U.S. Fish and Wildlife Service
Marquette Biological Station
3090 Wright Street
Marquette, Michigan 49855
U.S.A.

and

U.S. Fish and Wildlife Service
Ludington Biological Station
5050 Commerce Drive
Ludington, Michigan 49431
U.S.A.

and

Department of Fisheries and Oceans
Sea Lamprey Control Centre
1219 Queen Street East
Sault Ste. Marie, Ontario P6A 2E5
Canada

INSTRUMENT OPERATING PROCEDURE

INSTRUMENT:

Dissolved oxygen meter

MODEL:

55

MANUFACTURER:

Yellow Springs Instrument Co., Inc.

PRECAUTIONS:

POTENTIAL INTERFERENCES

Chlorine, sulfur dioxide, nitric oxide, and nitrous oxide can affect readings by behaving like oxygen at the membrane. Static electricity may affect readings.

SAFETY

No special precautions

PROCEDURES:

I. Meter preparation

A. At initial set-up six AA-size batteries are installed.

1. Use a screwdriver or coin to remove the thumbscrew on the bottom of the meter.

2. Open the battery-chamber cover.

3. Install the batteries according to the label on the battery-chamber sleeves.

4. Press and release the ON/OFF button on the front of the instrument. The LCD will come on; if not, consult the troubleshooting guide.

5. This procedure is also used when **LO BAT** appears on the LCD.

B. Remove the probe from the calibration chamber and add 6-8 drops of distilled water into the sponge on the bottom of the chamber. Turn the instrument over to allow excess water to drain.

C. Prepare the probe: this procedure is used at initial set-up and when membrane replacement is necessary.

1. Unscrew the probe sensor guard.

2. Remove the O-ring and old membrane (if present).

3. Rinse the sensor tip and KCl reservoir with distilled water.

4. Prepare the electrolyte according to the directions on the KCl solution bottle.

5. Install the membrane (YSI Model 5775 standard membrane; 1 mil recommended).
   a. Secure a membrane between your thumb and the probe body. Add electrolyte to the probe until a large meniscus completely covers the gold cathode. Do not touch the center of the membrane.
   b. With the thumb and forefinger of your other hand, grasp the free end of the membrane and with a continuous motion, stretch the membrane up, over, and down the other side of the sensor. Stretching forms the membrane to the contour of the sensor tip.
   c. Secure the end of the membrane under your forefinger while continuing to hold the probe.
   d. Roll the O-ring over the end of the probe, while being careful not to touch the membrane surface. Leave no wrinkles in the membrane or trapped air bubbles under the membrane. Minor wrinkles may be removed by lightly tugging on the edges of the membrane beyond the O-ring.
   e. Trim excess membrane from the probe with scissors or a sharp knife. Check that the stainless steel temperature sensor is not covered by excess membrane.

f. Shake off excess KCl and rinse the stainless steel thoroughly with distilled water to prevent corrosion. Reinstall the sensor guard. Store the sensor in a humid environment such as the calibration chamber between measurements and when not in use.

II. Calibration

A. Ensure that the sponge inside the instrument calibration chamber is wet. Insert the probe into the calibration chamber.

B. Turn the instrument on by pressing the **ON/OFF** button on the front of the instrument. Wait a few minutes for the dissolved oxygen and temperature readings to stabilize.

C. Use two fingers to press and release the two “up” and “down” arrow keys at the same time.

D. The LCD will prompt you to enter the local altitude in hundreds of feet. Use the arrow keys to increase or decrease the altitude (example: entering the number 12 indicates 1200 feet). When the proper altitude appears on the LCD, press the **ENTER** key once to view the calibration value and a second time to move to the salinity compensation procedure.

E. The LCD will prompt you to enter the approximate salinity of the water you are about to analyze. Use the arrow key to decrease the salinity compensation to 0 (fresh water value). When 0 appears on the LCD, press the **ENTER** key.

F. It may be necessary to re-calibrate the instrument each time the YSI Model 55 is turned off. Complete all calibrations at a temperature as close as possible to the sample temperature.

III. Oxygen measurement

A Once the calibration is complete, the only keys which will remain operational are the **MODE** key, the **LIGHT** key, and the **ON/OFF** key.

B. Place the probe in the water. When measuring oxygen concentration of stream water, immerse the probe in slow moving water away from riffles or highly aerated areas.

C. Slowly move the probe to maintain movement of water across the membrane. Stream current furnishes sufficient movement when measuring the oxygen content of stream water.

D. Allow sufficient time for the probe to stabilize before measuring temperature and dissolved oxygen concentration.

E. Move between the mg/L and % air saturation mode by pressing the **MODE** key; the **LIGHT** key activates the back-light on the LCD.

F. The **ON/OFF** key turns the instrument off.

IV. Storage

A. Turn the **ON/OFF** switch to OFF.

B. Add a small quantity of deionized water to the sponge in the calibration chamber.

C. Rinse probe with deionized water.

D. Return the probe to the calibration chamber.

E. Return the meter to the storage case and secure.

MAINTENANCE:

I. Battery replacement - see section I.A.

II. Membrane replacement - see section I.C.

REFERENCE:

Operations Manual YSI Model 55 Handheld Dissolved Oxygen System

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This procedure has been reviewed and approved by the undersigned representatives of the U.S. Fish and Wildlife Service.

REVIEWED/APPROVED Jessica M. Barber Digitally signed by JESSICA BARBER Date: 2020.03.10 11:02:47 -04'00' DATE_____

Field Supervisor (U.S.)