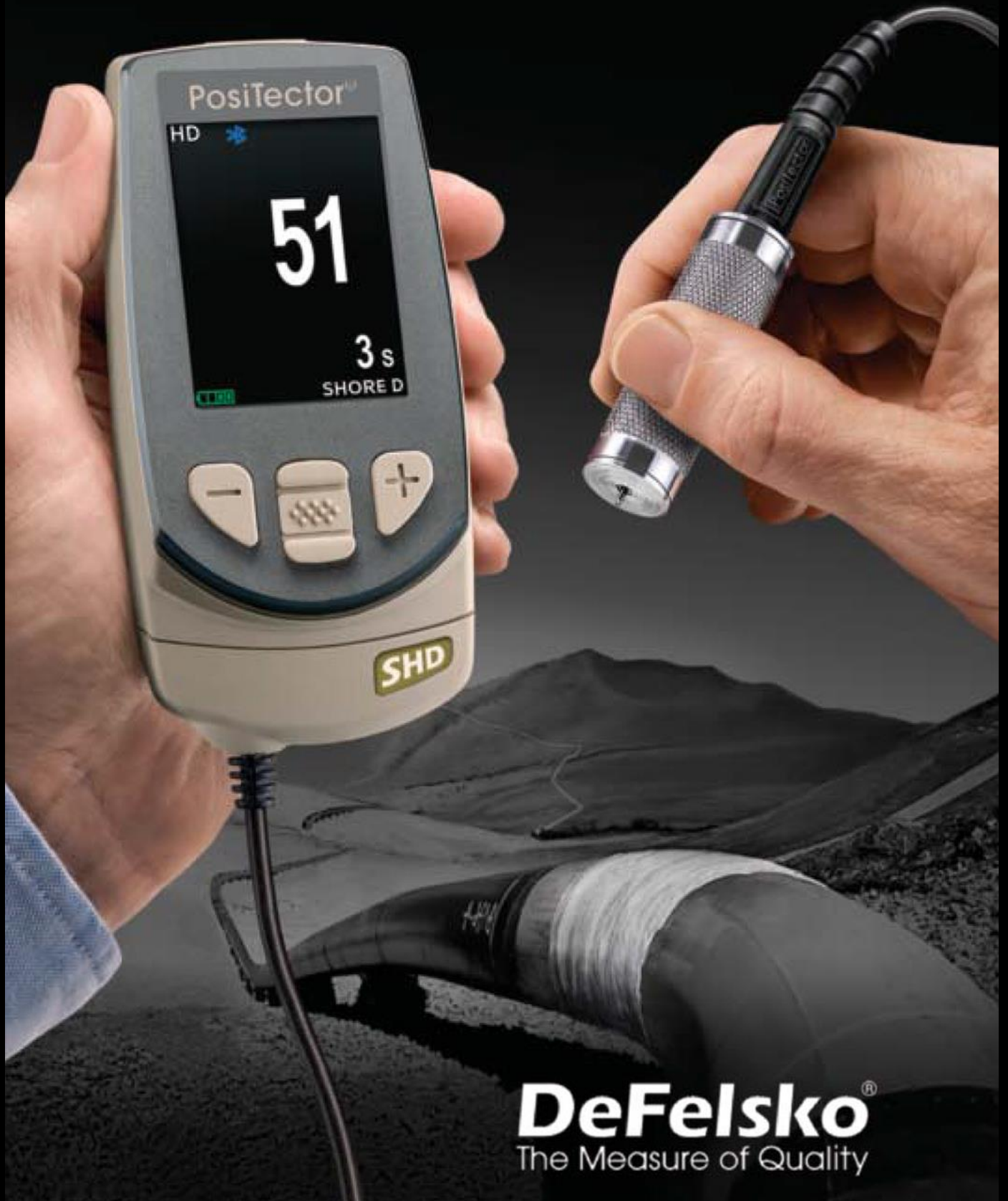


PosiTector[®] **SHD**

Shore Hardness Durometer

Full Guide v. 1.0



DeFelsko[®]
The Measure of Quality

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Introduction


The **PosiTector** Shore Hardness Durometer (**SHD**) is a hand-held electronic instrument that measures the indentation hardness of non-metallic materials. The **PosiTector SHD** gage consists of a PosiTector body (Standard or Advanced) and an interchangeable probe (SHD-A or SHD-D).

