SX811-BR Portable pH Meter

for Beverage Making

Instruction Manual

RoHS compliant CE ISO9001:2008 IP57 WATERPROOF

APERA INSTRUMENTS, LLC

www.aperainst.com

V1.0

1 Brief Introduction

Thank you for purchasing the Apera Instruments SX811-BR portable pH meter kit. This device is an outstanding combination of advanced electrical, sensor technology and software design. The meter is equipped with LabSen® 213 pH Electrode, designed for testing pH level of all types of beverage e.g. wine, beer, juice, tea, etc. It also works well testing regular water solutions.

(for other applications, please refer to Section 11 to find the specific electrode that works best)

1.1 Features

- This microprocessor-based meter features automatic calibration, automatic temperature compensation (ATC), menu set-up, calibration reminder, calibration date checking, automatic powe-off and low-battery warning.
- GLP data management，clock display, manual storage and automatic timing storage, USB port and power outage data protection, your data is safe even with a dead battery.
- Advanced digital processing technology improvs meter responding time and accuracy. 1-3 points automatic calibration, calibration guide and self diagnose.
- IP57 waterproof, operable under extreme conditons. Powered by 3 AA batteries or USB connection to other power source. Solid and durable case，accessories are included.

1.2 Features of the LabSen® 213 pH Electrode

- **Backed by Swiss sensor technologies and materials**
- **Unique blue hemispherical glass membrane** – fast response rate, and highly resistent to general impact (the traditional glass bulb membrane is a lot more fragile), and can be tested in high temperature samples (up to 212˚F).
- **Long-Life Reference System** – improves the stability of reference electrode and prolongs the service life of the electrode
- **Patented pH/Temperature combination structure** – increases the temperature respond time by 40% compared to conventional isolated built-in thermistor

1.3 Proper use and maintenance of the LabSen® 213 Electrode

a) Prior to measurement, remove the rubber plug to maintain pressure of the reference solution, keep consistent flow rate of reference solution and stable potentials of junction.
b) After a period of usage, the reference solution will run low. Whenever the level falls to 1/2 height of the electrode, add 3M KCL solution to the refilling hole by using syringe or pipette.
c) The connector of the electrode should be kept clean and dry. If contaminated, please clean it with medical cotton and absolute alcohol and blow dry to prevent the short circuit of the electrode and slow reaction of electrode.
d) When not in use, the electrode measuring tip should be soaked in the soaking bottle containing storage solution to keep the membrane hydrated and junction unblocked. When measuring, please unscrew the bottle cap, pull out the electrode and rinse it with deionized water. After using, please put the electrode back into the bottle and screw tight the cap. Clean the bottle and replace

the storage solution if the storage solution gets turbid and mildewed. The electrode should never be soaked in pure water or buffer solution for long.

e) Please avoid measuring dehydrated medium like strong acid or alkaline solution, absolute ethyl alcohol and concentrated sulfuric acid. In case of measuring such solution, please try to reduce the immersion time and clean it carefully after use.

f) After 1-year of use, we recommend replace the electrode for the best accuracy.

g) All the tests should be sample tests, meaning after measurement, the samples should be abandoned and not be used for its original purpose again.

2 Technical Specifications

2.1 Instrument Technical Specs

	Technical Specs	
pH	Range	-2.00 to 19.99 pH
	Resolution	0.01/0.1 pH
	Accuracy	±0.01 pH ±1 digit
	Temperature Compensation	0 to 100 ˚C (Auto or Manual)
mV	Range	-1999 mV - 0 - 1999 mV
	Resolution	- 200 mV - 0 - 200 mV: 0.1 mV; Remaining: 1 mV
	Accuracy	±0.1% F.S ±1 digit
Temp.	Range	0 to 100˚C (32 to 212˚F)
	Resolution	0.1˚C
	Accuracy	±0.5˚C ±1 digit

2.2 Others

Data Storage	500 groups
Storage Content	Numbering, date, time, measurement, unit, temperature
Output	USB
Power	AA Batteries * 3 / DC5V (USB port)
IP Ranking	IP57 dust-proof and waterproof
Dimensions& Weight	Meter: (88×170×33) mm/ 313g With case：(360×270×76) mm/ 1.6kg

2.3 Electrode Technical Specs

Housing Material	Lead-free Glass
Temperature sensor	Yes

Junction	Ceramic
Reference Electrode	Long-Life
Electrolyte	3M KCL
Shape of glass membrane	Semisphere
Range	0 to 14 pH
Temperature Range	-5 to 100˚C (23 to 212˚F)
Connector	BNC and RCA

3 Instrument Description

3.1 LCD Display

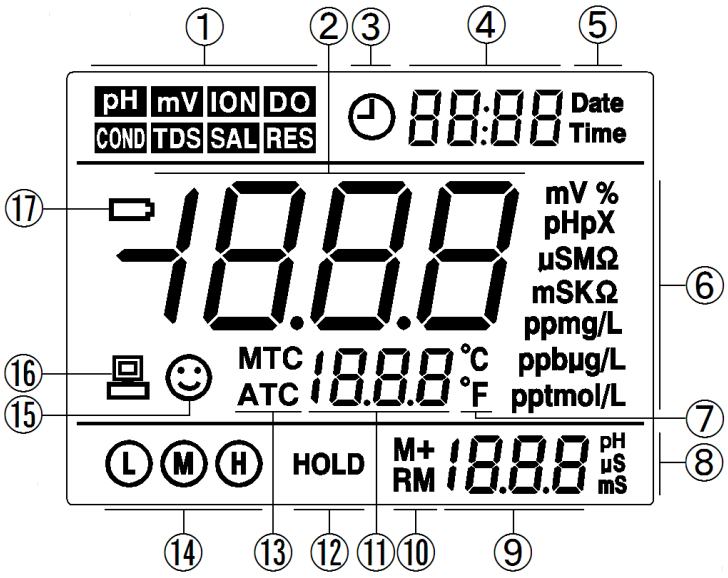


Diagram-1

(1) — Measurement mode icons

(2) — Measurement value

(3) — Timing storage icon. When this icon appears, the meter is in the automatic storage mode

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

(5) — Units of Date and time

(6) — Units of measurement

(7) — Temperature units (°C and °F)

(8) — Units of pH and conductivity calibration value

(9) — pH and conductivity calibration value, the numbering for storage and recall, and prompts of special display mode

(10) — Storage and recall icons

M+ — Measurement to be stored icon, RM — Reading to be recalled icon

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

(12) — Automatic reading lock-up icon

(13) — Temperature compensation icons

ATC — automatic temperature compensation, MTC — manual temperature compensation

(14) — Calibration guide icon

(15) — Stability icon of readings

(16) — USB icon，when this icon appears, the meter connects the computer

(17) — Low battery icon, when this icon appears, please renew the battery

3.2 Keypad

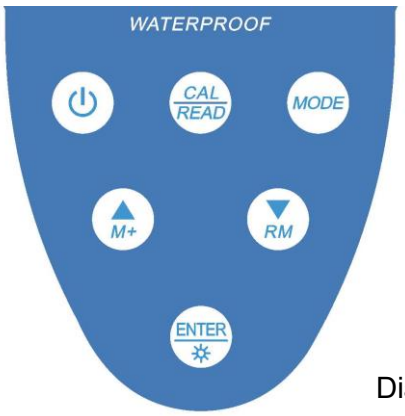


Diagram-2

3.2.1. Keypad operations

Short press ----- <1.5 seconds, Long press ----- >1.5 seconds.

