1 YEAR WARRANTY

$C\epsilon$

User's Guide

pH/mV meter

$C\epsilon$

RS232 interface

PHH-860
## pH/MV/Temp Handheld Meter with RS232 Capability

FUNCTIONAL DESCRIPTION

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, μmS, ppm.. These are not available for the meter model number **PHH-860**.

The LCD is divided into three distinct sections : One large (Primary) top screen and two smaller bottom screens (Secondary and Relative Clock). The 3 display areas keep you constantly updated with the pH measurements and relative mV value while calibrating.

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.

- No "ATC" will be appeared without temperature sensor probe.

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CONTROLS AND INDICATORS
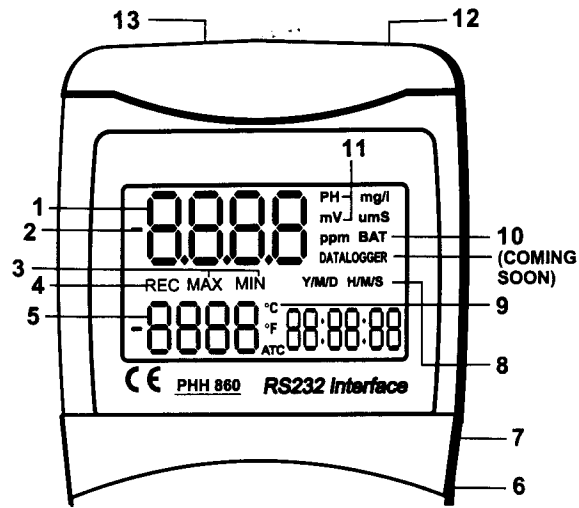
1. Primary Data Screen displays pH or mV reading, calibration value.
2. -Minus mV display.
3. MAX MIN pH recorded.
4. REC starts recording mode and displays max./min. pH recorded.
5. Secondary Data Screen displays temperature reading in degree C or degree F.
6. DC power in phone Jack marked DC9V.
7. 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 and plug.

BNC connector port   Temperature sensor probe port
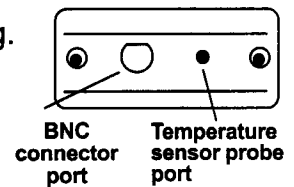
AUTO POWER OFF(SLEEP FUNCTION)

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 ⏻ 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.

| n | ← Fig. A | 6.60 ᵖᴴ |
| | Fig. B → | 25.0 °C ATC |
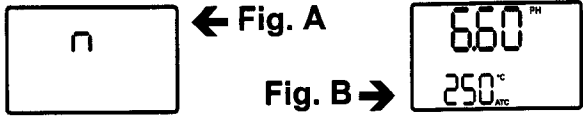
MODE OPTIONS

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.

⏻   REC
CAL   pH/mV
C/F   ☼

⏻+CAL = Disable Sleep Mode
pH/mV = ↑ C/F = ↓ REC = Save Cal.
C/F = Escape/Cal.4.00→7.00→10.00
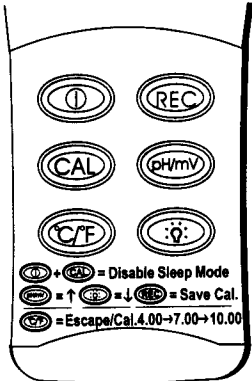
⏻ Turns instrument on (Default setting) and off. (See Fig. B)

REC Press momentarily and relative clock starts in the lower right screen.

REC is displayed in the middle left of (Fig. C) other button functions are locked out except Power , °C / °F and Backlight. Press momentarily again and the unit cycles through MAX (Fig. D) and MIN (Fig. E) and back to current pH; the record mode is displayed on the LCD. Press and hold REC for 3 seconds to turn off the record function to the normal mode.

