

Digital pH Meter PH300



Introduction

Overview

Thank you for selecting the Extech PH300. The PH300 measures pH, mV, and temperature and offers automatic calibration and temperature compensation.

This meter is fully tested and calibrated before shipping; with proper use it will provide years of reliable service.

Features

- Measures pH, mV, and temperature.
- Backlit LCD.
- Automatic temperature compensated probe.
- Internal data log memory stores 200 readings.
- Automatically recognizes up to thirteen pH buffer solution standards.
- Digital filter optimizes measurement speed and accuracy.
- Compensation settings for distilled water and ammonia solutions.
- Dust proof and waterproof (IP57 rated).
- Battery operated with automatic power OFF timer.

Supplied Equipment

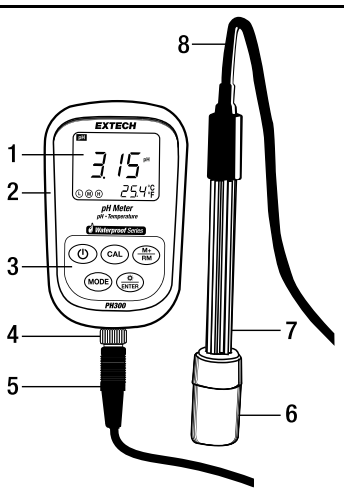
- PH300 meter.
- Electrode with automatic temperature compensation.
- 50 ml buffer solutions.
- Screwdriver for removing rear battery compartment cover.
- Batteries (2 x 1.5 V 'AA').
- User manual.
- Carrying case.

Description

Meter Description

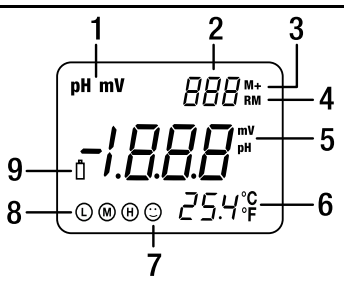
1. LCD
2. Protective jacket (must be removed to access rear battery compartment)
3. Keypad
4. Electrode collar
5. Electrode plug
6. Protective cap
7. Electrode body
8. Electrode cable

Battery compartment on rear of meter.








Display Description

1. Measurement modes.
2. Internal memory location number.
3. Reading stored.
4. Reading recalled.
5. pH or mV reading.
6. Temperature reading.
7. Stable measurement indicator.
8. Calibration icons (low, medium, high).
9. Low battery icon.



Keypad Description

	Power ON/OFF
	In the measurement mode, press to access the calibration mode. In the settings mode, press to change a setting (see Settings mode section).
	Short press to toggle pH and mV measurement modes. Long press to access the settings mode, and then short press to step through the parameters (P1, P2, P3, etc.).
	In the measurement mode, short press to toggle the backlight ON and OFF, or long press to toggle the display resolution between 0.1 and 0.01. In the settings mode, press to exit the mode.
	In the measurement mode, short press to store the displayed reading. Long press to recall the saved readings. In the settings mode, press to step through settings parameters or to change a setting.

Battery Power

The meter is powered by two (2) 1.5 V 'AA' batteries, housed in the rear compartment. A screwdriver is supplied for removing the rear compartment screw. Refer to the Maintenance section for battery replacement instructions.

pH Measurements

Measurement Preparation

1. Unscrew the protective cap on the probe jack (bottom of meter). Store the protective cap in the carrying case.
2. Carefully connect the pH probe to the meter's probe jack. The probe can only be inserted in one orientation. Once it is firmly connected, tighten the probe collar.
3. Press the **ON/OFF** key to switch the meter ON.
4. Short press the **MODE** key to select the pH mode, if necessary.

5. In pH mode, long press the **ENTER** key to toggle the resolution between 0.1 and 0.01.

Three-Point Calibration

Important: To maximize slope linearity, always perform a three-point calibration on new probes and probes that have not been in use for long periods. Calibrate once per day for best results.

1. Press the **CAL** key to enter Calibration mode. The display will show a blinking '**C1**'.
2. Rinse the probe thoroughly with distilled water. Gently shake off excess water and blot dry with a lint-free tissue (e.g., Kimwipe), avoiding contact with the pH-sensitive glass membrane. Immerse the probe into pH 7.00 buffer solution, stir briefly, and allow the reading to stabilize.
3. Press **CAL** again; the display will show a blinking '**7.00**'.
4. This step is completed when the display stops blinking and the '**C2**' icon appears. The meter will automatically proceed to the second calibration point.
5. Rinse the probe thoroughly with distilled water again. Gently shake off excess water and blot dry with a lint-free tissue, avoiding contact with the pH-sensitive glass membrane. Immerse the probe into pH 4.00 buffer solution, stir briefly, and allow the reading to stabilize.
6. Press **CAL** again; the display will show a blinking '**4.00**'.
7. This step is completed when the display stops blinking and the '**C3**' icon appears. The meter will automatically proceed to the third calibration point.
8. Rinse the probe thoroughly with distilled water again. Gently shake off excess water and blot dry with a lint-free tissue, avoiding contact with the pH-sensitive glass membrane. Immerse the probe into pH 10.01 buffer solution, stir briefly, and allow the reading to stabilize.
9. Press **CAL** again; the display will show a blinking '**10.01**'.
10. After the display stabilizes, the three-point calibration icon (Ⓜ Ⓜ) will appear, indicating that the calibration is complete.

