PH8500 Portable pH Meter

User Manual

Apera Instruments, LLC

aperainst.com

V4.0

Table of Contents

1 Introduction

Thank you for purchasing PH8500 pH meter. Please read the manual carefully before use.

1.1 Measurement parameters

Measurement parameters	PH8500
pH/mV	√
Temperature	√

1.2 Instrument features

- The portable meter is featured with intelligent functions including automatic calibration, automatic temperature compensation, complete parameter settings, self-diagnostics, calibration reminders, calibration data tracking, and automatic power-off.
- GLP compliant (Good Laboratory Practice), real-time clock display, manual/automatic data logging. USB data output via PC-link software.
- A built-in digital filter improves measurement speed and accuracy, with a stability indicator for reliable measurement taking.
- Supplied in a portable carrying case that includes the meter, electrodes, standard solutions, soaking solution, and all necessary accessories for convenient field use.
- The meter is dustproof and waterproof, meeting the IP57 protection rating.

1.3 pH measurement features

- Comes with a high-quality pH electrode with ATC (automatic temperature compensation)
- Supports 1–3 point automatic calibration with self-diagnosis.
- Automatically recognizes pH standard buffer solutions. Users can select from three buffer standards: USA series, NIST series, or custom-defined buffers.

2 Technical Specifications

2.1 Main specifications

pH	Measuring Range	(-2.00 to 16.00) pH
	Resolution	0.1/0.01 pH
	Accuracy	±0.01pH ±1 digit
	Temperature compensation	(0 ~ 100) °C (manual or automatic)
mV	Measuring Range	-1999mV to 1999 mV
	Resolution	-200 to 200 mV: 0.1mV; Other ranges: 1 mV
	Accuracy	±0.1% F.S ±1 digit
Temperature	Measuring Range	-10 to 110°C
	Resolution	0.1˚C
	Accuracy	±0.5˚C

2.2 Other specifications:

Data storage	500 sets
Storage content	Numberings, date, time, measurement values, measurement unit, and temperature value, last calibration record
Output	USB
Power	AA batteries × 3 (1.5V× 3)
IP rating	IP57 waterproof and dustproof
Dimension & Weight	Meter: (86×196×33) mm / 335 g
	Portable case: (370×270×77) mm /1.8 kg

3 Instrument Description

3.1 LCD Display:

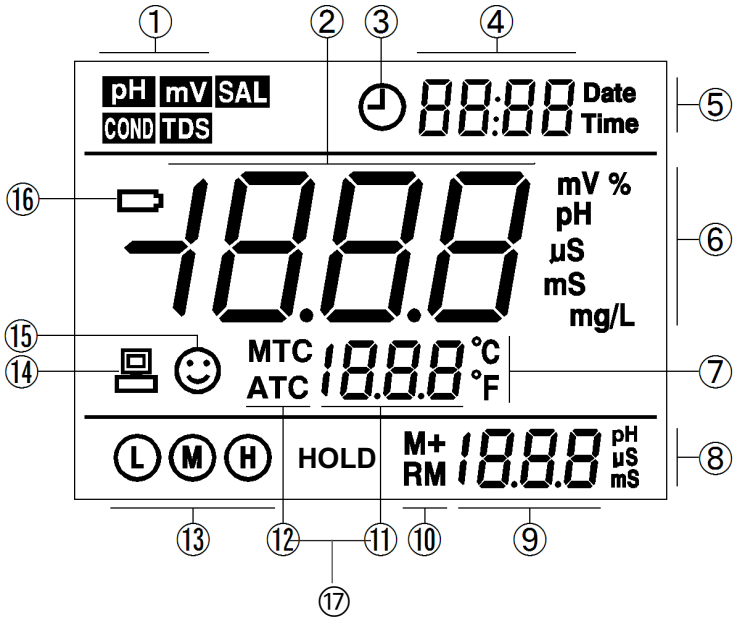

Diagram-2

(1) — Measurement mode icons

(2) — Measurement reading

(3) — Auto. Data Logging icon. When this icon appears, the meter is in the automatic data logging mode

(4) — Date and time, or prompts of special display mode

(5) — Units of date and time

(6) — Units of measurement

(7) — Temperature units

(8) — Units of calibration buffer value

(9) — Standard calibration value, the numbering for saved data and data recalling, and prompts of special display mode

(10) — Data logging and recall icons,

M+ — Data logging icon, RM — Recall the saved data

(11) — Temperature value, and prompts of special display mode

(12) — Temperature compensation icons, ATC — automatic temperature compensation,

MTC — manual temperature compensation

(13) — Calibration guide icon

(14) — USB icon: when this icon appears, the meter connects to the computer

(15) — Stability icon: When this icon stays on screen, it's good for recording the measurement.

(16) — Low battery icon: When this icon appears, please replace the batteries

(17) — Auto. Hold icon: When this icon appears, the reading will be automatically locked until being manually cancelled (refer to Section 3.4.2).

3.2 Keypad Functions

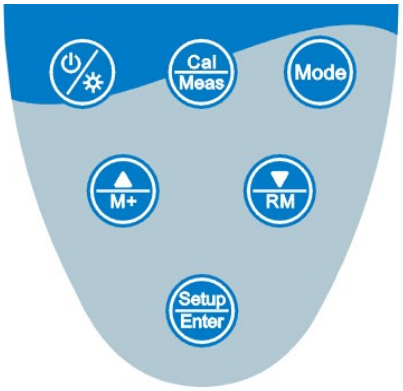

Diagram-3 pad

3.2.1. pad operations

- Short-press <1 second
- Long-press >2 seconds
- Power on the meter: short-press ⏻ to power on the meter.
- Power off the meter: In the measurement mode, long-press ⏻ to turn off the meter.

Notes: In the calibration mode or the parameter set-up mode, pressing ⏻ is invalid. Please short-press CAL/MEAS to return to measurement mode, then long-press ⏻ to turn off the meter.

