



Bio Instruments S.R.L.

SENSORS AND SYSTEMS
FOR MONITORING GROWING PLANTS

LT-1M, LT-1Mi

Leaf Temperature Sensor



Introduction

The LT-1M 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 1-meter cable to the waterproof box with the signal conditioner inside. The output cable length should be specified in the order if required. Every sensor is tuned and calibrated within the measurement range. The tolerance range is ± 0.08 °C only.

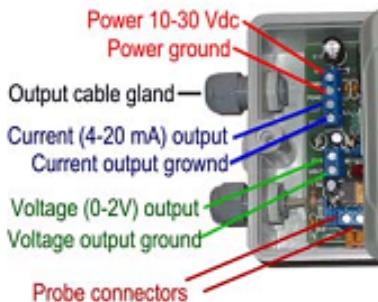
Installation

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

For models supplied without output cable, please use a four-core cable with 3 to 6 mm outer diameter. The connection diagram is shown in the picture below:



Connection scheme

Maximal length of the output cable is 10 m for sensors with voltage output and up to 200 m for sensors with 4 to 20 and 0 to 20 mA output.

For models supplied with the optional output cable, please refer to a wiring diagram attached to the sensor.

Calibrations table

U, Volts	I, mA	T, °C
0.001	4.008	0.0
0.195	5.560	5.0
0.400	7.200	10.0
0.615	8.920	15.0
0.830	10.640	20.0
1.046	12.368	25.0
1.258	14.064	30.0
1.461	15.688	35.0
1.655	17.240	40.0
1.835	18.680	45.0
2.000	20.000	50.0

Calibrations equations

Best Fit:

LT-1M model:

$$T = 1.8649 \times U^3 - 4.5048 \times U^2 + 26.542 \times U - 0.0099$$

LT-1Mi model:

$$T = 0.0036 \times I^3 - 0.1137 \times I^2 + 4.0587 \times I - 14.679$$

Approximation error $< \pm 0.06$ °C

Linear fit:

LT-1M model:

$$T = 24.477 \times U - 0.1352$$

LT-1Mi model:

$$T = 3.0605 \times I - 12.384$$

Approximation error $< \pm 1$ °C

Where: **U** – output voltage in Volts

I – output current in mA

Specifications

Measurement range		0 to 50 °C
Output	LT-1M LT-1Mi	0 to 2 VDC 4 to 20 mA
Instrumental accuracy		< 0.15 °C
Tolerance range		±0.08 °C
Probe weight		1.6 g
Contact area of thermistor		About 1 mm ²
Supply voltage		10 to 30 VDC
Power	LT-1M LT-1Mi	0.5 W max 1 W max
Probe dimensions, mm		50 W × 20 H × 10 D
Protection index		IP 64
Cable length between probe and signal conditione		1 m



Phyto-Sensor Group

Bio Instruments S.R.L.

20 Padurii St., C MD-2002

REPUBLIC OF MOLDOVA

Tel./Fax: +373-22-550026

info@phyto-sensor.com

www.phyto-sensor.com