PosiTector SHD: Included Accessories

- **Probe only:**
 - Quick Guide instructions
 - test block
 - protective rubber cap for probe
 - Certificate of Calibration traceable to NIST
- **Gage (in addition to above Probe accessories):**
 - protective rubber holster with belt clip
 - USB cable
 - wrist strap
 - nylon carrying case with shoulder strap
 - protective lens shield
 - 3 AAA alkaline batteries

Quick Start

The **PosiTector SHD** powers-up when the center navigation  button is pressed. To preserve battery life, the Gage powers down after approximately 5 minutes of no activity. All settings are retained.

1. Remove the protective rubber cap from the probe.
2. Power-up the Gage by pressing the center navigation  button. Ensure the probe indenter (pg. 3) is not in contact with any surface.
3. Measure
 - a. Press the probe down onto the material to be measured until the presser foot is in full, flat contact with the surface. HOLD STEADY against the surface.
 - b. The Gage will emit a single BEEP and display a ▼ symbol indicating a reading is being taken. The test timer will begin counting down (see **Test Time**, pg. 6). When the timer reaches **0s**, the Gage will BEEP twice and display the measurement value.
4. Lift the probe from the surface between readings.

Verify accuracy (pg. 4) on test blocks at the beginning and the end of each shift, or if the gage is dropped or suspected of giving erroneous readings.

IMPORTANT:

Do not place the indenter on hard materials such as steel or glass. Doing so may damage the indenter and cause the probe to read out of tolerance. Replace the rubber cap to protect the indenter and presser foot when not in use.

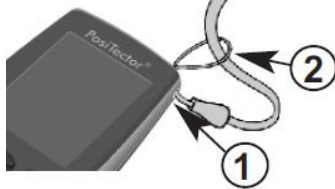
Damage to the indenter caused by measuring on hard materials is not covered by DeFelsko's warranty.

Protective Cap

PosiTector SHD probes are shipped with a protective rubber cap over the probe. Remove this cap prior to use. Replace the rubber cap to protect the indenter and presser foot when not in use.

Wrist Strap

We recommend attaching and wearing the supplied wrist strap.



Protective Lens Shield

The Gage display lens is covered with a thin plastic film for protection against fingerprints and other marks during shipment. This film, while usually removed before using the instrument, can be left in place if desired. Replacements can be purchased.

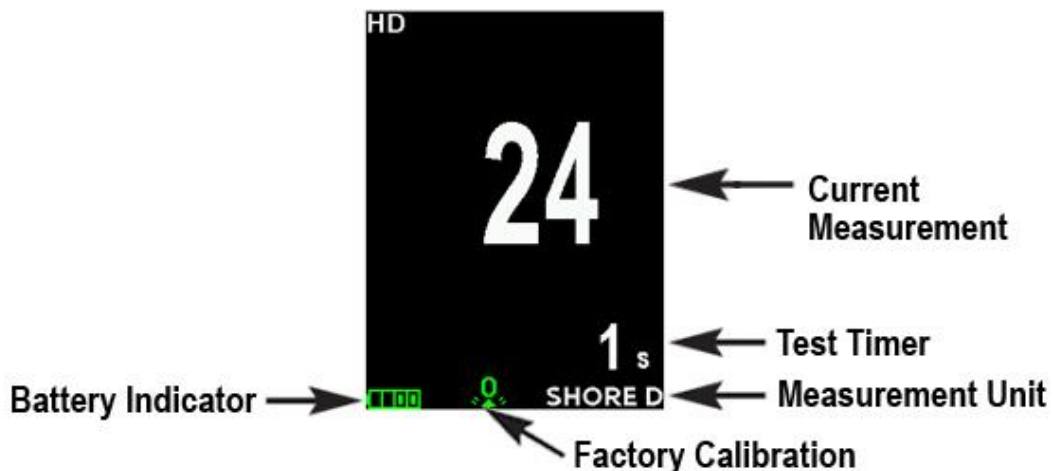
Certification

All **PosiTector SHD** probes include a Certificate of Calibration. For organizations with re-certification requirements, instruments may be returned at regular intervals for calibration. DeFelsko recommends that customers establish calibration intervals based upon their own experience and work environment.

