OHAUS®

# Multi-parameter Analyzer
# a-AB33M1

## Bench PH Meter
## a-AB33PH
## a-AB41PH

## Bench Conductivity Meter
## a-AB33EC

## Instruction Manual

# Contents

# 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;<br>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

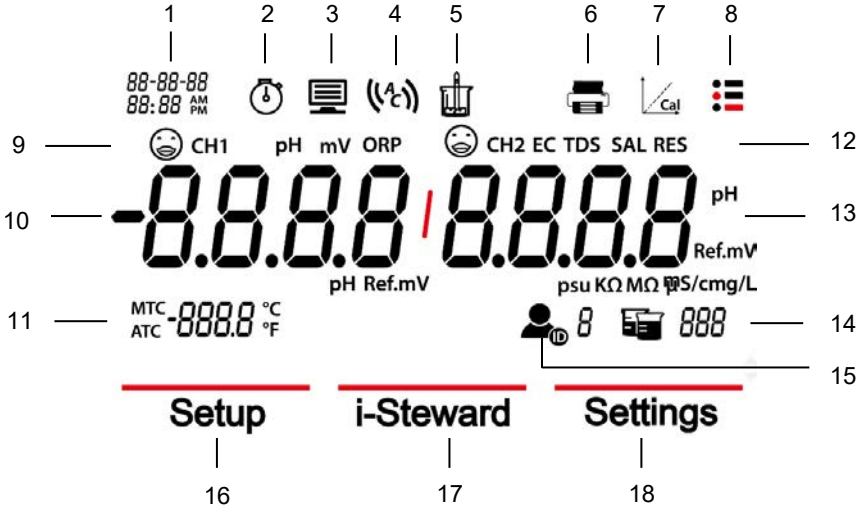



Figure 1-1 Touch screen

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** .
5. **Measurement icon**: blinks when measurement is in progress.
6. **Pinter 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%<br>and offset: ± (0-15) mV.<br>Electrode condition is good. | Slope: 90-95%<br>or offset: ± (15-35) mV.<br>Electrode condition is acceptable. | Slope: less than 90%<br>or offset: ± (35-60) mV.<br>Electrode condition is not good or needs cleaning. |

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

| | |
|---|---|
| ☺ | ☹ |
| Calibration result: within ± 20% of the set cell K value. | Calibration result: out of ± 20% of the set cell K value. |
| Electrode condition is good. | 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.

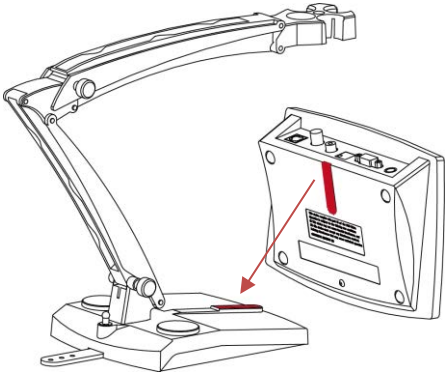
**Down Button**:

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.

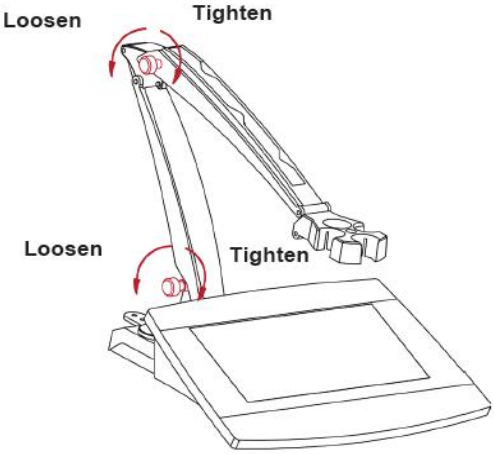
# 2. Installation

## 2.1 Install the stand-alone electrode holder

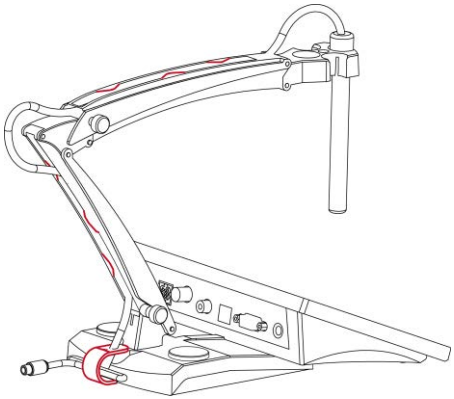
1. Attach the magnetic part on the bottom of the meter to the magnetic part on the stand-alone electrode holder to finish installation. (Both marked in red demonstrated below.)



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.

