# User's Guide

# PHH-37
## pH/mV and Temperature Meter

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The information contained in this document is believed to be correct, but OMEGA accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.
**WARNING:** These products are not designed for use in, and should not be used for, human applications.

# Introduction

- This instrument is a portable easy to use 3 ½ digit, compact-sized pH/mV and temperature meter.
- Dual display pH (mV) & Temperature.
- Auto power off function to extend battery life.
- Automatic Temperature Compensation and Manual Compensation.
- RS 232 Interface with Windows Software.

# General

**Low battery indication:** The "⊏⊞" is displayed when the battery voltage drops below the operating level.

**Accuracy:** Stated accuracy at 23°C ±5°C (79°F ±9°F), < 70% relative humidity.

**Operating environment:**
  **Meter:** 0°C to 50°C (32°F to 122°F) at < 70% relative humidity.
  **pH electrode:** 0°C to 80°C (32°F to 176°F) .

**Storage environment:** -20°C to 60°C ( -4°F to 140°F) at ≥ 80% relative humidity with battery and pH electrode removed form meter.

**Measurement rote:** 1 time per second, nominal.

**EMC-instrument unspecified for use in EMC field ≥ 0.5V/m.**

**Battery:** 3 pcs 1.5V (AAA size) UM-4 R03.

**Battery life:** 100 hours typical with carbon zinc battery.

**Dimensions:** 155.5mm(H) x 48mm(W) x 35mm(D)

**Weight:** 180g.

**Accessories:** Instruction manual, Software, Batteries, RS232 cable  pH4.01, pH7.00 and pH10.01 buffer solution, pH electrode, Carrying case, Screwdriver.

# Specifications

Accuracy stated at ambient temperature 18 to 28°C  (65 to 82°F), <70% R.H.

Temperature Coefficient: 0.1 times the applicable accuracy per °C from 0°C to 18°C and 28°C to 50°C(32°F to 64°F and 82°F to 122°F)
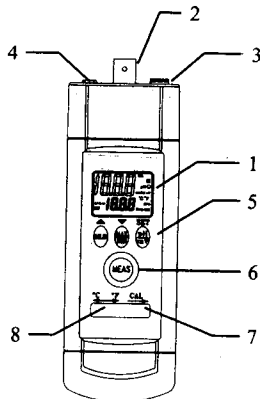
| Measurement | Range | Resolution | Accuracy |
|---|---|---|---|
| pH | 0 .00 to 14.00 | 0.01pH | ±0.03pH* |
| mV | -1000 to 1000mV(Auto) | 0.1mV/1mV | ±(0.5% rdg+2dgts) |
| Temp(°C) | 0 to 80°C | 0.1°C | ±1°C |
| Temp(°F) | 32 to 176°F | 0.1°F | ±2°F |

*Not include pH electrode error.

Input impedance: $10^{12}\Omega$

**Note: Probe can't be interchanged.**

# Front Panel Description



1. LCD: Measured values, unit, symbols and decimal points are displayed.
2. Input Socket: BNC connector for pH and mV.
3. Input Socket: Earphone (3.5mm) jack for temperature plug.
4. Input Socket: Earphone (2.5mm) jack for RS232 cable.
5. Push Buttons: Button for controlling meter.
6. Push Button: Turn on/off meter.
7. CAL Switch: Slide the switch to right to enter calibration mode.
8. °C/°F Switch: Slide the switch °C/°F to select the temperature unit.

## Push Button functions

### "HLD" Button:

Press the "HLD" button to enter the data hold mode, the "H" annunciator is displayed at the top-right of display. When data hold mode is selected, the pH meter held the present readings and stops all further measurements. Press the "HLD" button again to cancel data hold mode, causing pH meter to resume taking measurements.

### "MAX/MIN" Button:

Press the "MAX/MIN" button to enter the MAX, MIN, MAX-MIN, AVG recording mode. (displays the Maximum reading, Minimum reading, "MAX-MIN" reading and "AVG" reading in record mode)
In this mode, press "HLD" button to stop recording, all values are frozen, press "HLD" button again to restart recording. In this mode, the APO function and other buttons are disabled, excluding "HLD" and Back-light buttons. Press and hold down the "MAX/MIN" button for more than 2 seconds to exit the MAX/MIN function.

2

**"pH/mV" Button:**
It built in mV measuring function, letting you make ion-selective, ORP(oxidation-reduction potential), and other precise mV measurements. Pressing "pH/mV" button to change measurement range between "pH" and "mV".

**"MEAS" Button:**
It can turn on or off the meter by pressing "MEAS" button, power is automatically turn off if no operation for a period of 10 min.

