HORIBA Scientific LAQUAtwin

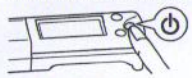
Instruction Manual (Operations)

COMPACT pH METER
pH11, 22, 33

Power ON/OFF

■ Power ON

1. **Press and hold the ON/OFF switch.**
   The power is switched ON, and the meter model number is displayed on the LCD.



■ Power OFF

1. **Press and hold the ON/OFF switch.**
   The power is switched OFF.

Calibration

■ Calibration points

The number of calibration points is dependent on the meter model.

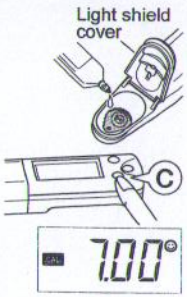
- Up to two-point calibration: pH11
- Up to three-point calibration: pH22
- Up to five-point calibration: pH33

Tip

- **Calibration values are saved even if the meter is switched OFF.**
- **Calibration value is rewritten if calibration is repeated using the same standard solution.**
- **Select the pH standard solutions close to the pH value of sample when the sample is known.**
- **Perform three-point calibration using pH 4.01, pH 7.00 (6.86), and pH 10 (9.18) standard solutions when the sample is unknown.**

■ Multi-point calibration

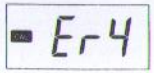
1. **Select USA or NIST standard solutions for the calibration. Refer to "pH buffer set up mode" on the reverse side of this paper. Default is USA standard.**
2. **Open the light shield cover and place some drops of the standard solution on the flat sensor taking care to cover the entire flat sensor.**
   Rinsing the sensor with the standard solution beforehand will provide a more accurate calibration as it will reduce sample crossover contamination.
3. **Close the light shield cover and press the CAL switch.**
   CAL and ☺ blink, and the calibration value is displayed.
   After the calibration is complete, CAL and ☺ stop blinking and the measured value is displayed.
   The calibration value at 25°C is displayed for 1 s and the display moves to the measurement mode automatically.



4. **After the first calibration is complete, open the light shield cover and remove the standard solution. Then remove moisture on the sensor by gently dabbing with a soft tissue.**
5. **Place some drops of the second standard solution on the flat sensor to cover the entire flat sensor.**
6. **Close the light shield cover and press the CAL switch.**
   CAL and ☺ blink.
   After the calibration is complete, CAL and ☺ stop blinking and the measured value is displayed.
   The calibration value at 25°C is displayed for 1 s and the display moves to the measurement mode automatically.
7. **Clean the sensor with tap water and remove moisture by gently dabbing with a soft tissue.**
8. **In the case of carrying out more than two-point calibration, repeat the steps 5. to 7. above.**

● Calibration error

- If CAL blinks and Er4 (error display) appears, the calibration has failed.
  Perform electrode conditioning. Check that the correct standard solution is used, and repeat calibration after cleaning the sensor.



- If the calibration repeatedly fails when using the correct standard solution(s), the sensor may have deteriorated. Replace the sensor with new one (part No.: 3200459834).

Measurement

Refer to the simplified manual on the reverse of the top plastic cover regarding the basic operations of meter.

Auto Stable (AS) Mode: ☺ appears when the measured value meets the stability criteria. If the value changes, ☺ disappears.

Auto Hold (AH) Mode: ☺ appears when the measured value meets the stability criteria. The reading then locks and will not change until the MEAS switch is pressed for the next measurement. Refer to "AS/AH mode" on the reverse side of this paper about setting of AS/AH mode.

■ Auto stable (AS) mode (Default setting)

1. **Confirm that the meter is in the measurement mode, and place a sample on the sensor.**
2. **When the read value meets the stability criteria, ☺ appears and the reading is locked.**
3. **Document the displayed value when ☺ appears.**
4. **If the read value does not meet the stability criteria, ☺ disappears and the reading changes with time.**

■ Auto hold (AH) mode

1. **Confirm that the meter is in the measurement mode, and place a sample on the sensor.**
2. **Press the MEAS switch.**
   The auto hold function is activated.
   MEAS blinks until the measured value has stabilized.
   When the measured value is stable, MEAS stops blinking and the displayed value is locked with MEAS and ☺ displayed simultaneously.

