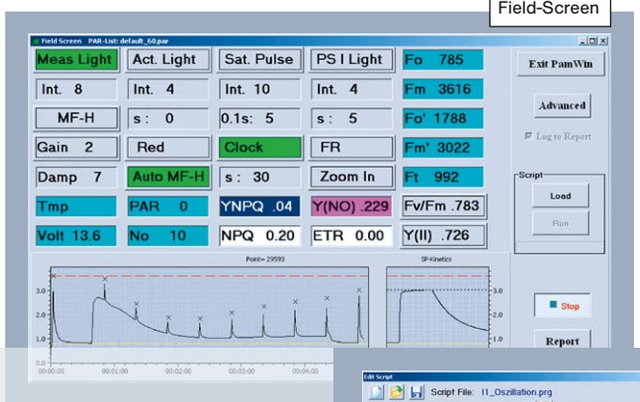
PamWin-3 Software

Different levels of graphical user interface

Two different user interfaces are provided by the PamWin-3 software: the Field Screen serves mainly for outdoor operation where ease and simplicity of instrument control is important.

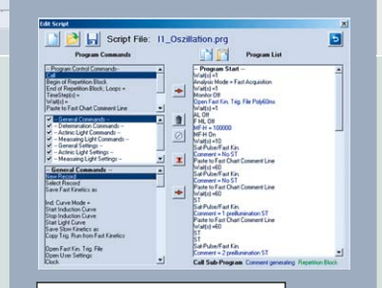
The Advanced Level offers a multitude of fluorescence analyses ranging from measurements of Kautsky induction kinetics to polyphasic rise kinetics, and fast fluorescence decay curves.

Field-Screen



Script files

The PAM-2500 Fluorometer can be operated automatically by employing the Script File feature of the PamWin-3 software. Script Files easily perform complex test protocols, which otherwise would require many manually entered commands.



Script Programming Window

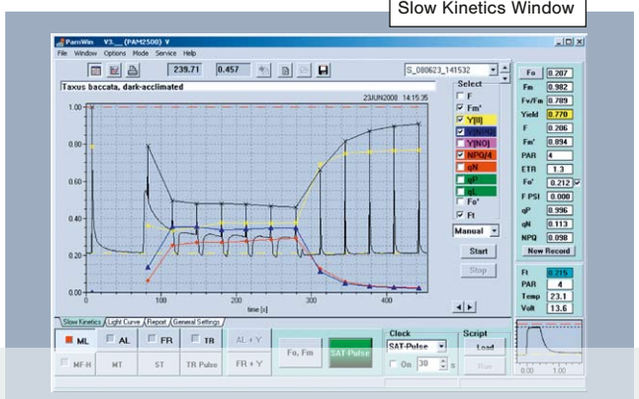
In this way, sophisticated measurements can be carried out reliably and reproducibly even by inexperienced users.

Advanced level windows

The advanced level of the PamWin-3 software includes Saturation Pulse analysis, recording of fluorescence kinetics (ranging from fast changes in the µsec domain to slow changes over many seconds, minutes or even hours), and a wide range of graphical and analytical features.

The instrument parameters of fluorescence Induction Curves and Light Curves can be easily programmed on the Settings window. The reproducible recording of Fast Kinetics can be designed using a special graphical user interface (Fast Trigger Settings).

Slow Kinetics Window



Accessories

- Ultra-mobile touchscreen computer
- Leaf-Clip Holder 2030-B
- Arabidopsis Leaf Clip 2060-B
- Micro Quantum/Temperature-Sensor 2060-M
- Suspension Cuvette KS-2500

Please visit **www.walz.com** for further informations, detailed technical specifications and updated software versions.

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Continuing the PAM-2000/2100 tradition with state-of-the-art technology

PAM-2500

Portable Chlorophyll Fluorometer

For basic/applied research and plant screening

WALZ
Mess- und Regeltechnik

PAM-2500

Portable Chlorophyll Fluorometer

- For basic/applied research and plant screening
- Powerful illumination system featuring red, blue, far-red light and single/multiple turn-over flashes
- Fully computer controlled; optional ultra-mobile PC for touch screen operation
- User-friendly and versatile PamWin-3 software for quenching analysis, slow/fast kinetic recordings, and Light Curves
- Optional accessories for algae and cyanobacteria

The **PAM-2500** Portable Chlorophyll Fluorometer is the successor of the well-known PAM-2000/2100 instruments which were introduced in the 1990s as the first portable PAM fluorometers. Since then they have been successfully applied worldwide by numerous scientists. In the development of the PAM-2500, particular care was taken to maintain all properties appreciated by PAM-2000/2100 users and, at the same time, to integrate state-of-the-art technology.

