Using a resistive fuel level sensor
Revision 1

Overview:
Resistive fuel level sensors indicate the level of fuel in the tank by the mean on the electrical resistance between 2 wires.

- The US standard is 33 (tank full) to 240 ohm (tank empty)
- The European (EUR) standard is 10 (tank empty) to 180 ohm (tank full)

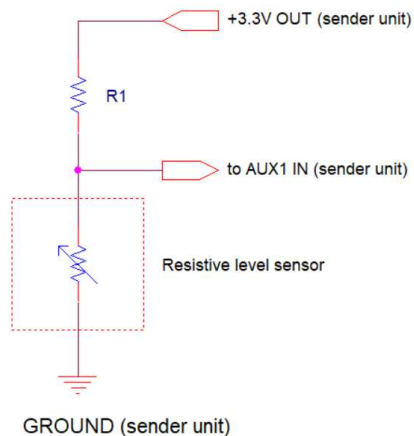Enginemeter EFMS100 AUX1 input can be used as a fuel level input.

AUX2 is not recommended for this application because "AUX2 has a 1kOhm/1% resistor internally connected to a 2.5V voltage reference and a 150Ohm/1% resistor is series with the terminal"

Information from EFMS100 user manual:
- AUX1 voltage range = **0 to 2.5V**
- AUX1 input leakage current = 50nA max. (not significant here)
- "+3.3V OUT": "Maximum output (sourcing current only / no sinking current) current = **10mA** !!!"

Principe:
1 additional resistor (R1) is used to create a resistor divider between "+3.3V OUT" (3.3V output) and "AUX1 IN" analog input.

The recommended value for R1 is 330 ohm in order to limit the current to 10mA (3.3V / 10mA = 330 ohm).

Using R1=330 ohm will produce the following characteristic:

Level sensor type	US standard	EUR standard
AUX1 voltage @ tank empty	240/(240+330)*3.3 =1.39V	10/(10+330)*3.3 =0.097V
AUX1 voltage @ tank full	33/(33+330)*3.3 =0.3V	180/(180+330)*3.3 =1.165V

Note that AUX1 voltage must always stay in the range 0 to 2.5V

Calibration:
A calibration is required mainly because the fuel tanks can have a complex shape.
Please refer to EFMS100 user manual for details about calibration.

The characteristic of the calibration block is defined by 11 data points and 2 values (MIN CALIBRATED VALUE and MAX CALIBRATED VALUE).

The 11 data point correspond to
0, 10, 20, 30, 40, 50, 60, 70, 80, 90 and 100%

The calibration procedure is a follow:

- Make sure the fuel tank is empty
- Write down AUX1 raw value as the 0% data point
- Add 10% of fuel in the tank
- Write down AUX1 raw value as the 10% data point
- Add 10% of fuel in the tank
- …
- …
- Write down AUX1 raw value as the 90% data point
- Add 10% of fuel in the tank
- Write down AUX1 raw value as the 100% data point

Now you can enter the 11 data points in the unit.

If you want to have the fuel level indicated in %, set
MIN CALIBRATED VALUE = 0   (for 0 %)
MAX CALIBRATED VALUE = 100   (for 100%)

If you prefer to have the fuel level indicated in gallons or liters, set
MIN CALIBRATED VALUE = 0   (for 0 gallons/liters)
MAX CALIBRATED VALUE = your tank capacity   (in gallons/liters)