

**1 YEAR**  
WARRANTY

# **Ω OMEGA®** **User's Guide**



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## **PHEH-276X SERIES** **pH/ORP Preamplifier**



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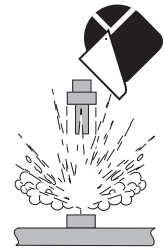
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## Safety Instructions



1. Depressurize and vent system prior to installation or removal.
2. Confirm chemical compatibility before use.
3. Do not exceed maximum temperature/pressure specifications.
4. Wear safety goggles or faceshield during installation/service.
5. Do not alter product construction.
6. When using chemicals or solvents care should be taken and appropriate eye, face, hand, body, and/or respiratory protection should be used.



## 1. Description

The Omega PHE/ORE series pH/ORP Preamplifiers are part of Omega's growing line of sensors for industrial fluid measurement and control. There are two styles of Preamplifiers, and each is available with NPT or ISO threads at the cable outlet. They all connect to four different families of pH and ORP electrodes to supply an amplified mV (analog) signal to Omega instruments.

## 2. Specifications

### General

Compatible Electrodes ..... PHE-2724, PHE-2726,  
ORE-2725 series

Compatible Instruments:  
Preamplifier models PHEH-276Y (ISO) and PHEH-276G (ISO)  
to Omega PHTX-271 series transmitters

Response Time (includes response time of electrodes):  
pH ..... < 6 sec. for 95% of change  
ORP ..... application dependent  
Temperature,  $\tau$  ..... 20 sec.

### Electrical

Maximum Offset .....  $\pm 7$  mV  
Input Impedance, Z .....  $> 10^{11} \Omega$   
Supply Voltage (V+ to V-) ..... 6 to 12 VDC  
Current consumption ..... < 1 mA

### Environmental

Enclosure Rating:  
PHEH-276Y (ISO)..... NEMA 6P/IP68  
PHEH-276G (ISO) ..... NEMA 4

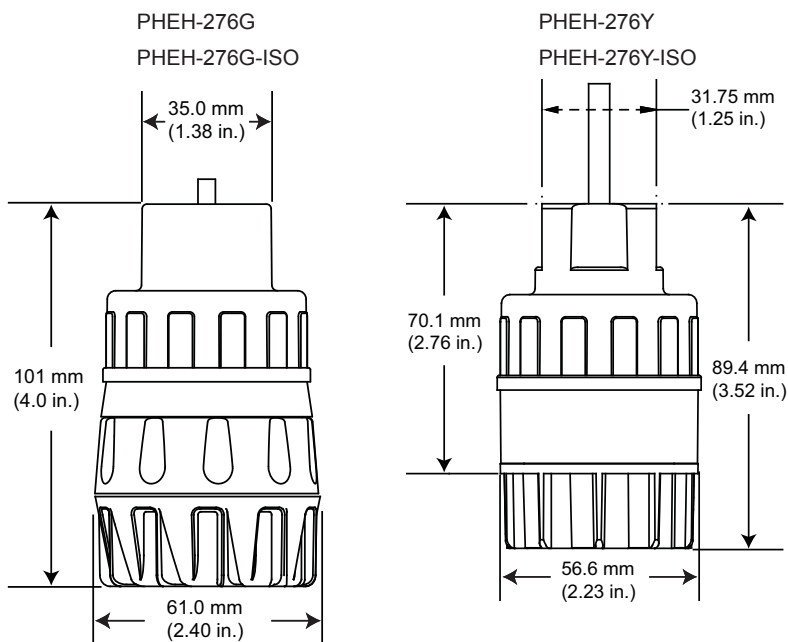
Materials:  
Submersible versions ..... CPVC (Gray)  
In-Line versions ..... PBT (Yellow)

Cable ..... 4.6 m (15 ft) 6-conductor  
with shield, 22 AWG  
Maximum cable ..... 122 m (400 ft)  
Shipping Weight ..... 0.64 kg (1.41 lb)

Operating Temperature..... 0 °C to 85 °C  
(32 °F to 185 °F)  
Storage Temperature ..... -20 °C to 85 °C  
(-4 °F to 185 °F)

Relative Humidity:..... 0 to 95%, non-condensing  
(without electrode connected)

### 3. Dimensions



#### CHEMICAL COMPATIBILITY WARNING

The retaining nuts of certain pH and ORP sensors and preamplifiers are not designed for prolonged contact with aggressive substances.