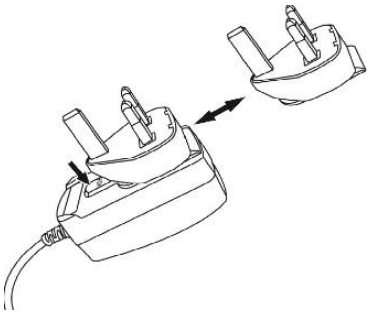


Figure 2-1 Change power adapter plug

## 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.

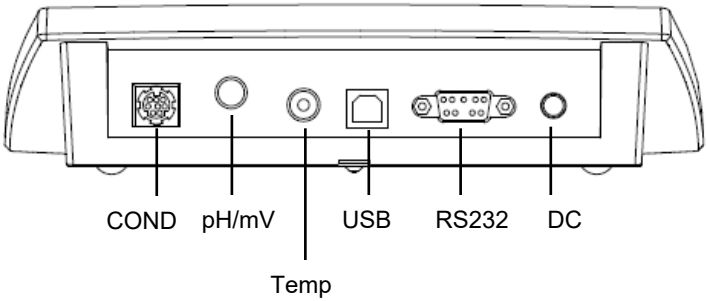



Figure 2-2 a-AB33M1 sockets

**a-AB33PH / a-AB41PH**

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

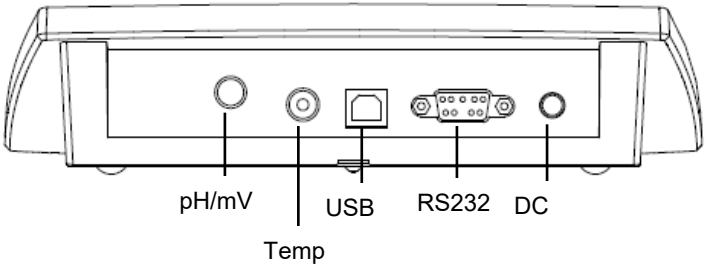



Figure 2-3 a-AB33PH / a-AB41PH sockets

**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.

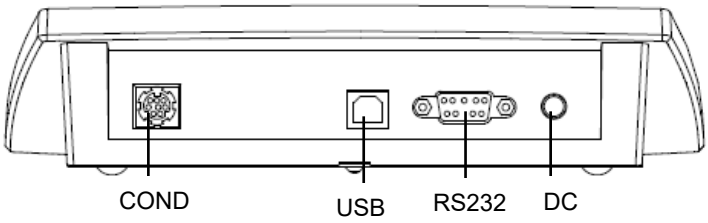



Figure 2-4 a-AB33EC sockets

# 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 ℃ or ℉ 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 ℉ to ℃ is: °C = 5/9 (°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, ±3mV, 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 kΩ 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 ± 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 µS/cm, 84 µS/cm, 146.5 µS/cm, 500 µS/cm, 1413 µS/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 ℉ to ℃ is: ℃ = 5/9 (℉ - 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 Cal 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%/℃ (the default is **2.0%/℃**) |
| | | TDS Factor | 0.01~5.0 (the default is **0.50**) |
| | Temperature | Temp.unit | **℃** , °F |
| | | Enter temp.value | 5.0~60.0℃(41.0~140°F) (the default is **25.0℃/77.0°F**) |
| | | Temp.cal (a-AB41PH) | 0~100℃ (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 µS/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%/℃ (the default is **2.0%/℃**)
**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
**℃**
℉

**Enter temperature value (Enter temp.value)**
5.0~60.0℃ (41.0~140℉) (the default is **25.0℃/77.0℉**)
**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℃ (32~212℉)

## 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)

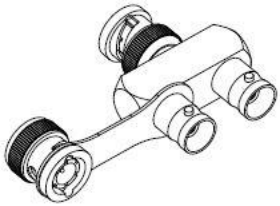
Enter this menu to enable or disable calibration alarm.
OFF = disabled
1 day = the meter/analyzer will warn if no calibration within 1 day after the last calibration.

**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)

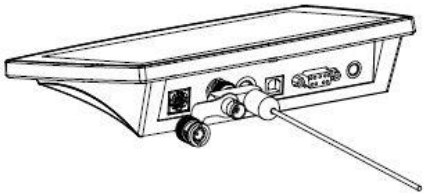
Enter this menu to check the condition of your PH electrode.
To perform the check:

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

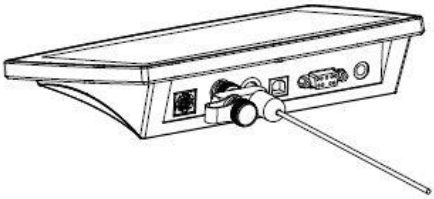


**Note**: you can contact an authorized OHAUS dealer to purchase the ECS tester connector.

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, русск, 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
русск
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 | 1 |
| 9 | | pH Value | X.XX |
| 10 | | pH Unit | pH |
| 11 | | mV Value | XX.X |
| 12 | | mV Unit | mV |
| 13 | | Temperature Value | XX.X |
| 14 | | Temperature Unit | C°, F° |
| 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 | | ℃, ℉ |
| 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 | %/℃ |
| 18 | Ref. Temp. | | | | 20C°, 25C° (68F°, 77F°) |
| 19 | Ref. Temp. Unit | | | | ℃, ℉ |
| 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.<br>• Clean or replace the pH electrode. |
| Error 5 | Slope out of range | • Make sure the buffer is correct and fresh.<br>• Clean or replace the pH electrode. |
| Error 6 | Meter cannot recognize the buffer | • Make sure the buffer is correct and fresh.<br>• 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.<br>• 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.<br>• The electrode may be broken or expired, so replace the electrode. |

**Note**: If an error happens, the meter will **beep 2 times** to alert.
If the troubleshooting section does not resolve your problem, contact an OHAUS technical support agent. For assistance in the United States, call toll-free 1-800-526-0659 between 8:00 AM and 5:00 PM Eastern Standard Time. An OHAUS Technical Support Specialist will be available to assist you. Outside the USA, please visit our website www.ohaus.com to locate the OHAUS office nearest you.

