

User's Guide

AQUASOL
DIGITAL

AB-TDS-01
AB-DO-01
AB-PH-01

TDS DO & pH



An
ISO 9001:2015
Company





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Introduction:

We thank you for having purchased bench top multi-parameters meter.

Before using the instrument, please note that the operation instructions should be read carefully, which will help you to operate and maintain the instrument, as well as to avoid trouble caused by unsuitable operation and maintenance.

Our bench top multi -parameters meter employs leading edge technology with integrated microprocessor, which is suitable for measurement in water solutions for institutes, industrial labs and production fields.

The information presented in this manual is subject to change without notice as improvements are made.

Features:

1. Microprocessor based designed and rugged housing with splash proof keyboard.
2. The large backlight LCD displays pH or ORP or Conductivity or DO and Temperature simultaneously.
3. Automatic Temperature Compensation (ATC), Manual Salinity (MSC) and Altitude (MAC) Compensation.
4. Memory function stores and recalls up to 150 points. MAX/MIN and data Lock. ? or ? are available.
5. Combine special platform and electrode holder, or a Stirrer (optional) for convenient measuring.
6. Output data for capturing on PC directly via USB.

Specifications

AB-PH-01	pH	ORP
Range	-2.00~16.00 pH	-1999 ~ -200 mV -199.9 ~ 499.9 mV 500 ~ 2000 mV
Accuracy	±0.01+1 digit	± 2+1 digit
Resolution	0.01 pH	0.1/1 mV
Compensation	ATC: 0~100 °C	N/A

AB-TDS-01	Conductivity	TDS	Salt
Range	0.0~ 199.9µS 200~ 1999µS 2.00~ 19.99 mS 20.0~ 100.0 mS	0.0~131.9 ppm 132~1319 ppm 1.32~13.19 ppt 13.2~66.0 ppt	0.0~99.9 ppm 100~999 ppm 1.00~9.99 ppt 10.0~50.0 ppt
Accuracy	±2% FS	±2% FS	±2% FS
Resolution	0.1/1µS/0.01/0.1 mS	0.1/1ppm/0.01/0.1ppt	0.1/1ppm/0.01/0.1ppt
Compensation	ATC: 0~60 °C	ATC: 0~60 °C	ATC: 0~60 °C

AB-DO-01	DO	O2	Temp.
Range	0~20.00 mg/L 0~20.00 ppm	0~200.0 %	0~110 °C
Accuracy	±0.2+1 digit	±2% FS	±0.2+1 digit
Resolution	0.01 mg/L	0.10%	0.1 °C
Compensation	ATC: 0~60 °C MSC: 0~50 ppt MAC:0-20000 ft		

Accessories:

Please verify the corresponding accessories as below.

AB-TDS-01

Conductivity/TDS Cell, T/probe, Standard solution, AC/DC adaptor, Electrode holder, USB Software, Connection cable & Magnetic Stirrer.

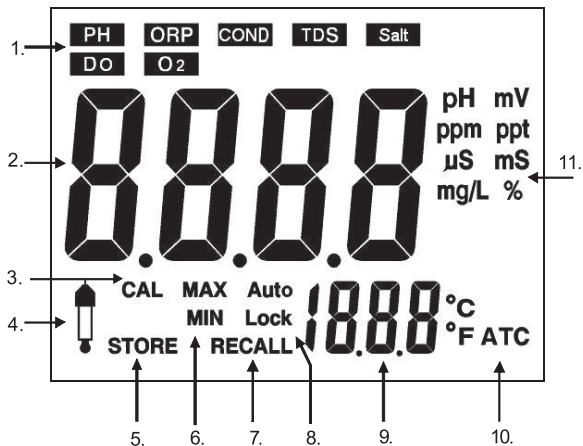
AB-PH-01

pH Electrode, T/probe, Buffer 4 & 7, AC/DC adaptor, Electrode holder, USB Software, Connection cable & Magnetic Stirrer.

AB-DO-01







DO probe, T/probe, Standard solution, AC/DC adaptor, Electrode holder, Membrane cap, Electrolyte, USB Software, Connection cable & Magnetic Stirrer.