Strong acids, caustic substances and solvents or their vapor may lead to failure of the retaining nut, ejection of the sensor and loss of the process fluid with possibly serious consequences, such as damage to equipment and serious personal injury.

Retaining nuts that may have been in contact with such substances, e.g. due to leakage or spilling, must be replaced.

### 4. PHEH-276G (ISO) In-line Assembly and Installation

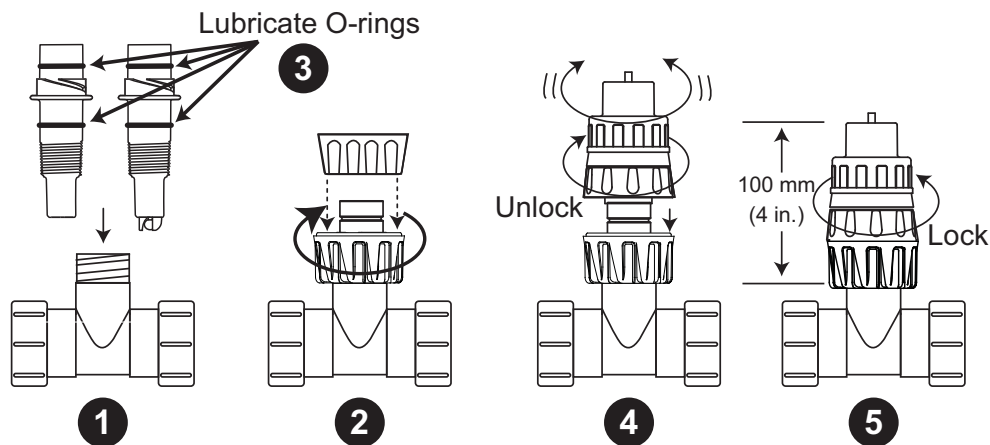
**PHEH-276G (ISO) In-Line models used with PHE-2724, PHE-2726, ORE-2725 series electrodes:**

1. The PHE-2724 and PHE-2726 can use a Omega installation fitting. Electrodes are sealed by the O-ring when it is installed into an Omega installation fitting.
2. The lower threaded nut is required to attach the electrode to the installation fitting when using a Omega fitting.



**HAND-TIGHTEN THE THREADED NUT ONTO THE INSTALLATION FITTING. DO NOT USE TOOLS!**

**DO NOT USE THREAD SEALANT OR LUBRICANTS ON THE FITTING THREADS OR THE SENSOR CAP.**



3. Lubricate O-rings with a non-petroleum based, viscous lubricant (grease) compatible with the system.
4. Seat the PHEH-276G (ISO) connector onto the top of the electrode. Open the connector by turning the upper locking ring 1/4-turn clockwise.
5. Turn the locking ring 1/4-turn counter-clockwise to lock the preamplifier in place. The mechanism will “click” when it is locked. When fully assembled the PHEH-276G (ISO) will stand about 100 mm (4 in.) above the installation fitting.

