

## The warranty period extension method 1 year → 2 years

The warranty period will be extended from 1 year to 2 years when you register customer information. ATAGO Logger NFC can also be downloaded at the same time.

## Digital Hand-held "Pocket" pH Meter

# PAL-pH

Cat.No. 4311

**ATAGO**  
Instruction Manual

### Parts



Sample stage

Apply samples on the electrode in the center of the sample stage.

Glass electrode

Reference electrode

LOD  
Measurement results and remaining battery charge are displayed.

START button (Power button)

Press to take measurements and hold down to turn off the display.

CAL button

Press to perform calibration.

START button &amp; CAL button

Press to set date, time, and delete data history.

Battery compartment

Place and remove batteries from here.

Lanyard hole

### Contents

Main unit...1      Calibration Report...1      AAA batteries...2  
Standard solution for calibration...pH4.01...1    pH6.86...1    pH9.18...1      PAL Silicone Cover...1

ATAGO instruments are rigorously inspected to ensure each unit meets the highest standards of quality assurance.

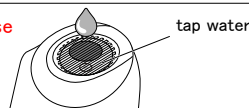
### Introduction

Thank you for purchasing the instrument. Carefully read and follow all instructions. Keep this manual for future reference. A small amount of solution may leak from the reference electrode. This is normal and does not affect the unit's performance.

#### Important: Please Read and Follow Instructions Carefully Before Initial Use

Place plenty of tap water and leave it for a while.

※Dry electrodes will result in abnormal measurement values.



### ●Safety Instructions

Read and follow all safety instructions before operating the instrument. Failure to comply with the following instructions may result in personal injury or property damage.

#### ⚠WARNING

- ◇Ensure safety when handling hazardous materials. Observe precautionary measures and use protective equipment. Be aware of the hazards of such chemicals and emergency response guidelines.
- ◇ATAGO may not be held liable for any injury or damage arising in connection with handling of hazardous materials during the use of the instrument.
- ◇Do not drop the instrument or subject it to strong physical shock.
- ◇Do not attempt to repair, modify, or disassemble the instrument.

#### ⚠CAUTION

- ◇Carefully read this manual to have basic knowledge of the function of each component.
- ◇ATAGO is not liable for any loss and damage caused by the measurement and use of this instrument.
- ◇ATAGO shall not be held responsible for any or all damages that may result from using the instrument for those other than its intended purpose (measurement of pH level of a liquid sample).
- ◇If the standard solution for calibration comes in contact with hands or skin, immediately rinse with plenty of water.
- ◇The glass electrode is fragile; be careful not to damage it. Glass shards may cause injury.

- ◇Do not use metal tools, such as a spoon, as they may scratch the glass electrode, resulting in erroneous measurements.
- ◇Do not measure organic solvents, oils, adhesives, cement, alcohol, surfactants, polymer solvents or hydrogen fluoride.
- ◇Do not use water above 50°C to rinse the instrument.
- ◇Only use the specified battery type. Observe proper polarities, properly aligning the anodes and cathodes.
- ◇Store the instrument away from direct sunlight/heat sources and excessive amounts of dust/debris.
- ◇Do not expose the instrument to a rapid change in ambient temperature.
- ◇Do not subject the instrument to strong vibration.
- ◇Do not place the instrument under anything heavy.
- ◇Loosen the battery compartment cover for air transportation.

(International Protection Classification IP65)

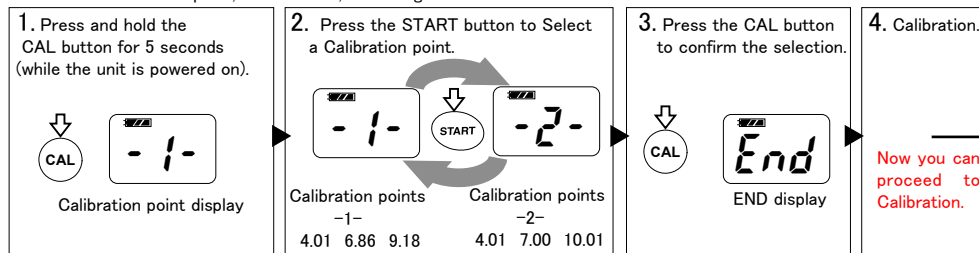
◇The instrument is water-resistant, not waterproof, and should not be submerged.

(Chemical Resistance of Body Case)

◇The body case is made of PC. Do not expose it to water vapor or solvents. See the list of "Solvents Harmful to Body Case."

