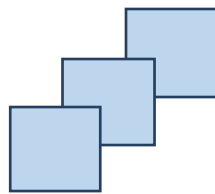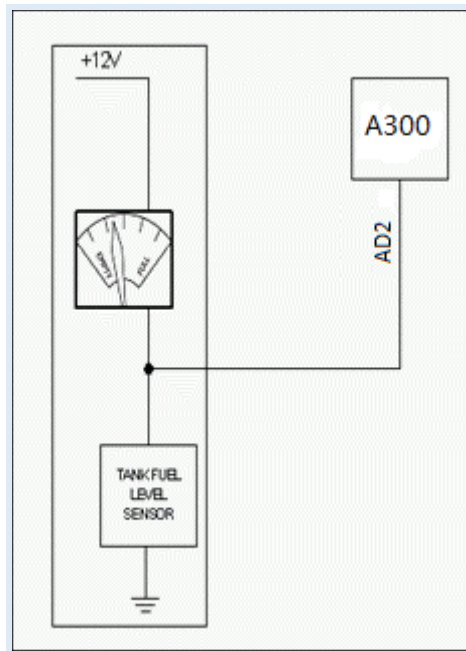# FIFOTRACK VEHICLE
ORIGINAL FUEL SENSOR
USER GUIDE

Original Fuel sensor

Version: V1.2

www.fifotrack.com

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Document History

Version	Revision Date	Author	Detail
V1.2	Dec 22, 2017	Vito Hu	Adding S30 model
V1.1	Feb 8, 2017	Vito Hu	Initial Version

Contents

1 Overview

fifotrack GPS tracker can read vehicle original fuel sensor (some customers name it built-in fuel sensor/original fuel gauge) data directly through analog input and upload the fuel data to server. This solution brings advantages as follows:

- Suitable for small car, delivery car and truck fuel monitoring

- Cost saving, no need buy external fuel sensor, no following maintenance costs.

- Easy and controlled installation way, each vehicle model only need one time calibration

- Safe, no need drill a hole or put probe on fuel tank

- Good fuel level graph under engine off

2 Applied Model

Below models support original fuel sensor solution.

⊙ A300 (firmware version V1.08 or above)

⊙ A500

⊙ S30

⊙ A600

⊙ A700

Model	Analog input1 voltage range (V)	Analog input2 voltage range (V)
A300	\	0~12
A500	\	0~12
S30	0~12	\
A600	\	0~12
A700	\	0~12

Available analog input for original fuel sensor solution

3 Basic Description of Connection
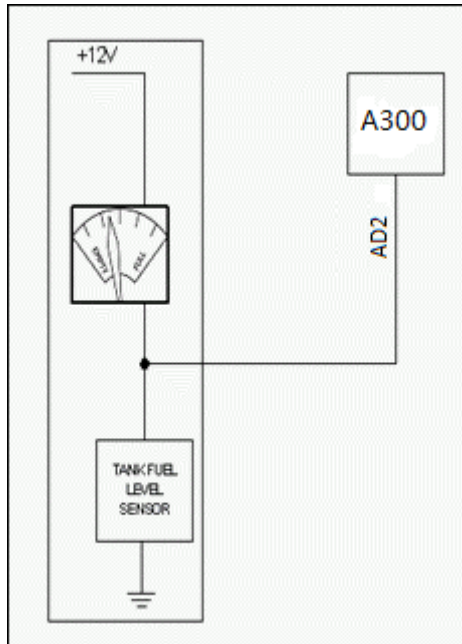
4 Fuel Sensor Cable Identification

4.1 Step 1

Remove the driver's indicator panel

Now the fuel level is more than quarter a tank as shown on the image above.

4.2 Step 2

Identify the cable that connects the fuel tank sensor to the gauge meter on the driver's panel. Behind the indicator panel, it is clearly labelled where the fuel sensor cable is connected as shown on the

