

# Cardy Twin pH Meter

## PRODUCT MANUAL

Item # 2103A



**Spectrum<sup>®</sup>**  
**Technologies, Inc.**

# CONTENTS

<b>General Overview .....</b>	<b>3</b>
<b>Specifications .....</b>	<b>4</b>
<b>Meter Components.....</b>	<b>5</b>
<b>Calibration and Measurement.....</b>	<b>6</b>
<b>Measuring Soil and Liquid Samples.....</b>	<b>7</b>
<b>Replacing the Sensor .....</b>	<b>8</b>
<b>Battery Replacement .....</b>	<b>9</b>
<b>Handling Preautions .....</b>	<b>10</b>
<b>Warranty.....</b>	<b>12</b>
<b>Product Return .....</b>	<b>13</b>
<b>Notes .....</b>	<b>14</b>

This manual will familiarize you with the features and operation of your new Twin pH meter. Please read this manual thoroughly before using your instrument. For customer support, or to place an order, call Spectrum Technologies, Inc. at (800)248-8873 or (815) 436-4440 between 7:30 am and 5:30 p.m. CST

FAX at (815)436-4460,

E-Mail at [info@specmeters.com](mailto:info@specmeters.com).

[www.specmeters.com](http://www.specmeters.com)

Spectrum Technologies, Inc

12360 S. Industrial Dr. East

Plainfield, IL 60585

# GENERAL OVERVIEW

---

Congratulations on the purchase of your Cardy Twin pH Meter. This manual describes your Cardy pH Meter, tells you how to use it, and keep it working accurately.

The Cardy Twin pH Meter delivers high quality answers with an accuracy of  $\pm 0.1$  pH. This self-contained digital meter allows you to test the pH levels in water, soil, sap and much more.

The replaceable sensor makes measurement of small samples much more convenient. See page 8 for details.

There is a two-point automatic calibration (4.0, and 7.0 pH), with a range of pH 2.0-12.0. The display will read out your results to the hundredth place.

# SPECIFICATIONS

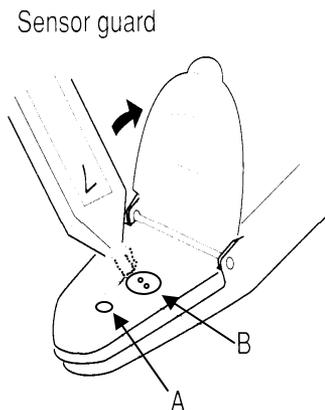
---

<b>Model:</b>	B-213
<b>Measurement:</b>	Glass electrode method
<b>Calibration:</b>	Automatic two point calibration
<b>Display:</b>	LCD, digital. (Resolution: 0.1 pH)
<b>Range:</b>	pH 2.0 - pH 12.0
<b>Reproducibility:</b>	± 0.1pH
<b>Accuracy:</b>	± 0.1pH
<b>Operating Temperature:</b>	5 - 40°C (41 - 104°F)
<b>Temperature Compensation:</b>	Automatic temperature compensation sensor
<b>Power Source:</b>	3V (Lithium dry cell CR2032) x 2
<b>Dry Cell Service Life:</b>	Approx. 150 hours for continuous use, except dry cells supplied with the pH meter
<b>Dimensions:</b>	165 x 29 x 19 mm (5.6 x 1.1 x 0.6")
<b>Weight:</b>	48 g (1.7 oz)

# METER COMPONENTS

---

1. **Reference Junction (A)**
2. **Glass Electrode Sensor (B)** - Measurement is made when liquid covers both the reference junction and the sensor.
3. **LCD** - Gives measurement and calibration information. Also indicates when battery needs replacement.
4. **On/Off Button** - Turns meter on and off.
5. **CAL Button** - Holding this button down toggles through the pH7 and pH4 calibrations. Also used to enter temperature measurement mode.
6. **Sensor Guard** - Protects the sensor during and after measurement.