One-Point and Two-Point Calibration

The meter can be calibrated using only one or two points if the expected measurement is known. Follow the procedure in the previous section, noting the following differences.

If the expected pH is 4.00, a one-point calibration can be used. If the expected measurement is between 4.00 and 7.00 pH, a two-

point calibration (4.00 and 7.00 pH) can be used. If the expected measurement is between 7.00 and 10.00 pH, a two-point calibration (7.00 and 10.00 pH) can be used.

For a 4.00 pH calibration, only \ominus (low) will appear. For a 7.00 pH calibration, only \oplus (medium) will appear. For a 10.01 pH calibration, only \oplus (high) will appear.

After a one- or two-point calibration, switch the meter OFF to cancel the remaining calibration points.

Calibration Considerations

For calibration accuracy, the pH of the standard buffer solution must be reliable. The buffer solution should be refreshed often, especially after heavy use.

If readings appear abnormal after calibration, try calibrating again. If the problem persists replace the electrode. Also, try resetting the meter to factory default conditions (Settings mode).

Calibration intervals depend on the sample, the electrode performance, and the required accuracy. For high accuracy measurements ($\leq \pm 0.02\text{pH}$), the meter should be calibrated immediately before taking a measurement. For general accuracy ($\geq \pm 0.1\text{pH}$), the meter can be used for approximately one week between calibrations.

The meter must be recalibrated in the following situations:

1. For a new probe, or a probe unused for long periods.
2. After measuring acids ($\text{pH} < 2$) or alkaline solutions ($\text{pH} > 12$).
3. After measuring a fluoride or concentrated organic solution.
4. When a solution's temperature differs widely from the calibration solution's temperature.

Testing the pH of a Sample

1. Perform a pH calibration as explained in previous sections.
2. Rinse and dry the pH probe and submerge it in a liquid sample.
3. Stir the solution briefly with the probe and allow it to stand until the display stabilizes.
4. For highest accuracy the temperature of the sample solution should be the same, or near, that of the calibration solution.

Displayed Error Messages

- **ERR 1:** Electrode zero potential error.
- **ERR 2:** Electrode slope error.

For either error, follow the recommendations below in order.

1. Shake electrode rigorously to remove trapped air bubbles.
2. Replace the pH buffers.
3. Perform a factory default reset (Settings mode).

Electrode Considerations

- The tip of the electrode should not come in contact with hard surfaces. Scratches or cracks on the electrode will cause inaccurate readings.
- Before and after each measurement, the electrode should be cleaned with purified (distilled) water and dried.
- Do not clean the glass bulb with a tissue, doing so will affect the stability of the electrode potential and increase the response time.
- The electrode should be thoroughly cleaned if a sample adheres to the electrode.
- Use a pH electrode cleaning solution if the electrode does not appear clean after washing.
- Electrode life can be shortened by heavy use, extreme conditions, and improper maintenance.

Over time, electrode sensitivity and accuracy can decrease and its response time can slow. This can result from strong solutions that damage the sensitive bulb or jams that form in the junction. In these cases, replace the electrode.

Soaking Solution

The electrode soaking solution, in the supplied bottle, is used to maintain the activation of the glass bulb and junction. Loosen and remove the protective bottle from the end of the electrode. Rinse the electrode in distilled water before taking a measurement.

When finished measuring, rinse the electrode with distilled water and place the electrode into the protective bottle, filled with soaking solution, and tighten the cap to prevent leaking. If the soak solution is turbid or moldy, replace the solution.

To prepare a soak solution: Use 25 g of pure KCL dissolved in purified (distilled) water and diluted to 100 mL. The electrode should not be soaked in a purified water protein solution or an acid fluoride solution for long periods. Never soak the electrode in organic silicon lipids.

pH Settings Mode

The table below shows the pH settings (parameters P1 ~ P7). Long press the **MODE** key to access the settings. In the settings mode, short press **MODE** to step through the settings. The subsequent sections explain each setting.

	Settings	Display	Options
P1	Buffer solution region	50L	USA (US and EU NIS (NIST) CH (China)
P2	Distilled water pH temperature calibration setting*	P11	ON/OFF
P3	Distilled water with ammonia pH temperature calibration setting*	P12	ON/OFF
P4	Temperature units	n/a	°C/°F
P5	Display backlight timer	bl	0, 1, 3, 6 minutes
P6	Automatic power OFF	AC	0, 10, 20 minutes
P7	Factory default reset	n/a	ON/OFF

* Set P2 or P3 ON only when measuring distilled water, or distilled water mixed with ammonia. When set ON, the temperature compensation and slope linearity algorithms of the pH probe are changed.