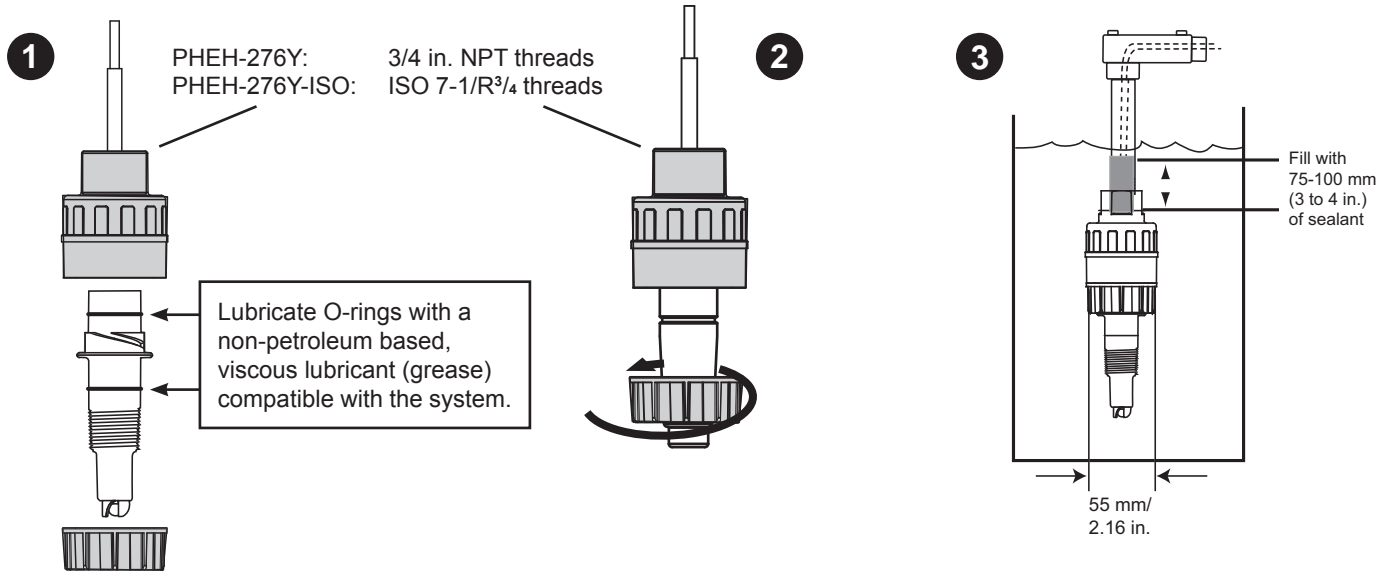
- The signal from the PHEH-276X Preamplifier series can be routed to the Omega PHTX-271 pH Transmitter.
- If the preamplifier cable must be extended beyond the standard 15 ft that is supplied with the PHEH-276X, use a junction box to terminate the wires.

**Note:** Do not extend the PHEH-276X cable more than 120 m (400 ft).

## 5. PHEH-276Y (ISO) Submersible Assembly and Installation

The submersible PHEH-276Y (ISO) can be installed in a tank or vessel if conditions are within pressure and temperature specifications. The PHEH-276Y (ISO) is able to withstand fluid temperatures up to 85 °C, but the electrode tolerances vary. Check the specifications of each component before installation.

