FIELDSCOUT®

SoilStik
pH Meter

PRODUCT MANUAL

Item # 2105

Spectrum® Technologies, Inc.

Contents

This manual will familiarize you with the features and operation of your new meter. Please read this manual thoroughly before using your meter. For customer support or to place an order, contact Spectrum Technologies, Inc between 7:30 a.m. and 5:30 p.m. CST.

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General Overview

Congratulations on the purchase of your Field Scout™ SoilStik™ Pro Meter. This manual describes how to use your pH meter and keep it working accurately. Read the manual thoroughly in order to make effective use of your meter.

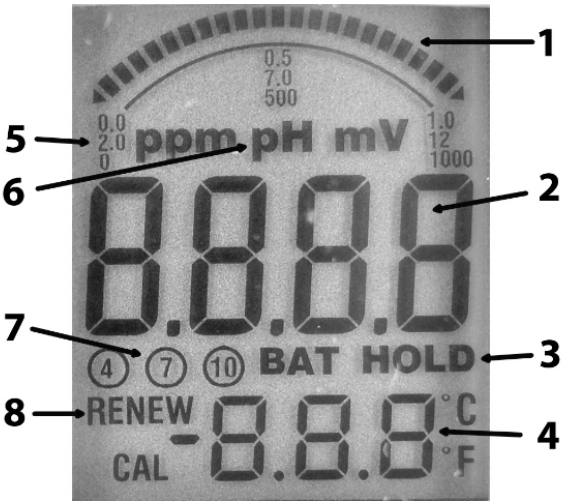
The SoilStik delivers high quality answers, with an accuracy of +/- 0.01 pH units. This self-contained digital meter allows you to test the pH levels in water, soil, and other liquids. The replaceable sensor makes the measurement of small samples much more convenient. The sensor provides a visual indication of when replacement is due.

The meter has a two-point, automatic calibration (pH 4 and 7), with a range of pH 2.0-12.0. The display will show your results to a resolution of 0.01 pH units.

Getting Started

- New meters are shipped with a battery insulating strip. Remove this strip before attempting to power up the meter. The battery compartment is accessed by removing the cap at the top of the meter.
- Remove the cap from the bottom of the SoilStik to expose the electrode glass surface and reference junction.
- Before first use, or after extended storage, soak the electrode (with its cap removed) in pH 4 solution for about 10 minutes.

LCD Display



1. Bar graph reading
2. Measurement reading
3. BAT (low battery) and HOLD (data hold) indicators
4. Temperature display
5. Bar graph scale designations
6. Units of measure
7. Calibration indicators
8. RENEW and CAL indicators

LCD Display Messages

In addition to displaying the pH and temperature readings, the LCD of the SoilStik can also display:

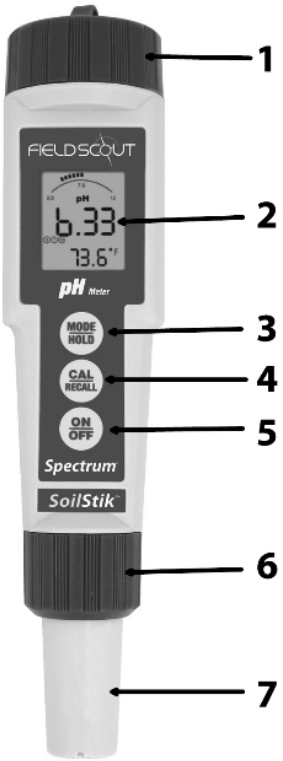
- **CAL** reminder
If the SoilStik is powered up in pH mode 15 times without being calibrated, the **CAL** reminder symbol appears on the LCD indicating that the SoilStik may require calibration. Some applications may require recalibration of the electrode more frequently than others. The **CAL** display is simply a reminder and will turn off when the pH electrode is recalibrated.

- **RENEW** reminder
The **RENEW** symbol appears when the output of the pH electrode fails an internal diagnostic test. A flashing **RENEW** warning indicates that the probe may be nearing the end of its useful life. Try to clean and recalibrate the meter. If the RENEW symbol remains flashing, remove the battery holder, press all 3 buttons for 10 seconds, and re-insert the battery holder (see p. 12). If this does not cause the **RENEW** symbol to disappear, replace the electrode.

- **HOLD**
While in measurement mode, pressing the **MODE** button causes the meter to hold the value on the LCD. The reading is also stored in short-term memory (see p. 10)

- **BAT**
Indicates that battery power is low. To preserve battery life, the meter automatically powers off after 10 minutes of inactivity.

