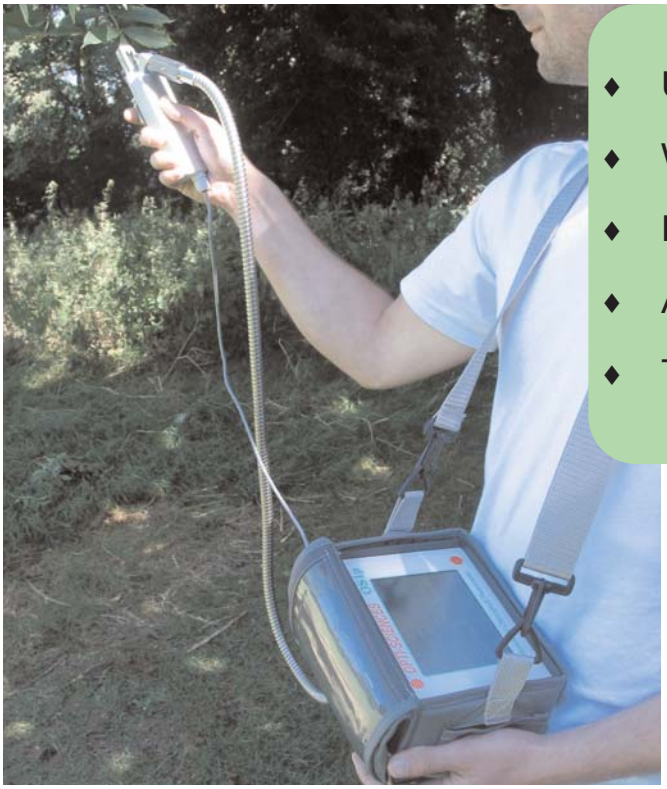
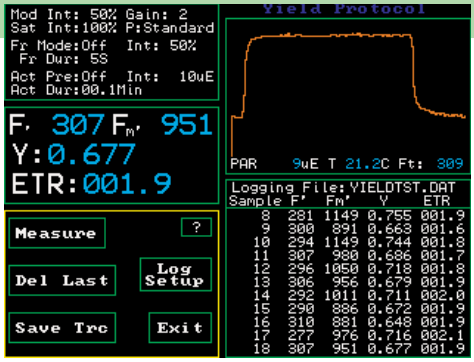
OS1p

Ultra Compact Chlorophyll Fluorometer

An ultra compact, battery portable system designed for plant stress field research



- Ultra compact
- Weighs only 1.4kg
- Plant stress tests including Yield Y(II)
- Accurate and reliable experimental data
- Touch screen, colour, graphic display



Plant stress research tool

Chlorophyll fluorescence is a proven optical based technique for measuring plant stress. This is achieved by assessing a plant's ability to utilise available sunlight in the photosynthesis process. Most types of plant stress can be measured in this way.

The OS1p is the most portable, accurate and easy to use research chlorophyll fluorometer yet. Incorporating the latest fluorescence technology and user interface features, the OS1p sets a new benchmark for plant stress experimentation.

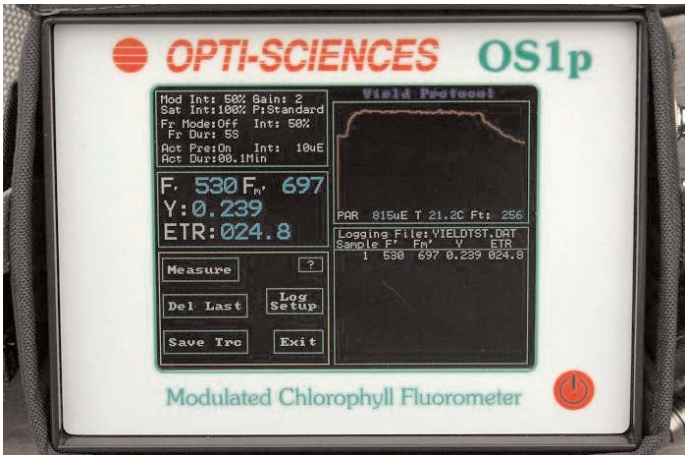
The OS1p employs the proven pulse modulation fluorescence technique, where a rapidly pulsing excitation light is used to induce a corresponding pulsed fluorescence emission. This fluorescence is measured at a longer wavelength than the excitation light. This fluorescence intensity is plotted against time in a variety of experimental protocols. The sophisticated detection system distinguishes between the pulsed response and the non-pulsed light, allowing both ambient light and dark adapted experiments to be performed.

The OS1p can perform the most commonly used and widely respected fluorescence tests such as Fv/Fm, Photosynthetic Yield Y(II), ETR, NPQ and rapid light curve. The new Multi-flash test ensures reliable data even at high saturation light levels.

Truly field portable

Weighing just 1.4kg, this robust, battery portable system offers up to 12 hours of continuous operation from a single charge.