## 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℃ 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 ±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 kΩ | |
| Installation Overvoltage | Category II | |
| Pollution | Degree 2 | |
| Power Supply | Power input: 100-240V~ 200mA 50-60Hz 12-18VA<br>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 | ± 2000.0mV |
| | 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 | No | 1 point calibration offset |
| Calibration | 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 µS/cm to 19.99 µS/cm<br>20 µS/cm to 199.9 µS/cm<br>200 µS/cm to 1999 µS/cm<br>2.00 mS/cm to 19.99 mS/cm<br>20.0 mS/cm to 199.9 mS/cm |
| | Resolution | 0.01 µS/cm minimum; auto ranging |
| | Accuracy | ± 0.5 % Reading ± 2 LSD |
| | Reference Temperature | 20 °C, 25 °C |
| | Cell Constants | 0.01 to 10.00 $cm^{-1}$ |
| | Temperature Compensation | Linear (0 to 10.0%/ºC), off |
| TDS | Measuring range | 0.1 mg/L to 200 g/L |
| | Resolution | 0.01 mg/L minimum, auto ranging |
| | Accuracy | ± 0.5 % Reading ± 2 LSD |
| | TDS Factor Range | Linear, 0.04 to 10.00, default 0.5 |
| Resistivity | Measuring range | 1 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 110.0°C,<br>32.0 °F to 212.0 °F |
| | Resolution | 0.1 °C, 0.1 °F |
| | Accuracy | ± 0.3 °C, ±0.3 °F |
| | Calibration | No |
| Calibration | Calibration points | 1 point cell constant calibration; 6 buffers available (10, 84, 146.5, 500, 1413 µS/cm, 12.88mS/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<br>20 µS/cm to 199.9 µS/cm<br>200 µS/cm to 1999 µS/cm<br>2.00 mS/cm to 19.99 mS/cm<br>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%/ºC), 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,<br>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

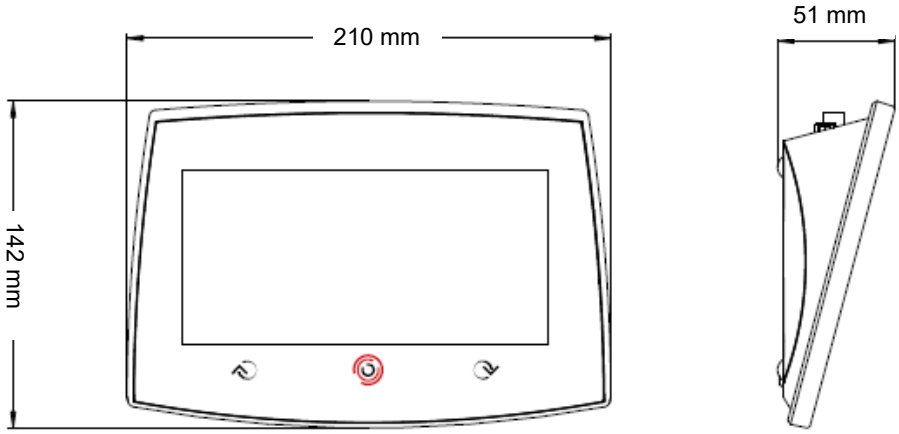



Figure 12-5 Dimensions

# 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 ℃ | 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 ℃ | 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 ℃ | 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 ℃ | 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 ℃ | 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 ℃ | 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 |
| CH3COOH | 10 | 1.69 |
| NaCl | 10 | 2.14 |
| H2SO4 | 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 µS/cm | 1.95 | 1.95 | 1.95 | 2.01 |
| 1413 µS/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 |
|---|---|
| CE | 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 www.ohaus.com/ce. |
|  | 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. For disposal instructions in Europe, refer to www.ohaus.com/weee. |
|  | 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: Aquasercher a-AB

**Issuing Party that Assembled the Product:**
Ohaus Instruments (Changzhou) Co., Ltd.
2F, 22 Block, 538 West Hehai Road, Xinbei District, Changzhou
Jiangsu 213022
China
Phone: +86 519 85287270

**Responsible Party – U.S. Contact Information:**
Ohaus Corporation
7 Campus Drive, Suite 310
Parsippany, NJ 07054
United States
Phone: +1 973 377 9000
Web: www.ohaus.com

**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.



OHAUS Corporation