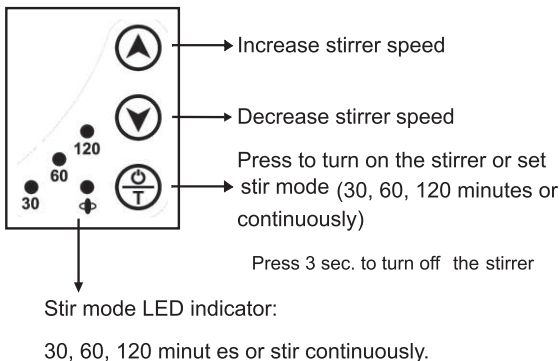
Display Description:



1. Function Mode
2. Measuring Value
3. Calibration Mode
4. Calibration error indicator
5. Reading stored indicator
6. MAX & MIN Value
7. Recall Mode
8. Auto lock or manually lock current reading
9. Temperature Indicator
10. Auto Temperature Compensation
11. Unit

Functions of Keyboard:

	Lock the current reading, press for 3 sec. to enter or exit MAX/MIN mode. In this mode, press to browse MAX and MIN reading.
	Store the current reading. Press 3 sec. to enter Recall mode.
	In Recall mode, browse records. Press both together 3 sec. to enter advanced setting (see page 16).
	
	Choose different function mode. Press 3 sec. to switch °C/°F, or switch pH - mV or ORP - mV (in ORP mode), or switch mg/L or ppm (in DO mode)
	Turn on or off power. Press 3 sec. to enter calibration mode




Preparation:

pH, ORP, COND, TDS, Salt

1. Connect AC adaptor with power source.
2. Remove the protection cap from the electrode and connect to input connector.
3. Connect the Temp. probe to meter and turn on the power switch.
4. Rinse the electrode with clean water and wipe it dry.


DO

1. Connect the DO probe and Temp. probe to meter and remove the protection cap from the probe.
2. Remove the membrane cap carefully.
3. Fill the membrane cap with the electrolyte solution up to the bottom of the threads on the inside of the cap.
(Please see step 7~10 in “**Membrane Cap Replacement**” on page 16 for details)
4. Press  button to turn the meter power on.

Calibration:

<pH>

1. Make sure the sensor is pH electrode.
Dip the electrode and the temperature probe into the buffer solution pH 7.00. Stir gently and wait until the reading is stable.

Press and hold  for 3 sec. to enter calibration mode.
The display will appear

CAL and flashing 7.00. When the display stops flashing and indicates “**SA**”, then “**End**” while calibration ends, and will return to measurement mode.

1. Rinse the electrode with clean water and wipe it dry. Dip the electrode into the buffer solution pH 4.01 as previous steps.
2. After slope calibration, pH 4.01 or pH 10.01, the display will indicate the percentage of slope (PTS) to show the status of the electrode. If the PTS is below 70% or above 130%, the electrode must be replaced. A slope of 100% is ideal.

Note:


1. Calibration error indicator icon will appear, and “**Err**” instead of “**SA**”, if calibration fails.
2. When doing a 2 or 3 point calibration, Calibrate with buffer pH 7 first, and then follow with buffer pH 4 or pH 10.
3. pH calibration type “**USA**” or “**NIST**” can be changed in advanced setting.
4. The calibration points of “**USA**” are 1.68, 4.01, 7.00, 10.01 and 12.45.
5. The calibration points of “**NIST**” are 1.68, 4.01, 6.86, 9.18 and 12.45.

<ORP>

Calibration is not necessary for ORP. However, it could be tested with specific ORP standard solution to check whether the electrode is good.

<COND, TDS, Salt>



1. Make sure the probe is Conductivity cell. Dip the cell and the temperature probe into the standard solution 1413 $\mu\text{S/cm}$. Stir gently and wait



1. until the reading is stable. Press and hold  for 3 sec. to enter calibration mode. The display will appear **CAL** and flashing 1413 μ S/cm. When the display stops flashing and indicates “**SA**”, then “**End**” while calibration ends, and will return to measurement mode.

Note:


1. Calibrated by 12.88 mS/cm standard solution would be better for measuring high conductivity solution.
2. The icon **COND** will display automatically during calibration mode.
3. Calibration error indicator icon will appear, and “**Err**” instead of “**SA**”, if calibration fails.
4. If the reading is not 0 μ S/cm while the cell is in the air and not dipped into any solution, calibrate it in the air to make reading becomes 0 μ S/cm.
5. The calibration point of Conductivity are 0, 84 μ S/cm, 1413 μ S/cm, 12.88 mS/cm and 80.0 mS/cm.