Meter Components



1. Battery compartment cap
2. LCD Display
3. **MODE/HOLD** button
4. **CAL/RECALL** button
5. **ON/OFF** button
6. Electrode collar
7. pH electrode

(Electrode cap is not shown)

CALIBRATION

The SoilStik automatically recognizes buffer solution pH's of 4, 7, and 10. Buffer solutions of pH 4 and 7 are included with the meter. Although it is possible to calibrate to all 3 values, a two-point calibration with a buffer of 7 plus 4 or 10 (whichever is nearest to the expected sample value) is always recommended. A one-point calibration (with a value closest to the expected sample value) is also valid. The meter should be calibrated every day or after 15 readings. For best accuracy, always calibrate at the sample temperature.

Calibration Procedure

1. Put a small amount of buffer solution in a small plastic cup (provided). For multi-point calibrations, pH 7 should be calibrated first, followed by 4 and/or 10. Place the electrode into the buffer solution and momentarily press the **CAL/RECALL** button.
2. The SoilStik will automatically recognize the calibration solution. After the **CAL/RECALL** button is released, the LCD will display **CAL/RECALL**. The pH calibration value will then flash on the LCD.
3. When calibration is complete, the SoilStik automatically displays the **END** symbol and returns to normal operation mode. Note: If the calibration solution is more than 1 pH unit different from pH 4, 7, or 10, the SoilStik will assume an error has been made, abort the calibration and return to normal operation mode without changing any internal calibration constants.
4. The appropriate circled indicator (④,⑦, or ⑩) will appear on the LCD when a calibration has been completed with a given calibration buffer solution. The calibration constants are stored until a new calibration is performed.
5. For a two- or three point-calibration, repeat steps 1 to 4. As additional calibrations are performed, additional circled indicators will appear on the LCD.

When the meter is powered off, the calibration constants are retained. Therefore, the circled indicators for all completed calibrations will remain illuminated. However, when a new calibration is done, only the circled indicator for that pH level will be displayed. If a multiple-point calibration is desired, the calibration must be performed for the other pH levels as well.

Notes:

1. If the batteries are removed or go dead, any user-created calibration data will be lost and the meter will return to the factory defaults.
2. Always turn the meter off and then on before calibrating to allow sufficient time to complete the calibrations during one power cycle, especially for multi-point calibrations. If the meter powers off automatically during a calibration, any completed calibrations will be saved. But, after the meter is powered up again, any new multi-point calibration will have to be done in entirety.

Changing the Temperature Units

Press and hold the **CAL/RECALL** button for approximately 3 seconds. The °C or °F symbol will change first and the numerical temperature value will change *after* the button is released. If the meter accidentally transitions into **CAL** mode, the **CAL** symbol will appear on the LCD. Simply turn the SoilStik off and start again.

Taking Liquid and Soil Measurements

Liquid Readings
When the electrode is placed in a solution, the main display and bar graph indicate the pH reading while the lower display reads temperature (readings flash until they have stabilized).

The curved bar graph is centered at pH 7. At a pH of 7, no bars will be visible on the bar graph. When the pH > 7, the bars will extend to the right. When the pH < 7, the bars will extend to the to the left.

Soil Slurry Readings
1. Add 1 part soil to 1 part distilled water.
2. Mix for 30 seconds.
3. Allow 1 to 2 minutes for soil slurry to come into equilibrium
4. Submerge the sensor into the soil slurry and record the result.
5. Wash the sensor with distilled water.

Direct Soil Readings
The SoilStik can also be used to take measurements on soil cores. Moisten the surface of the core with distilled water and press the electrode onto the moist soil. Be sure that the clear sensor and reference electrode are both in contact with the soil. Rinse and clean the sensor well before taking additional readings.

Storing and Recalling Measurements

Storing readings in short-term memory

While in measurement mode, pressing the **MODE/ HOLD** button will freeze the value on the LCD and store the number in memory. The LCD will briefly display the memory location number and then the value stored. The **HOLD** symbol will appear above the temperature reading. Momentarily press **MODE/HOLD** again to return to normal operation.

The short-term memory can hold 15 readings. After 15 readings have been saved, the SoilStik will return to memory location 1 and start overwriting existing data with newly stored data.

Recalling stored readings

Check that the **HOLD** symbol is not displayed. If it is, exit the **HOLD** function by momentarily pressing the **MODE/HOLD** button.

To view stored readings, momentarily press the **CAL/ RECALL** button and then press the **MODE/HOLD** button while the **CAL** symbol is displayed. The storage location number (1 through 15) will flash. If the meter accidentally transitions into **CAL** mode (causing the display to flash), press the **CAL/RECALL** button again to exit and start over.

The last reading stored will be displayed first. To advance through the stored readings, momentarily press the **MODE/HOLD** button. The location number is displayed first, followed by the reading stored in that location. To exit recall mode, momentarily press the **CAL/ RECALL** button and the SoilStik will return to normal operation.

Note: If the batteries are removed or go dead, any stored readings will be lost.

Sensor Replacement

The SoilStik is shipped with an electrode attached. Electrode life is limited and is dependent on (among other factors) frequency of use and care. If the electrode needs to be replaced, follow these steps for removing and connecting electrodes.