image below.
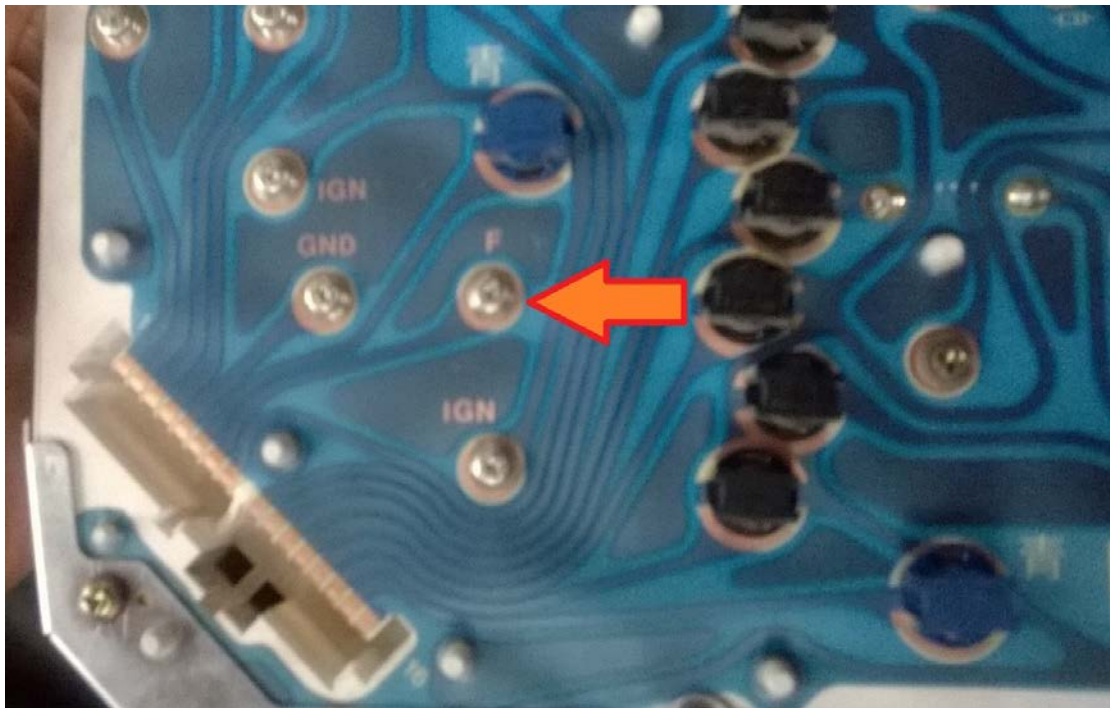
4.3 Step 3

After doing a continuity test, the cable was identified. To prove this, you have to cut the identified cable to see the reaction of the fuel gauge meter.

4.4 Step 4

After the vehicle moved around 100m, the gauge meter indicator arrow dropped from quarter a tank to Empty.

Then reconnect the cable, during driving, the arrow went back to the previous position (quarter tank)

The identified cable has been proved after above tests.

5 Fuel Sensor Cable Connection

## 5.1 Regular and Irregular Fuel Tank

Output voltage of original fuel sensor is not linear, both the regular and irregular fuel tanks need do the cable connection and calibration as follows.

5.2 Connect Fuel Sensor Cable to GPS Tracker

Original fuel sensor normally has three cables. Power and ground cable for power, fuel signal cable for fuel meter. Below is the cable connection between original fuel sensor and GPS tracker.

Original fuel sensor cable	fifotrack tracker cable
Power cable	\
Ground cable	Ground cable(GND)
Fuel signal cable	Analog input 2 (AD2)
Note: S30 model should use analog input1	
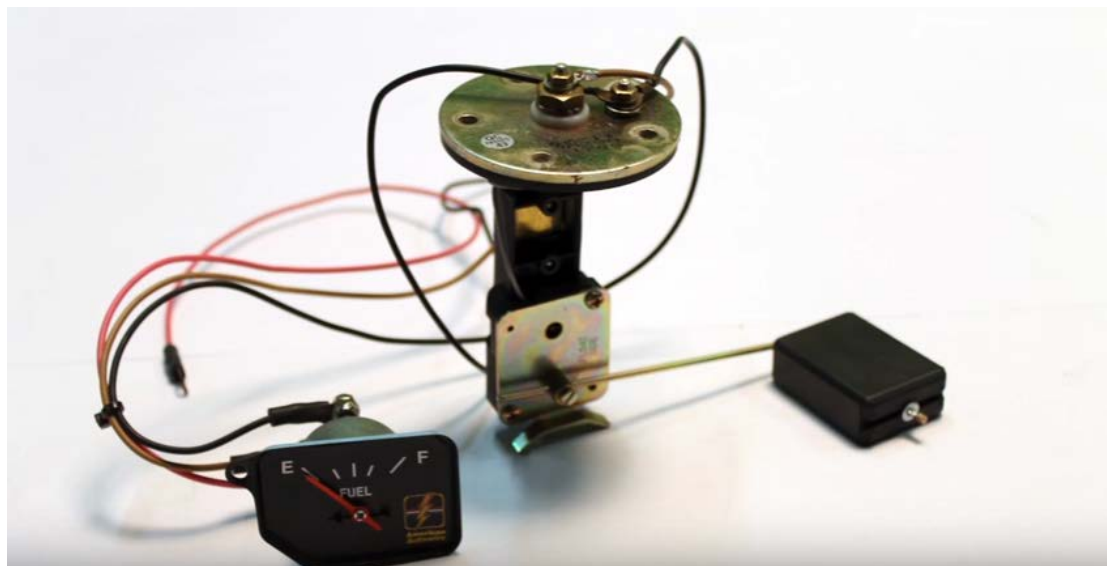
Understand original fuel sensor more via below links:

https://www.youtube.com/watch?v=G2NGAHjPbNU

https://www.youtube.com/watch?v=z4c8_NnBW4s&t=34s
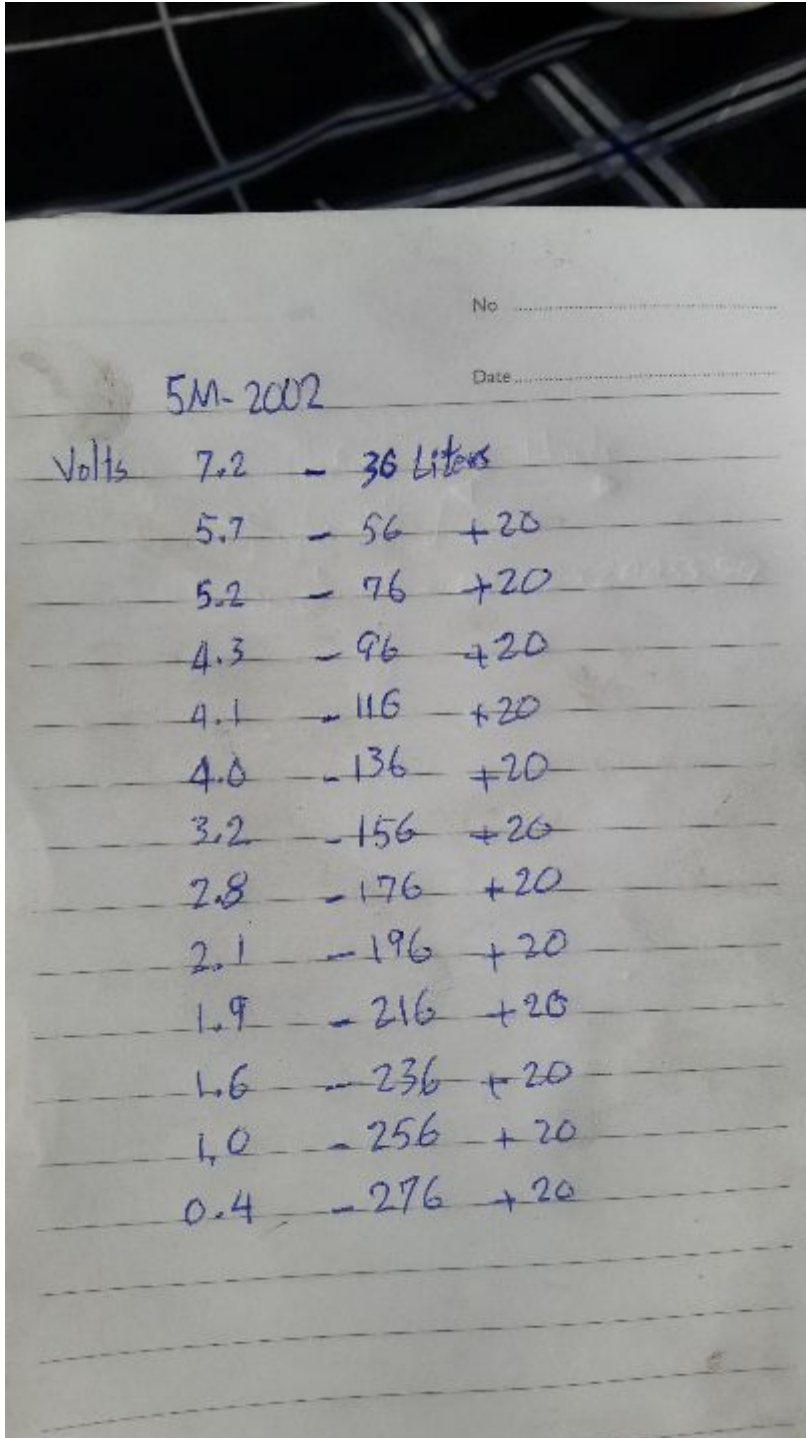
5.3 Record Voltage of Fuel Sensor Cable for Calibration

