

# OPERATION MANUAL

Hand Held pH/mV meter  
model 8601



Model: ■ 8601A0-Meter

■ 8601AZ-Complete

## **INTRODUCTION**

Thank you for purchasing this pH meter. This pH meter is designed with pH/mV & temp. dual display, cal. automatic buffer recognition, automatic temp. compensation, and record features.

The meter will display all LCD segments when it is first turned on for approx. 3 seconds. Though you might have seen DATALOGGER, Y/M/D, mg/l, mS, ppm.. these are not available for model 8601. For pH logger or other water quality related products, please contact the store you purchased 8601 for more information.

## **MATERIAL SUPPLIED**

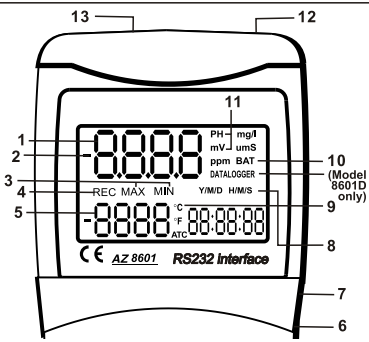
The full set contains:

- The meter x1
- The pH probe x 1
- Manual, 9V battery, Calibration buffer 3,7,10, Hard carry case

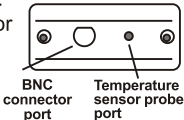
## **DISPLAY**

- The primary display shows the measured pH or mV reading.
- The secondary display shows the temperature of the reading.
- Unit of pH or mV is displayed in the right top of the screen. Unless the sensor probe is plugged into the meter, those readings keep changing in the screen are not referable.
- Unit of °C or °F and ATC are displayed at the bottom in the middle of the screen.
- "ATC" will not appear on LCD with the temperature sensor is unplugged.

# CONTROLS AND INDICATORS



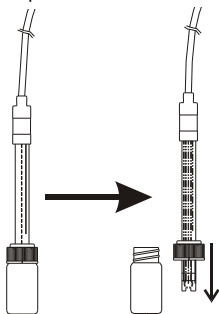
1. Primary Data Screen displays pH or mV reading, calibration value.
2. -Minus mV display.
3. MAX MIN pH recorded.
4. REC starts recording mode and displays max./min. pH recorded.
5. Secondary Data Screen displays temperature reading in degree C or degree F.
6. DC power in Jack.
7. RS232 output port.
8. H/M/S 88:88:88 displays data for Hour / Minute / Second.
9. °C/°F Toggles display data from °C to °F or °F to °C.
10. BAT battery low indication.
11. pH/mV Toggles display data from pH to mV or mV to pH.
12. Temperature sensor probe port.
13. pH. Electrode with BNC connector.



## PH PROBE

It is important to keep the pH probe wet when the meter is in storage.

The probe is well protected by a plastic bottle with solution in it. Please follow up below procedures when you want to use or store the probe.



### Step1

Rotate the bottle to remove the bottle away from the probe.

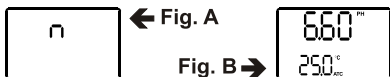
### Step2

Push down the cover and remove it away from the probe.

After using, please put back the cover on to probe, plug the probe into bottle and then rotate the bottle to make the bottle sealed well with cover.

## AUTO POWER OFF (SLEEP FUNCTION)

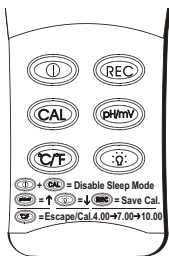
This instrument will shut off automatically in approx. 20 minutes for every power on. For recording or operating over longer periods of time, you can disable the sleep mode by pressing **I** and **CAL** simultaneously before power on. An "n" will appear in the middle of the screen at which time you can release the **CAL** button. (See Fig. A) The disable sleep mode will be invalid after power off.



## MODE OPTIONS

Delete and replace with programmable user selectable start-up mode.

