Tarangify T-LORA-R01

Version 1.0 | June 2025

Powered by ThingsLinker

Ultrasonic Node

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1. Product Overview

The Tarangify T-LORA-R01 is a low-power sensor node designed for IoT applications in remote and energy-constrained environments. It features an onboard AHT20 temperature and humidity sensor and supports external sensors such as the SR04M ultrasonic distance sensor for non-contact level and distance measurements. Built around the RAK3172 LoRaWAN module, the T-LORA-R01 provides long-range wireless communication, multiple sensor interfaces, and a solar charging system for sustained off-grid operation. This makes it ideal for a wide range of applications including well water depth monitoring, overhead tank level detection, rainwater harvesting systems, flood level alerts, and even fill-level monitoring in bins, silos, or reservoirs—enabling efficient data collection and real-time alerts in agriculture, water management, and environmental monitoring projects.

2. Features

- **Smart Overheat Protection:** Auto cut-off based on enclosure temp
- **LoRaWAN Connectivity:** Based on RAK3172 module. Range up to 15km.
- **USB to TTL Converter:** Integrated TTL for programming/debugging.
- **Solar Charging:** Inbuilt solar charging facilities.
- **Temperature & Humidity Sensing:** Onboard AHT20 digital temperature and humidity sensor.
- **Battery** : LiFePo4 with High capacity.
- **Voltage Monitoring:** Integrated voltage sensor for battery or supply voltage monitoring.
- **Multiple Communication Interfaces:** I2C, UART1, SPI
- **Flexible Sensor Input:** Dedicated PB4 pin for reading various sensor data.
- **Low Power Consumption:** Optimised for battery-powered applications.
- **Compact Form Factor:** Designed for easy integration into various projects.
- **Environment Factor:** Weather proof, UV proof, Waterproof Enclosure.

3. Specifications

- **3.1. RAK3172 LoRa Module**
  - **Supported LoRaWAN Regions:** EU868, IN865, RU864
  - **Operating Voltage:** Typically 2.9V 3.6V
  - **Operating Temperature:** −20∘C~+85∘C
  - **Communication:** UART (AT Commands), I2C, SPI

- **3.2. TTL Converter**
  - **Function:** USB to Serial (TTL) conversion
  - **Interface:** USB Type C , TTL serial pins
  - **Driver Support:** Windows, Linux, macOS

- **3.3. Solar Charging**
  - **Input Voltage:** 4.5V 6V (from solar panel)
  - **Dimension :** 104mm X 140mm
  - **Charging Current:** Up to 200mA
  - **Battery Type**: Lithium-iron phosphate (LFP)

- **3.4. AHT20 Temperature & Humidity Sensor**
  - **Sensor Type:** Digital Temperature & Humidity Sensor
  - **Interface:** I2C
  - **Temperature Range:** −40∘C~+80∘C
  - **Humidity Range:** 0 100%RH
  - **Accuracy:**
    - **Temperature:** ±0.3∘C
    - **Humidity:** ±2%RH

