



***Bio Instruments S.R.L.***

SENSORS AND SYSTEMS  
FOR MONITORING GROWING PLANTS

**DE-1L**

*Dendrometer*

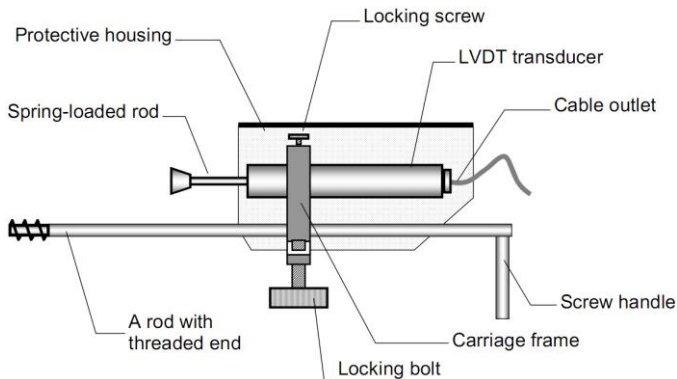


[www.phyto-sensor.com](http://www.phyto-sensor.com)

## Introduction

The DE-1L Dendrometer is a highly precise incremental LVDT-based sensor for monitoring micro-variations of trunk radius in micron range.

The sensor includes a linear displacement transducer (LVDT) mounted on a special rod with threaded end. When the rod is anchored inside the trunk, the LVDT rod follows movement of the trunk surface. The output signal follows the variation of distance between trunk surface and the anchored end of the rod.

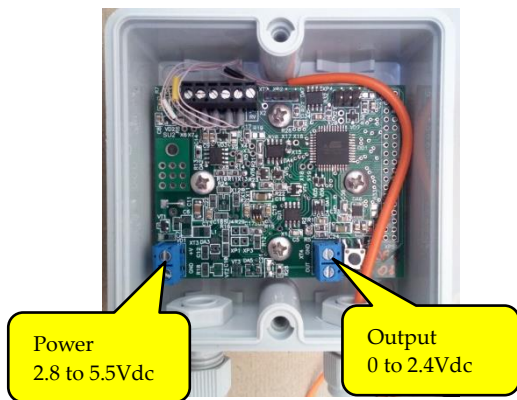


The probe is connected by a standard 2-meter cable to the waterproof box with the signal conditioner inside. A signal conditioner provides excitation of the LVDT and production of standard linear output signal. The output cable length should be specified in the order if required.

## **Connection**

Please use a four-core cable with 3 to 6 mm outer diameter.

The connection ports is shown in the picture below:



Maximal length of the output cable is 10 m.

## **Installation**

- In trees with rough bark over the cambium, rasp it away and pare down carefully an area of about 6 L × 5 W cm<sup>2</sup>. In caulis and species with smooth bark, no preparation may be needed.
- Drill the hole with the 3.3 – 3.5 mm bits. It is recommended to drill slowly using a wood drill

set to a low torque to prevent excessive tearing of wood fibers along the length of hole. The depth of hole must be 3 cm min. and 9 cm max.

- Free the locking bolt and remove the rod from the carriage frame.
- Carefully screw the rod into the tree. If there is difficulty in insertion, clear the hole carefully with the drill bit.
- Once the rod is implanted, set the sensor on the rod and adjust its position until the butt of spring-loaded rod touches the trunk.
- Readjust the sensor when its readings become close to 0 or 10 mm.

## **Calibrations table**

<b>V</b>	<b>mm</b>
0,000	0,000
2,400	10,000

## **Calibrations equations**

$$\Delta R = 4.1667 \times U$$

Where  $\Delta R$  – trunk radius variations  
 $U$  – output voltage in Volts

Response time is 0.25 s (after applying the power). The output is updated every 5 s at continuous power.

### **Power**

The DE-1L sensors are to be powered from an external regulated power supply with 2.8 to 5.5 Vdc output voltage.

## **Specifications**

Measurement linear range (LVDT stroke)	0 to 10 mm
Trunk diameter range	Above 6 cm
Analog linear output	0 to 2.4 Vdc
Resolution	0.005 mm (w/filter)
Operating temperature	0 to 50 °C
Temperature effect	< 0.02% total stroke / °C
Supply voltage	2.8 to 5.5 Vdc@30 mA max
Output auto update time	5s
Excitation time	0.25s
Overall dimensions, mm	90 W × 60 H × 23 D
Carrying rod, mm	160 L × 4 Ø
Threaded end, mm	10 L × 5 Ø
Cable length between probe and signal conditioner	2 m

## ***Customer Support***

If you ever need assistance with your sensor, or if you just have questions or feedback, please e-mail at [\*\*support@phyto-sensor.com\*\*](mailto:support@phyto-sensor.com). Please include as part of your message your name, address, phone, and fax number along with a description of your problem.



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