



*Bio Instruments S.R.L.*

SENSORS AND SYSTEMS  
FOR MONITORING GROWING PLANTS

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# **LT-xT-SDI12**

## **Leaf Temperature Sensors**

### **Quick Start Guide**



[phyto-sensor.com](http://phyto-sensor.com)

# Introduction

The LT-1T, LT-12T, LT-2T and LT-4T leaf temperature sensors contain a subminiature touch probe that measures absolute temperature of a leaf or air. The lightweight stainless-steel wire clip holds a high precision glass encapsulated thermistor, which is about a millimeter in diameter. Small size of the probe and its special design provide 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 response time. All conductors are proofed to avoid corrosion under the wet operating conditions.

The probe is connected by a standard 0.5-meter cable to the waterproof in-cable signal conditioner. The output cable standard length is 3.5 m, and it is customizable at ordering. Every sensor is tuned and calibrated within the measurement range. The tolerance range is  $\pm 0.08$  °C.

- **LT-1** – a single probe sensor.
- **LT-12** – a single probe sensor with a lightweight openwork holder for suspension of another standard LT-1 probe at a certain distance below the LT-12 probe. When installed on a plant leaf, the LT-12 probe measures the leaf temperature, and the LT-1T probe, which is suspended below, measures the air temperature outside the boundary layer near the measurement point on the leaf. That realizes a remarkable possibility to measure correctly the temperature difference between the leaf and air in a close vicinity.

- **LT-2** – a two-probe sensor: LT-12 (probe 1) and LT-1 (probe 2) sensors in one.
- **LT-4** – a four-probe sensor.

*Interface:* SDI12.

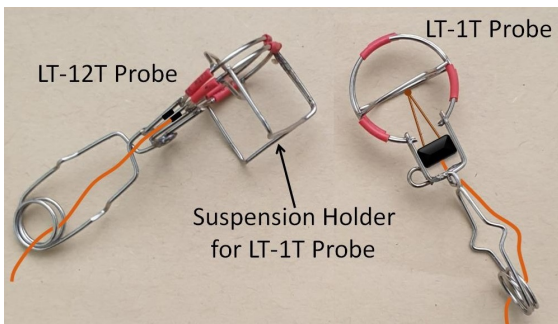
## Installation

Open the clip and attach the sensor to a leaf. Thermistor should be placed at the lower shady side of the leaf.

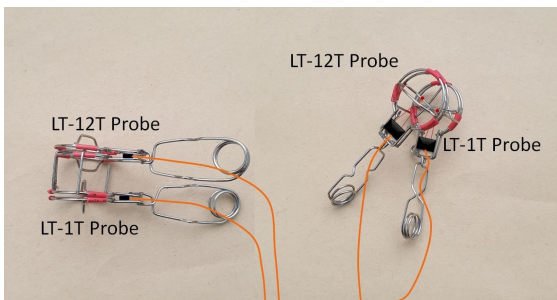
**IMPORTANT!** Secure the sensor's cable on plant stem with adhesive band in order to prevent occasional movement of the sensor.

### LT-12 and LT-2 sensors

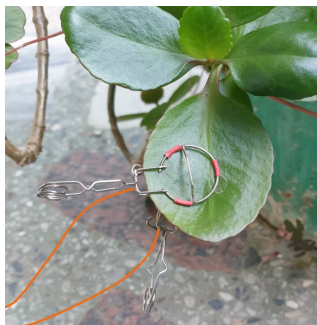
The outline of the LT-1 and LT-12 probes is illustrated in the Figures below.



*Fig.1. LT-12T and LT-1T Probes*



*Fig.2. The coupled LT-12T and LT-1T Probes*



*Fig.3. The coupled probes on a leaf*

# Connection

**The sequence and correctness of the connection must be observed!** The shield shall be grounded at the data loggers side or connected to the 'minus' contact of the power source.

## Connection order

1	White	Ground
2	Black	Shield
3	Yellow	SDI12 Input/Output
4	Red	Power 5 to 24 Vdc

## Data reading

In accordance with SDI12 Standard ([version 1.3](#)).

Decimal data format: XX.X (°C).

Data order: LT-12, LT-1, difference of LT-12 and LT-1.

## Power supply

The sensor is to be powered from an external regulated power supply with 5 to 24 Vdc @ 6 mA output voltage.

## Customer Support

If you ever need assistance with your sensor, or if you just have questions or feedback, please e-mail at [support@phyto-sensor.com](mailto:support@phyto-sensor.com). Please include as part of your message your name, address, phone, and fax number along with a description of your problem.

# Specifications

Measurement range		0 to 50°C
Output		SDI12
Instrumental accuracy		< 0.15°C
Tolerance range		±0.08°C
Excitation time		150 ms
Supply voltage		from 5 to 24 Vdc
Current consumption		2 mA typ. 6 mA max.
Number of probes	<i>LT-1</i>	1
	<i>LT-12</i>	1
	<i>LT-2</i>	2
	<i>LT-4</i>	4
Probe weight		1.6 g
Contact area of thermistor		About 1 mm <sup>2</sup>
Probe dimensions		50 × 20 × 10 mm
Protection index		IP64
Cable length		4 m

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