

# PosiTector<sup>®</sup> DPM

Dew Point Meter

Instruction Manual v. 3.1



DeFelsko<sup>®</sup>

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# Introduction


The **PosiTector Dew Point Meter (DPM)** is a hand-held, electronic Gage that continually measures, calculates and records climatic conditions, quickly and accurately. It consists of a body (Standard or Advanced) and probe (Built-In or Separate).


A typical Gage screen is shown (pg. 2), consisting of RH, Ta, Ts, Td, and Ts-Td readings. This group of readings is referred to as a dataset.

## PosiTector DPM Kit Contents

- Humidity, air and surface temperature sensors
- Protective rubber holster with belt clip
- Protective Cap for Surface Temperature Sensor
- Protective Lens Shield
- Wrist Strap
- 3 Alkaline AAA batteries
- Quick Guide Instructions
- Nylon carrying case with shoulder strap
- USB Cable
- Certificate of Calibration traceable to NIST
- Two (2) year warranty on Body and Probe

## Quick Start

The **PosiTector DPM** powers-up when the center navigation button  is pressed. Readings are updated automatically each second. 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 surface temperature sensor.
2. Power-up Gage by pressing the center navigation  button.



**Typical Screen**

%RH	<b>47.6</b>
Ta	<b>27.1</b>
Ts	<b>27.1</b>
Td	<b>15.0</b>
Ts-Td	<b>12.1</b>
°C	

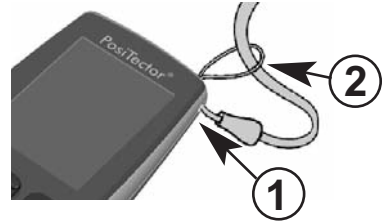
- RH** - Relative Humidity (measured)
- Ta** - Air Temperature (measured)
- Ts** - Surface Temperature (measured)
- Td** - Dew Point (calculated)
- Ts-Td** - Surface *minus* Dew Point Temperature (calculated)
- Tw** - Wet Bulb Temperature (calculated)  
*(Advanced Models Only)*

## Protective Cap

The **PosiTector DPM** is shipped with a protective plastic cap over the surface temperature sensor. Remove this cap prior to use. Replace it when the Gage is not in use to protect the sensor.

## Wrist Strap


We recommend attaching and wearing the supplied wrist strap.



## Protective Lens Shield

The LCD is covered with a thin plastic film for protection against fingerprints and other marks during shipment. This film, while usually removed before using the Gage, can be left in place to protect against paint overspray or debris. Replacements can be purchased.

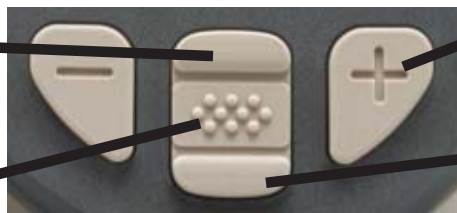
## Operation Overview

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

### Button Functions- Normal Operation

Scroll through  
Trend Charts  
(Advanced only)

Access the Menu



Pause / Resume

Restore brightness  
after dimming  
(Advanced only)

The Pause/Resume (+) button stops values from automatically updating to allow for closer examination of the relationship between the values or to allow time to manually record the entire dataset. Press (+) again to resume.

**RH** - The relative humidity sensor is located inside the white plastic housing. The sensor may require a longer period to stabilize in the event of extreme humidity changes.

**Ta** - The air temperature sensor is also located inside the white plastic housing. (Also known as Dry Bulb Temperature)

**Ts** - A surface temperature thermocouple is located on the tip of the silver probe (built-in probe model). It is spring loaded and designed to quickly self-align on a surface. Press it against a surface and allow a few seconds for the value to stabilize. Do not drag the sensor over the surface. Wet the surface for a faster response. Cover with the included protective plastic cap when not in use.

**NOTE:** For surface temperature measurement on steel over an extended of time, consider using the optional Magnetic Surface Temperature probe (pg. 7).

**Td** - The dew point temperature is a function of air temperature and relative humidity (see ISO 8502-4 Annex A). It is the temperature to which a volume of air must be cooled in order to reach saturation.

**Ts - Td** - The surface minus dew point temperature is important in judging the risk of condensation, or dew, forming on a surface. For example, ISO 8502-4 recommends that, unless otherwise agreed, the temperature of a steel surface generally should be at least 3°C (5°F) above the dew point when paints are applied.

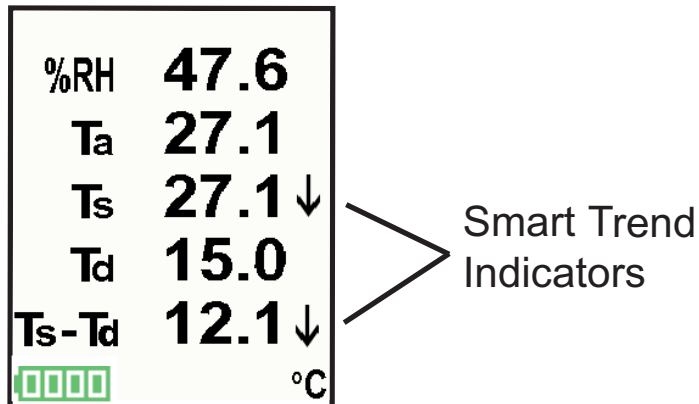
**Tw** - (Advanced models only) The wet bulb temperature is the temperature of adiabatic saturation. This is the temperature indicated by a moistened thermometer bulb exposed to air flow.

The wet bulb temperature is calculated from Ta and RH using an air pressure of 1.0 atmospheres (1013mbar). It approximates the temperature indicated by a moistened thermometer bulb exposed to airflow. Variations of Tw at other pressures could be greater than ±1°C (±2°F).