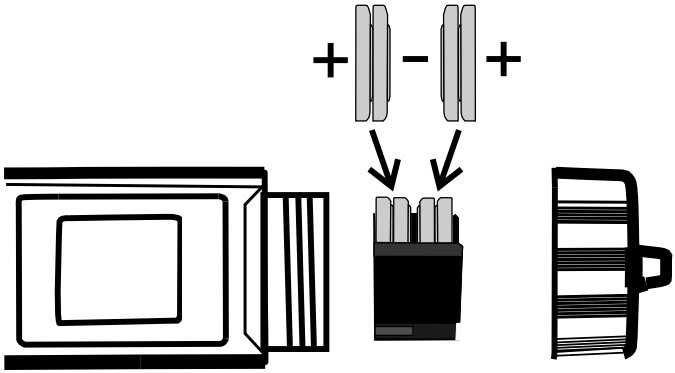
1. To remove an electrode, unscrew and completely remove the electrode retaining collar.
2. Gently rock the electrode from side to side, pulling it away from the meter, until it disconnects.
3. To attach an electrode, carefully plug the electrode into the meter socket (note that the electrode connector is keyed, ensuring proper connection).
4. Secure the electrode in place by tightly turning the collar in place. (a rubber gasket seals the electrode with the meter).

Battery Replacement

The batteries need to be replaced when the LCD shows **BAT** symbol while the power is turned on or if the LCD shows nothing when you press the **ON/OFF** button. Note that if the batteries are removed, any stored readings will be discarded and any calibration data will be lost. The meter will return to factory calibration settings and so should be recalibrated (p. 7)

Battery Replacement Procedure:

1. Twist off the battery compartment cap.
2. Slide the black battery holder out of the meter chassis.
3. Replace the four (4) CR-2032 batteries. Take care that the positive side is facing up.
4. Return the battery holder. Be sure to align the 2 metal strips.
5. Replace the battery compartment cap.



Meter Handling/ Troubleshooting

• Be sure the sponge inside the electrode cap is hydrated at all times with one of the pH buffer solutions. It is preferred that the pH4 buffer solution be used.

• White KCl crystals may be present in the cap. These crystals will dissolve while the sensor is soaked or they can be simply rinsed off with tap water

• If the unit appears to be locked (display frozen) it is possible that the meter is in **Hold** mode (see p. 10) Simply press the **MODE/HOLD** button again or turn the meter off and restart if the display appears frozen. If this fails to revive the meter, remove the batteries, push the ON button for 10 seconds and then reinsert the batteries.

• If the meter has difficulty calibrating or maintaining a stable reading, the sensor may need to be replaced.

• Accuracy will be improved if the standard solution is at the same temperature as that of sample being measured.

SPECIFICATIONS

Calibration:	Two-point, pH 4 and 7
Display:	Digital LCD with bar graph.
Range:	pH 0.00 - pH 14.00
Accuracy:	+/- 0.01 pH
Resolution:	+/- 0.01 pH
Operating Temperature:	32 to 122°F (0 to 50°C) / < 80% RH
Temperature Range:	23 to 194°F (-5 to 90°C)
Temperature Resolution:	0.1° up to 99.9 then 1° thereafter
Temperature Accuracy:	± 1.8°F / 1°C [from 23 to 122°F (-5 to 50°C)] ± 5.4°F / 3°C [from 122 to 194°F (50 to 90°C)]
Short-term memory:	15 tagged (numbered) readings
Battery:	Four (4)CR2032 button batteries
Auto Power-off:	After 10 minutes of inactivity
Dimensions:	35.6 x 172.7 x 40.6 mm (1.4 x 6.8 x 1.6 inches)
Weight:	110g (3.85oz)

CE

WARRANTY

This product is warranted to be free from defects in material or workmanship for one year from the date of purchase. During the warranty period Spectrum will, at its option, either repair or replace products that prove to be defective. This warranty does not cover damage due to improper installation or use, lightning, negligence, accident, or unauthorized modifications, or to incidental or consequential damages beyond the Spectrum product. Before returning a failed unit, you must obtain a Returned Materials Authorization (RMA) from Spectrum. Spectrum is not responsible for any package that is returned without a valid RMA number or for the loss of the package by any shipping company.

CE

This equipment has been manufactured for
Spectrum Technologies, Inc.
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Aurora, IL 60504 USA

The Manufacturer's **DECLARATION OF CONFORMITY** is on file at the above address, and certifies conformity to the following:

Model Number:	2105
Description:	Portable, Hand-Held pH Meter
Type:	Electrical Equipment for Measurement, Control, and Laboratory Use
Directive:	89/336/EEC
Standards:	EN 61326 (1998) EN 55011 (1998/A1:2000/Class B) EN 61000-4-2 (1995/A1:1998/A2:2000) EN 61000-4-3 (1996/A1:1998/A2:2000)

Douglas L. Kieffer,
Soil/Water Products Manager March 5, 2009

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