

PLANT PHYSIOLOGICAL RESEARCH



P3.50
Parts List
Pg 402-403

Plant physiological research comprises a study of all kinds of processes taking place in growing plants or their environment. For this type of research we provide a number of field and laboratory instruments, for example, for surface measurements of plant leaves, water potential measurements, and water or CO₂ evaporation measurements, allowing to analyze the behaviour of diseased plant leaves at special conditions.

19.01 Leaf colour charts

Colour charts express colours of leaves in objective and numerical terms by means of comparison with a large number of standard colour chips (according to Munsell).

19.04 Automatic porometer

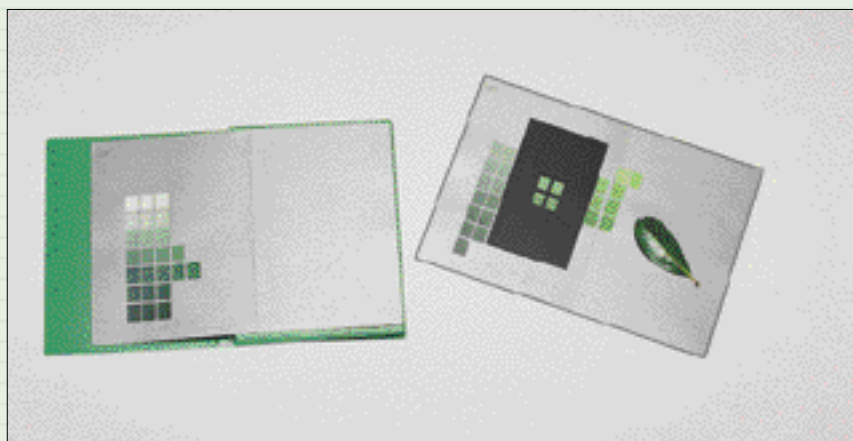
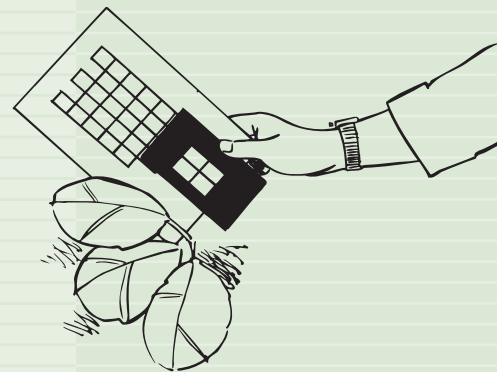
The loss of water (evaporation) by plant leaves is regulated by the stomata (pores) of the leaves, as CO₂ absorption is necessary for photosynthesis. It is an important indicator for the physiological condition of the plants. The opening of the

stomata can be interpreted as the resistance against gas diffusion (in s/cm) and is measured using the porometer. The porometer is fitted with an automated, fast measuring cycle which yields temperature compensated measuring results. Since the stomata are sensitive to the presence of the porometers sensor head, measurements are executed within less than 15 seconds. The instrument has a measuring range of 0 - 30 s/cm and is suitable for wide and narrow leaves. The instrument has an internal memory for approximately 1500 measurements, including notes. Data can be transmitted via an RS232 interface to a printer or PC. The instrument is provided with a clearly readable display and function keys.

In preparation of a series of measurements, the porometer can be calibrated fast and easy by using software and a calibration plate.

The porometer is supplied including sensor head, calibration plate, RS232 cable, software, charging apparatus and carrying bag.

The leaf colour is determined with the leaf colour chart.

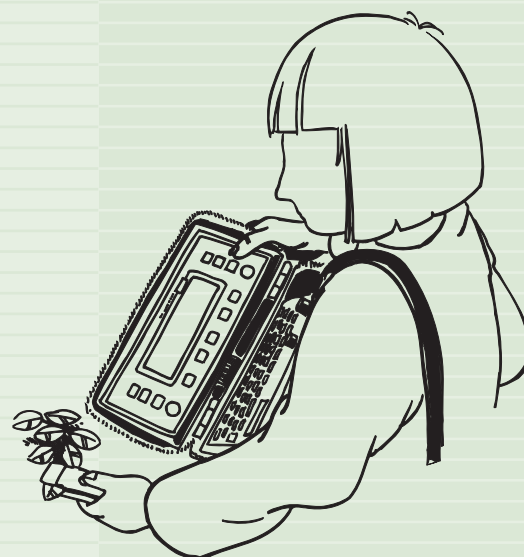


Leaf colour chart



Automatic porometer

Using the porometer the measurement of the resistance against gas diffusion is executed directly on the leaf.