The display will default to the mode last used. For your convenience, the meter defaults to the setting used during the last operation. The

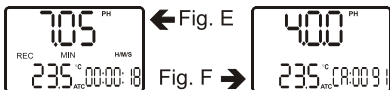
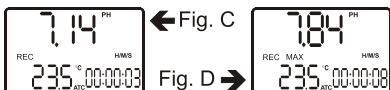


following table lists the modes of operation that can be invoked by pressing the button indicated.

- I** Turns instrument on (Default setting) and off. (See Fig. B)
- REC** Press momentarily and relative clock starts in the lower right screen.

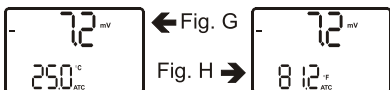
When in REC mode, (REC displays in the middle left of the LCD, Fig. C) pH/mV and CAL function keys are locked out. In REC mode, press REC key to display MAX (Fig. D) and MIN (Fig. E) and back to current pH in cycle. Press and hold REC for 3 sec. to turn off the record function and revert to the normal mode.


**CAL** Press momentarily to enter the Calibration mode. (Fig. F)



**pH/mV** Press momentarily to toggle display data from pH to mV or from mV to pH(Fig. G). Or press momentarily to increase the figure when calibration is performed.

**°C/°F** Press momentarily and the unit toggles between °C and °F temperature(Fig. H); The unit mode is indicated on the middle bottom area. Or press momentarily to escape current calibration to the next point.



-  Press momentarily and the back-light illuminates for approx. 30 seconds then turns off automatically. Or press momentarily to decrease the figure when calibration is performed.


## AUTOMATIC TEMPERATURE COMPENSATION (ATC)

The meter is recommended to use **AZ86P3** three in one epoxy combination probe with a temperature sensor probe for the automatic temperature compensation (ATC), the meter is capable of taking measurements with automatic or manual temperature compensation.

Ensure the **AZ86P3** probe is plugged into the meter for ATC, otherwise use **AZ86P2** Two in one probe and additional temperature probe, the probe must be submersed in the liquid you are measuring.

## CALIBRATION

Calibration is necessary and should be done regularly.

1. Power on the meter.
2. Press  button to enter pH calibration mode, you will first see " 4.00 pH" on the LCD readout.

If the buffer is incorrectly inserted or the probe is damaged, "Err" will appear on the bottom-right corner. (Fig. 1)

Fig. 1 →



3. Press **pH/mV** button to increase (Fig. J) Or press **Light** to decrease (Fig.K) the displayed value in order to meet your calibration buffer. The adjustable range for 4.00 pH calibration point figures from 3.50 to 4.50. (Fig. J, K)



4. Ensure the measured pH value to stabilize in the bottom-right corner, it means the meter is now calibrated to the current buffer, the 4.0pH calibration point is now completed. (Remark: The value shows beside CAL is a reference value of mV ). The correct mV value is the digits you see from the right bottom corner but with a decimal point after 3rd digit ,i.e. before 4th digit . For example , if you see 1234 after CA , the mV value should be 123.4 .

5. Press **REC** to save the calibration, "SA" will appear on the LCD (Fig. L).



If you are performing multipoint calibration, press **C/F** to go to the next pH 7.0 calibration procedure.

6. Rinse the probe with de-ionized water or a rinse solution, and place it in the next pH buffer. Follow the procedures as pH 4.0 for additional pH 7.0 calibration, the range for 7.0 pH calibration point figures from 6.50 to 7.50.



When calibration is complete, save the calibration by pressing **REC**, otherwise, escape by pressing **C/F** to additional calibration (pH 10). (Fig. M)



7. Follow the same procedure as pH 4.0 and pH 7.0 for pH 10 calibration point. The range for pH 10.0 calibration point figures from 9.50 to 10.50.(Fig. N)

8. After saving the calibration of the last pH 10.0 point by pressing button, you will see an "END" appears on the LCD, it means the calibration has been completely finished. (Fig. O)



**NOTE:**

The meter can be manually set up the temperature value for ensuring an accurate pH measurement. This function is used when your pH electrode is ATC feature exclusive. Please follow up below steps.

