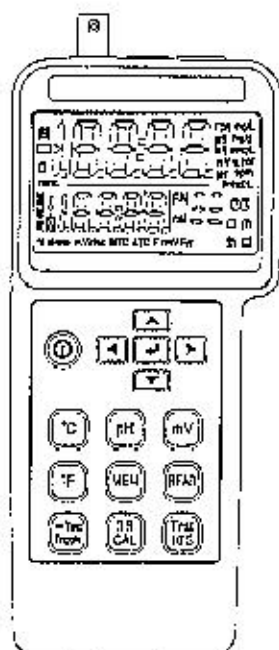


pH/ORP/Temperature Meter

INSTRUCTION MANUAL



1. SPECIFICATIONS

1-1 General Information

Circuit :	Custom one-chip of microprocessor circuit.
Display :	76.5mm×60.5mm×2.7mm super large LCD dual display.
Measurement :	pH : 0 to 14 pH mV : 0 to 1999mV Temperature : 0°C to 100°C (32°F to 200°F)
Temperature compensation for pH range :	Manual(MTC): 0°C to 100°C (32°F to 200°F), adjusting by push button or button on front panel. Automatic(ATC): 0°C to 100°C (32°F to 200°F), adjusting with the optional temperature probe.
Calibration for pH range :	Built in (pH4.010 and pH7.000) calibration on front panel, high reliability.
Auto data hold :	The indicator will halt in LCD from flash status when the electrode output becomes stable.
Memory recall :	Single recording : 99 records. Continuous recording : Have 99 sets of records, MAX. 3000 points.
Auto power off :	Press key turn on the meter, the " " mark lighted exit the auto power off mode.

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- 8). : Button for decreasing the values of parameters.
- 9). : Button for entering/escaping the mode of parameter settings.
Don't release the key to increase the value rapidly.
Press button, it will display calendar year and month, day, hour, minute, second.
If user press & hold the button for 2 seconds, it will perform as the following:
Parameters (in sequence):
Calendar year (from Year 2000 to Year 2099)
Calendar month-day (from 01-01 to 12-31)
Calendar hour-minute (from 00h:00m to 23h:59m)
MTC (from 0.0°C to 100.0°C or 32.0°F to 200.0°F)
Interval time (from 002s to 255s)
- 10). : Button for selecting temperature unit °C.
- 11). : Button for selecting temperature unit °F.
- 12). : In continuous measurement mode, pH Meter will not stop measuring even the reading is same as previous reading. Press button again to hold the reading.
- 13). : Button for measuring pH.
- 14). : Button for measuring mV.
- 15). : Single record : Press button to get and memorise the reading.
Continuous recording : Press & hold button for 2 sec, it will start continuous recording (M1~M99 sets).

- Memory Clearing: Press & hold button and to re-power on the meter, LCD will appear "Clr" indicator, it means that the memories have been cleared.
- 16). : To read the memorized value for pH - mV - temperature (R1~R99 sets).
- 17). : Press & hold button for 3 secs to enter into the adjustment mode, select the reference calibrated value of pH or temperature by pressing , then press button to complete the adjustment.
- 18). : Press button, the indicator will flash and halt in LCD (around 10 secs), the reading is also held, the meter stops measuring at this moment.

3. 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 a button adjustment on the meter, or it may be automatic with an optional temperature sensing probe immersed in the test solution.

➤ Temperature compensation mode :

- 1). Automatic temperature compensation: To connect the optional temperature probe with earphone jack and immerse in the test solution, LCD will appear "ATC" sign.
- 2). Manual temperature compensation: You can enter temperature between 0.0°C to 100.0°C manually. (An ATC probe will override manual compensation.) The preset temperature of pH Meter 0 is 25°C. Use button or button.

