

The Opti-Science OS5p+ vs. the PAM 2500®

Spec	PAM 2500®	OS5p+
Display screen	Graphic display touch screen Black & White	Graphic display Color touch screen
Stable actinic light source	No. They recommend an external actinic light source for longer measurements. All light sources heat up when they are in use. The heat significantly reduces output over time, causing variable measuring results	Yes- a PAR sensor maintains stable actinic PAR light intensity over long periods of time, for more reliable quenching values, Y(II) values and ETR values. No external light source is necessary.
RGBW actinic light source	No. It has a red and a blue LED actinic light source	Yes – It has an RGBW light source to provide a wider range of measuring flexibility and control
Genty- Loriaux F_M' correction option for high actinic light	No. It has a Red saturation intensity up to 25,000 $\mu\text{moles m}^{-2} \text{s}^{-1}$	Yes. It has the Genty Loriaux F _M ' correction protocol for measuring Y(II) and ETR at high actinic light levels. The maximum White LED saturation intensity is up to 12,000 $\mu\text{moles m}^{-2} \text{s}^{-1}$ and provides Y(II) and ETR values with an “infinitely intense” saturation flash. It may also be used without the protocol. Loriaux S.D., Avenson T.J. Burns, Welles J.M., McDermitt D.K. Eckles R.D., Riensche B., Genty B.S.D. (2013) “Closing in on maximum yield of chlorophyll fluorescence using a single multiphase flash of subsaturating intensity”, Plant, Cell and Environment (2013) 36, 1755–1770
Barcode reader capability	No.	Yes. It will work with any commercially available barcode reader with a USB port.
Affordable dark clips for F_v/F_M Measurement	Price of dark clips are 3-5 times the cost of OSI dark clips.	Yes, affordable dark clips allow measuring large plant populations for better statistical results.
Strasser OJIP	Does OJIP and provides intensity values	Does Strasser OJIP for plant stress detection. with direct readout of Strasser’s most important parameters and all of Strassers parameters in the data file. It also has a calibrated light source because intermediate OJIP values change with actinic saturating light intensity (Vredenburg 1999) Both Stasser intensities of 3,000 and 3,500 $\mu\text{moles m}^{-2} \text{s}^{-1}$ are included,

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Does Vredenburg quenching OJIP	Unknown.	Yes
Components and Computer Interfaces	USB, and Bluetooth. Wireless LAN, SD cards <i>Requires special software that may require updates. Current software works with Windows 10 or newer software and requires bluetooth.</i>	Newer components with USB, & SD Card NO external software is necessary, it will work with Excel, Matlab, Apple numbers, or any other comma delimited spreadsheet software! It will work with Excel-2 (1985) or newer or Apple-1 (1976) or newer software.
Far red light	Yes	Yes
Modulated light sources	Red	Red <u>or</u> Blue decided at time of purchase.
Memory	128 Megabytes	2 Gigabytes
Parameters	<p>Fo, Fm, F, Fo', Fv/Fm, Y(II), ETR, PAR, leaf temp.</p> <p>Quenching: Baker: q_P, q_N, NPQ, Kramer Y(NPQ), Y(NO), q_L, Y(II) Hendrickson Y(NPQ), Y(NO), NPQ, Y(II) Ruban & Murchie pNPQ, qP_d, q_l, Fo' measured Fo' calculated</p> <p>Quenching relaxation values: qE, qT, qz, q_l,</p> <p>Fast kinetics- Walz version of OJIP</p> <p>Rapid light curves RLC ETR_{MAX}, I_M I_K a.</p> <p>Light Curves</p>	<p>Fo, Fm, F, Fo', Fv/Fm, Y(II), ETR, PAR, leaf temp.</p> <p>Quenching: Baker: q_P, q_N, NPQ, Kramer Y(NPQ), Y(NO), q_L, Y(II) Hendrickson Y(NPQ), Y(NO), NPQ, Y(II) Ruban & Murchie pNPQ, qP_d, q_l, Fo' measured Fo' calculated</p> <p>Quenching relaxation values: qE, qT, qz q_l,</p> <p>Strasser OJIP – all Strasser measuring parameters. Vredenberg OJIP – OJIP quenching values</p> <p>Rapid light curves RLC ETR_{MAX}, I_M I_K a.</p> <p>Light curves</p>

Spec	PAM 2500®	OS5p
PAR Clip	<p>0-20,000 $\mu\text{moles m}^{-2} \text{s}^{-1}$ and temperature for -20°C degrees to 60°C degrees centigrade. The fiber optic is at 60° to the leaf surface or 30° from perpendicular.</p> <p>They recommend the use of an <u>external source</u> for longer measurements involving internal illuminators. Because it is not stable.</p> <p>The PAR Clip is <u>Not recommended for measuring internal illuminator intensity. Intensity charts are recommended</u></p> <p>Thermo couple – requires frequent replacement, damages leaf samples, and is accurate to $\pm 0.5^{\circ}\text{C}$</p>	<p>Our Par Clip offers substantial advantages. <i>It is designed to prevent opening inappropriately when high leaves are measured or when it is used for longer quenching measurements on a tripod.</i> In addition the 45° angle PAR Clip decreases leaf shading of the measuring area. Works from 5°C to 60°C. It will read to $3,000 \mu\text{moles m}^{-2} \text{s}^{-1}$</p> <p>The most intense PAR values measured anywhere on earth are below the $3000 \mu\text{moles m}^{-2} \text{s}^{-1}$ range. More is unnecessary.</p> <p>Internal actinic illumination can be measured with the OS5p+ PAR Clips and <i>the halogen actinic light sources may be used for extended periods without problem or significant variation. It includes a stable light source that varies by less than 1% over 30 minutes.</i></p> <p><i>Uses a solid-state thermistor that rarely requires replacement, allows non-destructive measurement, is accurate to $\pm 0.1^{\circ}\text{C}$, and it is on the top of the leaf.</i></p>
Fluorometer battery	<p>About 6 hrs.</p>	<p>Ni- metal hydride battery. 8-12 hours</p>
Weight	<p>5.5 lbs with fiberoptic</p>	<p>3.6 lbs. with fiberoptic</p>
Leaf absorption at 680nm & 720 nm	<p>Unable to find anything. Normally, the Dual PAM is necessary for measuring absorption of photosystem I.</p>	<p>No</p> <p>Both the Opti-Sciences Y(II) meter, in the PSK, and the iFL have the ability to measure leaf absorption in the visible range. The Y(II) meter and the OS5p+, together, are likely more affordable than the PAM 2500. <i>It does <u>not</u> measure absorption at 720 nm. Leaf absorption changes as photoprotective plant mechanisms adjust and chloroplast migration occurs. It also changes with photoinhibition and many types of plant stress.</i></p>