ELECTRONICS 4 ALL

AT-105/TP-100-TH

USER MANUAL

REVISIONS

Revision	Author	Date	Changes
1.0	J. Walz	June 25, 2021	Initial Release
1.1	J. Walz	August 24, 2021	Removed Confidential Mark

ABBREVIATIONS

Acronym	Description
BLE	Bluetooth Low Energy
FSR	Full Scale Range
LOS	Line of Sight
RH	Relative Humidity
RTD	Resistive Temperature Detector

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FCC COMPLIANCE AND ADVISORY STATEMENT

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Any changes or modifications not explicitly approved by Electronics4All Inc. could cause the device to cease to comply with FCC rules Part 15, and thus void the user's authority to operate the equipment.

INDUSTRY CANADA COMPLIANCE AND ADVISORY STATEMENT

Operation is subject to the following two conditions: (1) This device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Son fonctionnement répond aux conditions suivantes: (1) l'appareil ne provoquera aucune interférence nocive et (2) l'appareil tolère toutes les interférences reçues, y compris les interférences qui ont pour conséquence des réactions non souhaitables.

SAFETY

1. Operate the device only with the specified internal battery.

2. The device is intended for use only in a clean and dry indoor environment.

3. Always wear personal protective equipment appropriate to the environment where the device is installed and operated.

4. The device contains no user serviceable parts. Do not attempt to repair the unit. See the Contact Information section for support or repair.

INSTALLATION

INTENDED USE

The device is intended to be installed and operated in an indoor industrial environment. The wireless system is Class A equipment and may cause radio interference in residential areas.

PRODUCT DISPOSAL

BATTERY

The AT-105 and TP-100-TH contain a primary lithium battery. Do not dispose of spent batteries with general waste. Contact your local government for directions on the proper disposal methods.

PRODUCT

The AT-105 and TP-100-TH are recycled by Electronics4All Inc. See the Contact Information section to recycle either product.

MAINTENANCE AND CLEANING

Clean the enclosure using a clean dry cloth.

CONTACT INFORMATION

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TP-100-TH / AT-105 WIRELESS SENSOR

FIGURE 1 – AT-105 ASSET TRACKER

FIGURE 2 – TP-100-TH TEMPERATURE PROBE

AT-105

The AT-105 (Asset Tracker) is a small, light-weight Bluetooth 5.0 location tracking beacon and environmental sensor. The AT-105 contains a 6-axis accelerometer, an integrated temperature and humidity sensor, and an ambient light sensor. It is powered by a single CR2450 coin cell.

TP-100-TH

The TP-100-TH (Temperature Probe) contains all the same feature sets of the AT-105, with the addition of an external PT100 resistive temperature detector (RTD).

Unless otherwise noted, the instructions and specifications included in this manual apply to both product types.

COMPATIBLE GATEWAYS

The sensors are compatible with the following gateways manufactured by Electronics4All Inc.

Part Number	Description
GTW-BL100	Wireless Bluetooth 5.0 Receiver, LAN TCP/IP Communication, Integrated Ambient Temperature and Humidity Sensor
GTW-BL200	Wireless Bluetooth 5.0 Receiver, 900 MHz LoRa WAN Long Range Repeater Network, LAN TCP/IP Communication, Ambient Temperature and Humidity Sensor, PoE Compatible
P-GTW-BL300	Wireless Bluetooth 5.0 Portable Datalogger, Android X-Lab Database Application, Adjustable Sensor Reporting Interval

INTERFACES

OVERVIEW

Red LED — Light Sensor

Green LED — Humidity and Temperature Sensor

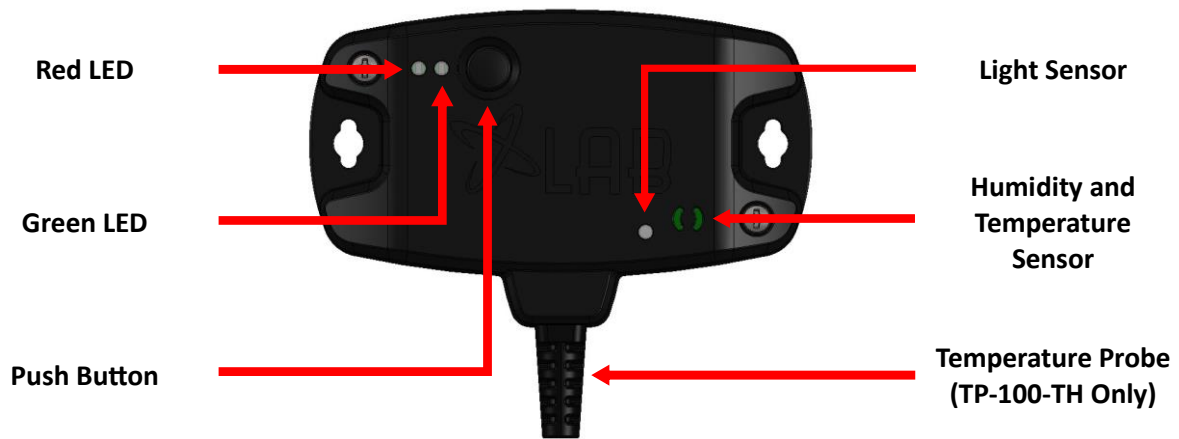Push Button — Temperature Probe (TP-100-TH Only)