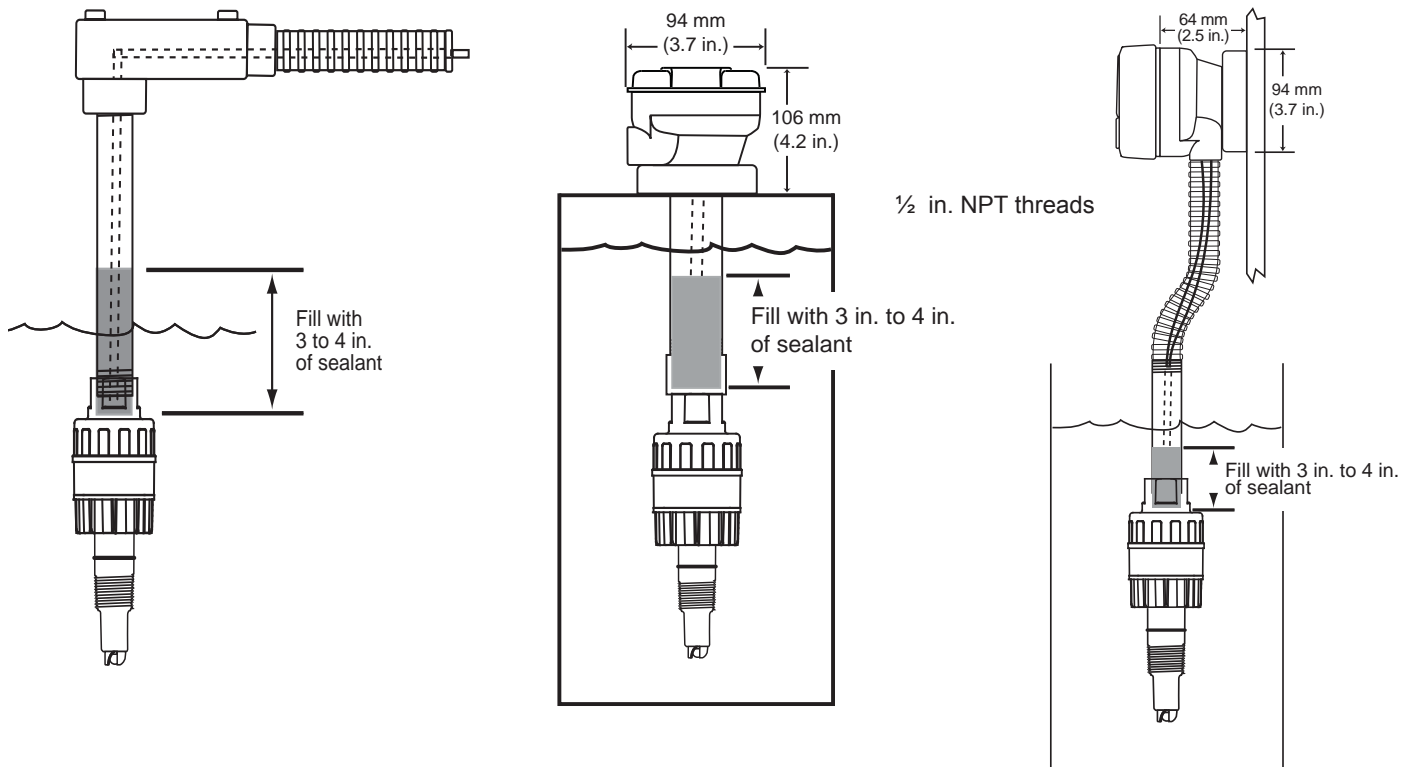
1. Insert a PHE-2724, PHE-2726, ORE-2725 series electrode into base of the PHEH-276Y (ISO).  
Lubricate O-rings with a non-petroleum based, viscous lubricant (grease) compatible with the system.
2. Thread retaining cap over electrode and hand-tighten onto PHEH-276Y (ISO).  
• Keep the electrical interconnection between electrode and preamplifier dry and clean at all times.
3. Attach 3/4 in. watertight pipe to the top of the PHEH-276Y (ISO). Secure the threaded connection to prevent any leakage.  
• Fill the lower 75-100 mm (3 to 4 in.) of conduit or extension pipe with a flexible sealant such as silicone to prevent liquid accumulation on the back seal of the PHEH-276Y (ISO).



Use standard installation hardware to connect the submersible PHEH-276Y (ISO) directly to external equipment.