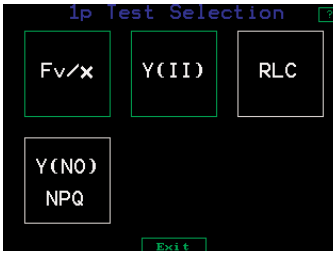
Easy to use

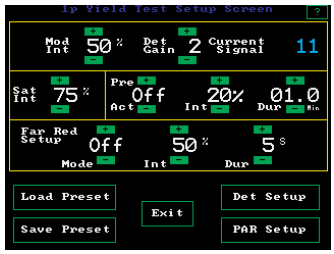


A wide variety of plant stresses can be quickly and easily analysed using the OS1p.

The OS1p has been designed with a high degree of automation. Full programming and operation is achieved by a series of menus on a large backlit, colour, touch sensitive screen.

Common stress tests are pre-programmed into the OS1p, greatly simplifying the experimental set up. These routines can be easily changed by the researcher whilst in the field. No separate PC device is required.

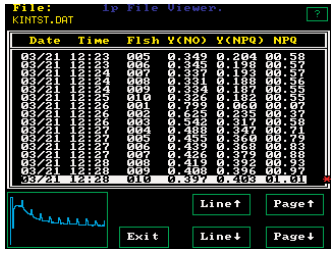




Fast screening of plant stress

The selected stress tests can be initiated either from the console or via a trigger at the end of the fibre optic probe. Most tests only take a couple of seconds to perform, meaning that many intact leaf samples can be analysed over a relatively short period of time.

Calculated parameters and real time fluorescence transient curves are presented on the colour display, together with previous tabulated results. Comments of up to 20 characters may also be added to the experimental data.



Large integral data storage

Data can either be stored in a large 1Gb internal memory, capable of storing thousands of test data sets and traces, or on removable SD memory cards.

Once back in the laboratory, data is quickly and easily transferred to a PC via USB or directly from the SD cards.

The OS1p is supplied, as standard, with an open body cuvette, 10 dark adaption cuvettes and both a carry bag with strap and a durable ABS transport case.

An optional algae cuvette is available.

Optional PAR Clip

In a light adapted environment, photosynthetic Yield Y(II) varies not only with different types of plant stress, but also with light level and leaf temperature. For this reason, it is important to use a PAR clip to achieve reliable results.

The PAR clip can be used to maintain a constant light level over a selected time. It may also provide ambient light levels to a leaf on partly cloudy days.

The unique ***bottom opening*** design of the OSI PAR Clip allows one handed operation and prevents the clip unexpectedly opening due to the weight of the fibre optic cable.

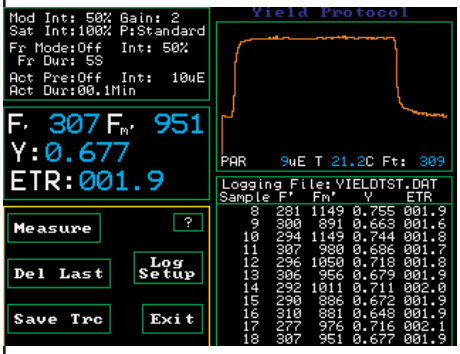
A cosine corrected PAR sensor is positioned and calibrated to measure both ambient PAR and PAR from the internal actinic light source. Measurements of actinic light are automatically corrected for differences in the plane orientation between the leaf and the PAR sensor.

A solid state thermistor provides the accurate reporting of temperature.

The most popular stress tests

The OS1p provides researchers with the most widely used fluorescence test protocols, making it the ideal choice for the routine and fast testing of plant stresses on both algae and higher plants.

Quantum Photosynthetic Yield Y(II):



Light adapted test, the test most suited to the widest range of plant stresses and more sensitive for some plant stresses than Fv/Fm. As Photosynthetic Yield measurements can vary significantly with environmental light and temperature, it is recommended that the PAR Clip be used when making Photosynthetic Yield measurements in the field.

The OS1p is able to provide constant light levels to a leaf for at least 20 minutes, a prime requirement for accurate Y(II) measurements.

The importance of Multi-flash

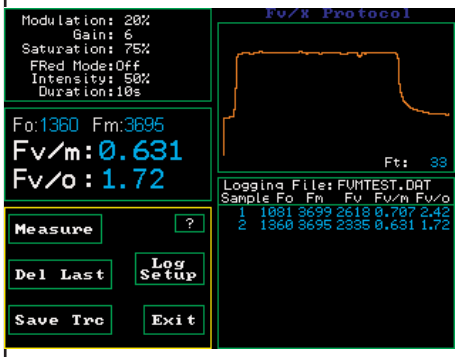
It has been found that, during pulse modulated based stress tests, the complete closure of the PSII reaction centres is problematical with leaves that have a high actinic light history. This can result in Photosynthetic Yield Y(II) being underestimated by as much as 40%.

The OS1p features a Multi-flash protocol to overcome these limitations. It involves consecutive flashes at increasing saturating concentrations and linear regression analysis to determine Fm', using an infinitely intense saturation pulse.