Table – 1 Keypad Operations and Functions

pad	Operations	Functions
	Short press	● When the meter is powered off, short press to turn on the meter; ● In measurement mode, short press to turn on or turn off the backlight display.
	Long press	● In measurement mode, long press to turn off the meter.
	Short press	Select measurement parameter: **pH** → **mV**
	Short press	● In measurement mode, short press to enter calibration mode; ● In auto. hold mode (HOLD), recall mode (RM) or other mode, short press to return to measurement mode,
	Short press	● In measurement mode, short press to enter parameter settings; ● In calibration mode, short press to finish the calibration; ● In parameter settings, short press to confirm the change; ● In data recalling mode (RM), short press to return to measurement mode.
	Short/ long press	● In measurement mode, long press to enter manual temperature compensation mode, then short press or long press to increase the temperature value; ● In measurement mode, short press to save the measurement value; ● In data recalling mode (RM), short press to browse through the saved data; Hold to browse quickly. ● In parameter settings mode, short press to change the parameter in main menu and sub-menu; ● In sub-menu mode, short press to make changes.
	Short/ long press	● In measurement mode, long press to enter manual temperature compensation mode, then short press or long press to increase the temperature value; ● In measurement mode, short press to recall the saved data; ● In data recalling mode (RM), short press to browse through the saved data. Hold the to browse quickly. ● In parameter settings mode, short press to change the parameter in main menu and sub-menu; ● In sub-menu mode, short press to make changes.

3.3 Meter Socket

Electrode socket displays as Table – 2. USB socket displays as Table– 3.

Table – 2 Sockets for meters

Models	Photos	Description
PH8500 pH/Conductivity meter		● BNC socket (right) — connect pH electrode or ORP electrode, ● RCA socket (middle) — connect temperature probe

Table – 3 USB socket

Functions	Connect to meter	Description
USB communication		The meter has USB communication function, connecting the meter to a computer by USB cable with the installation of PC-Link software (included in the flash drive)

3.4 Reading Mode

3.4.1 General Reading Mode

When the reading becomes stable, a **smiley icon** ☺ will appear on the LCD (see *Diagram 4*).

If ☺ is **not displayed or is flashing**, do **not** record the reading or perform calibration until the value has stabilized. There are **three stability criteria**:

- **Normal** (factory default)
- **High** – stability is determined over a longer period
- **Low** – stability is determined over a shorter period

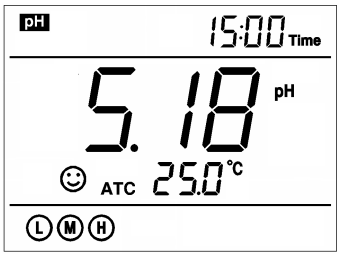

Diagram - 4

Users can select the appropriate stability criterion based on the testing requirements in P1.3 (refer to Section 7.3).

3.4.2. Automatic Hold mode

Select On in P3.6 to turn on Automatic Hold mode.

When the reading is stabilized for more than 10 seconds, the meter automatically locks the reading and displays the **HOLD** icon, see Diagram – 5.

In HOLD mode, short press (CAL/MEAS) to release the lock.

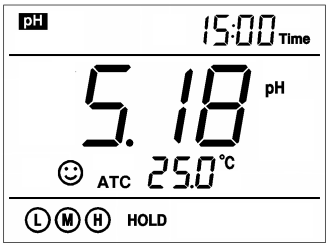

Diagram - 5

3.5 Data Logging, Data Recalling, Data Deletion

3.5.1. Manual Data Logging

When the measurement reading becomes stable, short press (M+).

The **M+** icon and the storage serial number will appear on the LCD, indicating that the current measurement data has been successfully stored (see *Diagram 6*).

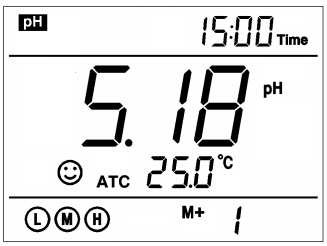

Diagram - 6

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3.5.2. Automatic Data Logging

To enable automatic data logging, set the storage interval (e.g., 3 minutes) in **parameter P3.3 (refer to Section 7.5)**.

Once activated, ⏲ will appear on the LCD, and the meter will enter the automatic data logging mode.

- After pressing (M+), ⏲ begins flashing, and the first measurement value is stored.
- After the preset time interval (e.g., 3 minutes), the second measurement will be automatically stored.
- The number next to M+ indicates how many sets of data have been stored (see *Diagram 7*).

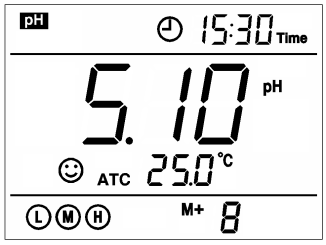

Diagram - 8

To **pause** the automatic data logging, short press (M+) again, ⏲ will stop flashing.

During automatic data logging mode, manual data logging is disabled.

To **exit** automatic data logging mode, set the time interval to **0** in **parameter P3.3**.

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3.5.3. Recalling stored data

In measurement mode, short-press (RM) to recall the most recently stored measurement.

The **RM** icon and the corresponding stored data will appear on the display (see *Diagram 8*).

- Continue short pressing (M+) or (RM) to browse through previously stored data sequentially.
- Press and hold (M+) or (RM) to quickly scroll through stored data.
- Short press (CAL/MEAS) to return to measurement mode.

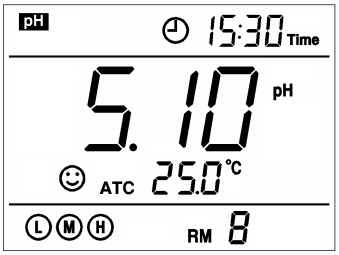


Diagram - 8

3.5.4. Data Deletion

Select **YES in parameter setting P3.6** to delete all the stored data, refer to Section 7.5. Once deleted, the data cannot be retrieved.