## Switch Functions

**"°C/°F" Switch:**
It can select the temperature unit by sliding the switch. If intend to measure the "°C", then slide the switch to left. If intend to measure the "°F", then slide the switch to right.

**"CAL" Switch:**
It can enter the calibration procedure by sliding the switch to right.

# pH Temperature Compensation

Enable the meter to read solutions at various temperatures, the meter will make the correct electrode's temperature dependency to measure the pH value. The compensation may be manual with two buttons adjustment on the meter, or it may be automatic with pH electrode's temperature sensor immersed in test solution.

### Temperature Compensation Mode:

**Automatic Temperature Compensation:**
Connecting the 3.5mm temperature plug into earphone and the pH function will be temperature compensated automatically.

**Manual Temperature Compensation:**
Take the 3.5mm temperature plug away then press and hold down the "SET" button which are printed in white word on the overlay for more then 2 seconds to enter temperature compensation mode between 0.0°C and 100.0°C (32.0°F to 212°F). The preset temperature is 25.0°C (77.0°F), press " ▲ " or " ▼ " which are printed in white sign to increase or decrease the compensation temperature. Pressing and hold down "SET" button more than 2 seconds to complete the temperature.

3

# Calibration Procedure

### pH Calibration With Automatic Temperature Compensation(ATC):

1. Connect the 3.5mm temperature plug into earphone. Select the function in pH(ATC)/ °C. (or °F) Slide the switch °C/°F to select the temperature unit.
2. Sliding the "CAL" switch to right to enter calibration procedure.
3. Put pH electrode into buffer solution pH4.01 and agitate the buffer solution. If the solution is inaccurate, LCD will show E4, please check value of buffer solution. (Fig-1)
4. Wait for the reading to be stable. (Fig-2)
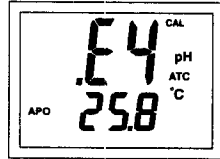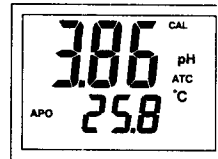
(Fig-1)          (Fig-2)

5. Press and hold down "SET" button for more than 2 seconds to enter the pH4.01 mode, and the main (pH) display blanks. (Fig-3)
6. The preset value is pH4.01 and user can press " ▲ " or " ▼ " button to enter determined value in LCD. Press and hold down "SET" button for more than 2 seconds to complete the pH4.01 calibration, and LCD will show SA. (Fig-4, Fig-1)
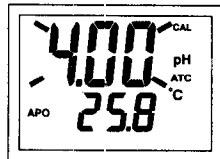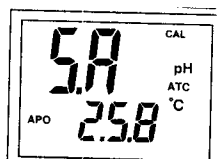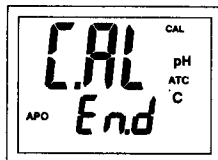
(Fig-3)          (Fig-4)

7. Rinse electrode and blot with lint-free tissue.
8. Put pH electrode into buffer solution pH7.00, repeat steps 3 to 7.
9. Put pH electrode into buffer solution pH10.01, repeat steps 3 to 7.
10. If you complete steps 1 to 9, the LCD will show CAL(main display) and End(sub display). (Fig-5)
11. Sliding the "CAL" switch to left to leave calibration procedure.

(Fig-5)

4

**pH Calibration With Manual Temperature Compensation(MTC):**

1. Take the 3.5mm temperature plug away. Select the function in pH(MTC)/°C. (or °F)
2. Sliding the "CAL" switch to right to enter calibration procedure.
3. Put pH electrode into buffer solution pH4.01 and agitate the buffer solution, if the solution is inaccurate, LCD will show E4, please check value of buffer solution. (Fig-6)
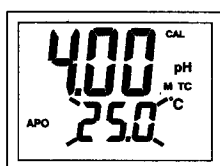4. Waiting for the reading to be stable. (Fig-7)
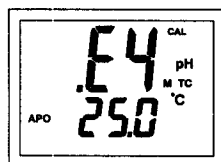
 (Fig-6)
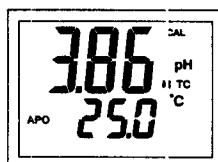
 (Fig-7)

5. Press and hold down "SET" button for more than 2 seconds to enter the pH4.01 calibration procedure, and the sub(Temp.) display blanking. (Fig-8)
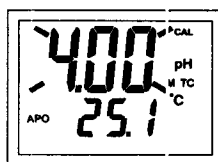
 (Fig-8)