- a) Press **CAL** button to start 4.00pH calibration point, for setting up the temperature value, press and hold **C/F** button 2 seconds, "St" will display above the default 25°C.(See Fig.I-1) To increase the temperature value by press **pH/mV** button, or press **⊕** button to decrease the temperature value.

The temperature range is  $-5^{\circ}\text{C}\sim 80^{\circ}\text{C}$ , press **REC** button to save the temperature value.

- b) Easy to measure the pH value with 2 in one electrode (86P2AZ), or any compatible pH electrode without temperature compensation, now you will see the temperature setting value replaced pre-set temperature.

Fig 1-1



## **MAINTENANCE**

- ✓ Please always keep the pH glass bulb wet by using the plastic bottle to protect and store our electrode, you can also store in a pH 4.0 buffer with 1/100 part of saturated KCL. Never use distilled water for storage.
- ✓ Always rinse the pH electrode and reference junction in de-ionized water before next use.
- ✓ Never touch or rub glass bulb for lasting pH electrode life.
- ✓ This meter is designed with cloth junction. To prolong the life of the electrodes, it is recommended to clean them monthly by immersing them in cleaning solution for half an hour. Afterwards, rinse it with tap water and re-calibrate the meter.
- ✓ The other way to prolong the life of the electrodes is to extend the cloth junction and cut the dirt portion.

The extendable cloth reference junction is used to eliminate the reading errors from clogged junction. Follow up below steps to expose the new unused portions.



Extendable  
cloth junction



**Step1**

Using tweezers to pull out the cloth junction and expose the new unused portion.



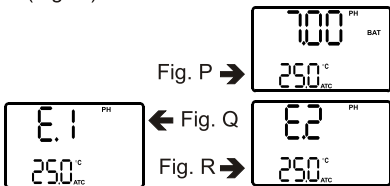
**Step2**

Cut the clogged cloth and expose the new portion.

## **TROUBLESHOOTING**

? Power on but no display. Check the battery are in place and making good contact or correct polarity , replace a new battery or attach optional AC adaptor for the weak battery caused.

- ? Unstable reading. Clean the probe and recalibrate or make sure sample entirely covers the probe sensor, or replace a new probe and re-calibrate if you find a broken probe.
- ? Slow response. Clean probe by immersing the electrode in tap water for 10-15 minutes, then thoroughly rinse with distilled water or use a general purpose electrode cleaner. You could also follow up the maintenance steps of cloth junction renew in page 10 to improve the response time.
- ? CAL: Err. Calibration error. Replacing wrong buffer with correct one or input a correct buffer value. If above are not working, the probe might be damaged or broken, replace a new one and re-calibrate.
- ? BAT indication. Replace with a new battery. (Fig. P)
- ? E.1. Out of pH range, too acid (<1pH). (Fig. Q)
- ? E.2. Out of pH range , too alkali (>14 pH). Plug in the pH electrode and temperature sensor probe (if any). (Fig. R)



## REPLACING THE BATTERY

### Replace your 9-volt battery when:

- ✓ The BAT icon appears on the right of the screen.
- ✓ The meter will not power on.
- ✓ Use of the back-light causes the BAT icon to appear.

Even if the battery was recently replaced, check its voltage level if you get no response from your instrument.

To replace the battery:

1. Remove the pH electrode and temperature sensor of the instrument.
2. Lay the instrument face-down on a clean, flat surface.
3. Remove the battery by screw driver and observe indicated polarity and close the cover after replacing with a new battery.



