

INSTRUCTION MANUAL

pH/ORP RECORDER

MODELS

PHR – 212

PHR – 212 – ORP



PRESTO-TEK

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ABOUT THIS MANUAL

This manual introduces you to Presto-Tek's 212 series pH/orp recorder. Use it to understand how your model works, what its functions are, and how to easily install and maintain your pH/orp system. This manual tells you:

- About the 212 series in general
- Specific features, functions and options about the model you have chosen
- Special consideration prior to installation of a pH/ORP system
- Step-by-step installation
- Step-by-step calibration
- Chart paper replacement
- Operation
- Warranty information

1 INTRODUCTION

You have just received the PHR-212, a member of our new 212 family of instruments designed to monitor and record levels of pH and oxidation reduction potential. If you have used traditional pH and ORP instrumentation, you will quickly appreciate the ease with which your PHR-212 is installed, calibrated and serviced.

If this is the first system you have installed, this manual provides an easy to follow step-by-step procedure to ensure correct installation and proper operation.

If you are familiar with pH and ORP installations, read Section III to familiarize yourself with 212 series features and functions prior to installation. This section thoroughly describes these functions and shows their physical location on the instrument itself.

UNDERSTANDING THE PHR-212 FUNCTIONS

The PHR-212 is really two instruments: A pH(ORP) recorder and a pH(ORP) monitor. It accepts as its input a single pH or ORP electrode. This input is digitally displayed and continuously recorded via the strip chart recorder.

The strip chart recorder continuously records the input from the pH(ORP) electrode. The pH scale is 2 to 12 with each large division being one pH unit. The ORP scale is 0 to +1000 mV with each large division being 100 mV.

The chart speed is normally 1" per hour. At this speed, one roll of chart paper will last approximately 30 days. The sliding door on the recorder allows the date and time to be marked.

III FEATURES

The PHR-212 has many standard features including:
(See Drawing A-194)

- Compact design
- Front panel control
- Hinged fold down panels for convenient wiring and electrode connecting
- 3-1/2 digit 1/2" high LCD display

IV OPTIONS

Some options you may have chosen include:

- Remote mounting of PHTM module for applications where electrode is located more than 10 feet from the controller
- Benchtop or NEMA 4X enclosure
 - △ The benchtop enclosure is particularly useful when the PHR-212 will be moved

membrane. Special electrodes are available. Consult the factory for details.

- TEMPERATURE also affects the pH measurement. The PHR-212 has automatic temperature compensation capabilities, but an ATC element must also be inserted in the process stream. The 212 series uses a 1000 ohm platinum resistance device as its ATC and it may be mounted in the pH electrode or in its own separate housing.
- TEMPERATURE not only affects the pH measurement but also the normal life expectancy of the pH electrode. Maximum life is achieved at ambient temperatures although special electrodes are available that are more durable at higher temperatures.
- THE CHEMICAL COMPOSITION of the process solution may not only affect the glass pH electrode but also the electrode assembly housing. In these cases Kynar® or stainless steel housings may be required.
- STRAY CURRENTS in the solution will cause the pH electrode to report incorrect information to the PHR-212. The output from the pH electrode is only a few millivolts. If stray currents are present, they may be picked up by the pH electrode and transmitted to the PHR-212. It is necessary to eliminate the current either by finding the leakage or by adding an earth ground to the solution. Some pH electrode assemblies may incorporate a solution ground (which can be tied to an external earth ground) to eliminate this problem.

VI INSTALLATION (1) UNPACKING

- After unpacking the PHR-212, remove the 4 panel screws from the 4 panel screws from the front panel.

gauge wire or larger. Connect a white wire for neutral to #13, a green wire to #15 for ground, and a blk wire 117 VAC to #14. Your PHR-212 is now wired and ready for service.

VII

CALIBRATION

Now that the 212 is wired, follow the steps below to calibrate the pH or ORP electrode: (Skip to section 2 if calibrating an ORP electrode)

(1) pH

- Close the sub-panel and securely fasten the captive thumb screw.
- Turn the PHR-212 front panel ON/OFF switch to ON.
- Remove the protective plastic shipping cap from the pH electrode and rinse with pure water.
- Place the pH electrode and temperature probe (if ATC is required) into a #7 buffer solution.
- Using the CAL potentiometer on the front panel, adjust the display to read 7.00.
- Next, adjust the pH CAL knob on the recorder until the indicator on the recorder also reads 7
- Rinse the pH electrode and temperature probe and immerse in a #10 or #4 buffer. Choose a buffer which is close to actual solution to be measured.
- Adjust the slope potentiometer on the panel until the digital display reads the value for the buffer chosen.
- Check to see that the recorder indicator needle also reads the correct buffer value.
- Rinse the pH and temperature electrodes and install in the solution to be measured. Calibration is now complete.