<DO>

1. Make sure the sensor is DO probe and remove the protection cap.
2. Press  to turn on power and press  to choose **O2** mode. Wait 10 minutes to 30 minutes for the probe to polarize. The reading should be approx. 101.7% (saturation) after the probe has completely polarized


3. Let the probe in the air. Press and hold  for 3 sec. to enter calibration mode. The display will appear **CAL** and flashing 101.7%. When the display stops flashing and indicates “SA”, then “End” while calibration ends, and will return to measurement mode.
4. Optional 'zero oxygen' calibration: (improves measurement accuracy for very low or very high DO measurements). Place the probe into a zero oxygen calibration solution, such as 5% sodium sulfite, wait for stability and press and hold  to enter calibration. Stability in a zero solution may take many minutes, depending on probe history.

Note:

1. The icon  will display automatically during calibration mode.
2. Calibration error indicator icon will appear, and “Err” instead of “SA”, if calibration fails.
3. If the reading is not 0% while the probe is not connected, calibrate it in the air without probe to make reading becomes 0%.

Measurement:

<pH>

1. Press  to choose pH mode.
After calibration, rinse the pH electrode with clean water and wipe it dry. Dip the electrode and the

temperature probe into the sample solution which is going to be measured. Stir gently and wait until a stable reading can be obtained

<ORP>

1. Insert ORP electrode, and press **(MODE)** to choose ORP mode.
2. Rinse the ORP electrode with clean water and wipe it dry. Dip the electrode into the sample solution which is going to be measured. Stir gently and wait until a stable reading can be obtained.

Note:

1. The display will appear “----” when it is over measuring range.
2. After measurement, rinse the electrode with clean water. Replace the soaking bottle. The soaking bottle should be always filled with soaking solution (4M KCL).

<COND, TDS, Salt>

1. Insert Conductivity cell, and press **(MODE)** to choose COND, TDS or Salt mode.
2. After calibration, rinse the conductivity cell with clean water and wipe it dry. Dip the electrode and the temperature probe into the sample solution which is going to be measured. Stir gently and wait until a stable reading can be obtained.

Note:

1. The display will appear “----” when it is over measuring range.

2. The unit will auto-range to $\mu\text{S}/\text{cm}$ or mS/cm , or ppm or ppt.
3. After measurement, rinse the cell with clean water and replace the protective cap.
4. Don't touch or wipe the surface of the inner black plate of the conductivity cell.

<DO>




1. Remove the protection cap and turn on the power and press **MODE** to choose **O₂** mode. Wait 10 minutes to 30 minutes for the probe to polarize. The reading should be approx. 101.7% (saturation) after the probe has completely polarized.
2. Select the desired units of measure by pressing **MODE** until the proper units are shown in the display.
3. Place the probe in the sample to be measured. Stir the probe in the sample to remove any trapped air bubbles from the membrane surface.
4. Allow the meter time to settle to the final measurement value.

Note:



1. The larger the difference in temperature between the probe and the solution the longer it will take for the reading to stabilize. Stabilization time can vary from ten (10) seconds to five (5) minutes.



Cover the probe with the probe cap. The sponge contained in the cap should be moistened (not soaked) with DI (distilled water) or clean tap water.




MAX/MIN mode:

1. Press and hold  button until the display appear flashing **MAX** and **MIN** icons to enter MAX/MIN. Press  lightly to browse MAX and MIN value during this mode.
2. To exit this mode, press and hold  button again until the flashing **MAX** and **MIN** icons disappear and return to measuring mode.
















Store and Recall mode:




1. In measuring mode, press  to store the current reading. The **Store** icon and the ordinal of this record will appear on the display.
2. Press and hold  for 3 sec. to enter Recall mode.

In this mode, use  or  to browse records.




Press and hold  to exit this mode and return to measuring mode.
3. In Recall mode, press   together for 3 sec. to clean all the records in the memory.


Advanced Setting:

1. In pH, TDS or DO measuring mode, press   together for 3 sec. will enter advanced setting.
2. In pH advanced setting,
 - (1) Press  to set “**pH calibration type**”, and use  or  to choose “**USA**” or “**NIST**”.
Then press  to confirm and return to measuring mode.
 - (2) Press  to turn on or off “**Auto Lock**” function. Use  or  to choose on or off.
Then press  to confirm and return to measuring mode.
3. In TDS advance setting, press  to set the ratio between conductivity and TDS. Use  or  to adjust ratio from 0.5 to 1.0. Then press  to confirm and return to measuring mode.
4. In DO advanced setting,
Press  to set “**Salt Compensation**”. Use

Use  or  to adjust the value from 0 to 50 ppt. Then press  to confirm and return to measuring mode.

