ADC BioScientific Ltd.

# OS-30p+

## Rapid Plant Stress Screening Device

An enhanced, hand-held device for $F_V/F_M$ and OJIP analysis


- Small hand-held device
- Integral optical probe
- Accurate $F_V/F_M$
- Advanced OJIP analysis
- Colour graphic display
- Large integral data storage
- Cost effective

## Using Chlorophyll Fluorescence to analyse plant stress

Chlorophyll fluorescence is proven to provide reliable, non-destructive information regarding the photosynthetic processes and plant health/stress.

Fluorescence tests can be easily and quickly performed by the pre-darkening of the leaf followed by short exposure to a saturating light intensity. Measuring the fluorescence intensities over time produces a Kautsky induction curve. The shape of this curve and the value of significant transient levels on the curve are used to assess environmental stress damage on the photosynthetic apparatus.

## Accurate Fv/Fm and OJIP analysis

Fv/Fm is the most widely used fluorescence test for plant stress detection. Fv/Fm, defined as Maximum Photochemical Efficiency, is a comparative measurement of plant stress with lower values indicating plant stress. The OS-30p+ is designed for the rapid screening of Fv/Fm.

The OJIP test uses higher sampling rates to resolve early fluorescence transient steps in the Kautsky curve. These steps are affected differently by different types of plant stress. The OS-30p+ uses the revered Strasser* equations for all OJIP parameters.

The OS-30p+ ensures the most accurate Fv/Fm, Fv/Fo and OJIP results by measuring Fo, rather than offering an estimated value.

## Single hand operation

The battery operated OS-30p+ features a built-in optical probe, meaning that only one hand is required to operate the unit.

Lightweight leaf clips are provided for effective pre-darkening of the measurement site prior to the induction of fluorescence. These non-destructive clips are suitable for use on a wide range of plant species.

Measurements are made by introducing the analysis probe to the leaf clip. The leaf clip shutter is then withdrawn, exposing the dark adapted site to an auto-calibrating, saturating, excitation 660nm LED source. Induced fluorescence is measured by a PIN photodiode at >700nm. Excitation intensity and experimental duration is user selectable.

The OS-30p+ provides a direct read-out of both the standard and an enhanced range of Fv/Fm, Fv/Fo and OJIP parameters.

## Selected references


Aydi, Samir, Sameh Sassi Aydi, Asma Marsit, Nadia El Abed, Rami Rahmani, Jalloul Bouajila, Othmane Merah, and Chedly Abdelly. 2023. **Optimizing Alternative Substrate for Tomato Production in Arid Zone: Lesson from Growth, Water Relations, Chlorophyll Fluorescence, and Photosynthesis**. *Plants 2023, Vol. 12, Page 1457* 12 (7): 1457. https://doi.org/10.3390/PLANTS12071457.

Elfanah, Ahmed M.S., Mohamed A. Darwish, Adel I. Selim, Omnya M.A. Elmoselhy, Abdelraouf M. Ali, Maher A. El-Maghraby, and Magdi T. Abdelhamid. 2023. **Hyperspectral Reflectance and Agro-Physiological Traits for Field Identification of Salt-Tolerant Wheat Genotypes Using the Genotype by Yield*trait Biplot Technique**. *Frontiers in Plant Science* 14. https://doi.org/10.3389/FPLS.2023.1165113/FULL.

Favaretto, Viviane F., Carlos A. Martinez, Hilda H. Soriani, and Rosa P.M. Furriel. 2011. **Differential Responses of Antioxidant Enzymes in Pioneer and Late-Successional Tropical Tree Species Grown under Sun and Shade Conditions**. *Environmental and Experimental Botany* 70 (1): 20–28. https://doi.org/10.1016/j.envexpbot.2010.06.003.

Leitão, Susana T., Emanuel Ferreira, M. Catarina Bicho, Mara L. Alves, Duarte Pintado, Daniela Santos, Pedro Mendes-Moreira, Susana S. Araújo, J. Miguel Costa, and Maria Carlota Vaz Patto. 2019. **Maize Open-Pollinated Populations Physiological Improvement: Validating Tools for Drought Response Participatory Selection**. *Sustainability 2019, Vol. 11, Page 6081* 11 (21): 6081. https://doi.org/10.3390/SU11216081.

Ortega, Alfonso, Inmaculada Garrido, Ilda Casimiro, and Francisco Espinosa. 2017**. Effects of Antimony on Redox Activities and Antioxidant Defence Systems in Sunflower (Helianthus Annuus L.) Plants**. *PLoS ONE* 12 (9). https://doi.org/10.1371/journal.pone.0183991.

Sparks, Aaron M., Alexander S. Blanco, David R. Wilson, Dylan W. Schwilk, Daniel M. Johnson, Henry D. Adams, David M.J.S. Bowman, Douglas D. Hardman, and Alistair M.S. Smith. 2023. **Fire Intensity Impacts on Physiological Performance and Mortality in Pinus Monticola and Pseudotsuga Menziesii Saplings: A Dose–Response Analysis**. *Tree Physiology* 43 (8): 1365–82. https://doi.org/10.1093/TREEPHYS/TPAD051.

