

# USER GUIDE

## Capacitive Fuel Level Sensor

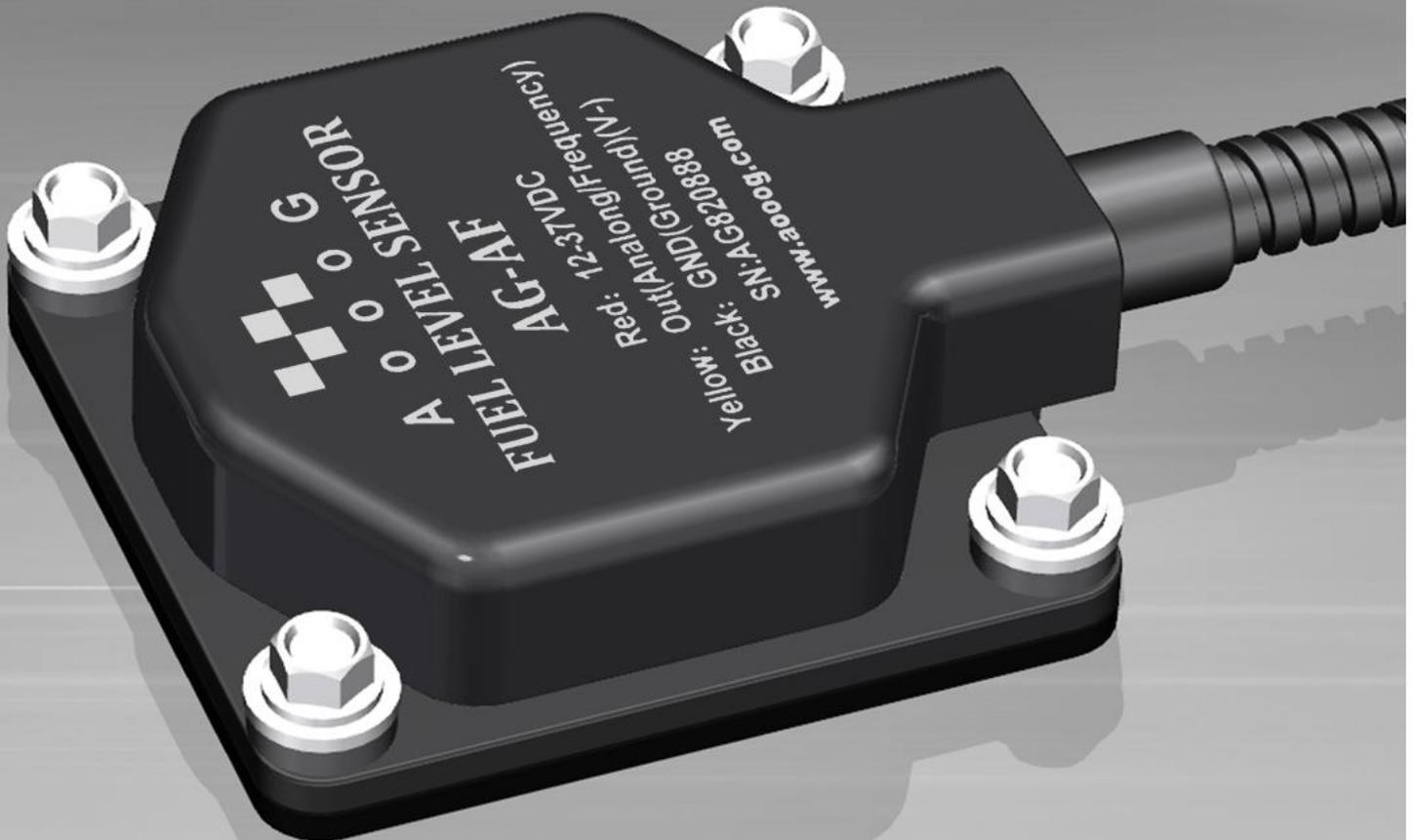
Analog(0-9V) Frequency(500-2000Hz)、RS232、RS485 Interface

AG-AF、AG-RS485、AG-RS232

Experience the ease of first start with AoooG

Get to know with device operating principles and parameters.

Learn about device functionalities and configuration in depth.



## General description

The device is meticulously engineered to precisely measure the level of liquid fuels and other non-conductive liquids within vehicle tanks and stationary fuel storage systems. Its versatile application spans across various industries. The captured measurements are then seamlessly translated into an output signal format, including Analog, Frequency, RS232, and RS485, which is then transmitted to an external device connected to it.

Under specific operational conditions, the device boasts exceptional accuracy, achieving levels as high as 99.5%. In the contemporary market landscape, there exist multiple lines of sensors utilizing diverse technologies to gauge fuel levels. These technologies encompass magnetically operated switches (reed switches), ultrasonic wave-based systems (ultrasonic sensors), and capacitive sensing mechanisms (capacitive sensors). Of these, capacitive sensing technology stands out as it offers superior precision and an extended operational lifespan.