3.2.2. Turn on the meter

Press ⏻ to turn on the meter: LCD full display → display the measurement mode (backlight for one minute).

3.2.3. Turn off the meter

Only in the measurement mode, press ⏻ to turn off the meter.

Note: In the calibration mode or the parameter setup mode, pressing ⏻ is invalid. Please press ENTER key to return to the measurement mode, then press ⏻ to turn off the meter.

Table – 1 Keypad operations and descriptions

Keypad	Operations	Descriptions
⏻	Short press	●Press this key to turn on or turn off the meter.
MODE	Short press	Select measurement parameters: ●pH meter: pH → mV
	Long press	●In measurement mode, press this key to enter main menu.
CAL READ	Short press	●In measurement mode, press this key to enter in calibration mode ●In recall mode (RM), press this key to return to measurement mode ●Cancel any operation to return to measurement mode.
ENTER ✲	Short press	●In measurement mode, press this key to turn on or turn off backlight ●In calibration mode, press this key to conduct calibration ●In main menu, press this key to enter submenu ●In submenu, press this key to enter parameter set-up mode ●In parameter set-up mode, press this key to confirm parameters.
	Long press	●In pH measurement mode, press and hold this key to change the resolution repeatedly: 0.01→ 0.1pH
▲ M+ ▼ RM	Short/ long press	●In the mode of manual temperature compensation (MTC), when press and hold this key, the temperature value flashes, then press this key to change the temperature value, and press ENTER ✲ to confirm ●In measurement mode, press ▲ M+ to store the measuring value, press ▼ RM to recall the stored measuring value ●In recall mode (RM), short press this key to change the storage numberings, press and hold this key to change the number quickly ●In the main menu and submenu mode, press this key to change the numbering of the main menu and the submenu ●In the parameter set-up mode, press this key to select parameters.

3.3 Display mode

3.3.1 ***Reading stability display mode***

When the measuring value is stable, smiley icon ☺ appears on LCD, see Diagram – 3. If ☺ icon does not appear or flash, please do not get the reading value or make calibration until the measuring value is stable.

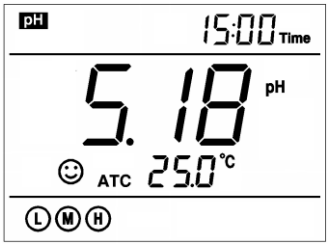


Diagram - 3

3.3.2 ***Automatic lock-up display mode***

Select **On** from parameter P4.6 to turn on automatic lock-up display function. When the reading value stabilizes more than 10 seconds, the meter locks the measuring value automatically and displays **HOLD** icon, see Diagram – 4. In the **HOLD** mode, press CAL/READ to release lock-up.

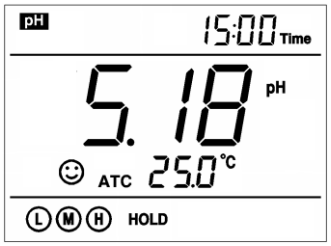


Diagram - 4

3.4 Data storage, recall, and delete

3.4.1 ***Manual storage***

When the measurement is stable, press M+ key, the meter displays **M+** icon and storage serial number on LCD, storing measuring information, see Diagram – 5: the meter stores the first group of the measuring value.

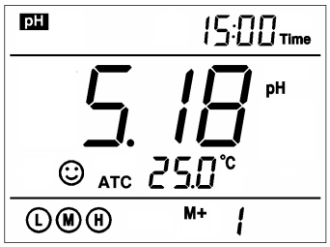


Diagram - 5

3.4.2 ***Automatic timing storage***

Set the storage timing (eg. 3 minutes) from parameter P4.1, ◴ icon appears on LCD and the meter enters into the timing storage mode. When press M+ key, ◴ icon flashes and the first measuring value is stored. After 3 minutes, the 2nd measuring value is stored. See Diagram – 6: the meter stores automatically eight measuring values. When press M+ key, ◴ icon stops flashing and the meter stops automatic storage. In automatic storage mode, manual storage does not work. Set time 0 from parameter P4.1 to exit from the automatic storage mode.

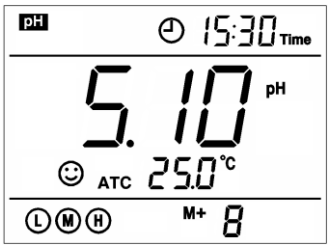


Diagram - 6

3.4.3 ***Recall stored data***

In the measurement mode, press RM key to recall the last stored measuring value. See Diagram – 7: display **RM** icon and storage serial number. Continue pressing M+ key and RM key to recall successively the stored measuring value. Press and hold M+ key and RM key to recall quickly the stored measuring value.

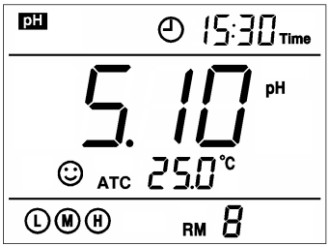


Diagram - 7

3.4.4 ***Clear stored data***

Select **YES** from parameter P4.5 to clear all stored value, refer to the Section 6.4.

4 pH Measurement

4.1 Information regarding pH Calibration

4.1.1 Things needed in addition to what's included in the kit

A clean cup, distilled water (8-16oz), and tissue papers for rinsing and drying the probe.

4.1.2 Electrode Connectors

The pH electrode has two connectors: the BNC connector connects the pH probe; the RCA connector connects the temperature sensor. Plug these two connectors into 'pH/mV" and "TEMP" sockets. Please note not to pull the cables in case of poor contact. Please keep the connectors clean and dry. Refer to section 1.3 regarding how to properly maintain the pH electrode.

4.1.3 Use the Electrode

Screw off the probe cap, and put it aside (do not dump or spill the protelyte solution). Prepare a cup of distilled water, and rinse the electrode in it for a few seconds. Gently shake the probe to remove excess water, and dry it with clean tissue paper (DO NOT rub or wipe the probe, just use paper to dap off excess water). Insert the probe into the test sample; Gently shake the probe for a few seconds; wait for the stable measurement (a smiley face appears and stays) and then record the readings. When test is finished, rinse the probe with distilled water, make sure there is no contaminant left on the sensor tip (if necessary, use soap water to clean the sensor tip with a soft brush), then place the electrode in the probe cap with protelyte solution and tighten the cap so as to keep the sensitivity of the pH sensor.