3. **Document the displayed value.**
4. **Press the MEAS switch.**
   The auto hold function is deactivated and ☺ disappears.

Note

- **If a measured value is out of the specified measurement range, "Or" is displayed for upper range and "Ur" is displayed for under range.**
- **When using the auto hold function, you must deactivate the function before starting another measurement.**
- **When you have a problem with the calibration or measurement, refer to frequently asked questions.**

■ Measurement display change

- **For pH11 and pH22**
  The display mode changes from pH to mV each time pressing the MEAS switch in AS mode.
- **For pH33**
  The display mode changes from pH to mV to temperature each time pressing the MEAS switch in AS mode.

■ Storage

1. **Clean the sensor with tap water and remove moisture on the sensor and meter by dabbing gently with soft tissue.**

Note

Do not wipe or push the flat sensor strongly. It may damage the sensor. Please dab softly with a tissue or cloth to remove excess liquid.

2. **Close the light shield cover and the slide cap before storing the meter.**

CODE: I2003947000-3200593367-GZ0000395601
December, 2014

Setup Mode

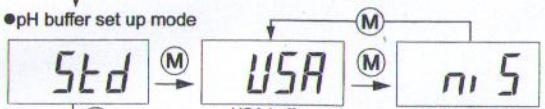
The setup mode allows the user to customize the meter to his specific needs.
To enter the setup mode, press and hold the MEAS and ON/OFF switches for over 3 seconds when the meter is switched OFF. All the LCD segments appear and then the meter enters the setup mode.

— Tip —

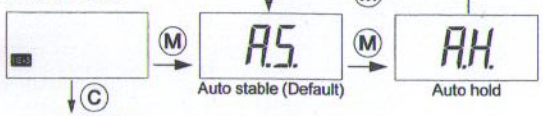
To save the setting changes, press the CAL switch.

●Enter the setup mode Press and hold the MEAS and ON/OFF switches for over 3 seconds.

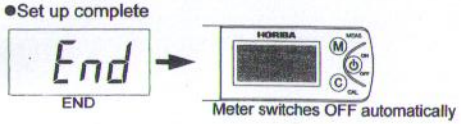
●pH buffer set up mode



●AS/AH mode



●Set up complete



● **pH buffer setting mode**
You can calibrate the instruments with USA (pH 1.68, 4.01, 7.00, 10.01, 12.46) or NIST (pH 1.68, 4.01, 6.86, 9.18, 12.46) standard solutions. Select one to suit your requirements.

— Tip —

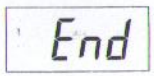
To exit the setup mode without making any change, press the ON/OFF switch.

■ Initialization mode

All setup choices are erased. Meter is reset to the factory default values.

1. **Press and hold the MEAS, CAL and ON/OFF switches for over 3 seconds when the meter is switched OFF to enter the initialization.**
   All the LCD segments are displayed and then the software version is automatically displayed and the display changes as shown right.

2. **Press the CAL switch.**
   All settings data is reset to the factory default values. When initialization is complete, End appears. The meter automatically switches OFF.

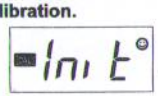


■ Initialize calibration

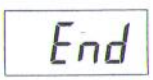
Initialize calibration in the following cases.

- To delete the calibration data
- If the number of points for the last calibration is uncertain.
- After the sensor is replaced.

1. **Press and hold the CAL and ON/OFF switches for over 3 seconds when the meter is switched OFF to Initialize calibration.**
   All the LCD segments are displayed and then the software version is automatically displayed and the display changes as shown right.



2. **Press the CAL switch.**
   All calibration data is reset. When initialization of calibration data is complete, End appears. The meter automatically switches OFF.



