# Logger NB-IoT_CAT-M1 with Ultrasonic Head Installation Guide

Thank you for purchasing the Tekelek Logger 4G NB-IoT/CAT-M1 which is an ATEX certified ultrasonic sensor which communicates data to a remote server, suitable for monitoring fuel tanks levels.

## Safety Information:

The Logger is ATEX compliant, but if installing in a harsh, environment first check local applicable regulatory and safety guidelines to ensure installer security.  Please refer to the User Manual for more information on the warnings and hazards.

## TEP 1: Ultrasonic Head Installation

The following outlines the sensor mounting options:
- The sensor must sit in a vertical position on top of the tank and be fitted such that the sensor has a clear path to the tank contents. Position it so that there are no internal obstructions that may interfere with the ultrasonic signal.
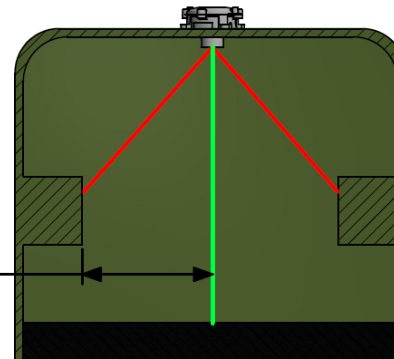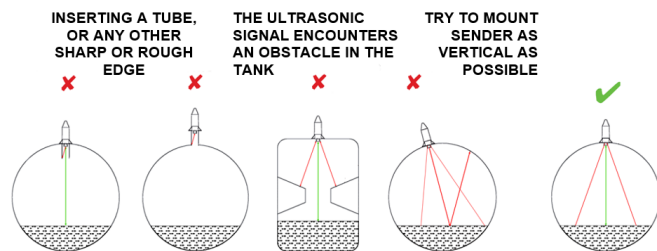


Clearance to internal obstructions: 13cm

- If obstacles cannot be avoided, then a waveguide may be required. Please refer to Appendix 3 for further details.
- Locate a suitably positioned threaded opening on the top of the tank to hold the sensor.
- The sensor will fit directly into threaded 1 ¼", 1 ½" or 2" BSP (British Standard Pipe) existing tank connections.
- Ensure that the gasket is placed, and that the sensor is screwed correctly into the tank.
- For tanks that do not contain a suitably positioned threaded opening on the top of the tank to hold the sensor, please refer to Appendix 2.
- Refer to Appendix 4 for ultrasonic signal divergence plot

## STEP 2: Logger Installation

The Logger works in conjunction with a remote server and before installation must first be registered to this. Access to the backend server is required to verify that the unit has correctly joined the network.
The following outlines the Logger mounting options.

- **Adhesive Strips – Horizontal mounts:**
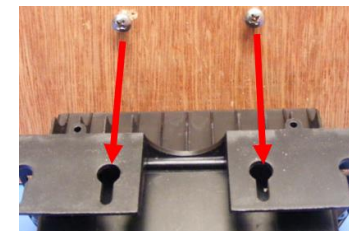


- **Cable Ties – Handle mount:**



- **Cable Ties – Horizontal mount onto pipe:**



- **Cable Ties – Vertical mount onto pipe:**



- **Screws – Wall mount:**



- **Screws – Wall mounted from the rear:**

## STEP 3: Activation

Hold the supplied magnet to the indicated hot spot on the Logger, 4 short beeps will be heard approx. one second apart, these will be followed be a long beep which indicates that the logger is now attempting to connect to the network.



- A series of beeps will be heard. This indicates the logger is logging onto the network.
- Upon successful registration to the network the logger will attempt to initiate a connection to the server, details of which have been preconfigured in the logger. This is indicated by higher pitched beeping.
- The successful activation of the unit is indicated by two successive short beeps two seconds apart. Once the logger has successfully connected, the server must issue the required commands to the logger to complete the activation process.

## STEP 4: Beep Pattern

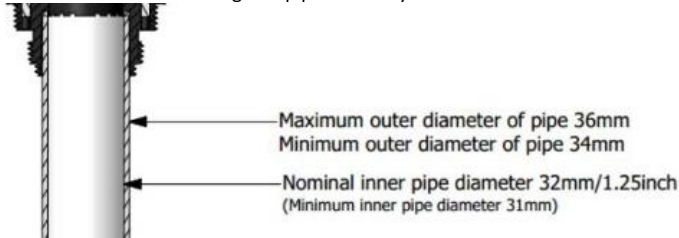| Beep Pattern | Definition |
| --- | --- |
| Low beep once per second | Network Registration |
| High beep once per second | Network Registration |
| Low beep once every 4 seconds | Network / TCP Listen |
| Low beep once every 2 seconds | Re-establish Network / TCP |
| High / Low combination beep | Incoming Data |
| Low / High combination beep | Outgoing Data |
| Low double-beep every 4 seconds | Network Listen (Data Received & Unit Active) |
| Low double-beep every 2 seconds | Re-establish Network |
| High double-beep every 4 seconds | TCP Listen (Data Received & Unit Active) |
| High double-beep every 2 seconds | Re-establish TCP |

## Appendix 2: Drilling Procedure

- Choose a flat spot on the top of the tank.
- Use a 45.5mm tapping drill to drill a 1 ½" BSP hole on the surface of the tank.
- Place the foam gasket over the hole followed by the mounting adaptor.
- Tighten on to tank with 2 stainless steel self-tapping, counter sunk screws, supplied. Do not over tighten!
- Screw the sensor into the adaptor. Ensure that the sensor is vertical on the tank and screwed correctly into the base and that the threads have not crossed, to give a secure seal

## Appendix 3: Waveguide

**Note:** The default sensor configuration is non-waveguide mode and the measurements will be inaccurate unless a waveguide configuration mode is used.