Press  to set “**Altitude Compensation**”.

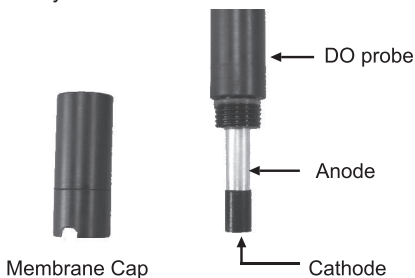
Use  or  to adjust the value from 0 to 20K ft. Then press  to confirm and return to measuring mode.

2. In any advanced setting, press  to reset all settings to factory setting (except “ph calibration type” and “Auto Lock”).

Membrane Cap Replacement:

1. Do not touch the membrane as skin oils will interfere with the oxygen permeability rate of the membrane. Replace the cap carefully.
2. It is recommended that the probe remain attached to the meter during this replacement process.
3. Unscrew the cap firmly and carefully from the probe.
4. Rinse the old electrolyte solution from the Cathode and Anode.
5. Use the supplied Polishing Strips to clean, polish, shine, and/or remove scratches from the cathode. Be sure to moisten the cloth before polishing the cathode. Do not over-polish the sensitive gold cathode.
6. Set the new replacement membrane cap on a flat surface. Leave the cap in this position during the replacement process.
7. Fill the membrane cap with the electrolyte solution up to the bottom of the threads on the inside of the cap.
8. Tap the membrane cap to release and prevent air bubble in electrolyte solution.
9. Keeping the cap in a fixed position on a flat surface, carefully insert the probe into the new cap by first dipping and removing the probe several times from the cap. With each dip, push the probe progressively deeper into the bonded cap. Finally, screw the probe slowly onto the cap until fully tightened. The dipping and removal technique minimizes the introduction of air bubbles into the electrolyte solution. Air bubbles in the electrolyte can affect measurements.

10. It is normal that excess electrolyte solution will leak out the cap during this replacement since it minimizes the introduction of air pockets. Clean off the excess electrolyte before use.



DO probe clean:

When the Do reading is unstable or incorrect, please follow the below steps to clean the probe.

1. Unscrew the membrane cap from the probe.
2. Put the sand paper on the table, let the coarse side on the up side, and add some water on it.
3. Rub the cathode part against the sand paper according to figure "8" for around 10 times.
4. Use the sand paper to clean the anode part.
5. After cleaning the probe, please refill new electrolyte into the membrane cap.



Connect to PC:

<System Requirement>

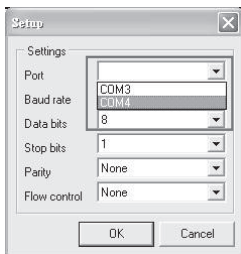
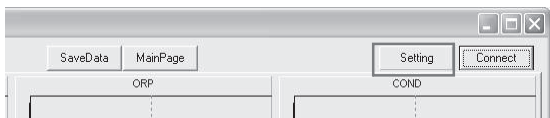
1. OS: Windows 2000, Windows XP, Windows Vista, Windows 7.
2. USB host controller.

<Software Installation>

1. Open USB Driver folder and install USB “PL2303_Prolific_DriverInstaller_vXXXXX.exe”
2. Copy “USB_software.exe” from the CD-ROM to the folder you want to put in.

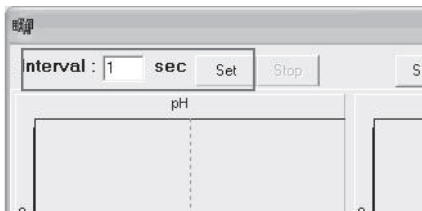
<Operations>

1. Double-click “USB_software.exe” to start the program.
2. Click setting button to set COM port in the Setup window.

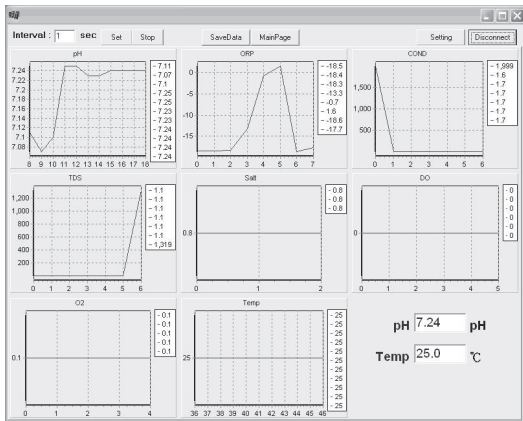


Choose the responding Port and then click **OK**. In normal situation, other settings do not need to be changed.

