

Operations Manual EcoSense® pH100

**Portable
pH, mV and
Temperature
Instrument**



- English
- Français
- Español
- Deutsch
- Italiano

WARRANTY

The EcoSense® pH100 Instrument is warranted for one year from date of purchase by the end user against defects in materials and workmanship. pH100 probes and cables are warranted for six months from date of purchase by the end user against defects in material and workmanship. Within the warranty period, YSI will repair or replace, at its sole discretion, free of charge, any product that YSI determines to be covered by this warranty.

To exercise this warranty, write or call your local YSI representative, or contact YSI Customer Service in Yellow Springs, Ohio. Send the product and proof of purchase, transportation prepaid, to the Authorized Service Center selected by YSI. Repair or replacement will be made and the product returned, transportation prepaid. Repaired or replaced products are warranted for the balance of the original warranty period, or at least 90 days from date of repair or replacement.

Limitation of Warranty

This Warranty does not apply to any YSI product damage or failure caused by: (i) failure to install, operate or use the product in accordance with YSI's written instructions; (ii) abuse or misuse of the product; (iii) failure to maintain the product in accordance with YSI's written instructions or standard industry procedure; (iv) any improper repairs to the product; (v) use by you of defective or improper components or parts in servicing or repairing the product; or (vi) modification of the product in any way not expressly authorized by YSI.

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GENERAL INTRODUCTION

The model pH100 is one of three instruments in the EcoSense product line from YSI. The pH100 is a precision tool that measures pH, mV and temperature. A built-in microprocessor stores, calculates and compensates for all parameters related to pH determinations including pH electrode temperature characteristics, electrode slope deviations and buffer solutions.

This unit has a splash-proof IP65 case. The mechanical touch keys are highly reliable with tactile and audio feedback. This meter uses one 9V battery. Re-calibration is not required when power is restored.

The front of the meter has a large LCD that displays pH or mV and temperature simultaneously along with user prompts and mode indicators. The unit prompts the user through calibration and measurement procedures.

An AUTOLOCK feature for both pH and mV measurements enables the unit to automatically sense the end point and "lock" the display to indicate the end point value of a measurement. The pH100 can also be used in non-AUTOLOCK mode. AUTOLOCK and user prompts help eliminate most errors in determining pH and mV values, resulting in precise, repeatable, error-free measurements.

The model pH100 is available with pH, mV, ORP and ATC (Automatic Temperature Compensation) probes. Other features include electrode offset recognition, electrode slope recognition, electrode efficiency display, built-in buffer coefficients, automatic or manual temperature compensation, long battery life, and 50/60 Hz AC noise rejection. This meter is universal, user-friendly, for field, industrial and laboratory applications.

INITIAL INSPECTION

Carefully unpack the unit and accessories, and inspect for shipping damages. Compare received parts with materials listed on the packing list. Notify YSI immediately of any damage or missing parts. Save all packing materials until satisfactory operation is confirmed.

SPLASH RESISTANCE

Though the pH100 meter is housed in a watertight case, DO NOT use it underwater. The splash-resistant case prevents permanent damage to the unit if accidentally dropped into non-corrosive solutions. Follow these steps immediately if the unit is immersed in any solution:

1. Rinse unit carefully with distilled water. After rinsing and drying, inspect and clean connectors to remove all contaminants that may affect probe connections.
2. Wait for the unit and probe to dry completely before resuming operation.
3. If the unit does not function correctly after steps 1 and 2, call YSI for possible repair or replacement (see Warranty).

BATTERY INSTALLATION

An initial display of "BAT" on the LCD indicates approximately one hour of battery life for unit operation within specifications. Replace battery when "BAT" appears on the LCD. (See Figure 1.)

To replace battery, remove the two battery cover screws and battery cover and o-ring. Replace the 9V battery. Replace battery cover and o-ring (align the o-ring properly to insure a good seal) and fasten the two battery cover screws for the splash-resistant feature.

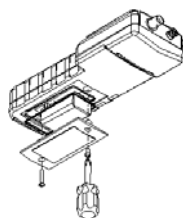


Figure 1.
Battery Installation

KEY FUNCTIONS OF THE MODEL pH100

1. **⏻**: Turns the unit ON or OFF. The pH calibration values are not erased when the unit is turned off. The unit powers up in the same status as when it was turned off. When the unit is not in use, turn it off to save battery life. For long term storage, remove the batteries.
2. **MODE**: Selects display mode. Press **MODE** to sequentially display pH-AUTOLOCK , mV-AUTOLOCK , pH, and mV. Calibration values are not affected by changing display mode.
3. **STAND** and **SLOPE Keys**: Used for dual-point pH calibration of the unit. Press and hold **STAND** while turning on the power to change buffer sets.
4. **Δ** and **∇ Keys**: Press to enter temperature values in manual (MAN) mode. These keys are inoperative when operating in ATC mode.
5. **MEA/EFF.**: Press to release the unit from AUTOLOCK status when operating in pH-AUTOLOCK or mV-AUTOLOCK mode. Press and hold for 5 seconds to display the electrode efficiency.
6. **ESC**: Press to clear the unit when an error signal appears; it clears all calibration values stored in internal memory. To prevent accidental clearing during normal use, the key does not respond unless pressed and held for 2 seconds. The key responds only when an error message displays.