### How to Select a Calibration Option

Select the Calibration option, either 1 or 2, according to values of the standards.



### Calibration

Calibration points -1-

Calibration can be done at 3 points (pH 4.01, pH 6.86, and pH 9.18).

If the sample is above pH 6.9, calibration can be done at 2 points (pH 6.86 and pH 9.18).

If the sample is less than pH 6.9, calibration can be done at 2 points (pH 4.01 and pH 6.86).

Press the CAL button to perform calibration for either pH 4.01, pH 6.86, or pH 9.18.

\* If the power is not turned on, press the START button to turn on the power, then perform the following procedure.

Calibration points -2-

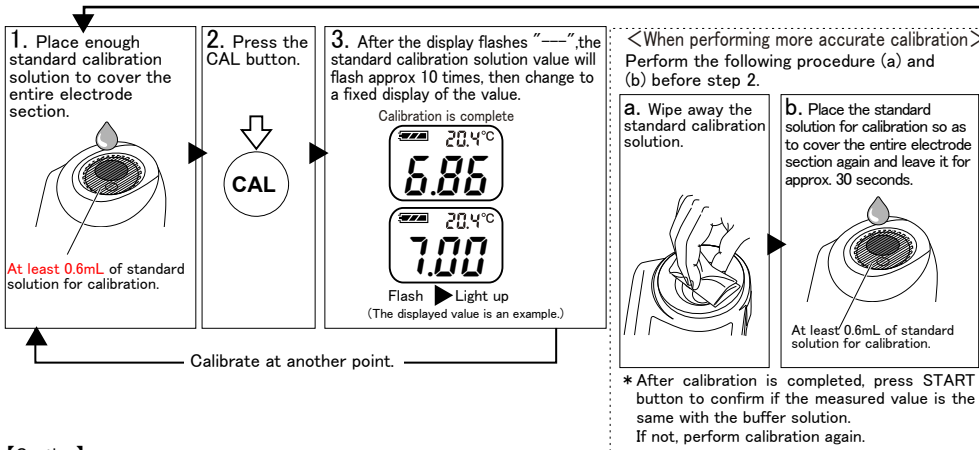
Calibration can be done at 3 points (pH 4.01, pH 7.00, and pH 10.01).

If the sample is above pH 7.0, calibration can be done at 2 points (pH 7.00 and pH 10.01).

If the sample is less than pH 7.0, calibration can be done at 2 points (pH 4.01 and pH 7.00).

Press the CAL button to perform calibration for either pH 4.01, pH 7.00, or pH 10.01.

\* If the power is not turned on, press the START button to turn on the power, then perform the following procedure.



#### [Caution]

- ◇Perform calibration before initial use and at least once a month to maintain precision and accuracy.
- ◇Measure a standard calibration solution. When the measurement value falls outside of the expected range, perform calibration.
- ◇When the time lapsed since last measurement is more than 2 weeks, it is recommended to calibrate the instrument.
- ◇If the ambient temperature changes during the daily work with this instrument, it needs the calibration again.

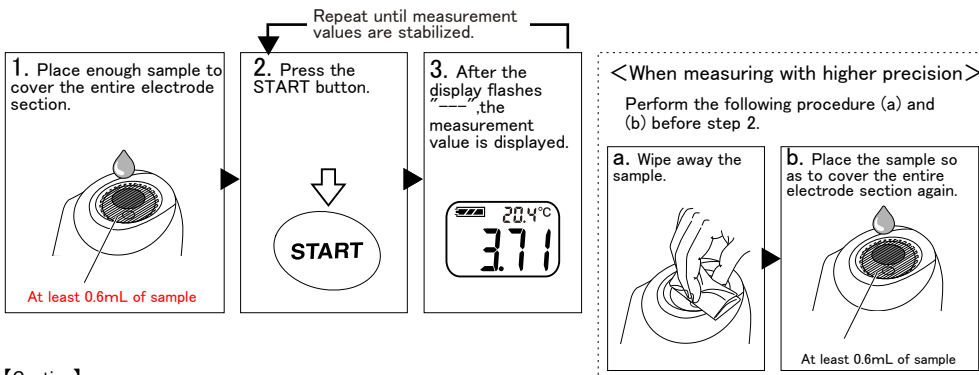
Additional refills of standard solutions for calibration can be purchased from ATAGO (sold separately).

Contact ATAGO for recommended standard solutions.

