

Dendrometer*



- Highly precise
- Flexible for any measuring demands (radius, diameter, circumference, stem length, leaf thickness)
- Extremely light (13 g), Less strain on plants
- No power consumption
- Suitable for any outdoor conditions
- No calibration required, with a direct μm output
- Proven track record of more than 10 years use under outdoor conditions
- Least maintenance requirements

Why we need dendrometer?

Usually, changes occur in plant tissues as a result of growth and water content, leading to diurnal and seasonal plant dynamics. Diurnal variations reflect changes in tissue water content while seasonal dynamics are attributed to long-term increases due to growth. It has long been in the interest of plant scientists to design precise and appropriate instruments to monitor such changes in plants in a precise time scale and correlate them with environmental changes for accurate interpretation of plant responses to the environment. Techniques are currently available for accurate monitoring of physical environmental parameters, but to obtain accurate corresponding data for plant responses has been illusive. Quantitative measurements such as yield, tree ring width, etc. are cumulative results of effects of various environmental factors integrated over a complete growth season, e.g. one year and therefore, lacks precision (i.e. which environmental factor, at what time and in what intensity it affects plant growth). To study relationships between environment and plants, there is need for precise, simultaneous data on plant responses and

environmental variables that influence these responses. Dendrometers are ideal tools for meeting such demands. The Ecomatik Dendrometers (patents pending) are highly precise instruments for continuous monitoring of radial and vertical changes of plant tissues e.g. stems, fruits, leaves etc..

The Ecomatik Dendrometers

The Ecomatik Dendrometers are highly accurate and easy to use. They do not require any power supply and are easily automated. You only need a data reading device e.g. a data logger (for continuous data recording) or a simple voltmeter (for instantaneous data reading). No calibration required. Except for the reset, which is done after 11 mm growth expanse (usually after many months or years), they are maintenance-free. The sensors are absolutely suitable for any outdoor conditions and in any season.

There are four Dendrometer types available, for measuring radius (DR), diameter/thickness (DD), circumference (DC) and stem length (DV). One Dendrometer consists of a sensor fixed by a frame onto a tree.

Dendrometer



Type DR, for measuring changes in radius, suitable for diameter > 8 cm. The stem is injured by two screws.



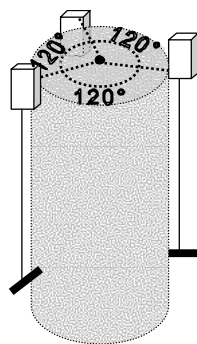
Type DD, the frame can be reduced to meet any size of plant tissue.



Type DC, very light, the complete sensor is only 16 g (without cable).



Type DC, For measuring changes in circumference, suitable for diameter > 2 cm, no injury to stem.



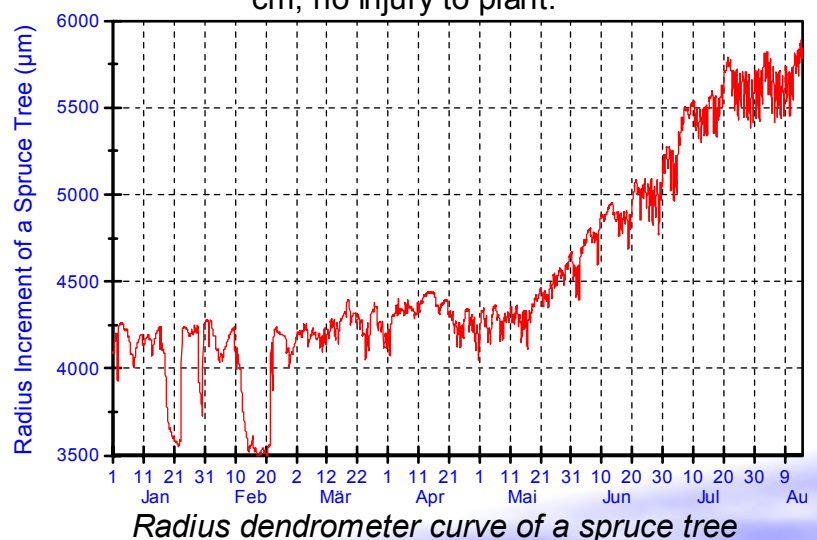
Type DV, a novel sensor in dendrology, For measuring vertical variation of one section of plant stem. The data reflect important parameters of plant physiology:

- (1) The variation of water content in the plant body and xylem water potential, respectively;
- (2) The variation of plant orientation during the growth.

Normally, three sides of the tree are equipped with three vertical Dendrometers.



Type DD, for measuring changes in diameter, suitable for diameter < 11 cm, no injury to plant.



Dendrometer

Technical Specification and Ordering Information

Type	DD Diameter/Thickness Dendrometer	DR Radius Dendrometer	DC Circumference Dendrometer	DV Vertical Dendrometer
Frame				
Use area	For measuring stem diameter, fruit diameter, and leaf thickness	For measuring stem radius	For measuring stem and fruit circumference	For measuring vertical variations of tree trunk, this is an indirect measure of xylem water potential in the tree body
Suitable for plant size	Diameter/thickness from 0 to 11 cm (>11 cm on request)	Diameter >8 cm.	Diameter from 2 to 32 cm (> 32 cm on request)	Diameter >8 cm
Plant injury	No	The stem is injured by two screws (diameter=6 mm)	No	The stem is injured by two screws (diameter=6 mm)
Temperature Coefficient	Very low	Very low	Temperature coefficient of the special wire cable $<1.4 \times 10^{-6}/K$	Temperature coefficient of the special wire cable $<1.4 \times 10^{-6}/K$
Material	Stainless steel	Stainless steel	Stainless steel	Stainless steel
Size/Weight	Frame: 18×15×1.5 cm, 52 g	Frame 14×15×1.5 cm, 60 g	Special wire cable <3 g	Special wire cable <3 g
Sensor				
Measurement Range	11 mm without reset, continuously extendable by resetting the frames			
Accuracy	<2 μm (measuring with two channels)			
Output signal	0 - 11 000 ohm			
Power supply	No power supply required			
Temperature Coefficient	2 signal-ended channels measurement <0.1 $\mu m/K$			
	1 signal-ended Channel measurement <0.04 %/K			
Environment	Outdoor condition: -30 to 40 °C air temperature, 0 to 100% relative air humidity			
Weight of sensor	13 g without cable and frame			
Cable length	2 m standard, extendable up to 100 m			
Collection of data	Continuously with data logger, instantaneous with a voltmeter			