3.6 Auto. Power-off

The meter will be powered off if there is no operation for more than 20 minutes. Change the automatic power off time in parameter setting P3.7

3.7 Manual Temperature Compensation (MTC)

In measurement mode, when there is no temperature probe connected to the meter (**MTC** appears beside temperature), long-press (M+) or (RM). The temperature value will start flashing, then press (M+) or (RM) to adjust the temperature value to the true value, and short press (SETUP ENTER) to confirm to achieve manual temperature compensation.

4 pH Calibration and Measurement

4.1 pH Electrode Information

The meter comes with a default 201T-F combination pH electrode with built-in temperature sensor for automatic temperature compensation. When dipping pH electrode in the solution, stir the solution quickly for a few seconds to eliminate potential air bubbles around the sensor.

Note: The 201T-F pH/temp. electrode is only suitable for general water solutions' pH measurement. For special applications such as low ion concentration or complex solutions, please refer to **Section 10** to find the suitable pH electrode model.

4.2 pH Calibration Notes

4.2.1. Standard buffer solution

The meter uses two series of standard buffer solution: USA series and NIST series, each series consists of 5 groups solution, icons see Table - 4

Table - 4 pH standard buffer solution series

Calibration guide icons		pH standard buffer solution series	
		USA series (USA)	NIST series (NIS)
Three-point calibration	(L)	1.68 pH and 4.00 pH	1.68 pH and 4.01 pH
	(M)	7.00 pH	6.86pH
	(H)	10.01 pH and 12.45 pH	9.18 pH and 12.45 pH

4.2.2. **Three-point calibration**

The instrument can perform 1-3 point calibration. The first point calibration must be 7.00 pH (or 6.86 pH) standard solution, then select other standard solution to perform the second and the third point calibration, see Table-5.

Table - 5 Three-point calibration mode

Calibration	USA Series		NIST Series		Icon	When to use
1-point	7.00 pH		6.86 pH		(M)	Error Tolerance > ±0.1 pH
2-point	Option A	1st pt: 7.00 pH 2nd pt: 4.00 pH or 1.68 pH	Option A	1st pt: 6.86 pH 2nd pt: 4.01 pH or 1.68 pH	(L)(M)	Range < 7.00 pH
	Option B	1st pt: 7.00 pH 2nd pt: 10.01 pH or 12.45 pH	Option B	1st pt: 6.86 pH 2nd pt: 9.18 pH or 12.45 pH	(M)(H)	Range >7.00 pH
3-point	1st pt: 7.00 pH 2nd pt: 4.00 or 1.68 pH 3rd pt: 10.01 or 12.45 pH		1st pt: 6.86 pH 2nd pt: 4.01 or 1.68 pH 3rd pt: 9.18 pH or 12.45 pH		(L)(M)(H)	Range: 0 to 14.00 pH

4.2.3. **How Often to Calibrate**

The recommended calibration frequency depends on the nature of the test samples, the condition of the electrodes, and the required measurement accuracy.

- For **high-accuracy measurements** (error tolerance < ±0.03 pH), calibrate the meter **at least once per week**.
- For **general or lower-accuracy measurements** (error tolerance > ±0.1 pH), calibration **once per month** is sufficient.

However, the meter **must be recalibrated** before measurement under any of the following conditions:

- The electrode has not been used for an extended period, or a new electrode is connected.
- After testing **strongly acidic** (pH < 2.00) or **strongly alkaline** (pH > 12.00) solutions.
- After testing **fluoride-containing** or **strong organic** solutions.
- When there is a **significant temperature difference** between the test sample and the buffer solutions.

4.2.4. **Calibration Reminder (Due Calibration)**

In parameter setting P1.4 (refer to Section 7.3), you can set the reminder interval — in days or hours — for the meter to remind you to perform calibration again after your next calibration. When it's due to calibrate, the **Er5** icon will appear on LCD (see Diagram – 9). To clear the error code, either perform a calibration, or go to parameter setting P1.4 and select "NO" to cancel the calibration reminder.

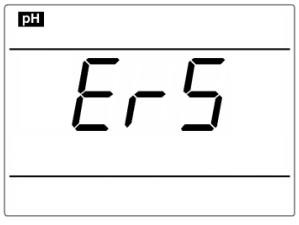
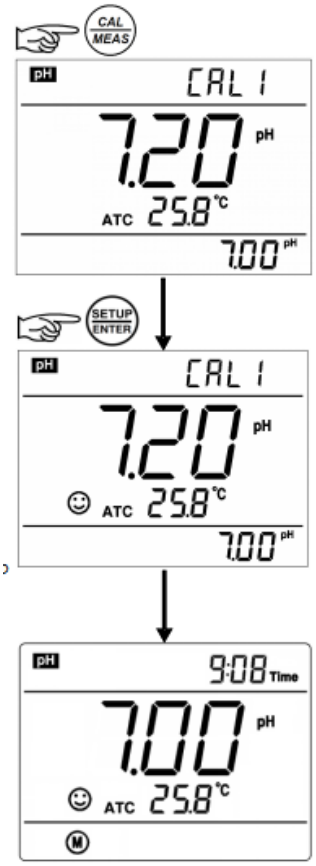


Diagram - 9

4.2.5. **Check calibration date, offset, and slope**

You can also check the date/time (P1.5), pH electrode offset (P1.6) and slope (P1.7) from the last calibration to decide whether a new calibration is needed. Refer to Section 7.3 for details.

4.3 How to Perform pH Calibration



4.3.1. The 1st point calibration

In measurement mode, short press (CAL/MEAS) to enter calibration mode, CAL 1 flashes at the top right of screen and "**7.00 pH**" flashes at the bottom right, indicating using pH 7.00 buffer solution to do the 1st point calibration. Rinse pH electrode in distilled or deionized water, shake dry or blot dry the electrode with Kimwipe/clean tissue to remove excess water (**NEVER** rub the glass membrane). Then dip electrode into the pH 7.00 buffer at least 1 inch deep, stir it for a few seconds and let it stand.

