



**Multi-parameter Analyzer
a-AB33M1**

**Bench PH Meter
a-AB33PH
a-AB41PH**

**Bench Conductivity Meter
a-AB33EC**

Instruction Manual

Contents

1.	INTRODUCTION	3
1.1.	SAFETY PRECAUTIONS	3
1.2.	INTENDED USE	4
1.3.	TOUCH SCREEN	5
1.4.	BUTTONS.....	7
2.	INSTALLATION	8
2.1	INSTALL THE STAND-ALONE ELECTRODE HOLDER	8
2.2	INSTALLING THE POWER ADAPTER	9
2.3	CONNECT THE PH AND CONDUCTIVITY ELECTRODES	10
3.	PH OPERATION (A-AB33M1, A-AB33PH AND A-AB41PH).....	11
3.1	PH SETUP	11
3.1.1	Set temperature unit and temperature	11
3.1.2	Select a predefined buffer group.....	11
3.1.3	Select a pH resolution.....	12
3.2	PH CALIBRATION	12
3.2.1	Perform 1-point calibration.....	13
3.2.2	Perform 2-point calibration.....	13
3.2.3	Perform 3-point calibration.....	14
3.2.4	Perform an ORP electrode calibration.....	14
3.3	PH MEASUREMENT	15
3.3.1	Measurement modes	15
3.3.2	PH measurement.....	16
3.3.3	mV and ORP measurement	16
3.3.4	Temperature measurement	16
4.	CONDUCTIVITY OPERATION (A-AB33M1 AND A-AB33EC).....	17
4.1	CONDUCTIVITY SETUP	17
4.1.1	Set cell K value.....	17
4.1.2	Set calibration standard solution	17
4.1.3	Set reference temperature	17
4.1.4	Set temperature coefficient.....	18
4.1.5	Set TDS factor.....	18
4.2	CONDUCTIVITY CALIBRATION	18
4.3	CONDUCTIVITY MEASUREMENT	19
4.4	TDS, SAL (SALINITY) AND RES (RESISTIVITY) MEASUREMENT.....	19
5.	DUAL CHANNEL MEASUREMENT (A-AB33M1).....	20
5.1	AUTO ENDPOINT MODE.....	20
5.2	CONTINUOUS READING MODE	20
6.	USER MANAGEMENT	21
6.1	USER MANAGEMENT (A-AB33M1, A-AM33PH AND A-AB33EC)	21
6.2	USER MANAGEMENT (A-AB41PH)	21
6.2.1	Switch between different users	21
6.2.2	Change password.....	22
7.	RECORDS MANAGEMENT	22
8.	MENU.....	23

EN-2	Analyzer and Bench Meter
8.1	SETUP MENU 23
8.2	I-STEWARD MENU 26
8.3	SETTINGS MENU 30
9.	PRINTING..... 33
9.1	PRINT FORMAT 33
9.2	OUTPUT FORMAT 36
10.	COMMANDS..... 36
11.	MAINTENANCE 37
11.1	ERROR MESSAGE 37
11.2	METER MAINTENANCE..... 38
11.3	ELECTRODE MAINTENANCE 38
11.3.1	<i>PH electrode maintenance</i> 38
11.3.2	<i>Conductivity electrode maintenance</i> 38
11.4	CLEANING..... 39
12.	TECHNICAL DATA..... 39
12.1	SPECIFICATIONS 39
12.2	DIMENSIONS 44
13.	APPENDIX..... 45
13.1	PH BUFFER GROUPS 45
13.2	CONDUCTIVITY STANDARDS..... 46
13.3	EXAMPLES OF TEMPERATURE COEFFICIENTS (A-VALUE) 47
14.	COMPLIANCE 48

1. Introduction

This manual contains installation, operation and maintenance instructions for a-AB33M1 multi-parameter analyzer, a-AB33PH, a-AB41PH and a-AB33EC pH and conductivity bench meter. Please read it completely before installation and operation.

The table below lists the measurement modes each model supports:

Table 1-1 Measurement modes

Model	Supported measurement modes
a-AB33PH / a-AB41PH	pH, mV, relative mV and ORP measurement
a-AB33EC	Conductivity, TDS, salinity and resistivity measurement
a-AB33M1	pH, mV, relative mV and ORP measurement on channel one; Conductivity, TDS, salinity and resistivity measurement on channel two

1.1. Safety precautions

Definition of Signal Warnings and Symbols

Safety notes are marked with signal words and warning symbols. These show safety issues and warnings. Ignoring the safety notes may lead to personal injury, damage to the instrument, malfunctions and false results.

WARNING For a hazardous situation with medium risk, possibly resulting in severe injuries or death if not avoided.

CAUTION For a hazardous situation with low risk, resulting in damage to the device or the property or in loss of data, or minor or medium injuries if not avoided.

ATTENTION For important information about the product. May lead to equipment damage if not avoided.

NOTE For useful information about the product.

Warning Symbols



General hazard



Explosion hazard



Electrical shock hazard

Safety Precautions



CAUTION: Read all safety warnings before installing, making connections, or servicing this equipment. Failure to comply with these warnings could result in personal injury and/or property damage. Retain all instructions for future reference.

- Before connecting power, verify that the AC adapter's input voltage range and plug type are compatible with the local AC mains power supply.
- Do not position the equipment such that it is difficult to reach the power connection.

- Make sure that the power cord does not pose a potential obstacle or tripping hazard.
- The equipment is for indoor use only.
- Do not operate the equipment in wet, hazardous or unstable environments.
- When using chemicals and solvents, comply with the instructions of the chemical producer and the general lab safety rules.
- Do not allow liquids to enter the equipment.
- Disconnect the equipment from the power supply when cleaning.
- Service should only be performed by authorized personnel.



WARNING: When using chemicals and solvents, comply with the instructions of the producer and the general lab safety rules.



WARNING: Never work in an environment subject to explosion hazards! The housing of the instrument is not gas tight. (Explosion hazard due to spark formation, corrosion caused by the ingress of gases).



WARNING: Electrical shock hazards exist within the housing. The housing should only be opened by authorized and qualified personnel. Remove all power connections to the unit before opening.

1.2. Intended use

This instrument is intended for use in laboratories, pharmacies, schools, businesses and light industry. It must only be used for measuring the parameters described in these operating instructions. Any other type of use and operation beyond the limits of technical specifications, without written consent from OHAUS, is considered as not intended. This instrument complies with current industry standards and the recognized safety regulations; however, it can constitute a hazard in use. If the instrument is not used according to these operating instructions, the intended protection provided by the instrument may be impaired.

1.3. Touch screen

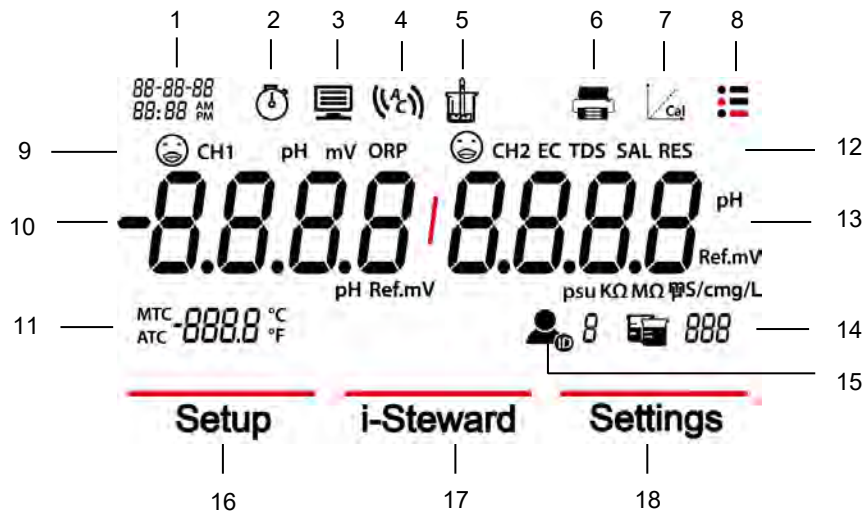


Figure 1-1 Touch screen

1. **Date and time**
2. **Clock icon (a-AB41PH)**: appears when the timing function is used.
Note: this function is only available for a-AB41PH model.
3. **Computer icon**: appears when connects to a computer.
4. **Auto endpoint icon** (⌚); **Continuous reading icon** (⌚ c).
5. **Measurement icon**: blinks when measurement is in progress.
6. **Printer icon**: touch to print.
7. **Calibration icon**: touch to calibrate; blinks when calibration is in progress.
8. **Menu icon**: touch to enter menu settings.
9. **PH electrode condition (a-AB33M1, a-AB33PH and a-AB41PH)**



Slope: 95-105%
and offset: $\pm$ (0-15) mV.
Electrode condition is good.



Slope: 90-95%
or offset: $\pm$ (15-35) mV.
Electrode condition is acceptable.



Slope: less than 90%
or offset: $\pm$ (35-60) mV.
Electrode condition is not good or needs cleaning.

Conductivity electrode condition (a-AB33M1, a-AB33EC)

Calibration result: within $\pm 20\%$
of the set cell K value.

Electrode condition is good.



Calibration result: out of $\pm 20\%$
of the set cell K value.

Electrode needs cleaning.

