User's Guide

PHE-2700-DLA
pH/ORP Simulator and System Tester

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Servicing North America:

U.S.A.:
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Omega Engineering, Inc., One Omega Drive, P.O. Box 4047
Stamford, CT 06907-0047 USA
Toll-Free: 1-800-826-6342 TEL: (203) 359-1660
FAX: (203) 359-7700 e-mail: info@omega.com

Canada:

976 Bergar
Laval (Quebec), Canada H7L 5A1
Toll-Free: 1-800-826-6342 TEL: (514) 856-6928
FAX: (514) 856-6886 e-mail: info@omega.ca

For immediate technical or application assistance:

U.S.A. and Canada:

Sales Service: 1-800-826-6342 / 1-800-TC-OMEGA®
Customer Service: 1-800-622-2378 / 1-800-622-BEST®
Engineering Service: 1-800-872-9436 / 1-800-USA-WHEN®

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En Español: (001) 203-359-7803 FAX: (001) 203-359-7807
info@omega.com.mx e-mail: espanol@omega.com

Servicing Europe:

Benelux:

Managed by the United Kingdom Office
Toll Free: 0800 099 3344 TEL: +31 20 347 21 21
FAX: +31 (0)20 6434643 e-mail: sales@omega.nl

Czech Republic:

Frystatska 184
733 01 Karviná, Czech Republic
Toll-Free: 0800-1-66342 TEL: +420-59-6311899
FAX: +420-59-6311114 e-mail: info@omegashop.cz

France:

Managed by the United Kingdom Office
Toll-Free: 0800 466 342 TEL: +33 (0) 161 37 29 00
FAX: +33 (0) 130 57 54 27 e-mail: sales@omega.fr

Germany/Austria:

Daimlerstrasse 26
D-75392 Deckenpfronn, Germany
Toll-Free: 0 800 6397678 TEL: +49 (0) 7059 9398-0
FAX: +49 (0) 7056 9398-29 e-mail: info@omega.de

United Kingdom:
ISO 9001 Certified

OMEGA Engineering Ltd.
One Omega Drive, River Bend Technology Centre, Northbank
Irlam, Manchester M44 5BD England
Toll-Free: 0800-488-488 TEL: +44 (0)161 777-6611
FAX: +44 (0)161 777-6622 e-mail: sales@omega.co.uk

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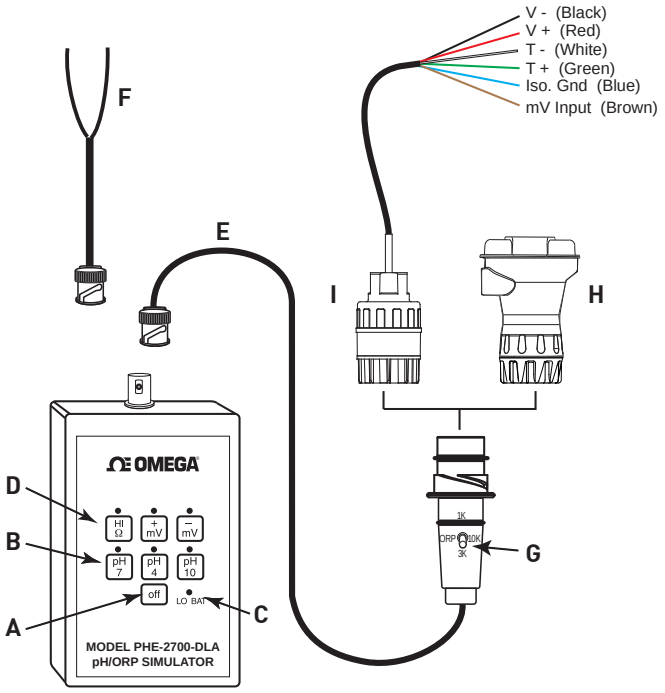
WARNING: These products are not designed for use in, and should not be used for, human applications.