When ☺ stays on screen, short press (SETUP/ENTER) to finish the 1st point calibration, the meter returns to measurement mode, (M) will appear at the bottom left of the screen, indicating the middle point of calibration is completed.

4.3.2. The 2nd point and 3rd point calibration

Use pH 4.00 and pH 10.01 buffer solutions to calibrate the second and/or third point following the steps in Section 4.3.1.

When pH 4.00 is finished, (L) will appear, indicating the low point of calibration is completed;

When pH 10.01 is finished, (H) will appear, indicating the high point of calibration is completed.

Notes:

a) Always begin calibration with the pH 7.00 buffer solution. If a second or third calibration point is needed, perform them immediately after completing the first point, without turning off the meter.

b) Do NOT power off the meter between calibration points. If the device is turned off before completing the second or third point, and you attempt to calibrate with pH 4.00 or pH 10.01 after rebooting, the meter will display an Er1 error. In this case, you must restart the calibration sequence from pH 7.00.

c) During calibration, if you press (SETUP/ENTER) before the reading is fully stabilized (☺ does not stay on screen), then **Er2** will appear. To clear the error, simply wait for ☺ to stay on screen before pressing (SETUP/ENTER).

d) To cancel the calibration and return to measurement mode, short press (CAL/MEAS) during calibration.

4.4 Customer-defined calibration (take pH 1.60 and 6.50 calibration solution as an example)

4.4.1. Select **CUS** from parameter setting P1.1 (refer to Section 7.3). Then short press (CAL/MEAS) to return to measurement mode and short press (CAL/MEAS) again to enter the customer-defined calibration mode.

4.4.2. Rinse pH electrode in distilled or deionized water, allow it to dry, and submerge it in pH1.60 buffer solution. Stir the solution briefly and allow it to stay in the buffer solution until a stable reading is reached. **CAL1** flashes at the top right of LCD, indicating 1st point calibration of customer-defined solution. Press (▲ M+) or (▼ RM) to adjust the value to 1.60, then short press (SETUP ENTER) to finish the calibration. After calibration is done, the meter will automatically return to measurement mode.

4.4.3 To calibrate the 2nd point of customer-defined calibration, short press (CAL MEAS) to enter calibration mode, and use the pH 6.50 solution, then follow the steps in section 4.4.2.

4.4.4 To cancel calibration, short press (CAL MEAS) during calibration.

4.5 Self-diagnosis and Troubleshooting

During the process of calibration, the meter has a self-diagnosis function, displaying error codes indicating different problems. Refer to Table – 6 for the detailed information.

Table – 6 Self-diagnosis information of pH measurement mode

Error Code	Potential Problem	Troubleshooting
Er 1	Cannot recognize the solution	1.Check whether pH buffer solution is correct/fresh/clean. 2.Check whether the meter connects the electrode properly. 3.Replace the electrode
Er2	Press (SETUP ENTER) when the reading is not stable yet during calibration.	Do not press (SETUP ENTER) until ☺ stays on screen.
Er3	During calibration, the readings cannot be stabilized over 3 minutes in the pH buffers.	1.Check whether there is any air bubble in the glass bulb. If so, shake the electrode vigorously in the air to remove the air bubble. 2.Replace a new pH electrode.
Er4	pH electrode performance error (offset <-60mV or >60mV, slope <75%)	1.Check whether the buffers are correct, clean& fresh. 3.The pH electrode has reached the end of its service life. Replace a new one.
Er5	Time to re-calibrate your pH electrode	Short press (CAL MEAS) to perform calibration or cancel due calibration in parameter P1.4

4.6 pH Measurement

4.6.1 Power on the meter to enter measurement mode. Rinse the electrode with pure water for a few seconds. Shake dry or blot dry the electrode with Kimwipe/clean tissue. Submerge the electrode into your sample solution at least 1 inch deep (see pic-11). Stir the electrode for a few seconds and hold still. Wait for the reading to get fully stabilized (☺ stays on screen) and then record it as the pH measurement.

4.6.2 In measurement mode, short press (▲ M+) to save the stabilized reading as the pH measurement. Short press (▼ RM) to recall all the saved data. For more details in data logging, refer to Section 3.5.1 to 3.5.3.

4.6.3 Tip to Minimize Measurement Error

According to the pH isothermal measurement principle, the closer the temperature of the test sample is to that of the calibration solution, the smaller the measurement error will be. Following this principle ensures the highest accuracy in pH measurement.

Example:
If the test samples are measured at 50 °C, it is recommended to warm the calibration solutions to a similar temperature — with a temperature difference of no more than 5 °C — before performing calibration. This minimizes errors caused by temperature variation between the sample and the buffer solutions.

4.7 pH Electrode Maintenance

4.7.1 pH Electrode Cleaning

The meter is only as accurate as the electrode is clean. Always thoroughly rinse off the electrode before and after each measurement with distilled water or deionized water in a container or with a wash bottle.
To remove excessive water, just shake them off or blot dry with Kimwipe/clean tissue. Never rub the glass membrane of the electrode. Otherwise, static electricity will be generated and cause measurement error.
For tough contaminants staying on the glass membrane or junction, refer to the table below for the proper cleaning procedures for different contaminants:

Table-7

Type of Contamination	Cleaning Agent	Soaking Time
Lipophilic substances, e.g. oil and fat deposits	Dish soap water	5 – 10 min
Proteins	Apera Electrode Cleaning Solution (SKU: AI1166)	30 – 60 min
Inorganic coatings such as hydrocarbons	Commercially available glass cleaning solutions	5 – 10 min
Hard, scale-type calcium deposits	Apera Electrode Cleaning Solution (SKU: AI1166)	5 – 10 min

Alkaline coatings	Apera Electrode Cleaning Solution (SKU: AI1166)	5 – 10 min
Acidic coatings	0.1M NaOH solution	5 – 10 min
Sulfide-containing solutions	Thiourea	30–60 min, leave until junction discoloration disappears.
Unknown substances	Apera Electrode Cleaning Solution (SKU: AI1166)	30 – 60 minutes

NOTES
Use a soft brush to help thoroughly clean off the contaminants. After the cleaning procedure, the pH electrode should always be soaked in 3M KCl solution for 12-24 hours for rehydration. Calibrate the pH electrode again before taking new pH measurement.