NOTE: All the tests should be sample tests, meaning after measurement, the samples should be abandoned and NOT be used for its original purpose again.

4.1.4 Standard Buffer Solution

The meter adopts 3 series of standard buffer solutions: USA, CH, and NIST. They can be selected in parameter P1.1 (see Section 6.3) as showed in Table-2 (default standard series is USA)

Table-2

Calibration icon		pH standard buffer series		
		USA	CH	NIST
3-Point calibration	(L)	1.68 or 4.00 pH	1.68 or 4.00 pH	1.68 or 4.01 pH
	(M)	7.00 pH	6.86 pH	6.86 pH
	(H)	10.01 pH	9.18 pH	9.18 pH

4.1.5 3-Point Calibration

The meter can adopt 1 to 3 points' calibration. The 1st point must be using 7.00 pH (or 6.86 pH) buffer solution, and then choose other buffers to do 2nd point and 3rd point. Please refer to Table-3 for details. In the process of calibration, the slope of acidity range and alkalinity range will be displayed.

Table-3 Calibration Mode

	CH	USA	NIS	Calibration icon	When to adopt
1-Point Calibration	6.86 pH	7.00 pH	6.86 pH	(M)	accuracy≤ ±0.1 pH
2-Point Calibration	6.86 pH and 4.00/1.68 pH	7.00 pH and 4.00/1.68 pH	6.86 pH and 4.01/1.68 pH	(L)(M)	0 to 7.00 pH
	6.86 pH and 9.18 pH	7.00 pH and 10.01 pH	6.86 pH and 9.18 pH	(M)(H)	7.00 to 14.00 pH
3-Point Calibration	6.86pH, 4.00/ 1.68 pH, and 9.18 pH	7.00pH, 4.00/ 1.68 pH and 10.01 pH	6.86pH, 4.01/ 1.68pH, 9.18 pH	(L)(M)(H)	0 to 14.00 pH

4.1.6 How often to calibrate

The frequency that you need to calibrate your meter depends on the tested samples, performace of electrodes, and the requirement of the accuracy. For high-accuracy meaustements (≤ ±0.02pH), the meter should be calibrated before test every time; For ordinary-accuracy measurements (≥±0.1pH), once calibrated, the meter can be used for about a week or longer. In the following cases, the meter must be re-calibrated before testing:

a) The electrode hasn't been used for a long time or a new electrode is connected.
b) After measuring strong acid (pH<2) or strong base (pH>12) solutions.
c) After measuring fluoride-containing solution and strong organic solution
d) There is a significant difference between the temperature of the test sample and the temperature of the buffer solution that is used in the last calibration.

4.1.7 Calibration reminder

Preset the interval between calibrations (starting from the time when you set it), and then the meter will remind you to calibrate at the end of that interval. For detailes, please see P1.2 (6.3). When the preset time is reached, Er6 icon will be displayed at the lower right corner of the LCD (as showed in graph-8). At the time, the meter can still be operated. It is just reminding you to do calibration in order to ensure its accuracy. After calibration, the Er6 icon will disappear; To make it disappear, users can also choose NO in P1.2 in parameter setting.

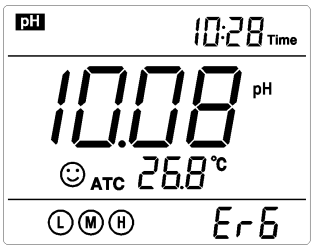


Diagram-8

4.1.8 Check calibration time

In this mode, users can see the date and time of last calibration so as to help them determine if there is need to calibrate. For details, please see parameter setting P1.3 (6.3)

4.1.9 Change temperature manually

When temperature electrode is not connected, long press (RM) or (M+) the temperature will flash, and then short press or long press (M+) or (RM) to change temperature, press (ENTER) to confirm.

4.2 pH Calibration (use 3-point, USA Standard as an example)

1) Press CAL READ to enter calibration mode. CAL1 icon will flash in the upper right corner of the LCD. 7.00 pH will flash in the lower right corner of the LCD, reminding you to use pH 7.00 buffer to conduct 1st point of calibration.

2) Use distilled water to rinse off electrode and then dry it. Dip it into pH 7.00 buffer solution, stir gently and let it stand still and wait for the reading to become stable. In the lower right corner of LCD, the process of auto recognizing the buffer solution will be displayed. Pressing ENTER before the buffer is recognized will generate Er2 (please refer to table 6).

3) When the meter locks 7.00 pH, stable ☺ icon displays on LCD. Press ENTER key to calibrate the meter. **End** icon appears after calibration is done. The 1st point calibration is finished. In the meanwhile, CAL2 will flash at the upper right corner, and 4.00 pH & 10.01 pH will flash alternately at the bottom right, indicating using pH4.00 or pH10.01 buffer solution to make the 2nd point calibration.

4) Take out pH electrode, rinse it in distilled water, dry it, and dip it into pH 4.00 buffer solution. Stir the solution gently and let stand still in the buffer solution until a stable reading is reached. The meter's display will show the recognition process of calibration buffer solution at the lower right of LCD. When the meter recognizes 4.00 pH, stable ☺ icon displays on LCD.
Press ENTER key to calibrate the meter. End icon and electrode slope of acidity range display after calibration is done. In the meanwhile, CL3 will flash at the upper right corner of the LCD, and 10.01 pH will flash at the lower right, indicating using pH10.01 buffer solution to make the 3rd point calibration.