The Multi-flash methodology is already widely accepted within the scientific community for determining the most accurate Photosynthetic Yield and ETR measurements.

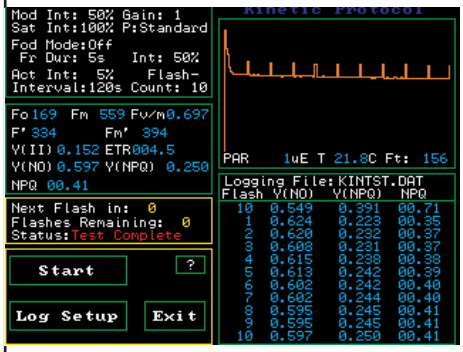
Multi-flash is available in all the OS1p measuring protocols and can be turned off or on by the user.

Fv/Fm: Photochemical Efficiency:



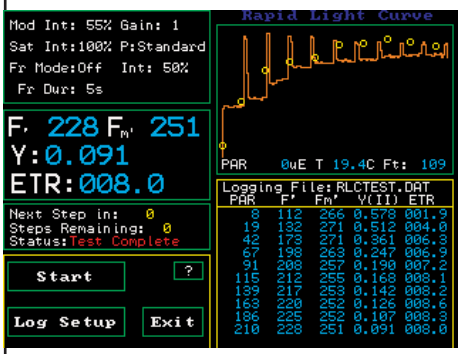
The most widely used fluorescence test requires pre-darkening of the leaf. The OS1p optimises Fv/Fm measurements by firstly automatically setting the modulated light source. Then secondly by providing a far red light option to ensure full oxidation of PSII prior to test.

Quenching tests:



Another versatile fluorescence test, Hendrickson parameters with NPQ are provided as standard with the OS1p. Kramer Lake model parameters or Puddle model parameters may be purchased as alternative protocols at the time of manufacture.

Rapid light curves:



10 point experimental curve used to study light saturation characteristics in variable light conditions, such as under a canopy or aquatic work. The OS1p provides integral curve fitting software as standard.

ADC BioScientific

For over 40 years ADC's name has been synonymous with plant physiology research, with an outstanding reputation for the manufacture and supply of truly field portable instrumentation.

The OS range of portable Chlorophyll fluorometers are proven to be reliable and innovative research tools.

The introduction of the OS1p maintains our "*leaders in portability and ease of use*" status.

ADC is committed to quality: "**Quality of product and quality of service".**

From design to delivery, ensuring optimal performance and reliability is of paramount importance to our team of experienced engineers. Once in the field you are supported by our network of over 30 customer support centres worldwide.

Plant Stress Guide

To assist researchers, a Plant Stress Guide is available that provides the value and limitations of different fluorescence tests for different kinds of plant stress. This very informative document has been compiled from worldwide published research independent of fluorometer brand.

Plant stresses include: Light, drought, heat, nutrient (including nitrogen), cold, over watering, herbicide, heavy metal and CO_2.

Contact ADC BioScientific if you would like to receive a complementary copy of the Plant Stress Guide.

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Parameters include:

Y(II): Quantum Photosynthetic Yield (F/Fm')
Fo: Minimum fluorescence
Fm: Maximal fluorescence
Fv: Variable fluorescence
Fv/Fm: Maximum photochemical efficiency
Fv/Fo: More sensitive stress detector than Fv/Fm, but does not measure plant efficiency.
Fm': Maximal fluorescence under steady state conditions
Fs: Fluorescence signal prior to saturation pulse (F')
NPQ: NPQ, Y(NPQ), Y(NO) lake model parameters according to Hendrickson calculations supplied as standard. Customer may alternatively purchase the Puddle model or Kramer Lake Quenching models.
Ft: Current fluorescence readout
ETR: Electron transport rate (with optional PAR sensor)
PAR: Photosynthetic Active Radiation (with optional PAR sensor)
T: Leaf temperature (with optional PAR sensor)
$rETR_{max}$: Leaf photosynthetic capacity
Ik: Minimum saturation level
RLC: Rapid light curves
α: Initial slope of line at low PAR values, relating ETR to PAR. Used as a measure of quantum efficiency.
Im: Intensity at $rETR_{max}$

Specifications

Excitation sources:
Saturation pulse: LED with 690nm filter. 11,000uE
Modulating light: 660nm LED with 690nm filter
Actinic light: LED to 3,000 uE.

Detection method: Pulse modulation.

Detector: PIN photodiode with 700-750nm filter.

Sampling rate: Auto-switching from 10 to 10,000 points per second, depending on phase of test.

Test duration: Adjustable 0.1 seconds - 16 hours.

Data storage: 1Gb internal memory. Unlimited data storage by removable SD cards.

Digital output: SD cards and USB

User interface: Graphic, backlit, colour, touch screen display (114mm x 89mm).

Battery: Internal 12V, rechargeable Nickel metal hydride battery providing up to 12 hours of continuous operation.

Dimensions: 18 x 14 x 8cm

Weight: 1.4kg
1.6kg with PAR clip