4.7.2 pH Electrode Storage

Store the pH electrode in the 3M KCL soaking solution in the electrode storage vial when not in use. Make sure to twist on the vial locking ring tightly after inserting the electrode into the storage vial. If the 3M KCL soaking solution is contaminated, replace it with fresh solution. As a rule of thumb, replace the soaking solution on a monthly basis.

If you ever find white crystals outside the storage vial, it is perfectly normal. It is the 3M KCL soaking solution or the reference electrolyte that crystallizes over time by its nature. Just rinse them off and add in new soaking solution. This chemical is not poisonous or dangerous, and the electrode's performance will not be affected.

NEVER store the electrode in pure water like tap, RO, distilled, or deionized water as they could damage the pH electrode. If this happens, immediately soak the pH electrode in 3M KCL soaking solution overnight, then re-calibrate it before use.

5 mV Measurement

5.1 ORP Measurement

In measurement mode, short press (MODE) to switch to mV measurement mode. If a pH electrode is connected, the mV value stands for the original millivolt value of pH measurement.
If ORP measurement is needed, users need to connect an ORP electrode (e.g. Apera 301Pt-C combination ORP electrode) and perform the test. ORP stands for Oxidation Reduction Potential, a measurement of the cleanliness of the water and its ability to break down contaminants. The unit of ORP value is mV.

5.2 ORP Notes

ORP measurement does not require calibration. When you are not sure about ORP electrode's condition, test an ORP standard solution to see whether the ORP electrode works properly. When the measurement error is <±15 mV to the standard value at a certain temperature, the ORP electrode is in good condition. The table below is the data of standard ORP solution for 222 mV and 650 mV at different temperatures.

°C	10˚C	15˚C	20˚C	25˚C	30˚C	35˚C	40˚C	45˚C	50˚C
222 mV	242 mV	235 mV	227 mV	222 mV	215 mV	209 mV	200 mV	192 mV	185 mV
650 mV	672 mV	665 mV	657 mV	650 mV	642 mV	635 mV	627 mV	620 mV	612 mV

6 Parameter Settings

6.1 Main menu

In the measurement mode, short press (SETUP ENTER) to enter P1.0, then press (M+) or (RM) to switch to main menu: P1.0→P3.0. Please refer to Diagram – 14.

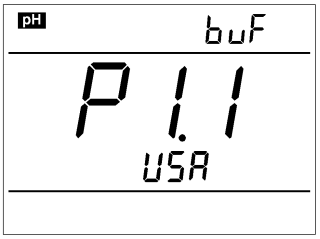
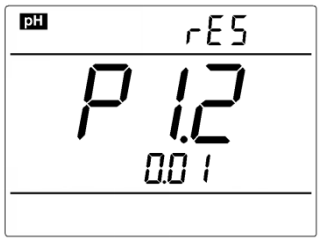
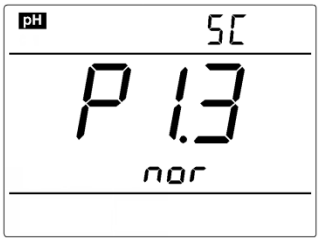
P1.0: pH parameter setting; P3.0: Basic parameter setting.

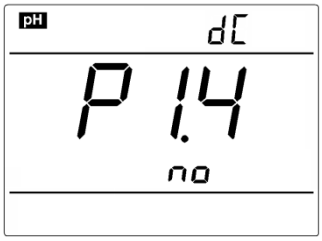
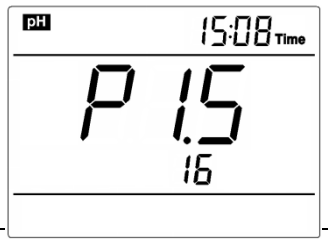
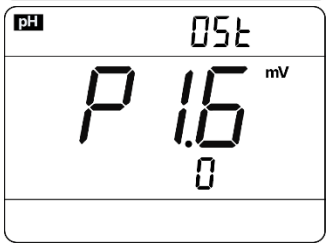
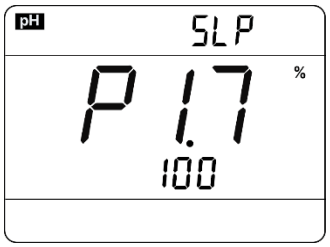
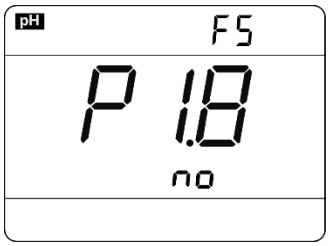
6.2 Sub-menus

6.2.1. In P1.0 mode, press (SETUP ENTER) to enter P1.1 for pH parameter settings, press (RM) or (M+) to switch among sub-menus: P1.1→P1.2→P1.3→P1.4→P1.5→P1.6→P1.7→P1.8,, See Diagram–14.