**NOTE:** Tw can only be displayed with memory off and its value cannot be stored in memory.

The Gage may require a period of time before the above climatic readings stabilize. This is most noticeable when the Gage is relocated from one extreme environment to another (i.e. from a warm location to a cold location). A period of up to 30 minutes should provide adequate time for stabilization.

**Smart Trend™ Indicators** ↑↓ - identify rising, falling or stable readings. The Gage compares each measurement with recent values to provide the current direction of change.



While the absence of an arrow does not necessarily signify stability, it can be taken to mean that particular reading is undergoing little or no change. Slow changes could therefore occur without being noted by an indicator arrow.

### **Calibration**

Calibration is the controlled and documented process of measuring traceable calibration standards and verifying that the results are within the stated accuracy of the Gage. Calibrations are typically performed by the Gage manufacturer or by a certified calibration laboratory in a controlled environment using a documented process.

The **PosiTector DPM** is shipped with a Certificate of Calibration showing traceability to a national standard. For organizations with re-certification requirements, the **PosiTector DPM** may be returned at regular intervals for calibration. DeFelsko recommends that our customers establish Gage 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 online at no charge at [www.defelsko.com](http://www.defelsko.com).



## Why is Measurement Important?

For industrial painters, the primary reason for measuring climatic conditions is to avoid rework and the premature failure of protective coatings. Recommendations and requirements are covered under various internationally recognized standards.

**Temperature** – It is important to measure both surface and air temperatures as they are often different. Application at incorrect temperatures can cause defects including: blistering, pinholing, cratering, dry spray & mud cracking. By measuring surface temperature it is possible to avoid potential application problems if air or surface temperatures become too hot or too cold for satisfactory film formation. Surface and air temperatures directly affect the rate of cure of the applied coating or lining system and are major factors in the formation of surface moisture or dew. ASTM D3276 Standard Guide for Painting Inspectors (Metal Substrates) states that the minimum air/surface temperature is usually 5°C (40°F).

**Relative Humidity** - the amount of moisture in the air expressed as a percent of overall volume. High relative humidity can retard the rate of solvent evaporation. For this reason, the maximum relative humidity at which coatings or linings can be applied and cured is generally set at 85%. This can be set as an alarm in the Advanced model.

**Dew Point Temperature** - the temperature at which moisture will begin to form on a surface. The dew point temperature is a function of air temperature and the relative humidity. (see ISO 8502-4 Annex A). It is the temperature to which a volume of air must be cooled in order to reach saturation. A number of major standards organizations call for careful dew point control. Moisture on a freshly blasted steel substrate will cause the steel to rust. If a thin, invisible film of moisture is trapped between the applied coating and the substrate, the system will likely fail prematurely. To ensure that dew point problems do not exist, ISO 8502-4 and SSPC guidelines state that the surface temperature must be a minimum of 3°C or 5°F above the dew point during the 3 critical phases of coating preparation, application, and cure.

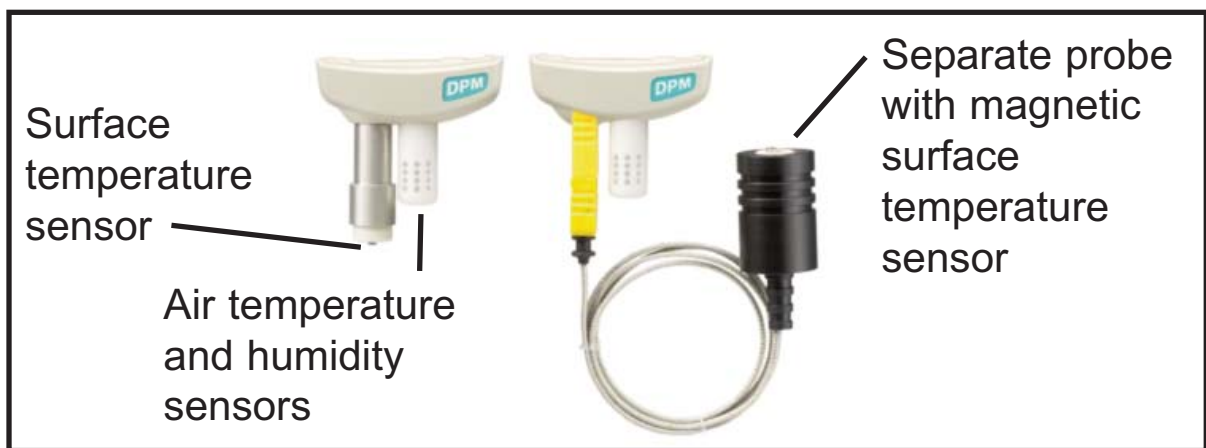
## Probes

The **PosiTector DPM** consists of a body and a probe. Two probe models (Built-In and Separate) are offered, as pictured below. All bodies accept all probes. See **Gage Info** (pg. 11) to find your body and probe type. More information is available at: [www.defelsko.com/dewmeter.htm](http://www.defelsko.com/dewmeter.htm)

To disconnect a probe from a body, power-down the Gage and pull the plastic probe connector horizontally (in the direction of the arrow) away from the body. Reverse these steps to attach a new probe.



When powered-up the **PosiTector** automatically determines what type of probe is attached and does a self-check.



Optionally, the Magnetic Surface Temperature Probe can be disconnected from the K-Type thermocouple connector (separate probe models only) and replaced with one of the following accessories:

### **Hand-held Surface Temperature Probe**

- for spot checking hard-to-reach surfaces

### **Self-adhering Surface Temperature Probe**

- sticks to solid materials including aluminum, wood, concrete, etc. Ideal for unattended monitoring.

### **Liquid Temperature Probe**

- general purpose probe with stainless steel shaft

**CAUTION:**

To ensure optimal performance of your **PosiTector DPM**, do not obstruct the airflow near the air temperature and humidity sensors. Keep fingers away from the sensor, as body heat can cause incorrect readings. Allow time for the Gage to acclimate and for the readings to stabilize when moving the Gage between different environments.