(2) ORP

Your instrument has been precalibrated at the factory with use of a mV calibrator. The "CAL" pot has been adjusted for 0 mV. The "SLOPE" pot has been adjusted at 1000 mV.

- ORP electrodes cannot be calibrated, only tested.
- To test your ORP system, use the following procedure:
 - Δ Close the sub-panel and securely fasten the captive thumb screw.
 - Δ Turn the PHR-212 front panel ON/OFF switch to ON.
 - Δ Prepare a pH buffer for testing. Use approximately one gram quinhydrone to 250 ml of your electrode buffer. The table on the following page shows the theoretical millivolts to be expected between a platinum ORP electrode and the saturated calomel reference or the 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 difference values between the various solutions will hold within a few millivolts.

QHQ VS.

<u>PH (25°C)</u>	<u>4M AG/AgCl</u>	<u>Sat. Calomel</u>	<u>Difference</u>
0	+499 mV	+455 mV	---
4.01	+262 mV	+218 mV	237 mV
6.86	+ 93 mV	+ 49 mV	169 mV
9.18	- 44 mV	- 88 mV	137 mV

Remove the panel from the the enclosure and , inspect for possible shipping damage.

(2) MOUNTING

- Panel mount enclosure (see BROCHURE ADVERTISEMENT for panel cut-out dimensions). The panel mount enclosure has two (2) counter sunk holes in the front lip of the enclosures back cover. Remove the PHR-212's front panel. Insert the back cover through the cut-out. Fasten it to the panel with 6-12 x 1/2" flathead screws and nuts provided.
- NEMA 4X enclosure -
The NEMA 4X enclosure can be mounted to any flat surface using the four (4) mounting holes in its base.
- Bench Top -
The bench top PHR-212 version is designed to move where it's needed. Included is a convenient carrying handle. Power and electrode connections are made on the back panel via plug-in connectors.

(3) WIRING

The front panels are factory prewired from the terminal strip on the monitor circuit board to the switch and fuses. The recorder and pHTM are also prewired unless you have ordered the remote pHTM module (see remote pHTM installation). It is necessary to wire-
(Drwg. 20005)

1. pH(DRP) electrodes
2. Temperature electrode (if applicable)
3. Remote pHTM wiring
4. Input power

- Pull wires through the holes in the rear of the panel mount box, or through the side of the NEMA 4X enclosure.
- Make sure the instrument panel is fastened securely using the (4) 6-32 Phillips head screws. Loosen the monitor's captive thumb screw in the upper left hand corner of the monitor sub-panel, and hinge the sub-panel all the way down.
- (4) TERMINAL STRIP NUMBERING
 - Find the terminal strip on the right hand side of the sub-panel. The terminal strip is numbered from right to left as you face it. Terminal #1 is nearest the panel hinge and numbers increase to the left to the top of the panel.
- (5) pH(ORP) ELECTRODES
 - Locate the BNC connector on top of the sub-panel. Connect the pH electrode to the BNC connector. Dual input unit accept 2 electrodes.
- (6) TEMPERATURE ELECTRODE FOR ATC
 - The PHR-212 will automatically compensate for temperature variations if a 1000 ohm platinum RTD is connected. If ATC is required, locate the terminal strip next to the BNC connector (labeled with a resistor symbol) on top of the sub-panel. Remove the fixed resistor that is shipped with the instrument. Connect the RTD sensor to the terminal strip. If the temperature of the solution remains within 10 degrees of a point, a fixed resistor may be used in lieu of ATC. See page 16 for RESISTANCE VS. TEMPERATURE CHART.
- (7) REMOTE PHTM WIRING
 - If the pH(ORP) electrode will be mounted more than 10 feet from the PHR-212, a remote PHTM-1 transmitter should be installed.
- (8) INPUT POWER
 - Now connect the 117V line current. Make sure the input power circuit breaker and the front panel ON/OFF switch are off. Use #18

(3) REMOTE
PHTM
CALI-
BRATION

Remote pHTM calibrations follow the same procedures as pH described above with the exception that the CAL and SLOPE adjustments are located on the pHTM module. (If it not possible to view the PHR-212's display during calibration, a digital voltmeter will be required.)