6. The preset value is 25.0°C (77.0°F) and user can press " ▲ " or " ▼ " buttons which are printed in white sign to increase or decrease determined value in LCD. Press and hold down "SET" button for more than 2 seconds to complete the temperature of pH4.01 calibration, and LCD will show SA(Fig-9), then the main display blanking. (Fig-10)
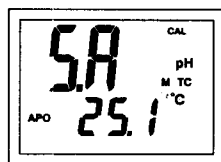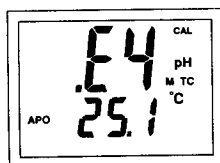
 (Fig-9)

 (Fig-10)

7. The preset value is pH 4.01 and user can press " ▲ " or " ▼ " buttons which are printed in white sign to increase or decrease determined value in LCD. Press and hold down "SET" button for more than 2 seconds to complete pH4.01 calibration, and LCD will show SA. (Fig-9, Fig-11)

5

 (Fig-11)

8. Rinse electrode and blot with lint-free tissue.
9. Put pH electrode into buffer solution pH7.00, repeat steps 3 to 8
10. Put pH electrode into buffer solution pH10.01, repeat steps 3 to 8.
11. If you complete steps 1 to 10, the LCD will show CAL(main display) and End(sub display). (Fig-12)
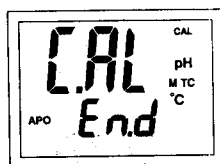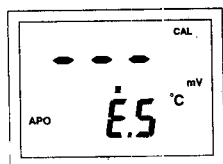
 (Fig-12)

12. Sliding the "CAL" switch to left to leave calibration procedure.

## Temperature Calibration:

1. Select the function in mV and connect the temperature plug.
2. Sliding the "CAL" switch to right to enter calibration procedure.
3. Put pH electrode into a standard which is 25.0±10°C (or 77.0±18°F) and the temperature is stable, if the temperature is inaccurate, LCD will show E5, please check value of temperature.(Fig-13)
4. Waiting for the reading to be stable. (Fig-14)
5. Press and hold down "SET" button for more than 2 seconds to enter the temperature calibration, and the sub (Temp.) display blanking, (Fig-15)



(Fig-13)



(Fig-14)



(Fig-15)

6

6. The preset value is 25.0°C (or 77.0°F) or user can press "▲" or "▼" button which are printed in white sign to increase or decrease the determined value in LCD. Press and hold down "SET" button for more than 2 seconds to complete 25.0°C (or 77.0°F) calibration, and LCD will show SA. (Fig-16, Fig-17)
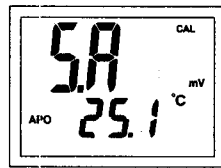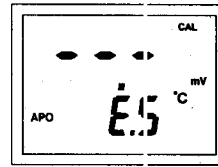
 (Fig-16)    (Fig-17)

7. Put pH electrode into a standard which is 70.0±10°C (or 158.(±18°F) and the temperature is stabled, repeat steps 3 to 6.

8. If you complete steps 1 to 7, the LCD will show CAL(main d.splay) and End(sub display). (Fig-18)
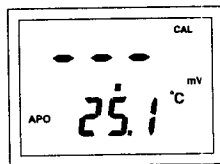
 (Fig-18)

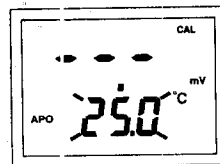9. Sliding the "CAL" switch to left to leave calibration procedure.

7

# Measuring Procedure

### pH Measurement

#### Calibrate the instruments and pH electrode before measuring.

1. Connect the combination pH electrode to the BNC socket.
2. Power on the instrument by pressing the "MEAS" button.
3. If the operation is under the "ATC" then please refer 5.1.1 Automatic Temperature compensation mode.
4. If the operation is under the "MTC", (take the 3.5 mm temperature plug away) then please refer 5.1.2 Manual Temperature compensation mode.
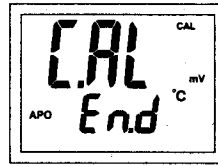5. Place the electrode into the measured solution, the instrument will display the pH value.
6. After making the measurement, please rinse the electrode with distilled water.

### mV Measurement

The instrument builds in mV measuring function letting you make ORP or other precise mV measurements.

1. Power on the instrument by pressing the "MEAS" button and pressing pH/mV button to change unit between "pH" and "mV".
2. The meter will show the mV value on the display.

# pH Electrode Maintenance

The proper way of using and protecting the electrode, it will prolong the life of the glass membrane. If your pH electrode is exhibiting by slow response, continuous drift, or erratic readings, follow the procedures listed below.

