

ORpH-7

pH & ORP Meter

Operator's Manual



Newport Electronics, Inc.

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This product may be covered by one or more
of the following patents:

United States Patents Des. 336,895; 5,274,577

France Brevet No. 91 12756

Spain 2039150

United Kingdom Patent No. 2248954

and other international patents pending

From the technical library of:

Warranty

All Products from NEWPORT ELECTRONICS, INC. are warranted against defective material and workmanship for a period of one (1) year from the date of delivery.

If the unit should malfunction, it must be returned to the factory for evaluation. NEWPORT's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by Newport, if the unit is found to be defective it will be repaired or replaced at no charge. However, this WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of NEWPORT's control. Components which wear or which are damaged by misuse are not warranted. These include contact points, fuses, and triacs.

In addition to NEWPORT's standard warranty period, NEWPORT ELECTRONICS will extend the warranty period for one (1) additional year only if the warranty card enclosed with each instrument is returned to NEWPORT.

Newport is glad to offer suggestions on the use of its various products. Nevertheless, NEWPORT warrants only that the parts manufactured by it will be as specified and free of defects. NEWPORT MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive and the total liability of NEWPORT with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall NEWPORT be liable for consequential, incidental or special damages.

Every precaution for accuracy has been taken in the preparation of this manual; however, NEWPORT neither assumes responsibility for any omissions or errors that may appear nor assumes liability for any damages that result from the use of the products in accordance with the information contained in the manual.

SPECIAL CONDITIONS: Should this equipment be used in any nuclear installation or activity, purchaser will indemnify NEWPORT and hold NEWPORT harmless from any liability or damage whatsoever arising out of the use of the equipment in such a manner.

Return Requests

Direct all warranty and repair requests/inquiries to the NEWPORT Customer Service Department. BEFORE RETURNING ANY PRODUCTS(S) TO NEWPORT, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM NEWPORT'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit. NEWPORT's warranty does not apply to defects resulting from action of the buyer, mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting NEWPORT:

1. P.O. number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult NEWPORT for current repair charges. Have the following information available BEFORE contacting NEWPORT:

1. P.O. number to cover the COST of the repair,
2. Model and serial number of product, and
3. Repair instructions and/or specific problems relative to the product.

For technical or application assistance please call:

Newport Electronics, Inc.

2229 South Yale Street
Santa Ana, CA
92704-4426
TEL: (714) 540-4914,
(800) NEWPORT • FAX: (714) 546-3022

Newport Technologies Inc.

976 Bergar
Laval (Quebec)
H7L5A1, Canada
TEL: (514) 335-3183
FAX: (514) 856-6886

Newport Electronics Ltd.

Unit 25 Swannington Road
Cottage Lane Industrial Estate
Broughton Astley
Leicestershire
England, LE9 6TU
TEL: 44 (1455) 285998
FAX: 44 (1455) 285604

Newport Electronics B. V.

Postbus 8034
1180 LA Amstelveen
The Netherlands
TEL: 31 (20) 6418405
FAX: 31 (20) 6434643

Newport Electronics Spol S.R.O.

Ostravska 767
733 01 Karvina
Czech Republic
TEL: 42 (69) 6311899
FAX: 42 (69) 6311114

Newport Electronics GmbH

Daimlerstrasse 26
D-75392 Deckenpfronn
Germany
TEL: 49 (07056) 3017
FAX: 49 (07056) 8540

Newport Electronics S.A.R.L.

9 rue Denis Papin
78190 Trappes
France
TEL: 33 (1) 30.62.14.00
FAX: 33 (1) 30.69.91.20

In Mexico

TEL: 95-800-NEWPORT

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Unpacking

Remove the Packing List and verify that you have received all equipment, including the following (quantities in parentheses):.

- 1 soft carrying case
- 1 9V alkaline battery
- 1 bottle of buffer solution (pH 7.00)
- 1 Operator's Manual

The carrying case contains the following:

- 1 small screwdriver
- 1 ORpH-7 Meter

If you have any questions about the shipment, please call the NEWPORT Customer Service Department.