Based on our product knowledge, data and customer feedback, a one year calibration interval from either the date of calibration, date of purchase, or date of receipt is a typical starting point. Written calibration procedures are available from DeFelsko Corporation at no charge.

See: www.defelsko.com/quality/calibration_procedures.htm

Typical Screen



Why is Measurement Important?

A hardness test is useful to determine a material's suitability for a particular application, or a specific process used to produce the material.

The measured "hardness" of a material may be described as its resistance to permanent indentation.

In simple terms, indentation hardness is measured by pressing an indenter into a material's surface with a specific load (or force) for a designated time interval. Shore durometers indicate a hardness value which is determined by the distance the indenter is allowed to push into the material either upon contact (initial hardness), or after a given period of time.



Probes

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

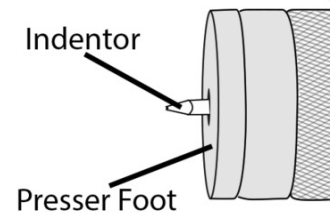
To disconnect a probe from a body, slide the plastic probe connector horizontally (in the direction of the arrow) away from the body. Reverse these steps to attach a different probe. It is not necessary to power-down the Gage when switching probes.

The **PosiTector** gage body accepts a wide variety of probe types including magnetic, eddy-current and ultrasonic coating thickness, surface profile, environmental, shore hardness and ultrasonic wall thickness probes. See www.defelsko.com/probes

The **PosiTector SHD** probe consists of an indenter, calibrated spring and a presser foot.

Two probe models are available for measuring on a variety of materials:

- **PosiTector SHD-A** (Shore A) - soft rubber, elastomers, neoprene, silicone, etc.
- **PosiTector SHD-D** (Shore D) - hard rubber, epoxies, hard plastics, PVC, acrylic, etc.



Calibration, Verification and Adjustment

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 test block.
3. **Adjustment** - to a known hardness

Calibration

Calibration is the high-level, controlled and documented process of measuring traceable calibration standards over the full operating range of the probe, and verifying that the results are within the stated accuracy of the probe. Calibrations are performed by the manufacturer, their authorized agent, or by an accredited calibration laboratory in a controlled environment using a documented process.

Verification

Verification is an accuracy check performed by the user on known reference standards. A successful verification requires the Gage to read within the combined accuracy of the probe and the test blocks. Instrument operation may be verified with the included test block.

Place the test block on a flat, hard surface and take three to five readings. The measurement points should be at least 6mm (0.24") apart. If the average of those readings is outside than the combined accuracy of the test block and gage, the gage may require service.

Some causes for the gage to not read properly are the indenter being damaged, incorrect pressure being applied to the test block or temperatures beyond normal conditions.

Verify accuracy at the beginning and the end of each work shift. During the work shift, if the Gage is dropped or suspected of giving erroneous readings, its accuracy should be re-verified.

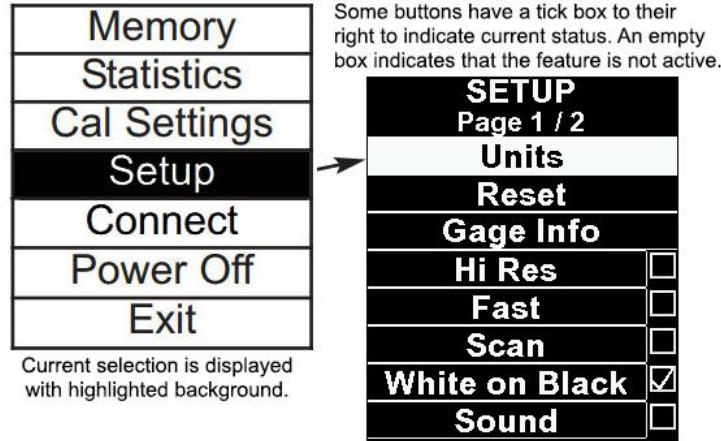
Adjustment

Adjustment, or Calibration Adjustment, is the act of aligning the Gage's readings to match that of a known reference in order to improve accuracy of a gage on a specific material.
(see **1 Pt Adjust**, pg.5)

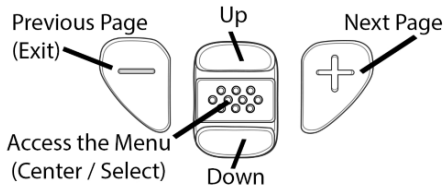
Menu Operation

Gage functions are menu controlled. To access the Menu, power-up the gage, then press the center navigation button.