When using the surface temperature probe, do not use excessive downward force, and do not drag it sideways. When the Gage is not in use, place the plastic cap over the surface temperature sensor to prevent damage.

**NOTE:** Additionally, the **PosiTector** accepts a number of probe types including magnetic and eddy current coating thickness, ultrasonic coating thickness, surface profile, environmental and ultrasonic wall thickness probes. For best accuracy, ensure your Gage has the latest software **Updates** (pg. 27) before measuring with a new probe. For the latest information about probe interchangeability, visit [www.defelsko.com/probes](http://www.defelsko.com/probes).



*PosiTector bodies accept all 6000, 200, DPM, UTG, SPG and RTR probes*

# 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 DPM** Advanced Model:

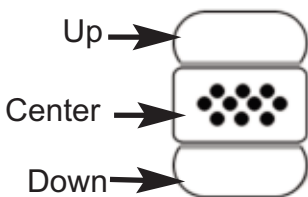
Memory
Auto Log
Alarm
Setup
<b>Connect</b>
Help
Power Off
Exit

Some buttons have a tick box to their right to indicate current status. An empty box indicates that feature is not active.

Sync Now	
USB Drive	<input type="checkbox"/>
Auto SYNC	<input checked="" type="checkbox"/>
Bluetooth	
WiFi	
Powder Probes	
<b>Updates</b>	
Exit	


Current selection is displayed with darkened background

## Navigation Button




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

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

**NOTE:** The center  button is purposely recessed to help eliminate unintentional powering-up of the Gage.

## Alarm Mode


The **PosiTector DPM** can automatically alert the user when current climatic conditions exceed pre-set values. When selected, the Alarm icon  is displayed at the top of the screen. According to ISO 8502-4 and ASTM D3276, steel surfaces should generally be 3°C (5°F) above the dew point when painting. The Alarm mode can be used in conjunction with Memory and Auto Log modes.

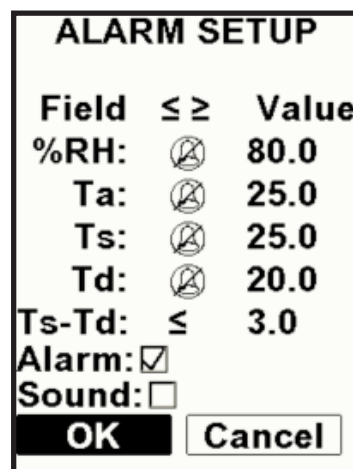
**Standard models** have one, fixed alarm.

When selected, the Gage will alert the user when the surface temperature is less than 3°C (5°F) above the dew point temperature. Enable by selecting the tick box. The Gage will alert the user with an audio tone and the LCD screen will reverse (see right) when conditions may be unsuitable for painting.




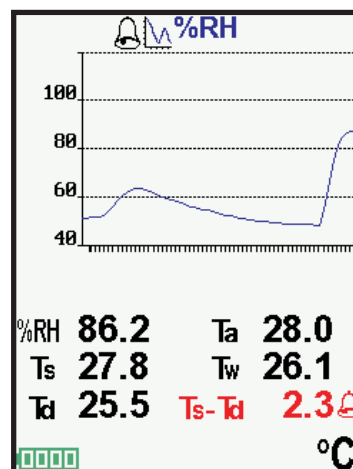
**Advanced models** allow the user to set up custom alarm conditions for each reading in a dataset. Use the **Up** and **Down** buttons to scroll through each value and corresponding operator.

For each reading, select between  (off),  $\geq$  (greater than or equal to), and  $\leq$  (less than or equal to) using the (-) and (+) buttons. Press the down button and set the value using the (-) and (+) buttons.



For example, at upper right, the Gage will alarm if the Ts-Td value is less than or equal to 3.0.

In alarm mode, if an alarm condition is met, the relevant reading is displayed in red, and the Alarm icon  is displayed beside it (see image at right). If the “Sound” checkbox was selected in the Alarm Mode setup screen, an audio tone will also be emitted.





# Setup Menu

## Reset

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

- All batches, stored datasets, images and batch names are erased.
- Menu settings are returned to the following:  
**Memory** = OFF                      **Bluetooth** = OFF  
**Auto Log** = OFF                      **Trend Chart** = None

Perform a more thorough **Hard Reset** by powering down the Gage, waiting several seconds, then simultaneously holding both the center  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.
- Alarm values are set to default.
- Menu settings are returned to the following:  
**Units** = Celsius                      **Language** = English  
**Flip Display** = Normal              **Battery Type** = Alkaline  
**Auto Sync** = OFF                      **Backlight** = Normal  
**Alarms** = OFF                          **Auto Log Interval** = 5 min  
**Alarm Sound** = OFF                  **Bluetooth Streaming** = OFF  
**Wet Bulb** = OFF                        **USB Drive** = ON  
**White on Black** = OFF

**NOTE:** - Date, Time and WiFi 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 Gage to your free *PosiSoft.net* account.



## Wet Bulb

(Advanced models only)

Displays the wet bulb temperature ( $T_w$ ) on the main screen. It is calculated from  $T_a$  and RH using an air pressure of 1.0 atmospheres (1013 mbar). Variations of  $T_w$  at other pressures could be greater than  $\pm 1^\circ\text{C}$  ( $\pm 2^\circ\text{F}$ ).

**NOTE:** This menu item only appears when all memory functions are turned off. Wet Bulb readings cannot be stored in memory.