## Key Features:

- ❖ **Adjustable:** Can be easily cut to fit various tank sizes, automatically recognizes the new length after cutting.
- ❖ **High Precision:** Resolution of less than 1mm; Accuracy rating of 99.5%.
- ❖ **Wide Input Range:** Supports input voltages from 9V to 37V with safeguards against overload and reverse-polarity, AI temperature compensation.
- ❖ **Extreme Temperature Resilience:** Functional across a wide temperature range from -40°C to +85°C.
- ❖ **Efficient Filtering:** Equipped with a filter to guard the probe against debris and water.
- ❖ **IP67 Waterproof:** Adheres to the IP67 waterproof standard for reliable performance in wet conditions.
- ❖ **Easy Configuration:** Installation and configuration software available on PC through a Connection Device.
- ❖ **Rapid Installation:** Designed for quick and hassle-free installation.
- ❖ **Flexible Calibration:** Parameters can be easily reset and recalibrated using an external calibrator.
- ❖ **Versatile Application:** Suitable for measuring fuel levels in diesel, gasoline, and kerosene tanks.

## Application

- ❖ **Vehicle Fleet Management:** Ideal for vehicles, trucks, coaches, and agrimotors in GPS fleet management and tracking systems.
- ❖ **Marine Usage:** Suited for boats and maritime transportation for accurate fuel level tracking.
- ❖ **Generator Sets:** Reliable monitoring of fuel levels in generator sets.
- ❖ **Construction Machinery:** Essential for construction machinery to ensure proper fuel management.
- ❖ **Industrial Oil Storage:** Perfect for industrial oil storage tanks and stationary storage tanks.
- ❖ **Industrial Facilities:** Ideal for factories and industrial zones requiring precise fuel level measurements.
- ❖ **Agricultural Machinery:** Essential for maintaining optimal fuel levels in agricultural machines.
- ❖ **Wide Range of Use:** Versatile application extends to various industries, including transportation, manufacturing, and more



## Technical specifications

### Technical specifications of the AoooG-AG product

Description	AG-AF	AG-RS232	AG-RS485
<b>Output signal</b>	Analog (0...9V) Frequency (500...2000Hz).	RS232	RS485
<b>Power supply (DC input voltage, V)</b>	9-37V	9-37V	9-37V
<b>Maximum power consumption, mA</b>	20mA	20mA	20mA
<b>Length size (L),mm</b>	700, 1000, 1500...up to 3000 mm	700, 1000, 1500...up to 3000 mm	700, 1000, 1500...up to 3000 mm
<b>Measuring error, %</b>	± 0.5 %	± 0.5 %	± 0.5 %
<b>Operating temperature, ° C</b>	-40...+85° C	-40...+85° C	-40...+85° C
<b>Baud rate, bit/sec</b>	2400, 4800, 9600, 19200, 38400, 57600, 115200.	2400, 4800, 9600, 19200, 38400, 57600, 115200.	2400, 4800, 9600, 19200, 38400, 57600, 115200.
<b>Waterproof standard (Ingress protection rating, IP)</b>	IP67	IP67	IP67
<b>Average service life, (years))</b>	5 years	5 years	5 years
<b>Absolute error in temperature measurement within the entire temperature measuring range, °C</b>	± 2°C	± 2°C	± 2°C
<b>Message interval, (s)</b>	Continuous	1	1
<b>Application environment</b>	Diesel、 Biodiesel、 Gasoline,Kerosene(Not applicable to conducting medium)	Diesel、 Biodiesel、 Gasoline,Kerosene(Not applicable to conducting medium)	Diesel、 Biodiesel、 Gasoline,Kerosene(Not applicable to conducting medium)

**Important Note:** The AoooG Fuel Level Sensor is designed to provide highly accurate measurements of fuel levels within tanks. Given the precision required for installation, it's imperative that the installation process is carried out with meticulous care. To ensure optimal results, we recommend that installation technicians receive thorough training from specialists or experts in this field prior to installing the device. This approach guarantees accurate measurements and the device's seamless integration into your operations.

# Install

1. **Optimal Installation Location:** The placement of the sensor is crucial for accurate fuel level measurements. It is recommended to position the sensor as close as possible to the geometric center of the fuel tank or storage container. Ideally, the sensor should be situated at the lowest point within the tank, as illustrated in the diagram below. This strategic positioning ensures that the sensor captures the most precise and reliable readings of the fuel level, enabling you to effectively monitor and manage your fuel resources.

