



"For the continuous measurement of sap velocity in plants"

- Dual needle, Granier design**
- Constant heat, heat dissipation method
- Reusable
- Weatherproofed
- Individual sensors and complete systems available



Sap Velocity

The Thermal Dissipation Probe, T.D.P., is a new transpiration sensor designed for the continuous measurement of sap velocity in plants with a diameter over 70mm.

*The technique was first proposed by Granier (**), who inserted a needle, containing a heater, into the sapwood of a tree and measured the difference between the temperature of the heated needle and the sap wood some distance below the needle.*

T.D.P. needle probes measure the sapwood heat dissipation which increases with sap velocity and resultant cooling of the heat source.

When the sap velocity is zero, the temperature difference between the two sensors is maximal. When the flow increases the measured (dT) difference decreases.

This accurate technique enables continuous measurement of sap flow under low flow rates using inexpensive equipment.

Complete Systems

ADC can supply fully integrated systems for the measurement of sap velocity. Each preconfigured system comprises 1 to 32 TDP probes a dedicated data storage module, voltage regulator and battery. The system is supplied prewired and housed in a weatherproof enclosure. Software is also provided for the calculation of sap velocity and flow rate.

*** Granier, Andru (1985) Une nouvelle methode pour la mesure du flux de seve brute dans electrnics des arbers
Ann.Sci.For.,42:8188*

Why T.D.P. ?

An important distinction in the thermal dissipation probe is that a constant heat dissipation method is used, the heating element stays on and continuous measurements are taken at set intervals during the day. This is in contrast to the heatpulse velocity (HPV) method, where the time lag between pulses and the distance between sensors determines the sap velocity. In heat pulse systems, time and distance are very critical, whereas in TDP neither time nor distance are critical. Another distinction is that the HPV method requires a waiting period before another reading is possible whereas, with the TDP, the signals are constantly available for the data storage module.

Probe Specifications

	TDP30	TDP50	TDP80
Length:	30mm (1.2")	50mm (2")	80mm (3.2")
Diameter:	1.2mm (0.050")	1.65mm (0.065")	1.65mm (0.065")
Spacing:	40mm	40mm	40mm
	0.15 to 0.2 W	0.15 to 0.2 W	0.2 to 0.25 W
Cable:	3 Mtrs	3 Mtrs	3 Mtrs
Heater Resistance:	50 Ohms	75 Ohms	110 Ohms
Operating Voltage:	3.0 V (@ ~8°C)	3.5 V (@ ~8°C)	7.5 V (@ ~8°C)

Extension cables: extension cables are available in 7.6 Mtr, 15 Mtr, 23 Mtr lengths. If other lengths are required cables up to 23 Mtr can be ordered. The sensor cables come with male and female sealed environmental locking type connectors for fast connection to extension

Data Storage module Specifications

Inputs:	Voltage single ended or differential $\pm 2\text{mV}$ to $\pm 2\text{V}$
Modes:	Individual channel configuration for logging and integration intervals: 10, 20, 30 seconds 1, 2, 5, 10, 20, 30 minutes 1, 2, 3, 4, 6, 12, 24 hours Transmission of data at the above intervals whilst logging Transmission of data on demand from an external signal Control of start / stop logging times
Resolution:	15 bit
Memory:	Battery backed 1 Mb RAM giving >3000 records + date and time
Clock:	Real time lithium battery- backed clock enabling synchronisation of several units
Power requirements:	12 Volt battery



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