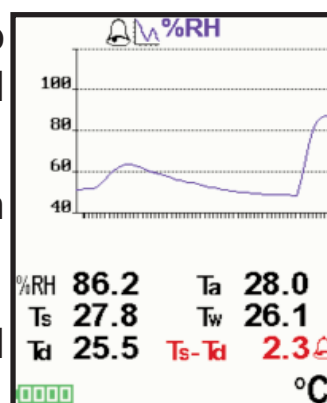
## Trend Chart

(Advanced models only)

Displays a real-time graph of the readings over the last three minutes. Use Trend Charts to monitor short-term environmental changes and spot trends.

**Shortcut:** Press the **Up** button to scroll through the trend charts from the main screen.

**NOTE:** Trend charts can only be displayed when memory is off.



## Flip Display

This option causes the display to rotate  $180^\circ$ . Ideal for right-side-up viewing when the sensors are pointed away from the user.

## White on Black

(Advanced models only)

Inverts the LCD display to white on a black background to provide better readability in some surroundings.

## Backlight

(Advanced models only)

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 datasets 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 Gage's date and time can also be viewed in **Gage Info** (pg. 11).

## 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 charger. The battery state indicator icon is calibrated for the selected battery type. No damage will occur if the wrong battery type is selected.

**NOTE:** DeFelsko recommends the use of *eneloop* (NiMH) rechargeable batteries. It may take as long as 12 hours to charge dead batteries.

## Units

Converts the display from Celsius (°C) to Fahrenheit (°F) or vice versa. Stored measurements in memory are not converted.

**NOTE:** - Switching units will close any open memory batch.  
- Alarm values do not have units.

## Language

Converts displayed and printed words to the selected language.

## Memory Management

The *PosiTector DPM* has internal memory storage for recording measurement datasets. Stored datasets can be reviewed on-screen or accessed via computers, tablets and smart phones. Datasets are date and time-stamped. Datasets can be stored manually (using the **(+)** button), or automatically using the Auto Log mode (pg. 17).

Button functions with **Memory ON:**






**Standard models** store up to 2,500 datasets in one batch. The following appears within the **Memory** menu:

On: turns memory on

Off: turns memory off (stored datasets remain in memory)


Clear: removes all datasets from memory



View: lists group statistics and all stored datasets 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 datasets. Press  to exit.

**Advanced models** store 20,000 datasets in up to 1,000 batches (groups).

The following appears within the **Memory** menu:

### 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. The  icon appears. New batch names are date stamped at the time they are created.

B3	n0
%RH	47.6
Ta	27.1
Ts	27.1
Td	15.0
Ts-Td	12.1
	
	°C

### Open

Selects a previously created batch name to open and make current. Use the **(+)** and **(-)** buttons to scroll through pages of saved batches. When selected, the batch name and number of stored datasets will be displayed.


### Close

Stops the recording process, closes the current batch, and removes batch information from the display.

### Delete

Removes a batch completely from memory. Use the **(+)** and **(-)** buttons to scroll through pages of saved batches. The name is deleted and all datasets are erased.

## View

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

$\bar{x}$  - Average

$\uparrow$  - Maximum Value

$\sigma$  - Standard Deviation

$\downarrow$  - Minimum Value

## Annotate

(Advanced models only)

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, PosiSoft Mobile and are included in PosiSoft USB Drive reports.



## Print

Sends a statistical summary and individual datasets to the optional Bluetooth Wireless Printer (pg. 24).

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

## Display

Display options for the currently open batch are:

*Td, Ts, Ta, Ts-Td, %RH*: A chart of batch readings

Image: An image downloaded from PosiSoft.net during synchronization

Notes: Instructions or notes downloaded from PosiSoft.net during synchronization.

None: default screen showing current dataset

**Shortcut:** When a batch is open, press **Up** to scroll through the above display options.

**NOTES:**

- Remove the last dataset from the current open batch by pressing (-).
- Batches can be renamed in the Gage using PosiSoft.net

**Summaries**

(Advanced models only)

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

In the following example, Batch 3 (**B3**) indicates an “F” 6000 coating thickness probe was used to record a total of “6” readings in “PA2” mode.

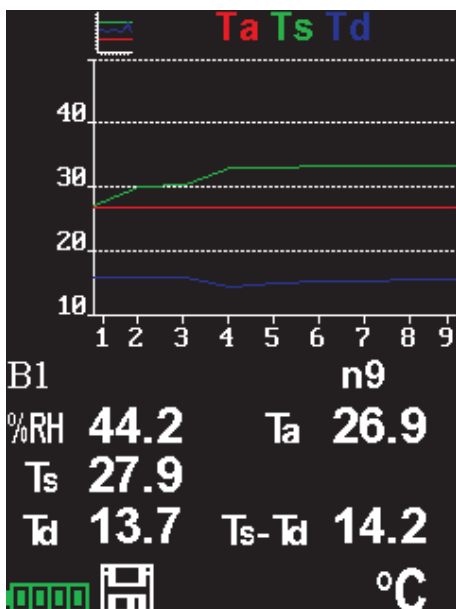
Batch Name	Probe Type	#	Type
B4	SPG	20	
B3	F	6	PA2
B2	F	10	
B1	UTG-C	5	

**OK**

**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. 21).

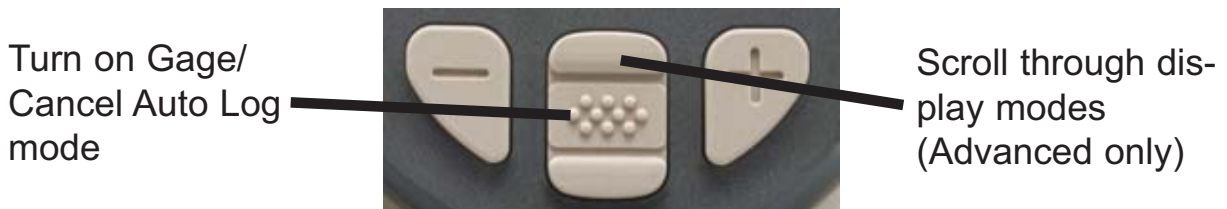
Below is a **PosiTector DPM** sample screen with:



- Memory mode on with one batch containing nine saved datasets
- Chart of saved Ta, Ts, and Td readings displayed
- White on Black mode (pg. 12)
- Readings in Celsius (°C)
- Full Battery

## Auto Log Mode

The **PosiTector DPM** can automatically record datasets into memory at user selected time intervals. When selected, the Auto Log icon  will appear on the display with a timer counting down until the next dataset is stored. Readings on the display are only updated when a dataset is stored. Connect the Gage to a USB power source for long-term use using the included USB cable.



