

DEX Growth Dendrometer



The DEX20, DEX70, DEX100 and DEX200 are highly precise electronic dendrometers that measure the growth and size of plant stems and fruits. The effects of environmental factors on the water balance of plants and stem size variations over time are easily monitored with a temperature compensated dendrometer. The DEX is a caliper-style device with a full bridge strain gage attached to a flexible arm. The output signal is then recorded by a data logger or computer in real time. The millivolt sensor output shows both the diurnal and long term growth of the plant. The device has been used to test plants under conditions of water stress, elevated ozone and other atmospheric pollutants. Applications for screening plants for growth rate and stress tolerance are also common.

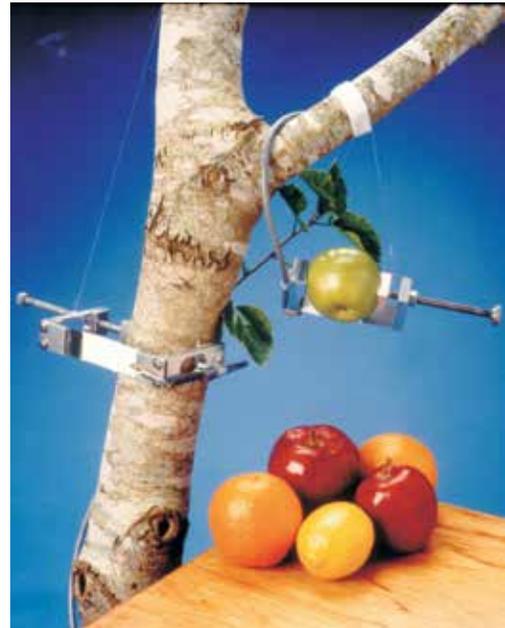
Installation

The device is connected to a data logger, clamped onto a stem and suspended with mounting monofilament guides on the center of gravity of each caliper arm which are then attached to the tree or a staked plant. Velcro straps are provided for easy installation on trees or woody plants. The screw adjuster is tightened to adjust the clamping blocks on opposite sides of the dendrometer. Thereafter the change in stem size increases the output, which directly converts to the diameter increase past the point one recorded as the device's zero point. A calibration multiplier may be loaded directly into a logger multiplier command, as well as the zero offset, and thus giving readings directly in mm or inches instead of millivolts. Users may install optional shading and shielding to minimize heating and radiation effects.

Application

A field test was done in an apple orchard in Mattawa, Washington in September 1995. Data was collected over a 15 day period. After the data was acquired, the information was transferred to a personal computer for analysis. Millivolt signals were converted to millimeter units of movement. The initial value of the dendrometer was then subtracted from subsequent values so that the Dendrometers were zeroed. The effect of temperature was removed by predicting the effect of temperature, then subtracting this value from the data points.

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Features

- **Nondestructive**
- **Real-Time measurements**
- **Adaptable to computer systems**
- **Long-term measurements possible**
- **Adaptors for woody stemmed, herbaceous plants, and fruits**
- **Weatherproof and rugged for field study**
- **Wires directly to data logger**
- **One differential channel per sensor**
- **Sensitivity Range ± 0.005 mm**
- **Four stem clamping blocks provided**
- **0 - 13 mm expansion range**
- **Calibration Kit available**



Specifications

Units	DEX20	DEX70	DEX100	DEX200
MECHANICAL				
Measurement Range	5 - 25	10 - 70	25 - 100	95 - 200
Expansion Range	0 - 5	0 - 13	0 - 13	0 - 13
Dimensions				
Length	65	102	155	263
Width	19	25.4	25.4	38
Height	36	51	76	153
Weight	55 g	180 g	230 g	572 g
Standard Clamping Blocks				
Dimensions Set 1	19 x 19 x 6	25 x 25 x 9.5	25 x 25 x 9.5	25 x 25 x 905
Face Radius	5 mm	70 mm	106 mm	200 mm
Dimensions Set 2	19 x 19 x 6	25 x 25 x 13	25 x 25 x 13	
Face Radius	25 mm	5 mm / 50	25 mm / 75	
Optional Clamping Blocks				
Dimensions	19 x 19 x 6	25 x 25 x 9.5	25 x 25 x 13	38 x 38 x 7
Spherical Radius	25 mm	70 mm	105 mm	500 mm
ENVIRONMENTAL				
Operating Range	-10 to 50° C			
Temperature Stability	0.0025 mm/° C			
Accuracy over 20° C Range	0.050 mm			
ELECTRICAL				
Signal Output Range	±5 mV	±5 mV	±2.5 mV	±2.5 mV
Output Sensitivity ^{NOTE1}	.5 mV/mm	.22 mV/mm	.13 mV/mm	.05 mV/mm
Conversion Multi. ^{NOTE1}	2.0 mm/mV	4.5 mm/mV	7.7 mm/mV	20 mm/mV
Output Linearity	±.01 mV/mm	±.006 mV/mm	±.004 mV/mm	±.004 mV/mm
Electrical Noise Limit	±0.01 mV	±0.01 mV	±0.01 mV	±0.01 mV

NOTE 1

Output sensitivity and multiplier are determined by a 10 point calibration curve from 0 - 3 mm and 5 points from 3.5 to 13 mm. Each sensor is provided with a factory calibration certificate for precise figures.

Ordering Information

DEX20

Dendrometer for stems or fruits 20 mm, 3 m cable length

DEX70

Dendrometer for stems or fruits 10 - 70 mm, 3 m cable length

DEX100

Dendrometer for stems or fruits 25 - 100 mm, 3 m cable length

DEXCC

Calibration kit for DEX70 or DEX100

ECWD-25

8 m cable for dendrometer, waterproof connector

ECWD-Lxx

Extra length, (XX) added to cable ECWD-25