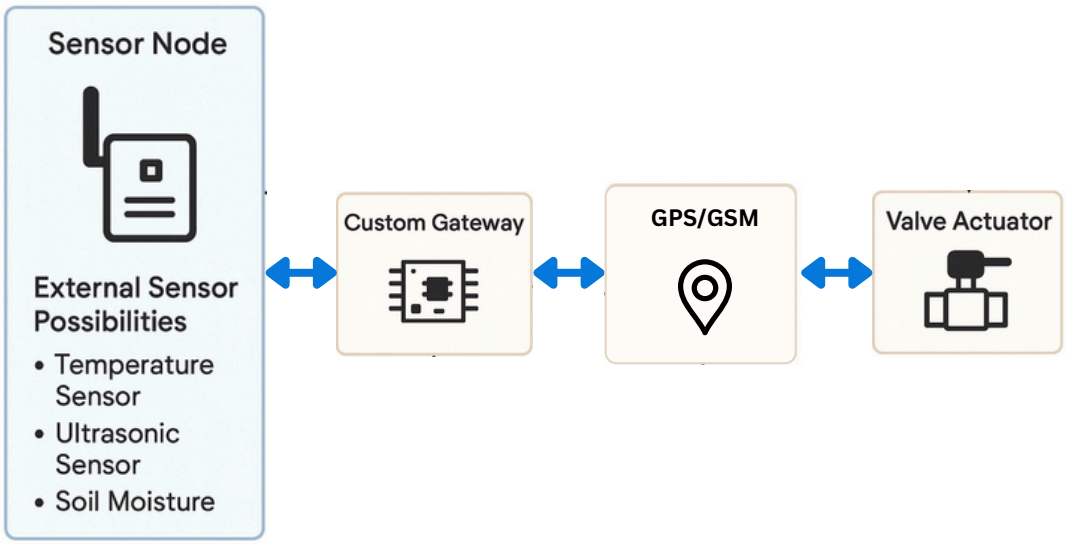
- **3.5. Voltage Sensor**
  - **Type:** Resistive Voltage Divider
  - **Pin :** PB2
  - **Output:** Analog voltage, connected to an ADC pin of the RAK3172
  - **Measurement Range:** typically designed for battery voltage monitoring

- **3.6. General I/O & Interfaces**
  - **I2C:** Shared bus for AHT20 and external I2C devices.
  - **UART1:** Dedicated for external serial communication.
  - **SPI:** Available for external SPI peripherals.
  - **PB4 Pin:** Configurable General Purpose Input/Output (GPIO) for additional sensor input.
  - **PA15 Pin:** Status LED
  - **PB5 Pin:** Addressable RGB LED

- **3.7. Electrical Specifications**

Parameter	Value
Operating Voltage	3.3V (regulated from LiFePO4)
Battery Support	3.6V LiFePO4 6000mAH
Charging Input	~6V (via solar panel)

4. Workflow



It communicates wirelessly over roughly 15km line of sight using a custom LoRa P2P protocol to a custom gateway. This enables off-grid, real-time automation such as smart irrigation, and while it doesn't require internet, it can connect if desired.

- **RAK3172 Configuration for LoRaWAN or LoRa P2P:**

To enable the RAK3172 module as a LoRa P2P module or LoRaWAN end-device, it must be configured by sending AT commands. You can configure the RAK3172 in two ways:

- LoRaWAN End-Device - RAK3172 as LoRaWAN IoT device.
- LoRa P2P - Point-to-point communication between two RAK3172 modules.

- **Example:**
  - A LoRaWAN-based smart irrigation system uses solar-powered sensor nodes to monitor soil moisture in agricultural fields. These nodes send uplink data to a LoRaWAN gateway, which forwards it to a cloud server. When the application detects low moisture levels, it sends a downlink command to an actuator node—typically a device—that activates a relay or solenoid valve to start irrigation.

5. Applications of Sensor Node

- **Environmental Monitoring:** Remote temperature, humidity, and general environmental data collection.
- **Smart Agriculture:** Soil moisture, weather station, and irrigation control.
- **Asset Tracking:** Low-power, long-range tracking of assets.
- **Industrial IoT:** Monitoring sensor data in industrial environments.
- **Smart City Applications:** Air quality, street light control, waste management.
- **Remote Sensing:** Data collection from isolated or hard-to-reach locations using solar power.

