pH Analysis Workflow

with Easy-to-Use pH Electrode

General Operating Procedure Recommendations

Expedite your SOP development by leveraging these general operating procedure recommendations for equipment setup, pH calibration, and pH measurements. In this technical note, a refillable pH electrode is employed, offering the advantages of an easy-to-clean and fill electrode that works with viscous, semi-solid, or dirty samples, and a separate temperature sensor for more reproducible pH measurements.

Recommended Equipment

- Fisherbrand™ accumet™ pH Glass-Body Double Junction Refillable Electrode (Cat. No. 13-620-223A)
- Fisherbrand accumet Stainless Steel ATC Temperature Probe (Cat. No. 13-620-19)
- Electrode fill solution (Cat. No. SP138-500)
- pH buffers, typically pH 4.01 buffer, pH 7.00 buffer, and pH 10.01 buffer
- Electrode storage solution
- Deionized water
- 50 mL beakers

Refillable pH Electrode Setup

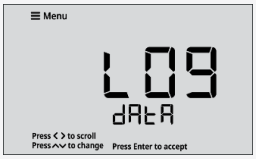
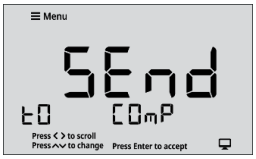
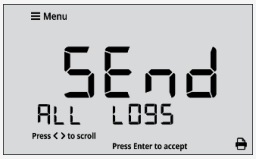
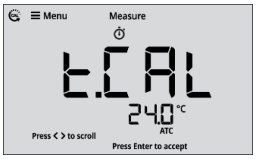
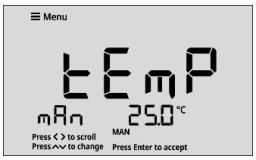
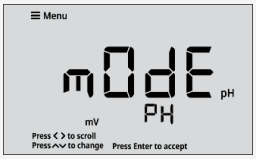
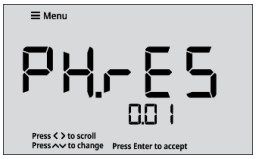
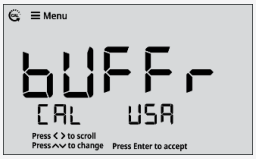
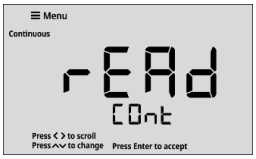
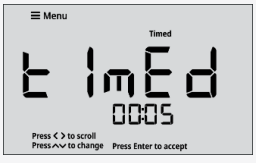
Note: Add electrode fill solution before using the electrode each day. The electrode fill solution must reach above the reference junction and at least one inch above the level of the sample to ensure a proper flow rate. The electrode fill hole should always be open when taking measurements.

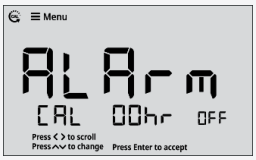
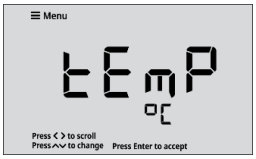
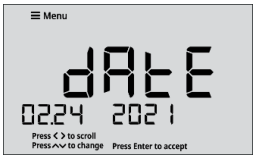
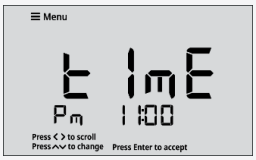
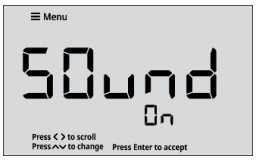
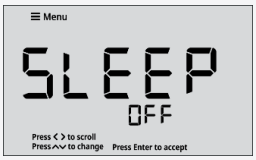
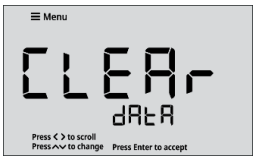
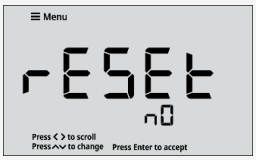
1. Remove any protective shipping materials from the pH electrode.
2. Rinse the pH electrode with deionized water to remove any salt deposits.
3. Open the fill hole on the pH electrode.
4. Add electrode fill solution to the pH electrode until it reaches the bottom of the fill hole.
5. Soak the pH electrode in electrode storage solution for at least 30 minutes prior to use; the sensing bulb and reference junction must be immersed in the electrode storage solution.