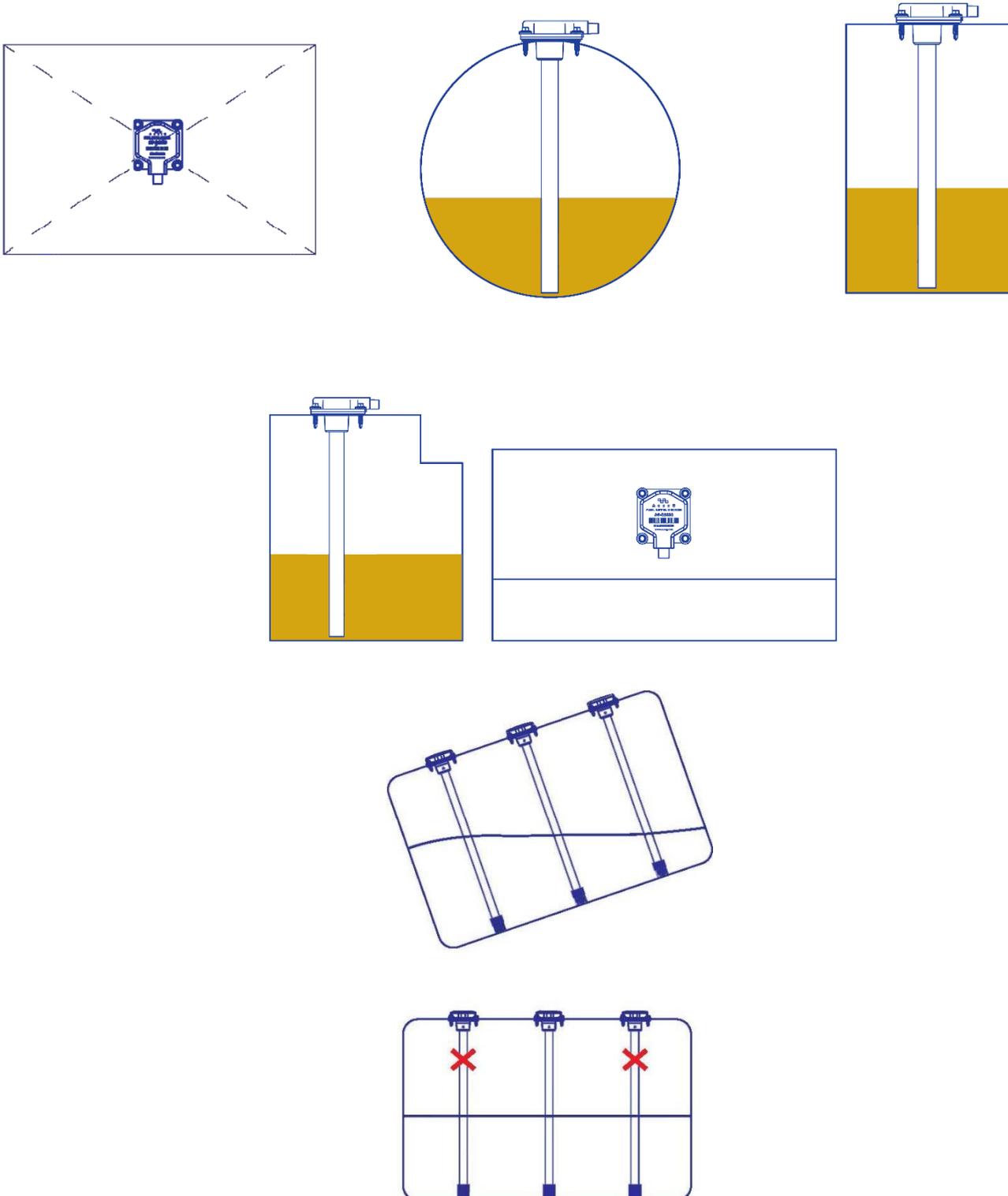


Figure 1. Selecting the location to install sensor

## 2. Drilling the hole on fuel tank

Drill out the central bore by bimetal core drill  $\varnothing 38$  mm

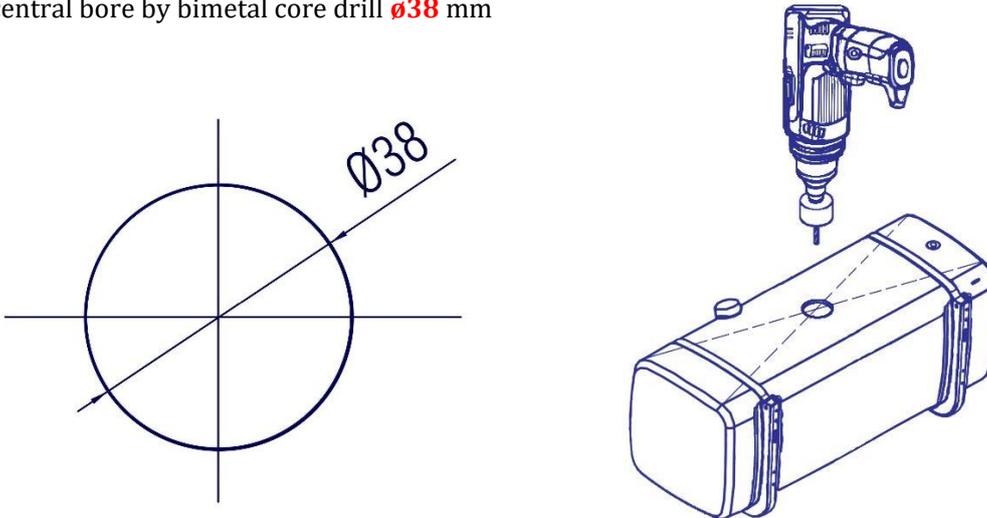


Figure 2. Drilling the selected hole

## 3. Measuring the Tank Depth and Cutting the Sensor's Measuring Probe

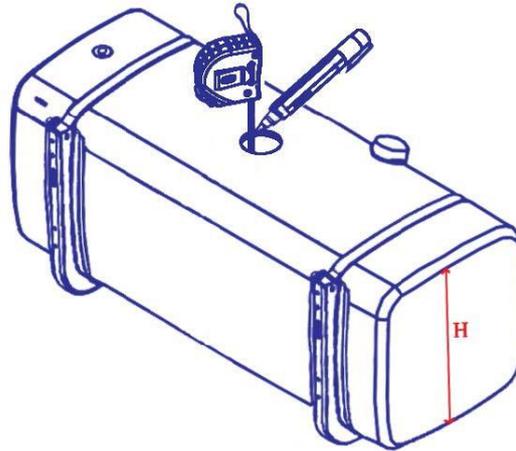


Figure 3. Measuring the tank depth

**To achieve accurate measurements, follow these steps to cut the sensor's measuring probe:**

1. Measure the Depth: Determine the depth of the oil tank accurately.
2. Calculate Length: Subtract 25 mm from the tank's depth. Ensure the measuring probe's length is a minimum of 150 mm.