6. Connectivity Interfaces

Interface	Description
UART1	External modules
UART2	Connected to TTL for USB serial
I²C	Used by AHT20; exposed for other sensors
SPI	Exposed for peripheral communication
GPIO	PB4 exposed (Analog capable)

7. Onboard Sensors

Sensor	Type	Interface	Notes
AHT20	Temperature + Humidity	I²C	±0.3°C, ±2%RH accuracy
Voltage	Resistor Divider	Analog pin	Battery voltage monitoring

8. Ultrasonic sensor

Sensor	Type	Interface	Notes
SR04m	Ultrasonic Sensor	UART1	• Weather - proof Ultrasonic probe • Power supply : 3.0V ~ 5.5V • Max Range : 450cm • Tolerance Range : 20cm • Long Range Accuracy : ±1cm • Resolution : 1mm

9. Power Management

- **Solar Panel Input:** 6V max
- **Battery Charging:** Supports 3.6V LiFePO4
- **Low Power Modes:** Supported sleep functions
- **Power Consumption:**
  - **Deep Sleep:** ~2–5 mA
  - **Active TX (LoRa):** ~250–350 mA

10. Mechanical Specifications

- Dimensions: 100mm (L) × 200mm (W) × 60mm (H)
- Weight: ~18 grams
- Weather Proof
- UV Proof
- Hard Material

11. Environmental Ratings

Parameter	Value
Operating Temp.	-15°C to +55°C
Storage Temp.	-20°C to +75°C
Humidity (non-cond.)	10% to 90% RH
Cooling	Natural convection

