

Leaf-&-Air-Temperature

Type LAT-B3 (Broadleaf)

Technical Specifications



Leaf temperature sensor type LAT-B3, magnet-mounted on leaf surface.

The LAT-B3 (**Leaf-&-Air-Temperature Broadleaf** type) is a precise dual-probe sensor for continuous measurements of leaf surface and ambient air temperatures. Absolute air temperature (T_{air}) and leaf temperature (T_{leaf}) are measured via two precise micro thermistor probes. Sensor-individual matching of the two probes, ensures high measurement precision of leaf-to-air temperature difference ($\Delta T_{\text{leaf-air}}$). The leaf-to-air temperature difference ($\Delta T_{\text{leaf-air}}$) can be calculated from concurrent values of the two probes. Designed for broad leaves, the sensor is mounted on the leaf by means of a ultra-light-weight magnetic clamp mechanism.

Technical Specifications

Name	LAT-B3 : Leaf-&-Air Temperature Sensor, broadleaf type
Application positioning Suitable leaf size and thickness	Mounting position: Leaf surface Dual-probe spacing: User-configurable distance between T_{leaf} and T_{air} probes max. 35 mm Standard sensor size for leaves of: Length > 1.4 cm length Width between 0.8 to 20 cm (for larger leaf widths on request). Stable magnet-mounting possible for leaf thickness < 0.7 mm
Measurement range	-25 to + 70°C
Accuracy	Sensor dependent: Tolerance of Absolute T_{air} & T_{leaf} : $\pm 0.4^\circ\text{C}$ in temperature range between $+5^\circ\text{C}$ to $+40^\circ\text{C}$ $\pm 0.8^\circ\text{C}$ in temperature range between -25°C to $+70^\circ\text{C}$ Tolerance of leaf-to-air temperature difference ($\Delta T_{\text{leaf-air}}$): $\pm 0.2^\circ$ in temperature range between -25°C to $+70^\circ\text{C}$ Logger dependent, @ 25°C : e.g. CR300 series: $\pm 0.01^\circ\text{C}$ e.g. DL18 Logger: $\pm 0.03^\circ\text{C}$
Resolution	Logger dependent, @ 25°C : e.g. CR300 series: $0.25 \cdot 10^{-4}^\circ\text{C}$ e.g. DL18 Logger: $0.35 \cdot 10^{-3}^\circ\text{C}$
Size and weight	Diameter 12 mm, weight ca. 0.9 g
Output signal type	Supplied with 2500 mV, output signal is between 0 to 2500mV
Power supply	Excitation voltage Vex usually switched 2500 mV, power up 100ms max. Power consumption negligible.
Operating conditions	Air temperature: -25 to 70 °C, air humidity: 0 to 100%

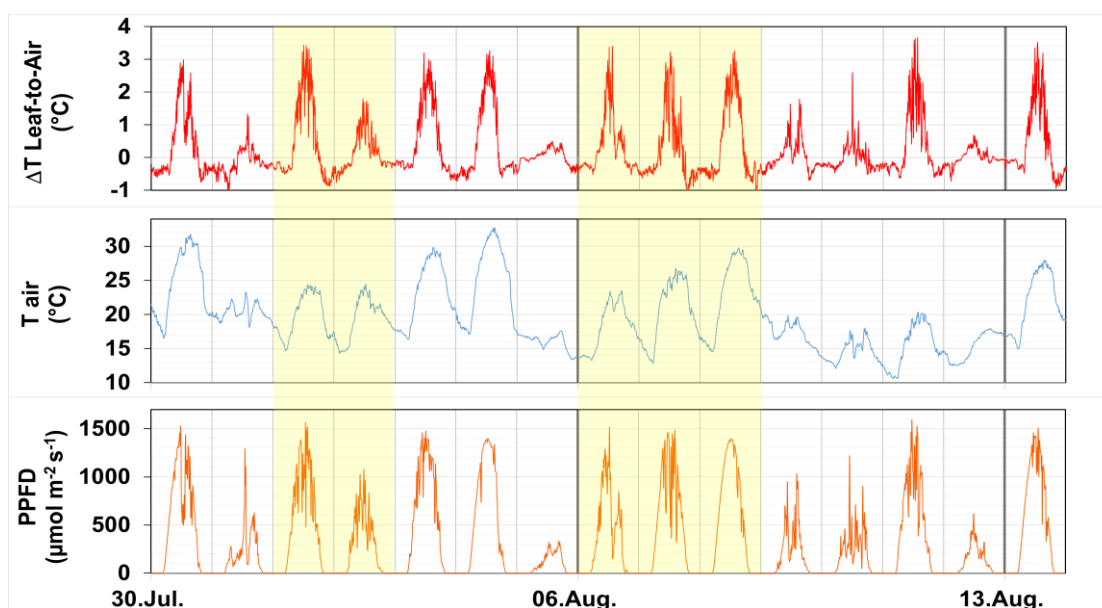


Fig. 1: Comparison of temperature difference between leaf surface and ambient air ($\Delta T_{\text{leaf-air}}$), air temperature (T_{air}) and solar radiation (PPFD).

Upper: Diurnal variations in temperature difference between upper leaf surface and ambient air ($\Delta T_{\text{leaf-air}}$, measured via LAT-B sensor) of a sun exposed leaf of a mature beech tree at the experimental site “Kranzberger Forst” of the TU Munich.

Middle: Diurnal variations in air temperature (T_{air} , measured via LAT-B sensor), at canopy height (27m above ground)

Lower: Diurnal variations in solar radiation above canopy, given in photosynthetic photon flux density (PPFD)