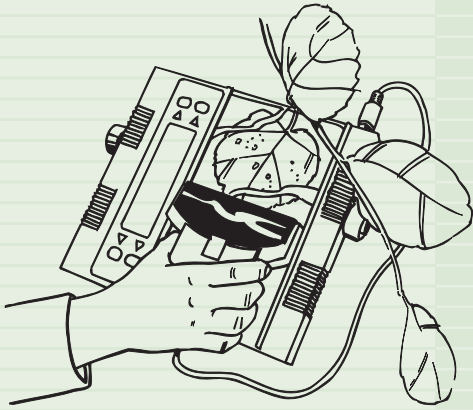


P3.50
Parts List
Pg 403

PLANT PHYSIOLOGICAL RESEARCH



A diseased leaf is researched in the field using the portable leaf area meter.



19.13 Portable leaf area meter for diseased leaves

The portable compact leaf area meter is suitable for non-destructive measurement of leaf surfaces that are affected by diseases. The measurements are done by means of user friendly, menu driven software.

The meter consists of a high resolution scanner and a scan board with integrated data processing and storage. The instrument is provided with a large graphical display, allowing direct read out of the measured parameters of the scanned leaf. The measurements can be shown in mm, cm or inches, and are stored together with leaf images.

The leaf area meter has a memory size for approximately 2000 measurements. The data can be transmitted via an RS232 interface to a printer or PC.

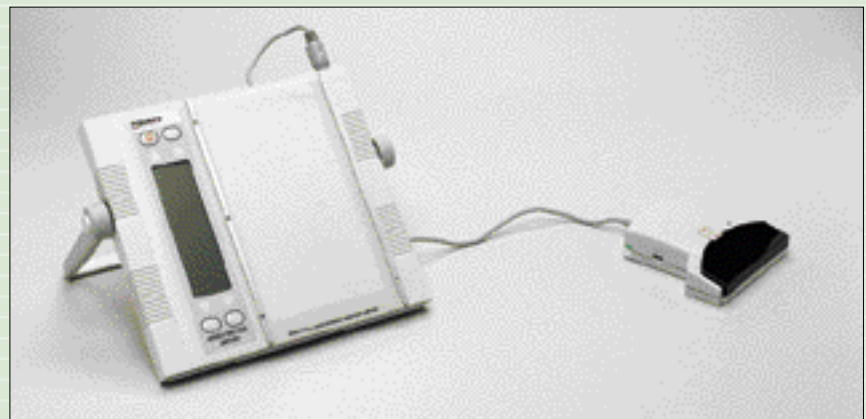
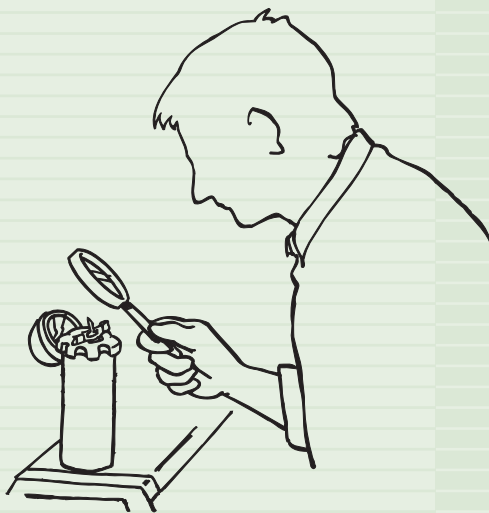
The meter is supplied including battery charger, scan board, software and RS232 cable.

19.15 Laboratory plantwater status console

An analog system to determine the water potential in plant sections, up to 40 Bar. The instrument is supplied with an adjustable pressure source, pressure vessel, standard sample holder, accessories and manometer.

The meter operates in accordance with the pressure bomb method of Scholander. Following this technique a leaf or small branch is cut off and is being exposed to atmospheric pressure in the sample holder. Subsequently, the pressure in the pressurization vessel is being increased, until the moment the plant moisture is pushed through the stem cut. This equilibrium pressure is an indicator for the negative pressure of the water in the plant system at the moment the sample was cut off. Unusual moisture tensions (as a result of water shortages) imply deterioration of plant growth and the resulting yield. The system is suitable for branches and leaves with a stem cross section of at most 6 mm.

The sample is checked for sap discharge.