FIGURE 3 – INTERFACE AND SENSOR LOCATIONS

PUSH BUTTON

A single push button is located on the top of the sensor. The push button is used to pair the sensor to a compatible Gateway. See the Pairing section for operation.

LEDS

Two LEDs (Red, Green) are located on the top of the sensor. The LEDs are used to indicate the status of the pairing operation, and to provide a visual indication when the sensor sends a wireless broadcast.

Operation	LED Pattern
Device Reset	Red (1 second), Green (1 second), OFF (1 second), Green (1 second)
Single Button Press	Red (1 second): Device Not Paired to Gateway Green (1 second): Device Paired to Gateway
Pairing	Red (1 second), Green (1 second): Successful Pairing Red (1 second): Unsuccessful Pairing
Unpairing	Green (5 seconds), Red (Fast Flashing), Then Device Reset

LIGHT SENSOR

An ambient light sensor is located on the top of the sensor. The light sensor reports the percentage of light exposed to the sensor, from 0% to 100%, where 100% is equivalent to approximately 220 Lux.

HUMIDITY AND TEMPERATURE SENSOR

The sensor contains an integrated humidity and ambient temperature sensor. The temperature measurement range is -40 °C to 120 °C (± 0.5 °C), and the humidity measurement range is 0 to 100% RH (± 3.5% RH).

Caution: If liquid is allowed to enter the humidity and temperature sensor opening, damage to the humidity sensor may occur.

ACCELEROMETER

The sensor contains a 6-axis accelerometer and gyroscope with a default full scale range of ± 16 g.

FIGURE 4 – AXIS ORIENTATION

TEMPERATURE PROBE

FIGURE 5 – TP-100-TH

The TP-100-TH is equipped with a PT100 platinum resistance temperature detector (RTD). Measurement range is -50 °C to 260 °C with a full range accuracy of ± 3 °C.

The supplied cable length is 100 cm (1 m). The sensing element is made of stainless steel with an average length of 30 mm and a diameter of 4 mm.

BATTERY INSTALLATION AND REPLACEMENT

The sensor is powered from a single CR2450 Lithium / Manganese Dioxide (Li/MnO2) battery.

Under normal operation, the internal battery should last for between 1.5 to 2 years using the default reporting interval of 5 minutes.

If a sensor fails to broadcast, one of the LEDs no longer lights when pressing the push button, or the sensor appears to continually reset, the battery should be replaced.

RECOMMENDED BATTERY PART NUMBERS

The following battery manufacturers are recommended by Electronics4All Inc.

Manufacturer	Part Number	Capacity
Energizer	ECR2450	620 mAh
Sony / Murata	CR2450	610 mAh
Panasonic	CR-2450EL	620 mAh

CR2450 batteries from other manufacturers may be used, however it should be noted that their capacity may be lower and/or the internal impedance of the battery may be higher, both of which will result in a reduced runtime of the battery compared to those in the above table.
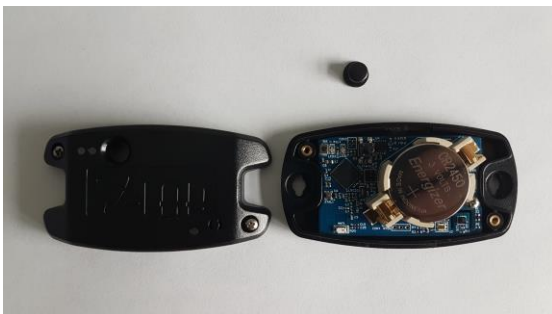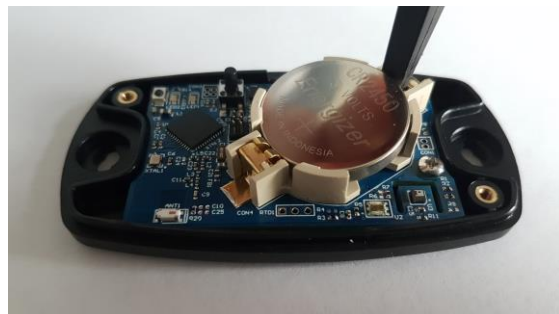
REPLACEMENT INSTRUCTIONS