Below is a sample menu for a **PosiTector SHD Advanced Model**:



To navigate, use the **Up** and **Down** buttons to scroll vertically and **SELECT**.



Press the **(+)** button to switch pages in a multipage menu.

Press the **(-)** button to return to the previous menu or page.

Select **Exit** to exit from any menu.

Cal Settings Menu

1 Pt Adjust


Adjusts the Gage to a known material hardness.

Step 1: Select **1 Pt Adjust** from the **Cal Settings** menu.

Step 2: Press the **(+)** button to select the number of readings to be used to obtain an average, typically 3 to 10 readings. The greater the variation between readings, the more readings should be taken to obtain an average.

Step 3: Repeatedly measure the known hardness sample using the on-screen green arrows as a guide. After the final reading, the Gage will calculate and display an average measurement value of all readings taken on the sample. If the expected hardness value is not obtained (within tolerance), adjust the displayed value up **(+)** or down **(-)** to the known hardness value and press **SELECT** to enter the value.

Cal Reset

Restores the gage back to factory calibration and range settings. The  icon will appear on the display.

Setup Menu

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

Auto Sub-Batch = OFF

Statistics = OFF

Hi Lo Alarm = OFF

Hi Res = OFF

Bluetooth & Stream = OFF



WiFi & Access Point = OFF

Auto Ignore 20/90 = OFF

Auto Dim = ON

Cont. Reading = OFF

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

1. Power down the Gage and wait 5 seconds.
2. Simultaneously press and hold the **(+)** and  center 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:

Bluetooth Smart = OFF

Test Time = 1 second

Sound = ON

Backlight = Normal

Flip Display = Normal

Auto Sync .net = ON

USB Drive = ON

Language = English

Battery Type = Alkaline

NOTE: Date, Time and WiFi settings are not affected by either **Reset**.

Gage Info

Displays the model number & serial number, probe type & serial number, PosiSoft.net registration key, the amount of remaining memory for storage of readings, date and time, and software packages.

For security purposes, the registration key is required to add the instrument to your free PosiSoft.net account.

Test Time

The **PosiTector SHD** has an on-screen timer to measure the hardness of a material after a given period of time as defined by international standards, typically 1, 3 or 15 seconds.

Use the **(-)** and **(+)** buttons to adjust the test duration. When taking a reading, the timer starts automatically once the presser foot is on the surface and the **▼** symbol appears on the display.

Hi Res.

Increases the displayed Gage resolution to 0.1.

NOTE: Gage accuracy is not affected.

Auto Ign.

(Auto Ignore)

According to most international standards, readings below 20 and above 90 are not considered reliable. When enabled, measurement results outside 20/90 will emit a low tone and will not be included in **Memory** or **Statistics**.

NOTE: If values above 90 Shore A are measured, the **PosiTector SHD-D** probe should be used. If values below 20 Shore D are measured, use the **PosiTector SHD-A** probe.

Cont. Reading

(Continuous Reading)

When enabled, the gage will continuously display probe readings. Ideal when a test timer is not required or when performing a calibration verification. **Cont. Reading** is not available when **Memory**, **Statistics** or **HiLo Alarm** modes are enabled.

Sound

Toggle the Gage sounds ON (checked) or OFF (unchecked).

Flip Display

This option causes the display to read upside down.

Backlight

Selects display brightness (Sun, Normal or Night). All settings will dim slightly after a period of no activity to conserve battery life. Press the **Down** button to brighten the display.

Set Clock

All batches are date-stamped when created, and all readings are time-stamped (24 hour format) when stored into memory. It is therefore important to keep both the date and time current using this menu option. Use the **Up** and **Down** buttons to scroll, and the **(-)** and **(+)** buttons to adjust a value. The instrument's data and time can also be viewed in Info.

