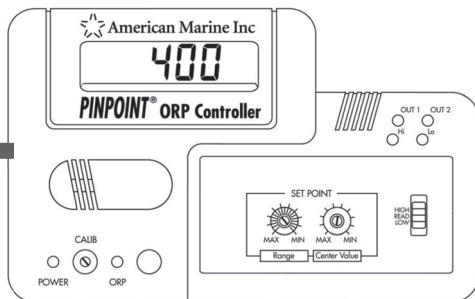


PINPOINT[®] **ORP/REDOX Controller** **120VAC**



User's Manual

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PINPOINT® ORP/REDOX Controller User's Manual

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I. Overview

This device consists of an ORP/REDOX Monitor and electronics, which will control external device(s) based on the ORP/REDOX reading. There are two adjustments to be made before putting the controller into service. Calibration and controller set points. After the controller is in service, it will be necessary to re-confirm and occasionally re-calibrate the ORP/REDOX controller. Always keep fresh calibration fluid on hand.

Many users will be controlling an ozone generator or chlorine device to raise ORP/REDOX values and/or/perhaps a different device to lower ORP/REDOX values with this instrument. It is important to pay special attention to the placement of the ORP/REDOX probe in the system and insure reasonable fluid circulation. Needle valves, pumps, and similar devices, should be designed to slowly raise or lower ORP/REDOX at a reasonable rate. Control electronics are not human, they are not intelligent and they cannot “know” when something has happened to make their input or output invalid.

II. General Specifications

ORP/REDOX Measurement Range -2,000 to +2,000

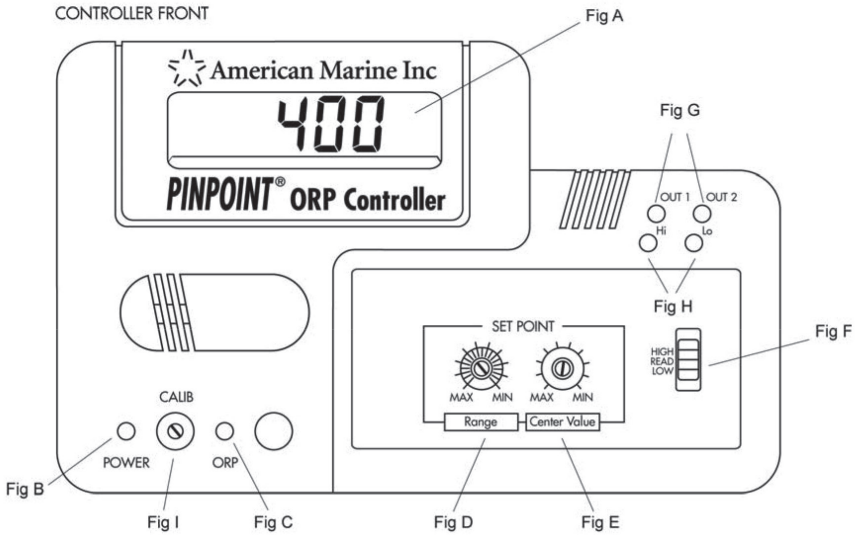
ORP/REDOX Set Point Range 000 to +1,000

3 1/2 Digit LCD Display

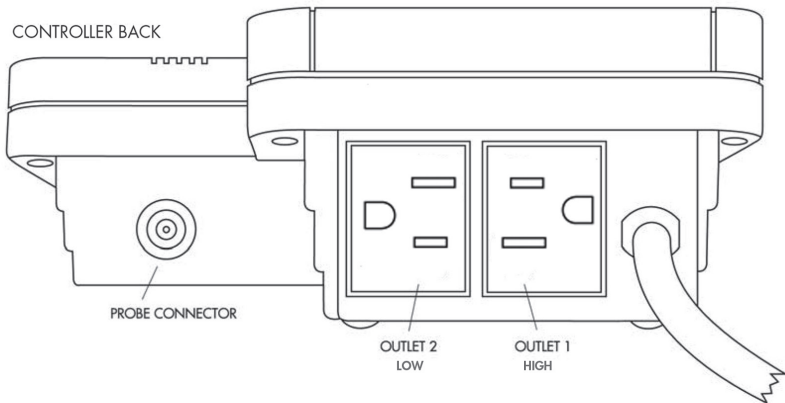
Resolution 1 mV

2 Independent 5 Amp 120 VAC Relay Outputs

CONTROLLER FRONT



CONTROLLER BACK



III. Displays and Adjustments

ORP/REDOX Display

ORP/REDOX Monitor Adjustment & Instrument Status

Controller Set Point Block

Display Mode

Controller Status LED's

120 VAC Outlets (#1 & 2)

PINPOINT® ORP/REDOX Probe

UPPER LEFT (ORP/REDOX Display)

The 3 1/2-digit LCD (Fig. A) at the top left of the controller displays a value corresponding either to the ORP/REDOX as measured through the probe or the HIGH or LOW controller set points.

