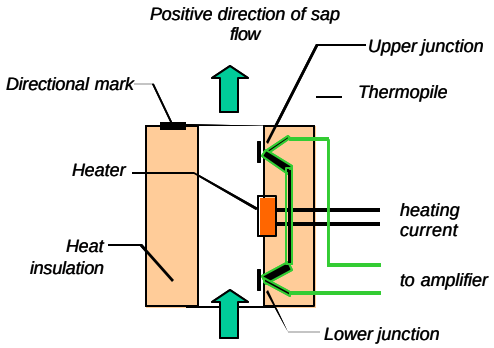
PHYTECH LTD.
Phytomonitoring Sensors and Systems
Yad Mordekhai 79145, Israel
Tel.: +972-8-6736804
Fax: +972-8-6736820
E-mail: info@phytech.co.il
URL: www.phytech.co.il

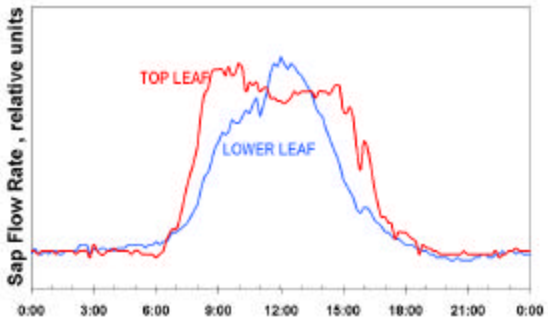
SF-4M AND SF-5M SAP FLOW RELATIVE RATE SENSORS

The SF-4M and SF-5M sensors enable to monitor diurnal variations of sap flow rate in a leaf petiole or a small stem.

The operation of SF-8 sensor is based on a constant heat method with symmetric disposition of thermo-sensitive elements (see picture below). A small heater warms a part of a stem to 2-3 degrees above the ambient temperature. If there is no flux in the stem, the distribution of temperature is symmetric; therefore the output signal of the thermopile is close to zero. As a result of xylem flux, the temperature increases in the direction of the flow and decreases in the opposite direction. The thermopile output follows the gradient of temperature. However, the proportionality between sap flow and signal is limited. Estimated upper limit is 3 ml/h for the SF-4 and SF-5 type sensors. Therefore, the sensor should be positioned on the plant so that the maximum possible flow rate would not exceed the limit specified above. It means that the area of leaves above the sensor should not exceed approximately 50 square centimeters. A leaf petiole is one of the most suitable places. Sensor must be covered by 2-3 layers of aluminum foil for protecting against solar radiation and other external heat sources.



Both SF-4M and SF-5M sensors provide relative measurement of sap flow rate. The SF-4M sensor is designed for stems from 1 to 5 mm in diameter. The SF-5M fits for stems from 4 to 10 mm in diameter.



Analysis of diurnal behavior of sap flow rate versus vapor pressure deficit or potential evapotranspiration (if available) is a fruitful method for investigating limiting factors of transpiration. A typical record is shown in the picture: a top leaf demonstrated midday reduction of sap flow in result of stomatal response while the lower one had no signs of water deficit. .

Both SF-4M and SF-5M Sap Flow Relative Rate Sensor include a sensor, dc powered signal conditioner with optional power adapter for unipolar power supply.

SPECIFICATIONS:

Measurement Range: Not specified. Approximate range of 3 ml/h was determined with the use of stem simulator (5 mm diameter fiber filled PVC hose)

Overall dimensions:

SF-4M Sensor: 30 x 30 x 40 mm^3;

SF-5M Sensor: 30 x 35 x 40 mm^3

Heating Power: 30 mW typical

Output: 0-2 V or 4-20 mA (optional)

Supply Voltage: ± 15 Vdc ± 10%

Optional power adapter operates on 10 to 30 Vdc