INSTRUCTIONS FOR GALVANIC GLASS STERILIZABLE DISSOLVED OXYGEN ELECTRODES

The galvanic glass dissolved oxygen electrode is a self-powered sensor which can be repeatedly steam sterilized in place in fermentation tanks of all sizes.

SPECIFICATIONS

Probe Current:	at 28°C and 760 mm pressure
Nitrogen:	0.25 microamperes maximum; 0-5 mV (depending on meter used)
Air:	~ 10 microamperes; 30-50 mV (depending on meter used)

Membrane temperature coefficient:	~ 4% / °C
Maximum sterilization temperature:	125°C

HOW THE PROBE WORKS

When the probe leads are connected together, oxygen is reduced at the silver cathode and the oxygen partial pressure at the cathode falls to zero. This reaction causes a current to flow through the leads. The current is directly proportional to the absolute oxygen partial pressure outside the probe.

ISOLATION AND STERILIZATION

Since the probe is a complete system in itself, it is relatively unaffected by its external environment. The electrodes are bathed in a known medium and protected from contamination by the teflon membrane. Thus, the probe will measure oxygen in solutions contaminated by ionic reducing agents and reducing (ion consuming) organic matter. The probe is subject to interference only from low-molecular-weight reducing gases like the halogens and hydrogen sulfide.

The probe and electrolyte are designed to withstand temperatures above those normally associated with the fermentor sterilization process. In addition, the well supported membrane can withstand autoclave pressures. **THE PROBE RESERVOIR MUST BE VENTED TO THE ATMOSPHERE. THE FILLING TUBES MUST BE DISCONNECTED DURING STERILIZATION FOR VENTILATION.**

ANODE AND PROBE PROTECTION

There is one condition under which the probe can be rapidly destroyed. This will occur whenever an interference between air and electrolyte occurs on any portion of the lead anode. The lead will rapidly oxidize because of the unlimited oxygen supply; the electrolyte will dissolve the lead oxide and the anode will be destoyed at the interface within a few hours.

To prevent this type of destruction, be sure the probe is completely filled with electrolyte and that no air bubbles are trapped in the probe. When storing or mounting the filled probe, be certain that no interface between lead anode, electrolyte and air occurs.

PROBE STORAGE

Fill the probe with electrolyte, eliminate air bubbles, short the output leads and store the probe in a vertical position.

CHANGING THE MEMBRANE

1. Cut a 3/4” length of silicone rubber tubing and place it in a container of methyl chloroform solvent. The solvent will cause the tubing to swell and soften. Allow the tubing to soak for at least 2 minutes.

2. Use a razor blade to cut the old silicone rubber tubing and discard the old membrane.

3. Carefully remove a new membrane and lay it across the tip of the probe, stretch it slightly and hold its end against the side of the probe with the thumb and forefinger (see Figure 1 below).

4. Remove the silicone rubber tubing from the solvent and carefully slide it over the membrane onto the probe.

5. Inspect the membrane - it should be taut and should not be wrinkled where it covers the cathode.

6. Allow the solvent to evaporate from the silicone tubing, then inspect the membrane again. Trim off excess from behind the silicone tubing.

7. Apply a thin bead of silicone RTV around the back end of the silicone tubing (the end close to 12 mm body).

8. After filling the probe, tap the side near the tip to eliminate any air bubbles which may be trapped in this area.

9. With a hypodermic syringe and needle, fill the probe completely through the fill tube marked “fill”.

10. Hang probe vertically and allow 24 hours for silicone to cure. Make sure the output leads are connected.

Figure 1 - Membrane Mounting Procedure