When you receive the shipment, inspect the container and equipment for signs of damage. Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

NOTE

The carrier will not honor damage claims unless all shipping material is saved for inspection. After examining and removing contents, save packing material and carton in the event reshipment is necessary



General Description

The NEWPORT® ORpH-7 meter is a dual function instrument that measures pH and ORP (oxidation-reduction potential). It is ideal for measurements of ORP that are pH dependent. Applications include swimming pool maintenance, drinking water disinfection, chrome reduction and cyanide destruction of electroplating waste water.

Parts of the Meter

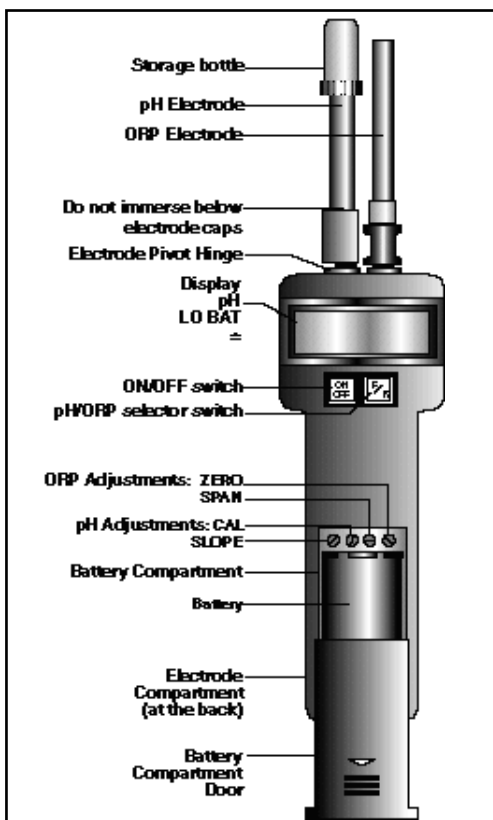


Figure 1. Parts of the Meter



Setting up the Meter

Installing the Battery (Fig 2)

Carefully remove the meter from the carrying case making sure you don't lose the small screwdriver.

To install/change the battery, do the following:

1. Insert your thumb in the recessed area of the battery compartment door and pull it away from the display.
2. Snap the 9V alkaline battery into the battery clip.
3. Place the battery clip/battery assembly at the top of the battery compartment.
3. Replace the battery compartment door and snap into place.

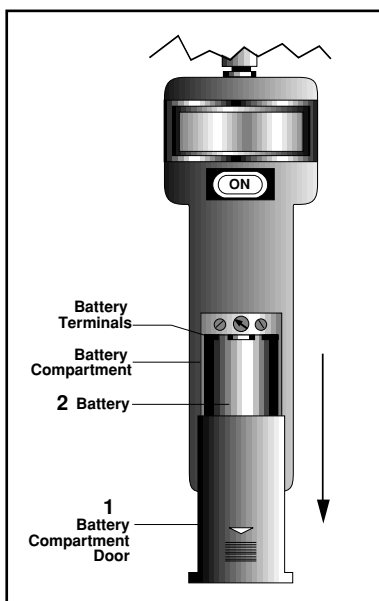


Figure 2. Installing the Battery



Operating Instructions

When you are ready to take your measurements, you must first remove the protective bottle or cap. The pH and ORP electrodes have either a soaker bottle or rubber cap to protect the glass bulb from contamination and to prevent the electrode from drying out.

1. Hold part of the electrode shaft and the white cap with one hand, with thumb and forefinger of the other hand loosen the bottle a couple of turns and slide the bottle off the pH electrode carefully. On the ORP electrode simply pull off the cap.
2. Energize by depressing the ON/OFF switch once.
3. To change to pH or ORP depress the F/R switch once.
4. Immerse electrodes into solution to be measured. For proper operation, immerse electrodes $\frac{1}{2}$ of their length. Observe reading.
5. Depress the F/R switch once to change parameters.
6. Observe the second reading.
7. Rinse Electrodes thoroughly and return pH and ORP electrodes to storage compartment behind the handle.