Parameter P1 (pH buffer solution region)

1. In the pH measurement mode, long press **MODE** and release; the '**P1**' icon will appear.
2. Use the **CAL** and **M+/RM** keys to step through the three selections: USA (for use in the US or EU, NIS (for NIST calibration purposes), and CH (for use in China).
3. Short press **MODE** to step to the next parameter (P2), or press **ENTER** to exit.

Parameter P2 (Distilled water temperature compensation)

1. From the P2 menu, use the **CAL** and **M+/RM** keys to set this feature ON or OFF.
2. Short press **MODE** to step to parameter P3, or press **ENTER** to exit.

Parameter P3 (Distilled water with ammonia temp. compensation)

1. From the P3 menu, use the **CAL** and **M+/RM** keys to set this feature ON or OFF.
2. Short press **MODE** to step to parameter P4 or press **ENTER** to exit.

Parameter P4 (Temperature units of measure)

1. From the P4 menu, use the **CAL** and **M+/RM** keys to select °C or °F.
2. Short press **MODE** to step to parameter P5 or press **ENTER** to exit.

Parameter P5 (Display backlight timer)

1. From the P5 menu, use the **CAL** and **M+/RM** keys to select the backlight timer (0, 1, 3, 6 minutes). The backlight will automatically switch OFF after the selected time. Set to '0' to disable the backlight.
2. Short press **MODE** to step to parameter P6 or press **ENTER** to exit.

Parameter P6 (Automatic power OFF timer)

1. From the P6 menu, use the **CAL** and **M+/RM** keys to set the APO timer (0, 10, 20 minutes). The meter will switch OFF automatically after the selected time. Set to '0' to disable APO.
2. Short press **MODE** to step to parameter P7 or press **ENTER** to exit.

Parameter P7 (Factory default settings reset)

1. From the P7 menu, use the **CAL** and the **M+/RM** keys to select ON (perform the factory default reset) or OFF (abort).
2. Short press **MODE** to return to parameter P1 or press **ENTER** to exit.

Millivolt Measurements

1. Connect the electrode to the meter.
2. Press the ON/OFF key to switch ON the meter.
3. Short press **MODE** to switch to the mV mode, if necessary.
4. Place the electrode in the sample solution, slowly stir the solution with the electrode and then allow it to rest in the solution.
5. Wait for the stabilization icon to appear and note the mV reading.

Specifications

General Specifications

Display	LCD with multifunction indicators
Probe	Electrode with automatic temperature compensation
Power	2 x 1.5 V 'AA' batteries with automatic power OFF
Operating conditions	41 to 95°F (5 to 35°C); 85% RH maximum
IP rating	IP57 (waterproof and dust proof)
Data log memory	200 data points (100 pH and 100 mV readings)
Meter dimensions	2.6 x 4.7 x 1.2 in. (65 x 120 x 31 mm)
Meter weight	1.7 lbs. (180 g)
Safety	CE and CMC

pH Specifications

Range	-2.00 to 19.99 pH
Resolution	0.1 or 0.01 selectable
Accuracy	Meter: ± 0.01 pH Meter and Probe: ± 0.02 pH
Input current	$\leq 2 \times 10^{-12}$ Amperes
Input impedance	$\geq 1 \times 10^{12} \Omega$

Stability	±0.01 pH over 3 hours
Automatic temperature compensation	32 to 212°F (0 to 100°C)

mV Specifications

Range	-1999 mV to + 1999 mV
Resolution	1 mV
Accuracy	Meter: ±0.1% (full scale); probe adds additional error

Temperature Specifications

Range	32 to 212°F (0 to 100°C)
Resolution	0.1°
Accuracy	32 to 140°F (0 to 60°C): ±0.9°F (±0.5°C) 140 to 212°F (60 to 100°C): ±1.8°F (±1.0°C)

Maintenance

Battery Replacement

When battery voltage is low, the battery icon appears.

1. Remove the protective jacket that surrounds the meter.
2. Remove the rear screw that secures the battery compartment. A screwdriver is supplied.
3. Remove the old batteries and install two new 1.5 V 'AA' batteries, observing correct polarity.
4. Securely replace the battery compartment cover using the compartment screw before use.



Do not dispose of used batteries or rechargeable batteries in household waste. Please recycle. **Disposal:** Do not dispose of this instrument in household waste. Please recycle.

Cleaning and Storage

Wipe the meter housing with a damp cloth (water and mild detergent), as necessary. Do not use solvents or abrasives.

For best accuracy, always keep the meter clean and dry, especially the meter's electrode and electrode jack. Clean with medical cotton and alcohol if necessary.

Store the meter with the batteries removed.

Customer Support

Customer Support Local Telephone List:

<https://support.flir.com/contact>

Returns (RMA):

<https://customer.flir.com/Home>

Warranty

Teledyne FLIR warrants this Extech brand instrument to be free of defects in parts and workmanship for two years from date of shipment. To view the full warranty text, please visit the support site, link below.

<https://www.flir.com/support-center/warranty/>

Website

<http://www.flir.com>

Customer support

<http://support.flir.com>

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