[Part No.]	Standard solution for calibration	[Part No.]	Standard solution for calibration
RE-99210	pH4.01 (volume: 500mL per bottle)	RE-99214	pH10.01 (volume: 500mL per bottle)
RE-99211	pH6.86 (volume: 500mL per bottle)	RE-99230	10mL pH4.01/pH6.86/pH9.18
RE-99212	pH7.00 (volume: 500mL per bottle)	RE-99231	10mL pH4.01/pH7.00/pH10.01
RE-99213	pH9.18 (volume: 500mL per bottle)		

### Measurement

\* If the power is not turned on, press the START button to turn on the power, then perform the following procedure.



#### [Caution]

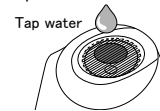
- ◇Do not splash water above 50°C. The plastic may warp, which may compromise the water resistance.
- When measuring hot samples, place only the necessary amount and do not let it overflow from the sample stage well.
- When hot water is necessary to clean off hardened samples, use water-soaked gauze around the sample stage and keep hot water away from the body case.
- ◇In rare cases, a measurement value may be displayed even if there is not sample placed on the electrode section. In such instances, simply place some sample on the electrode section and press the START button. Measurements will be taken normally.
- ◇When measuring samples such as strong acids and high alkaline, take a quick measurement and rinse off any remaining sample with tap water.

<LCD Auto Shut-off>

The instrument will turn itself off after 5 minutes of inactivity. To manually turn it off, hold down the START button for more

### Calibration and Measurement Guidelines

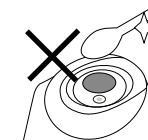
◇When the electrodes are dry after long period of not being used



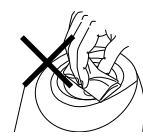
Tap water

Place plenty of tap water and leave it for a while.

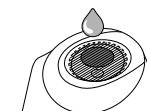
◇Do not damage the electrodes. Do not use metal tools.



◇Be careful not to scratch the electrodes.



◇The insufficient amount of sample will result in abnormal measurement or calibration.



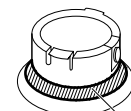
At least 0.6mL

◇Initial measurements may fluctuate with hot or cold samples. Wait for the instrument to acclimate to the sample temperature, then press the START button. Alternatively, press the START button multiple times until measurements become stable.

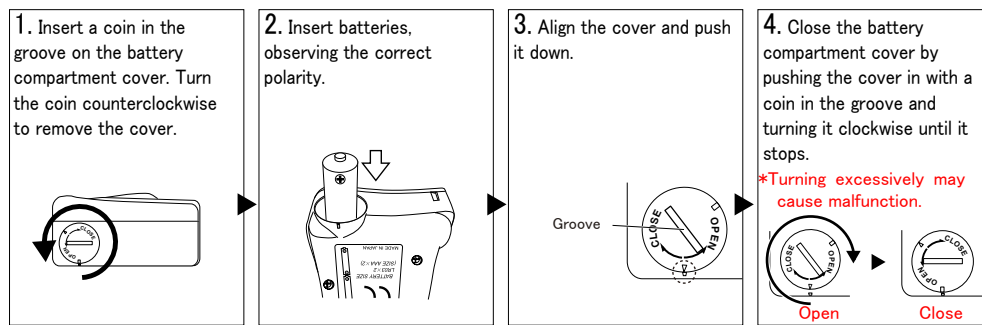
### Replacing the Batteries

#### [Caution]

- ◇Please remove the tape in the battery compartment before first use.
- ◇Fasten the battery compartment cover tightly to prevent water ingress or poor connection, which will cause erroneous measurements. Push the cover in firmly and turn.
- ◇When the O-ring on the cover is dirty or damaged, the water resistance may be compromised.
- ◇When the battery icon indicates the low power level (---), replace both batteries with a brand new set of AAA alkaline batteries (1.5V).
- ◇Static images may occasionally appear on LCD. Such retained pixel charges do not indicate a faulty display, consume the battery power, or affect the instrument's performance in any way.
- ◇Check the expiration dates on batteries before purchase.
- ◇Calibrate the instrument after the batteries are replaced.



O-ring



### Cleaning

#### [Caution]

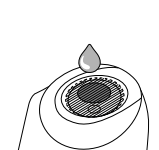
- ◇Do not scratch the electrode.
- ◇The instrument is water-resistant, not waterproof, and should not be submerged.

For samples containing oils or fats:

Clean oily residues on the electrode section with ethyl alcohol. Then rinse the electrode section with tap water thoroughly.



