

Automated Photosynthesis System Series (APS)

NEW!

AOC
BioScientific Ltd.

Multi-chamber Photosynthesis System



Adaptable system for replicated leaf gas exchange measurements



Automated investigation of diurnal variation in plant photosynthetic performance

Since 1969, ADC have been world leaders in the design and manufacture of infrared gas analysers (IRGAs). We have consistently advocated the open mode of analysis, whereby a constant flow of air and ambient pressure are maintained throughout the sample chamber. This technique is accepted within the plant science community as the most accurate and versatile operating system for photosynthesis research.

The APS (2024) is the world's first automated portable multi-channel photosynthesis system.

It has an integral gas multiplexer. It consists of an analyser/controller and separate automated chambers connected with pipes and a cable.

Analyser: Comprises a CO₂ analysis cell and a two mass flow meters. The analyser has a sampling pump and air supply pump for each connected chamber.

Channels (one channel per chamber): The analyser is offered in a 5 or 10 channel options. Fewer chambers can also be operated. Each channel has its own pump for analysis and air supply. Air supply pumps are powered all the time to maintain constant flow.



The **APS chamber** has two hinged jaws that automatically close onto a leaf to measure the photosynthetic rate.

- The jaws have two sensors to measure air temperature and leaf temperature.
- When closed for sampling, the gaskets on each jaw form a seal on the leaf to prevent air leaks.
- During the experiment, the leaf is held in position by leaf guides to allow repeated sampling. One of the leaf guides has a PAR sensor.
- The PAR level is measured by a sensor clipped onto the leaf support arm.
- The circulation fan in the block ensures air exchange between the two jaws.
- The block also has humidity sensors for the incoming air and circulating air.
- The gas tubing connecting chambers to the analyser can be of any length.

For the investigation of plant, soil and atmospheric interactions, ADC BioScientific Ltd. expertly produce a wide range of portable, user-friendly and cost-effective devices, from photosynthesis to soil respiration systems. We are committed to enabling carbon cycle research worldwide through quality instrumentation and local, technical support.

ADC BioScientific Ltd. also supply: Portable Photosynthesis Systems, Leaf Area Meters, Chlorophyll Content Meters, Advanced Fluorometers, Automated Soil CO exchange Systems, and Portable Soil Respiration Systems.



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Technical Specifications

APS Console

Measurement range and technique:

CO₂ : Span 2,000 ppm, 1 ppm resolution Infrared Gas Analysis

H₂O: 0 - 75 mBar, 0.1 mBar resolution

Atmospheric Pressure range: 600-1100 mbar. Accuracy -4/+2 mBar

Gas flow control

Pump flow maximum at least 340 $\mu\text{mol/sec}$

Flowmeter: scale 680 $\mu\text{mol/sec}$

Flow measurement accuracy +/- (1.5 % of reading + 0.5 % of scale)

Power supply:

DC Voltage in: Minimum 11.5 V Maximum 17.5 V

DC Current in: 2 A maximum.

Analogue input:

Channel resolution: 12 bit, accuracy +/- 1.5 %

Dimensions:

Weight (10 channels) 8.55kg

26 cm (W) x 19.1 cm (D) x 28.4 cm (H)

Overall case size including feet, handle & entries: 17 cm (D) x 25.5 cm (W) x 28.5 cm (H)

APS Chamber

Measurement range

PAR: 0-3,000 $\mu\text{mol/m}^2/\text{sec}$

Air temperature (top jaw): -20 to 90 °C +/- 0.5 °C. 0.1° C resolution

Leaf temperature (bottom jaw): 0 to 50 °C +/-0.5 °C. 0.1 °C resolution

RH: 0 to 100 % +/- 2 % RH

Power supply:

DC Voltage 13.8 V

Communications:

RS485

Connections: 1:Ground (0V); 2:DC positive; 3:RS485-A; 4:RS485-B;

Electrical screen (connect to ground)

Gas connections: 2 off, luer.

Dimensions:

Weight without cover: 780 g, Weight of cover: 40g

10.4 cm (W) with cover x 20 cm (L) x 27 cm (H)