Fuel tank volume	Fuel sensor cable voltage
0 liters	X
10% full liters	X
20% full liters	X
30% full liters	X
40% full liters	X
50% full liters	X
60% full liters	X
70% full liters	X
80% full liters	X
90% full liters	X
Full liters	X
Note:	
1) **This measure should be done under engine on status.**	
2) **More calibration records, higher precision.**	

For Example

Fuel tank volume (full is 65 liters)	Fuel sensor cable voltage
0 liters	3.90V
10 liters	3.47V
20 liters	2.89V
30 liters	2.15V
40 liters	1.53V
50 liters	0.93V

60 liters	0.21V

Note:

1) **This measure should be done under engine on status.**
2) **More calibration records, higher precision.**

Real Example from Customer

5M-2002

No

Date

```
Volts  7.2  -  36 Liters
       5.7  -  56   +20
       5.2  -  76   +20
       4.3  -  96   +20
       4.1  - 116   +20
       4.0  - 136   +20
       3.2  - 156   +20
       2.8  - 176   +20
       2.1  - 196   +20
       1.9  - 216   +20
       1.6  - 236   +20
       1.0  - 256   +20
       0.4  - 276   +20
```

5.4 Connect Digital input3 to ignition switch ON state

Digital input3 of A300/A500/A600/A700, digital input2 of S30 are specified to detect the status of engine on/off for original fuel sensor solution.

Note:

1. Customers still need connect digital input2 to ignition ON state for normal engine on/off detection, for example different uploading time interval under engine on/off conditions.

2. There are "OFF/ACC/ON/START" four states of Ignition switch, make sure digital input connect to ignition "ON" state wire.
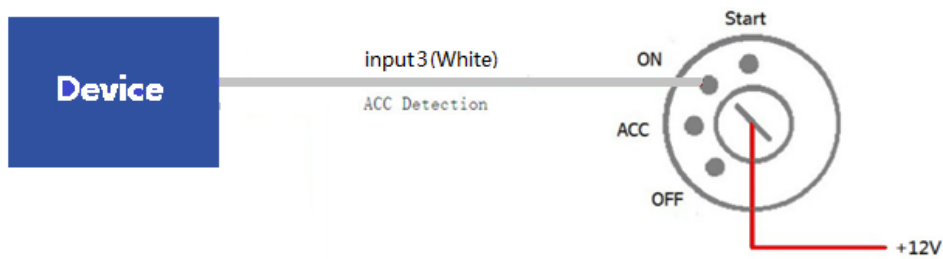
5.5 Contact Sales

Different vehicle models have different formulas, please contact fifotrack sales to finish below steps:
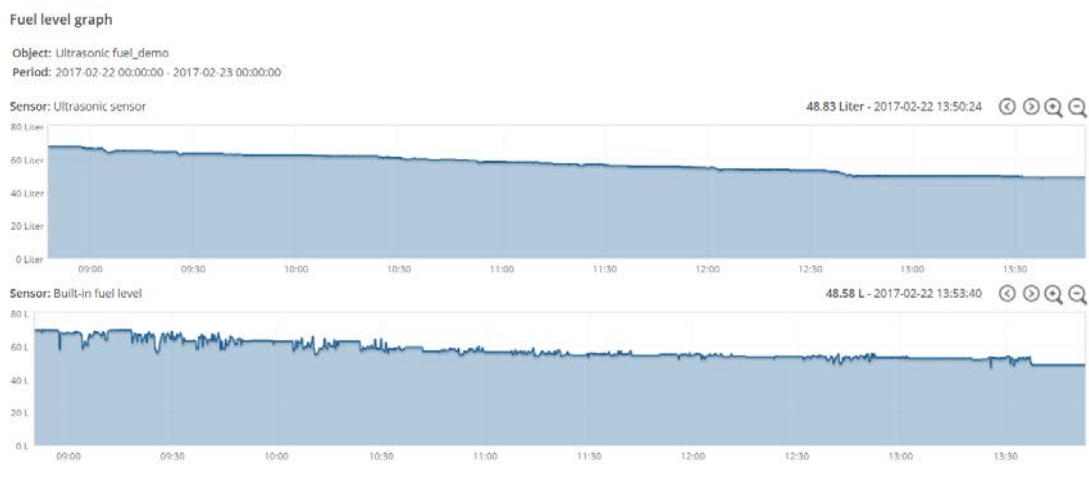
1. Adjust analog input voltage range by command
2. Specific formula on FIMS tracking software

6 Fuel Level Monitoring

6.1 Fuel Level Comparison Graph

Ultrasonic fuel sensor and vehicle original fuel sensor results of same truck.