**OR**

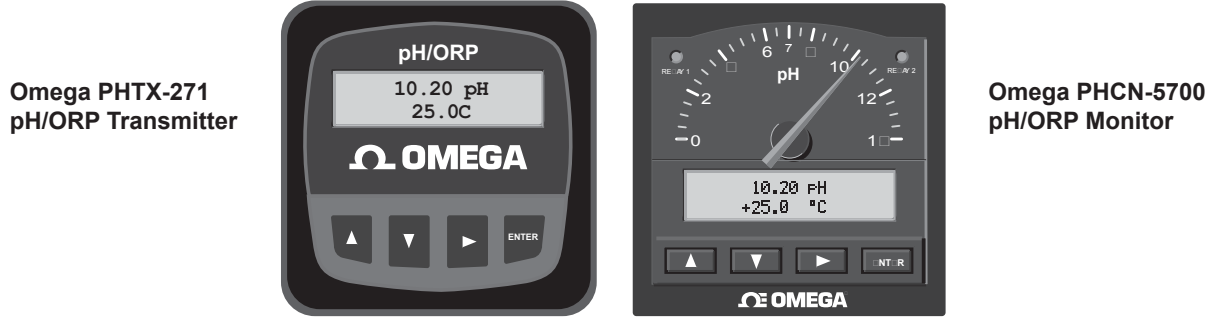
The PHTX-27G Universal Mount junction box mounts flat onto a wall or can be strapped to a post or pipe.



## 6. Wiring to Omega Instruments

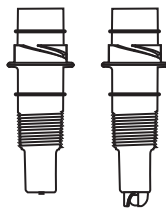
Any of these electrodes can be connected to the Omega PHCN-5700 and PHTX-271 pH/ORP instruments using the PHEH-276G (ISO) and PHEH-276Y (ISO) Preamplifiers.

The following wiring diagrams illustrate how to properly connect the preamplifier to the instrument terminals:

