



Chloroview 1

Entry Level System for the Measurement of Photosynthesis & Respiration in Gas-Phase Samples

- ✓ 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



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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).

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 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 1 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 oxygen electrode chamber provides a highly versatile solution to measurements of dissolved oxygen in liquid-phase samples. It 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 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 with a stoppered central precision bore allowing additions/subtractions to be made to/from the reaction mixture using a standard Hamilton type syringe.

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

2 slots are provided to accept 50mm square optical filters or a manual shutter plate. A range of light intensity steps may be achieved by adding permutations of the 4 A5 neutral density filters supplied (0.1, 0.3, 0.6 and 1.0 O.D.) to attenuate the light intensity. Maximum sample illumination intensities vary depending on the type of electrode chamber in use.

Technical Specifications

OXYV1 Oxyview Electrode Control Unit

Measuring Range:	0 - 100% oxygen
Min. O₂ Resolution:	10 x 10 ⁻⁶ μmol/s/ml at 20 °C
Magnetic Stirrer:	Manually operated between 250 - 900rpm in % steps
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
Integral Test Resistor:	Yes
Signal Inputs:	Electrode disc input
Signal Output:	0 - 5V analogue electrode signal
Dimensions (w x d x h):	90 x 135 x 85mm. Weight: 320g
Power Supply:	95 - 260V universal input mains supply. Output 12V DC 2.5A

DW1 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 circulating water bath
Dimensions (d x h):	65 x 105mm. Weight: 100g

S1 Oxygen Electrode Disc

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

LS2 Halogen 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 4 neutral density filters (supplied)
Dimensions:	Light housing: 145 x 65 x 75mm. Weight 1.0kg Power supply: 86 x 150 x 140mm. Weight 1.4kg
Max. Intensity in DW1:	1800 μmolm ⁻² s ⁻¹

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 band
Resolution:	1 μmolm ⁻² s ⁻¹ at 0 - 5000, 10 μmolm ⁻² s ⁻¹ at 5001 - 50000
PAR Sensor:	Silicon photodiode/optical filter with white acetal diffuser (7mm dia)
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

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