



Ultrasonic LoRaWAN Installation Guide

Thank you for purchasing the Tekelek Ultrasonic LoRaWAN waste bin sensor which uses ultrasonic technology to measure the contents of your waste bin and then communicates this data to a LoRaWAN network.



STEP 1: Activation

The Ultrasonic LoRaWAN waste bin sensor works in conjunction with a LoRaWAN network and a connected platform and before activation must first be registered with both. Access to the LoRaWAN backend server is required to verify that the unit has correctly joined the network. See User Manual for further details.

Ensure that the LoRaWAN™ network is within communication range of the sensor. This should occur before the sensor is physically fitted onto the Tank.

- Place the sensor as close as possible to the point of installation, press the button for 1 second to connect to the LoRaWAN network and upload a status message.
- The LED will stay illuminated as the sensor registers:
 - Red** LED flashing = The sensor is registering & connecting for the first time. (Sensor is shipped in dormant state).
 - Green** LED flashing = The sensor is already registered. The connection process will take between 20 & 40 seconds.
- After the connection has completed, the LED will flash on & off (to indicate whether the connection was a success or failure).

LED Patterns

- Press and hold the button for approximately 1 second, until the LED turns green.
- Wait approximately 10-20 seconds and observe if the LED flashes green or red.

See the following for description of Green/Red LED flash codes.

LED Radio Signal Strength Flash Codes:

LED Pattern	Function
Green X 3 Flashes	Excellent signal strength
Green X 2 Flashes	Good signal strength
Green X 1 Flash	Adequate signal strength
Alternate Green/Red Flash	Weak signal strength
<u>Weak signal strength:</u> Try 5 times and if this response is stable then it's deemed adequate. If the sensor shows some double red flashes during this signal strength test - then an external antenna should be tried. It may need to be elevated for best performance.	

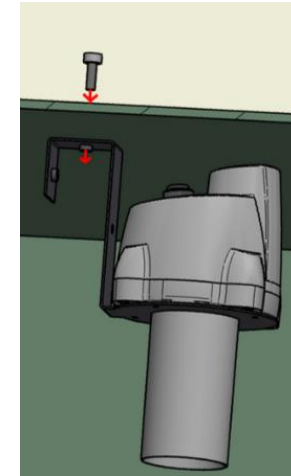
LED Error Flash Codes:

LED Pattern	Function
Red X 1 Flash	Authentication or LoRaWAN join request fail
Red X 2 Flashes	No response from LoRaWAN network
Red X 3 Flashes	General Error. Please try again. If the error persists, contact the supplier for support.
Red X 5 Flashes	Maximum number of allowed button presses exceeded (up to 6 button presses per hour allowed).

STEP 2: Installation

The following outlines the Ultrasonic LoRaWAN waste bin sensor mounting options.

- The sensor is to be fitted on the underside (inside) of the top of the waste bin.
- The sensor must sit in a vertical position and be fitted such that the sensor has a clear path to the tank contents. Position it so that it is as close to the centre of the bin as possible and ensure there are no internal obstructions that may interfere with the ultrasonic signal.
- Once a suitable position has been located, fix the sensor in place by attaching the bracket to the waste bin using the bolt provided.



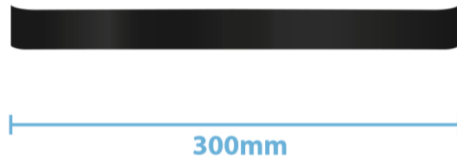
- The antenna can be mounted on glass, metallic and plastic surfaces.
- The antenna RF cable is fed via the through hole mount base to ensure no cable is visible when fixed and the rubber seal around the base protects against water ingress.
- The antenna is fixed via its 22mm length screw thread and can fit onto panels of up to 13mm thickness.



Appendix 1: External Antenna

The external antenna should be elevated and clear of near obstacles for best performance. The antenna should be mounted on a magnetic surface (at least 15cm² area) for best performance. The antenna requires self-amalgamating tape to seal the antenna cable joint - Note: This cable joint, while water resistant, should not be submerged in water. Please see the Tekelek YouTube channel for video instruction.

- Cut 300mm of 'Tesa' (provided) self-amalgamating tape.



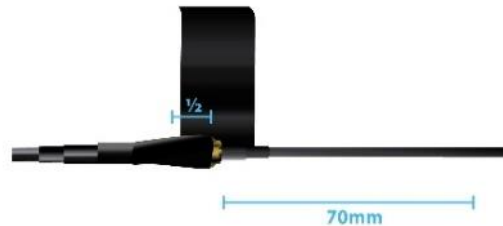
- After fitting in the required site location, connect the SMA connector from the Antenna to that of the sensor.



- Start wrapping the tape 70cm away from the SMA connection. The tape needs to be kept in tension by stretching and the clear plastic backing of the tape should be unwrapped as the installation proceeds.



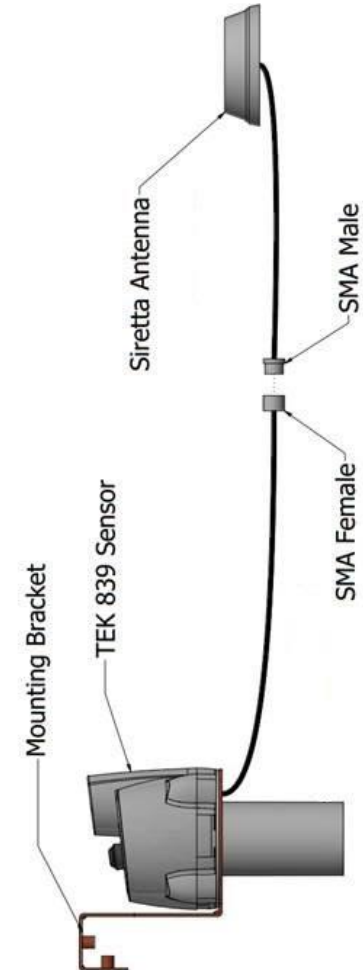
- Keep the tape stretched while wrapping, over-lapping half the width of the previous turn.



- Continue to wrap the tape to a distance of 70cm on the other side of the SMA connector. Then reverse the direction and continue to wrap back along to the starting point. Note: the tape must be stretched for best performance.



- Excess cable can be looped and tie-wrapped.
- A P-clip (shown in the picture below) is supplied to secure the antenna cable and keep the sealed joint away from any standing water.



For more information on the Tekelek Ultrasonic LoRaWAN waste bin sensor please visit our website www.tekelek.ie where a link to our YouTube page can also be found.