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

← Fig. C

Fig. D →

← Fig. E

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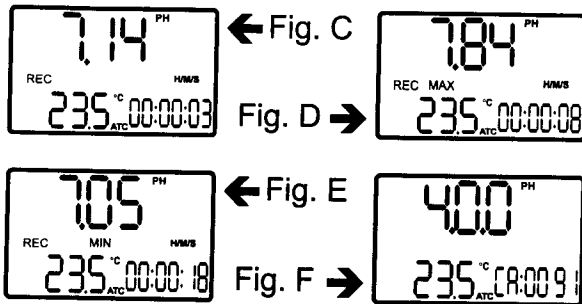
pH/mV Press momentarily to toggle display data from pH to mV or from mV to pH(Fig. G). Or press momentarily to increase the figure when calibration is being performed.

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.

← Fig. G

Fig. H →
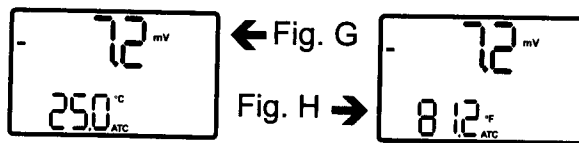
☼ Press momentarily and the backlight illuminates for approx. 30 seconds then turns off automatically. Or press momentarily to decrease the figure when calibration is being performed.

AUTOMATIC TEMPERATURE COMPENSATION (ATC)

The meter is recommended to use **PHE-860** 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 **PHE-860** probe is plugged into the meter for ATC, otherwise use a standard pH probe with a BNC connection and an additional temperature probe, the probe must be submersed in the liquid you are measuring.

If there is no temperature sensor plugged into the meter, the default manual temperature setting is automatically 25 degree C , Manually set the temperature to match your working conditions using a separate thermometer and record the working condition (temperature of the liquid) to convert the pH value for what you are measuring.

1. Power on the meter.
2. Press CAL 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. I)

Fig. I ➡
```
 400 ᴾᴴ
270°C ᴀᴛᴄ CA: Err
```
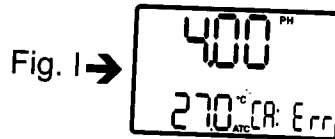
3. Press ᴾᴴ/ᵐⱽ button to increase(Fig. J)Or press 🌣 to decrease (Fig.K) the figures to refer to the calibration buffer solution which you have, the range for 4. 00 pH calibration point figures from 3.50 to 4.50. (Fig. J, K)

```
 401 ᴾᴴ
270°C ᴀᴛᴄ CA 88:88
```
⬅ Fig. J

Fig. K ➡
```
 399 ᴾᴴ
270°C ᴀᴛᴄ CA 88:88
```
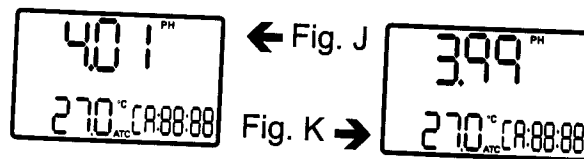
4. Ensure the measured pH value to stabilize in the bottom-right corner, it means the meter is now calibrated to the current buffer, the 4.0pH calibration point is now completed. (Remark: The value shows beside CAL is the relative mV reading, as an mV reference value, o divide by 10 and with a 0.1 resolution from the 4 digits)

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

Fig. L ➡
```
 SA
```
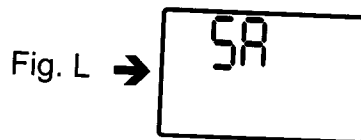
If you are performing multipoint calibration , press C/F to go to next pH 7.0 calibration procedure.

