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

Quick Start & Installation Guide

phyto-sensor.com

Introduction

The LATH-3T Leaf–Air Temperature & Humidity Sensor is a precision instrument designed for accurate, non-invasive measurement of leaf temperature, air temperature, air humidity, and a full set of derived microclimatic parameters directly at the leaf surface.

The sensor combines two subminiature contact probes with an integrated temperature and humidity measurement module. When installed on a plant leaf, one probe measures the leaf temperature, while the second probe, suspended just below the leaf, measures the air temperature outside the leaf boundary layer in the immediate vicinity of the leaf surface. This configuration allows accurate measurement of the temperature difference between the leaf and the surrounding air under real field conditions.

The lightweight stainless-steel wire clip holds a high-precision, glass-encapsulated thermistor with or a diameter of approximately 1 mm. The small size of the probe and its special design ensure almost negligible disturbance of the natural leaf temperature.

The thermistor is connected to the clip by thin 0.15 mm leads to minimize heat conduction and to achieve fast thermal response. All conductors are protected against corrosion for reliable operation under wet and outdoor conditions.

The probe is connected via a standard 0.5 m cable to a waterproof in-line signal conditioner. The standard output cable length is 3.5 m and can be customized at the time of ordering.

Each sensor is individually tuned and calibrated over the full measurement range. Typical sensor matching is ±0.08 °C.The LATH-3T further incorporates a precision temperature and humidity sensor inside its signal-conditioning module, positioned in the cable tube within 0.5 m of the leaf probe. Using an adiabatic correction model, the instrument recalculates air temperature and humidity to the location of the air thermistor. It also derives all secondary parameters with reference to the micro-space between the leaf and air thermistors, ensuring high physiological relevance of the measurements.

The sensor communicates via the SDI-12 interface (version 1.3).

Installation

Open the clip and carefully attach the sensor to a healthy, representative leaf. The thermistor measuring the leaf temperature must be placed on the shaded underside of the leaf.

IMPORTANT! Secure the sensor cable to the plant stem using adhesive tape or a similar fixing method in order to prevent accidental movement of the sensor during operation.

For correct measurements, both probes must be protected from direct solar radiation and from strong air turbulence as much as possible.

The signal conditioner is equipped with a cylindrical protective cap that covers the ventilation openings in the enclosure and protects them from accidental water ingress. During operation, the signal conditioner must be installed (suspended) in a vertical position with the protective cap facing upwards. A wire hanger is provided for suspension. Care must be taken to prevent dripping or running water from entering under the protective cap.

Electrical Connection

The connection sequence and wiring polarity must be strictly observed. The cable shield should be grounded at the data logger side or connected to the negative terminal of the power supply.

Wire color coding

1	White	GND
2	Black	Shield
3	Yellow	SDI-12 Data (I/O)
4	Red	Power supply (5 to 24 V DC)

Power Supply

The sensor must be powered from an external regulated power supply with a voltage of 5 to 24 V DC.

Typical current consumption is approximately 2 mA. Maximum current consumption does not exceed 6 mA.

Data Reading

In accordance with SDI-12 Standard (version 1.3).

Data order:

#	Parameter	Units	Resolution
1	Leaf temperature	°C	0.1
2	Air temperature	°C	0.1
3	Leaf-air temperature difference	°C	0.01
4	Air relative humidity	% RH	0.1
5	Air VPD	kPa	0.01
6	Lea fVPD	kPa	0.01
7	Air partial vapor pressure	kPa	0.01
8	Leaf internal vapor pressure	kPa	0.01
9	Air saturated vapor pressure	kPa	0.01
10	Air absolute humidity	g/m^3	0.01
11	Air absolute humidity	$mmol/m^3$	1

Specifications

Measurement range	0 to 50°C
Output interface	SDI-12
Instrumental accuracy	< ±0.15°C
Typical sensor matching	±0.08°C
Excitation time	150 ms
Supply voltage	5 to 24 Vdc
Current consumption	2 mA typ. 6 mA max.
Probe weight	1.6 g
Effective thermistor contact area	approx. 1 mm^2
Probe dimensions	50 × 20 × 10 mm
Ingress protection rating	IP64
Standard cable length	4 m

Customer Support

If you need any assistance with your sensor, or if you have any questions or feedback, please contact us at:

support@phyto-sensor.com

Please include your name, company, contact details, and a short description of your question or problem.

Manufacturer

Bio Instruments S.R.L.
20 Padurii St., Chisinau MD-2002
Republic of Moldova
info@phyto-sensor.com
phyto-sensor.com