

## Lagondaforum: fuel gauge

### fuel gauge

*Written by Peter S30 at Jun 15, 2014 3:26 pm*

Who knows how the fuel gauge on the 2ltr works? probably it is the same on many other cars?

My fuel gauge was reading very low (about half or less of what it should). It has 3 connectors. One is ground, one connected to the fuel tank sender and one is +12V (my car is on negative earth). I removed the gauge, because the fuel tank sender resistance seemed reasonable.

I removed the gauge from my MGA to compare. The one from the MG is like described well on the internet ([http://mgaguru.com/mgtech/electric/fg\\_01.htm](http://mgaguru.com/mgtech/electric/fg_01.htm)): it has 2 coils: one called the "full" coil, one called the "empty" coil, both are connected on one point which is connected to the resistor on the fuel tank. The other ends are connected to ground and 12V. Measuring the resistance between the 3 connections gave 100 Ohm, 100 Ohm and 200 Ohm which makes sense (1 coil, the other coil and both together).

The gauge from the Lagonda is different: it has 180 Ohm between all 3 points. (how does this work with 2 coils, may be the upper one has a connection in the middle too). When I connect the gauge to ground and +12V, I could get it showing half full. Connecting the third to either ground or 12V would let it show empty or full. But that is not what the fuel tank sender delivers. The fuel tank sender connects more or less to ground only. On my gauge this leads to a value between empty and less than half full.

I opened the gauge (glas removed, face removed), see picture. I do not understand how it works, nothing seems broken, no possibility to adjust and however I connect it it does not do what it should. Was it made for a different type of fuel tank sender?

The only solution I see so far would be to buy a "normal" one (e.g. MGA) and put the face of the Lagonda instrument in.

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#### Attachments:

[fuel gauge.jpg](#) (filesize: 72.26 KB)

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### Re: fuel gauge

*Written by Peter S30 at Jun 17, 2014 8:33 am*

A Lagonda friend has sent me this photo of the sender unit on his 3ltr. It has 3 wires connected! I assume it is +12V, ground and the signal to the gauge. With such a sender unit my gauge would work correctly. My conclusion so far: the gauges like on the MGA are standard and work with a sender unit that has only the signal and ground. And there are the (more unusual) gauges like on the 2 and 3 ltr Lagonda (and may be others) that require a different sender. Somebody has replaced the sender of my Lagonda with a new (wrong) one. If nobody has other solutions or can tell me I am wrong, I will probably have to built a little electronic converting my signal to the one needed.

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#### Attachments:

[fuel sender 3wire-kl.JPG](#) (filesize: 71.01 KB)

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### Re: fuel gauge

*Written by Peter S30 at Jul 07, 2014 8:42 am*

This job took me much longer than I thought but finally the solution and explanation for the problems:

On the sketch the upper diagram shows how an original (3 connector) tank sender (a potentiometer) would have worked with the still original fuel gauge in my car. The fuel gauge, when connected to 12V and ground only, shows half full. The signal from the sender is between negative (ground) and +12V. (Works accordingly on cars with positive ground). This pulls the needle up or down accordingly. It seems all modern available tank senders only have 2 connections: one is ground and the second signal, no connection to +12V. Might be for safety reasons not to have power from the battery directly on the sender if it shorts by fault.

The sender I found in my car is of the modern type: a tunable resistor (potentiometer) against ground only. This would work fine with other fuel gauges

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like the one from MGA and other cars but not with the one in my Lagonda. Connected directly to the original Lagonda fuel gauge it would display from half full to empty only when it goes from top to bottom in the tank. But there was another problem with this sender: mechanically when in low position the tank would be still half full because the drop arm is so short and a longer one can not be fitted because the fuel tank is divided in compartments leaving not much space for the sender drop arm. And the tank was not grounded properly, so the signal would be erratic.

The solution: I found a universal tank sender where the potentiometer can be adjusted to sit in the middle of the fuel tank. This allows to have a total travel of the 26cm needed with a drop arm length of only half of that. It came with a fuel gauge that would work fine with it but looks to modern (see parts not needed on the right side of the image "fuel gauge replacment"). So it needed an electronic that converts the signal to fit to the old gauge. This is shown in the lower part of the sketch: an operation amplifier with adjustable gain (defined by the 100k resistor and 10k potentiometer). The gain is set once to match the sender unit to the fuel gauge reading. The current through the sender is only 2.5mA and limited by the 5k resistor. I prefer to have low currents in the tank. I also have put a fuse of 32mA in the connection to the tank sender, just in case something goes wrong. I also had to make a new holding plate for the new sender because the one that came with it has 5 holes not six like on my fuel tank.

It works fine tested on the bench, the reading should now quite well correspond to the real fuel level. Also works in the car but I have not tested it yet under real driving conditions.

I will not tell you how many hours this took me but I now understand why so many drivers are using a wooden dipstick to check the fuel level.

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### Attachments:

[sender new and old.jpg](#) (filesize: 84.49 KB)

[fuel gauge replacement.jpg](#) (filesize: 60.45 KB)

[fuel gauge electronics.jpg](#) (filesize: 84.64 KB)

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### Re: fuel gauge

*Written by h14 at Jul 07, 2014 10:59 am*

Hi Peter,

Well done, a heroic resolution to your annoying problem!

I face a similar issue with my LG6 special, which has a fuel gauge and sender unit; but no connection between the two. The gauge is a modern one of period style, and to confuse further, for reasons I've been unable to fathom, the petrol tank is from a Derby Bentley. Doubtless the previous owner discovered the two weren't compatible, so yes, the car came with a wooden dipstick...in fact not really necessary as the racing pattern filler is huge and provides a good view of the tank contents anyway.

Your "modern" sender unit, the one you've removed, looks pretty similar to the one for my 1951 Riley RMB. So might be older, but perhaps they're still manufactured for the retro market.

Laurence

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