3. Cutting: Using appropriate tools, cut the measuring probe to the calculated length. It's essential that the shearing line is perpendicular to the sensor's longitudinal axis.
4. Adjust as Needed: Adjust the cutting point based on the oil tank's height for the most precise measurements.

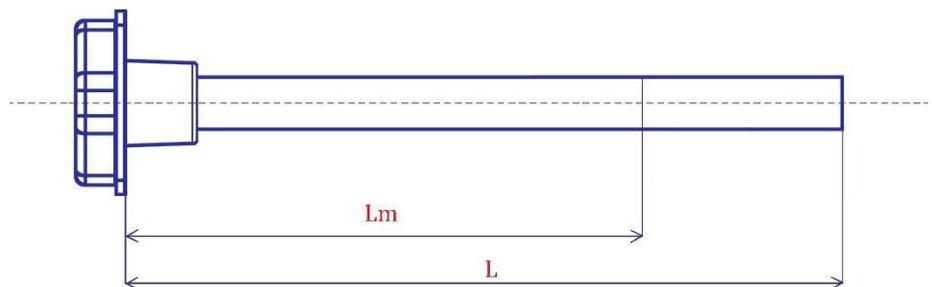
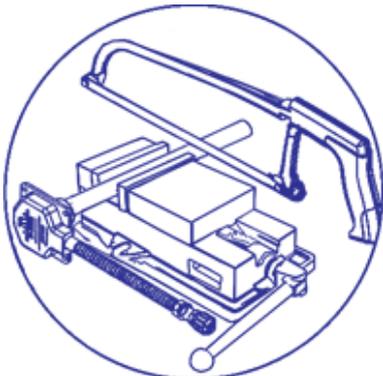


Figure 4 illustrates the original length ( $L$ ) of the sensor probe and the length

after cutting ( $H - 25\text{mm} = L_m$ ).

## 4. Min/Max Calibration

1) **Set Empty** - Choose one of the following connection methods to power the fuel level sensor. (Set Empty for minimum fuel level calibration). Ensure that the sensor is positioned away from fuel and set the Empty level.