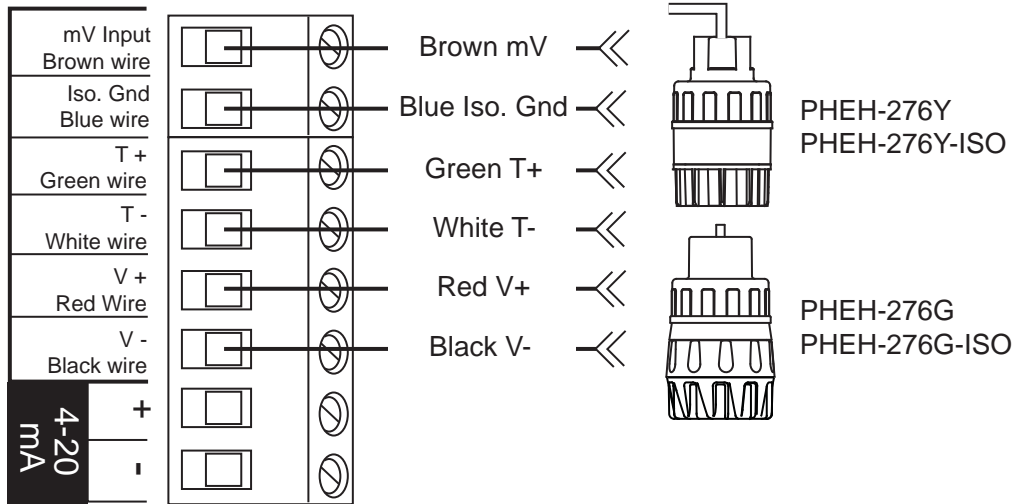


Standard output, Omega installation fittings

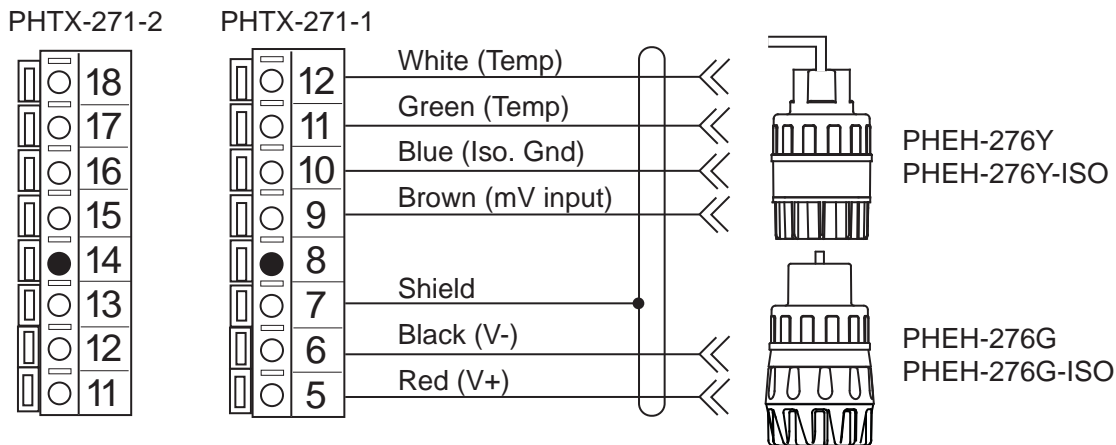
- PHE-2724 (ISO)
- ORE-2725 (ISO)
- PHE-2726 (ISO)
- PHE-2726-HF (ISO)
- PHE-2726-LC (ISO)