10. **First measurement channel (a-AB33M1)**

Note: a-AB33M1 supports dual channel measurement, other models only support one measurement channel.

11. **Temperature:** touch to switch between MTC and ATC temperature.

12. **Measurement mode area:** touch to switch between different pH and conductivity measurement modes.

PH, mV, ORP (a-AB33M1, a-AB33PH and a-AB41PH);

EC, TDS, SAL (Salinity), RDS (Resistivity) (a-AB33M1, a-AB33EC);

13. **Second measurement channel (a-AB33M1)**

Note: a-AB33M1 supports dual channel measurement, other models only support one measurement channel.

14. **Beaker icon:** touch to recall measurement data.

15. **User ID icon:** touch and then press the or button to select user by user ID.

Touch the **Menu icon**  to enter the following menu:

16. **Setup:** touch to enter parameter setup menu.

17. **i-Steward:** touch to enter electrode condition menu.

18. **Settings:** touch to enter meter's setup menu.

Note: when you enter the three menus introduced above, touch the related sub-menu items to continue settings.

1.4. Buttons

**Up Button:**

- a) When setting parameters, press to increase the setting value or to display the previous option.
- b) When in setup menu, press to scroll up to the previous page of menu selections.
- c) When in calibration and PH electrode check system (PH ECS), press to repeat the previous step.

**Home Button:**

- a) Press to turn on the meter.
- b) Press to start a new measurement.
- c) Press to exit from the current mode or menu and return to the measurement mode.

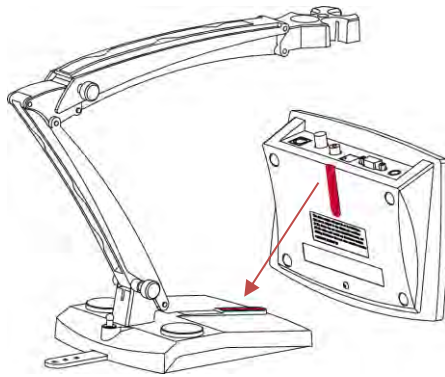
**Down Button:**

- a) When setting parameters, press to decrease the setting value or to display the next option.
- b) When in setup menu, press to scroll down to the next page of menu selections.
- c) When in calibration and PH electrode check system (PH ECS), press to move to the next step.

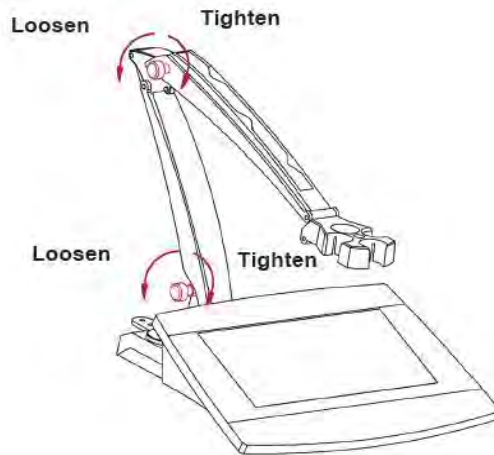
2. Installation

2.1 Install the stand-alone electrode holder

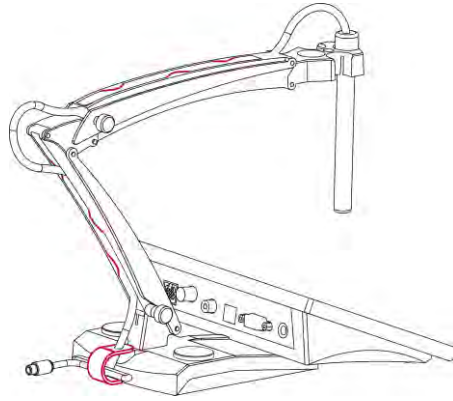
1. Attach the magnetic part on the bottom of the meter to the magnetic part on the stand-alone electrode holder to finish installation. (Both marked in red demonstrated below.)



2. The two tension knobs can be adjusted by turning clockwise to tighten or turning counterclockwise to loosen. When they are loosened, you can move the holder up and down, forward and backward to the desired angle. Then you can tighten the knobs to fix the holder.



Note: the stand-alone holder boasts a harness storage design. You can push the electrode's cable in the slots marked in red below, roll up and fix the harness storage strip located at the bottom of the holder, and pass the cable through the strip.



2.2 Install the power adapter

Change the plug for the power adapter according to the graphic below if necessary. Ensure to connect the right power adapter to your power supply.

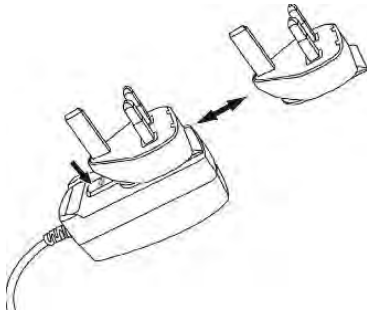


Figure 2-1 Change power adapter plug

2.3 Connect the pH and conductivity electrodes

The following graphics demonstrate sockets available for pH and conductivity measurement. Some models have fewer sockets than others, depending on the measurement modes the meter/analyzer support.

a-AB33M1

There are two sockets for pH electrode, the "pH/mV" socket and the "Temp" Socket. One socket for conductivity electrode, the "COND" socket.

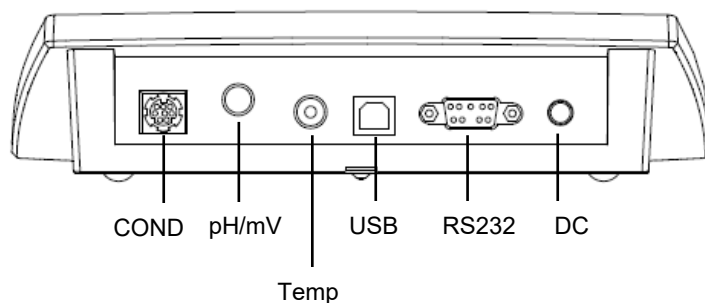


Figure 2-2 a-AB33M1 sockets

a-AB33PH / a-AB41PH

There are two sockets for pH electrode, the "pH/mV" socket and the "Temp" Socket.

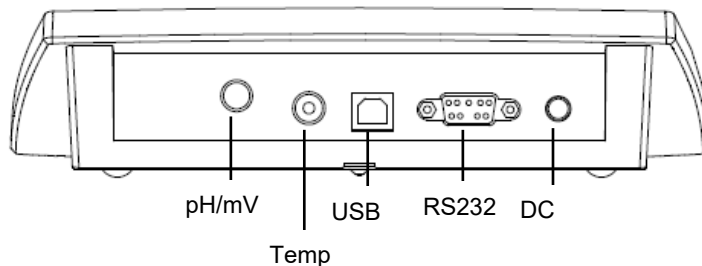


Figure 2-3 a-AB33PH / a-AB41PH sockets

Note: for 2-in-1 pH electrode, you only need to connect it to the pH/mV socket, while for other electrodes, you need to connect to both the pH/mV and Temp socket.

a-AB33EC

There is one socket "COND" for conductivity electrode.

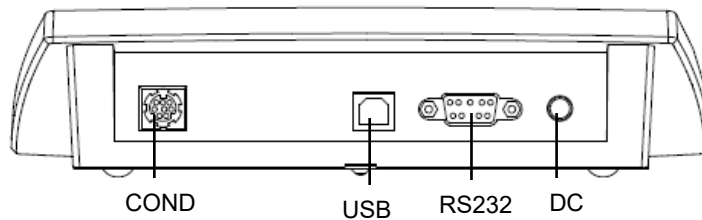


Figure 2-4 a-AB33EC sockets

3. PH Operation (a-AB33M1, a-AB33PH and a-AB41PH)

This chapter is for a-AB33M1, a-AB33PH and a-AB41PH models which support pH measurement.

3.1 PH setup

3.1.1 Set temperature unit and temperature

Please note:

If a temperature electrode is used, Automatic Temperature Compensation (ATC) and the sample temperature are displayed on the screen. You may then choose to skip Manual Temperature Compensation (MTC) setup (below).

If the meter does not detect a temperature electrode or one is not used, the meter automatically switches to MTC mode and MTC appears on the screen.

Temperature and temperature unit can be set as follows:

1. Touch the **Menu** icon  to enter menu option.
2. Touch **Setup**.
3. Press the  button if you are using an a-AB33M1 model. Skip this step if you are using an a-AB33PH or a-AB41PH model.
4. Touch **Temperature**.
5. Touch **Temp.unit** and then touch **°C** or **°F** to select temperature unit.
6. Repeat the previous steps and then touch **Enter temp.value** to enter temperature.
7. Press the  or  button to adjust temperature value.
8. Touch the value on the screen to confirm your setting.

Note:

1. The default MTC temperature value is 25°C (77°F).
2. The calculation formula from °F to °C is: $^{\circ}\text{C} = 5/9 (^{\circ}\text{F} - 32)$.