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)

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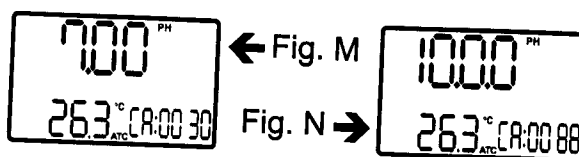
7. Follow the same procedure as pH 4.0 and pH 7.0 for pH 10 calibration point. The range for pH 10.0 calibration point figures from 9.50 to 10.50.(Fig. N)

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)

Fig. O →
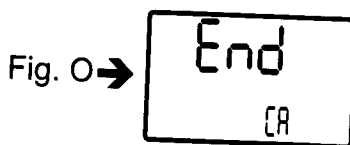
P.S.The meter features can be manually set up the temperature value for ensuring an accurate pH measurement. (This is in case you are using the pH electrode which is without A.T.C. Feature.)

a)Simutaneously press ⓘ and Ⓒ/F to enter temperature setting mode, set the temperature value you measured by a general purpose temperature probe, press ⓟH/mV button to increase the temperature value, or press ⓔ button to decrease the temperature value. The temperature range is -50°C~80°C, press ⓡEC button to save the temperature value.

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

MAINTENANCE

✓Please always keep the pH glass bulb wet by using the rubber cap to protect and store our electrode, you can also store in a pH 4.0 buffer with 1/100 part of saturated KCL.

✓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.

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.

? <u>Unstable reading.</u> 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.

? <u>Slow response.</u> 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.

? <u>CAL: Err.</u> Calibration error. Replace wrong buffer with correct one, or buffer input value incorrect, otherwise, the probe damaged or broken, replace a new one and re-calibrate.

? <u>BAT indication.</u> Replace with a new battery. (Fig. P)

? <u>E.1.</u> Out of pH range, too acid (<1pH). (Fig. Q)

? <u>E.2.</u> Out of pH range , too alkali (>14pH). Plug in the pH electrode and temperature sensor probe (if any).(Fig. R)

Fig. P →

Fig. Q ←

Fig. R →
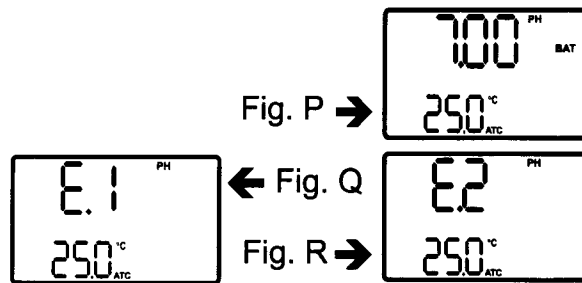
REPLACING THE BATTERY

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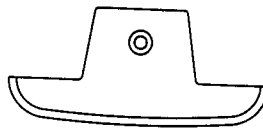
Remove battery from instruments that you do not plan to use for a month or more. Do not leave battery in instrument.

OPERATING CONDITIONS

✓ Input Impedance = 10^{12} ohms

✓ Operating temperature 0°~50°C (32~122°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 (±0.1~195) 1 mV (±190~499)
Accuracy	±0.02pH	±0.2 mV ±2 mV
Dimension	72 x 182 x 30 mm (meter)	
Unit Weight	Approx. 220 gram (with battery)	
Temperature compensation from -5 to 80°C , Accuracy :±0.3°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)		

MATERIAL SUPPLIED

This package contains:

✓ The meter x 1

✓ Battery x 1 (9.0 volt)

✓ Operation manual

✓ Hard carrying case

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OPTIONAL ACCESSORY:

✓ **PHE-860** Three in one Epoxy combination pH electrode with ATC , 40" (102cm) cable and rubber cap included.

✓ **PHE-1311** pH electrode with BNC connector without ATC.

✓ RS232 software disk or CD with D-sub connector

✓ Standard Buffer Solution.

✓ DC Adaptor

RS232 OUTPUT:

The meter can link with personal computer to capture on-line data 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. Insert the D-sub 9P type connector onto computer's Com.1 or 2 port or....

3. Start to set up RS232 software by inserting the CD-ROM or Floppy diskette.

4. When installing the RS232 software,please follow the operation manual procedure in the software package.

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