### Options 1- Power Bank

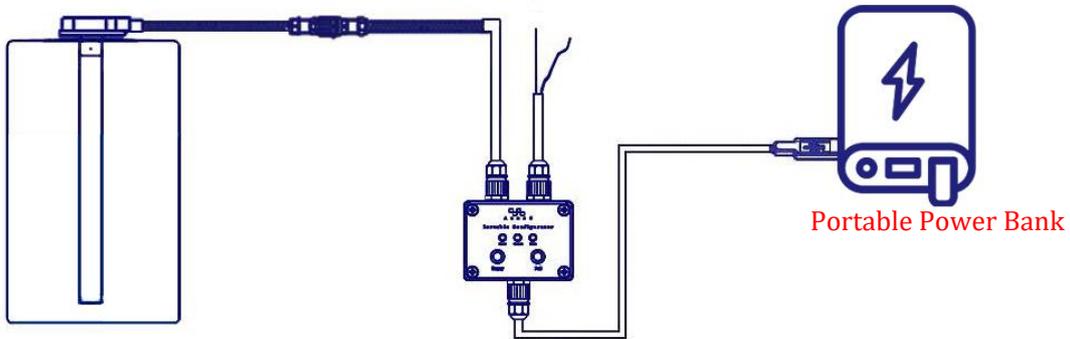


Figure 5. Connect the portable configurator USB to the power bank, and use the power bank to power the fuel level sensor.

### Options 2 - Computer

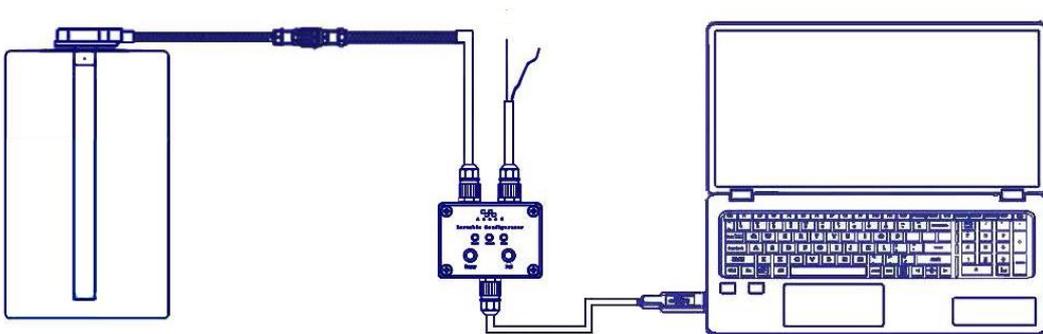


Figure 6. The USB of the portable configuration device is connected to the computer, and power is supplied to the fuel level sensor through the computer, which is convenient for calibration.

### Options 3 - Battery

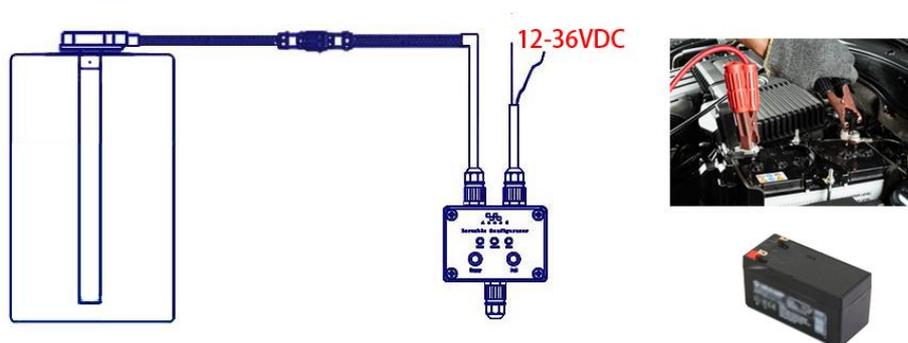


Figure 7. Portable configurator power cable connected to truck battery or battery

**Notes:** Choose one of the power supply modes shown in the previous figure. When the power supply is functioning properly, the red power indicator light on the portable configuration device will illuminate, indicating normal operation. Then press and hold the "Empty" button. After the yellow light starts flashing, release the "Empty" button. Wait for the yellow light to stop flashing, indicating the completion of the setting.

**2) Set Full** - There are three power supply options for the fuel level sensor. Please choose one of the following connection methods (Select Set Full for calibrating maximum fuel level). Completely submerge the aluminum tube in the fuel to set the full level.

### Options 1-Power Bank

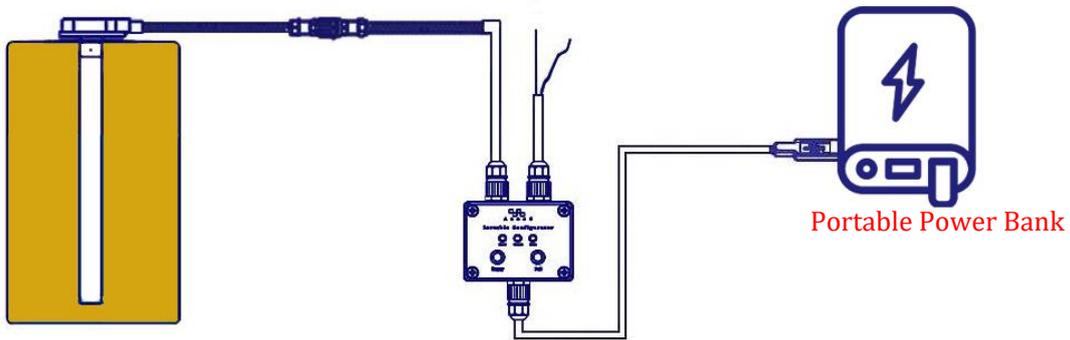


Figure 5. Connect the portable configurator USB to the power bank, and use the power bank to power the fuel level sensor.