When **ESC** is pressed, all LCD elements light. After about 2 seconds, the unit enters pH-AUTOLOCK mode. "AUTOLOCK" displays and "STAND" begins to flash indicating the need for calibration. Press **ESC** only when errors occur that require unit re-calibration.

THE LCD DISPLAY

1. **WAIT**: Displays while unit waits for a stable reading or end point sensing.
2. **BAT**: Low battery indicator.
3. **ATC/MAN**: "ATC" displays if an ATC probe is connected. Otherwise, "MAN" displays.
4. **STAND/SLOPE**: "STAND" or "SLOPE" remains steady if the parameter has been calibrated. If either one has not been calibrated, it flashes.
5. **AUTO**: Autolock mode indicator.
6. **HOLD**: Indicates a reading is frozen during Autolock mode.
7. **EFF%**: Displays when the user views electrode efficiency. It is recommended to replace the electrode when efficiency is less than 75%.
8. **pH/mV** : Unit and mode indicators.
9. Main display for pH, mV and probe efficiency values.
10. **°C**: Temperature display.

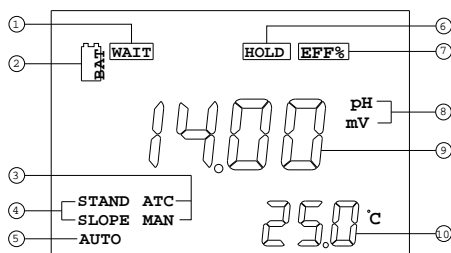


Figure 2. LCD Display

OPERATIONAL PROCEDURES

Buffer Set Selection

The pH100 has two buffer sets: 7.00, 4.01, 10.01 pH and 6.86, 4.00, 9.18 pH. The factory default is buffer set 7.00, 4.01, and 10.01. To change the buffer set, turn off the unit and place the sensor in buffer 7.0. Next, turn the unit on while pressing and holding the **STAND** key. Continue pressing the **STAND** key until the unit beeps. If the unit is uncalibrated and in pH mode, it displays "7.00" if the first set is active, and "6.86" if the second set is active.

pH Calibration

The pH100 uses a 2-point calibration. The first point must be a 6.86/7.00 buffer, and the second either a 4.00/4.01 or 9.18/10.01. These buffers can be purchased from a YSI representative.

1. Turn the unit on. Connect the pH electrode to the BNC connector and the ATC/Temp probe to the ATC/Temp connector of the unit; "ATC" displays. Press **MODE** until "pH" displays. Autolock may be on or off as desired.
2. Place the pH and ATC/temp probes into the first buffer solution (either 7.00 or 6.86). Allow temperature readings to stabilize, then press and hold "STAND" for 3 seconds to calibrate. If **AUTOLOCK** is off, the first point has been calibrated. If **AUTOLOCK** is on, "WAIT" flashes until the unit detects a stable reading. Once the unit calibrates the first point, "SLOPE" flashes.

NOTE: If no temperature probe is connected, adjust the temperature reading to that of the first buffer using the Δ or ∇ keys (0.0 to 60°C) **BEFORE** pressing "STAND".

3. Rinse the pH and ATC/temp probes in distilled water, then place into the second buffer solution (either 4.01/4.00 or 10.01/9.18). Allow temperature readings to stabilize, then press "SLOPE" to calibrate. If **AUTOLOCK** is off, the second point has been calibrated. If **AUTOLOCK** is on, "WAIT" flashes until the unit detects a stable reading. Once the unit calibrates the second point, the unit beeps twice and both "STAND" and "SLOPE" display steadily.

NOTE: If no temperature probe is connected, adjust the temperature reading to that of the first buffer using the Δ or ∇ keys (0.0 to 60°C) **BEFORE** pressing "SLOPE".

4. The unit calculates and compensates for the pH electrode slope deviation corresponding to the values of the two calibration buffers. The unit is now dual-point calibrated and ready for measurements. After calibration, press and hold **MEA./EFF.** for about 5 seconds to display the new electrode efficiency.

Using the model pH160 Electrode Simulator

The model pH160 Electrode Simulator can be used to confirm proper instrument calibration. To use the simulator:

1. Install the 9V battery provided.
2. Attach the pH160 to the pH100. Turn both units on. The pH160 has a small switch to the right of the pH buttons.
3. In pH measurement mode, press one of the pH buffer simulator buttons on the pH160. The corresponding pH value should appear on both screens.

Note: Calibration with the pH simulator calibrates only the instrument - NOT the instrument and probe. For best accuracy, calibrate the pH instrument and probe together using buffer solutions.

pH Measurements

To take pH measurements, "STAND" and "SLOPE" must display steadily, indicating the unit is dual-point calibrated and ready for measurements. If "STAND" and "SLOPE" are blinking, perform a pH calibration before taking measurements.