1. Wipe off the sample. (Remove the sample with a plastic pipette.)



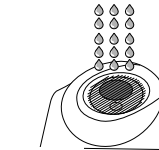
2. Apply tap water. (Repeat several times.)



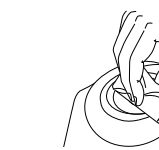
Wipe off the tap water.



1. Wipe off the sample. (Remove the sample with a plastic pipette.)



2. Rinse with tap water.



3. Wipe off the tap water.

### Error Messages

The following messages alert the user when an operation has failed.



The battery is low. Display will turn off after 10 seconds.



The sample measured is outside the measurement range. The START button was pressed with nothing on the electrode section.



The sample measured is outside the measurement range. The START button was pressed with nothing on the electrode section.



The START button was pressed with nothing on the electrode section.



The CAL button was pressed with nothing on the electrode section.



The detection temperature was over 45°C. A pH value was displayed (accuracy is not guaranteed).



The detection temperature was less than 5°C. A pH value was displayed (accuracy is not guaranteed).

## About Data Transmission Function

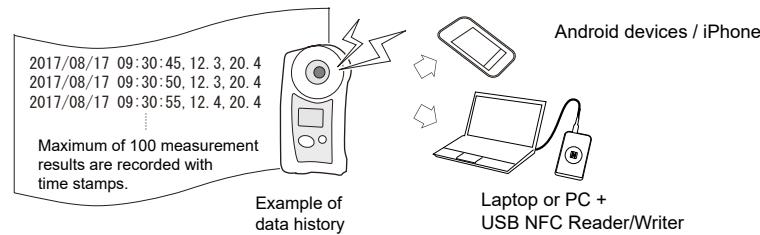
This instrument stores maximum number of 100 measurement data. This instrument is equipped with NFC (Near Field Communication) technology.

Data history can be accessed by bringing PAL-NFC to any Android devices, iPhone or PC-linked USB NFC Reader/Writer\* (in conformance to PC/SC specification).

\* Operation tested with SONY USB NFC Reader  
PaSoRi RC-S380.

### 【Caution】

Data history exceeding 100 will overwrite old activity with new data, replacing the oldest recorded information first.



## Preparation

### (1) Software installation

Install a software to readout the NFC tag ahead of time.

#### Android devices / iPhone

Applicable Application Software (app)

"NFC Reader"

\* If an NFC tag reader app is already installed on the Android devices or iPhone, this app can be used.

2019/01/17 09:30:45	LLL	20.4
2019/01/17 09:31:50	8.31	20.5
2019/01/17 09:32:12	8.25	21.0
2019/01/17 09:34:26	AAA	21.2
2019/01/17 09:43:07	c6.86	22.3
2019/01/17 09:43:18	c4.01	22.5
2019/01/17 09:45:39	5.89	25.1
2019/01/17 09:46:07	5.92	HHH

Example of data history read out

#### Laptop or PC + USB NFC Reader/Writer

Data history can be exported to Microsoft<sup>®</sup> Excel<sup>®</sup> (for Windows<sup>®</sup>) using a PAL NFC software "ATAGO Logger (NFC)."