Battery Type

Selects the type of batteries used in the Gage from a choice of "Alkaline", "Lithium" or "NiMH" (nickel-metal hydride rechargeable). If "NiMH" is selected, the Gage will trickle charge the batteries while connected via USB to a PC or optional AC power supply (USBAC). 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.

Language

Converts displayed and printed words to the selected language.

Statistics Mode

Statistics \bar{x}

A statistical summary will appear on the display.

Remove the last reading by pressing the (-) button. Press (+) to clear statistics.

\bar{x} - Average

\uparrow - Maximum Value

σ - Standard Deviation

\downarrow - Minimum Value

Hi Lo Alarm \updownarrow

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


Clear

Clears all on-screen Statistics and HiLo tabulations.

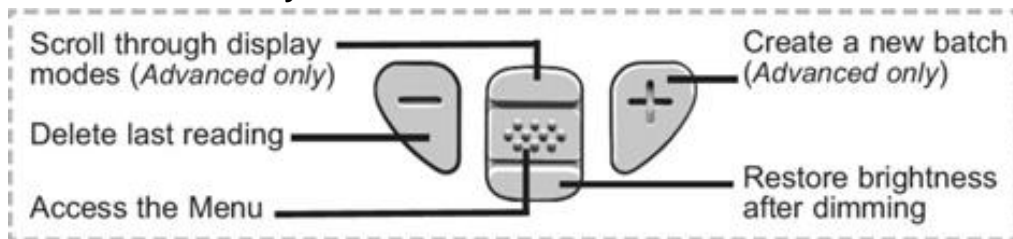
SHORTCUT: Press the (+) button while viewing the measurement screen to Clear.

Memory Management

The **PosiTector SHD** 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 and basic statistics are displayed when the Gage is set to store measurement data.

Button functions when **Memory** is ON:



Screen Capture

Press both (-) (+) buttons at any time to capture and save an image copy of the current display.

The last 10 screen captures are stored in memory and can be accessed when connected to a computer (see **PosiSoft USB Drive**, pg. 13).


Standard models store up to 250 readings in one batch.

The **Memory** menu includes the following options:

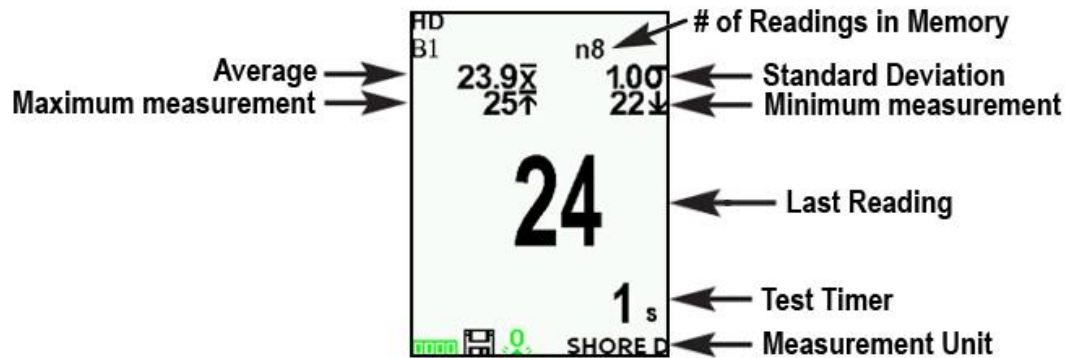
On: turns memory on and begins recording

Off: stops recording (stored readings remain in memory)

Clear: removes all readings from memory

View: lists group statistics and all stored readings on the display. It will begin by showing statistics based on all readings in memory. Use the **Up** and **Down** buttons to scroll through all readings. Press  to exit.

Standard model display with **Memory ON** shows measurement statistics:



Advanced models store 100,000 readings in up to 1,000 batches.

