Integration of the DU-05 digital fuel level sensor and GEOTAB GO9

We all know that fuel usage monitoring is an important part of GPS fleet monitoring systems today. For several years, the MyGeotab platform of GEOTAB Company, a world leader in the field of telematics, has integrated the Fuel Management module, which provides data from various sources on vehicle fuel consumption, information on refueling, as well as important indicators on the condition of the engine. Our customers have long been convinced of the high accuracy of fuel data in the MyGeotab platform, which allows effective management of fuel costs in the fleet and leads to significant cost reduction and optimization of enterprise productivity.

![Kvinto Plus - Smart Fleet Solutions logo]

Key aspects where fuel data is used in the MyGeotab platform:

❖ Real-time tracking:
  ➢ The platform allows you to track the location of vehicles in real time.
  ➢ By analyzing the data, fleet managers can identify inefficient routes, excessive idling, and aggressive driving that increase fuel consumption.
❖ Fuel consumption metrics:
  ➢ The platform collects fuel consumption data, including the amount of fuel used per trip or period.
  ➢ Metrics such as fuel economy (liters per kilometer) help gauge the efficiency of vehicles.
❖ Idle detection:
  ➢ Excessive idling uses up fuel and increases emissions.
  ➢ The MyGEOTAB platform detects idle events and informs fleet managers.
  ➢ Solving the idle problem can significantly reduce fuel costs.
❖ Route optimization:
  ➢ Coordinate tracking helps optimize routes by taking factors such as traffic, road conditions and gas stations into account.
  ➢ Efficient routes reduce mileage, travel time and fuel consumption.
❖ Maintenance Alert:
  ➢ Regular maintenance (eg oil changes, tire rotations) improves fuel efficiency.
  ➢ The MyGEOTAB platform sends maintenance reminders based on mileage or engine life.
❖ Fuel theft prevention:
  ➢ Fuel theft is a common problem in transport companies.
  ➢ The MyGEOTAB platform detects a sharp drop in fuel level, indicating possible theft.
❖ Geozones and refueling stations:
  ➢ Geozones allow you to define virtual boundaries on the map.
  ➢ Fleet managers can create geofences around gas stations.

In order to further increase the accuracy of data on actual fuel consumption, specialists of the Kvinto-Plus Company provided the possibility of connecting the DU-05 digital fuel level sensor to the GEOTAB GO9 telematics device, which allowed the integration of information from the DU-05 fuel level sensor to the MyGEOTAB platform.

How is the actual fuel consumption rate calculated on the MyGEOTAB platform?

Fuel consumption is calculated using a combination of fuel data reported by the engine, imported fuel card data and GPS-calculated distance traveled. The actual fuel consumption rate is then calculated as the amount of fuel used per trip for the distance traveled on that fuel (mpg or L/100 km).

Digital fuel level sensor DU-05.

The DU-05 level sensor (hereinafter referred to as the sensor) is designed for measuring the level or volume of liquid with a relative dielectric constant from 1.8 to 3 in containers, tanks, reservoirs (hereinafter referred to as tanks) and issuing a digital signal for display, transfer or registration of level or volume to external devices.

High-quality inline fuel level sensor ДУ-05 is an improved version of ДУ-02 designed for accurate control of filling, draining and consumption of diesel fuel. The main advantage is the RS 485 digital interface, which significantly exceeds the accuracy of other digital and analog DUT (fuel level sensors). It allows, unlike analog sensors, to take fuel readings with the most accurate resolution, not 1-2000 thousand points per bank, but already 8000 points in the tank. It is more accurate, allows you to immediately receive data from the sensor in liters, there is a function to "clone" sensors to the configuration of each fuel tank without taring it.

All models of fuel level sensors are certified in Ukraine and are produced according to the Technical Conditions registered in the State Standard of Ukraine.