# CALIBRATION & MEASUREMENT

---

- 1) Turn power supply on.
- 2) Rinse the sensor with distilled water. Gently blot dry.
- 3) Apply a few drops of pH 7 Standard Solution to the Sensor. Confirm that the sensor and the reference junction **are connected** with the Standard Solution.
- 4) Press and hold the **CAL** button once. The “CAL” symbol will illuminate on the LCD and pH 7.00 will appear on the display.
- 5) Calibration is complete when the “CAL” symbol disappears and the readout reads pH 7.0 . Rinse the Sensor with distilled water and blot dry.
- 6) Apply a few drops of pH 4 standard solution to the sensor. Confirm that the sensor and the reference junction **are connected** with the Standard Solution.
- 7) Press and hold the **CAL** button until the “CAL” symbol and pH 4.01 appear on the display.
- 8) Calibration is complete when the “CAL” symbol disappears and the readout reads pH 4.0. Rinse the Sensor with distilled water and blot dry.
- 9) Apply the sample to the Sensor by placing a small amount of the sample on the Sensor with the pipet, immersing the Sensor in the sample, or by scooping out a representative measurement sample. Confirm that the glass sensor and the Liquid Junction **are entirely covered** by the sample.
- 10) Read the data when figure on the LCD is stabilized and the ☺ symbol appears.
- 11) Rinse the sensor thoroughly with distilled water after each measurement. Replace the sensor cap on the sensor when finished.

# MEASURING SOIL AND LIQUID SAMPLES

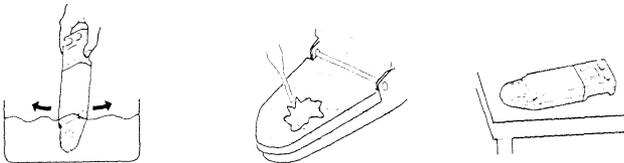
---

## Soil Samples

- 1) Collect a representative soil sample.
- 2) Mix the soil and distilled water using a 1:1 proportion. Stir for 30 seconds.
- 3) Allow 1 to 2 minutes before you begin the test.
- 4) Submerge the sensor into the mixture of soil and distilled water. Read the results.
- 5) Wash the sensor with distilled water and blot dry.

## Liquid Samples

There are three ways to apply the sample to the sensor.



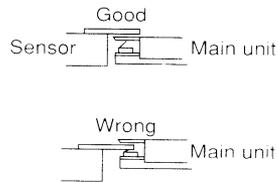
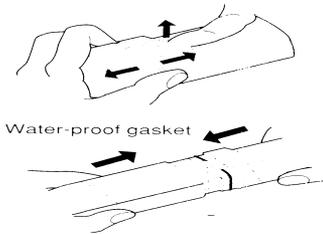
1. Open the sliding cap of the sensor guard and submerge the sensor into the sample solution.
2. Open the sensor guard and apply the solution to the sensor
3. Swirl the sensor in the liquid, scoop out a sample, and set meter on a level surface for taking measurement.

**Note:** This pH meter is water resistant. However, do not make any measurements by completely submerging the meter in the sample solution. If, by mistake, the meter is dropped into the sample solution, recover it immediately and dry it quickly and thoroughly.

# REPLACING THE SENSOR

---

- 1) Wipe water off the meter.
- 2) Pull the bottom part of the housing away from meter by pushing the tongue located on the backside of the meter and sliding the sensor away from the unit body.
- 3) Confirm that the watertight O-Ring is properly seated.
- 4) Insert the new sensor into the meter firmly.
- 5) Calibration the meter.



## NOTE:

- Do not remove the replacement sensor when the pH meter is wet. This can damage the meter's electronics.
- The sensor connection must be watertight. Therefore, the gasket should be replaced every two years.

## The sensor should be replaced when:

- Sensor response is slow, measured value is unstable, or calibration cannot be made.
- Measured value does not change when the sample is changed.
- Display of 0.0 blinks during measurement.
- Temperature warning blinks.