### Options 2-Computer

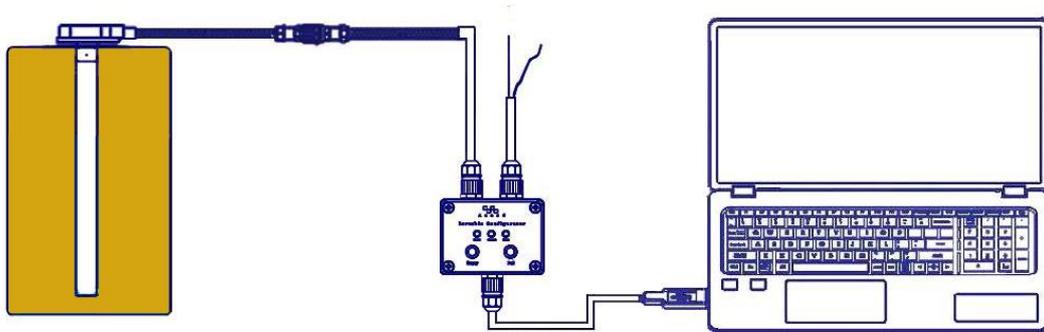


Figure 6. The USB of the portable configuration device is connected to the computer, and power is supplied to the fuel level sensor through the computer, which is convenient for calibration.

### Options 3-Battery

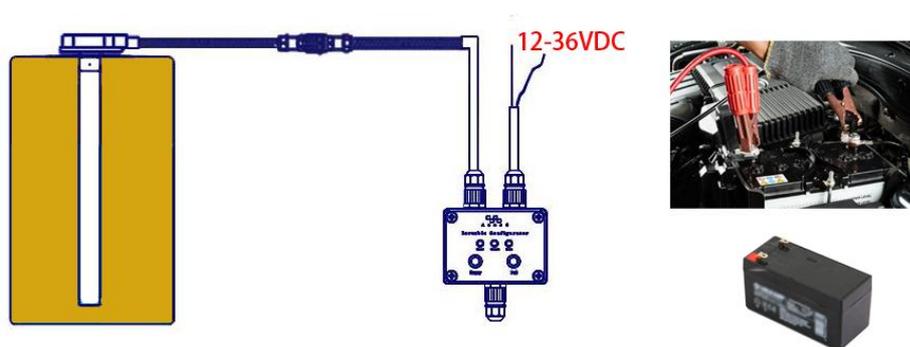


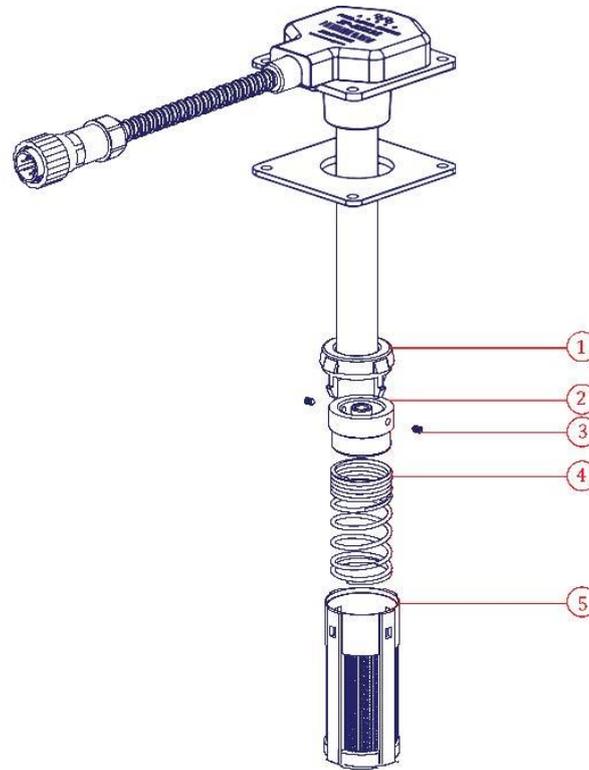
Figure 7. Portable configurator power cable connected to truck battery or battery

**Notes:** Choose one of the power supply modes as shown in the previous step. When the power supply is functioning correctly, the red power indicator light on the portable configuration device will illuminate, indicating normal operation. Press and hold the "Full" button for an extended duration. After the yellow light starts flashing, release the "Full" button, and wait for the yellow light to stop flashing. This confirms the completion of the setting.