3.1.2 Select a predefined buffer group

To select a buffer group:

1. Touch the **Menu** icon  to enter menu option.
2. Touch **Setup**.
3. Touch **pH**.
4. Touch **Buffer group**.
5. Touch the name of the buffer group you want to confirm your setting. For details of the buffer group information, please check the following table:

Table 3-1 Buffer group

pH Buffer Group	Temperature	pH Value				
USA standard	25°C	1.68	4.01	7	10.01	/
JJG standard	25°C	1.68	4.01	6.86	9.18	12.46
Europe standard	25°C	2	4.01	7	9.21	11
MERCK (Ref.20°C)	20°C	2	4	7	9	12
DIN (19266)	25°C	1.68	4.008	6.865	9.184	12.454

3.1.3 Select a pH resolution

To select a pH resolution:

1. Touch the **Menu** icon  to enter menu option.
2. Touch **Setup**.
3. Touch **pH**.
4. Touch **Resolution**.
5. Touch the resolution value you want to confirm your setting.

Note: pH Resolution value varies for different models, so please check the actual value on the screen.

3.2 PH calibration

a-AB41PH model supports a maximum 5-point calibration, while a-AB33PH and a-AB33M1 models support 3-point calibration. OHAUS recommends to perform at least 2-point calibration.

Standard procedure of pH measurement is as follows:

- a) pH electrode preparation
- b) Buffer preparation and pH electrode calibration
- c) Sample preparation
- d) pH measurement
- e) Record measurement results or print
- f) Rinse the pH electrode and properly store

PH electrode preparation: pH electrode should be rinsed with pure water before and after use. Check if the electrode is physically damaged. (Be careful with the glass bulb.)

The pH electrode should be stored in the storage bottle; the solution in the bottle is 3M KCl solution. After placing the pH electrode into the sample or buffer solution, user should stir several seconds, wait for 30 to 60 seconds for the signal to stabilize, and then press the related button to operate (Calibration or measurement).



WARNING Do not operate the equipment in hazardous environments. The equipment is not explosion protected.



WARNING When using chemicals and solvents, comply with the instructions of the chemical producer and the general lab safety rules.

3.2.1 Perform 1-point calibration

Select a predefined buffer group before performing the calibration. Please refer to the **Select a predefined buffer group** section above for details.

To start calibration:

- 1 Touch the mode area one or several times to select **pH**.
- 2 Touch the  icon on the screen.
- 3 Touch **pH** if you are using an a-AB33M1 model. Skip this step if you are using other models.
- 4 Follow the instruction on the screen to rinse the electrode, place it in a calibration buffer, stir 5 seconds, and wait for 30 seconds.
- 5 Press the  button when you finish the previous step to start calibration. The  icon on the screen starts to blink during the process.
Note:
 - Calibration starts with the Auto End Point Mode.
 - Pressing the  button during the calibration can cancel the process.
- 6 The meter reaches endpoint automatically. The screen will display the calibration point pH value (e.g. 7.00) with the temperature.
 - a) Touch **Accept** to accept the calibration result.
 - b) Touch **Recalibration** if you want to re-calibrate and repeat the previous steps.
- 7 If you touch **Accept** in the previous step:
 - a) Touch **Finish** to complete calibration, and the calibration result will be shown.
Note:
 - Press the  button to exit calibration and return to measurement screen.
 - Touch the  icon to print the result if you connect the meter to a printer or a computer.
 - b) Touch **Next** to perform a 2nd calibration.

3.2.2 Perform 2-point calibration

After finishing the 1-point calibration as described above, touch **Next** to perform a 2nd calibration.

- 1 Rinse the pH electrode with pure water and wipe off with tissue. Place the electrode in the next calibration buffer, stir and wait for 30 seconds.
- 2 Press the  button when you finish the previous step to start the second calibration.
- 3 Repeat the steps for performing the 1-point calibration to finish the 2-point calibration.

3.2.3 Perform 3-point calibration

Repeat the steps for performing a 2-point calibration to perform a 3-point calibration using a third buffer.

If you use an a-AB41PH model, you can repeat the previous steps and continue to finish a 5-point calibration.

3.2.4 Perform an ORP electrode calibration

To perform an ORP calibration:

- 1 Prepare the electrode according to the instructions in the electrode manual. Connect the electrode to the meter/analyzer.
- 2 Touch the mode area one or several times to select **ORP**.
- 3 Touch the  icon on the screen.
- 4 Touch **ORP** if you are using an a-AB33M1 model. Skip this step if you are using other models.
- 5 Follow the instruction on the screen to rinse the electrode, place it in a standard solution, stir 5 seconds, and wait for 30 seconds.
- 6 Press the  button when you finish the previous step to start calibration. The  icon on the screen starts to blink during the process.

Note:

- Calibration starts with the Auto End Point Mode.
 - Pressing the  button during the calibration can cancel the process.
- 7 The meter reaches endpoint automatically.
 - a) Touch **Finish** to complete the calibration, and the calibration result will be shown (e.g. 433mV, ± 3 mV, 430mV, 25°C).
 - b) Touch **Recalibration** if you want to re-calibrate and repeat the previous steps.

Note:

- Pressing the  button can cancel the calibration and return to measurement screen.
- Touch the  icon to print the result if you connect the meter to a printer or a computer.

3.3 PH measurement

3.3.1 Measurement modes

3.3.1.1 Auto or Continuous End Point Mode

To switch between the two modes:

1. Touch the **Menu** icon  to enter menu option.
 2. Touch **Setup**, and then touch **Mode**.
 3. Touch **Read type**.
 4. Touch **Auto-Stop** or **Continuous** to confirm your setting.
- When in Continuous Mode, to manually reach a pH measurement, you need to press the  button. Then the  icon and the  icon stop blinking, and the reading freezes.
 - When in Auto End Point Mode, the meter/analyzer determines when the reading is stable. The reading freezes when the  icon stops blinking and the  icon appears on the display.

3.3.1.2 Timed mode (a-AB41PH)

a-AB41PH model supports timed measurement mode. Use this mode to measure samples during the time period you set. The available time interval is from 5 seconds to 24 hours.

To set up the timed period:

1. Touch the **Menu** icon  to enter menu option.
2. Touch **Setup**, and then touch **Mode**.
3. Touch **Read type**.
4. Touch **Timed**. **Time interval 00 (hour):00 (minutes):05 (seconds)** is displayed.
5. Press the  or  button to switch between different numbers. When you see the number you want, touch on the **00:00:00** area to confirm your setting of the hour. Then repeat these two step to finish setting all the time interval.

To start the timed measurement:

1. On the measurement screen, find the reminder "**The countdown starts: 00:00:05**" which suggests the timed period is set successfully. (The timed period varies according to the time you set in the previous steps.)
2. Press the  button to start the measurement.
3. The meter will automatically store the measurement result during the timed period and export to your printer or computer if they are connected to the meter. After the timed period, for example, if you set 5 seconds as the timed period, the meter will automatically start a new round of 5 seconds measurement.
4. Press the  button to end the measurement.

3.3.2 PH measurement

- 1 Place the electrode in the sample, stir for 5 seconds and then wait for 30 seconds.
- 2 Press the  button to start the pH measurement, the  icon starts to blink during the measurement.
- 3 When the meter reaches endpoint (the  icon appears on the display, and the  icon stops blinking.), it will display the pH value and the temperature.

Note:

- In Continuous End Point Mode, you need to press the  button to manually end the measurement.
- Touch the  icon to print the result if you connect the meter to a printer or a computer.

3.3.3 mV and ORP measurement

- 1 Touch the mode area on the screen to switch between **mV** and **ORP** measurement.
- 2 Follow the same procedure as for pH measurement.

3.3.4 Temperature measurement

For better accuracy, we recommend to use either a built-in or a separate temperature electrode.

- If a temperature electrode is used, ATC and the sample temperature are displayed.
- If the meter does not detect a temperature electrode, it automatically switches to the manual temperature compensation mode and MTC appears. MTC temperature should be set.

Note: a-AB33PH and a-AB33M1 model support to use MTC mode even if a temperature electrode is used. If MTC mode is selected, it will continue to display MTC.

Note: the meter accepts NTC 30 k Ω temperature electrode. ATC (Auto Temperature Compensation) or MTC (Manual Temperature Compensation), the Temperature Compensation only corrects for the change in the output of the electrode, not for the change in the actual solution. This means the meter corrects the signal (mV) from the electrode to get a more accurate pH value according to the real temperature.

4. Conductivity Operation (a-AB33M1 and a-AB33EC)

This chapter is for a-AB33M1 and a-AB33EC models which support conductivity measurement.

4.1 Conductivity setup

4.1.1 Set cell K value

The cell K value is usually recorded in the factory inspection report or marked on the electrode cable.

To set the Cell K value:

1. Touch the **Menu** icon  to enter menu option.
2. Touch **Setup**, and then touch **Conductivity**.
3. Touch **Cell K**.
4. Press the  or  button to adjust the value. Touch the value on the screen to confirm your setting.

After calibration, if the result is within $\pm 20\%$ of the cell K value you set, the screen will display , indicating the electrode is in good condition. If the result is out of the range, the screen will display , indicating the electrode needs cleaning.

4.1.2 Set calibration standard solution

The six predefined standard solutions are 10 $\mu\text{S/cm}$, 84 $\mu\text{S/cm}$, 146.5 $\mu\text{S/cm}$, 500 $\mu\text{S/cm}$, 1413 $\mu\text{S/cm}$ and 12.88 mS/cm .

