Technical Specifications

Dimensions:	260mm (L) x 235mm (D) x 83mm (H).
Weight:	2.8 kg
Light Sources:	Temperature compensated 594nm amber LED with 4 step frequency control (Optional 470nm blue LED) Ultra-bright white LED: Actinic >3,500 µmol m^{-2} s^{-1}, saturating >13,000 µmol m^{-2} s^{-1} at sample surface. Far red: 735nm LED
Detector:	PIN photodiode with >700 nm filter
Detection Method:	Rapid peak pulse tracking
Sampling Rate:	Variable 10 Hz to 20 kHz depending upon instrument mode
Electronics:	16 bit 165 microprocessor, 8 A/D channels 12 bit resolution, 4 external digital I/O lines, Single 12 bit buffered DAC (0 to 4095 mV)
Storage:	256 Kb backed up RAM storing up to 2,430 full trace or 12,850 parameter only Fv/Fm data sets
User Interface:	4 button keypad
Display:	20 x 4 LCD display
Power Supply:	95 to 260V universal input mains supply
Leafclips:	10 x dark adaptation clips with fibre-optic adapters. Optional PAR/temp clip with cosine corrected PAR sensor (0 to 20,000 µmol m^{-2} s^{-1}) & thermocouple (-10 to 90 °C). Remote trigger button and tripod mount.

Hansatech Instruments is a British company that has been developing high quality scientific instrumentation for over 40 years. Our systems are used widely for teaching & research in cellular respiration & photosynthesis programs in more than 100 countries throughout the world. We have gained an enviable reputation for quality, reliability & excellent price/performance.

Our product range consists of a range of modular solutions for the measurement of oxygen using Clark type polarographic sensors. We also develop chlorophyll fluorescence measurement systems using both continuous excitation & pulse-modulated measurement techniques with further optical instrumentation for the measurement of sample chlorophyll content.

Purchasers of Hansatech Instruments products can be assured of ongoing support & prompt & efficient attention to enquiries at all times. Support is available both directly & from our global distributor network. Customers are encouraged to register their instruments on our website which allows access to our Support Ticketing System in addition to instruments manuals & software upgrades.

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Hansatech Instruments

FMS 1+

Lab-based pulse-modulated chlorophyll fluorometer

Hansatech Instruments

FMS 1+

Lab-based pulse-modulated chlorophyll fluorometer

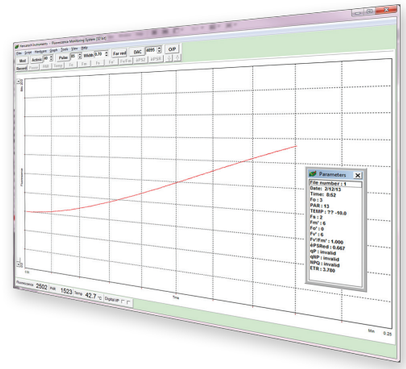
- **Integral amber (594nm), Ultra-bright white LED (optional 470nm blue LED) & 735nm far-red LED**
- **External device control interface**
- **Programmable by Hansatech Scripting Language (HSL)**
- **Optional leaf-clip with integral PAR/temperature sensor**
- **Fibre-optic cable suitable for incorporation into O_2 electrode chambers &legacy IRGA systems**
- **Windows® data acquisition & data analysis software**

FMS 1+

Lab-based pulse-modulated chlorophyll fluorometer

The FMS 1+ modulated chlorophyll fluorimeter is a versatile pulse-modulated instrument with mains power supply for laboratory/near-field use. It is suitable for non-invasive sampling of chlorophyll fluorescence under natural or artificial light conditions and may be interfaced with our range of oxygen electrode chambers for simultaneous oxygen measurements.

The FMS 1+ modulated chlorophyll fluorimeter consists of a control unit housing all of the electronics, optics and light sources necessary to derive most common chlorophyll fluorescence parameters. These are optically linked to the sample by a statistically randomised fibre-optic cable that is suitable for insertion into a range of sample containers such as oxygen electrode chambers, older infra-red gas analysis (IRGAS) chambers, Petri dishes and microtitre plates.



The system may be operated in several different modes: serial connection to a Windows® PC enables real-time instrument control and data presentation.

Captured data is simultaneously presented as a real-time chart recorder emulation and parameters-only format for easy identification of key experimental events.

This PC mode of operation is suitable for development of complex protocols which may be programmed into the instrument using the simple drag and drop editor to generate user-defined scripts.

Once programmed, the FMS 1+ chlorophyll fluorimeter can be operated as a stand-alone fluorimeter inside the laboratory or outside (via connection to an optional external battery). All measurement data and calculated parameters are saved to integral protected memory. The unit can store up to six experimental protocols, any one of which may be accessed and executed using the built-in menu system. When data collection is complete the results can be downloaded to the Windows® software for full analysis.

All of the light sources required for modulated measurement of common chlorophyll fluorescence parameters are self-contained within the instrument.

The PAR/temperature leafclip (FMS/PTL) allows measurements to be made under ambient light conditions.

A leafclip system has been developed allowing experiments which require dark-adapted measurements e.g. screening applications measuring Fv/Fm to be performed.