



GFS-3000: Gas exchange measurements

The portable GFS-3000 is a high precision system for the assessment of plant photosynthesis (CO_2 -uptake) or respiration (CO_2 -release) and transpiration in combination with optical measurements.

DESCRIPTION

Gas exchange measurements rely on the basic principle that changes in CO_2 and H_2O concentrations are determined when air passes through a climate controlled chamber containing a plant sample.

The GFS-3000 is suitable for controlled laboratory settings as well as demanding field conditions.

The GFS-3000 perfectly complements with other Walz systems giving access to numerous aspects of photosynthesis research.

The Portable Gas-Exchange and Fluorescence System GFS-3000 enables wide range climate control. All environmental parameters relevant for plant photosynthesis (CO_2 , H_2O , temperature, light, ventilation and flow) can be controlled automatically and over the full physiological range.

Optional fluorescence modules further expand the system's capability. Experimental protocols for automatic light-curves or automatic CO_2 -curves can be easily programmed.



Main Components of the Basic System Package GFS-3000

- Control Unit 3200-C containing the CO_2 and H_2O analyzer, as well as all components required for the CO_2 , H_2O and flow control
- Standard Measuring Head 3010-S featuring high application flexibility containing the ventilation system, temperature and light control
- LED Light Source 3041-L with warm white LED array providing up to 10 cm^2 homogenous illumination

Modified System Package GFS-3000FL

- The modified system package GFS-3000FL contains the LEDArray/PAM-Fluorometer 3056-FL instead of the LED Light Source 3041-L. All other components remain the same as in the basic system package GFS-3000. In terms of price, GFS-3000FL offers an interesting option to combine gas exchange and fluorescence measurements.

Optional Components and Accessories of the GFS-3000

- LED-Array/PAM-Fluorometer 3056-FL for illumination of the leaf area and fluorescence measurements
- Fiberoptics PAM-Fluorometer 3050-F to analyze fluorescence in sunlight
- Miscellaneous accessories such as cuvettes and adapter plates offering user-specific application options
- Accessories for product combinations with other Walz systems
- Also, the complete equipment will be modified on customer request.

ACCESSORIES

GFS-3000

- Interface Box

Accessories for the Standard Measuring Head 3010-S

- Leaf Area Adapters
- Compact Tripod ST-1010
- Various Cuvettes

Accessories for Fluorescence Components

- Dark Leaf Clips 3010-DLC
- Leaf Area Adapter 3010-F-2010
- Oxygen Sensor 3085-O2
- Miniature Fiberoptics MINI-PAM, 3010-F-MINI

Accessories for System Combinations

- Adapter IMAG-MIN/GFS
- DUAL-PAM Gas-Exchange Cuvette 3010-DUAL
- Adapter IMAG-MAX/GWK1

Accessories concerning power Additional accessories

GFS-3000

Control-Unit 3200-C

The Control-Unit 3200-C contains the CO₂ and H₂O analyzer, as well as all components required for the CO₂, H₂O and flow control.

- Gas Analyzer.
- CO₂ Control
- Flow Control
- Humidity Control
- Power

Standard Measuring Head 3010-S

The design of the 3010-S offers maximum flexibility. The measuring area can be adapted with special plates; the cuvette can be modified for conifers, lichens, *Arabidopsis* plants or specific requirements. 3010-S provides wide temperature-, light- and ventilation-control as well as a trigger button for the manual start of a user program.

LED-Array/PAM-Fluorometer 3056-FL

The PAM fluorometry with the saturation pulse method provides detailed information on the light-energy usage of photosystem II and, thus, adds important information on primary photosynthetic reactions to the gas exchange data.

Fiberoptics PAM-Fluorometer 3050-F

It employs a blue LED for measuring light and the saturating light pulses, and also features far-red illumination for Fo' determination.

Operation & GFS-Win Software

Contact info



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Applications

- Typical applications of the GFS-3000 are the assessment of CO₂-assimilation, H₂O-conductance or CO₂-respiration in dependence on CO₂-concentration, intercellular CO₂-concentration, light, temperature, humidity or time of day.
- The following graphics show some examples measured with the GFS-3000.

This Instrument is manufactured by our principle company

WALZ - Germany