Frequently asked questions

Question	Answer
How can I check the sensor's condition?	Perform a two-point calibration. If calibration error occurs, the sensor has deteriorated. Replace the sensor.
Can I measure high or low temperature samples?	This meter can not measure a sample with temperatures outside the meter's operating temperature range (5 to 40°C). The difference between the sample temperature and ambient temperature increases the measurement error. Perform measurement after the sample reaches the ambient temperature.
The measured value does not change after changing the sample.	If ☺ lights steadily in AH mode, the measured value is locked. Press the MEAS switch to unlock the value. If the value does not change after unlocking, the sensor may be damaged. Replace the sensor.
"Or" or "Ur" blinks in pH measurement.	The measured pH may be out of the specified measurement range (0 to 14 pH). Measure a standard solution to check, and if "Or" or "Ur" still blinks, replace the sensor.
°C blinks during measurement.	The measured temperature is not within the specified operating temperature (5 to 40°C). If the ambient temperature is within the specified range and °C blinks, replace the sensor.
The meter does not power ON.	Check that the batteries are inserted properly. If the battery voltage is low, replace them both with new ones at the same time.
Err is displayed during the calibration	Please note that if you press the CAL switch in mV or temperature display mode, Err is displayed. This is because there is no calibration facility available for these modes.
Er1 is displayed soon power ON.	The internal IC in the meter may be defective. Perform a meter initialization. If Er1 is still displayed after the initialization, the internal IC in the meter is defective. Replace the meter with a new one (the meter can not be repaired).
Er2 is displayed right after power ON.	The internal IC in the meter is defective. Replace the meter with a new one (the meter can not be repaired).
Er3 is displayed right after power ON.	The internal IC in the meter is defective. Replace the meter with a new one (the meter can not be repaired).

CODE: I2003947000-3200593367-GZ0000395601

HORIBA Scientific LAQUAtwin

Instruction Manual (Before Use)

COMPACT pH METER
pH11, 22, 33

Preface

This manual describes the operation of the COMPACT pH METER, pH11, 22, 33.
Be sure to read this manual before using the product to ensure proper and safe operation of the instrument. Also safely store the manual so it is readily available for reference whenever necessary.

Product specifications and appearance, as well as the contents of this manual are subject to change without notice.

Warranty and responsibility

HORIBA, Ltd. warrants that the Product shall be free from defects in material and workmanship and agrees to repair or replace free of charge, at option of HORIBA, Ltd., any malfunctioning or damaged Product attributable to responsibility of HORIBA, Ltd. for a period of two (2) years from the delivery. However, the warranty period of sensor is 6 months. In addition, the warranty applies only when the sensor repeatedly fails even after cleaning and conditioning. In the following cases, none of the warranties is valid;

- Any malfunction or damage attributable to improper operation
- Any malfunction attributable to attempted repair or modification by any person not authorized by HORIBA, Ltd.
- Any malfunction or damage attributable to violation of the instructions in this manual or operations in an environment and the manner not specified in this manual
- Any malfunction or damage attributable to any cause or causes beyond the reasonable control of HORIBA, Ltd. such as natural disasters
- Any deterioration in appearance attributable to corrosion, rust, and so on
- Replacement of consumables such as the standard solutions

HORIBA, LTD. SHALL NOT BE LIABLE FOR ANY DAMAGES RESULTING FROM ANY MALFUNCTIONS OF THE PRODUCT, ANY ERASURE OF DATA, OR ANY OTHER USES OF THE PRODUCT.

Trademarks

Company names and brand names are either registered trademarks or trademarks of the respective companies. (R), (TM) symbols may be omitted in this manual.

