Distributed Plant Photosynthetic Physiology and Environmental Monitoring System - PLS-10R

Continuous monitoring of plant photosynthetic rate, physiological indicators and environmental factors

The PLS-10R is a photosynthetic system, but it is not an ordinary photosynthetic system.
It is designed for long-term continuous monitoring. The unique automatic opening and closing of the blade chamber allows the measuring gap to be open to maintain the natural state of the blade to the greatest extent. Multiple leaf chamber channels allow for simultaneous monitoring of multiple samples.

The PLS-10R is a photosynthetic system, but it's more than just a photosynthetic system.
It is also a multi-channel plant physiology and environmental monitoring system. It can be connected to multiple sensors to monitor environmental factors (PAR, air temperature and humidity, soil temperature and humidity, etc.) and plant physiological indicators (leaf temperature, stem flow rate, stem micro-changes, fruit growth, etc.).

Key features:

- The CO2 gas exchange of blades can be continuously monitored for 24 hours
  - Obtain daily net assimilation of CO2 (net production)
  - Analysis of CO2 exchange balance (photosynthesis and respiration) during the day and at night
  - Accurately study the effects of environmental factors such as light, temperature, and CO2 concentration on plant growth
- H2O gas exchange, transpiration rate and stomatal conductance of blades can be continuously monitored for 24 hours
- Continuous monitoring can last for hours, days, or even weeks
- Multiple leaf chambers can be configured to monitor multiple samples simultaneously
- Through external sensors, micro-changes in stems, micro-changes in fruits, soil temperature and humidity can be monitored synchronously

The leaf chamber

Fields of application

- Optimize cultivation methods for high yields
- Identify the limiting factors for yield improvement and take the right action at the right time.
- Find out the limiting factors of the plant itself, such as stomatal factors
- Compare the differences between different varieties and treatments
- It can be widely used in many fields such as plant physiology, ecology, agronomy, horticulture, crop cultivation, facility agriculture, and water-saving agriculture

In Europe, some scientists use it as a long-term monitoring system for the ecological environment, examining changes in plant environmental conditions along the Mediterranean coast and the exchange of CO2.

In South Korea and Japan, in Asia, users use the system for long-term monitoring of crops in growing

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chambers.

Measurement parameters

A wide range of sensors are available

Photosynthetic gas exchange measurements: CO2 Concentration, Air Relative Humidity, Air Temperature, Leaf Temperature, Board Temperature, PPFD, Air Flow Rate, Varometric Pressure, CO2 Exchange Rate, Transpiration Rate, Stomatal Conductance (for Transpiration), Stomatal Conductance (for CO2 Exchange), Air VPD, Leaf VPD, etc

Measured values from external sensors: micro-changes in stems, trunk diameter growth, fruit growth, foliar temperature, PAR, air temperature and humidity, soil temperature and humidity, etc

Main technical parameters:

- Measurement mode: automatic continuous monitoring
- Number of leaf chambers: Multiple
- Leaf chamber type: automatic opening and closing
- Leaf chamber area: round 10 cm2 (rectangular designs available upon special order)
- Operating temperature: 5 – 50 ° C
- Degree of protection: IP53

Basic configuration:

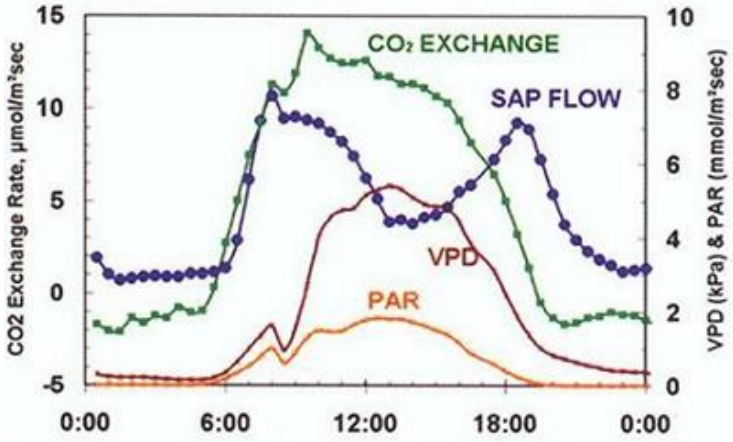
Blade chamber, stainless steel bracket, control software, operation manual

Optional

Stainless steel bracket, optional sensor

Application examples:

The following figure is the monitoring results of cotton leaves in one day, which is only the numerical comparison of a part of the sensors, and the system can obtain a number of sensor numerical control graphs, so that the test results are more clearly expressed on the figure, so that it is more convenient and intuitive to study the impact of environmental factor changes on plant physiology.



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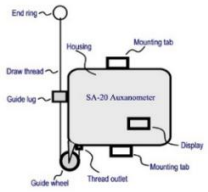
Optional sensors and accessories

name	Basic parameters	Image
LT-1/4 Blade Temperature Sensor	Number of probes: LT-1:1 probe; LT-4: 4 probes; Measuring range: 0 to 50 ° C; Measurement accuracy: ±0.15 ° C; Resolution: 0.1 ° C	
SD-5 stem micro-change sensor	Suitable stem diameter: 5 to 25 mm Measuring range: 0 to 5 mm Resolution: 0.002 mm	
SD-6 stem micro-change sensor	Suitable stem diameter: 20 to 70 mm Measuring range: 0 to 5 mm Resolution: 0.002 mm	
SD-10 stem micro-change sensor	Suitable stem diameter: 20 to 70 mm Measuring range: 0 to 10 mm Resolution: 0.002 mm	
DE-1 Trunk Diameter Growth Sensor	Trunk diameter range: greater than 60 mm Measuring range: 0 to 10 mm Resolution: 0.005 mm	
FI-L Fruit Growth Sensor	Range: 30 to 160 mm Resolution: 0.065 mm	
FI-M Fruit Growth Sensor	Range: 15 to 90 mm Resolution: 0.038 mm	
FI-S Fruit Growth Sensor	Range: 7 to 45 mm Resolution: 0.019 mm	
FI-XS Fruit Growth Sensor	Range: 4 to 30 mm Resolution 0.019 mm	
SA-1250 Plant Growth Sensor	Range: 0 to 500 mm Resolution: 0. 2 mm	
SF-4/5 stem flow sensor	Measuring range: <12 ml/h Diameter range: 1-5 mm; 4-10 mm	

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SMTE-3 Soil Moisture, Temperature, Conductivity Sensor	Soil moisture: 0 to 100 % vol.% WC Temperature: -40 to 50 ° C Conductivity: 0 to 15 dS/m	
Software	You can set the sampling time of the sensor, download data, etc	