LOWER LEFT (ORP/REDOX Monitor Power & Instrument Status)

Below the display is a single adjustment screw which is used to calibrate the electronics to the attached *PINPOINT*® ORP/REDOX Probe, and two LED's which report the status of the instrument.

The adjustment screw marked "CALIB" (Fig. I) is used with *PINPOINT*® +400mV ORP/REDOX Calibration Fluid. Detailed information on how to make these adjustments is given later.

The red POWER LED (Fig. B) is illuminated when the power is turned on to the controller. The ORP/REDOX LED (Fig. C) is illuminated when the display is indicating the ORP/REDOX as measured through the probe with the slide switch in the middle "READ" position. The ORP/REDOX LED is off when the display is indicating either the HIGH or LOW controller set points.

CENTER (Controller Set Point Block)

There are two adjustment screws that are used to create the controller set points. They control the RANGE (Fig. D) and CENTER VALUE (Fig. E) of the controller. Detailed information regarding their adjustment is given later in the ADJUSTING THE CONTROLLER section.

LOWER RIGHT (Display Mode)

The position of the SLIDE SWITCH (Fig. F) determines what the LED display will show. In the center position, the display indicates the ORP/REDOX that the probe is measuring, and the RED ORP/REDOX LED (Fig. C) at the lower left of the instrument will be illuminated. Sliding the switch up or down will cause the display to show the HIGH or LOW controller set points.

UPPER RIGHT (Controller Status LED's)

There are a total of 4 LED's here. The upper row (Fig. G) shows the status of the 120 VAC outlets, which you will find on the back of the controller. The lower LED lights (Fig. H) are activated when the slide switch is in either the HIGH or LOW position.

120 VAC OUTLETS

There are two outlets, which will be energized when the ORP/REDOX measurement is above (outlet #1) or below (outlet #2) the controller set points. A common application for the controller will be to control the addition of Ozone Gas to the system. Since the addition of Ozone Gas raises the ORP/REDOX value, the Ozone Creating Device would be plugged into the LOW control outlet (Outlet #2). If an ORP/REDOX lowering substance is being dispensed into the system, the device controlling the flow would be attached to the HIGH control outlet #1.

A Laboratory Grade **PINPOINT® ORP/REDOX Electrode** is supplied with the controller. A fluid-filled bottle will protect the end of the electrode. The fluid inside the bottle is commonly known as storage fluid. There is a suction cup attached to the electrode, which may be used to secure it, or a user-devised scheme of holding the electrode may be employed.

IV. CALIBRATING THE ORP/REDOX METER SUBSYSTEM

This is a single point calibration instrument. **PINPOINT® ORP/REDOX +400 mV Calibration Fluid** must be used to set the CALIB adjustment screw.

Before you begin the calibration process, you should disconnect any devices attached to the ORP/REDOX Controller outlets.

1. Set the display mode switch (far right) to the center position (READ). The ORP/REDOX LED (lower left, Fig. C) should be illuminated.
2. Unscrew and remove the plastic bottle protecting the end of the electrode if you are doing this for the first time. If the electrode has already been in service, you should note the condition of the electrode and clean it if required.
3. Rinse the electrode with room temperature tap water. Gently shake the electrode to remove any clinging drops of water.
4. Immerse the tip (bottom 1 inch) of the electrode into the **PINPOINT® ORP/REDOX +400 mV Calibration Fluid**. The display should show a steady reading fairly close to 400.
5. If the electrode does not easily stabilize or have the ability to reach 400 with the CALIB adjustment; this may be a sign that the electrode should be replaced.
6. Adjust the CALIB screw to bring the displayed ORP/REDOX to 400.
7. Remove the electrode from the **PINPOINT® ORP/REDOX +400 mV Calibration Fluid** and briefly rinse it with room temperature tap water. Gently shake the electrode to remove clinging drops of water.

The ORP/REDOX calibration process is now complete.

The ORP/REDOX calibration should be checked every month or whenever a displayed reading looks unusual. Typical probe life is 18 months of continuous duty.

Replacement **PINPOINT® Electrodes, Calibration Fluid, Probe Extension Cables** and **Storage Fluid** are available from www.americanmarineusa.com.

V. PROPER PLACEMENT OF THE ORP/REDOX ELECTRODE

When the controller is in use, it is critical that the tip (bottom 1-inch) of the electrode be immersed in the system at all times. If the water level falls below the sensing tip of the electrode, the ORP/REDOX probe will not read properly and connected devices will not act accordingly.

Consider the final placement of the probe and attach it securely so that it remains in position.