To set the standard solution:

1. Touch the **Menu** icon  to enter menu option.
2. Touch **Setup**, and then touch **Conductivity**.
3. Touch **Std.Solution**, and then touch the standard solution you want to confirm your setting. Press the  button to turn to the next page if the solution is not in the first page.

4.1.3 Set reference temperature

To set the reference temperature:

1. Touch the **Menu** icon  to enter menu option.
2. Touch **Setup**, and then touch **Conductivity**.
3. Touch **Ref.Temp.**.
4. Touch the reference temperature you want to confirm your setting.

Note: The calculation formula from F to C is: $C = 5/9 (F - 32)$.

4.1.4 Set temperature coefficient

To set the temperature coefficient:

1. Touch the **Menu** icon  to enter menu option.
2. Touch **Setup**, and then touch **Conductivity**.
3. Press the  button to turn to the next page and then touch **Temp.Coeff.**.
4. Press the  or  button to adjust the value. Touch the value on the screen to confirm your setting.

Note:

If you set the temperature correction coefficient value as 0.0 %/°C, there will be no temperature compensation for the conductivity measurement. The meter will display the real conductivity value at current temperature without compensation.

4.1.5 Set TDS factor

To set the TDS factor:

1. Touch the **Menu** icon  to enter menu option.
2. Touch **Setup**, and then touch **Conductivity**.
3. Press the  button to turn to the next page and then touch **TDS Factor**.
4. Press the  or  button to adjust the value. Touch the value on the screen to confirm your setting.

4.2 Conductivity calibration

Set the calibration standard solution and cell K value before performing the calibration. Please refer to the above **Set calibration standard solution** and **Set cell K value** section for details.

To start calibration:

1. Touch the mode area one or several times to select **EC**.
2. Touch the  icon on the screen.
3. Touch **COND** if you are using an a-AB33M1 model. Skip this step if you are using other models.
4. Follow the instruction on the screen to rinse the electrode, place it in a standard solution, stir 5 seconds, and wait for 30 seconds.
5. Press the  button when you finish the previous step to start calibration. The  icon on the screen starts to blink during the process.

Note:

- Calibration starts with the Auto End Point Mode.
 - Pressing the  button during the calibration can cancel the process.
6. The meter reaches endpoint automatically. The screen will display the calibration point EC value (e.g. 12.88) with the temperature.
 - a) Touch **Finish** to complete the calibration, and the calibration result will be shown.

- b) Touch **Recalibration** if you want to re-calibrate and repeat the previous steps.

Note:

- Press the  button to exit calibration and return to measurement screen.
- Touch the  icon to print the result if you connect the meter to a printer or a computer.

Note:

To ensure the most accurate conductivity readings, you should verify your cell constant with a standard solution before measurement and recalibration if necessary. Always use fresh standards.

For STCON3, the normal cell constant range is 1.50 – 2.00. (e.g. 1.71 /cm) if the cell constant is out of the range due to an improper calibration, you may need to recover to factory settings (check **i-Steward menu** chapter for details), and then repeat calibration.

4.3 Conductivity measurement

To switch between Auto and Continuous Modes before measurement, please refer to **Auto or Continuous End Point Mode** section for details.

To start measurement:

- 1 Place the electrode in the sample, stir for 5 seconds and then wait for 30 seconds.
- 2 Press the  button to start the conductivity measurement, the  icon starts to blink during the measurement.
- 3 When the meter reaches endpoint (the  icon appears on the display and the  icon stops blinking.), it will display the conductivity value and the temperature.

Note: in Continuous End Point Mode, you need to press the  button to manually end the measurement.

4.4 TDS, SAL (Salinity) and RES (resistivity) measurement

- 1 Touch the mode area on the screen one or several times to switch between **TDS**, **SAL** and **RES** mode.
- 2 Follow the same procedure as for conductivity measurement.

5. Dual channel measurement (a-AB33M1)

a-AB33M1 model supports dual channel measurement. This mode helps users to perform pH and conductivity measurement at the same time and view both measurement results simultaneously through a split display.

5.1 Auto endpoint mode

When in Auto endpoint mode:

1. Press the  button to start the dual channel measurement. The  icon starts to blink during the measurement.
2. When the  icon blinks twice, it indicates the reading of one channel has reached the endpoint. The result will be automatically stored.
3. When the  icon blinks twice again, both channels have reached the endpoint and the measurement ends. The display will show the measurement result.

Note:

- Touch the  icon to print the result if you connect the analyzer to a printer or a computer.
- Press the  button to start a new measurement.

5.2 Continuous reading mode

When in continuous reading mode:

1. Press the  button to start the dual channel measurement. The  icon and the  icon start to blink during the measurement.

The blinking of the  icon indicates that the measurement result will be exported continuously to a computer if you connect one to the analyzer, while the result will not be stored to the analyzer.

Note:

During the export, the frequency of the pH channel is 2Hz, while the frequency of the conductivity channel is 1Hz.

2. Press the  button to end the measurement.

6. User management

User management helps to manage measurement results and parameter settings by different users.

The meter/analyzer provides 10 users. User ID 0 refers to the admin account.

User management cannot be accessed during measurement.

6.1 User management (a-AB33M1, a-AM33PH and a-AB33EC)

To switch between different users:

1. Touch  on the screen.
2. Press the  or  button to select between different user IDs. Touch  when you see the ID number you want to confirm your setting.

6.2 User management (a-AB41PH)

AB41PH model provides password protection for user management, preventing unauthorized access to the meter.

6.2.1 Switch between different users

1. Touch  on the screen.
2. Press the  or  button to select between different user IDs. Touch  when you see the ID number you want to confirm your setting.
3. The display shows the following:

Enter Password

0.0.0.0

Enter the password of the user. The initial password for all users is **0.0.0.0**.

- If the password remains the initial one, touch on the **0.0.0.0** area five times to confirm.
 - If you've changed the password before, press the  or  button to switch between 0-9. When you see the number you want, touch on the **0.0.0.0** area to confirm your input. Then repeat these two step to input all the numbers.
4. If the password is correct, the meter will return to the measurement screen with the user ID you select displayed. If the password is incorrect, the meter will require you to re-enter.

6.2.2 Change password

1. Touch  on the screen.
2. Press the  or  button to select between different user IDs. Touch  when you see the ID number you want to change password for.
3. Enter the old password. If the old password is correct, the meter will require you to enter a new password.

Note:

- Please refer to the above **Switch between different users** section for how to enter password.
- If the password is wrong, the meter will require you to re-enter.

4. Then enter the same new password again to confirm. If the modification is successful, you will see 'Modify Password - Successful' on the screen.

Note: If you enter the new password differently for the two times, the meter will require you to re-enter the new password.

7. Records management

The meter/analyzer can record 1000 sets of measurement results from 0 to 999. If the record is full, the oldest record will be automatically overwritten.

To enter records management:

1. Touch  on the screen, and then press the  or  button to view each record.
2. Touch  on the screen to print the record if you connect the meter/analyzer to a printer or a computer.
3. Touch  again to exit and return to the measurement screen.

Please check the following table for the total number of measurement and calibration records each model supports.

Table 7-1 Records management

Model	Maximum Measurement Records	Maximum Calibration Records
AB33PH	1000	1 pH calibration result and 1 ORP calibration result
AB33EC	1000	1 conductivity calibration result
AB33M1	1000	1 pH calibration result, 1 ORP calibration result and 1 conductivity calibration result
AB41PH	1000	10 pH calibration and ORP calibration results

Note: The calibration records are separate and not included in the 1000 sets of measurement records.

8. Menu

Touch the **Menu** icon  to enter the meter/analyzer's setup menu.

8.1 Setup menu

Enter this menu to set the meter/analyzer's parameters. The default settings are in bold.

Table 8-1 Setup menu

Menu	Sub-Menu	Sub-Menu Options	Options
Setup	Mode	Read type	Auto-Stop , Continuous, Timed (a-AB41PH)
		Stability	SmartStability , Fast, Medium, Slow (a-AB41PH)
		Average	Auto Smart , OFF
	pH (a-AB33M1, a-AB33PH, a-AB41PH)	Resolution	0.1, 0.01 , 0.001 (a-AB41PH)
		Buffer group	USA , JJG, DIN, EU, Merck
	Conductivity (a-AB33M1, a-AB33EC)	Cell K	0.01~10.0 (the default is 0.1 (a-AB33EC) and 1.75 (a-AB33M1))
		Std.Solution	10 µS/cm, 84 µS/cm (a-AB33EC), 146.5 µS/cm, 500 µS/cm, 1413 µS/cm (a-AB33M1) and 12.88 mS/cm.
		Ref.Temp.	20°C(68°F), 25°C(77°F)
		Temp.Coeff.	0.0~10.0%/°C (the default is 2.0%/°C)
		TDS Factor	0.01~5.0 (the default is 0.50)
	Temperature	Temp.unit	°C , °F
		Enter temp.value	5.0~60.0°C(41.0~140°F) (the default is 25.0°C/77.0°F)
		Temp.cal (a-AB41PH)	0~100°C (32~212°F)

Read type

Set the endpoint mode.

Auto-Stop = the meter/analyzer determines when the reading is stable and reaches the endpoint automatically.

Continuous = the meter/analyzer keeps measuring and users manually end the measurement.

Timed (a-AB41PH) = the meter/analyzer keeps measuring during the time period users set.