### Cleaning the pH Bulb

#### Protein Contamination:

Soak the electrode bulb/tip in a 10% solution of pepsin for 30 minutes. Rinse with deionized water and soak the electrode in pH7.00 buffer for two hours before using.

#### Oil Contamination:

Wash the electrode with a 50% water-acetone solution. Do not soak the electrode in the acetone solution, or it will deteriorate the bottom seals of the plastic electrode, Rinse with deionized water and soak the electrode in pH7.00 buffer for two hours before using.

### Recondition the pH Bulb

Only resort to this procedure if the preceding maintenance and cleaning procedures fail to restore acceptable electrode performance. Rinse immediately with deionized water and soak in pH7.00 buffer for two hours before using.

### Caution

To prevent permanent damage, care should be taken to prevent liquid permeating the pH meter. Meanwhile, the batteries should be taken out if user will not use the meter for a long period. Also, to choose the fitted pH electrode is required.

Please always keep the pH glass bulb wet by 4M 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.

8

## Trouble Shooting

? Power on but no display: Check the battery are in place and making good contact or correct polarity, replace a new battery.

? Unstable reading: Clean the probe and recalibrate or make sure sample entirely covers the 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.

? LCD show E2 at ATC Range: The temperature of solution over 100°C (212°F).

? LCD show E3 at ATC Range: The temperature of solution under 0°C (32°F).

## Battery Replacement

1. Power is supplied by three 1.5V(AAA size) batteries.

2. The "⊟➕" appears on the LCD display when replacement is needed. To replace the batteries, remove the screw from the back of the meter and lift off the battery cover.

3. Install three 1.5V batteries.

4. When not use for long time remove battery.

5. Don't keep in place with high Temp. or high humidity.

## Cleaning

Periodically wipe the case with a damp cloth and detergent, do not use abrasives of solvents.

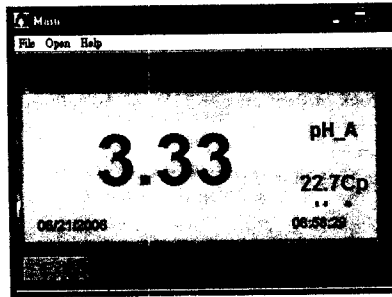# I  Install the PHH-37 Software

1. Run setup.exe on your PHH-37 software disk.
2. Change the path if necessary or choose "Finish" button to install program directly.

**Note:**
1. Check the PHH-37 software disk for virus before installation.
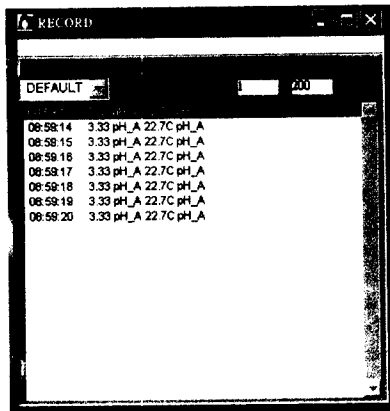2. System required: 80486-33 with 16MB RAM or better.

# II  PHH-37 Software Operate manual



**File**
> Print Window        Print Main Window

**Open\Display\List**

| Button | Description |
|---|---|
| [FILE NAME] | 1. DEFAULT-saving: the file name saved with time.xls<br>Such as: C:\Program Files\PHH-37\Data\06210901.xls.<br>This file was saved at 09:01 am. June 21.<br>2. User-saving: the file name saved by user. |
| [INTV] | Enter the number of second between recording input reading. |
| [LIST] | Enter the number of message history then view the message by shifting bar. |
| [CLR] | Clear the message window. |
| [REC] | Start the recording. |
| [OFF] | Stop the recording. |

| Button | Description |
|---|---|
| [Exit] | To exit PHH-37 application. |

# III Setup, Start & Exit on Software

### Quick Start at the PHH-37

1. Install the RS-232 cable between PC's Com port and PHH-37's RS-232 port.
Please make sure:
    - The RS232 cable connector (to meter) faced up with panel.
    - Physical Com port number has to be the same as setup in software.
2. Turn the PHH-37 on.

**At the PC**



setup

1. Open the PHH-37 software by double-clicking on the icon SETUP.exe.
2. Please double-clicking PHH-37 on the file C:\ Program Files\PHH-37 to start the PHH-37 application.

### Quick Exit
Click Exit to exit PHH-37 application.

11

# ▬▬▬▬▬ WARRANTY/DISCLAIMER ▬▬▬▬▬

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If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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| 2. Model and serial number of the product under warranty, and | 2. Model and serial number of the product, and |
| 3. Repair instructions and/or specific problems relative to the product. | 3. Repair instructions and/or specific problems relative to the product. |

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