

Using STAR-Tank on Diesel Fuel Tanks

There are major differences in the electromagnetic properties of water and diesel fuel. Water has a high dielectric constant (~80) compared to diesel fuel, which has a much lower dielectric constant (around 2-3). Radar systems, especially those using phased coherent radar, rely on the reflection of electromagnetic waves off the surface to calculate depth. The dielectric constant influences the radar wave's ability to propagate through and reflect off the surface.

In diesel fuel, the special fuel firmware of STAR-Tank works quite differently to water: STAR-Tank bounces the signal off the bottom of the tank and reads the reflected surface from the returned bounced signal. The limitations are that a metal tank is needed. The depth has to be less than 500mm so the reflected signal is never more than 1000mm. If the tank is non-metal, a thin metal reflector is needed under the tank.

Because the level is the inversion of the signal the “full” and “empty” values on the Cerbo will be the inversion of water. This means full will be a bigger value than empty as the signals travels further. The range will be quite small and the values will not relate to any physical depth. They are a computed calculation.

Follow the instruction on page 6 of the start tank manual for OTA with the Diesel Fuel file. Then follow the setup to calibrate the sensor.

Step-by-Step Instructions for Setting Up Your Star Tank Sensor

1. Initial Calibration in Open Air:
Follow the calibration instructions on page 4 of the Star Tank manual with the sensor out of the tank.
2. Prepare the Tank:
Make sure the tank is completely empty (or as close to empty as possible).
3. Mount the Sensor on the Tank:
Place the calibrated sensor back on top of the empty tank.
4. Configure the Sensor in the Cerbo Device:
Open the Cerbo device settings.
Enable the sensor under the I/O settings.
5. Record the Empty Value:
Go to Device List → Tank Sensor → Setup.
Note the “Sensor Value” currently displayed.
Enter this value into the field labelled “Sensor value when empty.”
6. Fill the Tank and Record the Full Value:
Fill the tank completely with the intended hydrocarbon liquid.
Check the “Sensor Value” again.
Enter this new reading into the “Sensor value when full” field.
7. Set the Tank Capacity:
Input the total volume of the tank into the “Capacity” field.

Once these steps are completed, your sensor and Cerbo device should reflect the tank's liquid level.