Meter Preparation

1. Connect the assembled power adapter to the meter and wall outlet
2. Connect the pH electrode and ATC probe to the meter
3. Select the appropriate meter settings in the meter Setup Menu:
   a. In the Measure Mode, press the **Menu** key to access the meter Setup Menu
   b. The first Setup Menu item (View Logs, Data Log) will appear; to scroll through the Setup Menu list, use the ◄ and ► keys
      i. Press the ► key to scroll to the next item
      ii. Press the ◄ key to scroll to the previous item
      iii. The list is cyclical, so continue to press the ► key to scroll from the last item to the first item again
   c. To change a setting within a Setup Menu item, press the ▲ or ▼ key

      For numeric value changes:
      i. Press the ▲ key once to increase the value by one least significant digit/unit
      ii. Press the ▼ key once to decrease the value by one least significant digit/unit
      iii. Press and hold the ▲ key to quickly increase the value
      iv. Press and hold the ▼ key to quickly decrease the value
   d. Once a setting is changed, press the **Enter** key to save the change
   e. When viewing data logs or calibration logs, press the **Menu** key to go back to the main Setup Menu list
   f. Press the **Read** key at any time to exit the Setup Menu and return to the main measure mode

Setup Menu	Description	Default Screen/Setting
View Logs	View up to 500 data log points and active pH, RmV, and temperature calibrations.	
Log Export Type	Set the log export type as computer or printer. If computer is selected, the logs are exported in CSV format. If printer is selected, the logs are exported in list format.	
Export All Logs	Send all saved data logs and calibration logs to the selected export device.	
Temp. Calibration or Manual Temp. Input	When an ATC probe is connected, use the Temperature Calibration menu to perform a one-point temperature offset calibration, up to ±5°C.	
	When no ATC probe is connected, use the Manual Temperature Input menu to enter the sample temperature value, from –5°C to 105°C.	
Measure Mode	Set the main measure mode to pH or relative mV (RmV).	
pH Resolution	Set the displayed pH resolution as 0.01 or 0.1 pH units.	
Calibration Buffer Set	Set the pH buffer set as USA, NIST, DIN, or FSCI for automatic buffer recognition during pH calibrations. USA: 2.00, 4.01, 7.00, 10.01, 12.00 NIST: 1.68, 4.01, 6.87, 9.18, 12.46 DIN: 1.09, 3.06, 4.65, 6.79, 9.23, 12.75 FSCI: 1.00, 3.00, 6.00, 8.00, 10.00, 13.00	
Read Type	Set the Read Type as Continuous, Auto-Read, or Timed to define how measurements are performed and when measurements are saved and exported.	
Timed Interval	When Timed is set as the Read Type, set the time interval from 5 seconds to 60 minutes. This time interval is used to automatically save and export measurements.	

Setup Menu	Description	Default Screen/Setting
Calibration Due Alarm	Set the calibration due alarm interval from 0 hours (off) to 60 hours. An alarm is triggered if a calibration is not performed within the specified time interval.	
Temperature Units	Set the temperature units as °C (Celsius) or °F (Fahrenheit).	
Set Date Format	Set the date format as month-day-year (MM.DD.YYYY) or day-month-year (DD.MM.YYYY).	
Set Date Value	Set the month, day and year values. The date format used for this Setup Menu item will match the setting in the Set Date Format item.	
Set Time Value	Set the time in AM/PM format.	
Audio Mode	Set the audible beep to on or off. The audible beep is used when an alarm is triggered.	
Sleep Mode	Set the sleep mode to on or off. When the meter sleep mode is on, the meter will enter sleep mode when no keys are pressed for 20 minutes. Once the meter is in sleep mode, press the **Power** key to resume using the meter.	
Clear Data	Erase all data logs or erase all calibration logs.	
Factory Reset	Erase all data logs, calibration logs, and settings and return the meter to its factory default state.	

Calibration Preparation

For best results, periodic calibration with known, accurate, and fresh pH buffers is recommended. During the pH calibration, the meter will automatically recognize each pH buffer value using the pH buffer set selected in the setup menu and the mV signal measured by the pH electrode. Once the reading is stable, the meter will automatically display the buffer value at its measured temperature from the selected buffer set.