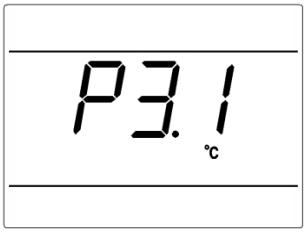
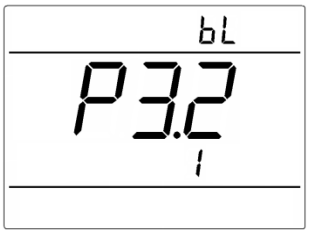
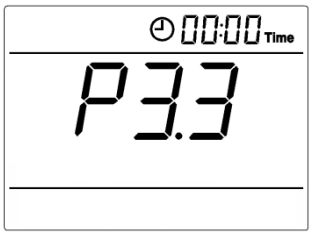
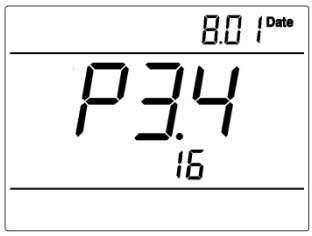
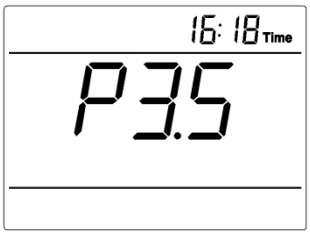
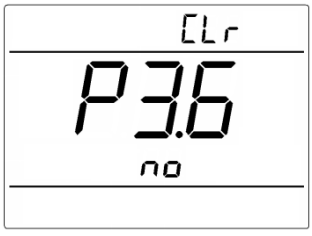
6.2.3. In P3.0 mode, press (SETUP ENTER) to enter sub-menu P3.1 of TDS parameter setting, then press (M+) and (RM) to switch among sub-menus: P3.1→P3.2→P3.3→P3.4→P3.5→P3.6→P3.7→P3.8,

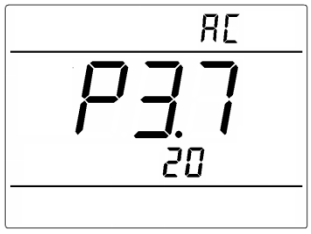
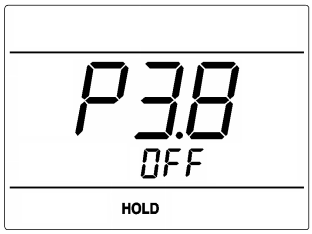
6.3 Sub-menu of pH parameter setting (press (M+) or (RM) to switch)

	**P1.1 – Select pH standard solution** (USA-NIST-CUS) 1. In measurement mode, press (SETUP ENTER) to enter P1.0, press (SETUP ENTER) to enter P1.1. 2. Press (SETUP ENTER), **USA** flashes, press (M+) to select USA→nIS→CUS, press (SETUP ENTER) to confirm. USA-USA series; nIS-NIST series; CUS- customer-defined. 3. After confirming the change, press (M+) to enter P1.2, or press (CAL MEAS) to return to measurement mode.
	**P1.2 – Select resolution** (0.01 – 0.1) 1. Press (SETUP ENTER), **0.01** flashes, then press (M+) to select 0.01→0.1, press to confirm. 2. After confirming the change, press (M+) to enter P1.3, or press (CAL MEAS) to return to measurement mode.
	**P1.3 – Set stability criteria** (Normal – High – Low) 1. Press (SETUP ENTER), **nor** flashes. Press (M+) to select nor→HI→Lo, press (SETUP ENTER) to confirm. Nor – Normal, Hi – High (harder to show ☺), Lo – Low (easier to show ☺). 2. After confirming the change, Press (M+) to enter P1.4, or press (CAL MEAS) to return to measurement mode.

	**P1.4 – Set due calibration** (No – H00 – D00) 1. Press SETUP ENTER , **no** flashes, then press M+ to select no→H00→d00 Press SETUP ENTER to confirm. 2. When **H** flashes, press SETUP ENTER , **00** flashes. Press M+ to adjust Hours(0-99), press SETUP ENTER to confirm; When **D** flashes. press SETUP ENTER , **00** flashes. Press M+ to adjust days (0-99), press SETUP ENTER to confirm. E.g., if **D07** is set, then the meter will pop up **ER5** 7 days after your last calibration to remind you to recalibrate your electrode. 3. After confirming parameter, press M+ to enter P1.5 mode, or press CAL MEAS to return to measurement mode.
	**P1.5 - Check the time and date of the last pH calibration** 1. The time and date of calibration displays alternately at top right of LCD (Date display: Month – Day), the number in the LCD middle displays Year (Year 2016). 2. Press M+ to enter P1.6, or press CAL MEAS to return to measurement mode.
	**P1.6 – Check the offset of the pH electrode from the last calibration** 1. The number below P1.6 is the value of the offset (measurement in pH 7.00). The acceptable range for a pH electrode is -30 to 30 mV. 2. Press M+ to enter P1.7, or press CAL MEAS to return to measurement mode.
	**P1.7 – Check the slope of the pH electrode from the last calibration** 1. The number below P1.7 is the value of the slope (the average slope of a 3-point calibration or the slope from a 2-point calibration). The closer the slope is to 100%, the better the condition of the pH electrode. 2. Press M+ to enter P1.8, or press CAL MEAS to return to measurement mode.
	**P1.8 – Restore to factory default setting** (NO – Yes) 1.Press SETUP ENTER , **no** flashes, then press M+ to select no→YES, press SETUP ENTER to confirm, the meter returns to measurement mode. No–not restore to conductivity factory default settings, Yes–restore to conductivity factory default settings. 2. If not choosing Yes, press CAL MEAS to return to measurement mode.