Note: for detailed information about the three endpoint modes, please refer to **Measurement modes** section.

Stability

Set measurement accuracy.

SmartStability = the meter/analyzer determines stabilization time automatically.

Fast = faster stabilization time with less stability.
 Medium = normal stabilization time with normal stability.
 Slow (a-AB41PH) = slower stabilization time with more stability.

Each selection's specific algorithm is as follows:

Table 8-2 Stability algorithm

Selection	Algorithm
Smart stability with 0.1 resolution or 1 significant digit	When the difference between the maximum value and the minimum value of the measurement result within 4 seconds is less than 0.5pH or 0.6mV, the meter/analyzer will consider the result as stable.
Smart stability with 0.01 resolution or 2 significant digit	When the difference between the maximum value and the minimum value of the measurement result within 6 seconds is less than 0.08pH or 0.15mV, the meter/analyzer will consider the result as stable.
Smart stability with 0.001 resolution or 3 significant digit	When the difference between the maximum value and the minimum value of the measurement result within 8 seconds is less than 0.01pH or 0.1mV, the meter/analyzer will consider the result as stable.
Fast stability	When the difference between the maximum value and the minimum value of the measurement result within 4 seconds is less than 0.5pH or 0.6mV, the meter/analyzer will consider the result as stable.
Medium stability	When the difference between the maximum value and the minimum value of the measurement result within 6 seconds is less than 0.08pH or 0.15mV, the meter/analyzer will consider the result as stable.
Slow stability (a-AB41PH)	When the difference between the maximum value and the minimum value of the measurement result within 8 seconds is less than 0.01pH or 0.1mV, the meter/analyzer will consider the result as stable.

Note: please enter the following PH resolution menu to set resolution mentioned in the first three selections in the table.

Average

Enable or disable average.

Auto Smart = the meter/analyzer calculates the average automatically. This selection helps to reach measurement stability faster.

OFF = disabled.

PH (a-AB33M1, a-AB33PH, a-AB41PH)

Resolution

0.1

0.01

0.001 (a-AB41PH)

Note: please refer to **Select a pH resolution** section for details.

Buffer group

USA

JJG
DIN
EU
Merck

Note: please refer to **Select a predefined buffer group** section for details.

Conductivity (a-AB33M1, a-AB33EC)

Cell K

0.01~10.0

The default value is 0.1 for a-AB33EC model and 1.75 for a-AB33M1 model.

The cell K value of the compatible conductivity electrode AquaSeareacher series is as follows:

Series	Cell K value
STCON7	0.08-0.1
STCON3	1.5-2.0

Note: please refer to **Set cell K value** section for details of the cell K value setting.

Standard solution (Std.Solution)

10uS/cm

84uS/cm (a-AB33EC)

146.5 μ S/cm,

500uS/cm

1413uS/cm (a-AB33M1)

12.88mS/cm

Note: please refer to **Set calibration standard solution** section for details of the standard solution setting.

Reference temperature (Ref.Temp.)

20°C (68°F)

25°C (77°F)

Note: please refer to **Set reference temperature** section for details of the reference temperature setting.

Temperature coefficient (Temp.Coeff.)

0.0~10.0%/°C (the default is **2.0%/°C**)

Note: please refer to **Set Temperature coefficient** section for details of the temperature coefficient setting.

TDS Factor: 0.01~5.0 (the default is **0.50**)

Note: please refer to **Set TDS factor** section for details of the TDS factor setting.

Temperature

Temperature unit

°C

°F

Enter temperature value (Enter temp.value)

5.0~60.0°C (41.0~140°F) (the default is **25.0°C/77.0°F**)

Note: please refer to **Set temperature unit and temperature** for details of the temperature setting.

Temperature calibration (Temp.cal)

Enter this menu to set calibration temperature if the temperature measured by your electrode is incorrect or you change to a different temperature probe to use.

NIST-traceable thermometers should be used to measure and verify the temperature to enter. Please carefully inspect the certified thermometers to ensure that they conform to the specifications and are certified against NIST standards.

For how to use NIST-traceable thermometers to measure the temperature and input the temperature to the meter:

1. Put the electrode connected to the meter to a known and temperature stable solution.
2. Put the NIST thermometer to the same solution to measure temperature.
3. Wait for the meter's temperature to become stable and check against the temperature measured by the NIST thermometer.
4. If you need to enter the temperature measured by the NIST thermometer to the meter, touch the **Menu** icon  to enter menu option.
5. Touch **Setup**, and then touch **Temperature**.
5. Touch **Temp.cal**. Press the  or  button to adjust the value. Touch the value on the screen to confirm your setting.

The available temperature value is: 0~100°C (32~212°F)

8.2 i-Steward menu

Enter this menu to set electrode condition parameters. The default settings are in bold.

Table 8-3 i-Steward menu

Menu	Sub-Menu	Options
i-Steward	Cal.Due Alarm	OFF, 1 day, 7 days , 14 days
	PH ECS	/
	Cal log list (a-AB41PH)	/
	Self-Test	/
	Log Clear (a-AB41PH)	/
	Reset (a-AB41PH)	Factory reset
		Parameter reset
		Reset password

Calibration due alarm (Cal.Due Alarm)

Enter this menu to enable or disable calibration alarm.

OFF = disabled

1 day = the meter/analyzer will warn if no calibration within 1 day after the last calibration.

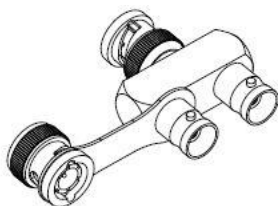
- 7 days** = the meter/analyzer will warn if no calibration within 7 days after the last calibration.
- 14 days** = the meter/analyzer will warn if no calibration within 14 days after the last calibration.

PH electrode check system (PH ECS)

Enter this menu to check the condition of your PH electrode.

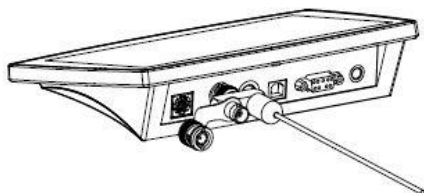
To perform the check:

1. Take out the optional ECS tester connector, and remove the cover of the BNC shorting cap on the connector.

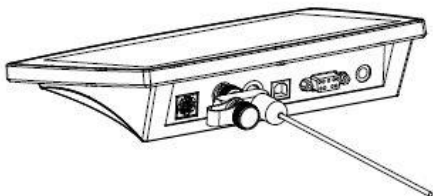


Note: you can contact an authorized OHAUS dealer to purchase the ECS tester connector.

2. Connect the ECS tester to the meter/analyzer's pH/mV socket as demonstrated in the following graphic.



3. Touch the **Menu** icon  to enter menu option.
4. Touch **i-Steward**, and then touch **PH ECS**.
5. Make preparation for the electrode according to the display on the screen, and then press the  button when you finish to continue.
6. Waite for the reading to stabilize. When you see the screen displays "Parallel 100 mΩ resist, keep in pH 4.01 buf", close the cover of the BNC shorting cap on the connector as demonstrated in the following graphic. Press the  button when you finish to continue.



7. The display shows the result. The meter/analyzer will display if your electrode is in good condition or not

Self-test

Enter this menu to test if the touch screen, and the buttons function normally.

To perform the test:

1. Touch the **Menu** icon  to enter menu option.
2. Touch **i-Steward**, and then touch **Self-Test**.
3. Disconnect electrodes and attach the included BNC shorting cap to the meter/analyzer's pH/mV socket if you use an a-AB33M1, a-AB33PH or a-AB41PH model. Press the  button when you finish to continue. Skip this step if you use other models.
4. Wait for the reading to stabilize and then enter the testing the screen step. Check the display to see if all the icons are displayed normally.
5. Press the  button to enter the next step to test the touchpad. Touch all the icons on the screen one by one. Their disappearances from the screen indicate that the touchpad functions normally.
6. Press the  or  button one by one according to the reminder on the screen. If all the above steps have been passed, the meter/analyzer will show a reminder that the self-test has passed.
7. Press the  or  button to return to the main menu.

If your meter/analyzer does not pass the self-test and show errors. You can contact an OHAUS technical support agent for help.

Calibration log list (Cal log list) (a-AB41PH)

Enter this menu to view the latest 10 calibration results.

Note: This function is only available for a-AB41PH.

To view the calibration result:

1. Touch the **Menu** icon  to enter menu option.
2. Touch **i-Steward**, and then touch **Cal log list**.
3. The display shows the first calibration record. Press the  or  button to select between different records, and then touch on the calibration data on the screen to view the calibration result.

Log Clear (a-AB41PH)

Enter this menu to clear all the measurement logs. This feature is only visible to the administrator (user ID 0).

1. Touch the **Menu** icon  to enter menu option.
2. Touch **i-Steward**, and then touch **Log Clear**.
3. Press the  button to confirm the deletion, or press the  button to cancel the deletion.

4. If you press the  button in the previous step, wait for the display to show the finish of the process. After that, press the  button or the  button to return to the setup menu.

Note: This function is only available for a-AB41PH.

Reset (a-AB41PH)

This feature is only visible to the administrator (user ID 0).

Note: This function is only available for a-AB41PH.

Factory reset

Enter this sub-menu to reset the meter to its factory default settings.