- Source a suitable pipe to act as the waveguide. This pipe should conform the dimensions in the figure below in order to fit the sensor. The recommended pipe material is PVC (domestic waste pipe is often used). Other materials are possible but should be checked for chemical resistance to fuel oil.

- Cross-section of waveguide pipe assembly:



Maximum outer diameter of pipe 36mm
Minimum outer diameter of pipe 34mm

Nominal inner pipe diameter 32mm/1.25inch
(Minimum inner pipe diameter 31mm)

- The pipe should be cleanly cut to length. The length required should be measured from the top of the tank (where the sensor is to be mounted) to that of the fuel outlet point (as shown).



**Note:** The bottom of the pipe should be a minimum of 5cm from the base (floor) of the tank to prevent it from touching in the case of tank dimensional changes due to temperature etc.

- The waveguide pipe should be securely attached via the two grub screws and hand tightened with an M1.5 Allen key (Note: over-tightening the grub screws can damage the plastic). Care should be taken to keep the sensor and pipe vertically aligned and supported, while fitting during the installation.



Grub Screws
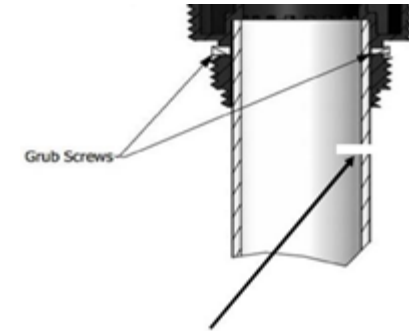
Air escape vent hole (2mm diameter)

**Note**: Depending on the weight, length and surface finish of the pipe, it may be necessary to glue it into position. In this case a hole should be drilled near the top of the waveguide pipe, just below the adapter, to ensure that any trapped air can exit.
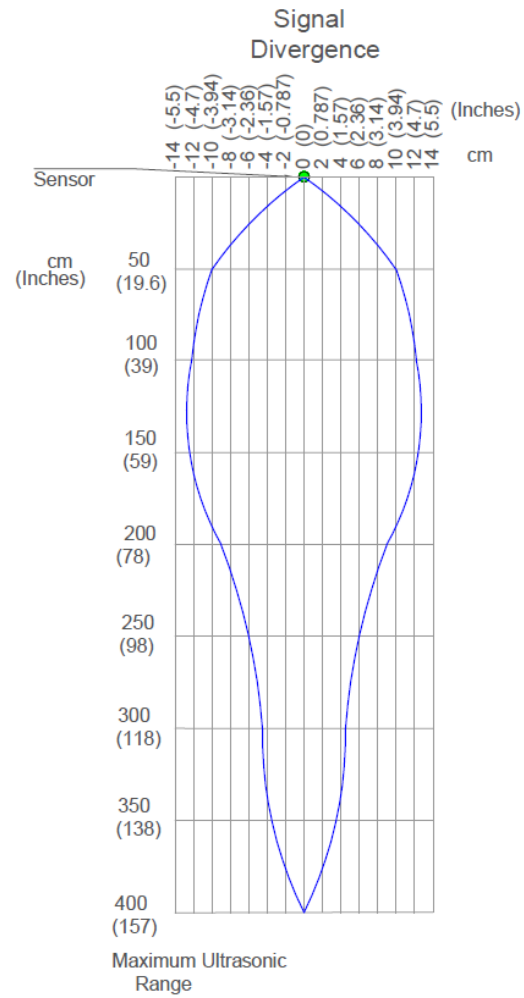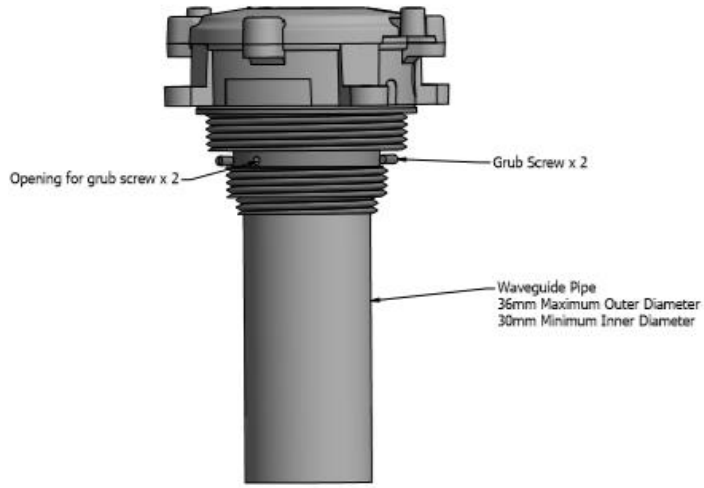
- Insert the correctly sized rubber seal ring, as required for the tank opening (supplied), and position it on the face of the adapter that is screwed onto the top of the tank.



- Insert the whole assembly carefully into the tank, taking care not to loosen the pipe, and fit into position. Hand tighten the assembly until the rubber seal locks into position.

- Waveguide assembled



Opening for grub screw x 2

Grub Screw x 2

Waveguide Pipe
36mm Maximum Outer Diameter
30mm Minimum Inner Diameter

Signal
Divergence

Sensor

cm
(Inches)

Maximum Ultrasonic
Range

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

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