



CHLOROVIEW 1 SYSTEM

- Convenient, entry-level system for the study of photosynthesis & respiration measurements in liquid-phase samples under illumination.
- Clear cast acrylic DW1 oxygen electrode unit with integral S1 electrode disc sensor.
- Oxygen electrode control & signal acquisition via Oxyview control unit.
- Oxygen signal output from Oxyview to recording device via 0 - 5V analogue output.
- Illumination via LS2 high intensity tungsten halogen white light source.
- LS2 intensity adjustable by insertion of neutral density filters.
- Quantitherm light/temperature sensor for light source calibration.

Overview

Chloroview 1 is an entry level system for studies of photosynthesis & respiration from liquid-phase suspension samples under actinic illumination. The system is ideally suited to teaching environments for under & post-grad plant biology studies of the photosynthetic processes but is equally at home in research facilities where demands on equipment performance are high.

Samples are typically between 0.2 - 2.5ml and consist of suspensions of extracted chloroplasts, micro-algae etc. Changes in oxygen concentration of the sample medium are determined by the integral oxygen electrode mounted in the base of the chamber.

The system comprises the Oxyview control unit, S1 Clark type electrode disc, DW1 liquid-phase electrode chamber, LS2 high intensity light source with neutral density filters to modify light intensities and QRT PAR/temperature sensor for light source calibration. All necessary accessories and spares are also included (excluding circulating water bath and chart recorder).

Components of the System

The Chloroview 1 system consists of the following individual items:

OXYVI 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, 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 has an integral magnetic stirrer for liquid-phase applications allowing the overall footprint of the Oxyview control unit to be minimal (90 x 135mm); convenient when multiple setups are required for teaching programmes in limited space.

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.

DW1 Electrode Chamber



The DW1 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.

The DW1 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 adjustable plunger assembly. This plunger has a stoppered central precision bore allowing additions/subtractions to be made to/from the reaction mixture using a standard Hamilton type syringe.

SI Oxygen Electrode Disc

The Chloroview 1 system is based around the S1 Clark type polarographic oxygen electrode disc. When fitted, the dome of the electrode disc forms the floor of the electrode chamber reaction vessel providing a sensitive and rapid response to small changes in oxygen tension within the sample.



The electrode disc comprises a central platinum cathode and a concentric silver anode. Preparation includes the addition of electrolyte and the application of a thin oxygen permeable P.T.F.E. membrane to the electrode dome. Once prepared and positioned in the electrode chamber, the disc is connected to the Oxyview control circuitry which applies a small polarising voltage between the electrodes. In the presence of oxygen, a small current is generated proportional to oxygen activity in the sample.

LS2 High Intensity Light Source



The LS2 is a high intensity (100W) tungsten halogen light source which is powered from a stabilised power supply.

The separate lamp housing contains a cooling fan, infrared reducing "Hot-Mirror" and optics to provide light with minimum variation of intensity across the beam and little divergence from parallel.

QRT1 PAR/Temperature Sensor

The QRT1 with QTP1 probe sensor is a handheld PAR sensor combined with a thermometer. The QTP1 probe mounts vertically in the reaction vessel of the DW1 electrode unit & permits calibration of incident light & temperature in the chamber.



Technical Specifications

OXYVI Oxyview Electrode Control Unit

Measuring Range	0 - 100% oxygen
Min. O ₂ Resolution	Typically 10 x 10 ⁻⁶ μmols/ml at 20 °C
Integral Magnetic Stirrer	Manually operated between 250 - 900rpm in % steps
Polarising Voltage	Selectable between 0.4 - 0.9V (0.7V recommended default)
Gain/Back Off Control	Signal back off in 1mV steps. Signal gain in 2 modes: Coarse gain x1, x2, x5, x10, x20, x50, x100. Fine gain in 1mV steps
Integral Test Resistor	Yes
Signal Inputs	Electrode disc input
Signal Output	0 - 5V analogue output of electrode signal
Dimensions	90 (w) x 135 (d) x 85mm (h). Weight: 320g
Power Supply	95 - 260V universal input mains supply. Output 12V DC 2.5A
Electrode Chamber Compatibility	All Hansatech Instruments electrode chambers

DW1 Oxygen Electrode Chamber

Measurement 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	65 (d) x 105mm (h). Weight 100g
Additional Information	Variable plunger assembly with central bore for sample additions

SI Oxygen Electrode Disc

Electrode Type	Clark type polarographic oxygen sensor
Electrode Output	Typically 1μA at 21% O ₂ . Residual current in 0% O ₂ typically 0.02μA
Response Time	10 - 90% typically < 5 seconds
Oxygen Consumption	Typically < 0.015 μmol hr ⁻¹

LS2 High Intensity White Light Source

Lamp Type	100W tungsten-halogen (50W available on request)
Power Supply	Mains, stabilised power supply. 12V DC 10A. 120/240V 60/60Hz
Intensity Adjustment	Via combinations of neutral density filters (4 ND filters supplied)
Dimensions	Light housing: 145 (h) x 65 (w) x 75mm (d). Weight 1.0kg Power supply: 86 (h) x 150 (w) x 140mm (d). Weight 1.4kg
Max. Intensity in Chambers	1800 μmol m ⁻² s ⁻¹ (8000 μmol m ⁻² s ⁻¹ when using LS/FO adapter and fibre optic cable)

QRT1 PAR/Temperature Sensor

Measuring Range	0 - 50000 μmol m ⁻² s ⁻¹ (+/- 5%) in 2 ranges (0 - 5000 and 0 - 50000) in 400 - 700nm waveband
Resolution	1 μmol m ⁻² s ⁻¹ at 0 - 5000, 10 μmol m ⁻² s ⁻¹ at 5001 - 50000
PAR Sensor	Silicon photodiode/optical filter combination with white acetal diffuser (7mm diameter)
Temperature Sensor	RT curve matched bead type thermistor. 0 - 50°C/32 - 122°F. 0.02°C resolution
Signal Display	Handheld display unit. 16 x 2 LCD display. 0 - 5V analogue output of PAR/temperature values
Power Requirement	4 x 1.5V AA (LR6) cells. Typically 100 hours battery life
Dimensions	Display: 146 (h) x 92 (w) x 32mm (d). Weight: 300g (including batteries). QTP1 probe: 9.5 (dia.) x 107mm (length). Weight: 50g