To reset:

1. Touch the **Menu** icon  to enter menu option.
2. Touch **i-Steward**, and then touch **Reset**.
3. Touch **Factory reset**. The screen displays the reset information.
4. Press the  button to confirm, or press the  button to cancel.

Parameter Reset

Enter this sub-menu to reset all the parameters under **Setup** menu.

To reset:

1. Touch the **Menu** icon  to enter menu option.
2. Touch **i-Steward**, and then touch **Reset**.
3. Touch **Parameter reset**. The screen displays the reset information.
4. Press the  button to confirm, or press the  button to cancel.

Reset password

Enter this sub-menu to reset user password.

1. Touch the **Menu** icon  to enter menu option.
2. Touch **i-Steward**, and then touch **Reset**.
3. Touch **Reset password**. The screen displays the user ID of which to reset. Press the  or  button to switch between different user IDs.
4. Touch the number of the user ID on the screen to confirm your selection. The meter will reset the password to 0000 for the user.

8.3 Settings menu

Enter this menu to set the meter/analyzer's settings. The default settings are in bold.

Table 8-4 Settings menu

Menu	Sub-Menu	Options	
Settings	Language	English , Espanol, Francais, 中文, Türkçe, pyccck, Portuguese	
	RS232	Export to	PC , Printer
		Baud Rate	38400, 19200, 9600 , 4800, 2400, 1200
		Parity	7 Even, 7 Odd, 7 None, 8 None
		Stop Bits	1 bit , 2 bit
		Handshake	None , Xon/Xoff
	Date/Time	Time Format	12H Clock, 24H Clock
		Date Format	MM/DD/YY , DD/MM/YY, YY/MM/DD
		Adjustment	/
	Brightness	High, Medium , Low	
	Keypad Beep	ON, OFF	
	Auto Shut Off	OFF, 15, 30	
	About meter	/	

Language

Set the language displayed for menus and messages.

English

Espanol

Francais

中文

Türkçe

pyccck

Portuguese

RS232

Export to

Set where to export measurement data:

Printer = export to a printer.

PC = export to a computer.

Baud Rate

Set the baud rate (bits per second).

1200 = 1200 bps

2400 = 2400 bps

4800 = 4800 bps

9600 = 9600 bps

19200 = 19200 bps

38400 = 38400 bps

Parity

Set the data bits and parity.

7 EVEN	= 7 data bits, even parity
7 ODD	= 7 data bits, odd parity
7 NONE	= 7 data bits, no parity
8 NONE	= 8 data bits, no parity

Stop bit

Set the number of stop bits.

1 bit	= 1 stop bits
2 bit	= 2 stop bits

Handshake

Set the flow control method.

None	= no handshaking
Xon/Xoff	= XON/XOFF software handshaking

Date/Time**Time format**

Set the time format.

12H Clock	= 12 hours
24H Clock	= 24 hours

Date Format

Set the date format.

MM/DD/YY	= Month/Date/Year
DD/MM/YY	= Date/Month/Year
YY/MM/DD	= Year/Month/Date

Adjustment

Enter this menu to adjust data and time.

1. Touch the **Menu** icon  to enter menu option.
2. Touch **i-Steward**, and then touch **Adjustment**.
3. The first two digits of date on the upper left corner of the screen starts to blink.
4. Press the  or  button to adjust the date. Touch **Next** on the screen when you finish to adjust the next digits of date and time.
5. Then touch **Next** again until all the digits have been adjusted, and the meter/analyzer returns to the main menu.

Brightness

Enter this menu to Increase or decrease the display brightness under different lighting conditions.

High	= high brightness
Medium	= medium brightness
Low	= low brightness

Keypad Beep

Enter this menu to enable or disable the beep sound when pressing buttons.

ON	= enabled beep sound
OFF	= disabled beep sound

Auto Shut Off

Enter this menu to set up automatic shutdown time. The meter/analyzer will shut down if no operation during the time period you set.

OFF = disabled

15 = the meter/analyzer will shut down after 15 minutes of no operation.

30 = the meter/analyzer will shut down after 30 minutes of no operation.

Note: during auto or continuous measuring modes, the meter/analyzer will not perform this operation.

About meter

Enter this menu to check the meter's model, serial number and software version.

9. Printing

9.1 Print format

Note: In the following tables, number and item columns are only for illustration to explain the printing content and will not be printed out in the final result.

Table 9-1 PH calibration

Number	Item	Printing Content
1	Meter Model	AB33PH/AB33M1/AB41PH
2	Serial Number	XXXXXXXXXX
3	Software Revision	X.XX
4	Channel	pH
5	Mode	pH
6	Date & Time	2020/9/25 14:34
7	Cal Point	1~5
8	Repeated for each point-to-point	Cal Point Index
9		pH Value
10		pH Unit
11		mV Value
12		mV Unit
13		Temperature Value
14		Temperature Unit
15	Slope Value	XXX.X
16	Slope Unit	%
17	Offset Value	XXX.X
18	Offset Unit	mV
19	Calibration ID (a-AB41PH)	#1~#10

Table 9-2 ORP calibration

Number	Item	Printing Content
1	Meter Model	AB33PH/AB33M1/AB41PH
2	Serial Number	XXXXXXXXXX
3	Software Revision	X.XX
4	Channel	pH
5	Mode	ORP
6	Date & Time	2020/9/25 14:34
7	ORP mV Value	XXX.X
8	ORP mV Unit	mv
9	Offset mV value	XX.X
10	Offset mV unit	mv
11	Reference mV value	XXX.X
12	Reference mV value unit	Rmv
13	Temperature Value	25
14	Temperature Unit	C°, F°
15	Temperature Type	ATC/MTC
16	Calibration ID	#1

Table 9-3 Conductivity calibration

Number	Item	Printing Content
1	Meter Model	AB33PH/AB33M1/AB41PH
2	Serial Number	XXXXXXXXXX
3	Software Revision	X.XX
4	Channel	Cond
5	Mode	Cond
6	Date & Time	2020/9/25 14:34
7	Conductivity Value	XX.X
8	Conductivity Unit	uS/cm
9	Conductance Value	XX.X
10	Conductance Unit	uS
11	Temperature Value	XX.X
12	Temperature Unit	C°, F°
13	Temperature Type	ATC/MTC
14	Calibration Type	Manual
15	Cell Constant	X.X
16	Calibration ID	#1

Table 9-4 PH measurement

Number	Mode		Printing Content
	pH	mV	
1	Meter Model		AB33PH/AB33M1/AB41PH
2	Serial Number		XXXXXXXXXX
3	Software Revision		X.XX
4	User ID		0~9
5	Date & Time		2020/9/25 14:34
6	Sample ID		000~999
7	Channel		pH
8	Mode		pH, mV
9	pH Value	/	XXX.X
10	pH Unit	/	pH
11	mV Value		XXX.X
12	mV Unit		mV
13	Temperature Value		XX.X
14	Temperature Unit		°C, °F
15	Temperature Type		ATC,MTC
16	Slope Value		XXX.X
17	Slope Unit		%
18	Offset Value		XXX.X
19	Offset Unit		mV

Table 9-5 ORP measurement

Number	Item	Printing Content
1	Meter Model	AB33PH/AB33M1/AB41PH
2	Serial Number	XXXXXXXXXX
3	Software Revision	X.XX
4	User ID	0~9
5	Date & Time	2020/9/25 14:34
6	Sample ID	000~999
7	Channel	pH
8	Mode	ORP
9	ORP Value	XXX.X
10	ORP Unit	RmV
11	Offset mV Value	XXX.X
12	Offset mV Unit	mV
13	Temperature Value	XX.X
14	Temperature Unit	C°, F°
15	Temperature Type	ATC,MTC

Table 9-6 Conductivity measurement

Number	Mode				Printing content
	Conductivity	TDS	SALT	RES	
1	Meter Model				AB33EC/AB33M1
2	Serial Number				XXXXXXXXXX
3	Software Revision				X.XX
4	User ID				0~9
5	Date & Time				2020/9/25 14:34
6	Sample ID				000~999
7	Channel				Cond
8	Mode				Cond, TDS, SALT, RES
9	Conductivity Value	TDS Value	SALT Value	RES Value	XXX.X, XX.XX, X.XXX
10	Conductivity Unit	TDS Unit	SALT Unit	RES Unit	uS/cm, mg/L, psu, Ω .cm
11	Conductance Value				XXX.X, XX.XX, X.XXX
12	Conductance Unit				S
13	Temperature Value				XX.X
14	Temperature Unit				C°, F°
15	Temperature Type				ATC,MTC
16	Temp. Coeff.	Temp. Coeff.	/	Temp. Coeff.	XX.X
17	Temp. Coeff. Unit	Temp. Coeff. Unit	/	Temp. Coeff. Unit	%/°C
18	Ref. Temp.				20C°, 25C° (68F°, 77F°)
19	Ref. Temp. Unit				°C, °F
20	Cell Constant				X.X
21	Cell Constant Unit				/cm

Note:

- When printing out dual channel measurement result, conductivity results will be printed after pH results and they will be shown in the same line.
- In continuous mode, "Continuous" will be used for Sample ID.