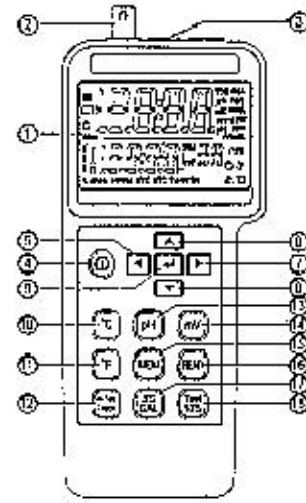
- Over input indication : Indicate by "----"
- pH electrode : Any kind of Ph electrode can be connected with BNC connector.
- Operating temperature : 0°C to 50°C (32°F to 122°F).
- Operating humidity : Max 80% RH.
- Sampling rate : About 1.5 time per second.
- Battery life : Approx. 120 hours.
- Calibration date : Record the last date of adjustment.
- Power supply : UM-1.5V x 6
- Power current : Approx. DC 20mA.
- Data output : RS232 PC serial Interface.
- Dimensions : 187(L) × 73(W) × 53(H)
- Weight : Approx. 320g with batteries.
- Application range : Stains · Lotion · Chemical · Brew · Bacteriology · Filthy water · Pulp · Pharmacy · Ferment · Electroplate · Drink · Aquaculture etc.
- Accessories : Carrying case, Instruction manual, Software, Batteries, RS-232 Cable.
- Option Accessories : pH 4 buffer solution, pH 7 buffer solution, pH electrode, Temperature probe.

1-2 Electrical Specifications (23 ±5°C)

Measurement	Range	Resolution	Accuracy
pH	0 to 14pH	0.001pH	±0.01pH
mV	0 to 600mV 601mV to 1999mV	0.1mV	±(0.05%+1d) ±0.1%
Temp (°C)	0 to 100°C	0.1°C	±0.5°C
Temp (°F)	32 to 200°F	0.1°F	±0.9°F

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2. FRONT PANEL DESCRIPTION



(Fig-1)

- 1). LCD : Measured values, unit, symbols, and decimal points are displayed.
- 2). Input socket : BNC connector for pH and mV.
- 3). Input socket : Earphone jack for temperature probe.
- 4). : Button for power on/off.
- 5). : Button for moving to the desired parameters.
- 6). : Button for increasing the value of parameters.
- 7). : Button for moving to the desired parameters.

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4. CALIBRATING PROCEDURE

4-1 pH Calibrating Procedure

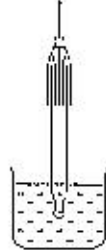
It is necessary to make the following calibration procedures, if user intends to keep the instrument and the electrode at high accuracy or it is the first time for user to use the meter and the electrode.

If the inaccuracy of the electrode is too large, LCD will display "Err".

- 1). Connect the combination pH electrode to the BNC socket and place the electrode into the buffer solution (pH 7.00).



(Fig-2)



(Fig-3)

- 2). Select ATC mode or MTC mode.
- 3). Waiting for the reading to be stable.
- 4). Press and hold button for 3 seconds to enter into the calibration mode.



- 5). Select pH mode (The preset value is pH 7.000 or user can press or to select).



(Fig-5)



(Fig-6)

- 6). Press button to complete offset calibration.



(Fig-7)

- 7). Rinse electrode and blot with lint-free tissue.



(Fig-8)



(Fig-9)

- 8). Slope calibration (pH 4.010), repeat steps 2 to 7.



(Fig-10)

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4-2 Temperature Calibrating Procedure

- 1). Plug in the "optional temperature probe" into the earphone jack. Place the temperature probe into the 0°C ice solution.
- 2). Press button is hold 3 seconds.
- 3). Select °C mode.
- 4). Press button than complete calibration.

5. MEASURING PROCEDURE

5-1 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 pushing the power on/off button.
- 3). If the operation is under the "ATC", then please refer to 3-1 measuring procedures.
- 4). If the operation is under the "MTC", then please refer to 3-2 measuring procedures.
- 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.

5-2 mV Measurement

The instrument builds in mV measuring function letting you make ORP or other precision mV measurements. Select the mV function, the meter will show the mV values on the display.

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5-3 Temperature Measurement

- 1). Plug in the "optional temperature probe" into the earphone jack.
- 2). Press or button to select temperature units.
- 3). Place the temperature probe into the tested solution, then the meter will show the temperature value and ATC sign. If take the temperature probe out, then the meter will show the MTC sign.

5-4 Auto Data Hold

Press and hold button during measurement. When the reading is stable, **A** indicator will flash and then halt on LCD.