Operating Tips

1. Electrodes should be rinsed thoroughly in tap water after each test.
2. Make sure to keep the electrode in the plastic bottle between uses.



ORpH-7 pH & ORP Meter

3. Keep these storage devices filled with 4 buffer (preferably) or tap water. **DO NOT USE DISTILLED WATER.**
4. Remove the battery if the meter will not be used for an extended period of time.
5. For best results, calibrate the pH meter with a buffer that is within 3 pH units of the sample to be tested.
6. Do not be alarmed if white crystals form at the end of the electrode. This is normal with pH electrodes. These crystals are potassium chloride. Remove the shipping cap and rinse with tap water to dissolve the crystals.

Calibrating the Meter

The meter is factory calibrated prior to shipping. However, since the electrode outputs change with age and condition it is important to calibrate with fresh pH buffers.

For best results, calibrate pH with a buffer that is within 3 pH units of the test sample. ORP can be tested using quinhydrone and pH buffers.

pH MODE

1. Rinse the pH electrode in tap water.
2. Insert in a fresh pH 7 buffer solution.
3. Slide back the battery compartment door to the first stop, exposing the adjustment screws.
4. Adjust the "CAL" screw until the display reads 7.00.
5. Remove probes, rinse and insert in a pH 4 or pH 10 buffer solution.
6. Adjust the "SLOPE" screw until the display reads the correct value.



ORP MODE

Your instrument has been pre-calibrated at the factory using a mV calibrator. The "ZERO" screw has been adjusted for 0mV. The "SPAN" screw has been adjusted at 1000mV. **DO NOT ADJUST THESE SCREWS.**

ORP electrodes cannot be calibrated, only tested. To test your ORP system, use the following procedure:

1. Turn on your ORpH-7 unit.
2. Add approximately one gram quinhydrone to 250 mL of the pH buffer. Table 1 shows the theoretical millivolts to be expected between a platinum ORP electrode and the four #4 molar silver/silver chloride reference when they are immersed in buffers saturated with quinhydrone. Note that the actual measurements will probably differ in absolute value from these because of a number of factors relating to the chemistry; but the different values between the various solutions will hold within a few millivolts.)

TABLE 1
Millivolts difference between
quinhydrone & 4 M silver/silver chloride

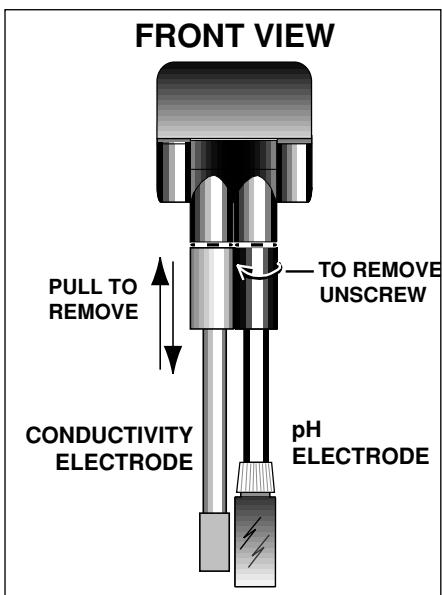
PH BUFFER (25°C)	QUINHYDRONE VS 4 M Ag/AgCl	DIFFERENCE
0.00	+499mV	----
4.01	+262mV	237mV
6.86	+93mV	169mV
9.18	-44mV	137mV



pH/ORP Electrode Care

pH Electrodes must be kept moist. The pH electrode was shipped stored in a soaker storage bottle. The storage solution contained in the bottle is a potassium chloride solution. Do not be alarmed if white crystals form at the end of the electrode. It is simply potassium chloride. Rinse with water to dissolve the crystals before using the electrode.

For storage, place the electrode back in the soaker bottle. If the potassium chloride solution evaporates or is lost, simply use pH buffer 4.0 or pH buffer 7.0 supplied for storage. DO NOT use distilled or deionized water as this will drastically reduce the electrode lifespan.