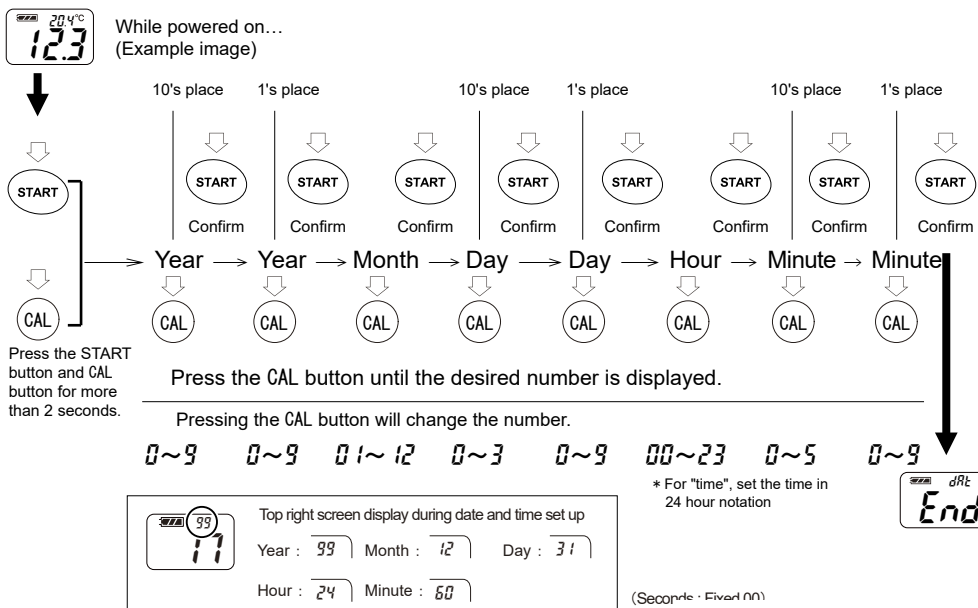
A0135897  
667937E581

Back side of the body  
Instrument's serial number  
UniqueID = Last 10 digits of NFC chip number (NFC's serial number)  
You can use the NFC's serial number to identify which instrument the readings correspond to.  
You can check the NFC chip number (serial number) by using an app that can read the serial number.  
Note: Not all NFC apps capture the NFC's serial number  
Suggested app: "NFC Tools"

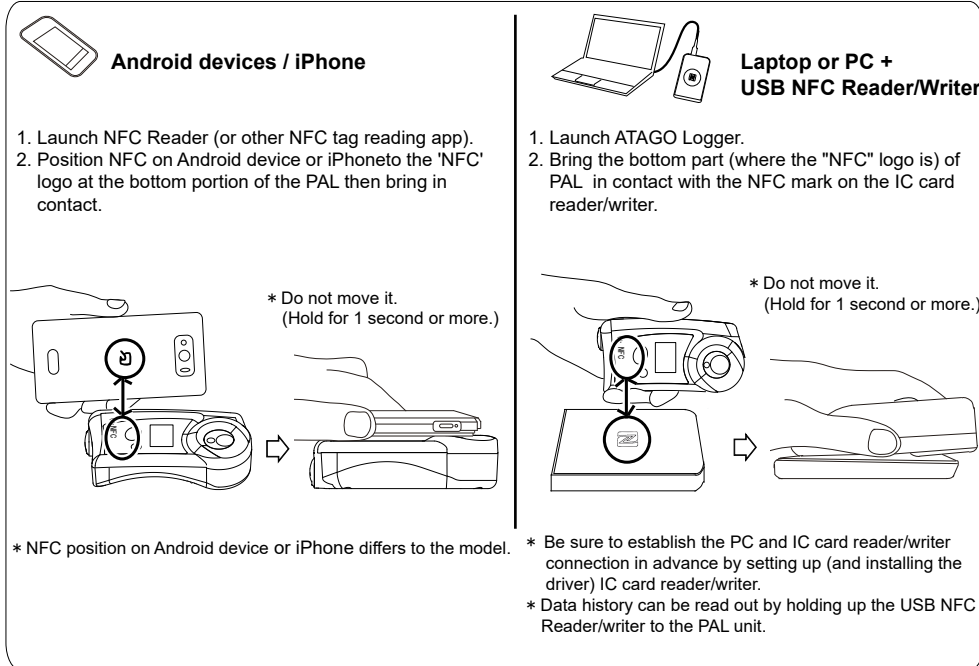
### (2) Date and time setting

Set the date and time (year [the last two digits of the western calendar], month, date, time and minute) prior to data history readout.

【memo】Reset the date and time when batteries are removed for 24hours or more.



## Data history readout



### All recorded data stored in this instrument are read out.

\* If data history is not read out, bring both in contact and move the one that is over the other device in a forward and back or left and right in a small motion.

【Caution】Bring PAL and Android devices, PAL and iPhone or PAL and USB NFC Reader/writer as close to each other as possible. (Position it so that the distance between both devices are 5mm or less.)

【memo】Data history can be read out while PAL is powered off.

【memo】Data history readout will not delete the stored data history.