**Standard models** remain powered-up while in auto log mode. The Gage will store datasets for 40-50 hours on a set of fresh alkaline batteries depending on the frequency of measurements.

**Advanced models** power down between measurements to conserve batteries. At each interval, the Gage will wake up, take a reading, sync to *PosiSoft.net* (if selected) and power down. The Gage can record approximately 8,000 datasets while in this mode using fresh alkaline batteries, or approximately one reading every hour for eight months.

### NOTES:

- Auto Log continues recording until memory is full, the Gage loses power, or the user turns off Auto Log mode. Stored datasets will remain in memory.
- To conserve battery life, readings update only at the Log Interval. The last recorded readings will remain “frozen” on the display until the next dataset has been stored.
- It is recommended that fresh alkaline batteries or newly recharged batteries be installed prior to an extended Auto Log.

## Accessing Stored Measurement Data

PosiSoft solutions for viewing, analyzing and reporting data:

**PosiSoft USB Drive** - connect the **PosiTector** to a PC/Mac using the supplied USB cable to access and print stored readings, graphs, photos, notes and screen captures. No software or internet connection required. **USB Drive** must be selected (See pg. 21).



**PosiSoft.net** - a free web-based application offering secure centralized storage of **PosiTector** readings. Access your data from any web connected device. Go to: [www.PosiSoft.net](http://www.PosiSoft.net)

**PosiSoft 3.0** - Desktop Software for downloading, viewing and printing your measurement data.

**PosiSoft Mobile** (*Advanced models only*) - access readings, graphs, capture photos and update annotations through WiFi enabled devices, such as tablets, smart phones and computers.

### **PosiSoft Desktop Manager (PDM):**

A small Windows based application which allows automatic two-way communication (synchronization) between the Gage and *PosiSoft.net* (internet connection required). When installed, PDM runs as a start-up application and resides in the Windows notification area (system tray) of a PC. PDM is available as a free download within your PosiSoft.net account or at [www.defelsko.com/downloads](http://www.defelsko.com/downloads)

Register your Gage on PosiSoft.net to take full advantage of your Gage's capabilities. See [www.PosiSoft.net](http://www.PosiSoft.net)

**NOTE:** PDM is not required for **WiFi** enabled gages (pg. 24).

## PosiSoft.net:

To enhance the operation of your Gage, all **PosiTector** users have access to the features provided by *PosiSoft.net*. It is a web-based application offering secure centralized management of readings.

After (1) a user account has been created, (2) a Gage has been registered, and (3) the *PosiSoft Desktop Manager* is downloaded and installed onto a Windows PC (not required for WiFi connected gages), synchronization of measurement data can be performed either manually or automatically whenever the **PosiTector** is connected to a web enabled PC (USB cable or Bluetooth wireless technology) or WiFi network (Advanced gages only). Gage measurements stored in memory are uploaded; images and batch notes are synchronized.

Uploaded data can be manipulated using a standard internet web browser from any location in the world - job site or head office. Reports and graphs with annotations and corporate logo can be generated. Data can be exported to XML or CSV (comma delimited) text files.

Measurement data can be shared with authorized users via a secure login from any computer and most web enabled devices including smart phones.

**NOTE:** A *PosiSoft.net* account is not required to **Update** (pg. 27) your **PosiTector**. Simply download and install *PosiSoft Desktop Manager* at [www.defelsko.com/downloads](http://www.defelsko.com/downloads)

## PosiSoft 3.0:

Desktop Software that can be installed onto your Windows PC and allows the user to download, view, print and analyze their measurement data.

Reports and graphs with annotations and corporate logo can be generated. Data can be exported to XML or CSV (comma delimited) text files.

**NOTE:** *PosiSoft Software* is available for use with DeFelsko's complete line of electronic instruments and is available for download at [www.defelsko.com/posisoft](http://www.defelsko.com/posisoft)



## PosiSoft Mobile:

Is a Gage-based software application featured in all **PosiTector** Advanced instruments (serial numbers 730,000+).

PosiSoft Mobile allows users to:



- browse stored measurement data including notes, images, statistics and charts
- update batch names/notes using your mobile device's keyboard
- insert images directly into Gage batches using your mobile device's camera or image library
- remotely view the live display of a working **PosiTector** & more

PosiSoft Mobile can be accessed from any WiFi enabled device using a standard web browser.

Ideal for use with devices such as Windows Phone/Mobile, Blackberry (RIM), Android, Apple iOS and more.

In addition to browser based access, PosiSoft Mobile Managers are available for Apple iOS and Android users.

See [www.defelsko.com/wifi/wifi\\_mobile](http://www.defelsko.com/wifi/wifi_mobile)



## Connect Menu

**Synchronizing** (Sync) is the process whereby **PosiTector** stored measurement data uploads to *PosiSoft.net* (from both Standard and Advanced models) while images and batch notes are downloaded to the Gage (*Advanced model only*). This transfer occurs when the Gage is connected via USB, Bluetooth or directly through your WiFi router/hotspot via WiFi. It can be triggered either manually (USB, Bluetooth or WiFi) or automatically (USB only).

### Sync Now

When selected, Gage immediately synchronizes stored measurement data via USB, Bluetooth or WiFi to *PosiSoft.net*. (*PosiSoft Desktop Manager (pg. 18) and an internet connection are required when using USB or Bluetooth.*)

Multiple gages can be synchronized simultaneously when connected using multiple connections (for example two gages connected via USB and one gage connected via WiFi or Bluetooth).