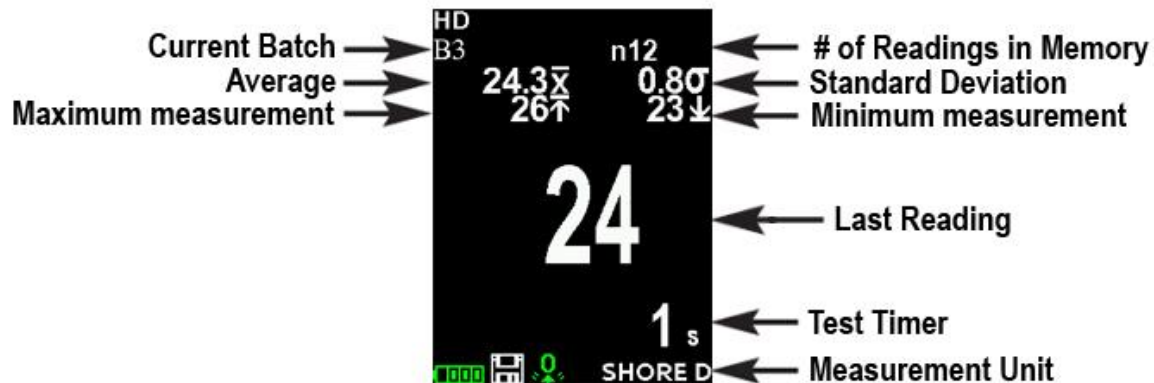
The **Memory** menu includes the following options:

New Batch

Closes any currently opened batch and creates a new batch name using the lowest available number. For example, if only **Batch 1** and **Batch 3** exist, then **Batch 2** would be created and made the current batch. Each measurement will be displayed and stored into this new batch. New batch names are date stamped at the time they are created.

NOTE: When a batch is open, press **(+)** to create a new batch.

Advanced model display:



NOTE:

- * Remove the last reading from the current open batch by pressing **(-)**.
- * Calibration adjustments cannot be made if readings are stored in memory.

Display

The default display mode shows a statistical summary. Press the **Up** navigation button to display other modes:

- **Chart:** Displays a live graph of measurements data
- **Notes:** Displays a batch note (see Annotate, pg. 10)

New Sub-Batch (appears only if a batch is currently open)

Creates a new sub-batch within the currently opened batch.

NOTE: When a sub-batch is open, create a new sub-batch by pressing (+)

This option will automatically create a new sub-batch after the required number of readings is stored in the current sub-batch. Use the (-) and (+) buttons to set the number of readings to store in each sub-batch, then select **New** to open the first sub-batch.



Open

Select a previously created batch or sub-batch name to open and make current. If it contains measurements, on-screen statistics will immediately reflect values calculated from this batch. The calibration setting (i.e. Cal 2) associated with this batch is also opened.

NOTE: A solid triangle ► is displayed to the right of the batch name when sub-batches are present. Press [grid] to view sub-batches. This also applies to the **Delete**, **View** and **Print** options.

Close

Stops the recording process, closes the current batch or sub-batch, and removes the statistics from the display.

Delete

Remove a batch or sub-batch completely from memory. The name is deleted and all measurements are erased. Sub-batches can be deleted individually.

To delete all related sub-batches, simply delete the top-level batch.

View

Scroll using the **Up** or **Down** buttons through information, statistical summary, and a list of each reading in the currently opened batch. Press [grid] to exit.

Annotate

Create meaningful batch names and enter notes directly on the Gage using a familiar onscreen QWERTY keyboard. Use the Gages navigation and (-)(+) buttons to enter annotations. Annotations can be synchronized with PosiSoft.net and are included in PosiSoft USB Drive reports.



Print

Sends a statistical summary and individual measurements to the optional Bluetooth wireless printer. (Advanced models only)

NOTE: To cancel printing, press and hold the (-) and (+) buttons simultaneously.

Batch Summary

Displays a summary of all stored batches including the name, probe type, number of readings and type.

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 cable. View and print readings and graphs using universal PC/Mac web browsers or file explorers. No software or internet connection required. **USB Drive** must be selected in the Gage's "**Connect > USB**" menu (pg. 13).

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, serial numbers 784000+*) 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.

For more information on our PosiSoft solutions, see: www.defelsko.com/posisoft


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 (pg.11). See www.defelsko.com/wifi


Enable

Turns WiFi functionality **ON**. When selected, the  icon will appear on the display. To deactivate WiFi, uncheck the Enable box.

Access Point




Connect your smart device/computer to a PosiTector Advanced body wirelessly without the need for a separate network. Wirelessly import readings into legacy PosiSoft 3.0 Desktop Software or whenever a WiFi network is not available or out-of-range.