Testing environment: vehicle runs between mountains, the truck goes uphill and downhill frequently.
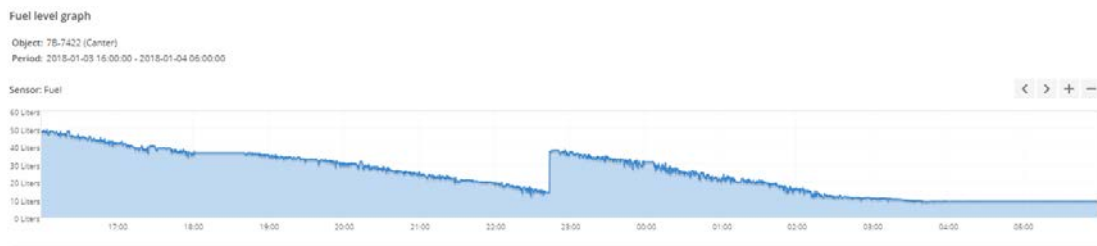
Vehicle original fuel sensor has more fluctuations than ultrasonic fuel sensor.

However, the trend of fuel consumptions is cognizable, maximum fuel wave is less than 10 liters.
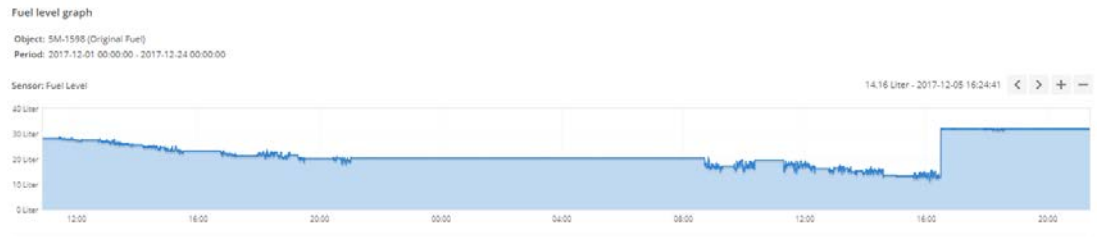
We keep improving it.

6.2 Small Car Fuel level Graph
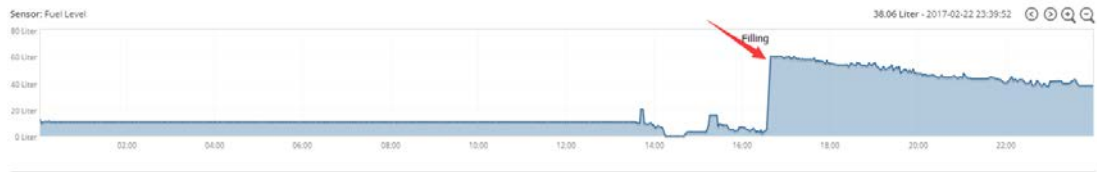
Note: Full 65 liters, red arrows is the fuel filling data.

Note: Full 52 liters

6.3 Small Car Fuel level Graph(Full 32 liters)

6.4 Real-time Fuel Level

6.5 Fuel level Accuracy

Compare to the external fuel sensor, original fuel sensor accuracy is less precise. Based on current firmware version, the accuracy as follows according to test results both in China and abroad.

Country	Fuel tank full volume (liter)	Fuel Tank Size(CM) (L*W*H)	Error (%)	Error (liter)
China	155	80*48*40	5.8%	9
Zambia	65	Irregular size fuel tank，height is 20CM	15.4%	10
Myanmar	32	Irregular size fuel tank	11.3%	3.6
Myanmar	52	Rectangular size fuel tank	9.6%	4.98

6.6 Vehicle Original Fuel Sensor Advantages and Limitations

Advantages:
1. Cost saving, no need pay for external fuel sensor and following maintenance costs.
2. Easy and controlled installation way
3. Safe, no need drill a hole on fuel tank
4. Fuel consumption trend, fuel filling, fuel theft are clear enough and acceptable for fleet management.
5. Good fuel level graph under engine off

Limitations:
1. When engine off, original fuel sensor will not work due to lack of power. The fuel filling or fuel theft data is not real-time, it will be uploaded when engine on.
2. Less precision compare to external fuel sensor

Please e-mail us at info@fifotrack.com if any question or feedback.