Szwajczak, Ewa, Edyta Sierka, and Michał Ludynia. 2023. "Potential Role of Low-Molecular-Weight Dioxolanes as Adjuvants for Glyphosate-Based Herbicides Using Photosystem II as an Early Post-Treatment Determinant." *Cells 2023, Vol. 12, Page 777* 12 (5): 777. https://doi.org/10.3390/CELLS12050777.

Wen, Guoqi, Bao Luo Ma, Yichao Shi, Kui Liu, and Wen Chen. 2023. "Selection of Oat (Avena Sativa L.) Drought-Tolerant Genotypes Based on Multiple Yield-Associated Traits." *Journal of the Science of Food and Agriculture* 103 (9): 4380–91. https://doi.org/10.1002/JSFA.12504.


## Online resources

For product enquiries, device manuals, brochures and our official agents in your country: www.adc.co.uk

Follow us on our social media platforms:

**Video tutorials**: YouTube: https://www.youtube.com/@adcbioscientificltd2784

**News and updates**: X.com (formerly Twitter): @ADC_Biosci

Facebook: https://www.facebook.com/adcbioscientific

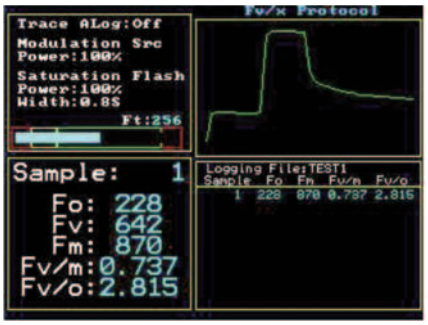
## Rapid field screening

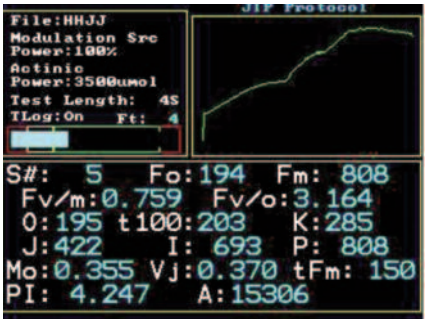
Fluorescence parameters are presented on the OS-30p+ large, colour, graphic display together with a logarithmic time scale presentation of the Kautsky curve. Previous measurements may be reviewed in the field. Up to 160,000 data sets and hundreds of experimental traces can be stored in the internal memory. Up to 32 OJIP graphs may be viewed and overlayed on the colour graphic screen, using 16 different colours.

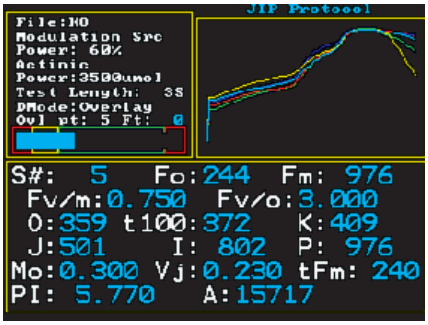
Data is downloaded via a USB port, into commonly available spreadsheets such as Excel. External graphing of data is easy and no specialised software is required.

The OS-30p+ will operate continuously for up to 8 hours from a single charge.

The OS-30p+ is the ideal choice for the rapid screening of a variety of plant stresses.




## Technical Specification

**Items supplied:** OS-30p+ unit with integral fluorescence optical probe, 10 dark adaption leaf clips, battery charger, USB cable, instruction manual and carry case.

**Test Modes:** $F_V/F_M$, OJIP.

**Displayed parameters:** $F_O$, $F_M$, $F_V/F_M$, $F_V/F_O$, O, K, J, I, P, $tF_M$, A, $M_O$ and PI/ABS.

**Additional parameters available in data measuring file:** RC/ABS, ABS/RC, TRO/RC, DIO/CS, ETO/RC, TRO/ABS, ETO/TRO, ETO/CS, ETO/RC, RC/CSO, RC/CSM, S, M, T.

**Excitation/Actinic source:** Solid state 660nm source. Saturating 525-6,000µE.

**Detection system:** Related pulse excitation detection with high resolution sampling mode for Kautsky induction curve recording.

**Detectors and filters:** A PIN photodiode with a 700nm-750nm bandpass filter.

**Test duration:** $F_V/F_M$: 0.1-1.5 seconds.
OJIP: 3-300 seconds.

**Sampling rate:** Up to 10µS.

**Digital output:** USB.

**Storage capacity:** Up to 160,000 data sets and hundreds of experimental traces.

**User interface:**
Display: Colour graphic display.
Keypad: 10 key dedicated function keypad.

**Power supply:** Rechargeable NiMH battery pack.

**Battery life:** 8 hours of continuous operation.

**Weight:** 900g.

**Operating range:** 5 to 45°C.

**Control unit dimensions:** 18cm x 7cm x 6cm.

*Strasser, R.J., M. Tsimilli-Michael and Srivastava, A. Analysis of the Fluorescence Transient.

ADC BioScientific Ltd.
Global House
Geddings Road
Hoddesdon
Herts. EN11 0NT
UK
Tel: +44 (0)1992 464527
sales@adc.co.uk www.adc.co.uk