9.2 Output format

When printed through a printer, the rows of the printing result will be separated and shown as follows:

The first row: the above item number 1, 2, and 3
 The second row: the above item number 4, 5, 6 and 7
 The third row: the above item number 8, 9, 10, 11 and 12
 The fourth row: the above item number 13, 14 and 15
 The fifth row: the above item number 16, 17, 18 and 19
 The sixth row: the above item number 20 and 21

10. Commands

Commands listed in the following table will be acknowledged by the meter/analyzer.

Table 10-1 Commands

Command Characters	Parameter	Function
SP	/	Print when measurement is stable
LP	LP 0	Print calibration result
	LP 1	Print measurement result
PV	/	Print version number
PSN	/	Print SN number
ON	/	Turn on the meter/analyzer
OFF	/	Turn off the meter/analyzer

11. Maintenance

11.1 Error message

a-AB33PH, a-AB41PH and a-AB33M1 models:

Table 11-1 Error message

Error Code	Possible Cause	Possible Solution
Error 3	Measured buffer temperature out of range (<0 °C or >50 °C)	Keep the pH buffer temperature within the range for calibration.
Error 4	Offset out of range offset > 60mV or < - 60 mV	- Make sure the pH buffer is correct and fresh. - Clean or replace the pH electrode.
Error 5	Slope out of range	- Make sure the buffer is correct and fresh. - Clean or replace the pH electrode.
Error 6	Meter cannot recognize the buffer	- Make sure the buffer is correct and fresh. - Check if the buffer has not been used more than once.
Error 7 (a-AB33M1)	Cell K value out of range	- Make sure the Cell K value set in the menu is in compliance with the cell K value of the electrode you use. - The electrode may be broken or expired, so replace the electrode.

a-AB33EC model:

Table 11-2 Error message

Error Code	Possible Cause	Possible Solution
Error 3	Measured standard temperature out of range (<0 °C or >35 °C)	Keep the standard temperature within the range for calibration
Error 7	Cell K value out of range	- Make sure the Cell K value set in the menu is in compliance with the cell K value of the electrode you use. - The electrode may be broken or expired, so replace the electrode.

Note: If an error happens, the meter will **beep 2 times** to alert.

11.2 Meter maintenance

Never unscrew the two halves of the housing!

The meter does not require any maintenance other than occasional wipe with a damp cloth and the replacement of depleted batteries.

The housing is made of acrylonitrile butadiene styrene (ABS). This material does not hold up well to some organic solvents such as toluene, xylene and methyl ethyl ketone (MEK). Any spillage should be immediately wiped off.

11.3 Electrode maintenance

11.3.1 PH electrode maintenance

Make sure the electrode is filled with electrolyte solution. Always store the electrode according to the electrode instruction manuals and do not allow it to dry out. It is necessary to store a pH electrode in a solution in order to keep the glass membrane of the pH electrode hydrated. Ideally a storage solution should be used. Never store an electrode in distilled or deionized water.

If the electrode response becomes sluggish or the slope is not acceptable, try the following:

- Soak the electrode in 0.1M HCl for at least 8 hours.
- For fat or oil contaminant, degrease the membrane with cotton wool soaked in either acetone or a soap solution.

After electrode treatment, a new calibration should be performed. If the electrode slope is still not acceptable, the electrode might need to be replaced.

11.3.2 Conductivity electrode maintenance

Conductivity Cell Storage

Conductivity cells can be stored in distilled or deionized water between measurements. For overnight storage or long-term storage, conductivity cells should be thoroughly rinsed and stored dry.

Conductivity Probe Maintenance

Cleaning recommendations:

Table 11-3 Cleaning

Contaminant	Cleaning Solution	Cleaning Time
Water soluble contaminants	Rinse with deionized water	No limit
Lubricants and oils	Soak in warm water about 60°C and liquid detergent	10 to 30 minutes
Lime or hydroxide coating	Soak in 10% acetic acid or 10% hydrochloric acid	10 to 30 minutes

11.4 Cleaning



WARNING: Electric Shock Hazard. Disconnect the equipment from the power supply before cleaning.
Make sure that no liquid enters the interior of the instrument.



Attention: Do not use solvents, harsh chemicals, ammonia or abrasive cleaning agents.

The housing may be cleaned with a cloth dampened with a mild detergent if necessary.

12. Technical data

12.1 Specifications

Equipment Ratings:

Indoor use only

Altitude: Up to 2000m

Operating temperature: 5 to 40°C

Humidity: Maximum relative humidity 80% for temperatures up to 31 °C decreasing linearly to 50% relative humidity at 40°C.

Electrical supply: 12VDC, 0.5A. (For use with certified or approved power supply, which must have a SELV and limited energy output.)

Voltage fluctuations: Mains supply voltage fluctuations up to $\pm 10\%$ of the nominal voltage.

Overvoltage category
(Installation category): II

Pollution degree: 2

Table 12-1 Specification 1

Benchtop Model	a-AB33M1, a-AB33PH, a-AB33EC	a-AB41PH
Display Type	6.5" Segment & Dot matrix LCD with backlight	
Multilanguage User Interface	English, Spanish, French, Portuguese, Chinese, Russian and Turkish	
Measurement Channels	1 to 2	1
Measurement End-point Modes	Auto-stop, Continuous	Auto-stop, Timed, Continuous
Datalog for Measurement	1000 sets data points with time and date stamp	
Datalog for Calibration	Last calibration	10 sets
Keypad	Capacitive touch	
Output	Connect to PC via RS232 and USB, Connect to Printer via RS232.	
pH Electrode Input	BNC	
Conductivity input	Mini-Din	
Temperature Input	Cinch, NTC 30 k Ω	
Installation Overvoltage	Category II	
Pollution	Degree 2	
Power Supply	Power input: 100-240V~ 200mA 50-60Hz 12-18VA Power output: 12 VDC 0.5A	
Net Weight	2.5 kg/5.5lb	
Gross Weight	2.8 kg/7.2lb	
Transportation Size	370 x 270 x 250 mm/14.56X10.63X9.84 in	

Table 12-2 Specification 2

pH Meter Model		a-AB33PH	a-AB41PH
Measurement Channels		pH/mV/ORP with temperature	
PH	Measuring Range	-2.00 to 16.00 pH	-2.000 to 20.000 pH
	Resolution	0.1/0.01 pH	0.1/0.01/0.001 pH
	Resolution Switch	Yes	
	Accuracy	± 0.01 pH	± 0.002 pH
	Pre-Defined Buffer Groups	3	5
ORP, RmV	Measuring Range	± 2000.0 mV	± 2000.0 mV
	Resolution	1 mV	0.1 mV
	Accuracy	± 1 mV	± 0.3 mV
	Units	mV, RmV	
Temperature	Measuring Range	-5.0 to 110°C,	-10.0 to 125.0 °C
		23°F to 230°F	14°F to 257°F
	Resolution	0.1 °C, 0.1 °F	
	Accuracy	± 0.5 °C, ± 0.5 °F	± 0.3 °C, ± 0.3 °F
Calibration	Calibration	No	1 point calibration offset
	Calibration points	Up to 3 points	Up to 5 points
	Calibration Sign	Slope/offset & face	
Calibration mode		Linear	

Table 12-3 Specification 3

Conductivity Meter Model		a-AB33EC
Measurement Channels		Conductivity/TDS/Salinity/Resistivity with temperature
Conductivity	Measuring Range	0.01 $\mu\text{S/cm}$ to 19.99 $\mu\text{S/cm}$ 20 $\mu\text{S/cm}$ to 199.9 $\mu\text{S/cm}$ 200 $\mu\text{S/cm}$ to 1999 $\mu\text{S/cm}$ 2.00 mS/cm to 19.99 mS/cm 20.0 mS/cm to 199.9 mS/cm
	Resolution	0.01 $\mu\text{S/cm}$ minimum; auto ranging
	Accuracy	$\pm 0.5\%$ Reading ± 2 LSD
	Reference Temperature	20 °C, 25 °C
	Cell Constants	0.01 to 10.00 cm^{-1}
	Temperature Compensation	Linear (0 to 10.0%/°C), off
TDS	Measuring range	0.1 mg/L to 200 g/L
	Resolution	0.01 mg/L minimum, auto ranging
	Accuracy	$\pm 0.5\%$ Reading ± 2 LSD
	TDS Factor Range	Linear, 0.04 to 10.00, default 0.5
Resistivity	Measuring range	1 to 100 $\text{M}\Omega\text{-cm}$
	Resolution	0.01 $\Omega\text{-cm}$ auto ranging
	Accuracy	$\pm 0.5\%$ Reading ± 2 LSD
Practical Salinity	Measuring range	0 to 100 psu
	Resolution	0.01 psu minimum, auto ranging
	Accuracy	$\pm 0.5\%$ Reading ± 2 LSD
Temperature	Measuring Range	-5.0 to 110.0°C, 32.0 °F to 212.0 °F
	Resolution	0.1 °C, 0.1 °F
	Accuracy	$\pm 0.3\text{ °C}$, $\pm 0.3\text{ °F}$
	Calibration	No
Calibration	Calibration points	1 point cell constant calibration; 6 buffers available (10, 84, 146.5, 500, 1413 $\mu\text{S/cm}$, 12.88 mS/cm)
	Calibration Sign	Cell constant & face
	Calibration mode	Linear