# BATTERY REPLACEMENT

---

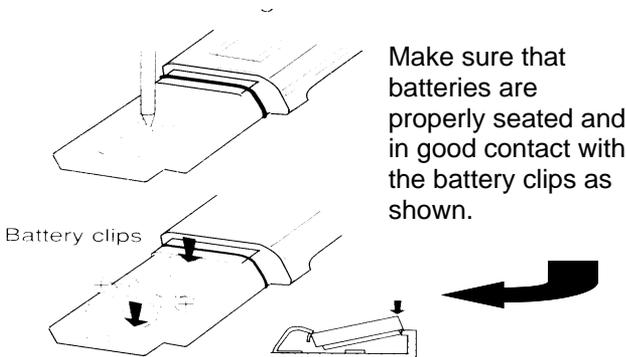
The batteries need to be replaced when the LCD displays “B” while the power is turned on or if it is blank after the Power button is pressed.

## Replacing the battery

1. Wipe water off the meter.
2. Pull out upper housing.
3. Remove the dry cell holder.
4. Put two new batteries in with the “+” surface facing upward.
5. Confirm that the watertight O-Ring is properly placed in the housing of the meter. Re-assemble the.

## CAUTIONS

- Don't remove housing of the meter when it is wet. This can damage the meter's electronics.
- The sensor connection must be watertight.
- Re-calibrate the meter after the batteries are replaced. The calibration value is deleted when the batteries are removed.
- If the meter does not work properly, check the voltage of the batteries and repeat the battery replacement procedure.



# HANDLING PRECAUTIONS

---

- Calibrate the meter prior to the first use. Daily calibration is recommended.
- Meter will not function correctly when calibration is performed under the following conditions
  - No standard solution on the sensor
  - Bubbles on the surface of the sensor
  - Either the sensor and or reference junction is not covered with the sample.
  - Sensor not properly installed in the pH Meter
  - Sensor has reached the end of its service life
- Measurement cannot be made while the LCD is displaying the "CAL" symbol.
- Don't calibrate with a standard solution other than pH 7.0 or pH 4.0. This will lead to inaccurate measurements.
- When making measurements of tap water, rainwater, or other solution with extremely low ion concentration, note the following:
  - Rinse the sensor thoroughly before taking measurement.
  - Apply a few drops of the sample of solution to be measured. The pH value might be unstable when the sensor is simply immersed into the solution to be measured.
- In measurement of soil or other solid matter, make a slurry using **distilled water**.
- Don't scratch or apply excessive force to either the sensor or reference electrode.



- Don't immerse the **On/Off** or **CAL** buttons in water.
- Don't replace the batteries or the Reference Electrode when the pH meter is wet.
- Don't press the POWER or the CAL Switches with a pointed object.
- Don't use the pH Meter at temperatures out of the working range of 5°C-40°C (41°F-104°F). This will shorten the service life of the sensor will be shortened.
- The following substances will damage the sensor :
  - Organic Solvent (thinner, benzene, etc.)
  - Strong acid (pH 0-2)
  - Strong alkali (pH 12-14)
  - Surface active agents, alcohol, oil, adhesive and cement.
- Keep the sensor away from direct sunlight or other strong light during calibration and measurement.
- If the meter has not been used in several days, hydrate the sensor by immersing it in water for about five minutes before calibrating.
- White crystals on the sensor are not a symptom of trouble. Simply rinse the sensor before use.
- Although the meter is auto-temperature compensated, it is recommended that, as much as possible, the sample and meter be approximately the same temperature.
- Avoid extremes of temperature. Don't place the pH meter close to heaters or where the meter might be exposed to direct sunlight.
- Don't bend or drop the pH Meter.
- Standard solution is caustic acid. Wash the skin thoroughly with water if the standard solution comes in contact with skin.

# 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

## ***Spectrum<sup>®</sup>*** ***Technologies, Inc.***

**12360 S. Industrial Dr. E**  
**Plainfield IL 60585**  
**(800) 248-8873 or (815) 436-4440**  
**Fax (815) 436-4460**  
**E-Mail: [info@specmeters.com](mailto:info@specmeters.com)**  
**[www.specmeters.com](http://www.specmeters.com)**