Regulations

Conformable Directive

This equipment conforms to the following directives and standards:

CE

EMC: EN61326-1
Class B, Portable test and measurement equipment

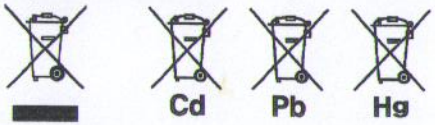
RoHS: EN50581
9. Monitoring and control instruments

Warning:
This product is not intended for use in industrial environments. In an industrial environment, electromagnetic environmental effects may cause the incorrect performance of the product in which case the user may be required to take adequate measures.

Information on Disposal of Electrical and Electronic Equipment and Disposal of Batteries and Accumulators

The crossed out wheeled bin symbol with underbar shown on the product or accompanying documents indicates the product requires appropriate treatment, collection and recycle for waste electrical and electronic equipment (WEEE) under the Directive 2012/19/EU, and/or waste batteries and accumulators under the Directive 2006/66/EC in the European Union.
The symbol might be put with one of the chemical symbols below. In this case, it satisfies the requirements of the Directive 2006/66/EC for the object chemical.
This product should not be disposed of as unsorted household waste.

Your correct disposal of WEEE, waste batteries and accumulators will contribute to reducing wasteful consumption of natural resources, and protecting human health and the environment from potential negative effects caused by hazardous substance in products.
Contact your supplier for information on applicable disposal methods.



FCC Rules

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

WARNING

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.

Korea Certification

B 급 기기 (가정용 방송통신기자재)

이 기기는 가정용 (B 급) 전자파적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며 , 모든 지역에서 사용할 수 있습니다 .

Taiwan Battery Recycling Mark

廢電池請回收

Specifications

Model	pH11	pH22	pH33
Measurement principle	Glass electrode method		
Minimum sample volume	0.1 mL*1		
pH range	0 to 14 pH		
Resolution (valid digits)	0.1 pH	0.01 pH	
Calibration	Up to two-point	Up to three-point	Up to five-point
Accuracy*2	±0.1 pH	±0.01 pH	
Temperature display	–	–	0 to 50.0°C
Display	Custom (monochrome) digital LCD		
Operating temperature/ humidity	5 to 40°C, 85% or less in relative humidity (no condensation)		
Power	CR2032 batteries (×2)		
Battery life	Approx. 400 hours in continuous use		
Outer dimensions/ mass	164 × 29 × 20 mm (excluding projections), Approx. 50 g (only meter, without batteries)		
Main functions	Temperature compensation, waterproof*3, auto stable/auto hold, automatic power OFF		

*1 0.05 mL or more if the sampling sheet B (sold separately) is used.
*2 The closeness of agreement between measured value and actual value of the pH 4.01 standard solution after two-point calibration using pH 4.01 and pH 7.00 standard solutions. The temperature during the calibration and measurement is the same. Two-point calibration is started from pH 7.00. The error of standard solutions and rounding error (±1 digit) are not included.
*3 IP67: no failure when immersed in water at a depth or 1 meter for 30 minutes.
Please note that the meter can not be used underwater.

Consumable parts sold separately

Part No.	Name	Type
3200459834	Sensor	S010, pH
3999960108	Standard solutions	514-4, pH 4.01
3999960109		514-7, pH 7.00
3200053858	Sampling sheet B	Y046, 100 sheet-pack

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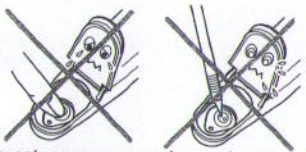
Handling Precautions

Meter and sensor

- The sensor is a consumable part. If it becomes damaged or its performance deteriorates, replace it with a new one (the sensor can not be repaired).
- Do not swing the meter and sensor using a strap.
- To ensure the waterproof performance, confirm the followings when attaching the sensor.
  - The waterproofing gasket is clean and undamaged.
  - The waterproofing gasket is seated properly in the groove with no twisting or warping.
  - The meter and sensor are not deformed.

- Neither the meter nor sensor is waterproof by itself. The sensor must be securely mounted on the meter before use.
- Do not drop the meter or apply excessive force to it.
- Do not leave the meter in areas of direct sunlight or high temperature/humidity.
- Do not clean the meter with organic solvents.
- The flat sensor is made of thin glass. Take care not to break it. If it is damaged, remove the sensor avoiding injury and dispose of it in a plastic bag.