**Remove battery from instruments that you do not plan to use for a month or more. Do not leave battery in instrument.**

## OPERATING CONDITIONS

- ✓ Input Impedance =  $10^{12}$  ohms
- ✓ Operating temperature  $0^{\circ}\sim 50^{\circ}\text{C}$  ( $32\sim 122^{\circ}\text{F}$ )
- ✓ Operating Humidity Max. 80% RH
- ✓ Calibration buffer solution suggested:
  - USA buffers (pH 1.68, 4.01, 7.00, 10.01, 12.45)
  - NIST buffers (pH 1.68, 4.01, 6.86, 9.18, 12.45)
  - DIN buffers (pH 1.09, 3.06, 4.65, 6.79, 9.23, 12.75)
- ✓ Power : One 9.0 volt battery

## SPECIFICATION

	pH	mV
Range	0.00 ~ 14.00	-499 ~ +499
Resolution	0.01pH	0.1mV ( $\pm 0.1\sim 195$ ) 1 mV ( $\pm 190\sim 499$ )
Accuracy	$\pm 0.02\text{pH}$	$\pm 0.2$ mV $\pm 2$ mV
Dimension	72 x 182 x 30 mm (meter)	
Unit Weight	Approx. 220 gram (with battery)	
Temperature compensation from $-5$ to $80^{\circ}\text{C}$ , Accuracy : $\pm 0.3^{\circ}\text{C}$		
Format	Baud Rate : 2400 bit/sec Data Bit : 8 , Stop Bit : 1	
: P xx.xx : t xxx.xc ; P xx.xx : t xxx.xF : or m xxx.x mV : t xxx.xc ; m xxx.x mV : t xxx.xF or m xxxx mV : t xxx.xc; m xxxx mV : t xxx.xF : or m _____ : t _____ (w/o probe) p _____ : t _____ (w/o probe)		

## **OPTIONAL ACCESSORY:**

- ✓ **AZ86P3** Three in one Epoxy combination pH electrode with ATC , 40" ( 102cm) cable and protection bottle (with solution) included.
- ✓ **AZ86P2** Two in one pH electrode without ATC.
- ✓ **RS232** software CD with D-sub connector
- ✓ Standard Buffer Solution.
- ✓ DC Adaptor

## **RS232 OUTPUT:**

The meter can link with personal computer to capture on-line datas ,display pH/mV or pH °C / ° F records with real-time output, you can retrieve file , save the datas for operating data analysis, records statistic , multi-files display in the screen,....versatile functions for your choice.

Connection procedures:

- 1.Plug the optional accessory RS232 cable onto the DC jack port ( at the right side of the meter)
- 2.Instert the D-sub 9P type connector onto computer's Com. 1 or 2 port or....
- 3.Start to set up RS232 software by running the software CD.
- 4.When installing the RS232 software ,please follow the operation manual procedure in the software package.

## **WARRANTY**

The meter is warranted to be free from defects in material and workmanship for a period of one year from the date of purchase. This warranty covers normal operation and does not cover battery , misuse, abuse, alteration, tampering, neglect, improper maintenance, or damage resulting from leaking batteries. Proof of purchase is required for warranty repairs. Warranty is void if the meter has been opened.

## **RETURN AUTHORIZATION**

Authorization must be obtained from the supplier before returning items for any reason. When requiring a RA (Return Authorization), please include data regarding the defective reason, the meters are to be returned along with good packing to prevent any damage in shipment and insured against possible damage or loss .



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**Data logger**

**Temp./RH transmitter**

**Wireless Transmitter .....**



This equipment has been manufactured for  
Spectrum Technologies, Inc.  
12360 S. Industrial Dr. East  
Plainfield, IL 60585 USA

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

Model Number: 2130  
Description: Portable, pH/mV Meter  
Type: Electrical Equipment for Measurement, Control, and Laboratory Use

Directive: 2004/108/EC  
Standards: EN 61326 (1998)  
CISPR11©IEC(2003+A1:2004)  
IEC/EN 61000-4-2 (1995+A1:1998+A2:2001)  
IEC/EN 61000-4-3 (2002+A1:2002)

A handwritten signature in black ink, appearing to read 'Doug Kieffer'. The signature is written in a cursive, flowing style.

Douglas L. Kieffer,  
Soil/Water Products Manager

April 8, 2009