- Connect the digital voltmeter to the two test points on the pHTM module.
 - Make sure the pH electrode and temperature probe (if applicable) are connected.
 - Now follow the same standardizing procedures as described above.
 - The readings on the digital voltmeter for the various buffers are as follows:

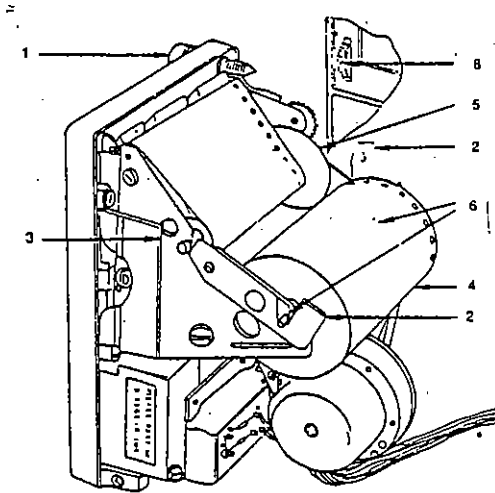
pH
#10 _____
#7 _____
#4 _____

- Once calibrated, place the pH (ORP) electrode back in the #7 buffer and go back to unit.
- Check to see that the digital display and recorder both indicate 7 pH. Adjust the recorder pH CAL pot if necessary.

VIII
CHART
RECORDER
PAPER
INSTALLATION

A Warning to 'renew chart' appears on the last three feet of each roll of paper. Do not use partial rolls of paper in re-roll mode. Refer to diagram on next page.

- Turn power off before loading chart paper
- Open recorder by loosening thumb screw (1).
- Unlatch paper retaining clips (2).
- Open panel to chassis latch (3) RH side plate.



SERIES 200 REROLL

IX OPERATION

(1) INDICATORS The PHR-212 has both a digital display and a continuous chart record of the pH (ORP) value.

- Use the digital display for intermittent checks of the pH (ORP) value and during calibration and maintenance.

SCALE

pH.....2 to 12

ORP.....0 to +1000 mV

- Use the chart paper as a permanent record of the pH (ORP) value for any given time period (usually 30 days). The chart recorder travels at 1" per hour. The plastic sliding door may be lowered to mark date and time on the chart paper.

SCALE

pH.....2 to 12

ORP.....0 to 1000 mV

- Use a remote indicator when display of the pH value is required in a control room or office separate from where the PHR-212 is mounted. Two (2) ordinary copper wires may be connected to the small terminal strip mounted on the sub-panel near the panel hinge and directly below the main terminal strip. These wires may be run up to 1,000 feet from the PHR-212 to a loop powered indicator (contact the factory for details).

SCALE

pH.....2 to 12

ORP.....0 to 1000 mV

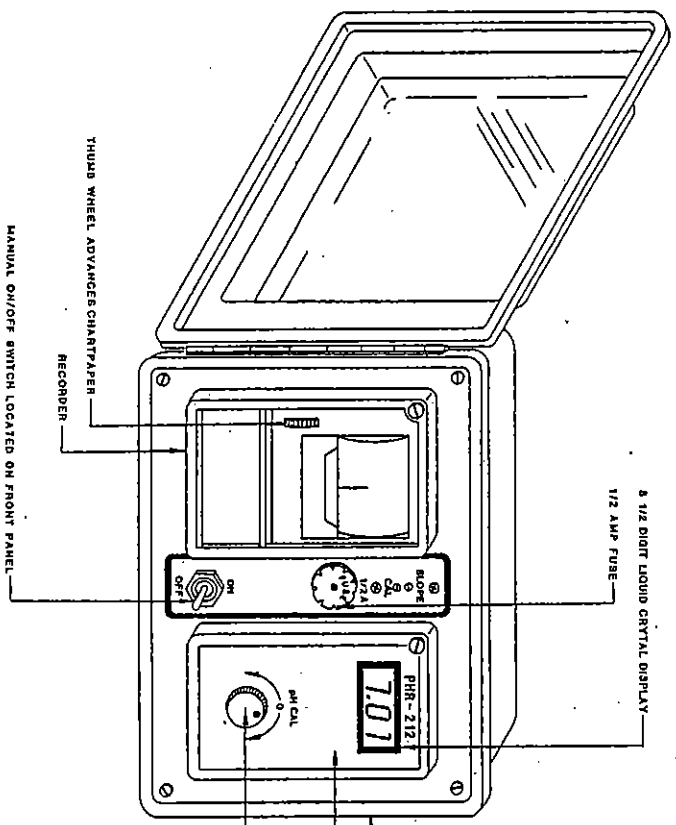
X

STEP-BY-STEP
OPERATING
INSTRUCTIONS

Now that you understand your PHR-212's functions, follow these procedures to begin normal operations:

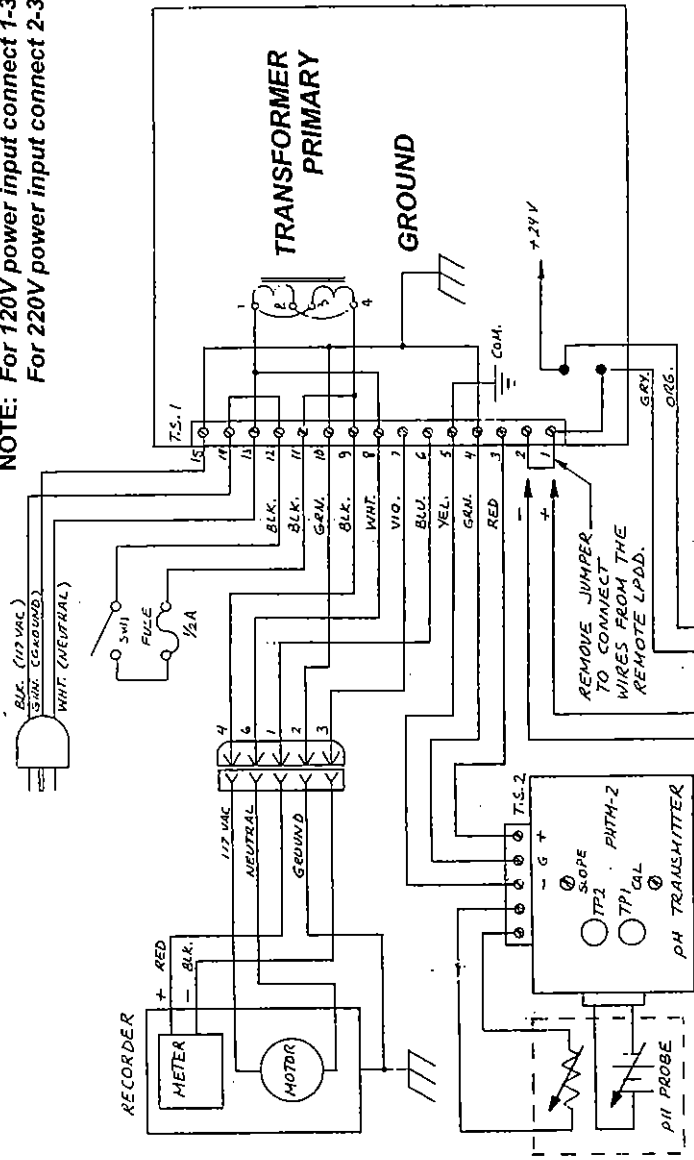
- Make sure electrodes are connected
- Turn on power switch
- Begin normal operation

REVISIONS			
LT#	DESCRIPTION	DATE	APPROVED



NOT INDICATED UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		PRESTO-TEK CORP.	
APPROVALS NAME TITLE ORGANIZATION	DATE	SCALE B	DRAWING NO. A 194
MODEL PHR-212 OUTLINE SALES DWG.		DO NOT SCALE DRAWING	
<i>[Signature]</i>		SHEET	

**NOTE: For 120V power input connect 1-3&2-4
For 220V power input connect 2-3**



TOLERANCES UNLESS OTHERWISE SPECIFIED
FRACTIONS DEC ANGLES

±	±	±	±
APPROVALS	DATE		
DRAWN <i>[Signature]</i>	9-15-85		
CHECKED			

PRESTO-TEK CORP.
PHR-212 WIRING
DIAGRAM
SCALE NONE
SIZE A
DRAWING NO. 20005
DO NOT SCALE DRAWING SHEET

11.99
LOOP POWERED DISPLAY

11.99
REMOTE POWERED DISPLAY

WARRANTY

ALL EQUIPMENT IS FULLY WARRANTED FOR A PERIOD OF ONE YEAR AS TO DEFECTS IN MATERIALS OR WORKMANSHIP. EQUIPMENT RETURNED IS PREPAID TO THE FACTORY. IF, IN THE OPINION OF THE FACTORY, FAILURE WAS DUE TO MATERIALS OR WORKMANSHIP, REPAIR OR REPLACEMENT WILL BE MADE WITHOUT CHARGE. AND RETURNED AT NO CHARGE, A NORMAL SERVICE CHARGE WILL BE MADE FOR REPAIRS MADE DUE TO MISTREATMENT, NORMAL WEAR, OR MADE ON EQUIPMENT OUT OF WARRANTY -- IN WHICH CASE, EQUIPMENT IS RETURNED FRIGHT COLLECT.

PH/ORP ELECTRODES CARRY A LIMITED 30 DAY WARRANTY DUE TO THE FRAGILE NATURE OF THIS COMPONENT.

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RESISTANCE VS. TEMPERATURE CHART

°C	0	10	20	25	30	40	50	60	70	80	90	100
°F	32	50	68	77	86	104	122	140	158	176	194	212
Ω	1000	1039	1078	1097	1117	1155	1194	1232	1271	1309	1347	1385