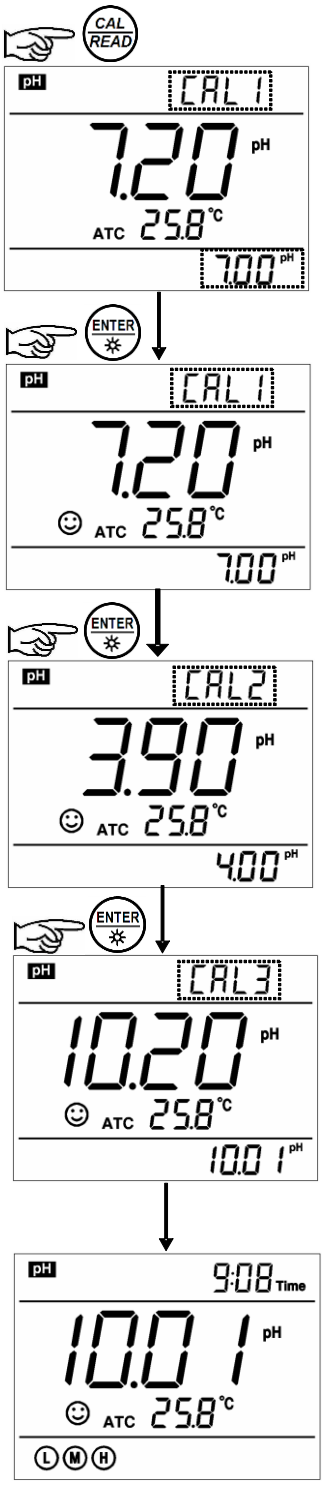


Diagram - 11

5) Take out pH electrode, rinse it in distilled water, dry it, and dip it into pH 10.01 buffer solution. Stir the solution gently and let it stand still in the buffer solution until a stable reading is reached. The meter's display will show recognition process of calibration buffer solution at the bottom right of LCD. When the meter recognizes 10.01 pH, stable ☺ icon displays on LCD. Press ENTER key to calibrate the meter. End icon and electrode slope of alkalinity range display after calibration is done. The meter returns to the measurement mode, displays stable measuring value and calibration guide icons. Please see Diagram–11 for the above calibration process.

6) During the calibration process, press CAL/READ key to exit from the calibration mode. The meter can perform one-point, two-point and three-point calibration. Calibration guide icons appear on LCD.

4.3 Customized Calibration

(take 1.60pH and 6.50pH calibration solution as an example)

1) Select **CUS** from parameter P1.1 (please refer to Section 6.3 for customer-defined solution). The meter enters into Customer-defined calibration mode. When press CAL/READ key, the meter's display shows a blinking **CAL1** icon at the top right of LCD, indicating the meter enters into the 1st point customer-defined calibration.

2) Rinse pH electrode in distilled 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. When LCD displays the stable measuring value and ☺ icon, press ENTER key and the measuring value flashes. Press M+ key or RM key to adjust the measuring value to 1.60, then press ENTER key to calibrate the meter. After calibration is done, LCD at the top right shows blinking CAL2 icon, indicating the meter enters into the 2nd point customer-defined calibration.

3) Rinse pH electrode in distilled water, allow it to dry, and submerge it in pH 6.50 buffer solution. Stir the solution briefly and allow it to stay in the buffer solution until a stable reading is reached. When LCD displays the stable measuring value and ☺ icon, press ENTER key and the measuring value flashes. Press M+ key or RM key to adjust the measurement value to 6.50, then press ENTER key to calibrate the meter. After calibration is done, the meter returns to the measurement mode. For customer-defined calibration, LCD does not show electrode calibration guide icons.

Note: For manual temperature compensation (MTC), when press ENTER key, the temperature value flashes. Press M+ key or RM key to adjust the temperature value, and then press ENTER key, pH measuring value flashes.

4) Notes

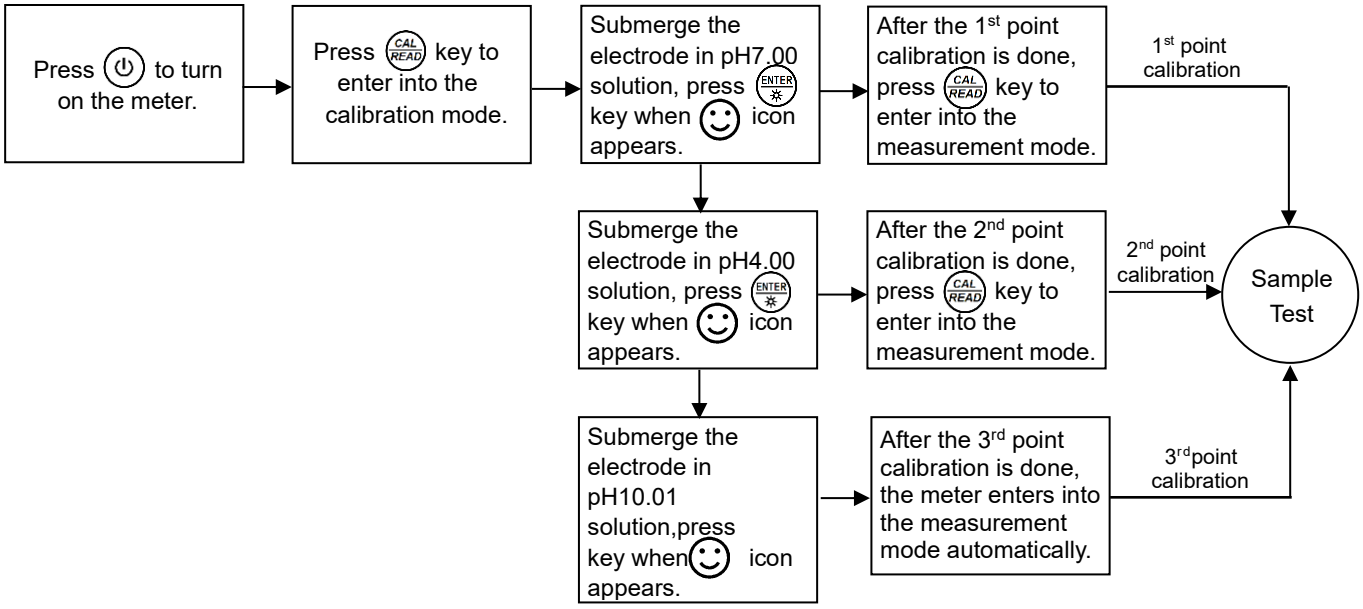
(a) The meter can perform 1-2 point customer-defined calibration. When the 1st point calibration is done, press CAL/READ key, the meter exits from calibration mode. This is one-point customer-defined calibration. When the 2nd point calibration is done, the meter returns to the measurement mode automatically.

(b) The value set in "Customer-defined" is at a fixed temperature. The meter is suggested to perform calibration and measurement at the same temperature to avoid significant errors. The meter cannot recognize customer-defined calibration solution automatically.

4.4 Sample test

1) Rinse pH electrode in distilled water, dry it, and dip it in sample solution. Stir the solution gently and let it stand still in the sample solution until the stable value and ☺ icon appears on LCD, get the reading which is pH value of sample solution, please refer to Diagram-12 for calibration and measurement process of pH meter.

Diagram – 12 Calibration and measurement process of pH meter



2) pH measurement of purified water

The meter is able to set up pH measurement mode of purified water with temperature compensation for pH value from parameter setup P1.5 (please see Section 6.3). "**PU-1**" icon displays at the right top of LCD, please refer to Diagram – 13.

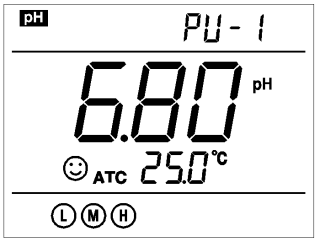


Diagram - 13

3) pH measurement of purified water mixed with ammonia

The meter is able to set up pH measurement mode of purified water mixed With ammonia with temperature compensation for pH value from parameter setup P1.6 (please see Section 6.3). "**PU-2**" icon displays at the right top of LC please refer to Diagram – 14.

