Oxyview System

Oxygen Electrode Measurement Teaching System

- Convenient, low cost system for teaching of photosynthesis research & cellular respiration measurements using the oxygen electrode
- Clear cast acrylic DW1/AD oxygen electrode chamber with integral Clark type polarographic oxygen electrode
- Oxyview electrode control unit with integral magnetic stirrer
- Oxygen content of sample displayed as digital or percentage value
- User-friendly configuration via a responsive 4 button control panel and a series of comprehensive menu screens
- Analogue output for connection to a chart recorder or other external recording device
- Minimal footprint (90 x 135mm) allowing multiple units where bench space is limited

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Overview

The Oxyview liquid-phase oxygen electrode teaching system has been designed in response to the ever-increasing demand for a low-cost system for teaching photosynthesis and respiration measurements using oxygen electrode techniques. The system is designed to be used in a busy teaching environment but is equally at home in a modern research facility. The system provides a high degree of flexibility allowing oxygen evolution or consumption to be demonstrated from a wide range of samples from isolated chloroplasts to mitochondrial suspensions in assays for both photosynthesis and cellular respiration studies.

The Oxyview system is an ideal solution for practical demonstrations of this significant and highly flexible method of bio-sensing throughout all areas of the biological sciences. It is setup and configured in minutes allowing multiple systems to be used easily amongst large groups for student practicals and techniques sessions.

The system comprises the Oxyview control unit, S1 Clark type electrode disc and DW1/AD liquid-phase electrode chamber with a range of accessories and spares also included (excluding circulating water bath and chart recorder).

Clark Type Oxygen electrodes have been in use in bio-sensing assays since their development in the early 1960’s by Prof. Leland Clark. Their use was first demonstrated as an effective tool for monitoring glucose in blood samples. Subsequently, Clark Type oxygen electrodes are now used in an enormous number of different bio-sensing applications from measurement of mitochondrial respiration in biomedical applications and as a probe of photosynthetic performance in plant biology labs.

The OXY1 Oxyview control unit has been designed as a convenient, low cost oxygen electrode control unit for teaching studies of photosynthesis and cellular respiration using the oxygen electrode measurement technique.

The Oxyview is configured and controlled via a front mounted control panel featuring 4 touch-sensitive buttons. Configuration is achieved by navigating through a series of simple menu screens and following the displayed guidelines for each step of the setup process. These configuration steps include setting of the stirrer speed and back-off and gain settings. Once configured, the Oxyview control unit provides an accurate and stable reading of the oxygen content of the sample in question. The Oxyview control unit has an integral magnetic stirrer allowing the overall footprint of the Oxyview system to be minimal (90 x 135mm); convenient when multiple setups are required for teaching programmes in limited space.

The Oxyview has a 0 – 5V analogue output. This allows the measured values from the control unit to be logged to an external recording device such as a chart recorder or similar datalogger accepting a 0 – 5V analogue input.

The DW1/AD oxygen electrode chamber provides a highly versatile solution to measurements of dissolved oxygen in liquid-phase samples. It can be used for a wide range of applications from basic teaching through to more advanced research assays. Due to the gas-tight plunger assembly, the DW1/AD lends itself particularly well to respiration assays in small sample volumes where any minute diffusion of ambient oxygen into the chamber may cause measurement artefacts.

The DW1/AD oxygen electrode chamber is constructed from clear cast acrylic providing good sample visibility & uniform illumination. Precise temperature control of the sample and electrode disc can be achieved by connecting the water jacket of the DW1/AD to a thermoregulated circulating water bath.

The sample is housed within a borosilicate glass reaction vessel which has a variable sample volume of between 0.2 and 2.5ml controlled by the gas-tight adjustable plunger assembly. This plunger has a stopped central precision bore allowing additions/subtractions to be made to/from the reaction mixture using a standard Hamilton type syringe.

Technical Specifications

**OXY1 Oxyview Electrode Control Unit**

- Measuring Range: 0 - 100% oxygen
- Min. O₂ Resolution: 10 x 10⁻⁶ μmol/ml at 20 ºC
- Magnetic Stirrer: Manually operated between 250 - 900rpm in 6 steps
- Polarising Voltage: Selectable between 0.4 - 0.9V (0.7V recommended default)
- Gain: Coarse: x1, x2, x5, x10, x20, x50, x100.
- Integral Test: Yes
- Resistor: Yes
- Signal Inputs: Electrode disc input
- Signal Output: 0 - 5V analogue electrode signal
- Dimensions: 90 x 135 x 85mm. Weight: 320g
- Power Supply: 12V DC 2.5A

**DW1/AD Oxygen Electrode Chamber**

- Suitability: Liquid-phase respiration/photosynthesis
- Construction: Clear cast acrylic
- Sample chamber: Precision bore, borosilicate glass tube
- Sample volume: 0.2 - 2.5ml
- Temperature control: Water jacket connected to temperature controlled circulating water bath
- Dimensions (D x H): 65 x 105mm. Weight: 110g
- Plunger: Variable plunger assembly with central bore for sample additions

**S1 Oxygen Electrode Disc**

- Electrode type: Clark type polarographic oxygen sensor
- Electrode output: Typically 1μA at 21% O₂
- Residual current: Typically 0.02μA in 0% O₂
- Response time: 10 - 90% typically < 5 seconds
- Oxygen Consumption: Typically <0.015μmol/min⁻¹

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