PHCN-5700 pH/ORP Monitor



pH/ORP Transmitter

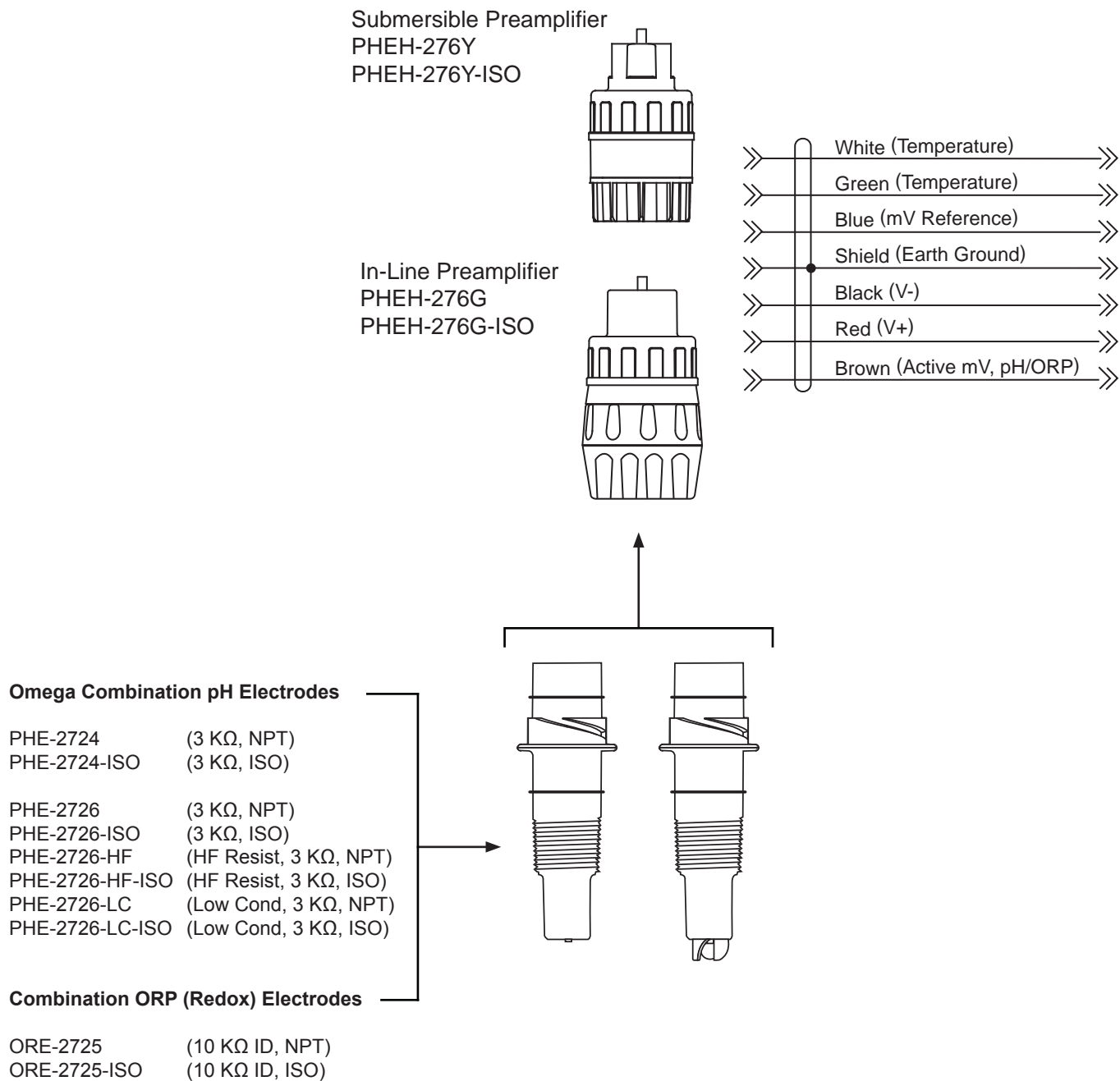


Connect this terminal ● to Earth GND to reduce electrical interference.

## 7. Wiring from PHEH-276 Preamp to Other Manufacturer's Equipment

The PHEH-276Y (ISO) and PHEH-276G (ISO) Preamp and electrode options may be used with third party equipment if the equipment can process the AMPLIFIED mV signal for pH and is compatible with the temperature compensation element (3 KΩ).

Refer to the manufacturer's manual for wiring details. Other products may use different terms to identify the function of each conductor.



## 8. Ordering Information

### PHEH-276X Series pH/ORP Preampfier

Mfr. Part No.	Description
PHEH-276Y	Submersible Preampfier with 3/4 in. NPT threads and 4.6 m (15 ft) cable
PHEH-276Y-ISO	Submersible Preampfier with ISO 7/1 R3/4 threads and 4.6 m (15 ft) cable
PHEH-276G	In-line Preampfier with 3/4 in. NPT threads and 4.6 m (15 ft) cable
PHEH-276G-ISO	In-line Preampfier with ISO 7/1 R3/4 threads and 4.6 m (15 ft) cable

### pH Electrodes

PHE-2724	Flat pH Electrode, 3 KΩ RTD, 3/4 in. NPT or Omega fittings
PHE-2724-ISO	Flat pH Electrode, 3 KΩ RTD, ISO 7/1 R3/4 or Omega fittings
PHE-2726	Bulb pH Electrode, 3 KΩ RTD, 3/4 in. NPT or Omega fittings
PHE-2726-ISO	Bulb pH Electrode, 3 KΩ RTD, ISO 7/1 R3/4 or Omega fittings
PHE-2726-HF	Bulb pH Electrode, 3 KΩ RTD, HF resistant, 3/4 in. NPT or Omega fittings
PHE-2726-HF-ISO	Bulb pH Electrode, 3 KΩ RTD, HF resistant, ISO 7/1 R3/4 or Omega fittings
PHE-2726-LC	Bulb pH Electrode, 3 KΩ RTD, Low conductivity, 3/4 in. NPT or Omega fittings
PHE-2726-LC-ISO	Bulb pH Electrode, 3 KΩ RTD, Low conduct., ISO 7/1 R3/4 or Omega fittings

### ORP (Redox) Electrodes

ORE-2725	Flat ORP Electrode, 10KΩ ID, 3/4 in. NPT or Omega installation fittings
ORE-2725-ISO	Flat ORP Electrode, 10KΩ ID, ISO 7/1 R3/4 or Omega installation fittings

### Accessories and Replacement Parts

PHE-2700-DLA	2759 Adapter Cable for use with PHEH-276X Dry lock Preampfier
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## 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 in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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## RETURN REQUESTS/INQUIRIES

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.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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