Contents

1. Description

The Omega PHE-2700-DLA pH/ORP Simulator is a battery-powered millivolt generator that simulates pH values of 4, 7 and 10, plus ORP values of ± 700 mV. This device is useful as a troubleshooting aid and for general verification of system operation. It is not a substitute for periodic system calibration with pH buffers or test solutions. Accessory adapter cables enable the PHE-2700-DLA to connect directly to PHTX-275Y, PHEH-275G(ISO), PHEH-275Y(ISO) pH/ORP Sensor Electronics or PHEH-276Y(ISO), PHEH-276G(ISO) pH/ORP Preamplifier. The adapters include a selector switch for pH or ORP simulation. The switch triggers automatic sensor-recognition software in Omega pH/ORP instrumentation.

2. Features



A) Power OFF Button.

B) Output simulation buttons and indicators.
Simulate pH and ORP output at five fixed values:
pH 4, pH 7, pH 10, –700 mV and +700 mV.
Pressing one of these buttons turns the PHE-2700-DLA on.

C) Low battery indicator.

D) High Ω switch:
- Adds 1000 MΩ resistance in series with output.
- Simulates high impedance of pH electrodes.
- Used to verify proper preamplifier operation.

E) Adapter cable:
For use with the PHTX-275Y, PHEH-275G(ISO), PHEH-275Y(ISO), PHEH-276Y(ISO), or PHEH-276G(ISO).

F) Bypass adapter cable.

G) Mode selector switch:
Trigger automatic sensor recognition software in Omega pH/ORP instrumentation.
- Top = 1K for a Omega DPU-90 or DPU-90P instrument needing PT1000 temperature compensation input.
- Middle = 10K for ORP simulation.
- Bottom = 3K for PHEH-276Y(ISO) or PHEH-276G(ISO) 3K temperature compensation input.

H) PHTX-275Y, PHEH-275G(ISO), or PHEH-275Y(ISO) Sensor Electronics.

I) PHEH-276Y(ISO) or PHEH-276G(ISO) Preamplifier.

3. Specifications

mV output accuracy..... ± 0.6 mV (± 0.01 pH)

pH system temperature simulation:
w/PHTX-275Y(ISO), PHEH-276G (ISO) adapter.....1.1 KΩ = 25 ºC (± 4 ºC)
w/PHEH-276Y(ISO) adapter.....3 KΩ = 25 ºC (± 4 ºC)
High Ω resistor value..... 1000 MΩ

Battery ..... 9V alkaline
Life: 400 hours
Dimensions..... 100 x 75 x 23 mm
(3.94 x 2.95 x 0.91 in.)
Weight ..... 120 grams (5 oz.)

mV Value

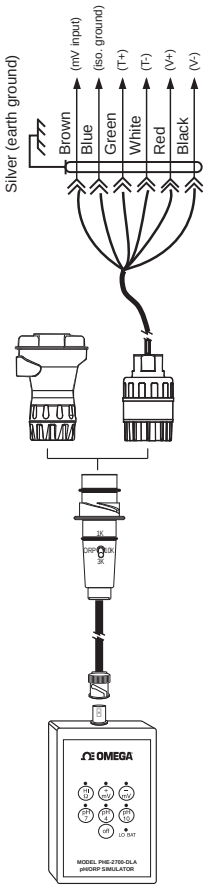
pH 4	+177 mV
pH 7	0 mV
pH 10	-177 mV
– mV	-700 mV
+ mV	+700 mV

4. Troubleshooting PHEH-276Y(ISO) and PHEH-276G(ISO) Preamplifier

A

Connecting the PHE-2700-DLA output to the adapter cable then connecting to the PHEH-276Y(ISO) and PHEH-276G(ISO) Preamplifier simulates the output of the pH/ORP electrode.

This configuration is used to verify general system operation. Every element of the system is tested except the electrode.



- Press any output simulation button to turn the PHE-2700-DLA on.
- Press OFF button to turn the PHE-2700-DLA off.

Step 1: Routine maintenance and calibration using buffers

- The most common problem in pH or ORP systems are related to electrode depletion or physical obstruction and fouling.
- Perform routine electrode maintenance, including cleaning and inspection of the electrode, then calibrate the system using buffer solutions. See the electrode and PHEH-276Y(ISO) and PHEH-276G(ISO) Preamplifier manuals for more information.

Does the meter respond to buffers correctly?

Yes: Problem resolved by cleaning/calibration.
No: Go to next step.

Step 2: Electrode: Connect PHE-2700-DLA as in "A"

This step requires the adapter cable.

