

Light Sources & Sensors



Hansatech
Instruments



LED1 - LED Light Source



LED Light Source



Software Controlled



3 Colour Options - Red, White, and Blue

- > High intensity probe type light housing with single LED light source
- > Available in 3 colours: LED1/W (white - 4100K), LED1/B (blue - 470nm) and LED1/R (red - 627nm)
- > Compatible with DW2/2, LD2/3 and DW3 (with suitable adapter) electrode chambers
- > Max. intensity up to 2000 $\mu\text{mol m}^{-2} \text{s}^{-1}$ in DW2/2
- > Requires Oxylab+ control unit for calibration and automatic control of intensity changes

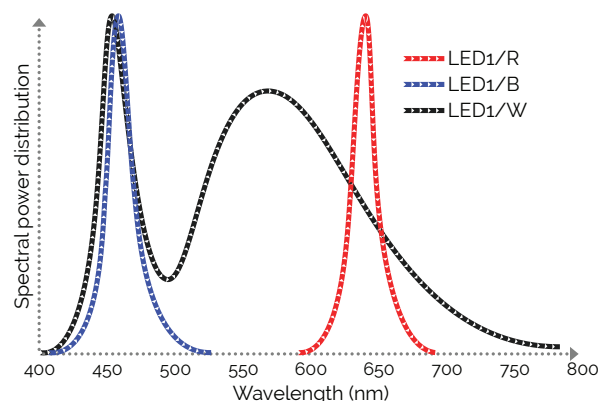
The LED1 range of light sources consist of single high intensity LED's. The source is available in 3 different colours:

- > LED1/W: White with a colour temperature 4100K
- > LED1/B: Blue with a peak wavelength centered on 470nm
- > LED1/R: Red with a peak wavelength centered on 627nm.

All 3 options have the capacity for a maximum intensity of 2000 $\mu\text{mol m}^{-2} \text{s}^{-1}$ and have been developed for optimum uniformity across the illuminated area.

The LED1 is designed primarily for use with the DW2/2 although it is possible to insert the LED1 into the 16mm internal diameter optical port of the LD2/3 and DW3 (via 16mm internal diameter reducing adapter) electrode chambers.

One or more light housings may be used in conjunction with the Oxylab+ electrode control unit to provide up to considerably higher light intensities in the DW2/2 reaction vessel.





LH36/2R - Red LED Light Source



LED Light Source



Software Controlled



Integral Cooling Fan

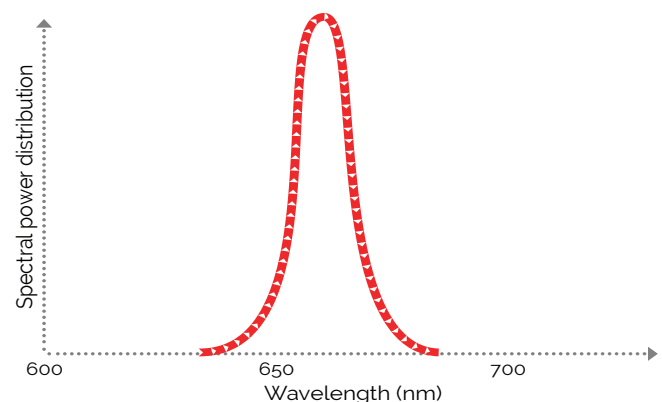
- > High intensity light housing with 36 red LED's centred on 650nm
- > Compatible with DW3, LD1/2 and LD2/3 electrode chambers
- > Max. intensity up to $900 \mu\text{mol m}^{-2} \text{s}^{-1}$ in DW3 and $750 \mu\text{mol m}^{-2} \text{s}^{-1}$ in LD1/2 and LD2/3
- > Requires Oxylab+ control unit for calibration and automatic control of intensity change

The LH36/2R consists of an array of 36 red LED's and is designed for use with the DW3 liquid-phase electrode chamber and LD1/2 and LD2/3 gas-phase electrode chambers.

The LH36/2R requires a connection with the Oxylab+ electrode control unit which is responsible for the regulation of light intensity according to a user defined PFD (Photon Flux Density) table.

The LH36/2R has an integral cooling fan which automatically switches on to cool the housing when the light intensity reaches a certain point.

The LH36/2R has a maximum intensity of $750 \mu\text{mol m}^{-2} \text{s}^{-1}$ in the gas-phase chambers and $900 \mu\text{mol m}^{-2} \text{s}^{-1}$ in DW3





LS2 - White Light Source



Tungsten Halogen Light Source



Infrared Reducing "Hot Mirror"



Mains Powered



Integral Cooling Fan

- > High intensity 100W tungsten halogen light source (50W option available)
 - > Max. intensity up to $1800 \mu\text{mol m}^{-2} \text{s}^{-1}$ in DW1, DW1/AD & LD1/2 electrode chambers
 - > Max. intensity up to $8000 \mu\text{mol m}^{-2} \text{s}^{-1}$ in DW2/2, DW3 & LD2/3 electrode chambers using LS2/FO and A8 accessories
 - > Integral optics provide minimum intensity variation across beam and little divergence from parallel
 - > Integral infrared reducing Hot-Mirror filter
 - > Mains powered stabilised power supply
 - > Mounting slots allowing addition of filters for intensity attenuation or spectral modification
-

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.