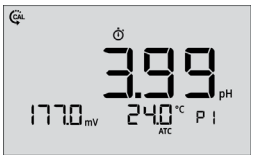
1. Add about 30 mL of the pH 4.01 buffer to a 50 mL beaker and label the beaker
2. Add about 30 mL of the pH 7.00 buffer to a 50 mL beaker and label the beaker
3. Add about 30 mL of the pH 10.01 buffer to a 50 mL beaker and label the beaker

Calibration Procedure

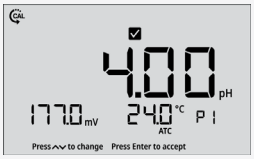
The following is an example of a three-point pH calibration using auto-recognized pH 4.01, 7.00 and 10.01 pH buffers. The pH buffers can be read in any order. For this example, pH buffers are read lowest to highest.

1. In the pH measure mode, press the **Cal** key to start the pH calibration. The active Calibration Buffer Set is shown.

2. Rinse the pH/ATC electrode and place it into the pH 4.01 buffer.

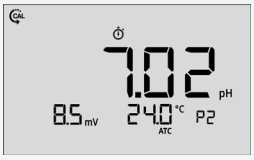


3. Wait for the pH value to stabilize. While the reading is stabilizing, the stopwatch icon is shown and the reading flashes. When the reading is stable, the checkmark icon is shown, and the reading is solid.

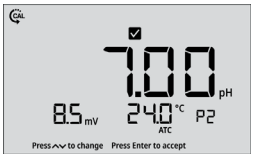


4. Once the reading is stable, press the **Enter** key.

5. Rinse the pH/ATC electrode and place it into the pH 7.00 buffer.

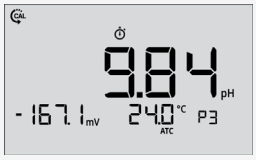


6. Wait for the pH value to stabilize. While the reading is stabilizing, the stopwatch icon is shown and the reading flashes. When the reading is stable, the checkmark icon is shown, and the reading is solid.

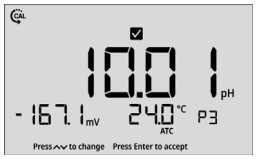


7. Once the reading is stable, press the **Enter** key.

8. Rinse the pH/ATC electrode and place it into the pH 10.01 buffer.



9. Wait for the pH value to stabilize. While the reading is stabilizing, the stopwatch icon is shown and the reading flashes. When the reading is stable, the checkmark icon is shown, and the reading is solid.



10. Once the reading is stable, press the **Enter** key.

11. Press the **Cal** key to save and end the calibration. The **Cal** key can be pressed when either the “SAVEd” or “4thPt” screens is shown.

12. The average slope value is shown. The average slope is recommended to be between 92% to 102%.

13. The meter proceeds to the main measure mode.

Sample Preparation

1. Add about 30 mL of the sample to a 50 mL beaker and label the beaker.
2. Repeat step 1 for additional samples.

Sample Measurement Procedure

1. Once the calibration is complete, prepare the samples to be measured.
2. Rinse the pH electrode and ATC probe and place them into the first sample solution.
3. Wait for the pH value to stabilize. While the reading is stabilizing, the stopwatch icon is shown and the reading flashes. When the reading is stable, the checkmark icon is shown, and the reading is solid.
4. Once the reading is stable, record the sample pH and temperature values.
5. Remove the pH electrode and ATC probe from the sample.
6. Repeat steps 2 through 5 for all samples.
7. When all samples have been measured, store the equipment. Between samples and overnight, store the pH electrode in electrode storage solution and the ATC probe in a dry place.

Ordering Information

Description	Cat. No.
Fisherbrand accumet AB315 pH/mV Bench Meter with Electrode Stand, Universal 110-240V Power Supply	**13-636-AB315**
Fisherbrand accumet AB315 pH/mV Bench Meter Bio Kit with pH Glass-Body Double Junction Refillable Electrode, ATC Probe, Electrode Stand, Universal 110-240V Power Supply	**13-636-AB315B**
Fisherbrand accumet pH Glass-Body Double Junction Refillable Electrode	**13-620-223A**
Fisherbrand accumet ATC Stainless Steel Temperature Probe	**13-620-19**

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