Table 12-4 Specification 4

pH and Conductivity Analyzer Model		a-AB33M1
Measurement Channels		pH/mV/ORP/Conductivity/TDS/ Salinity/Resistivity with temperature
PH	Measuring Range	-2.00 to 20.00 pH
	Resolution	0.01 pH
	Resolution Switch	Yes
	Accuracy	± 0.01 pH
	Pre-Defined Buffer Groups	5
ORP, Redox	Measuring Range	± 2000.0 mV
	Resolution	0.1mV
	Accuracy	± 0.5 mV
	Units	mV, RmV
Conductivity	Measuring Range	0.01 µS/cm to 19.99 µS/cm 20 µS/cm to 199.9 µS/cm 200 µS/cm to 1999 µS/cm 2.00 mS/cm to 19.99 mS/cm 20.0 mS/cm to 500.0 mS/cm
	Resolution	0.01 µS/cm minimum; auto ranging
	Accuracy	± 0.5 % Reading ± 2 LSD
	Reference Temperature	20 °C, 25 °C
	Cell Constants	0.001 to 10.000 cm ⁻¹
	Temperature Compensation	Linear (0 to 10.0%/°C), off
TDS	Measuring range	0.1mg/L to 199.9 g/L
	Resolution	0.01 mg/L minimum, auto ranging
	Accuracy	± 0.5 % Reading ± 2 LSD
	TDS Factor Range	Linear, 0.01 to 10.00, default 0.5
Resistivity	Measuring range	2 to 100 MΩ-cm
	Resolution	0.01 Ω-cm auto ranging
	Accuracy	± 0.5 % Reading ± 2 LSD
Practical Salinity	Measuring range	0 to 100 psu
	Resolution	0.01 psu minimum, auto ranging
	Accuracy	± 0.5 % Reading ± 2 LSD
Temperature	Measuring Range	-5.0 to 110°C, 23°F to 230°F
	Resolution	0.1 °C, 0.1 °F
	Accuracy	± 0.3 °C, ±0.3 °F
	Calibration	No
Calibration	Calibration points	Up to 5 points for pH; 1 point cell constant calibration; 6 buffers available(10, 84, 146.5, 500, 1413 µS/cm, 12.88mS/cm)
	Calibration Sign	Slope/offset & Cell constant & face
	Calibration mode	Linear

12.2 Dimensions

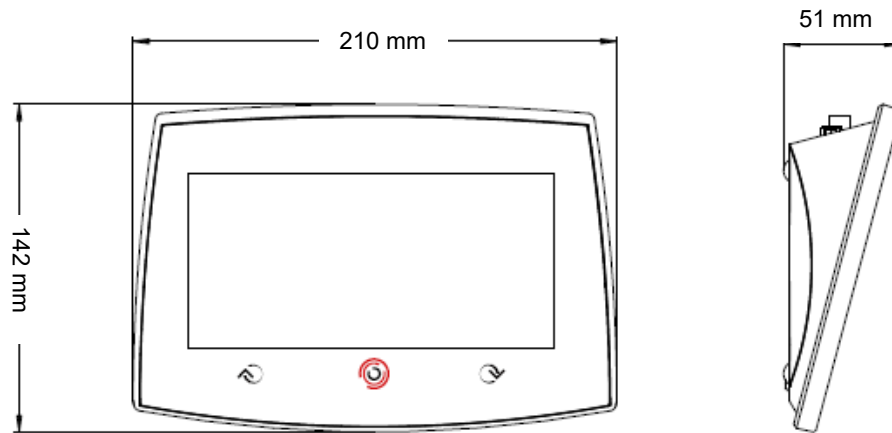


Figure 12-5 Dimensions

13. Appendix

13.1 PH buffer groups

The meter/analyzer automatically corrects for the temperature dependence of the buffer group of the pH value given in the following tables.

Table 13-1 Buffer group: USA standard

Temp °C	pH1.68	pH4.01	pH7.00	pH10.00
5	1.67	4.01	7.09	10.25
10	1.67	4	7.06	10.18
15	1.67	4	7.04	10.12
20	1.68	4	7.02	10.06
25	1.68	4.01	7	10.01
30	1.68	4.01	6.99	9.97
35	1.69	4.02	6.98	9.93

Table 13-1 Buffer group: JJG standard

Temp °C	pH4	pH6.86	pH9.18	pH12.45
5	3.99	6.95	9.4	12.73
10	4	6.93	9.33	12.67
15	4	6.89	9.27	12.59
20	4	6.88	9.23	12.52
25	4	6.86	9.18	12.45
30	4.01	6.85	9.14	12.36
35	4.02	6.84	9.1	12.25

Table 13-2 Buffer group: Europe standard

Temp °C	pH2.00	pH4.01	pH7.00	pH9.21	pH11.00
5	2.02	4.01	7.09	9.45	11.72
10	2.01	4	7.06	9.38	11.54
15	2	4	7.04	9.32	11.36
20	2	4	7.02	9.26	11.18
25	2	4.01	7	9.21	11
30	1.99	4.01	6.99	9.16	10.82
35	1.99	4.02	6.98	9.11	10.64
40	1.98	4.03	6.97	9.06	10.46
45	1.98	4.04	6.97	9.03	10.28
50	1.98	4.06	6.97	8.99	10.1

Table 13-3 Buffer group: MERCK (Ref. 20°C)

Temp °C	pH2.00	pH4.00	pH7.00	pH9.00	pH12.00
5	2.01	4.04	7.07	9.16	12.41
10	2.01	4.02	7.05	9.11	12.26
15	2	4.01	7.02	9.05	12.1
20	2	4	7	9	12
25	2	4.01	6.98	8.95	11.88
30	2	4.01	6.98	8.91	11.72
35	2	4.01	6.96	8.88	11.67
40	2	4.01	6.95	8.85	11.54
45	2	4.01	6.95	8.82	11.44
50	2	4	6.95	8.79	11.33

Table 13-4 Buffer group: DIN (19266) (Ref. 25°C)

Temp °C	pH1.09	pH4.65	pH6.79	pH9.23	pH12.75
5	1.668	4.004	6.95	9.392	13.207
10	1.67	4.001	6.922	9.331	13.003
15	1.672	4.001	6.9	9.277	12.81
20	1.676	4.003	6.88	9.228	12.627
25	1.68	4.008	6.865	9.184	12.454
30	1.685	4.015	6.853	9.144	12.289
35	1.691	4.026	6.845	9.11	12.133
40	1.697	4.036	6.837	9.076	11.984
45	1.704	4.049	6.834	9.046	11.841
50	1.712	4.064	6.833	9.018	11.705

13.2 Conductivity standards

Table 13-5 Conductivity standards

Temp °C	10 µS/cm	84 µS/cm	146.5 µS/cm	500 µS/cm	1413 µS/cm	12.88 mS/cm
5	6.1 µS/cm	53 µS/cm	93 µS/cm	315 µS/cm	896 µS/cm	8.22 mS/cm
10	7.1 µS/cm	60 µS/cm	106 µS/cm	360 µS/cm	1020 µS/cm	9.33 mS/cm
15	8.0 µS/cm	68 µS/cm	119 µS/cm	403 µS/cm	1147 µS/cm	10.48 mS/cm
20	9.0 µS/cm	76 µS/cm	133 µS/cm	452 µS/cm	1278 µS/cm	11.67 mS/cm
25	10.0 µS/cm	84 µS/cm	146.5 µS/cm	500 µS/cm	1413 µS/cm	12.88 mS/cm
30	11.0 µS/cm	92 µS/cm	161 µS/cm	549 µS/cm	1552 µS/cm	14.12 mS/cm
35	12.1 µS/cm	101 µS/cm	176 µS/cm	603 µS/cm	1667 µS/cm	15.39 mS/cm

13.3 Examples of temperature coefficients (α -value)

Table 13-6 Temperature coefficient examples

Substance at 25 °C	Concentration [%]	Temperature coefficient α [%/°C]
HCl	10	1.56
KCl	10	1.88
CH ₃ COOH	10	1.69
NaCl	10	2.14
H ₂ SO ₄	10	1.28
HF	1.5	7.2

α -coefficients of conductivity standards for a calculation to a reference temperature of 25°C

Table 13-7 α -coefficients of conductivity standards

Standard	Measurement temp.: 15°C	Measurement temp.: 20°C	Measurement temp.: 30°C	Measurement temp.: 35°C
84 μ S/cm	1.95	1.95	1.95	2.01
1413 μ S/cm	1.94	1.94	1.94	1.99
12.88 mS/cm	1.90	1.89	1.91	1.95

14. Compliance

Compliance to the following standards is indicated by the corresponding mark on the product.

Mark	Standard
	This product complies with the applicable harmonized standards of EU Directives 2011/65/EU (RoHS), 2014/30/EU (EMC), 2014/35/EU (LVD). The EU Declaration of Conformity is available online at
	This product complies with the EU Directive 2012/19/EU (WEEE). Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment.
	EN 61326-1

ISED Canada Compliance Statement:

CAN ICES-003(A) / NMB-003(A)

ISO 9001 Registration

The management system governing the production of this product is ISO 9001 certified.

FCC Supplier Declaration of Conformity

Unintentional Radiator per 47CFR Part B
Trade Name: OHAUS CORPORATION
Model or Family identification: Aquascercher a-AB

FCC Compliance Statement:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.