The table below shows the maximum achievable sample illumination intensities for each electrode chamber.

QRT1 - Quantitherm PAR/Temperature Sensor



- > Compact, fully portable handheld unit with QTP1 combined PAR/temperature probe sensor
 - > Temperature sensor range of 0 – 50°C with 0.02°C resolution
 - > LCD digital display of PAR and temperature values (°C or °F)
 - > QTP1 suspends vertically in reaction vessel of liquid-phase oxygen electrode chambers allowing light source calibration
 - > 0-5V analogue output of PAR and temperature signals
-

The QRT1 Quantitherm light meter and thermometer is specifically designed for use with the DW1, DW2/2 and DW3 liquid-phase oxygen electrode chambers.

Quantitherm overcomes the potential difficulties associated with accurately measuring PAR light levels and temperature within the reaction vessel of liquid-phase oxygen electrode chambers during photosynthetic experiments.

The temperature sensor operates across the range of normal measuring temperatures used for both photosynthesis research and cellular respiration studies and offers maximum accuracy in the 10°C – 40°C region. For photosynthesis research, the PAR quantum sensor provides a displayed resolution of 1 $\mu\text{mol m}^{-2} \text{s}^{-1}$ throughout the 0 to 5,000 $\mu\text{mol m}^{-2} \text{s}^{-1}$ range and additionally will measure extreme saturating light intensities (such as those used in pulse saturation techniques for chlorophyll fluorescence analysis) up to a maximum of 50,000 $\mu\text{mol m}^{-2} \text{s}^{-1}$ with a displayed resolution of 10 $\mu\text{mol m}^{-2} \text{s}^{-1}$.

SQS+ - Serial Quantum Sensor

- > Fully cosine corrected serial quantum sensor with dual functionality
 - > Filtered for 400 – 700nm waveband
 - > Measurement range of 0 – 5000 $\mu\text{mol m}^{-2} \text{s}^{-1}$ with 1 $\mu\text{mol m}^{-2} \text{s}^{-1}$ resolution
 - > Logs PAR values at user defined intervals directly to the PC screen on simultaneous graphical and digital display software
 - > Provides a light source calibration tool for the Hansatech Instruments Handy PEA chlorophyll fluorimeter
 - > USB communications to PC
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SQS+ (Serial Quantum Sensor+) can be used to log PAR values to a remote PC at user defined intervals via a USB connection. Custom software allows the SQS+ to display real time PAR values both graphically and as a digital panel meter and provides the function to save recorded values as a comma delimited (*.CSV) file for import to programs, such as Microsoft Excel®, for further analysis.

SQS+ uses a standard PP3 battery which is located in the battery compartment accessible from the underside of SQS+. The battery life expectancy may be up to 5 years depending on the logging interval of the instrument.

QSRED - Red Filtered Quantum Sensor

- > Compact, fully portable handheld light meter with matched cosine corrected, large area quantum sensor
- > LCD digital display of PAR radiation
- > Filtered for 550 – 750nm waveband
- > 3 measurement ranges (0 – 20, 0 – 200 and 0 – 2000 $\mu\text{mol m}^{-2}\text{s}^{-1}$)
- > 0 – 2V analogue output of PAR signal
- > Compatible for use with DW3, LD1/2 and LD2/3 electrode chambers as a light source calibration tool



The QSRED quantum sensor consists of a handheld display unit and matched cosine corrected sensor head containing a special high grade photocell filtered for the 550 – 750nm waveband. The linearity of response is excellent with a maximum deviation of 1% up to levels of 3000 watts/m² (greater than normal solar irradiance).

The $\mu\text{mol m}^{-2} \text{s}^{-1}$ value from the sensor is displayed on the LCD display. 3 measurement ranges allow maximum sensitivity from 0 – 2000 $\mu\text{mol m}^{-2} \text{s}^{-1}$.

QSRED is intended to be used primarily as a calibration tool for Hansatech Instruments red LED light sources.

QSPAR-Quantum Sensor

- > Compact, fully portable handheld light meter with matched cosine corrected, large area quantum sensor
- > LCD digital display of PAR radiation
- > Filtered for 550 – 750nm waveband
- > 3 measurement ranges (0 – 20, 0 – 200 and 0 – 2000 $\mu\text{mol m}^{-2}\text{s}^{-1}$)
- > 0 – 2V analogue output of PAR signal
- > Compatible for use with DW3, LD1/2 and LD2/3 electrode chambers as a light source calibration tool



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.



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