

MEP3AD10S1 Operational Description

The MEP3AD10S1 is a remote tank level monitoring device. It is intended to be powered by a non-rechargeable lithium battery pack for a predicted average lifetime of at least 15 years.

The unit contains an LTE Cat. 1 certified cellular module (FCC ID: R17LE910NAV2, IC: 5131A-LE910NAV2) which manages all cellular communications. A folded dipole antenna over a ground plane is used as main cellular antenna. Basic GPS functionality is also available to locate a lost unit or locate tanks that can be physically moved.

The device reads the tank level sensor every few minutes. When a significant level change is detected, the microcontroller (MCU) activates the cellular module. The latter then attaches to the preferred network and reports the data to a server. If there is no level change after 24 hours, the unit performs a daily report using the same procedure. The MEP3AD10S1 uses low data volume: up to 100KB per month, but usually around 10KB per month.

In the circuit, a load switch is used to power the external sensor. The sensor's signal is then read by the MCU through one of its analog to digital converter. The MCU sends the data using the cellular module. They communicate via a serial port.

The unit uses Bluetooth advertising to allow infield testing and diagnostics as well as enabling possible firmware upgrades. The MCU has an embedded 2.4GHz transceiver. The manufacturer provides the protocol stack for Bluetooth Low Energy. A 2.14dBi PCB antenna over a ground plane is used as Bluetooth antenna. During the activation of the cellular module, the Bluetooth advertising is disabled.