### Auto SYNC



Allows the Gage to automatically synchronize stored measurements with *PosiSoft.net* when initially connected to the internet via a PC running *PosiSoft Desktop Manager* (pg. 18) or a local WiFi network.

Additional measurements added to memory while connected are synchronized only when the USB cable is disconnected, then reconnected or when the **Sync Now** option is selected.

### USB Drive



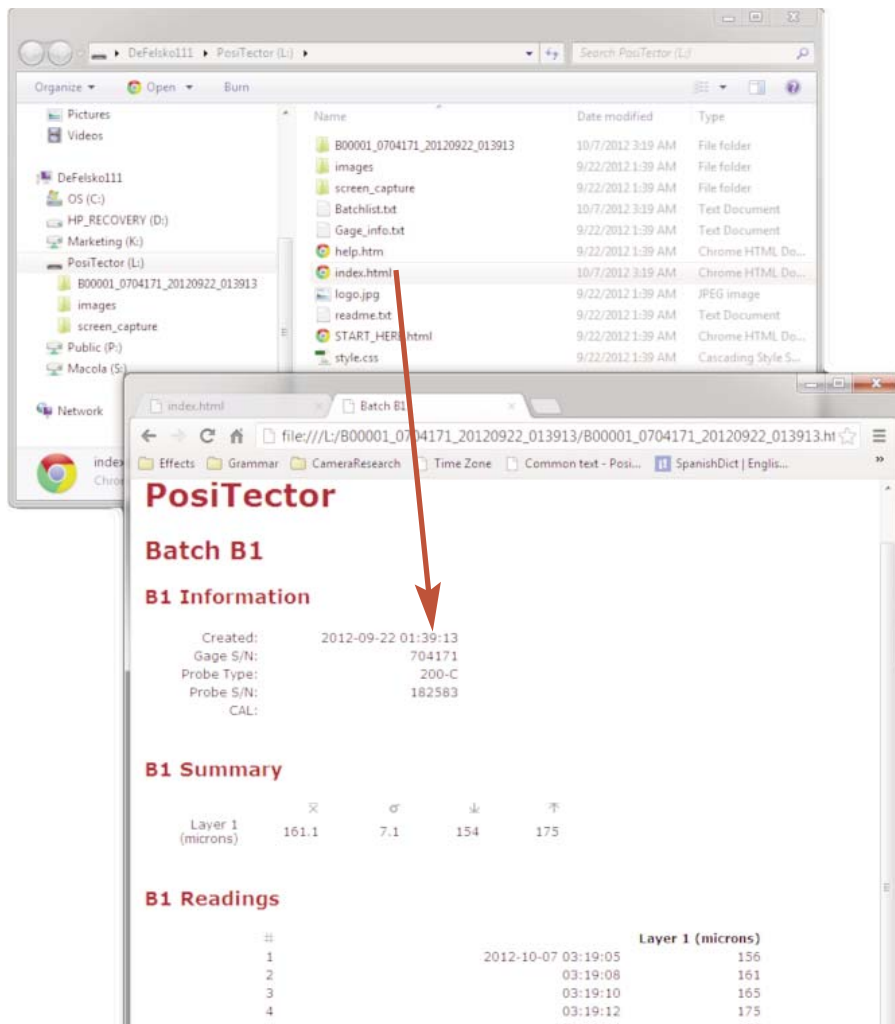
Universal Serial Bus (USB) is a specification to establish communication between devices and a host controller (usually a personal computer). USB has effectively replaced a variety of interfaces such as serial and parallel ports.

The **PosiTector** uses a USB mass storage device class which provides a simple interface to retrieve data in a manner similar to USB flash drives, cameras or digital audio players.



When checked, any computer can view readings 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 readings and graphs can be viewed or copied using universal PC/Mac web browsers or file explorers.

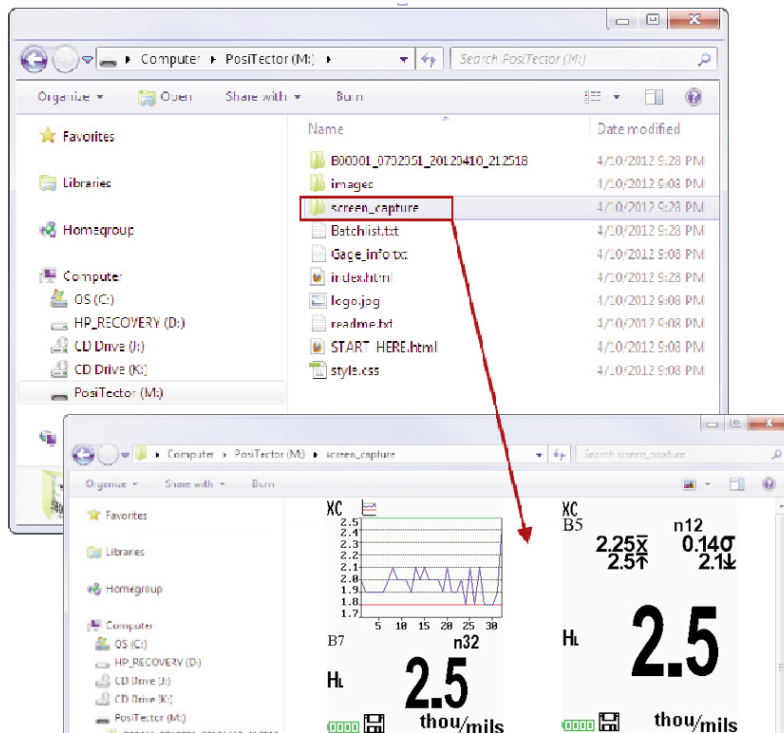


When your **PosiTector** is first connected to your Windows PC via a USB cable, an enumeration process is started that installs device drivers without re-booting your computer. You may see several pop-up windows in the taskbar at the bottom right of your screen. Wait for the entire process to be completed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

**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 Gage will trickle charge the batteries.

## Retrieving stored screen captures

The last 10 screen captures (pg. 16) stored in memory can be accessed by navigating to the “screen\_capture” directory within the “PosiTector” virtual drive.