To enable, select **Access Point** from the **Connect > WiFi** menu. The Access Point icon  will display in the upper left of the PosiTector display.

Securing your Access Point -

To ensure the PosiTector is only accessible to authorized devices, it is important that you enter a passphrase (password) for the Access Point. The default Passphrase is **password**.

In the **Connect > WiFi > Setup** menu, select **AP Passphrase**.

Press  button to display on-screen keyboard. Enter a Passphrase for the Access Point. The Passphrase will be required for all devices connecting to the PosiTectors Access Point.

The PosiTector is now visible to all WiFi enabled devices. Simply connect your devices WiFi to the new PosiTector Access point. All PosiTectors are uniquely identified by their respective gage body serial numbers.

AP Channel - Default Channel: 6

For most users the default channel will not have to be altered. If you are experiencing poor connection or are unable to connect, try another channel.

In the **Connect > WiFi > Setup** menu, select **AP Channel**.

Press the **UP** center navigation button to highlight the channel. Use the **(-)** or **(+)** buttons to change the channel. Press the **DOWN** navigation button and select **OK**. Press the  button.

Networks: With **WiFi Enabled** (pg. 11) the Gage will allow the user to add a new network and will automatically check for available local networks. Available networks detected by the Gage are listed on the screen along with any networks that the Gage has previously been connected to that are not currently within connection range.

Information: Gage displays information about the local WiFi network connection including...

- **SSID:** the network's name
- **State:** displays if the Gage is connected to the network or not
- **IP Address:** the network's IP Address

Setup: Allows user to setup a WiFi connection

- **IP Settings:** enter the IP information as follows...

IP Type (DHCP or Static), IP Address, Gateway, Netmask, DNS1, DNS2

- **Server Enable:** enables a connection between the network and the Gage
- **Gage Name:** enter a name for the Gage (up to 14 Characters).

AP Channel: The access point channel corresponding to a frequency range. (Default Channel: 6)

AP Passphrase: A series of characters, numbers or symbols used to log on to a WiFi network.

(Default Passphrase: password)

- **WiFi Reset:** erases all WiFi settings

USB

When **USB Drive** is checked , the **PosiTector** gage 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, digital cameras and digital audio players.

USB Drive is also required to import stored measurements into PosiSoft Desktop software (pg.11). Once connected, any computer can view measurements stored in memory by navigating a virtual drive labeled "PosiTector" using the included USB cable.

A formatted HTML report is viewed by selecting the "index.html" or "START_HERE.html" file found in the root directory. Optionally, text ".txt" files located in each batch folder provide access to measurement values. Stored datasets and graphs can be viewed or copied using universal PC/Mac web browsers or file explorers.

When your **PosiTector** is first connected to your Windows PC via a USB cable, an enumeration process is started that installs device drivers without re-booting your computer. You may see several pop-up windows in the taskbar at the bottom right of your screen. Wait for the entire process to be completed before proceeding.

Retrieving stored screen captures:

The last 10 screen captures stored in memory can be accessed by navigating to the "screen capture" directory within the "PosiTector" virtual drive.

NOTE: When connected, power is supplied through the USB cable. The batteries are not used and the body will not automatically power down. If rechargeable (NiMH) batteries are installed, the instrument will trickle charge the batteries.


Sync .net Now

The below **WiFi**, **USB** and **Bluetooth** 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 (pg. 11) is required when using **USB** connections to synchronize measurements with PosiSoft.net.

Bluetooth Smart (Advanced models only, serial numbers 784000 and greater) 

When **Enabled** , allows communication with a smart device running the PosiTector App (pg. 11) via auto-pairing Bluetooth Smart (BLE) wireless technology.

Select batches to flag them for synchronization to the PosiTector App. New batches created while **Bluetooth Smart** is enabled are automatically selected.

Sync Batches


With **Bluetooth Smart** enabled, select **Sync Batches** to transfer selected batches to the PosiTector App. This is useful when switching between smart devices, as only readings and batches that have yet to be synchronized with any smart device are synchronized automatically.

NOTE: If **Bluetooth Smart** is disabled, 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 (useful when switching between devices).

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

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.

Pairing

The instrument and receiving device must be paired before stored or streamed datasets can be transmitted. For pairing instructions

Info

Lists information about your current Bluetooth connection, including the currently paired device and MAC address.