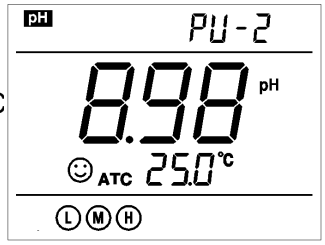


Diagram - 14

Note: In parameter setup, either "PU-1" or "PU-2" measurement mode can be selected, but both can not work at the same time.

4) Self-diagnosis information

During the process of calibration and measurement, the meter has self-diagnosis functions, indicating the relative information as below, please refer to chart – 6.

Chart – 6 Self-diagnosis information of pH measurement mode

Display Icons	Contents	Checking
Er 1	Wrong pH buffer solution or the buffer solution out of range.	1.Check whether pH buffer solution is correct. 2.Check whether the meter connects the electrode properly. 3.Check whether the electrode is damaged.
Er2	Press ENTER key when measuring value is not stable during calibration.	Press ENTER key when icon appears.
Er3	During calibration, the measuring value is not stable for ≥3min.	1.Check if the electrode is damaged. 2.The pH electrode is aged. Replace a new one.

Er4	pH electrode zero electric potential out of range（<-60mV or >60mV）	1.Check whether pH buffer solution is correct. 2. Check if electrode is damaged. 3.The pH electrode is aged. Replace a new one.
Er5	pH electrode's slope is out of range （<85% or >110%）	
Er6	Enter in pre-set due calibration to remind calibration	Press CAL/READ key to perform calibration or cancel due calibration setup from parameter P1.2.

5) pH isothermal principle

According to the pH isothermal measurement principle, the closer the test sample's temperature is to the calibration solution's, the higher the accuracy of the measurement. This principle is recommended to follow when conducting tests for the best result. Example: If users were to test samples at 150˚F, we recommend warming up the calibration solutions to the same temperature before performing calibrations in order to get the most accurate readings.

***The electrode can only test samples that are below 212˚F. Testing higher-temperature samples may cause permanent damage to the electrode.**

6) Factory default setting

For factory default setting, please refer to parameter P1.6 (Section 6.3). Per parameter P1.6, all calibration data is deleted and the meter restores to the theory value (zero electric potential of pH is 7.00, the slope is 100%). Some functions restore to the original value (refer to Appendix-I). When calibration or measurement fails, please restore the meter to factory default setting and then perform re-calibration or measurement. Please note once set the factory default, all the data deleted will not be retrievable.

5 mV measurement

5.1 ORP measurement

Press MODE key, and switch the meter to mV measurement mode. Connect ORP electrode (need purchase it separately) and dip it in sample solution, stir the solution briefly and allow it to stay in the solution until icon appears ☺ get the reading which is ORP value.

ORP means Oxidation Reduction Potential. The unit is mV.

5.2 Notes of ORP measurement

1) ORP measurement does not require calibration. When the user is not sure about ORP electrode quality or measuring value, use ORP standard solution to test mV value and see whether ORP electrode or meter works properly.

2) Clean and activate ORP electrode

After the electrode has been used over a long period of time, the platinum surface will get polluted which causes inaccurate measurement and slow response. Please refer to the following methods to clean and activate ORP electrode:

(a) For inorganic pollutant, submerge the electrode in 0.1mol/L dilute hydrochloric acid for 30 minutes, then wash it in distilled water, then submerge it in the soaking solution for 6 hours.

(b) For organic or lipid pollutant, clean the platinum surface with detergent, then wash it in distilled water, then submerge it in the soaking solution for 6 hours.

(c) For heavily polluted platinum surface on which there is oxidation film, polish the platinum surface with toothpaste, then wash it in distilled water, then submerge it in the soaking solution for 6 hours.

6 Parameter Setup

6.1 Main menu

In the measurement mode, press and hold MODE key to enter in mode P1.0, then press M+ or RM to switch among main menu: P1.0→P2.0→P3.0→P4.0. Please refer to Diagram – 20.

P1.0: pH parameter setup menu,

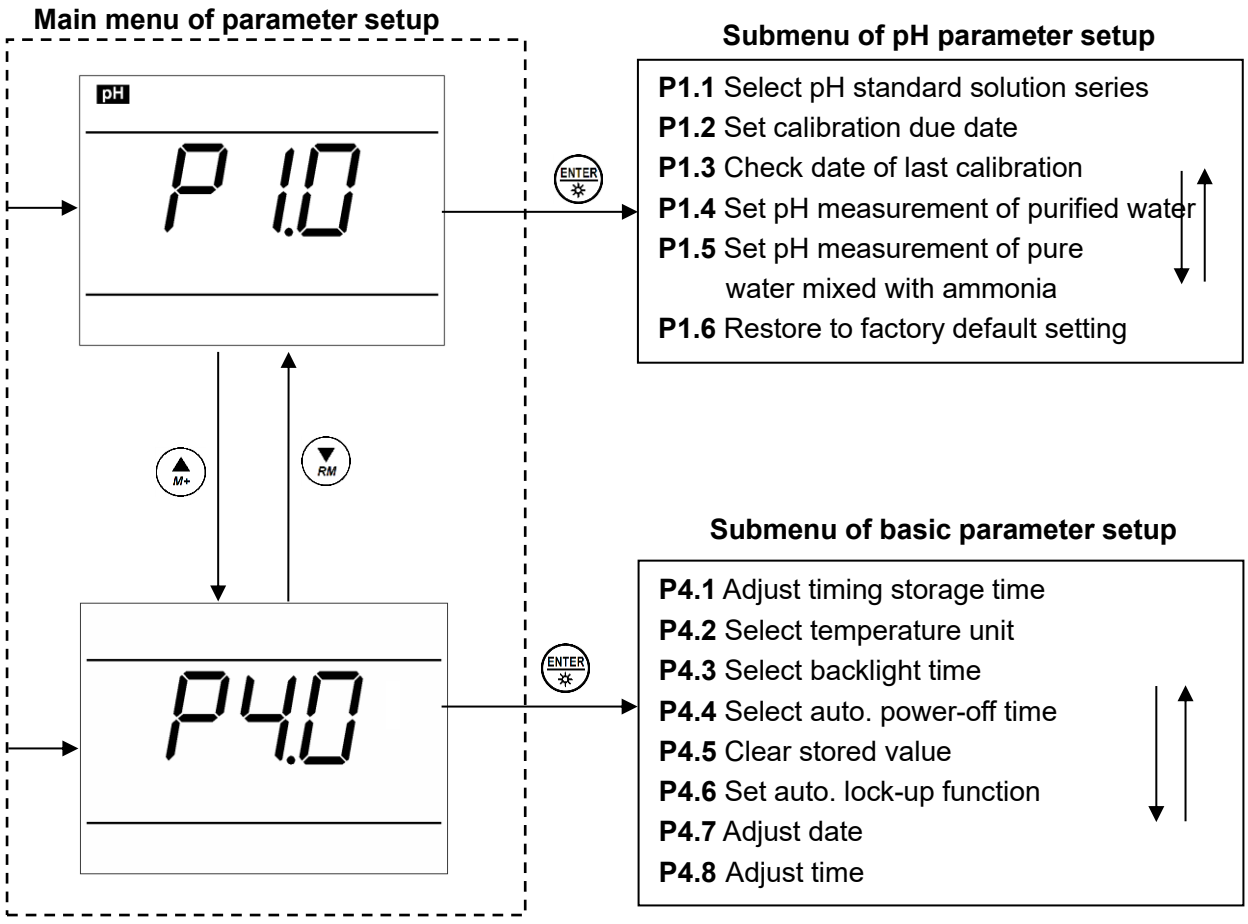
P4.0: Basic parameter setup menu.