## 5. Installing screen filter

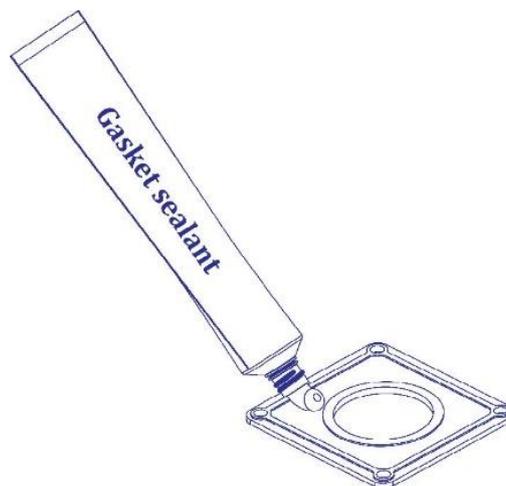
Follow the steps in the diagram below to install the mesh filter on the measurement probe of the sensor. This helps safeguard the measurement probe electrodes from the effects of mud and water. Utilizing the filter can considerably extend the sensor's trouble-free operational lifespan.

Mesh Filter Installation Sequence: Install in the order of the numbers indicated in the diagram, 1, 2, 3, 4, 5. Number 3 includes 2 screws for secure attachment.



*Figure 8 . Procedure for Installing the Screen Filter*

## 6. Apply a non-conductive sealant that is resistant to oil and petrol to the rubber gasket.



*Figure 9 . Applying the sealant to gasket*

Put the sensor in the tank and secure, using the self-tapping screws and seals provided by the supplier (each self-tapping), Connect the sensors to an external device using 7m cable

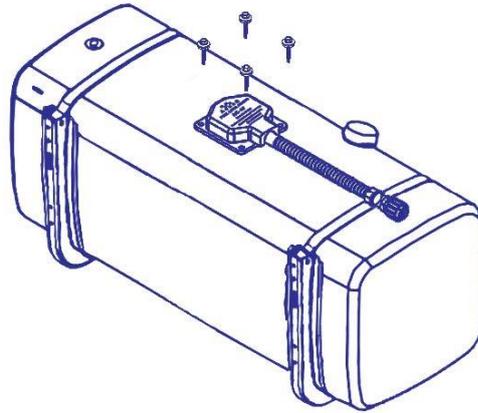


Figure 10. Put sensor into the tank

### 7. The wire cable color – RS485/RS232

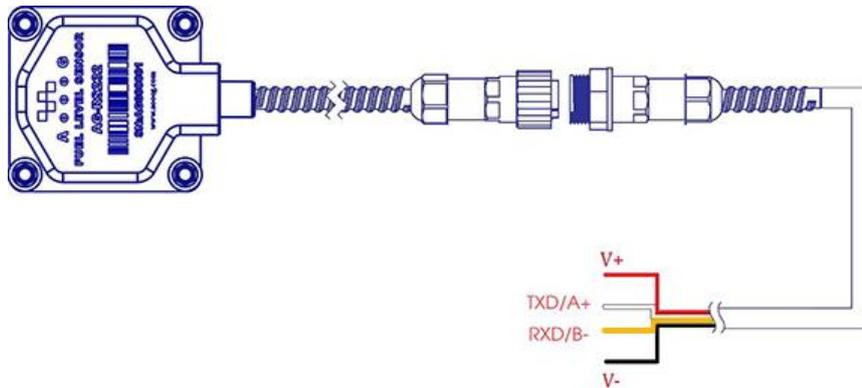


Figure 11. Wiring diagram of RS485 and RS232 output signals

Wire Color		Description
	<b>Red</b>	9-37 VDC
	<b>White</b>	RS232: TXD RS485: A+
	<b>Yellow</b>	RS232: RXD RS485: B-
	<b>Black</b>	GND (Ground) (V-)

Note: Connect the fuse holder to both the sensor's power line and the vehicle-mounted power circuit.

