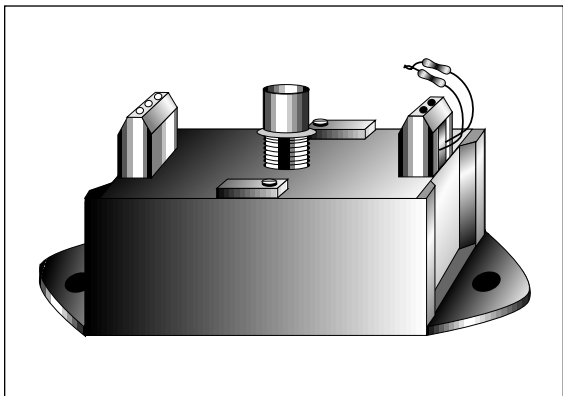


PHTM-014/212/ORP

pH Transmitter

Operator's Manual



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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
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2. Model and serial number of product, and
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Newport Electronics, Inc.

Unpacking

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

- 1 Operator's Manual
- 1 PHTM-014/212/ORP

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® Model PHTM-014/212/ORP is a 2-wire, 4-20 mA, pH/ORP transmitter that features platinum RTD temperature compensation, encapsulated construction, high input impedance, and high performance. The PHTM-014/212/ORP accepts as its input any pH or ORP electrode via a BNC coaxial connector. It transforms the probe signal to a 4 to 20 mADC, proportional to the pH or ORP level. This output may be transmitted over two wires to a control location; the same 2 wires provide power to the transmitter. Any DC power supply from 12 to 80 volts and at least 25mA may be used. There are two adjustments on the transmitter to standardize probes for "slope" and "Cal". The output can be monitored with a loop powered meter or a loop resistor and a multimeter during the standardization procedure.

Temperature compensation is automatic with use of a combination pH/ATC electrode. This probe contains a thin film ultra stable platinum resistance temperature sensor. These sensors are laser trimmed and conform to the DIN 43 760 standard. ORP units do not require ATC.



Installation

Two mounting holes are provided. The transmitter can be mounted in a head, weather-proof box, or any suitable flat surface.

The input probe connector is a BNC jack. Use only a coaxial cable that has insulation around the shield. The shield is isolated from ground, and this isolation should be maintained for proper operation. For best results, the probe cable should not be longer than 10 feet. Long cables result in a slow response because the probe must charge the cable capacitance through the high probe source resistance.

If the combination pH/ATC probe is used, temperature compensation is automatic. Connect the two sensor wires to the terminal strip with the resistor symbol; polarity does not matter. If fixed compensation is used, connect a metal film ± 50 ppm/ $^{\circ}\text{C}$ resistor to the resistor terminals. Refer to Table 1 for the value vs. temperature or use resistors supply by factory for 25°C .

The output wires are isolated from ground; connections are made to the terminal strip observing polarity to the terminals marked +, - out. These wires are to be connected to a DC power supply through a load resistor. The wires can be as long as necessary. Connect the ground terminal to earth ground.

The loop resistor can be either in the positive or negative power supply lead. The value of the loop resistor depends on the voltage required at the monitoring location.



Calculate the required power supply voltage from the following equation: Minimum power supply voltage = $12 + (.02 \times RL)$. A convenient value for the loop resistor might be 250 ohms, $VO = 1V$ to $\%V$. Minimum supply voltage = $12 + (.02 \times 250) = 17V$. The maximum supply voltage is 80V.

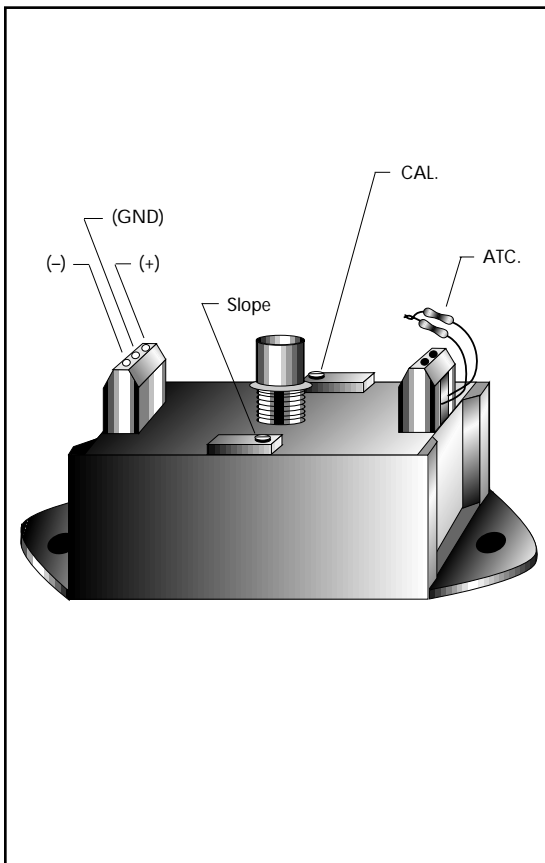
The output can be monitored at the transmitter location in several ways to facilitate probe adjustment. With the system in operation, place the electrode in a known buffer solution and monitor the transmitter in the following way:

A loop powered meter may be connected in series with the current loop and will read out directly in pH or ORP units. Adjust potentiometers as needed.

