



MONITORING-PAM: Fluorometer for Long-term Monitoring of Photosynthesis

DESCRIPTION

- The chlorophyll fluorometer MONITORING-PAM is designed for unattended, long-term and multi-site monitoring of chlorophyll fluorescence in air or underwater. At each measuring site, compact and robust emitter-detector units measure modulated chlorophyll fluorescence and perform saturation pulse analysis.
- Depending on system configuration, up to seven sites per MONITORING-PAM system can be measured simultaneously. At each site, photosynthetically active radiation (PAR) at sample level is recorded so that relative electron transport rates can be derived from PAR data and photochemical yields of photosystem II.



MONITORING-PAM

General Features

The multi-site chlorophyll fluorometer MONITORING-PAM operates several emitter-detector heads in parallel. A clip attached to each head positions the sample at defined distance and angle. Two types of emitter-detector heads are available which are specially designed for long-term operation in the field or under water.

Each emitter-detector head is equipped with a blue power LED. Based on exact timing of function, this LED provides modulated fluorescence excitation light, actinic light and saturation flashes. A lens focuses the LED radiation on the sample, and collects fluorescence. Maximum saturation pulse intensity at sample level exceeds $8500 \mu\text{mol m}^{-2} \text{s}^{-1}$. The emitter-detector heads detect

modulated fluorescence at wavelengths $> 650 \text{ nm}$. At the same time, the intensity of external photosynthetically active radiation at sample level is recorded by measuring the light reflected by a diffuse Teflon reflector mounted in-plane with the sample. For monitoring of land plants, TERRESTRIAL versions of the MONITORING-PAM are available, and for studies of submarine plants, AQUATIC versions are provided. The ONLINE configurations of both systems require permanent connection to the mains and to a Windows computer via the interface MONI-IB4/LAN (TERRESTRIAL version) or MONI-IB4/LANS (AQUATIC version).

ACCESSORIES

STAND-ALONE

Configuration of

TERRESTRIAL Version

- MONI-Interface USB/0
- Mobile Phone (GPRS)
Modem MONI-MOD1
- Satellite Modem

I. TERRESTRIAL Version

ONLINE Configuration

- The ONLINE configuration of the TERRESTRIAL version requires permanent power supply to the PC Interface Box MONI-IB4/LAN. The MONI-IB4/LAN provides input sockets for up to four RS-485 lines connecting to MONI-HEAD/485 emitter-detector heads. The LAN function of the MONI-IB4/LAN interface permits integration of the MONITORING-PAM in a local area network. In addition, RS-232 and USB communications are available for direct connection of the MONITORING-PAM with a Windows PC.
- Distances between components of the ONLINE configurations are determined by lengths of communication and power cables. For example, samples can be about 10 m away from the computer in case of USB or RS-232 communication but this distance can be increased to more than 100 m when Ethernet is used.

STAND-ALONE Configuration

- The STAND-ALONE configuration of the TERRESTRIAL version of the MONITORING-PAM is suited for independent long-term monitoring of photosynthesis at remote places in the absence of power supply. The system consists of the battery-powered data acquisition system MONI-DA, two solar panels MONI-SP and up to seven emitter-detector heads MONI-HEAD/485.
- The MONI-DA logs data on a microSD flash card and, additionally, on an 8 MByte ring buffer. Online connection between MONI-DA and a Windows computer can be established using the interface MONI-IB1 and USB communication. By means of a telephone or satellite modem, data can be transmitted to distant computers with little time delay.

II. AQUATIC Version

- ONLINE Configuration
- STAND-ALONE Configuration

Contact info



Monitoring MENA

Insight into instrumentations

(962) 5353-2091

PO Box 1100 Salt

Post Code 19110 JORDAN

sales@monitoring-mena.com

www.monitoring-mena.com

Application

- Continuous monitoring of fluorescence from a leaf
- Measure the impact of sustained fluorescence quenching during low temperatures on the dissipation of absorbed light energy.
- Monitoring of lichen photosynthesis.
- Characterize performance and stress response of photosynthesis in marine environments.
- Continuously monitor photosynthesis in a plant growing in lakes
- Carbon Dioxide Enrichment and understanding how elevated CO₂ of the earth's future atmosphere affects life.

This Instrument is manufactured by our principle company

WALZ - Germany