Essentially, the hardware and optical system are thoroughly modernized. Also, while continuing basic elements of the graphical user interface, instrument operation is based on the newly-developed PamWin-3 software. The program permits operation under Windows operating systems on normal personal computers, but also on ultra mobile touch screen computers (UMPC).

System Description

The PAM-2500 is an extremely compact and powerful system with all optical and electronic components contained in a 23 cm x 10.5 cm x 10.5 cm housing. The Measuring Light is generated by a 630 nm LED in the form of 1 µs pulses at frequencies ranging from 10 to 200,000 Hz.

Actinic Light sources are 455 nm blue, 630 nm red and 750 nm far-red LEDs.

A special fiberoptics links the fluorometer control unit to a leaf or to an optional special cuvette for measurements with suspensions of isolated chloroplasts, algae or cyanobacteria.

Measuring principle and quenching analysis

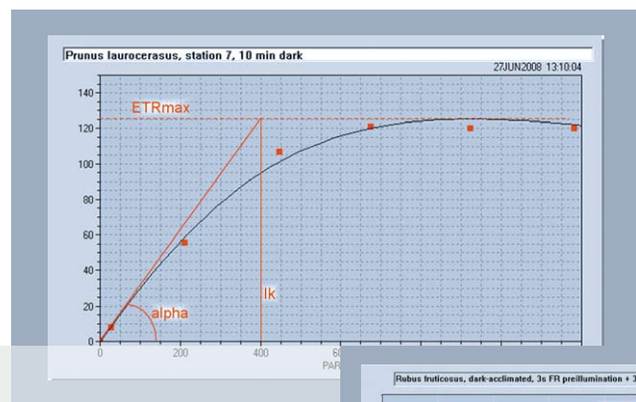
The PAM-2500 Chlorophyll Fluorometer employs pulse modulated (PAM) Measuring Light to excite chlorophyll fluorescence. The resulting pulse modulated chlorophyll fluorescence is detected with high sensitivity and selectivity, but the fluorometer is virtually insensitive to even strong unmodulated light like full sunlight or Saturation Pulses at up to 25,000 µmol quanta/(m^2·s).

The intensity of the Measuring Light can be sufficiently low for monitoring fluorescence yield without any change in the state of photosynthesis. In addition to the current fluorescence yield (Ft, in continuous light) and the maximum yield (Fm or Fm', during Saturation Pulses) it is also possible to determine the minimum yield Fo (after dark-acclimation) or Fo' (in the illuminated state).

Application

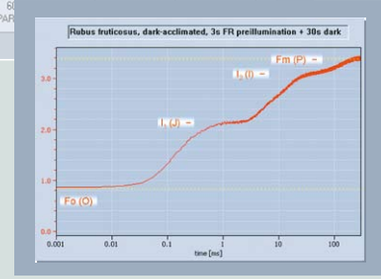
Light saturation curves

A major application of the PAM-2500 Fluorometer in eco-physiology consists in the fast and reliable analysis of the photosynthetic performance of plants. Two important parameters for characterizing photosynthesis are the maximum quantum yield for whole chain electron transport ("alpha", at low light intensities) and the maximum electron transport capacity ("ETRmax", at light saturation). The PamWin-3 software derives these parameters from the dependence of the electron transport rates on actinic light using a curve fitting procedure.



Polyphasic fluorescence rise upon onset of saturating light

The Fast Acquisition mode of the PAM-2500 enables recordings of rapid fluorescence kinetics with 10 µs time resolution. It may be emphasized that this high time resolution is achieved with pulse modulated signals.



This means that the fast kinetics of fluorescence yield is measured and, consequently, that signal amplitudes from different experiments can be directly compared irrespective of light intensity and sample geometry.