The "pH CAL" potentiometer is an offset adjustment for the pH probe. This adjustment allows standardization of different probes in 7.00 buffer.

The "Slope" potentiometer is a gain adjustment. This adjustment is used to standardize the output for probes with less than 100% efficiency and is used for 4.00 or 10.00 buffer.

PHTM-014/212/ORP
pH Transmitter



PHTM-014/212/ORP



**PHTM-014/212/ORP
pH Transmitter**

Table 1

Temp.	0°C	25°C	40°C	50°C	70°C	90°C	100°C
pH	mv.	mv.	mv.	mv.	mv.	mv.	mv.
0	+379.3	+414.0	+434.9	+448.8	+476.6	+504.4	+518.2
1	+325.1	+354.9	+372.8	+384.7	+408.5	+432.3	+444.2
2	+270.1	+295.8	+310.7	+320.6	+340.5	+360.3	+370.2
3	+216.8	+236.6	+248.5	+256.5	+272.4	+288.2	+296.1
4	+162.6	+177.5	+186.4	+192.4	+204.3	+216.2	+222.1
5	+108.4	+118.3	+124.2	+128.2	+136.2	+144.1	+148.1
6	+54.19	+59.15	+62.13	+64.12	+68.09	+72.05	+74.03
7	0	0	0	0	0	0	0
8	-54.19	-59.15	-62.13	-64.12	-68.09	-72.05	-74.03
9	-108.4	-118.3	-124.2	-128.2	-136.2	-144.1	-148.1
10	-162.6	-177.5	-186.4	-192.4	-204.3	-216.2	-222.1
11	-216.8	-236.6	-248.5	-256.5	-272.4	-288.2	-296.1
12	-270.1	-295.8	-310.7	-320.6	-340.5	-360.3	-370.2
13	-325.1	-354.9	-372.8	-384.7	-408.5	-432.3	-444.2
14	-379.3	-414.0	-434.9	-448.8	-476.6	-504.4	-518.2
Temp. Comp. Res.	1000Ω	1097Ω	1155Ω	1194Ω	1271Ω	1347Ω	1385Ω

Table 2

PHTM-014 pH	0 to 14 mA	PHTM-212 pH	2 to 12 mA	PHTM-ORP pH	0 to 1000mV mA
0	4.00	2	4.00	0	4.00
1	5.14	3	5.60	100	5.60
2	6.28	4	7.20	200	7.20
3	7.43	5	8.80	300	8.80
4	8.57	6	10.40	400	10.40
5	9.71	7	12.00	500	12.00
6	10.66	8	13.60	600	13.60
7	12.00	9	15.20	700	15.20
8	13.14	10	16.80	800	16.80
9	14.28	11	18.40	900	18.40
10	15.43	12	20.00	1000	20.00
11	16.57				
12	17.71				
13	18.66				
14	20.00				

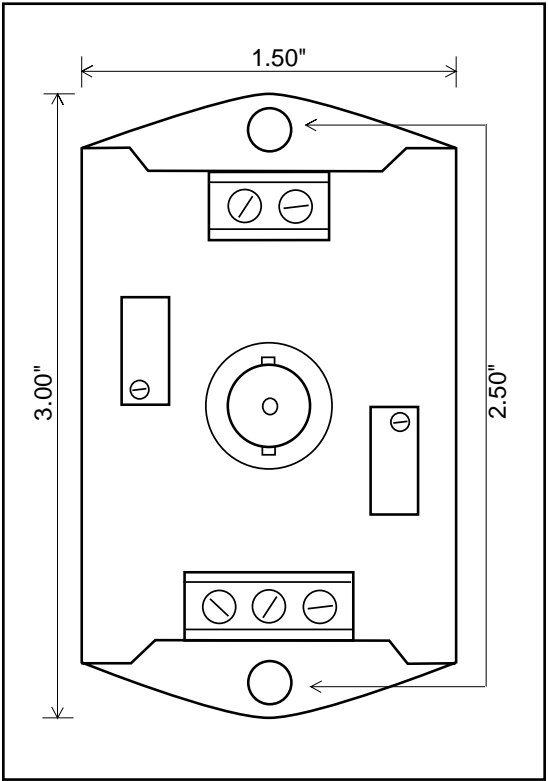


Specifications

Input:	0-14 pH, 2-12 pH, 0-1000mV
Output:	4-20 mA
Power Supply:	12 to 80 VDC/25 mA
Load Resistor:	0 to 3400 ohms
Linearity:	$\pm .02$ pH units
Temperature Coefficient:	$\pm .0008$ pH units/ $^{\circ}$ C, -25 to +70 $^{\circ}$ C
Operating Temp. Range:	-25 to +70 $^{\circ}$ C
Automatic Temp. Range:	$\pm .005$ pH units/ $^{\circ}$ C, 0 to 100 $^{\circ}$ V
Temperature Compensation:	Manual or automatic
Reverse Polarity Protection:	Internal diode
Dimensions:	2.25" x 1.5" x 1.5"



**PHTM-014/212/ORP
pH Transmitter**



Dimensions