The main benefits:

❖ High accuracy. The error in static mode is no worse than + 0.1% of the measurement range.
❖ Built-in galvanic isolation.
❖ Temperature stability of readings + 0.015% per 1°C. The presence of a thermocompensation algorithm for sensor readings and a built-in temperature sensor. Each sensor undergoes individual climatic tests.
❖ Interchangeability and "cloning" of sensors without taring the fuel tank. Since all calibration and tare data are "stitched" into the sensor and archived by the software (monitor). In other words, you can "clone" the sensors to the configuration of each fuel tank without taring it.
❖ Retention of resolution after sensor cropping. Regardless of the amount of sensor trimming, its resolution (the number of control points) does not decrease and remains initially determined during calibration.
❖ Optional calibration: calculation, without using fuel; accurate, using fuel.
❖ Ability to issue data in liters. After taring the tank, the sensor can output data both in codes and in liters with an accuracy no worse than + 1 liter. When issuing data in liters, the consumer does not need to "subscribe" calibration tables in the user software and change them when replacing the sensor or when re-taring the tank.
❖ Guaranteed measurement range, points — from 1024 to 8191.

❖ Data averaging time — from 11 to 69 seconds. That will allow to best adapt the readings of the sensor to the individual characteristics of the fuel tank.
❖ A fully automated system for monitoring sensor parameters in production conditions.
❖ Extra strong body made of slope-filled polymer.
❖ Functional and convenient software for calibration and taring:
  ➢ allows to correct mistakes made by personnel during tank taring;
  ➢ allows you to replace the sensors without re-tarring the tank;
  ➢ automatically saves the sensor parameters obtained during calibration and taring in the PC;
  ➢ automatically creates a ready-to-print Protocol for putting the sensor into operation;
  ➢ excludes unauthorized changes to sensor settings.

Technical characteristics of the DU-05 digital fuel level sensor

The length of the working part of the sensor (basic version)	700мм (+/- 1 мм)*
The minimum length of the working part of the sensor	300мм (after pruning)
The voltage of the primary DC power source	9-30 В.
Current consumption from the power source	32 мА.
Maximum range of data output in the code (selected by the user after calibration)	0 … +1023 bit., 0 … 2047 bit., 0 … 4095 bit., 0…8191 бит.
The main permissible measurement error in static mode	+/- 0,1% (from the range at 0 … +1023 bit)
Output resolution in codes	0,1% (at 0 … 1023 bit)
Maximum data output value in liters	16380 liters
The maximum number of calibration points	254
The maximum volume of the tare capacity	65500 liters
The period of averaging the results of measurements in the dynamic mode	12 or 25 sec. (selected by the user)
Digital interface (selected when ordering)	RS485 or RS232
Operating temperature range	from minus 40º to + 85º
The range of measured values of the temperature of the sensor	from minus 40º to + 100º
Accuracy of temperature measurement	+/- 1º
Ступінь захисту корпусу від пилу і вологи	IP68

* Sensors with a length of the working part different from the basic one (from L = 300 mm to L = 3000 mm with a step of ΔL = 100 mm) are made to order and can be cut by no more than 40% of the original length.

How to connect the DU-05 digital fuel level sensor

In order to use the wireless BLE fuel level sensor, you first need to register in the MyGeotab cloud fleet management platform. The fuel level sensor is mounted by engineers in the car tank and starts transmitting data to the special GEOTAB IOX- RS232 device, which in turn integrates with the GEOTAB GO9 through the standard IOX expansion port on the GO device.

IOX Installation Instructions

! IMPORTANT: Professional installation (Certified Geotab® Installer or equivalent) is required for the safe and proper installation of this product (harness and/or IOX). The installer must have sufficient technical knowledge and expertise for the respective installation.
WARNING! Always read and follow all safety information, including Important Safety Information and Limitations of Use, before harness and/or IOX installation. Disconnect the GO device from the vehicle before installation and connect it post-installation. Failure to follow these instructions and warnings can result in loss of vehicle control and serious injury or vehicle damage.