



Oxytherm System

Liquid-Phase Photosynthesis & Respiration Measurement System

- ✓ PC operated Oxytherm electrode control unit suitable for liquid-phase measurements of photosynthesis & respiration
- ✓ Peltier oxygen electrode unit with integral thermoelectric temperature control
- ✓ Compact design with integral electronics and magnetic stirrer
- ✓ Computer controlled oxygen electrode system with direct on-screen display of traces
- ✓ Custom Windows® software for instrument control and data analysis
- ✓ System expansion to 8 channels via purchase of additional components



Hansatech Instruments

Hansatech Instruments is a small, British, scientific instrument company located in the heart of rural Norfolk. For over 40 years, our efforts have been concentrated towards the design & manufacture of high quality instrumentation for teaching and research in the fields of cellular respiration and photosynthesis. Our instruments are now in use in a wide range of programs in more than 100 countries throughout the world and have gained an enviable reputation for quality, reliability and excellent price/performance.



Products

Hansatech Instruments product range covers a wide range of applications in the fields of photosynthesis and cellular respiration. We manufacture oxygen measurement systems based on Clark type polarographic oxygen sensors, chlorophyll fluorescence measurement systems for both continuous excitation and pulse-modulated measurement techniques and optical instrumentation for the measurement of sample chlorophyll content.



Support

Purchasers of Hansatech Instruments products can be assured of ongoing support and prompt and efficient attention to enquiries at all times. Customers are encouraged to register their instruments on our website which allows access to our Support Ticketing System in addition to instruments manuals and software upgrades.



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Overview

The Oxytherm oxygen electrode control unit is designed to provide PC control of oxygen uptake or evolution measurements across a broad range of applications from studies of mitochondrial and cellular respiration to measurements of isolated chloroplast suspensions in photosynthesis research.

Oxytherm operates in conjunction with user-friendly O₂view data acquisition and system configuration software to provide an effective tool for the measurement of oxygen signals from the S1/MINI Clark type electrode disc with quick and easy system calibration and configuration.

The S1/MINI oxygen electrode disc has been designed exclusively for use in the Oxytherm Peltier Electrode Chamber and is based on the standard 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 of the electrode 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 Oxytherm control circuitry which applies a small polarising voltage between the platinum and silver electrodes. In the presence of oxygen, a small current is generated proportional to oxygen activity in the sample.

Oxytherm is supplied with a sophisticated temperature controlled oxygen electrode chamber consisting of a fan assisted Peltier Element with a large surface area and thermally insulated reaction vessel. This allows rapid equilibration and maintenance of any user-selected temperature within the range 3-40°C (assumes ambient temperature of 20°C) providing freedom to site the unit away from the traditional laboratory setting. It also ensures that temperature related artefacts are minimised during measurement.

The Oxytherm oxygen electrode control unit comprises a robust yet lightweight enclosure containing the integrated electronics and magnetic stirrer. The electrode chamber consists of a similarly constructed enclosure containing the 10mm precision bore borosilicate glass reaction vessel which is well insulated in order to minimise heat loss through the casing and also provides the capability to perform both light and dark reaction measurements.

An optical port is situated on the side of the casing to suit FMS 1 and FMS 2 chlorophyll fluorometer fibre-optic cables allowing simultaneous measurement of chlorophyll fluorescence from photosynthetically active samples. There is also a viewing port in the front of the electrode unit with an illuminating white LED controlled by a push button on the side of the unit. Both control box and the electrode unit are powered from a single external 12V DC power supply.

An Oxytherm system may be configured as a single or multi-channel setup in order to make comparative measurements of oxygen from multiple samples. A system comprises a minimum of one (maximum of eight) control units linked together in a chain to the serial port of a Windows® PC. Oxytherm control units may be freely interspersed with Oxygraph oxygen electrode control units within a multi-channel system.

Simultaneous recording of an optional auxiliary input signal (e.g. temperature, pH, fluorescence, TPP+ or other specific ion electrodes etc) is also possible using the OXY/PHA amplifier unit coupled via the auxiliary input on the rear of the Oxytherm oxygen electrode control unit.

The control unit connects to a PC via the serial port and uses bidirectional RS232 communications for instrument control from the PC and data acquisition to the PC. There is no requirement for separate loggers, internal PC interfaces or A/D cards. Laptop or notebook computers are therefore just as suitable as a desktop PC and provide a highly portable, compact system whenever bench space is limited.

Technical Specifications

OXYT1 Oxytherm Electrode Control Unit

Measuring Range: 0 - 40% oxygen
Min. O₂ Resolution: 10 x 10⁻⁶ μmols/ml at 20 °C
Magnetic Stirrer: 150 - 900 rpm
Polarising Voltage: 700 mV
Gain: Up to x50 (10 bit resolution)
Back off: 12 bit resolution
Integral Test Resistor: Yes
Acquisition Rate: 0.2 - 10 readings/s
Signal Inputs: Electrode disc, Auxiliary input
Communications: Bidirectional RS232. USB via HAN/USB adapter (supplied)

Dimensions (w x d x h): 250 x 126 x 136mm - 1.27Kg
Power Supply: 95 - 260V universal input mains supply. Output 12V DC 2.5A

Peltier Electrode Chamber

Temp range: 3 - 40°C (25°C ambient).
Response time: <10 min, accuracy: +/- 0.5°C.
Sample volume: 0.2-2.5ml.
Optical ports: FMS fluorimeter fibre optic port,
Front viewing window
Dimensions: 132 x 100 x 90mm

S1/MINI Oxygen Electrode Disc

Electrode Type: Clark type polarographic oxygen sensor
Electrode Output: 1 μA at 21% O₂
Residual current: Typically 0.02 μA in 0% O₂
Response Time: 10 - 90% typically < 5s
Oxygen Consumption: Typically <0.015 μmol hr⁻¹



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JH BIO Innovations Pvt. Ltd.

145, AECS Layout, 1st Stage, Sanjay Nagar, Bangalore - 94, India.

Ph: 080 - 23418944/45/46 Fax: 080- 23418947

E-Mail: info@jhindia.com Web: www.jhindia.com

Hansatech Instruments Ltd

Narborough Road, Pentney, King's Lynn, Norfolk, UK PE32 1JL

Tel: +44 (0)1760 338877

Fax: +44 (0)1760 337303

www.hansatech-instruments.com

info@hansatech-instruments.com