6.2 Submenu

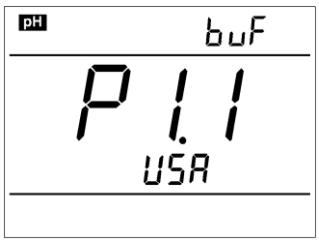
1) In P1.0 mode, press ENTER key to enter in submenu P1.1 of pH parameter setup, then press M+ and RM key to switch among submenu: P1.1→P1.2→…→P1.6, refer to Diagram – 20.

2) In P4.0 mode, press ENTER key to enter in submenu P4.1 of basic parameter setup, then press M+ and RM key to switch among submenu: P4.1→P4.2→…→P4.8, refer to Diagram – 20

Diagram -20

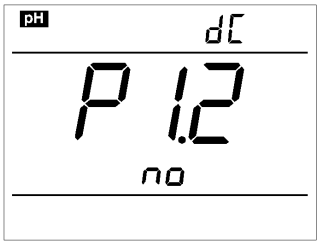


6.3 Submenu of pH parameter setup (press ▲M+ or ▼RM key to switch)



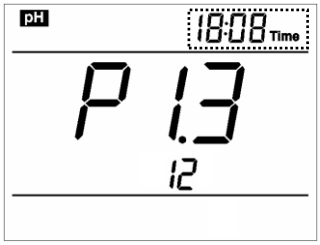
P1.1. – Select pH standard solution (USA-NIST-CUS-CH)

1. In P1.0 mode, press ENTER to enter in P1.1 mode, refer to the left diagram.
2. When press ENTER key,**USA** flashes,then press ▲M+ key, **NIST** flashes,etc. When parameter flashes, press ENTER to make confirmation(USA – USA series, NIS–NIST series, CUS–customer-defined, CH–Chinese series)
3. Press ▲M+ key to enter in P1.2 mode, or press CAL/READ key to return to the measurement mode.



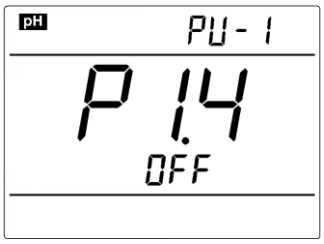
P1.2. – Set due calibration (NO – H00 – D00)

1. When press ENTER key, **No** flashes, then press ▲M+ key, **H** flashes, then press ▲M+ key, **D** flashes.
2. When **H** flashes, press ENTER key, **00** flashes. Press ▲M+ key to adjust hours (0-99 hours), press ENTER key to confirm. When **D** flashes, press ENTER key, **00** flashes. Press ▲M+ key to adjust days (0-99 days), press ENTER key to confirm. When **No** flashes, press ENTER to confirm.
3. After confirming parameter, press ▲M+ key to enter in P1.3 mode, or press CAL/READ key to return to the measurement mode.



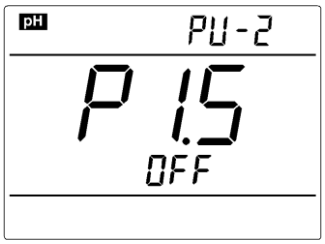
P1.3. – Check the time and date of the last calibration

1. The time and date of calibration displays alternately at right top of LCD (Date display: Month – Day), the number in the LCD middle displays Year (Year 2012).
2. Press ▲M+ key to enter in P1.4 mode, or press CAL/READ key to return to the measurement mode.



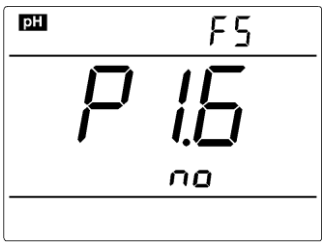
P1.4. – Set pH measurement of distilled water (Off – On)

1. Press ENTER key, **Off** flashes, then press ▲M+ key, **On** flashes, when parameter flashes, press ENTER key to confirm. **Off**–turn off temperature compensation, **On** – turn on temperature compensation.
2. After confirming parameter, press ▲M+ key to enter in P1.5 mode, or press CAL/READ key to return to the measurement mode.



P1.5. – Set pH measurement of distilled water with ammonia (Off – On)

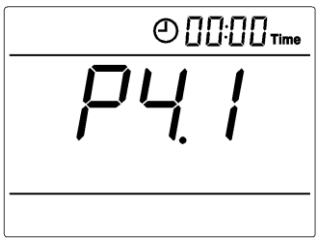
1. Press ENTER key, **Off** flashes, then press ▲M+ key, **On** flashes, when parameter flashes, press ENTER key to confirm. **Off**–turn off temperature compensation, **On**–turn on temperature compensation.
2. After confirming parameter, press ▲M+ key to enter in P1.6 mode, press CAL/READ key to return to the measurement mode.



P1.6. – Restore to factory default setting (NO – Yes)

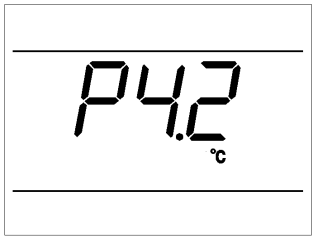
1. Press ENTER key, **No** flashes, then press ▲M+ key, **Yes** flashes. Press ENTER key to confirm, the meter returns to the measurement mode. **No** – Not restore to factory default setting, **Yes** – restore to factory default setting.
2. When do not select **Yes**, press CAL/READ key to return to the measurement mode.