## 8. The wire cable color – AG-AF

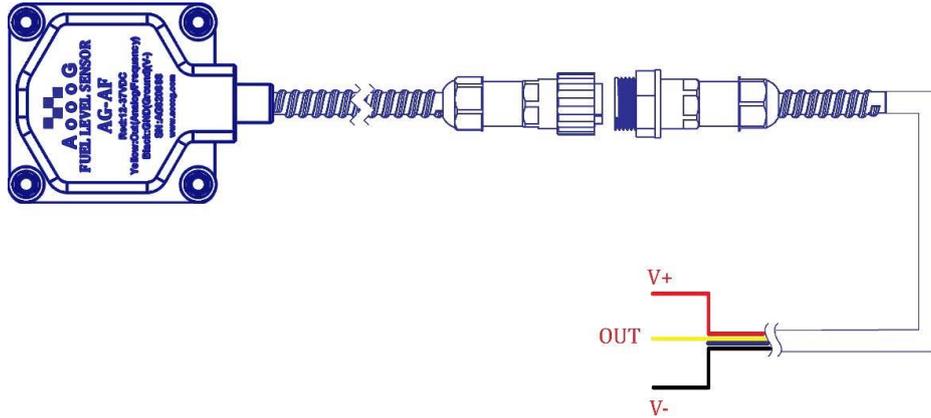


Figure 12. Wiring diagram of Analog and Frequency output signals

Wire Color		Description
	<b>Red</b>	9-37 VDC
	<b>Yellow</b>	Out (Analog/Frequency)
	<b>Black</b>	GND (Ground) (V-)

Note: Connect the fuse holder to both the sensor's power line and the vehicle-mounted power circuit.

## 9. Sealing - Install the bolt through a hole in the seal.

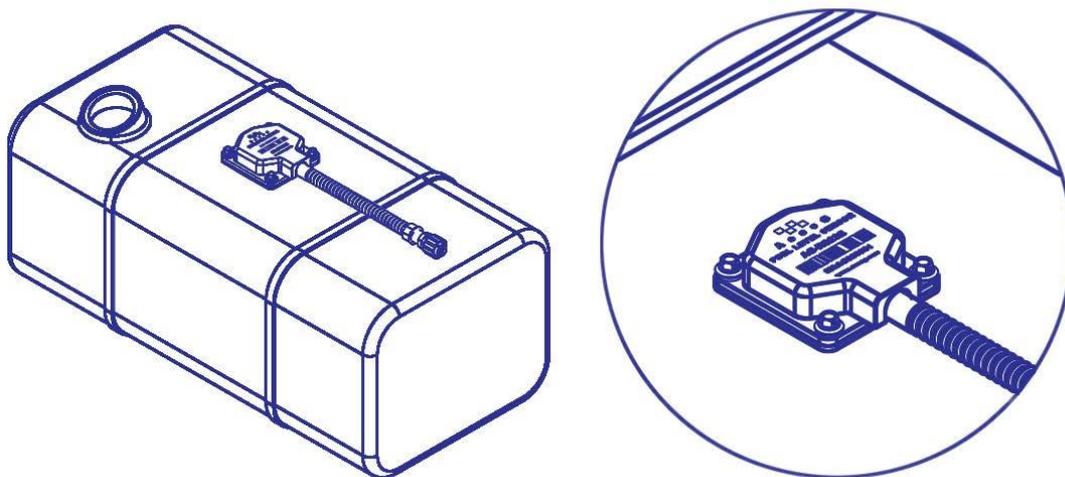
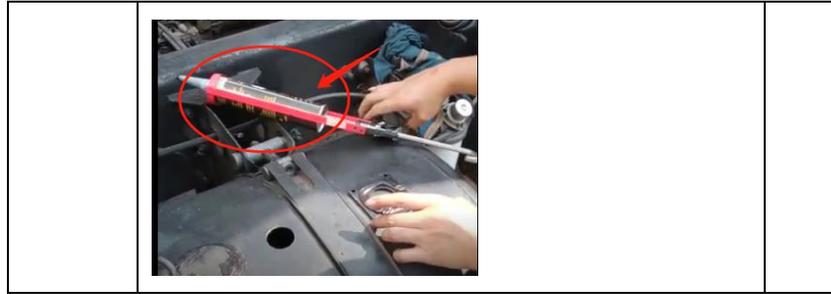


Figure 13. Sealing

No.	Description	Qty
1	Bimetal core drill $\varnothing$ 38 mm	1
		
2	4mm, T Shape Hex Socket Hexagonal Screwdrivers	1
		
3	Tape measure	1
		
4	M4.8mm Hexagon nut socket wrench	1
		
5	Power bank	1
		
6	Hacksaw	1
		
7	diesel fuel, Transparent plastic pipe	1
		
8	waterproof sealant	1



**Appendix B - Sensor AoooG and all the accessories**



No.	Description	Qty
1	7m signal wire	1
2	2A Fuse protection	1
3	Anti-vibration spring when moving	1
4	Self-drilling screws M4.8x32mm	4
5	Oil filter	1
6	Spring base	1
7	Oil Filter buckle	1
8	Gasoline resistant rubber gasket	1
9	Grub stainless steel hexagon socket set screw	2

**Attention**

The manufacturer is not responsible for product availability in case of non-compliance of requirements of this service manual, unauthorized service and repair; if device has damage or traces of opening of head's body, mechanical damage of the probe or the interface cable, as well as traces of corrosive acids, open flame, high voltage, lightning strikes or other natural factors.

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