1. Press **MODE** to enter pH mode with **AUTOLOCK** on or off as desired. For inherently unstable samples, the unit will not **AUTOLOCK**. Turn **AUTOLOCK** off in this case.
2. Rinse the pH electrode and/or ATC/temp probe with distilled water and immerse in the sample to be measured. Remove any air bubbles trapped around the probe by shaking or stirring the probe. Allow the pH and/or temperature to stabilize. If no ATC/temp probe is connected, "MAN" displays, indicating manual temperature compensation. Set unit to display the sample temperature by pressing the Δ and ∇ keys (-10.0 to 120°C). If an ATC/temp probe is connected "ATC" displays along with the sample temperature.

- If AUTOLOCK is off, the pH value of the sample displays on the screen. If both pH and temperature readings are stable, take a reading. If AUTOLOCK is on, press **MEA/EFF**. "WAIT" flashes until the unit determines a stable pH reading.

Temperature Measurements

The model pH100 can measure temperature independently with the ATC/Temp probe without using the pH electrode. Place the ATC/Temp probe in the media to be measured. The measured temperature displays.

mV Measurements

- Connect the optional combination mV electrode to the unit. Press **MODE** to enter mV mode with AUTOLOCK on or off as desired. For inherently unstable samples, the unit will not AUTOLOCK. Use mV mode with AUTOLOCK off in this case.
- Rinse electrode with distilled water and immerse it in sample to be measured. If AUTOLOCK is off, the mV value of the sample will be displayed on the screen. If AUTOLOCK is on, press **MEA/EFF**. "WAIT" flashes until the unit determines a stable mV reading.

TROUBLESHOOTING

MAIN DISPLAY	POSSIBLE CAUSE	CORRECTIVE ACTION
Er 1	<ul style="list-style-type: none"> pH electrode offset is greater/less than +/-1.5 pH. STAND was pressed before the electrode and ATC/Temp probe settle to within ± 1.5 pH of the buffer value. pH electrode is faulty 	<ul style="list-style-type: none"> Replace the buffer and/or the pH electrode. Press ESC. Allow sufficient time for the electrode and ATC/Temp probe to stabilize. Return for service.
Er 2	<ul style="list-style-type: none"> pH electrode slope is off by more than 30% of ideal slope. SLOPE was pressed before the electrode and ATC/Temp probe settled to within 30% of the buffer value. Buffer 4.00, 4.01, 9.18 or 10.01 is not correct. 	<ul style="list-style-type: none"> Check that the correct buffer is used and that the electrode slope is not off by more than 30% from the theoretical slope. Allow sufficient time for the electrode and ATC/Temp probe to stabilize. Replace the buffer and/or the pH electrode. Press ESC. Return for service.
Er 3	<ul style="list-style-type: none"> Temperature is out of the 0.0 to 60.0 °C range. 	<ul style="list-style-type: none"> Bring the buffer temperature within range. Return for service.
OvEr/Undr	<ul style="list-style-type: none"> Measured pH is out of the 16.00/-2.00 pH range. Measured mV is out of the 1250/-2000 mV range. Measured temperature is out of the 10/120 °C range. 	<ul style="list-style-type: none"> Bring the out of range unit into the correct measuring range. If units are within proper range, return product for service.

SPECIFICATIONS

Display	Range	Accuracy	Resolution
pH	-2.00 to 16.00 pH	$\pm 0.1\%$, ± 2 lsd	0.01 pH
mV	-1999 to 1250 mV	$\pm 0.1\%$, ± 1 lsd	1 mV
Temperature °C	-10.0 to 120 °C	± 0.5 °C	0.1 °C

pH Temp Compensation	AUTO/MANual -10.0 to 120.0 °C
pH Buffer Recognition	(4.01, 7.00 & 10.01) or (4.00, 6.86 & 9.18)
pH Buffer Calibration Temp. Range	0 to 60 °C
pH Electrode Offset Recognition	±90mV at pH 7.00 or 6.86
pH Electrode Slope Recognition	±30% at pH 4.00, 4.01, 9.18 or 10.01
Power	One 9V battery
Calibration Back-up	Yes
Audio Feedback	Yes, on all touch keys
Autolock Feature	Yes
Operating Temp. Range	0 to 50 °C
Operating Relative Humidity Range	up to 95%
ATC Probe	Thermistor, 10kΩ / 25 °C
Dimensions (L x W x D)	186 mm x 70 mm x 37 mm (7.3 in x 2.8 in x 1.5 in)
Weight (batteries included)	430 grams (1 lb)

RECOMMENDED SPARE PARTS LIST

PART #	DESCRIPTION
100-1	1-meter waterproof Y-cable with combo pH/reference junction & ATC electrodes.
100-4	4-meter waterproof Y-cable with combo pH/reference junction & ATC electrode.
110-1	pH electrode with 1-meter cable.
115-1	mV electrode with 1-meter cable.
130-1	ATC (temperature) electrode with 1-meter cable.
160	pH Simulator electrode.
180	pH carrying case, hard sided.
440	Cable weight kit
480	Instrument carrying case, soft sided.

Item #605367 • Drawing #A605367

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