6.4 Submenu of basic parameter setup (press M+ key or RM key to switch)



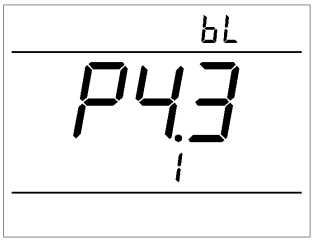
P4.1. – Adjust timing storage time

1. In mode P4.0, press ENTER key to enter in mode P4.1, refer to the left diagram: "**00:**": hours (0-99), "**:00**": minutes (0-59).
2. Press ENTER key, "**:00**" flashes, then press ENTER key, "**00:**" flashes. When the number flashes, press M+ key and RM key to adjust time and press ENTER key to confirm.
3. After confirming the parameter, press M+ key to enter in P4.2 mode or press CAL/READ key to return to the measurement mode.



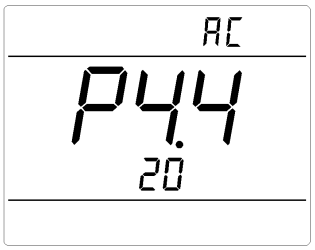
P4.2. – Select temperature unit (°C—°F).

1. Press ENTER key, °C flashes, then press M+ key, °F flashes. When the parameter flashes, press ENTER key to confirm.
2. After confirming the parameter, press M+ key to enter in P4.3 mode or press CAL/READ key to return to the measurement mode.



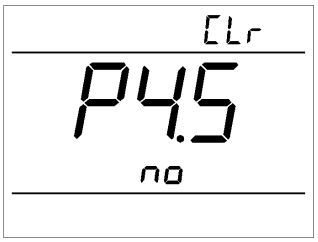
P4.3. – Select backlight timing (1-2-3-On)

1. When press ENTER key, "**1**" flashes, then press M+ key to select blinking 2→3→On. When the parameter flashes, press ENTER key to confirm. Select **On** to turn on the backlight, the time unit is minute.
2. After confirming the parameter, press M+ key to enter in P4.4 mode or press CAL/READ key to return to the measurement mode.



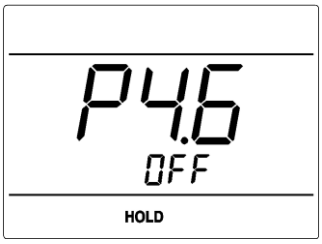
P4.4. – Select automatic power-off time (10-20-30-On)

1. Press ENTER key, "**20**" flashes, then press M+ key to select blinking 30→On→10. When the parameter flashes, press ENTER key to confirm. Select **On** to turn on the function, the unit is day.
2. After confirming the parameter, press M+ key to enter in P4.5 mode or press CAL/READ key to return to the measurement mode.



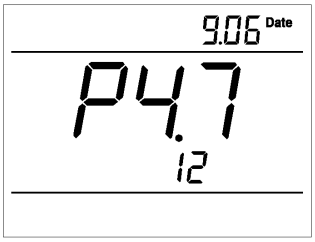
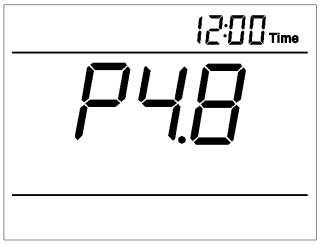
P4.5. – Clear all the stored value

1. Press ENTER key, "**No**" flashes, then press M+ key "**Yes**" flashes. When the parameter flashes, press ENTER key to confirm. **No**: not delete, **Yes**: delete.
2. After confirming the parameter, press M+ key to enter in P4.6 mode or press CAL/READ key to return to the measurement mode.



P4.6. – Set automatic lock-up function

1. Press ENTER key, "**Off**" flashes, then press M+ key, "**On**" flashes. When the parameter flashes, press ENTER key to confirm. **Off**: not set, **On**: set (the reading is automatically locked when stabilizes＞10 seconds.)
2. After confirming the parameter, press M+ key to enter in P4.7 mode or press CAL/READ key to return to the measurement mode.

	**P4.7. – Adjust date** 1. Press (ENTER) key, "**Month**" flashes, then press (ENTER) key, "**Date**" flashes, then press (ENTER) key, "**Year**" flashes. When the number flashes, press (M+) key or (RM) key to adjust date, then press (ENTER) key to confirm. Date display: Month - Date 2. After confirming the parameter, press (M+) key to enter in P4.8 mode or press (CAL READ) key to return to the measurement mode.
	**P4.8. – Adjust time** 1. Press (ENTER) key, "**Hour**" flashes, then press (ENTER) key, "**Minute**" flashes. When the number flashes, press (M+) key and (RM) key to adjust time, then press (ENTER) to confirm. 2. After confirming the parameter, press (CAL READ) key to to return to the measurement mode.

7 USB Communication

7.1 System Requirement

The meter uses "PC-Link" software with USB communication function. This software requires the computer to meet such requirement: Personal computer that operates in Windows system and a CD-ROM driver and a USB communication port (with Microsoft Excel installed).

7.2 Software Interface

Software interface: refer to Diagram-21.

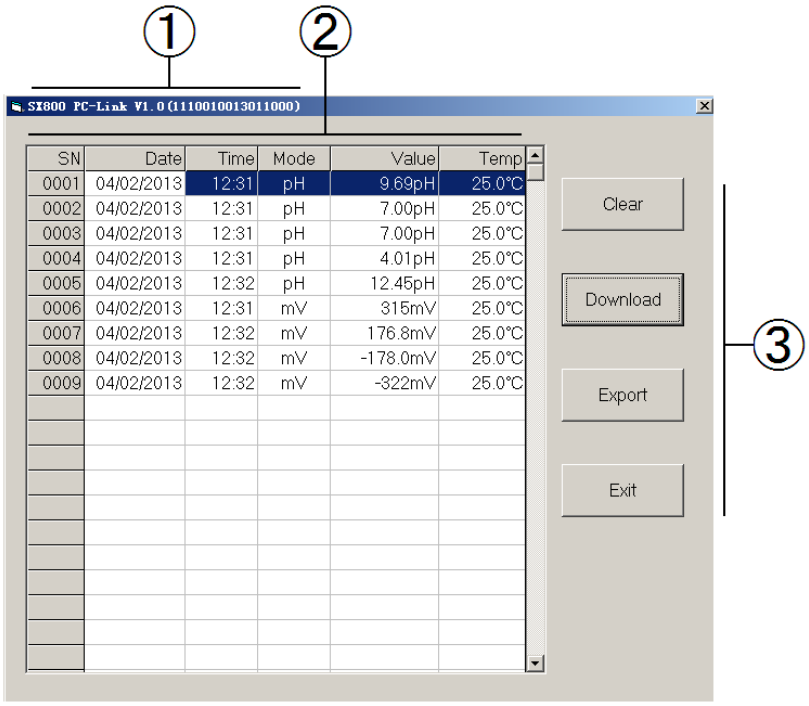


Diagram -21

1 — Meter serial number

2 — Stored value display area

3 — Keys

Clear — press this key to clear the data

Download — press this key to download the data from the meter to the computer, pH, mV, conductivity and dissolved oxygen are classified in the file.