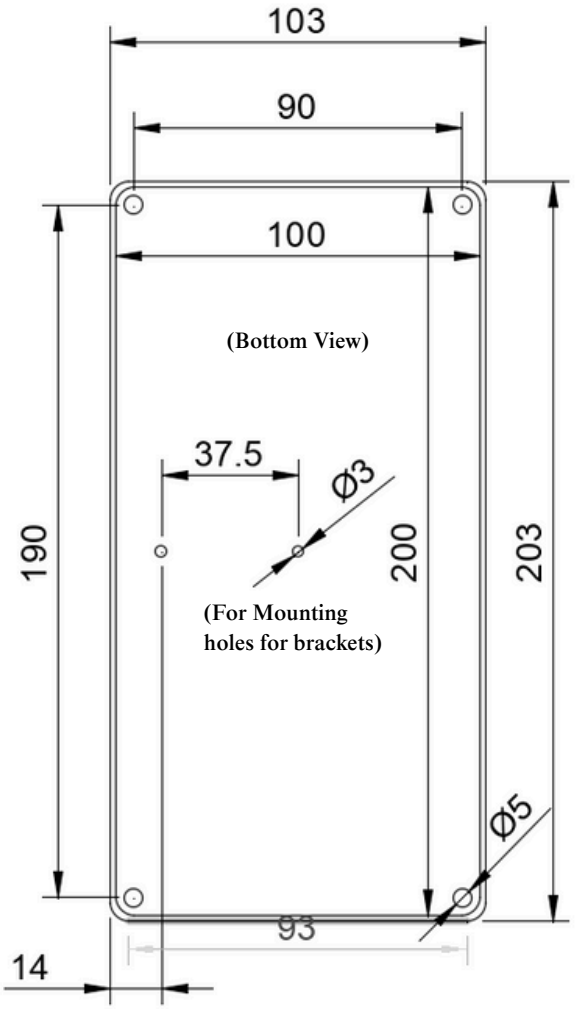
12. Ordering Information

Product Code	Description	Color
T-LORA-R01	Ultrasonic Node	Gray

13. Mechanical Drawing

- 13.1 Enclosure Design

All Dimension are in mm

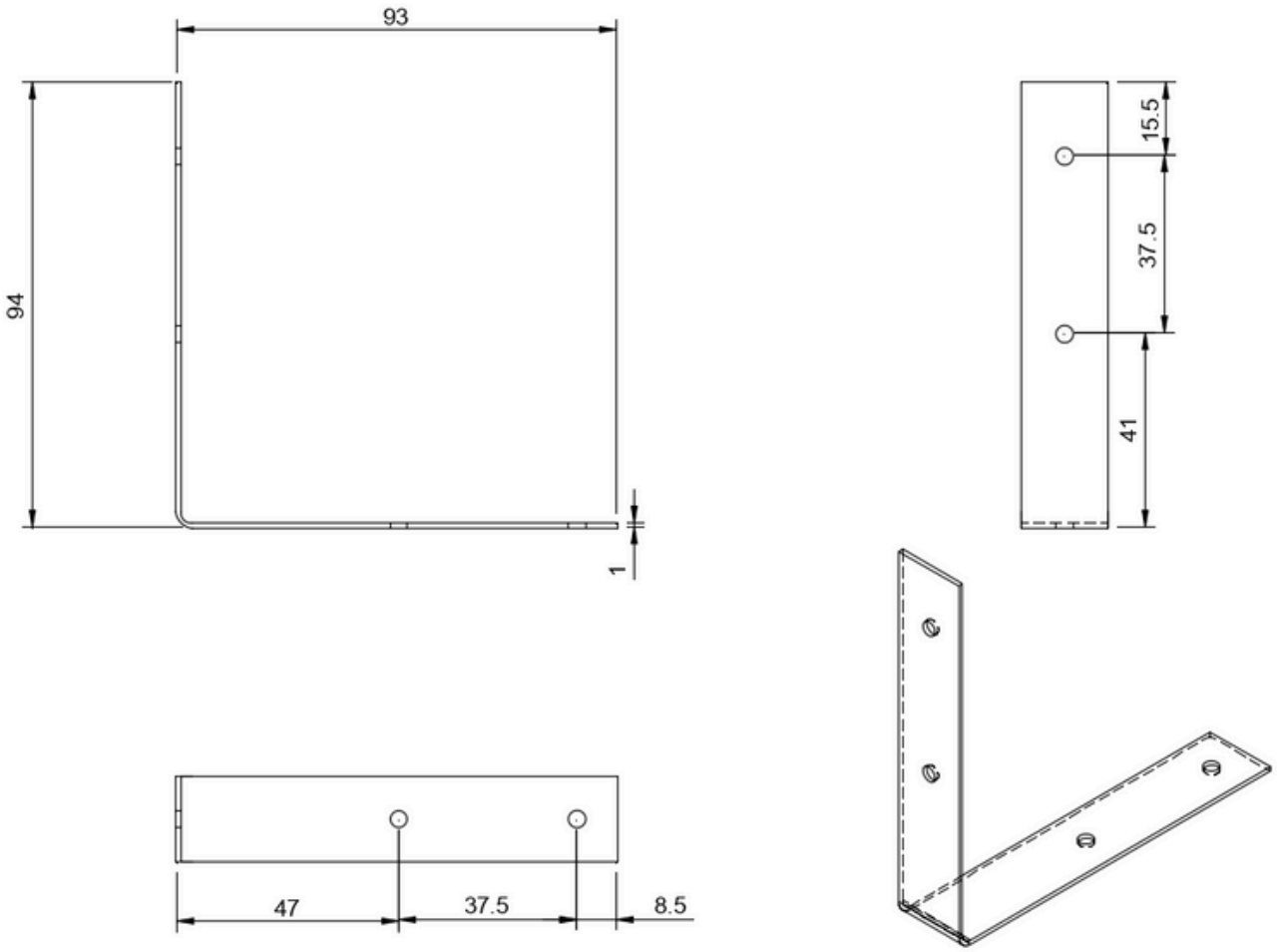


Dimension : 103mm x 203mm x 60mm

Dimensional error:

1. Length, width, height and pin pitch error ± 8%
2. Pin length error ±1mm
3. Pin diameter error -0.2mm

- 13.2 Mounting Bracket Drawing



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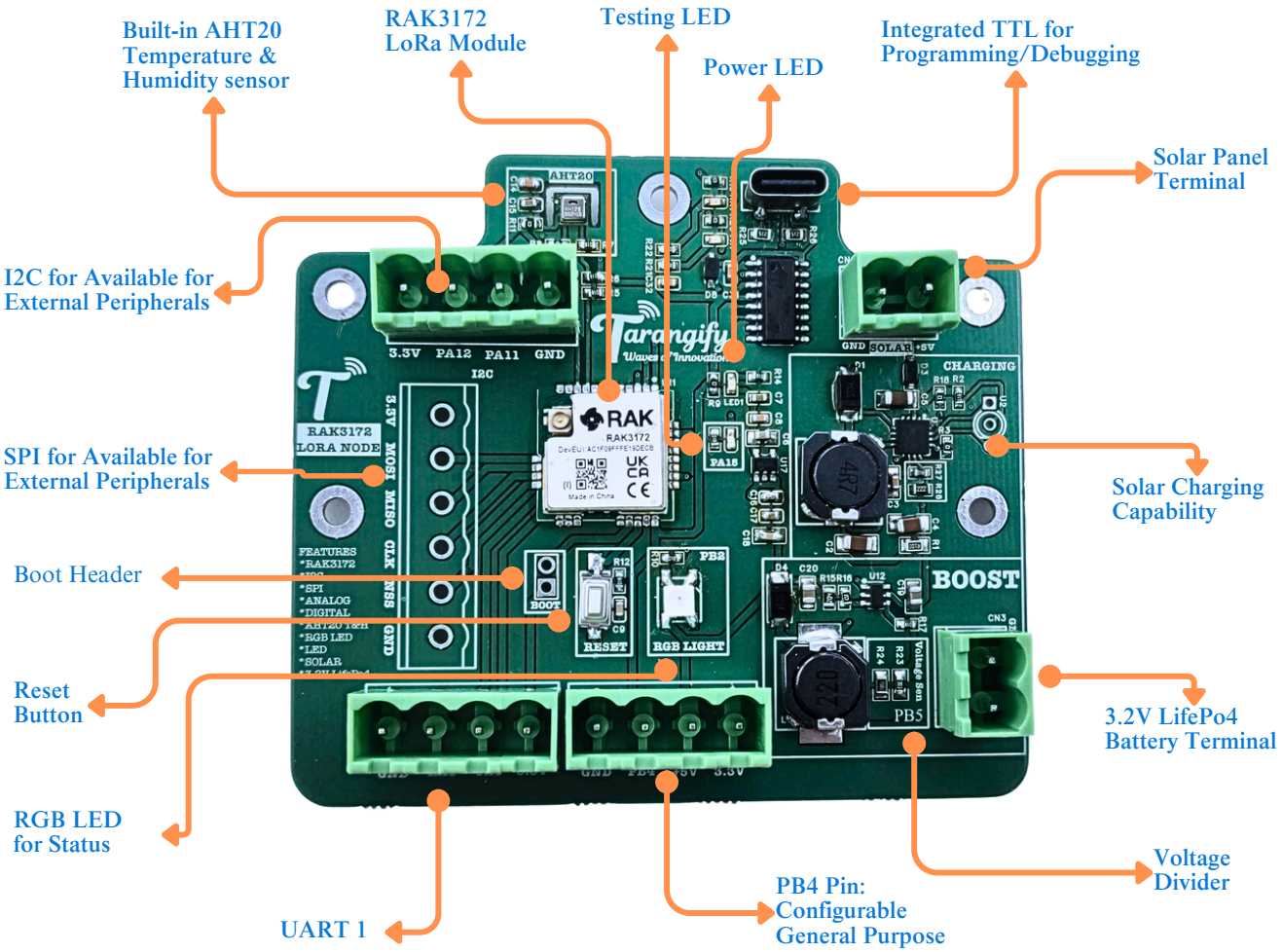
14. Node PCB


Built-in AHT20 Temperature & Humidity sensor
RAK3172 LoRa Module
Testing LED
Power LED
Integrated TTL for Programming/Debugging
Solar Panel Terminal
I2C for Available for External Peripherals
SPI for Available for External Peripherals
Boot Header
Reset Button
RGB LED for Status
UART 1
PB4 Pin: Configurable General Purpose
Voltage Divider
3.2V LifePo4 Battery Terminal
Solar Charging Capability
AHT20
RAK3172 LORA NODE
BOOST
CHARGING
RESET
RGB LIGHT
BOOT

15. Contact Information

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