

Oxyview 1

Oxygen electrode measurement
teaching system



Hansatech
Instruments



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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

Oxyview control unit

The OXYV1 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 control unit is fully compatible with the range of oxygen electrode chambers produced by Hansatech Instruments thus allowing a wide range of different assays to be performed in both liquid and gas-phases.



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 (for liquid-phase measurements) 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 is powered by a 12V DC wall cube which connects directly to the rear of the unit. Also at the rear is 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.

Oxygen electrode disc

Since its original design in the early 1970's by Tom Delieu and David Walker, the S1 Clark Type Oxygen Electrode disc remains largely unchanged – a true testament to the quality and reliability of the sensor. The S1 consists of a platinum cathode and silver anode set into an epoxy resin disc.



When a small voltage is applied across these electrodes (with the platinum negative with respect to the silver), the current which flows is at first negligible and the platinum becomes polarised (i.e. it adopts the externally applied potential). As this potential is increased to 700 mV, oxygen is reduced at the platinum surface, initially to hydrogen peroxide H_2O_2 so that the polarity tends to discharge as electrons are donated to oxygen (which acts as an electron acceptor). The current which then flows is stoichiometrically related to the oxygen consumed at the cathode providing a fast, effective method of detecting small changes in oxygen tension in a liquid-phase sample.

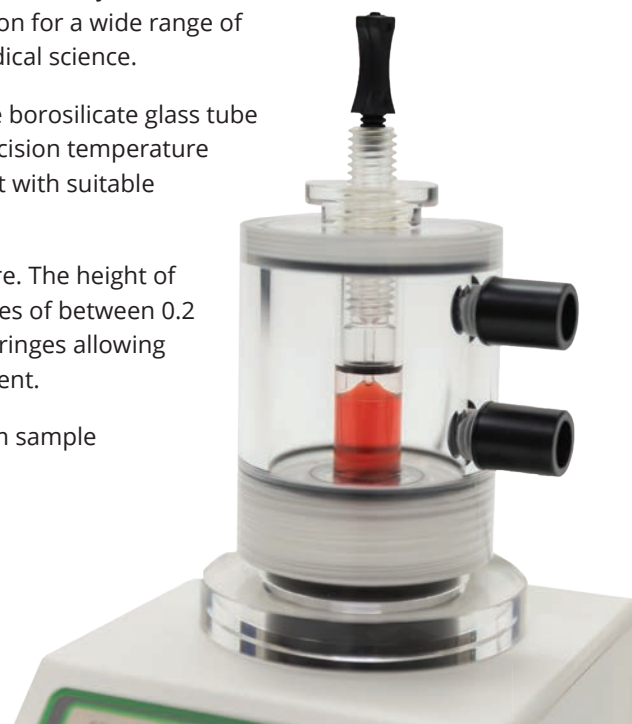
DW1/AD electrode chamber

A component that has proved itself time and again over 4 decades, the DW1/AD electrode chamber offers quality and versatility in measurements of dissolved oxygen. Developed in conjunction with the great Prof. David Walker, the DW1/AD provides a highly flexible solution for a wide range of applications covering both teaching and research in plant and biomedical science.

The reaction vessel of the DW1/AD is constructed from precision bore borosilicate glass tube with a prepared S1 electrode disc forming the floor of the vessel. Precision temperature control of sample and sensor is delivered via a concentric water jacket with suitable connection ports for a thermoregulated circulating water bath.

DW1/AD is fitted with a gas-tight plunger with a stoppered central bore. The height of the plunger may be adjusted easily to suit liquid-phase sample volumes of between 0.2 - 2.5ml whilst the central bore easily accommodates Hamilton type syringes allowing additions/subtractions to/from the reaction vessel during an experiment.

The clear acrylic construction allows high sample visibility and uniform sample illumination using external light sources where necessary.



System components

Oxyview 1 systems are supplied with the following components

- > OXYV1 Oxyview control unit
- > DW1/AD: Electrode chamber
- > S1: Oxygen electrode disc and SMB-SMB connection cable
- > A2: Membrane applicator to assist with smooth application of electrode membrane
- > A3: Top plate key and alignment jig to dismantle and reassemble DW1/AD for cleaning
- > S2/P: Pack of 5 magnetic followers
- > S3: Pack of 2 replacement borosilicate glass reaction vessels
- > S4: Reel of PTFE membrane (0.0125mm x 25mm x 33m)
- > S7A: Set of replacement o-rings for DW1/AD
- > S16: Cleaning kit for the S1 electrode disc.

Technical specifications

Oxyview 1 electrode control unit

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|---------------------|---|
| Measuring range: | Oxygen: 0 - 100% |
| Signal inputs: | Oxygen electrode (SMB) |
| Resolution: | 10 x 10 ⁻⁶ μmols/ml at 20 °C |
| Polarising voltage: | Selectable between 0.4 - 0.9V (0.7V recommended default) |
| Gain: | Coarse: x1, x2, x5, x10, x20, x50, x100. Fine: 1mV steps |
| Back off: | Signal back off in 1mV steps |
| Analogue output: | 0 - 5V electrode signal |
| Dimensions (HWD): | 90 x 135 x 85mm |
| Weight: | 320g |
| Power: | 95 - 260V universal input mains supply. Output 12V DC 2.5A |

DW1/AD 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 thermoregulated circulating water bath |
| Dimensions (DH): | 65 x 105mm |
| Weight: | 100g |
| Plunger: | Variable height plunger assembly with central bore for sample additions |

S1 oxygen electrode disc

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|---------------------|--|
| Electrode type: | Clark type polarographic oxygen sensor |
| Electrode output: | Typically 1.6μA at 21% O ₂ |
| Residual current: | Typically 0.04μA in 0% O ₂ |
| Response time: | 10 - 90% typically < 5 seconds |
| Oxygen consumption: | Typically <0.015μmol/hr ⁻¹ |



Hansatech Instruments is a British company that has been developing high quality scientific instrumentation for over 40 years. Our systems are used widely for teaching & research in cellular respiration & photosynthesis programs in more than 100 countries throughout the world. We have gained an enviable reputation for quality, reliability & excellent price/performance.



Our product range consists of a range of modular solutions for the measurement of oxygen using Clark type polarographic sensors. We also develop chlorophyll fluorescence measurement systems using both continuous excitation & pulse-modulated measurement techniques with further optical instrumentation for the measurement of sample chlorophyll content.



Purchasers of Hansatech Instruments products can be assured of ongoing support & prompt & efficient attention to enquiries at all times. Support is available both directly & from our global distributor network. Customers are encouraged to register their instruments on our website which allows access to our Support Ticketing System in addition to instruments manuals & software upgrades.

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