6.4 Sub-menu of basic parameter setting (press M+ or RM to switch)

	**P3.1 – Select temperature unit** (°C—°F). 1. In P3.0, press SETUP/ENTER enter P3.1. 2. Press SETUP/ENTER, **°C** flashes, press M+ to select °C →°F, then press SETUP/ENTER to confirm. 3. After confirming the change, press M+ to enter P3.2 mode. or press CAL/MEAS to return to measurement mode.
	**P3.2 – Select backlight timing** (1-2-3-On) 1. Press SETUP/ENTER , **1** flashes, then press M+ to select 1→2→3 (min)→On. When the parameter flashes, press SETUP/ENTER to confirm. Select **On** to make the backlight always turn on. After confirming the change, press CAL/MEAS to enter P3.3 mode or press M+ to return to measurement mode.
	**P3.3 – Adjust Auto. Data Logger's Interval** 1. Press SETUP/ENTER , **:00** flashes, press M+ or RM to adjust the auto. data logging's interval in minutes (0-59), press SETUP/ENTER to confirm the change; then **00:** flashes – adjust the interval in hours (0-99); press SETUP/ENTER to confirm the change. E.g. If 01:02 is set up, it means the meter will automatically save the reading in every 1 hour and 2 minutes. After confirming the change, press M+ to enter P3.4 mode or press CAL/MEAS to return to measurement.
	**P3.4. – Adjust date** 1. Press SETUP/ENTER, **Day** flashes, press M+ or RM to adjust, then press SETUP/ENTER to confirm; Then **Month** starts flashing, press M+ or RM to adjust, then press SETUP/ENTER to confirm; Then **Year** starts flashing, press M+ or RM to adjust, then press SETUP/ENTER to confirm. 2. After confirming the change (the numbers stop flashing), press M+ to enter P3.5 or press CAL/MEAS to return to measurement mode.
	**P3.5. – Adjust time** 1. When SETUP/ENTER is pressed, **Hour** flashes, then press SETUP/ENTER and **Minute** flashes. When the number flashes, press M+ or RM to adjust time, then press SETUP/ENTER to confirm the change. 2. After confirming the change, press M+ to enter P3.6 or press CAL/MEAS to return to measurement mode.
	**P3.6. – Clear all storage value** (No—Yes) 1. When SETUP/ENTER is pressed, **No** flashes, then press M+ to select No—Yes, press SETUP/ENTER to confirm. No: not delete, Yes: Delete. 2. After confirming the parameter, press M+ to enter P3.7 or press CAL/MEAS to return to measurement mode.

	**P3.7 – Automatic power-off setup** (10 min→20 min→30 min→On) 1. Press (SETUP ENTER), **On** flashes, press (▲ M+) to select 10→20→30→On, press (SETUP ENTER) confirm. **On** – the meter will never turn off automatically. 2. After confirming the change, press (▲ M+) to enter P3.8 or press (CAL MEAS) to return to measurement mode.
	**P3.8 – Set automatic lock-up function** (Off→On) 1. Press (SETUP ENTER) , **OFF** flashes, then press (▲ M+) to select OFF→On, 2. Press (SETUP ENTER) to confirm. Off: not set, On: set (the reading will be automatically locked when it's stabilized for more than 10 seconds.) 3. After confirming the change, press (CAL MEAS) to return to measurement.

7 USB Communication for Data Management

7.1 Software Requirement

There are two versions of PC-Link software included in the flash drive. The Web PC-Link Software and the traditional PC-Link software. The Web PC-Link software is installation-free and supports both Windows and Mac computers. Just open the html file with Chrome or Edge browsers, then connect the meter to your computer to start using the software. Scan the code below for video tutorial.

If using the traditional PC-link software, the recommended requirement for the computer is a Windows-based Personal computer (with Microsoft Excel) with USB communication port. The following content is about the traditional PC-link software.

7.2 Software Interface

Software interface: see Diagram-15.

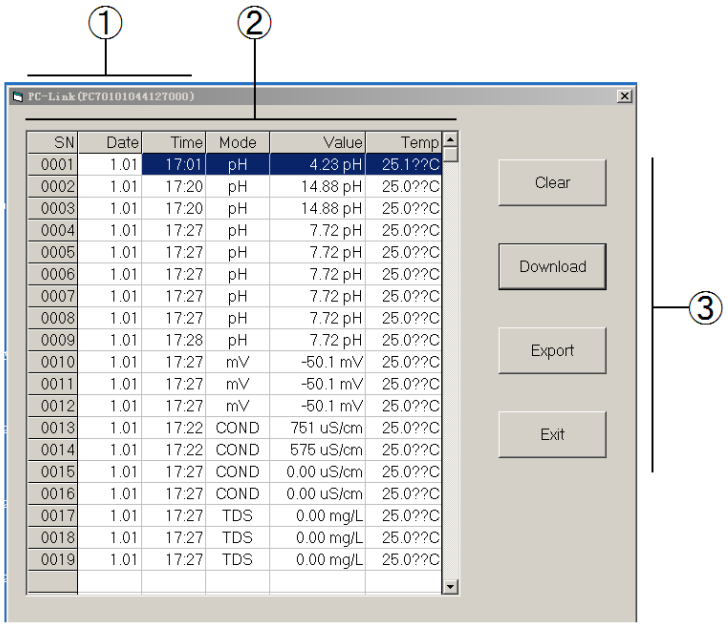


Diagram -15

① — Meter serial number

② — Stored value

③ — Function keys

Clear — press this to clear the data

Download — press this to download the data from the meter to the computer

Export — press this to export the stored value to Microsoft Excel file

Exit — press this, PC-Link program exits from the computer interface

7.3 Install Software

Please follow the steps as below to load PC-Link to the computer:

Open “PC-Link” file→double click “Setup” program → click “OK”→ click icons (see Diagram – 16) → click “Continue”→ click “Confirm”.

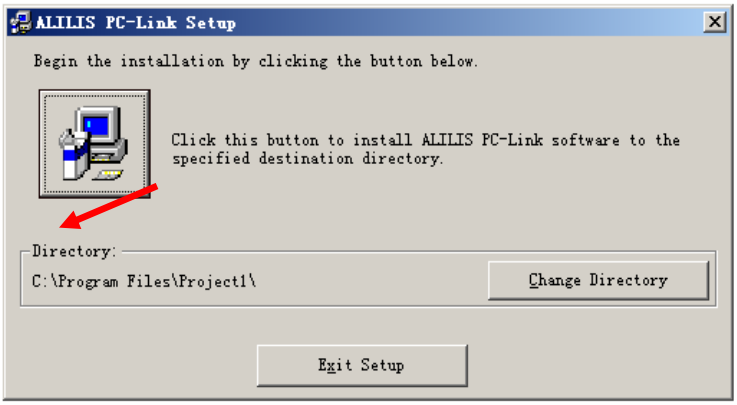


Diagram – 16

7.4 Automatic Connection Port

Connect USB cable to the meter and the computer, open PC-Link program, program interface shows on the computer, automatic connection is done after a few seconds. Icon shows at the left bottom of LCD.

