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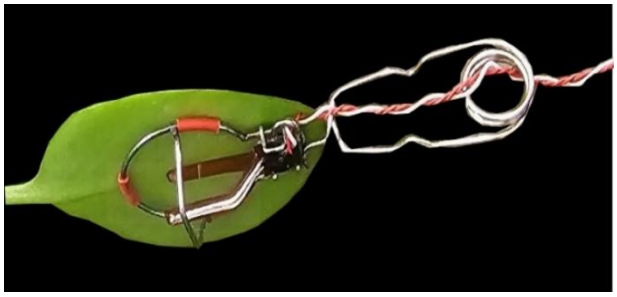
# New Generation Leaf–Air Sensors: LAT-2T and LATH-3T

This is our first information letter about two upcoming leaf temperature sensors.
For many years, Bio Instruments has been producing the LT-1T Leaf Temperature Sensor — a well-recognized and accurate contact sensor based on a micro-thermistor. Building on this foundation, we have developed two advanced next-generation models: **LAT-2T** and **LATH-3T-SDI12**.



## LAT-2T: Dual Leaf–Air Temperature Sensor

The LAT-2T integrates two micro-thermistors in one compact unit:

- One measures **leaf temperature** directly.
- The other measures **air temperature just below the leaf**, outside the leaf's boundary layer.

This configuration enables **precise measurement of the leaf–air temperature difference (ΔT)**, with a fixed distance of only 8 mm between the thermistors. This ensures accuracy and eliminates the errors that often occur when air temperature is measured by separate instruments located elsewhere in the canopy or greenhouse.

Even more importantly, when a standard air temperature & humidity sensor is available nearby (even if it is slightly biased due to solar heating), its paired data can be combined with the LAT-2T's air thermistor. Within an adiabatic model, this allows precise calculation of **local relative humidity at the air thermistor's position**. From this, both the **air vapor pressure deficit (VPD)** and the **leaf VPD** can be derived, since the vapor inside the leaf is assumed saturated at leaf temperature.

These parameters are fundamental for assessing **plant water status and stress indices**, making the LAT-2T a major step forward in phyto-monitoring.

## LATH-3T-SDI12: Leaf–Air Temperature & Humidity Sensor

But what if no standard air T/RH sensor is present nearby, or its distance could introduce significant errors? For this case, we designed the **LATH-3T**.
Compared to the LAT-2T, the LATH-3T includes a **precision temperature and humidity sensor** integrated into its signal conditioner, positioned in the cable tube within 0.5 m away from the leaf probe.
As a result, the LATH-3T provides a **complete set of microclimate and physiological parameters**, available directly to any data-logger via **SDI-12 or RS-485 Modbus RTU**:

- ✓ Leaf temperature
- ✓ Local air temperature (beyond the boundary layer)
- ✓ Leaf–air temperature difference (ΔT)
- ✓ Relative humidity of the air near the leaf
- ✓ Partial vapor pressure of the air near the leaf
- ✓ Maximum saturated vapor pressure near the leaf
- ✓ Leaf vapor pressure (saturated at leaf temperature)
- ✓ Air vapor pressure deficit (Air VPD)
- ✓ Leaf–air vapor pressure deficit (Leaf VPD)

**Conclusion**

It is easy to see the **substantial advance** these new sensors represent compared to the standard LT-1T. By combining direct leaf contact with accurate local air measurements, the LAT-2T and LATH-3T unlock a new level of precision in monitoring plant water status, stress indices, and microclimate dynamics.

Illustrations and technical diagrams will follow in the complete brochure.

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