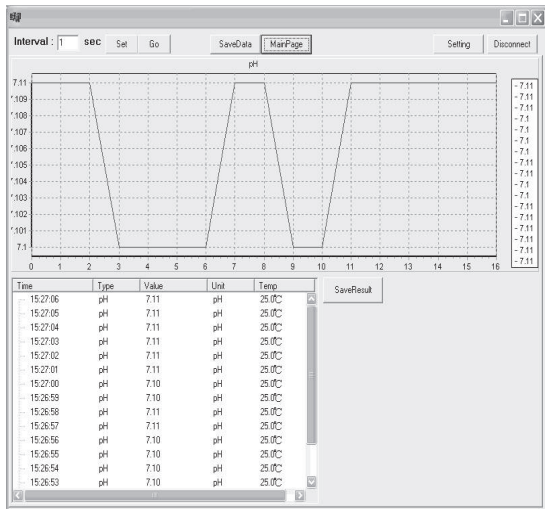
3. Fill in desired measuring interval seconds, and click **set**.



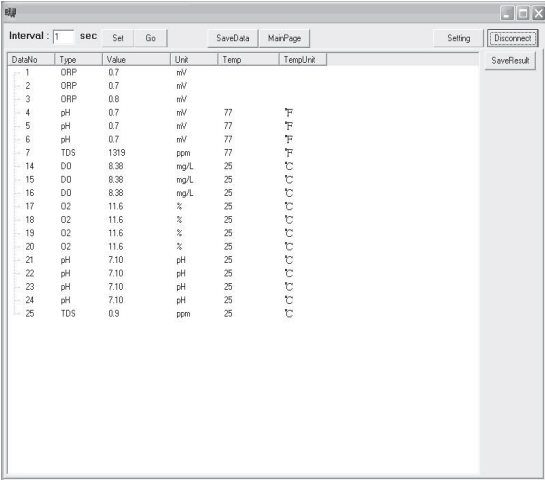
2. Click **Connect** to get readings and draw the curve.



- Click the small graphs of each mode in the main window can enter a big window with detail reading information. Click **Main Page** to back to the main window.
- In each big window, click **Save Result** will export the readings to .txt file.



1. Click **Save Data** and then press and hold **STO/RCL** to enter Recall mode. Press **MODE** to export all the records to the program. The records can also be saved as a .txt file by clicking **Save Result** in this window.



The screenshot shows a software window with a table of data. The window has a title bar with standard OS icons. Below the title bar, there are several buttons: 'Interval: 1 sec', 'Set', 'Go', 'SaveData', 'MainPage', 'Setting', 'Disconnect', and 'SaveResult'. The table has columns for 'DataNo', 'Type', 'Value', 'Unit', 'Temp', and 'TempUnit'. The data rows are as follows:

DataNo	Type	Value	Unit	Temp	TempUnit
1	ORP	0.7	mV		
2	ORP	0.7	mV		
3	ORP	0.8	mV		
4	pH	0.7	mV	77	°F
5	pH	0.7	mV	77	°F
6	pH	0.7	mV	77	°F
7	TDS	1319	ppm	77	°F
14	DO	8.38	mg/L	25	°C
15	DO	8.38	mg/L	25	°C
16	DO	8.38	mg/L	25	°C
17	O2	11.6	%	25	°C
18	O2	11.6	%	25	°C
19	O2	11.6	%	25	°C
20	O2	11.6	%	25	°C
21	pH	7.10	pH	25	°C
22	pH	7.10	pH	25	°C
23	pH	7.10	pH	25	°C
24	pH	7.10	pH	25	°C
25	TDS	0.9	ppm	25	°C

Note:

Please click **Disconnect** or close the program before turn off power or remove the USB cable.



TDS
DO & pH

Warranty Card*

Customer Name/ Address : _____

Dealer Name/ Address: _____

Bill No. _____

Date -: _____

Product details

Dealer Stamp
& Sign



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