- Do not measure samples such as the following, since they may damage the sensor or shorten its life.
  - Organic solvents
  - Oils
  - Adhesives
  - Cement
  - Alcohols
  - Concentrated acid (0 to 2 pH)
  - Concentrated alkaline (12 to 14 pH) or surfactants
- For some samples (such as pure water), the measured value may be unstable. This is natural.
- A small amount of liquid or white powder may appear on the liquid junction of the flat sensor. The appearance of this powder or solution is normal. Simply rinse it off with water before use.

Battery

- Keep batteries out of reach of children. If someone accidentally swallows a battery, call a doctor immediately.
- Do not throw batteries in fire.
- Do not attempt to recharge batteries.
- The batteries provided have been used for performance testing. Therefore, their service life may be short.
- The battery alarm icon lights up when the battery voltage is low. Replace the batteries when the battery alarm icon lights up. The meter power may not be switched ON/OFF when the battery voltage is low.
- Replace the 2 batteries at the same time.

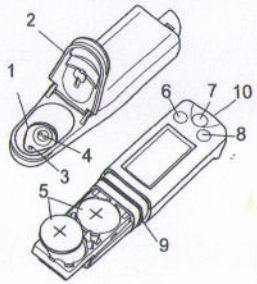
Others

Wash off any calibration fluid that comes into contact with hands or other exposed skin. If fluid gets in eyes, rinse them immediately and see a doctor.

Items in package

Meter model		pH11	pH22	pH33
Sensor	S010	1	1	1
Meter		1	1	1
Storage case		1	1	1
Batteries	CR2032	2	2	2
Standard solutions	pH 4 (pH 4.01)	1	1	1
	pH 7 (pH 7.00)	1	1	1
Pipette		1	1	1
Instruction manual		1	1	1

Part Names



No.	Name
1	Flat sensor
2	Light shield cover
3	Liquid junction
4	Glass membrane
5	Lithium batteries
6	MEAS switch
7	ON/OFF switch
8	CAL switch
9	Waterproof gasket
10	Strap eyelet

Initial Setup

Detaching the sensor

1. **Lift the sensor tongue tip and slide the sensor a little away from the meter.**
2. **Pull out the sensor all the way from the meter.**

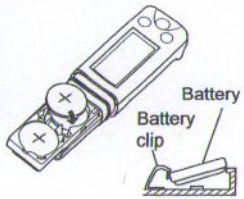
Inserting/removing batteries

Note

- **Switch OFF the meter before inserting/removing batteries.**
- **Always replace both batteries at once. Do not use old and new batteries together.**

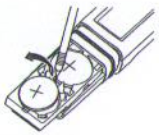
Inserting the batteries

1. **Slide both batteries into the battery case as shown.**
   Be sure to use two CR2032 batteries, and put them with the plus sides (+) upwards.



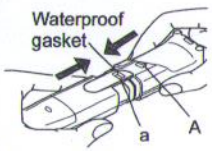
Removing the batteries

1. **Use a ball-point pen or other tool to pry the batteries out from the clips as shown.**



Attaching the sensor

1. **Confirm that the waterproofing gasket is clean and undamaged.**
2. **Slide the sensor onto the meter so that catch "A" on the back of the meter fits into hole "a" on the sensor tongue as shown.**



Electrode conditioning

Note

Before using the sensor for the first time or after several days of disuse, perform electrode conditioning.

1. **Place some drops of pH 7 standard solution to the flat sensor.**
2. **Wait a few hours before use.**
   There is no need to switch the meter ON.
3. **Clean the flat sensor with running water.**

HORIBA, Ltd.

2 Miyanohigashi, Kisshoin Minami-ku, Kyoto 601-8510 Japan
http://www.horiba.com

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