Stream

When checked, the instrument will stream datasets to the paired Bluetooth Device as they are taken. Datasets can be streamed as they are taken to the optional Bluetooth printer or third-party computer software.

Powder Probes

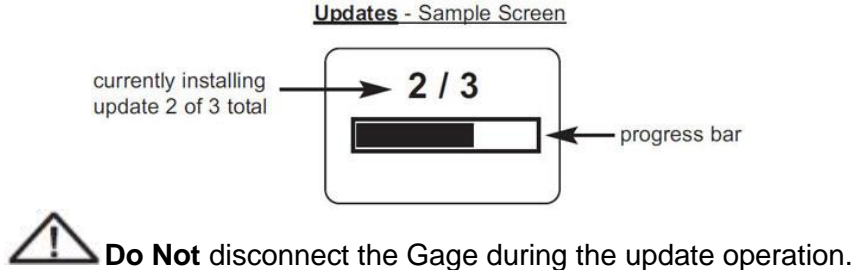
Displays menu options that enable the PosiTector body to communicate with wireless **PosiTector PC** probes.

Updates

Determine if a software update is available for your Gage.



To perform an update the Gage must be connected to an internet connected PC with PosiSoft Desktop Manager (pg. 11) or **WiFi** network.


WARNING: Ensure that stored measurements are backed up to a PC or PosiSoft.net. The Gage will perform a **Hard Reset** (pg. 6) after an update. All stored measurements will be erased from memory.



Power Supply / Battery Indicator

Power Source: 3 AAA alkaline, Lithium or optional Nickel-metal hydride (NiMH) rechargeable batteries. For best battery indicator results, ensure the appropriate **Battery Type** is selected in the **Setup > Battery Type** menu.

The battery indicator  displays a full bar with fresh alkaline or fully charged batteries installed. As the batteries weaken, the bar will be reduced. When the battery symbol is low  the instrument can still be used, but the batteries should be charged or recharged at the earliest opportunity. The instrument will turn off automatically when batteries are very low, preceded by a Low Battery Warning on the display.

 To retain all user settings and stored memory readings, only replace the batteries after the instrument has powered-down. Battery performance decreases at low temperatures.

Troubleshooting

Most conditions can be cleared with a **Hard Reset** (pg. 6). If not, visit our Service & Support page for information on sending your instrument to us for a no charge evaluation.

Probe attempts a measurement even while held in the air:

Turn the Gage OFF, and then ON again. Finally try a Reset.

Hardness readings are inconsistent:

- The indenter may be damaged or worn.
- Make sure you lift the probe well clear of the surface between measurements.

Gage powers-up but will not take any readings:

- Protective cap must be removed from probe (if outfitted with one).

Gage will not print to the Bluetooth wireless printer:

- Ensure the Gage has been paired for use with the printer and the Gage menu option **Connect > Bluetooth > Stream** box is ticked.
- Check printer batteries. Switch it OFF and then ON again.

Technical Data

Measuring Range: 0 – 100 Shore A and Shore D scales

Accuracy: ± 1

Resolution: 0.1

Conforms to:

ASTM D2240, ISO 868/7267/7619, DIN 53505 and others

Gage Size:

137 x 61 x 28 mm

5.4" x 2.4" x 1.1"

Weight: (without batteries)

140 g

4.9 oz.

Temperature Range:

+32° to +120° F

0 to +50° C

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Returning for Service

Before returning the Gage for service...

1. Install new or newly recharged batteries in the proper alignment as shown within battery compartment.
2. Examine the indenter tip and presser foot for dirt or damage.
3. Perform a **Hard Reset**. (pg. 6)
4. Attempt a measurement on the supplied test block. (see **Verification**, pg. 4)
5. If issue is not resolved, **Update** (pg. 15) your **PosiTector** gage body and re-attempt measurements.

IMPORTANT:

If you must return the Gage for service, please fill out and include the Service Form located at [redacted] with the Gage. Be sure to also include the probe, your company name, company contact, telephone number and fax number or email address.

Limited Warranty, Sole Remedy and Limited Liability

DeFelsko's sole warranty, remedy, and liability are the express limited warranty, remedy, and limited liability that are set forth on its website



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