- Connect the PHE-2700-DLA to the appropriate adapter cable, then insert adapter into PHEH-276Y(ISO) and PHEH-276G(ISO) preamplifier.
- Slide the Mode selector switch to the proper position.
- Press output simulation buttons and then HIΩ button. (The HIΩ button must be pressed after each output button.)
- See Section 5: Response Chart for proper display

Does the meter read valid temp and pH/ORP?

Yes: The electrode is at fault. Replace the electrode.
No: Go to next step.

Step 3: Verify meter calibration

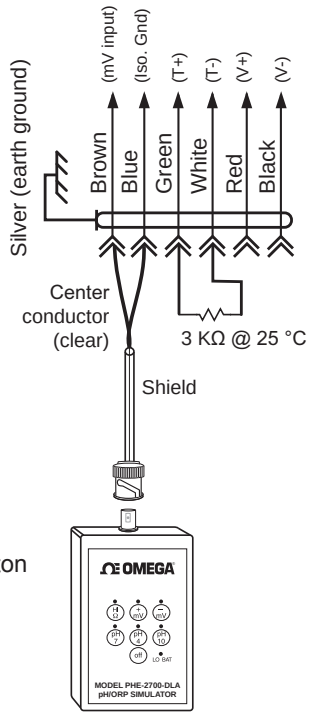
- Recalibrate the temperature, standard and slope in meter, using PHE-2700-DLA as input.
- Press output simulation buttons. See Section 5: Response chart for proper display

Does the meter display valid pH or ORP?

Yes: Problem resolved by meter calibration.
No: Go to next step.

Connecting the PHE-2700-DLA directly to the meter with the Bypass cable simulates the output of the PHEH-276Y(ISO) and PHEH-276G(ISO) preamplifier.

B



- Press any output simulation button to turn the PHE-2700-DLA on.
- Press OFF button to turn the PHE-2700-DLA off.

Step 4: Check the meter and preamplifier: Connect PHE-2700-DLA as in "B"

- Connect the PHE-2700-DLA directly into the meter using the bypass adapter cable.
- Connect a 3 KΩ resistor (not supplied) to the temp input of the meter.
- Press output simulation buttons.

Does the meter display a valid temperature (20 ºC to 30 ºC) and pH/ORP?

Yes: If there are no cable junctions from the preamplifier to the meter, replace the preamplifier. If there are junctions, go to next step.
No: Problem is in meter. Repair or replace the meter.

Step 5: Check interconnecting cable and junctions

- Connect PHE-2700-DLA and bypass cable at any J-Box or cable splice between the preamplifier and the meter.
- Press output simulation buttons. See Section 5: Response chart for proper display

Does the meter read valid temp and pH/ORP?

Yes: Problem is preamplifier or cable from preamplifier to junction.
No: Problem is in cable. Check all terminals and splices. Replace cable if necessary.