1   Remove the two (2) 4-40 Phillips machine screws on the sides of the enclosure.

2   Lift off the lid of the enclosure.

3   It is recommended to lift off the push button top and set it aside, as it may fall off when removing the battery.

4   Pry up the battery at the far end of the battery holder. It is recommended to use a non-metallic tool.

| 5 | Snap the new battery into the battery holder. The sensor will reset, indicated by an LED pattern on the two LEDs. | 6 | Reinstall the push button top. |

| 7 | Replace the enclosure lid and re-install the two (2) 4-40 Phillips machine screws. | 8 | Push and release the button to test button operation. The red LED should turn on for 1 second. |

MOUNTING

FIGURE 6 – MOUNTING PROVISIONS

Two (2) screw mounts are provided on the sides of the enclosure to secure the sensor. The openings support 8-32 screws.

PAIRING

PARING STATUS

To determine if the sensor has been paired with a Gateway, press and release the push button. If the green LED turns on for 1 second, the sensor is paired with a Gateway. If the red LED turns on for 1 second, the sensor is not paired with a Gateway.

PAIRING A SENSOR TO A GATEWAY

1. Place the target Gateway in Pairing Mode by pressing and releasing the PB1 push button on the Gateway. The green COM LED will turn on.

FIGURE 7 – GATEWAY IN PAIRING MODE

FIGURE 8 – SENSOR PAIRING

2. Press and hold the push button on the sensor. The red LED on the sensor will turn on for 1 second. Release the push button on the sensor when the LED turns off.

3. If pairing was successful, the green LED on the sensor will then turn on for 1 second, and the green COM LED on the Gateway will turn off.

4. If pairing was not successful, the green LED on the sensor will not turn on and the green LED on the Gateway will remain on. If this occurs, reattempt step 2.

UNPAIRING A SENSOR TO A GATEWAY

To unpair a sensor from a Gateway, press and hold the push button. After 5 seconds, the red LED will start to flash rapidly. The push button may then be released. The sensor is now no longer paired to the Gateway.

PROGRAMMING

Both the AT-105 and TP-100-TH support over-the-air (OTA) firmware programming to install updates to the sensor. Contact Electronics4All Inc. for details.

SPECIFICATIONS

Parameter	Description
Battery	
Battery Type	CR2450 3 VDC 600 mAh Li/MnO2
Power	
Average Current (TP-100-TH)	32 µA
Average Current (AT-105)	24 µA
Battery Life (TP-100-TH)	1.5 Years
Battery Life (AT-105)	1.5 Years
Radio	
Wireless Processor	• 48 MHz Arm Cortex M4F Processor • 2.4 GHz RF Transceiver Compatible with BLE 5.0 • Output Power up to +5 dBm with Temperature Compensation • Receiver Sensitivity: -105 dBm, 125 kbps
Security	• AES 128 and 256 bit Crypto Accelerator • ECC and RSA Public Key Hardware Accelerator • SHA2 Accelerator (Full Suite up to SHA-512) • True Random Number Generator (TRNG)
Communication Range	125 m Line of Sight
Communication Interval	5 Minute Default
Environmental	
Protection Rating	IP30
Pollution Degree	2
Operating Temperature	-20 °C to 60 °C
Storage Temperature	• -30 °C to 60 °C (Battery Installed) • -40 °C to 85 °C (No Battery Installed)
Permissible Humidity	20 % to 85 % RH (Operation and Storage)
Maximum Altitude	2000 m
Sensors	
Accelerometer	6-Axis, ± 16 g FSR

Temperature Sensor	-40 °C to 120 °C (± 0.5 °C, 15 to 40 °C)
Humidity Sensor	0 to 100 % Relative Humidity (± 3.5 % RH, 20 to 80 % RH)
Ambient Light Sensor	0 to 100 % Relative Light (Approximately 0 to 220 Lux)

External Temperature Probe (TP-100-TH)

Type	PT100 Resistive Temperature Detector
Measurement Range	-50 °C to 260 °C, ± 3.0 °C
Element	Stainless Steel, 30 mm (L) x 4 mm (D)
Cable Length	100 cm (1 m)

Mechanical

Enclosure Dimensions	75 mm (L) x 50 mm (W) x 15 mm (H)
Weight (TP-100-TH)	60 g
Weight (AT-105)	35 g

Certifications

FCC (TP-100-TH)	2AXVKWTP01
Industry Canada (TP-100-TH)	26661-WTP01
FCC (AT-105)	2AXVKWAT01
Industry Canada (AT-105)	26661-WAT01
Safety	61010-1