CI-340 Handheld Photosynthesis System

DESCRIPTION

The CI-340 Handheld Photosynthesis System is a portable, single-handed tool that measures photosynthesis, respiration, transpiration, stomatal conductance, PAR and internal CO_2. Light-weight and durable, the CI-340 was designed for field use. The optional accessory modules allow researchers to control CO_2, H_2O, temperature, light intensity, and measure chlorophyll fluorescence, while the ten different customized chambers accommodate any leaf size, including conifer needles and cacti. Direct chamber connection to the CO_2/H_2O gas analyzer reduces measurement delay and enables rapid measurement of gas exchange with minimal delays.

Our 10 customized leaf chambers maximize the amount of leaf area enclosed in the sample chamber. Some of these chambers are:

- Square Leaf Chamber LC-1
- Large Cylindrical Leaf Chamber LC-5
- Liter Leaf Chamber LC-10
- Cactus Leaf Chamber LC-11

Visit our website to see more.

CI-340 Handheld Photosynthesis System:

Roots play a vital role in crop and orchard health but are challenging to measure using above-ground indicators.

Because root-growth dynamics change seasonally and respond rapidly to various biotic and abiotic stressors, improved visibility and accessibility to roots throughout the growing season is key to improving crop management practices.

Evaluating Roots in the Field

Non-destructive root images show a variety of features including root system architecture, timing of new growth or dormancy, root length or depth, mycorrhizal root tips, fungal infection, and parasites or nematode cysts.

Installing clear, plastic tubes throughout the field provides growers with a way to track changes to root systems in response to:

- Fertilizer application
- Watering schedule
- Root die-back from disease
- Parasitic nematode attack, mycorrhizal inoculation

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Control Modules

The control modules expand the use of the CI-340 and enable users to modify light intensity, manipulate CO_2 and H_2O concentrates, adjust temperature, and measure chlorophyll fluoresence.

Light Module CI-301LA

The Light Module allows researchers to adjust the light intensity above the leaf in the chamber to perform light-response curves and standardize light environment across measurements.

Adjustable H_2O & CO_2 Control Module CI-301AD

The H_2O & CO_2 Control Module enables researchers to set or adjust the CO_2 and H_2O concentrations in the incoming air stream in order to investigate leaf-level physiological responses.

Temperature Control Module CI-510CS

The Temperature Control Module allows researchers to adjust the temperature of the leaf chamber to evaluate changes in photosynthetic rate relative to high or low temperatures.

Chlorophyll Flourescence Module CI-510CF

The Chlorophyll Fluorescence Module measures fluorescence simultaneously alongside gas-exchange measurements and provides researchers with information about changes in photosynthesis efficiency and heat dissipation from a leaf.

SPECIFICATIONS:

Main Unit

Main Unit: On board IRGA for CO_2 Analysis, H_2O Analysis with humidity sensor capacitor, Flow Control, Pump, Display and Key Board, Leaf Chamber attachment ports and Battery.
Display: LCD 40 x 6 characters or 320 x 64 pixel
Data Storage: 4 MB Internal FLASH RAM
Data Output: USB
Flow Rate: 100 ~ 1000 cm^2 / min
Operating Temperature: 0-45° C
Operating RH: 0-90% non-condensing
Power Supply: 7.2 VDC, 4400 mAh for 5 hours continuous use, extended hours of use with additional batteries. AC Adapter / Battery Charger supplied.
Weight: 1.5 Kg (3 Lbs) with Battery
Dimensions: 44 cm x 5.5 cm x 5 cm

CO_2 Analyzer

Sensor: Low power Non-Dispersive Infrared Gas Analyzer
Chopping Frequency: 1Hz
Sensors Response Time: 35 seconds
Source Life: 5,000 hours
Measuring Range: 0 to 2000 ppm (Standard) - 0 to 3000 ppm (Optional)
Resolution: 0.1ppm
Repeatability: ±0.1 ppm (short term)
Accuracy: < ± 2% up to 2000 ppm
Sample Cell: 100 mm x 10.2 mm (3.94” L x 0.40” Dia)

H_2O Analyzer

Sensor Type: Humidity Sensitive Capacitor
Stability: Stable Analyzer for accurate H20 measurements
Measuring Range: 0 to 100%
Resolution: 0.1%
Accuracy: ±2% at 10% RH, ±3.5% at 95% RH

PAR Measurement

Sensor Type: Filtered GaAsP - Photodiode
Measuring Range: 0 ~ 2500 µmol m^2s^{-1}
Accuracy: ±5 µmol 0-2500 µmol / m^2s^{-1}

Chamber Temperature Measurement

Sensor Type: Thermocouple
Display: LCD 40x6 characters 320x64 pixel
Measuring Range: -15 ~ 50°C
Accuracy: ±0.1°C

Leaf Temperature Measurement

Sensor Type: Infrared Sensor
Measuring Range: -10 ~ 50°C
Accuracy: ±0.3° C

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THEORY OF OPERATION

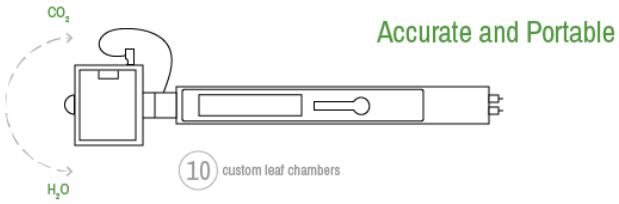
Photosynthesis is the formation of carbohydrates from CO_2 and a source of hydrogen (as water) in the chlorophyll-containing tissues of plants exposed to light. Photosynthetic rate is determined by measuring CO_2 before and after it enters the leaf chamber to calculate the rate of CO_2 assimilation by a known leaf area.

Transpiration is the movement of water vapor from leaf tissue into the atmosphere. Transpiration rate is determined by measuring water vapor before and after it enters the leaf chamber to calculate the rate of water vapor flux per one-sided leaf area.

Stomatal conductance refers to the openness of the leaf stomata determines the rate of CO_2 assimilation into the leaf and water vapor exits the leaf through the stomata. Stomatal conductance is calculated by measuring transpiration rate as a function of leaf temperature.

Product Features:

- Lightweight and optimized for single-handed operation
- Stable analyzers for accurate CO_2 and H_2O measurements
- Accommodates open and closed system measurements
- Infrared, non-contact leaf temperature sensor
- Ten interchangeable chambers customized for different leaf types
- Custom soil respiration chamber
- Control modules for light, temperature control, CO_2 / H_2O supply and chlorophyll fluorescence measurement
- Chlorophyll fluorescence and photosynthesis measured simultaneously.



APPLICATIONS

- Ecologists use the CI-340 to measure seasonal changes in photosynthetic rate as a response to temperature shifts.
- Agronomists use the CI-340 to measure water status of crop plants across related genotypes.
- Horticulturalists use the CI-340 to measure changes in leaf physiology as a result of drought stress.

Contact info

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