### Delete data history

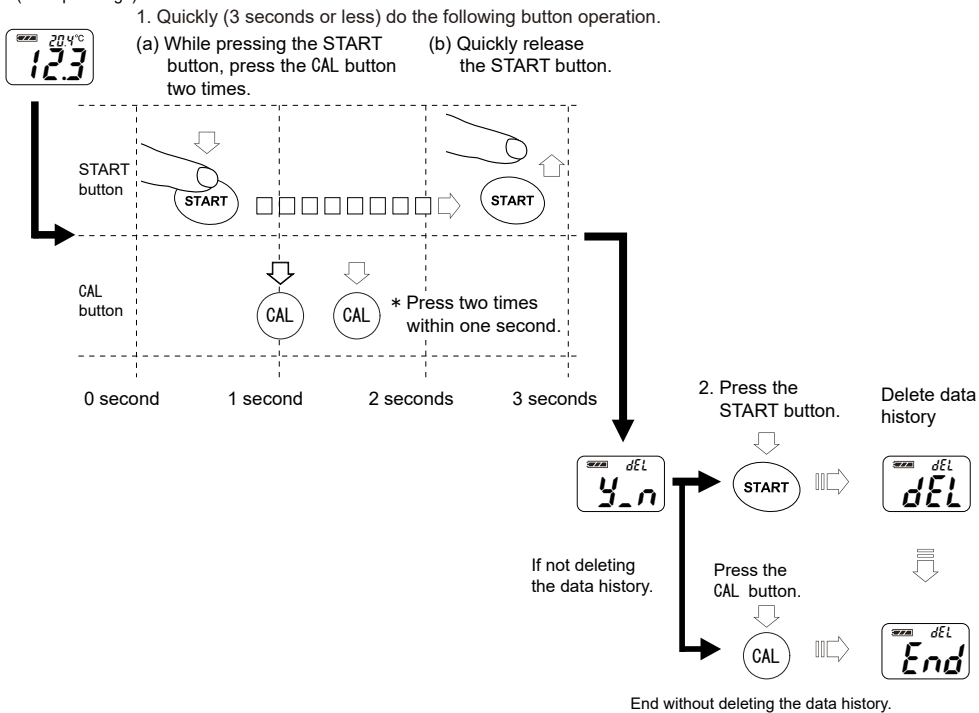
All data history will be deleted from this instrument.

【Caution】Deleted data history can not be restored.

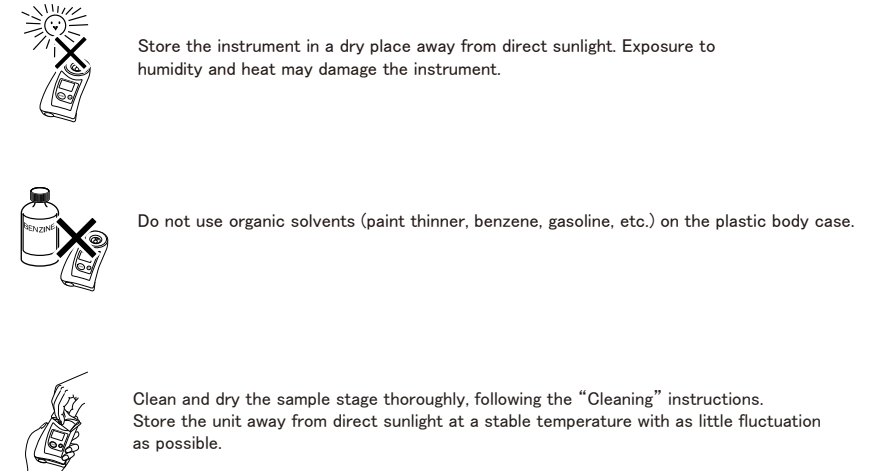
【memo】A data history can not be selected.

While powered on...

(Example image)



## Storage and Maintenance



## Repair and Warranty

The instrument is warranted for one year from the date of purchase.

This warranty is void if the instrument shows evidence of the following. Send the included batteries as well if they are still in use.

- Having been disassembled by unauthorized personnel
- Damages to the electrode section
- Water damage or having been dropped
- Having been misused and/or operated outside the environmental specifications
- Leakage from batteries other than those included with the unit

Repair services are available for a fee after the warranty expires.

Contact an ATAGO authorized service center for service and support.

Please have the serial number information ready when contacting a service center.

## Specifications

Measurement range	pH0.00 to 14.0	Temperature 10 to 40 °C
Resolution	pH0.01	Temperature 0.1 °C
Accuracy	pH±0.10	Temperature ±1 °C
Automatic temperature compensation range	10 to 40°C	
Ambient temperature range	10 to 40°C	
Sample volume	At least 0.6mL	
Calibration	Calibrate at 3 points (6.86, 4.01, 9.18) (7.00, 4.01, 10.01)	
Backlight	The backlight stays on for 30 seconds after any button is pressed.	
Output	NFC Forum Type 4 Tag ISO/IEC 14443 Type A Output category : Date Time, pH, Temp [degC] (e.g.) 2019/01/17 09:30:45, 3.71, 21.3	
Measurement time	Approx. 3 seconds	
Power supply	Size AAA alkaline battery × 2	
International Protection class	IP65 Water resistant	
Dimensions and weight	55(W) × 31(D) × 109(H)mm, 100g (main unit only)	

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