To replace the pH electrode, unscrew the triaxial connector counterclock-wise as indicated. Install a new electrode by turning it clockwise.

To replace the ORP electrode, unscrew the BNC connector.



If the pH electrode should dry out, soak the electrode up to 2 hours in pH buffer 4.0 solution. If the electrode is left dry for an extended period of time, rinse in a 10% HCl (Hydrochloric acid) solution for 10 seconds. Rinse with tap water and store in a warm KCl solution overnight. This may regenerate the pH electrode.

pH/ORP Electrode Replacement

Even with the best of care, pH/ORP Electrodes do not last forever. As with batteries or light bulbs, exactly how long a pH Electrode will provide satisfactory performance depends largely on each user's application as well as the care taken in use and storage. Inaccurate or unstable pH readings, drift, slow response, and difficulty in calibration are usually indications that the pH electrode has exceeded its useful life.

Replacement pH electrodes are available from NEWPORT Engineering. (Part number PHE-8200/N pH stick electrode with ATC and PHE-8236/N pH electrode with 3 ft extension cable with ATC. Replacement ORP electrodes are available from NEWPORT (part number ORE-8200/N ORP stick electrode and ORE-8236/N ORP electrode with 3 ft extension cable.

The pH electrode on the NEWPORT ORpH-7 meter uses a unique element for automatic temperature compensation and a special waterproof, gold-plated triaxial connector. These electrodes are not intended for use on other pH instruments. NEWPORT Engineering offers a triaxial to BNC adapter (part number PHE-8200-BNC which enables the use of conventional pH electrodes that have BNC connectors with the ORpH-7 meter.



Maintenance Handling

DO NOT lay instrument on display with wet electrode since the liquid may enter the instrument case through the base of the electrode creating a short or circuit board damage. Shake the instrument vigorously after each use to remove ALL water from the side of the pH electrode and inside of the ORP electrode.

Both electrodes are equipped with protective caps. The rubber or cap on the pH or ORP electrode protects the glass bulb inside the plastic sleeve , protects it from contamination and prevents it from drying out.





Specifications

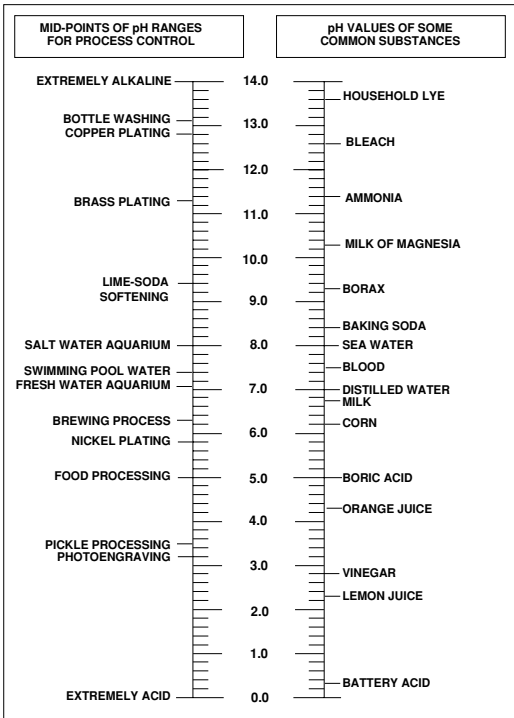
Range:	pH: 0 to 14.00 pH ORP: ± 1000 mV
Resolution:	pH: 0.02 pH ORP: 1 mV
Accuracy:	pH: ± 0.015 pH, ORP: ± 1 mV
Temperature Compensation:	10 to 100°C (pH only)
Power:	9V battery
Dimensions:	6.25"x1.25"x 2.25"
Weight:	9.5 oz

Tilt Stand

The vinyl coated wire tilt stand folds flat against the meter handle, or can be completely removed and later snapped back in place. It is particularly useful for benchtop applications with electrode cable extensions.



ORpH-7 pH & ORP Meter



**pH Values Common Industrial
and Household products**