Portable leaf area meter



Laboratory plantwater status console

PLANT PHYSIOLOGICAL RESEARCH



P3.50
Parts List
Pg 403

19.18 Digital portable plant moisture system

The digital portable plant moisture system can be used for observations in the field, allowing plant observations in accordance with the Scholander method. The leaf of a plant is placed in a special pressurization chamber by sealing the leaf stem in the removable neck of the chamber, allowing the operator to observe the stem, while the chamber is being pressurized.

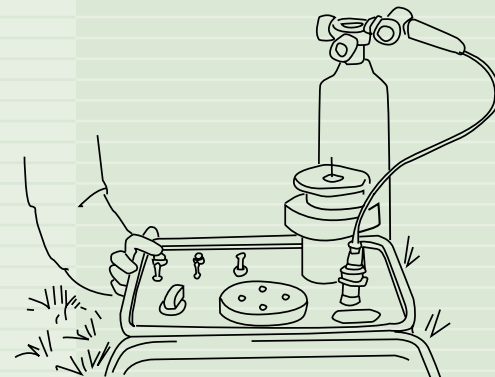
The system is designed for safety, as the pressure chamber and its lid are made of high grade brass, where the lid has a multi-thread screw head design. Pressurization takes place by an additionally supplied pressed air cylinder, that can easily be refilled in many centres anywhere. Pressurization is possible at the start of a new observation, as well as during operation. The chamber pressure is measured by a semi-conductor transducer, while a large liquid crystal display (LCD) screen provides read out for the operator. While the leaf stem is observed, the LCD screen can be frozen by flicking

a switch, allowing the operator to keep observing the leaf stem without the immediate necessity to read out, as the pressure end point can be read from the frozen LCD screen later.

The content of the pressurization chamber amounts 0,54 l and is suited for pressures up to 40 Bar. The system is to be supplied by a 9 Volt battery. The systems weight is 9 kg, the cylinders weight another 4.8 kg.

The system is supplied including a 3 l pressed air cylinder with reduction valves.

The digital plant moisture system is read out in the field.



19.19 Analogue portable plant moisture system

The technical specifications of this system are the same as those of the digital system. By replacing the electronic pressure transducer with a traditional dial gauge readout, considerable savings are made making this system ideal for projects with a low budget. The gauge has a maximum pressure needle which can be used to 'freeze' the reading.

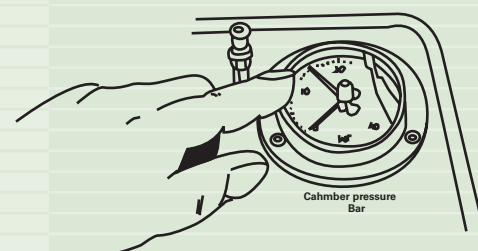


Digital plant moisture system



Analogue plant moisture system

The maximum pressure needle is used to 'freeze' the reading.





P3.50
Parts List
Pg 403



PLANT PHYSIOLOGICAL RESEARCH

The determination of CO₂ and water vapour exchange with the LCI.



19.72 LCI Ultra compact photosynthesis measurement system

A portable microprocessor controlled system for CO₂ and water vapour exchange measurements. The system is equipped with newly developed miniaturised infrared gas analysis (IRGA) sensors, housed in a conditioned leaf chamber.

The leaf chamber allows very accurate and reliable CO₂ and water vapour measurements for various types of plants. The leaf chamber CO₂ and water vapour concentrations are automatically controlled by the system, operating either in a controllable flow through mode, or in an open system mode.

The necessity for a large external volume is removed by a new buffer application, which counteracts fluctuations in ambient CO₂ concentrations. All CO₂ measurements are also automatically compensated for atmospheric pressure and temperature. The leaf chamber is provided with sensors for measurement of temperature and photo-synthetic active radiation (PAR) as well.

The instrument is operated by a control console,

equipped with a number of keys, a large liquid crystal display (LCD) screen, and a series of easy to use menus, which allow the user to access a wide variety of parameters, such as CO₂ and water vapour, chamber and leaf temperatures, PAR, Battery status, and many more. An exchangeable PC (PCMCIA) card is being provided, capable of storing a large number of measurements.

Finally, measurements can be initiated either by the control console or by a remote button located on the leaf chamber.

The recorded data is accessible either by downloading via an RS232 interface, or by transfer directly from the PCMCIA to a computer.

The data format is compatible with general spreadsheet applications.

The instrument is supplied including an exchangeable broad model leaf chamber, carrying bag, air probe, battery charger, spares kit and required chemicals.

Additional narrow and conifer model leaf chambers are also available.



Portable system for CO₂ and transpiration measurements