Be sure to check the probe position occasionally. Complacency usually sets in when you feel that “everything is running fine.”

VI. ADJUSTING THE CONTROLLER SET POINTS

The **PINPOINT® ORP/REDOX Controller** is capable of controlling ORP/REDOX within the range of 000 through +1,000. Negative Range control is possible. Contact American Marine Inc. directly for instruction. After the selection of the ORP/REDOX set points you will find that the controller can create a small or large span around the optimum selected ORP/REDOX value, from about +/- 5 ORP/REDOX mV to +/- 100 ORP/REDOX mV.

Two adjustment screws on the front panel determine the controller ORP/REDOX set points. The right adjustment screw is labeled “Center Value” and the left adjustment screw is labeled “Range.”

First, determine the optimum ORP/REDOX value for your system. As an example, let's choose 450 as the most optimum value for the ORP/REDOX.

1. Adjust the RANGE screw to Minimum for ease of calculation.
2. Toggle the slide switch from HIGH to LOW and note the display readings.

As an example if the HIGH reading is 520 and the LOW reading is 420 then the current optimal value is the number that is exactly in between. $(520 + 420) \div 2$ would be 470)

3. Since we are looking for an optimum value of 450 and the optimum value is currently set at 470 (20 too high) we should make the adjustment using the CENTER VALUE screw. Put the switch in the HIGH position and adjust the CENTER VALUE screw down by 20 from 520 to 500.

4. The HIGH value will now be set at 500 and the LOW value is automatically reset to 400. The optimum ORP/REDOX value (the number exactly in between the HIGH and LOW values) is now $500 + 400 \div 2$ which would be 450.

5. You may customize the ORP/REDOX range around your optimum ORP/REDOX value when the ORP/REDOX down or ORP/REDOX up device will become active. Currently the ORP/REDOX LOW value is set to 400 which indicates at a system ORP/REDOX value slightly below 400, outlet #2 will energize and the resulting

chemical reaction will drive the ORP/REDOX up to the optimal value of 450 at which time the controller will turn off the ORP/REDOX device (ozone generator). If you wish to have a larger span of ORP/REDOX range between device ON/OFF simply adjust the RANGE screw more toward Maximum.

6. ORP/REDOX down control is done in the same fashion toward the optimal value with an ORP/REDOX up device attached to outlet #2.

As an illustration of how the two adjustments are related, consider the following: When the measured ORP/REDOX moves from the center of the acceptable ORP/REDOX range (optimum value) to below the LOW set point, the device attached to the LOW outlet is activated and will remain ON until the ORP/REDOX is brought back to the center (optimum) value.

When the measured ORP/REDOX moves from the center of the acceptable ORP/REDOX range (optimum value) to above the HIGH set point, the device attached to the HIGH outlet is activated and will remain ON until the ORP/REDOX is lowered to the center (optimum) value.

PINPOINT® ORP/REDOX Controller **has control ability in *both* directions**

In our example the set points are as follows:

HIGH	500
LOW	400
OPTIMUM	450

The controller is set up to control Ozone Gas. There is an Ozone Generator attached to Outlet #2 in the back of the controller.

When the ORP/REDOX measurement of the water is below 400, Outlet #2 will energize the Ozone Generator and Ozone Gas will bubble into the water until the ORP/REDOX of the water reaches the Optimum Value of 450. When the ORP/REDOX value reaches the Optimum Value of 450 the Ozone Generator will shut off.

After the Ozone is shut down if the water still has a rising ORP/REDOX then the HIGH setting is important. If the ORP/REDOX of the water rises above the HIGH setting of 500 then outlet #1 will energize. Outlet #1 could have a regular air pump connected to it and the air should disperse in the water by an air stone. The air will drive off the Ozone Gas and return the water to the Optimum Value ORP/REDOX of 450 at which time the air pump will shut off.

NOTE: The American Marine line of **PINPOINT® pH, Temperature and ORP/REDOX Controllers** are unique because they can give control at both directions around the Optimum value. While attaching two devices that will control in both directions are not required it is a unique option.

WARRANTY

PINPOINT[®] **ORP/REDOX Controller** by American Marine Inc. is warranted to be free of defects in material and workmanship for a period of 2 years from date of sale. Positive proof of purchase is required for warranty claim.

American Marine Inc. will not be liable for any costs of removal, installation, transportation charges, or any other charges, which may result in connection with a warranty claim.

American Marine Inc. will not be liable for any damage or wear to products or livestock caused by abnormal operating conditions, water damage, abuse, misuse, unauthorized alteration or repair or if the product was not installed in accordance with the printed operating instructions.

Any defective product must be sent freight prepaid with appropriate documentation supporting the warranty claim. Replacement or repair will be at the discretion of American Marine Inc. Typical turnaround time within 24 hours. Overnight delivery available.

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