

SOLAR RADIATION MEASUREMENTS



P3.60
Parts List
Pg 403-404

Photosynthetic processes in plants are much dependent on solar radiation. For measuring solar radiation properties, a SunScan light interception measurement system is available.

19.14 Light interception measurement system, type SunScan

A direct relation exists between the quantity of incoming radiation absorbed (intercepted) and plant biomass created. Therefore, data concerning the photosynthetic active radiation (PAR) are of great importance in order to obtain the ideal light conditions for maximum yield.

The SunScan system meets the need for this data and is suited for measurement and analysis of the PAR in the canopy of crop.

The SunScan package consists of a light interception probe, data collection module and software.

The probe, having a 1 meter length, contains 64 PAR sensors which are read-out every single measurement. The probe has a measuring range of

0 to >> 2500 $\mu\text{mol-2s-1}$ and a resolution of 0.3 $\mu\text{mol-2s-1}$. The probe is to be connected to the data collection module via an RS232 interface. The control button on the grip of the probe allows fast and accurate measurements. By means of the data collection unit the probe is programmed for automatic measurements with time intervals in a range of 1 second to 24 hours.

The data module reads and calculates the average light level from every individual sensor provided, where every individual sensor value remains available in memory, allowing an additional, more detailed study of the PAR.

Raw readings and derived functions such as light transmission and leaf area index (LAI = variation in light perforation by crop/canopy) can be shown, collected and stored.

Groups of readings can be averaged, while different display and storage formats can be chosen. The data collection module is a light weight handheld computer for storage and analysis

The light interception probe is used to determine the leaf area index.



Light interception probe with data collection unit and PAR sensor on tripod.

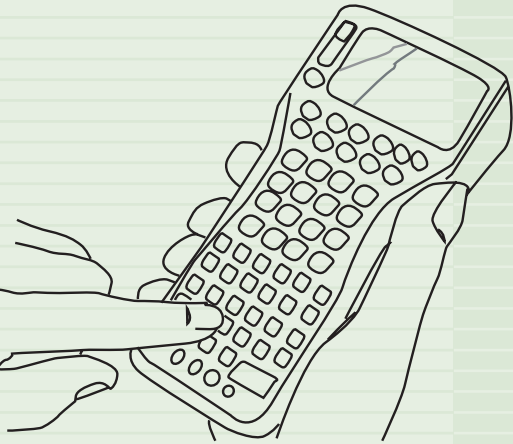
The PAR sensor is used for above canopy reference measurements together with the light interception probe.





P3.60
Parts List
Pg 403-404

Data are stored and processed on the data collection unit.



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of the measuring data produced by the probe. Data are stored on exchangeable flashcards. The supplied memory size provides a capacity for storage of about 2000 readings. For any further storage needs, additional flashcards are available. Finally, the collected data can be transferred to a computer or directly to a printer for further analysis.

As an alternative to the use of the data collection terminal, it is possible to connect a laptop computer to the RS232 interface of the interception probe and to run and use the supplied SunData software for programming, readout and data analysis, as the SunScan software provides all functions and options of the data collection module. However, the use of a data collection module is recommended, as the use of a laptop computer in the field will prove to be unpractical, due to its battery life time and weight.

The SunScan is supplied including interception probe, data collection module, and software. The datacollection module is provided with a 256 kb flashcard.

Also available is an external PAR sensor for measurement of PAR above the canopy and direct and diffuse light. Maximum reading 2500 $\mu\text{mol-2s-1}$.

The sensor uses an array of photodiodes and a unique shading pattern to calculate whether the sun is shining and to measure the direct and diffuse components of solar radiation.

This completely avoids the need for troublesome shade ring adjustments required with conventional diffuse light sensors.

The sensor can be mounted on a special telescopic tripod.



Light interception probe



Data collection module



External PAR sensor