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

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

7.3 Load software

Please follow the following steps to load PC-Link to the computer:

Open “PC-Link” file→double click “Setup” program → click “OK”→ click icons (refer to Diagram – 22) → click “Continue”→ click “Confirm”.

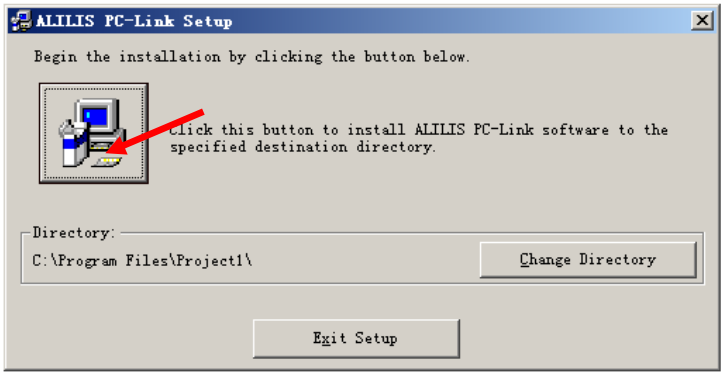


Diagram -22

7.4 Automatic connection port

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

Note: for re-connection after turn-off, the computer can not recognize the software automatically and please re-open the software interface.

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

7.5 Run software

Upload the stored value

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

7.6 Storage during operation

During operation, press key to store or set timing storage. The measuring information is downloaded to the computer through USB and will not be stored in the meter. The stored data during operation is the same as the data shown on the meter.

7.7 Data processing

Press “**Export** ” key to export the stored value to Microsoft Excel file and then analyze or print the stored data.

8 What’s in the box

	Contents	Quantity
1	SX811-BR Portable pH Meter	1
2	LabSen 213 pH/ATC Electrode,	1
3	pH standard buffer (4.00pH/7.00pH/10.01pH /50mL each)	One of each
4	Protelyte Electrode Storage solution (50 ml)	1
5	Plastic Syringe	1
6	PC-Link Software disk	1
7	USB Cable	1
8	Carrying Case	1
9	Manual	1

9 Limited Warranty

We warrant this instrument to be free from defects in material and workmanship and agrees to repair or replace free of charge, at option of APERA INSTRUMENTS, LLC, any malfunctioned or damaged product attributable to responsibility of APERA INSTRUMENTS, LLC for a period of **two years** from the delivery (a **six-month** limited warranty applies to electrodes). Warranty period is the time limit to provide free service for the products purchased by customers, not the service life of the tester or electrodes.

This limited warranty does not cover any damages due to:

i. transportation;
ii. storage;
iii. improper use;
iv. failure to follow the product instructions or to perform any preventive maintenance;
v. modifications;
vi. combination or use with any products, materials, processes, systems or other matter not provided or authorized in writing by us;
vii. unauthorized repair;
viii. normal wear and tear; or
ix. external causes such as accidents, abuse, or other actions or events beyond our reasonable control.

10 Appendix

10.1 Appendix I: Parameter setup and factory default setup

Modes	Prompts	Parameter setting items	Abbreviation	Description	Restore to factory default setup
P1.0 pH	P1.1	Select pH buffer solution	buF	USA－NIST－CUS－CH	—
	P1.2	Set due calibration	dC	No－H00－D00	No
	P1.3	Check the date of the last calibration	/	—	—
	P1.4	Set pH measurement mode of distilled water	PU-1	Off－On	Off
	P1.5	Set pH measurement mode of distilled water mixed with ammonia	PU-2	Off－On	Off
	P1.6	Restore factory default setting	FS	No－Yes	No
P4.0 Basic parameters	P4.1	Adjust storage timing	/	—	0:00
	P4.2	Select temperature unit	/	°C-°F	—
	P4.3	Select backlight time	bL	1－2－3－On	1
	P4.4	Select auto power-off time	AC	10－20－30－On	20
	P4.5	Clear stored value	CLr	No－Yes	No
	P4.6	Set up automatic lock-up function	/	Off—On	Off
	P4.7	Adjust date	/	—	—
	P4.8	Adjust time	/	—	—

10.2 Appendix II: Abbreviation glossary

Modes	Prompts	Code and abbreviation	Description
P1.0 pH	P1.1	buF	Standard buffer solution
	P1.2	dC	Due for calibration
	P1.3	/	
	P1.4	PU-1	Distilled water
	P1.5	PU-2	Distilled water mixed with ammonia
	P1.6	FS	Factory default setting
P4.0 Basic parameters	P4.1	/	
	P4.2	/	
	P4.3	bL	Backlight
	P4.4	AC	Auto power-off
	P4.5	CLr	Clear readings
	P4.6	/	
	P4.7	/	
	P4.8	/	
Others		CH	China
		USA	United States of America
		nIS	NIST
		OFF	Off
		On	On
		no	No
		YES	Yes

10.3 Appendix III: Self-diagnosis information

Icons	Self-diagnosis information
Er 1	Wrong pH buffer solution or the buffer solution out of range
Er2	Press (ENTER) key when measuring value is not stable during calibration.
Er3	During calibration, the measuring value is not stable for ≥3min.
Er4	pH electrode zero electric potential out of range （<-60mV or >60mV）
Er5	pH electrode slope out of range （<85% or >110%）
Er6	Enter in pre-set calibration date to remind calibration

11 Recommended pH Electrodes for Other Specific Applications

Application	**Ideal Apera pH Electrodes to Use with SX811-BR Meter**
Regular water solutions	201T-F, LabSen 213
Beverage, beer, or wine analysis	LabSen 213
Cosmetics	LabSen 851-1, (MP500 temp. probe required)
Dairy products (milk, cream, yogurt, mayo, etc.)	LabSen 823
High-Temperature liquid	LabSen 213
Low-temperature liquid	LabSen881 (MP500 temp. probe required)
Meat	LabSen 763
Micro sample testing	LabSen 241-6, LabSen 241-3 (MP500 temp. probe required)
Purified Water (Low ion-concentration samples)	LabSen 803, LabSen 813
Soil	LabSen 553
Solid or semi-solid samples (cheese, rice, fruit, etc.)	LabSen 753
Strong acid samples	LabSen 831 (MP500 temp. probe required)
Strong alkalined samples	LabSen 841 (MP500 temp. probe required)
Surface test (skin, paper, carpet, etc.)	LabSen 371 (MP500 temp. probe required)
Titration	LabSen 223
TRIS buffer solutions	LabSen 213, LabSen 223
Viscous liquid samples	LabSen 223, LabSen851-1
Wastewater or emulsion	LabSen 333

*** Visit http://aperainst.com/electrodes contact us at 1-614-285-3080 for more details.**

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