### Bluetooth

(Advanced models only)



**PosiTector** Advanced models have Bluetooth functionality to:

- **Communicate** with the *PosiTector Desktop Manager (PDM)* in lieu of a USB cable.
- **Stream** individual datasets to a computer or Bluetooth wireless printer as they are taken.
- **Print** to the optional battery powered Bluetooth wireless printer.

**On:** Turns Bluetooth functionality **On**. When selected, the  icon will appear on the display. To deactivate Bluetooth, select **Off**.

**Pairing:** The Gage and receiving device must be paired before stored or streamed datasets can be transmitted. For pairing instructions, see [www.defelsko.com/prINTER](http://www.defelsko.com/prINTER)

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

**Stream:** When checked, the Gage will stream datasets to the paired Bluetooth Device as they are taken. Datasets can be streamed as they are taken to the optional Bluetooth wireless printer (pg. 24) or third-party computer software.

## Bluetooth Wireless Printer

**PosiTector** Advanced models can output to the optional battery powered Bluetooth wireless printer one of two ways:



- Stream individual readings as they are taken.
- Print stored batch readings and summaries.

Begin by entering the **Connect > Bluetooth** menu. Turn Bluetooth **ON** and “**Pair**” the **PosiTector** to the printer. See: [www.defelsko.com/bluetooth](http://www.defelsko.com/bluetooth)

**Streaming:** In the **Connect > Bluetooth** menu, select the **Stream** tick box. All readings will now be simultaneously displayed on the LCD and sent to the printer.


**Printing:** In the **Memory** menu, select **Print**.

## WiFi


*(Advanced models only)*



Allows wireless communication with devices such as tablets, smart phones and computers connected to your local wireless network or portable mobile hot spot. See [www.defelsko.com/WiFi](http://www.defelsko.com/WiFi)


**On/Off** : Turns WiFi functionality **On**. When selected, the  icon will appear on the display. To deactivate WiFi, select **Off**.

**Access Point** : Connect your smart device/computer to a PosiTector Advanced body wirelessly without the need for a separate network. Wirelessly import readings into *PosiSoft 3.0 Desktop Software* (pg. 19) or access *PosiSoft Mobile* (pg. 20) in the field 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 PosiTector's 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.

**Import readings into PosiSoft 3.0 Desktop Software** (pg. 19)  
From the PosiSoft 3.0 menu, select **Import > From Gage**. All connected gages will display their unique serial number. Measurement data will be displayed upon completion of the import.

The time it takes for import will depend on the number of Batches and measurements present within the gage. Imports generally take no longer than a few seconds.

Batches are not erased from the gages memory during import. They remain on the gage until they have been deleted by the user. For more information regarding PosiSoft 3.0:

[http://www.defelsko.com/posisoft/posisoft\\_software.htm](http://www.defelsko.com/posisoft/posisoft_software.htm)

## **Accessing your PosiTector PosiSoft Mobile** (pg. 20)

### ***For use on Apple iOS and Android devices:***

PosiSoft Mobile Manager apps exist for Apple iOS and Android users. Simply download the App from the Apple App Store or Google Play.

Once your smart device/computer has been connected to the PosiTector Access Point, open the *PosiSoft Mobile Manager* app. Select your PosiTector from the list to open PosiSoft Mobile.

### ***For use with all WiFi enabled devices:***

Any WiFi enable device connected to the PosiTector Access Point can view the instrument's built-in PosiSoft Mobile web interface. Using your device's web browser, enter the IP address of your PosiTector to access the features of PosiSoft Mobile.

In the **Connect > WiFi** menu, select **Information** to view the IP address associated with your PosiTector.

Enter the displayed IP address into your devices web browser exactly as it appears. Example: 192.168.0.1:8080

For more information regarding PosiSoft Mobile:

[http://www.defelsko.com/posisoft/posisoft\\_mobile.htm](http://www.defelsko.com/posisoft/posisoft_mobile.htm)

**Networks:** 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. Users can enter this number into a web-browser of any WiFi enabled device that is connected to the same network in order to view the Gage's synced batches through **PosiSoft Mobile** (pg. 20).

**Setup:** Allows user to setup a WiFi connection

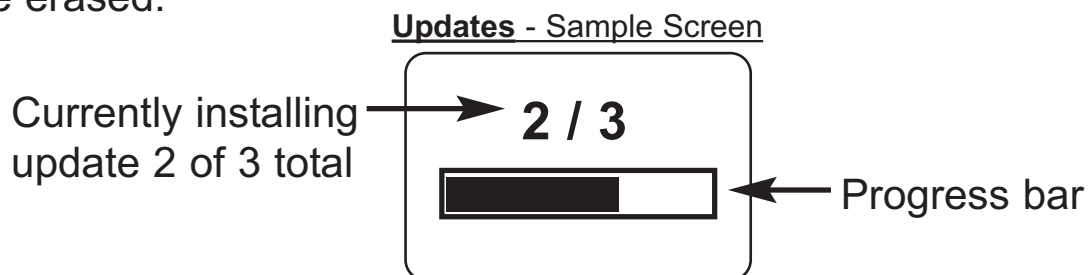
- IP Settings: enter the IP information as follows... IP Type (DHCP or Static), IP Address, Gateway, Netmask, DNS1, DNS2.
- Server Enable: enables a connection between the network and the Gage.
- Gage Name: enter a name for the Gage (up to 14 Characters).
- WiFi Reset: erases all WiFi settings.