If you want to cancel the data hold status, press button again to revert to the measuring status and **A** will disappear.

Press button again to hold the reading.

5-5 Data Record (Record & Read & Clear)

- 1). Memorize the readings
pH Meter can memorize the readings up to 99 records. Press button to record data represented by M(1-99). If press button and hold around 2 seconds, it will enter into continuous recording status. (M1-M99 sets, MAX 3000 points).
- 2). Recalling memory
Press READ button, LCD will show the last record. Press or button to review the data you recorded. R1 to R99 indicates the order of readings you measured.
- 3). Memories Clearance
Press and hold button to re-power on the meter. It will enter into the measuring mode until LCD shows "Clr" symbol.

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7. ELECTRODE PRECAUTIONS AND LIMITATIONS

- 1). Do not allow the electrode to go dry.
- 2). Do not wipe the electrode tip. Blot it with a lint-free tissue.
- 3). Do not leave the electrode in organic solvents, strongly basic solutions, concentrated fluoride solutions or hydrofluoric acid for extended periods. If measurements are made in these solutions, readings should be taken quickly and the electrode should be rinsed immediately with deionized water. After rinsing the electrode, soak it in 7.0 buffer for two hours before using again.
- 4). Do not use the electrodes in solutions that exceed a temperature range of 0°C to 100°C.
- 5). pH only

	98.0 - 102.0%
	Electrode is in good condition.
	95.0 - 97.9%
	Electrode needs to be cleaned.
	92.0 - 94.9%
	Electrode needs to be cleaned.
	Electrode needs to be renewed.

8. 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, low slope values, continuous drift, or erratic readings, follow the procedures listed below.

8-1 Cleaning the pH Bulb

- 1). 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 7.0 buffer for two hours before using.
- 2). 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 7.0 buffer for two hours before using.

8-2 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 7.0 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.

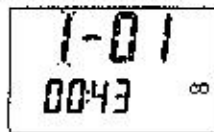
6. SETTING PROCEDURE

Please follow the following steps to set up the parameters for ① Calendar Year, ② Month-Day & Time (Hour:Minute), ③ Manual temperature compensation, ④ Interval time of record.

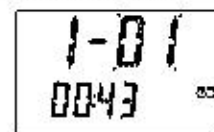
- 1). Press around 2 secs until hearing second beeping and the digit is flicking in LCD, then you are entering into the setting mode.
- 2). To set up for Year by pressing.



- 3). Press to set up for next parameter.
- 4). To set up for Month by pressing or button.

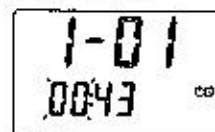


- 5). Press to set up for next parameter.
- 6). To set up for Date by pressing or button.

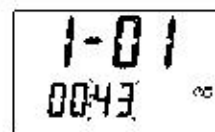


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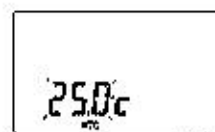
- 7). Press to set up for next parameter.
- 8). To set up for Hour by pressing or button.



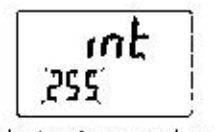
- 9). Press to set up for next parameter.
- 10). To set up for Minute by pressing or button.



- 11). Press to set up for next parameter.
- 12). To set up for Manual temperature compensation by pressing or button.



- 13). Press to set up for next parameter.
- 14). To set up for Interval time of record by pressing or button.



- 15). Press enter to finish the settings and return to measuring mode.

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9. BATTERY REPLACEMENT

- 1). When the LCD show , it indicates that the normal battery output is less than 6.8V. It is time to replace the battery.
- 2). Remove the battery cover.
- 3). Replace with 9V battery (heavy duty type) and place back the cover.
- 4). Make sure the battery cover is secured after replacing the battery.

10. RS-232 INTERFACE, SOFTWARE INSTALLATION and OPERATION

- For the detailed instruction, please refer to the content of attached CD-ROM, which has the complete instruction of RS-232 Interface, software operation and relevant information.
- RS-232 protocol : are enclosed within the content of CD-ROM, please open the CD-ROM for details.