4. Troubleshooting PHTX-275Y, PHEH-275G(ISO), PHEH-275Y(ISO) pH/ORP Sensor Electronics

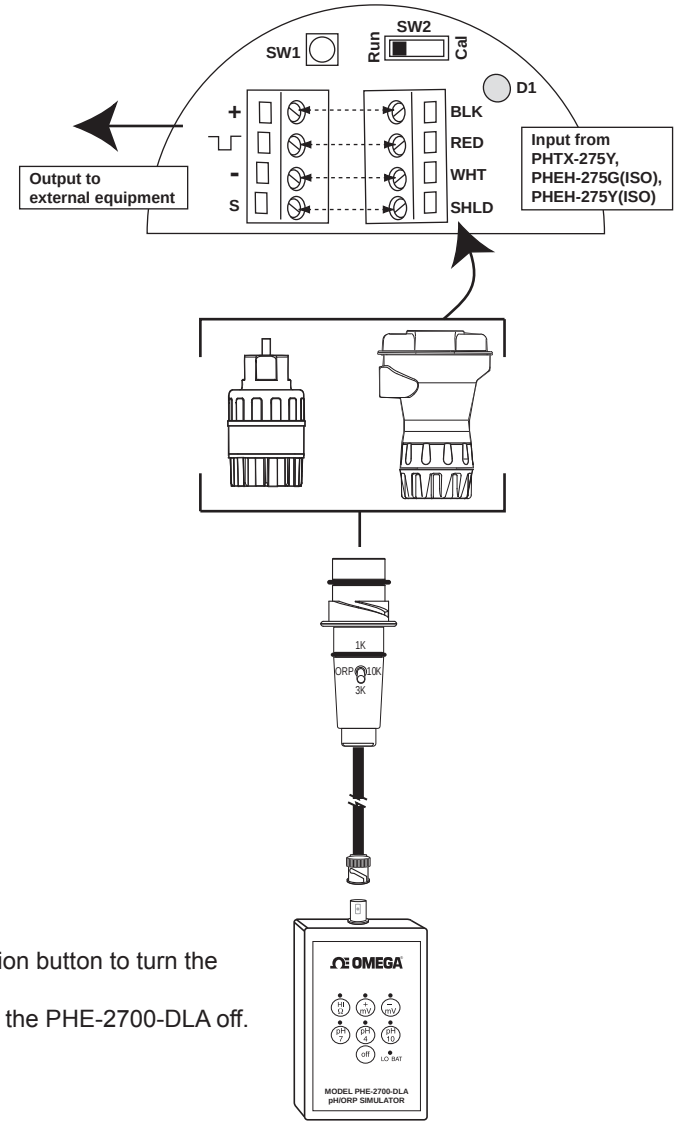
Before using the PHE-2700-DLA:
- The most common cause of pH/ORP system problems is electrode depletion.
- Perform routine electrode maintenance, including cleaning and inspection of the electrode, then calibrate the system.
- See the electrode and PHTX-275Y, PHEH-275G(ISO), PHEH-275Y(ISO) Sensor manuals for detailed information.

If the problem persists, or to verify general system operation:

This test procedure requires the adapter cable.
Connecting the PHE-2700-DLA output to the adapter cable then connecting the adapter into the PHTX-275Y, PHEH-275G(ISO), PHEH-275Y(ISO) sensor electronics simulates the output of the pH/ORP electrode.

- Always use the HIΩ button with the adapter cable.
- Connect the PHE-2700-DLA to the adapter cable, then insert adapter into PHTX-275Y, PHEH-275G(ISO), PHEH-275Y(ISO) electronics.
- Monitor the PHTX-275Y, PHEH-275G(ISO), PHEH-275Y(ISO) output using current monitoring device.
- Slide the PHE-2700-DLA Mode selector switch to the proper position (pH or ORP).
- Press output simulation buttons and then HIΩ button.
  (The HIΩ button must be pressed **after** each output button.)
  See Section 5: Response Chart for proper display.

Does the meter read a valid temp and pH/ORP?
Yes: The system is working fine or there is a problem with the electrode. Replace the electrode if necessary.
No: Problem is in PHTX-275Y, PHEH-275G(ISO), PHEH-275Y(ISO) Sensor Electronics. Replace the Sensor Electronics.



- Press any output simulation button to turn the PHE-2700-DLA on.
- Press OFF button to turn the PHE-2700-DLA off.

5. pH and ORP System Response Chart

Current output for PHTX-275Y, PHEH-275G(ISO), PHEH-275Y(ISO)

PHE-2700-DLA Button	pH System Response	ORP System Response*
–700 mV	Current output: 20 mA (max. output)	Current output: 5.6 mA All ORP displays: –700 mV
10 pH (–177 mV)	Current output: 15.4 mA All pH displays: 10 pH	Current output: 8.4 mA All ORP displays: –177 mV
7 pH (0 mV)	Current output: 12 mA All pH displays: 7 pH	Current output: 9.3 mA All ORP displays: 0 mV
4 pH (+177 mV)	Current output: 8.6 mA All pH displays: 4 pH	Current output: 10.3 mA All ORP displays: +177 mV
+700 mV	Current output: 4 mA (min. output)	Current output: 13.1 mA All ORP displays: +700 mV

*** 4 to 20 mA output values assume factory full span settings:** **pH: 0 to 14 (+414 mv to –414 mV)**
ORP: –1000 to +2000 mV

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6. Ordering Information

Mfr. Part No.	Description
PHE-2700-DLA	pH/ORP Simulator/System Tester (includes bypass adapter cable)

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal one **(1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product. If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

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Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'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.

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

1. Purchase Order 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 OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

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

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