



Bio Instruments S.R.L.

SENSORS AND SYSTEMS
FOR MONITORING GROWING PLANTS

LT-1/4T-S

Leaf Temperature Sensor



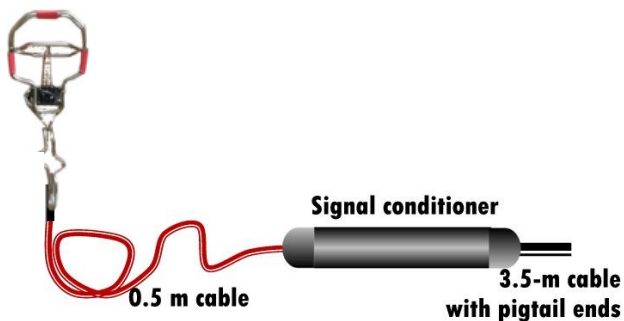
Introduction

The LT-1 / LT-4 sensor is a subminiature touch probe that measures absolute temperature of a leaf. 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 inside.

The LT-4 sensor has 4 probes.

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 $\pm 0.08^{\circ}\text{C}$.



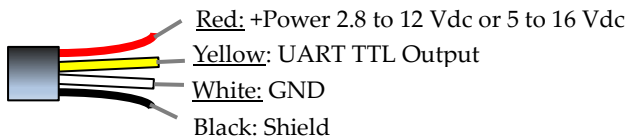
Installation

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

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

Connection

The connection diagram is shown below. The shield shall be grounded at the data loggers side or connected to the 'minus' contact of the power source.



Data reading

Digital outputs have data format: UART TTL, Baud Rate = 9600, 8N1.

Decimal data format: X.X (°C).

In a basic version, the UART-TTL operates as following:

1. After power is on, the sensor takes the first measurement within 100 ms approximately, and, then, sends the measured value in ASCII code. For instance, if the measured value is 24.5°C, the string looks like **24.5<CR><LF>**, where **<CR>** - Carriage Return **<LF>** - Line Feed.
2. Then the sensor takes new measurement and sends the new reading every 5 second while power is on.

Upon customer's request, the factory basic protocol can be modified with another (a) the string content (to add header, CRC, etc.), (b) Baud rate, (c) sampling time (any value from 1 s and more).

Power

The sensors are to be powered from an external regulated power supply with 2.8 to 12 Vdc output voltage (S1 modification) or 5 to 16 Vdc (S2 modification).

Specifications

Measurement range	0 to 50° C
Instrumental accuracy	< 0.15° C
Tolerance range	±0.08° C
Output	UART TTL
Probe weight	1.6 g
Contact area of thermistor	About 1 mm ²
Supply voltage	S1: 2.8 to 12 Vdc @ 6 mA max. S2: 5 to 16 mA @ 6 mA max.
Probe dimensions, mm	50 × 20 × 10
Output auto update time	5 s
Excitation time	0.08 s
Protection index	IP 64
Cable length	Customized (4 m total standard length)

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. Please include as part of your message your name, address, phone, and fax number along with a description of your problem.



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