Note:

To reconnect after turn-off, please restart the software interface, as the computer can not recognize the software automatically.

Besides, this software only recognizes 1-16 port numbers. For other port numbers, please set in "device manager" of the computer.

7.5 Operation Software

8.5.1. Upload the stored value

Press **Download**, all the data stored in the meter is downloaded to the computer. pH, mV, COND and TDS are sorted in the program.

8.5.2. Real-time storage.

During operation, press (▼ RM) to manually log data or start auto. data logging. The measurement will be downloaded to the PC-link software through USB and will not be stored in the meter's memory.

8.5.3. Data processing

Press Export to export the data to Microsoft Excel file for further analysis.

8 What's in the Kit?

No.	Include	Quantity	PC8500
1	PH8500 portable pH/conductivity meter	1 pc	√
2	201T-F plastic three-in-on pH electrode	1 pc	√
3	pH standard buffer solution (4.00/7.00/10.01pH/50mL)	1 bottle each	√
4	PC-Link communication software flash drive	1 pc	√
5	USB communication cable	1 pc	√
6	Portable carrying case	1 pc	√
7	User manual	1 pc	√

9 Recommended pH Electrodes for Different Applications

Applications	Ideal Apera pH Electrodes to Use
General water solutions	201T-F, LabSen 213
Dirty liquids such as wastewater, emulsions, suspensions, slurries, etc.	LabSen 333
Biotechnology and pharmaceuticals	LabSen 823
High-Temperature solutions	LabSen 863
Low-temperature liquid	LabSen 881
High salinity/ Strong alkaline solutions	LabSen 843
Complex and caustic solutions (e.g. electro-plating solutions)	LabSen 863
Pure Water (distilled/deionized/RO/drinking/well/storm/boiler water)	LabSen 803
Liquid food and beverage (milk, yogurt, sauce, jam, etc.)	LabSen 823
Micro-volume liquid samples	LabSen 241-3, LabSen 241-3SP
Semi-micro volume liquid samples	LabSen 243-6
Frozen/raw meats	LabSen 763
Soil direct test	LabSen 553
Solid or semi-solid samples (cheese, dough, fruits, sushi rice, meat products, etc.)	LabSen 753
Strong acid solutions, HF containing solutions (HF concentration<2000 ppm)	LabSen 833
Surface test (skin, paper, culture medium...)	LabSen 373
TRIS buffer solutions	LabSen 213/823
Viscous liquid e.g. skincare products, coatings, syrups, sugarcane juice, etc.	LabSen 853-S/853-H
Organic solvents, non-aqueous solutions	LabSen 873

Note:

- Every pH electrode gradually ages and will eventually fail. A typical service life of a pH electrode is 1-2 years depending on many factors such as frequency of use, nature of test samples, how well it is maintained, etc. We recommend replacing your pH electrode at least every 1 to 2 years to guarantee the optimal performance.
- For more information, go to https://aperainst.com/sensors/labsen or contact us at info@aperaint.com or +1 (614) 285-3080.

10 Appendix I: Parameter setting and factory default setting

Modes	Prompts	Parameter setting items	Abbreviation	Description	Restore to factory default setting
P1.0 pH	P1.1	Select pH buffer solution	buF	USA - NIST - CUS	USA
	P1.2	Select resolution	rES	0.01 - 0.1	0.01
	P1.3	Set reading stability criteria	SC	Normal - High - Low	Normal
	P1.4	Set due calibration	dC	No - H00 - D00	No
	P1.5	Check the date of the last calibration	/	-	-
	P1.6	Check electrode offset	/	-	-
	P1.7	Check electrode slope	/	-	-
	P1.8	Restore factory default setting	FS	No - Yes	No
P3.0 Basic parameters	P3.1	Select temperature unit	/	℃ - ℉	℃
	P3.2	Select back light timing	bL	1 - 2 - 3 - On	1
	P3.3	Adjust storage timing	/	-	0:00
	P3.4	Adjust date	/	-	-
	P3.5	Adjust time	/	-	-
	P3.6	Clear stored data	CLr	No - Yes	No
	P3.7	Automatic Power-off setup	AC	10 - 20 - 30 - On	20
	P3.8	Auto. Hold	/	Off - On	Off

11 Appendix II: Abbreviation Glossary

Modes	Prompts	Code and abbreviation	In English	Description
P1.0 pH	P1.1	buF	Standard buffers	Standard buffer solution
	P1.2	rES	Resolution	Resolution

	P1.3	SC	Stability criteria	Reading stability
	P1.4	dC	Due Calibration	Remind due calibration
	P1.5	/	/	/
	P1.6	FS	Factory default setting	Factory default setting
P3.0 Basic parameters	P3.1	/	/	/
	P3.2	bL	Back light	Back light
	P3.3	/	/	/
	P3.4	/	/	/
	P3.5	/	/	/
	P3.6	CLr	Clear readings	Clear readings
	P3.7	AC	Auto. close	Auto. close
	P3.8	/	/	/

12 Limited Warranty

We warrant this instrument to be free from defects in material and workmanship and agree to repair or replace free of charge, at the option of APERA INSTRUMENTS, LLC, any malfunctioned or damaged product attributable to the responsibility of APERA INSTRUMENTS, LLC for a period of **THREE YEARS for the instrument and SIX MONTHS for the probe from the delivery.**

This limited warranty does NOT cover any issues due to:

- Accidental damage
- Improper use
- Normal wear and tear
- Transportation
- Storage
- Failure to follow the product instructions
- Unauthorized maintenance, modifications, combination or use with any products, materials, processes, systems or other matter
- Unauthorized repair

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