## Updates

Determines if a software update is available for your Gage. If an update is available, a prompt will appear allowing the user to choose to perform the update at this time or not.

To perform an update the Gage must be connected to an internet connected PC with *PosiSoft Desktop Manager* (pg. 18), or **WiFi** network (pg. 24).

**NOTE:** Ensure that stored measurements are backed up to a PC or *PosiSoft.net*. The Gage may perform a **Hard Reset** (pg. 11) after completion of the update and ALL readings in memory would be erased.






 **DO NOT** unplug the Gage during the update operation.



## 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 (pg. 13).

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 Gage can still be used, but the batteries should be changed or recharged at the earliest opportunity. The Gage 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 Gage has powered-down.

Battery performance decreases at low temperatures.

## Additional Accessories

### Rechargeable Battery Pack - 4 AAA eneloop batteries

The **PosiTector** can operate on rechargeable batteries and DeFelsko recommends the use of *eneloop* (NiMH) rechargeables. *eneloop* batteries combine the advantages of regular rechargeable batteries and disposable (Alkaline) batteries. They discharge very slowly and can be stored for long periods without having self discharge concerns. Eneloop batteries come pre-charged and ready to use immediately. See: [www.eneloop.info](http://www.eneloop.info)

### AC Power Cable Kit

An optional AC Power Cable Kit is available for continuous operation or battery charging through the **PosiTector's** built-in USB port (as shown on page 18). This kit supplies several alternate power solutions for your battery-operated **PosiTector**. They allow the gage to operate continuously without the need for batteries.

Use the USB cable alone to connect a **PosiTector** to your PC's built-in USB port that acts as a continuous power source. Or connect the cable to the included power adaptor which plugs into any AC wall electrical outlet, 110 or 220V.

A selection of electrical plugs is included which are capable of dealing with most country's outlets. The USB cable provided can also be used for **Accessing Stored Measurement Data** (pg. 18).

## **USB Cable**

A USB Cable is provided with every **PosiTector**.

## **Bluetooth Printer**

This lightweight wireless printer receives data from all **PosiTector** gages via Bluetooth wireless technology. It is battery-operated and prints readings and statistical summaries.

## **Nylon Case**

Convenient soft shell nylon case for carrying a **PosiTector**. Case has compartments for Certificates of Calibration, instruction manuals and other accessories.

## **Protective Lens Shield**

One lens shield is included with every **PosiTector** instrument. Additional package of five (5) thin plastic lens shields are available and ideal for protecting the **PosiTector** display from paint and overspray.

## **Additional Probes**

A selection of K-type connector probes are available for your **PosiTector DPM** separate probe model. (If you have a built-in probe model, a lower unit may be purchased that allows the connection of K-type connector probes.)

See: [www.defelsko.com/dewmeter](http://www.defelsko.com/dewmeter)



## Troubleshooting

Most conditions can be cleared with a **Hard Reset** (pg. 11). If not, visit our Service & Support page for information on sending your Gage to us for a no charge evaluation.

See: <http://www.defelsko.com/service>

### **When the surface temperature probe is not on a surface, Air Temperature and Surface Temperature appear to be different**

Under normal conditions with the surface probe in air  $T_a$  and  $T_s$  should be within the combined tolerance of each sensor (typically 1°C each). It is possible for the difference to be larger if the surface probe has recently been in contact with surfaces that are at a different temperature than air.

### **RH value is slow to stabilize**

If the probe is exposed to very low humidity for an extended time period and then placed in a high humidity environment, the displayed Relative Humidity (RH) may appear to respond slowly. Allow the probe to stabilize 30 minutes for a change of RH greater than 50%. It may take longer if the probe was left at low RH for several months. To increase response time soak the sensor in a damp face cloth overnight to recondition the RH sensor.

### **Surface Temperature reads much higher than expected**

The probe tip may be dirty or damaged. Clean the probe tip by soaking in water or solvent. If  $T_s$  continues to read high then return the probe for service.

### **Surface temperature value does not agree with expected surface temperature or surface temperature probe is slow to respond**

In some cases the surface being measured is very rough and a good thermal connection from the probe tip to the surface is not possible. If possible place a small drop of water on the surface and then place the probe tip into the water drop. Quick and accurate results can be obtained in this manner.

### **Gage displayed an image of a triangle containing and exclamation point ( ! ) and powered down**

This image appears if the memory of the Gage has become corrupt. This can occur if the Gage batteries were removed while

the Gage was powered-on and the Gage was not able to self power-down. If this message appears it will be followed by a full reset. All datasets in memory will be erased and Gage settings will be reset to "out-of-the-box" settings.

**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

Conforms to: ISO 8502-4, BS7079-B, ASTM D3276,  
US Navy NSI 009-32, IMO PSPC, SSPC-PA 7 and others.

	Range	Accuracy	Resolution
Surface Temperature	-40° to 80° C 80° to 190° C -40° to 175° F 175° to 375° F	±0.5° C ±1.5° C ±1° F ±3° F	0.1° C 0.1° C 0.1° F 0.1° F
Air Temperature	-40° to 80° C -40° to 175° F	±0.5° C ±1° F	0.1° C 0.1° F
Humidity	0 to 100%	±3 %	0.1 %
Operating Range	-40° C to +80° C -40° F to +175° F		

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 surface temperature probe tip for dirt or damage.
3. Ensure the holes in the white humidity/air temperature sensor are clear.
4. Perform a **Hard Reset** (pg. 11).

### **IMPORTANT:**

If you must return the Gage for service, please fill out and include the Service Form located at [www.defelsko.com/support](http://www.defelsko.com/support) 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: [www.defelsko.com/terms](http://www.defelsko.com/terms)



*The Measure of Quality*

**[www.defelsko.com](http://www.defelsko.com)**

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