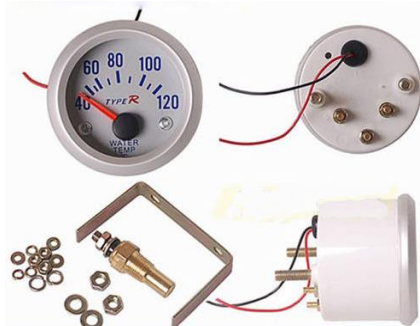
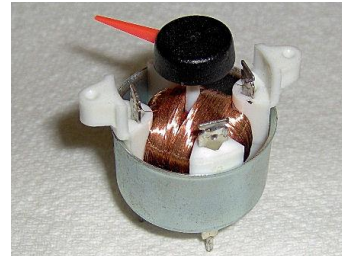


Simple Cheap Repair for Isabella Temperature Gauge

When an Isabella (Bourdon) temperature probe fails (fluid leaks), it can be expensive to have it repaired. If this service (or the money) is not available, then a cheaper option is possible. Modern cars use small thermistor probes which adjust the current in a small meter on the dashboard. These can now be bought very cheaply (China or UK) and work well. The scale runs (ostensibly) from 40 °C to 120 °C, so 175 °F is about in the centre:



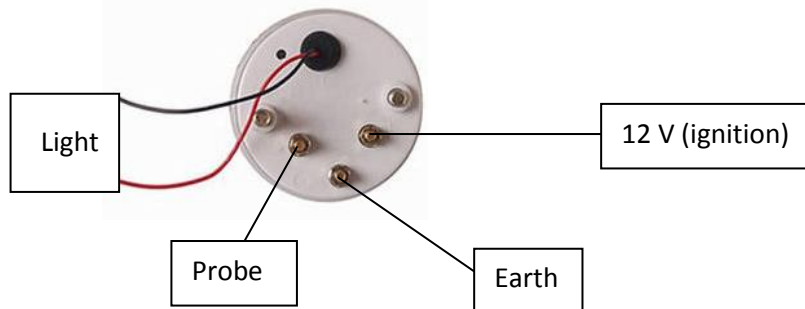
Thermometer showing thermistor probe



Air Core Meter

The moving coil meter inside these units is of the “Air Core” type which is quite small and allows the spindle of the meter to project out of the coil assembly - essential if it is to have a pointer at the very front of any display (as with the Isabella).

The meter itself has 3 connections (besides the dashboard illumination - not used here)



I happened to have an old spare Isabella thermometer ‘head/meter’ with no probe attached, so I decided to modify it to see if it could be done. I stripped down the meter that I had purchased from China (for less than £5), took out the air core meter, and fixed it to the back face of the Isabella scale using araldite - so that the spindle went through the existing spindle hole. Obviously none of the other holes lined up, so I had to use araldite for the fixing (I clearly didn’t want to make any extra holes in the face of the display):



Air core meter fixed to faceplate with araldite

The two outer (of the 3) connectors to the ‘air core’ meter must obviously be insulated from its metal casing meter. This casing was actually loose and held on by the connecting nuts in the original. It was held down by the plastic container of the original, and insulation was not a problem - there is a small ‘notch’ on the air core plastic former, and this was sufficient to maintain insulation in that situation. However, I wanted to be sure that

if I put it in an Isabella, it would be OK, so I put some 'earth sleeve over the brass bolts and into the small holes in the metal case, and locked the whole thing down with fibre washers and the nuts. The insulation was good and robust. A small piece of insulating tape around the lower part of the brass bolts would have worked just as well. Note: the red tape in the above photo was to mark the 12 V ignition connection.

I then cut a hole in the back plate to take the air core meter:



As an extra precaution (in case the araldite ever failed), I put some foam tape around the metal case so that it was in slight compression when I then screwed the front face on to the back plate:

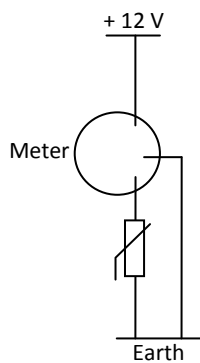


Foam around air core meter



Foam under slight compression

Tests with the following simple circuit and hot water in a cup gave very sensible results - measuring the temperature of the water. Obviously the needle had to be adjusted for the first reading, but the others followed sensibly:



You may notice that, here, the needle/pointer used is that from the purchased meter; this is because the spindle diameter of the air core meter is very small, and the Isabella pointer will need plugging with some material (perhaps silicone) for it to grip, and turn with the spindle.

The thermistor probe supplied with the meter was then screwed into the usual place by the water pump, and the thread was OK. I didn't over tighten it just in case:

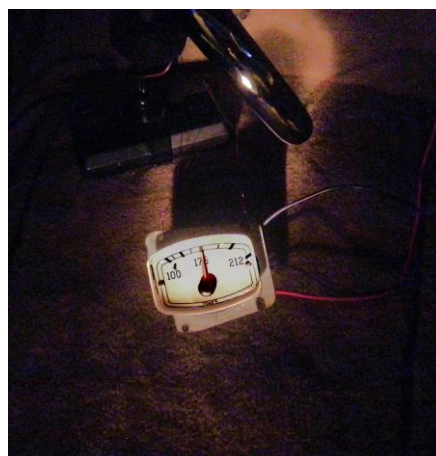


Ordinary plastic coated wire was used to go from the probe to the cab but, given that it has to pass along a hot cylinder head, PTFE coated wire would probably be better.

I tested it out on the road with the meter sitting on the 'gearbox tunnel', and it worked perfectly:



Switching on from cold: needle moves to low reading



Normal running - 175⁰F

Clearly this is not as good as having the original but, if one is desperate, or if repair of the Bourdon gauge becomes infeasible, this repair may be a useful option - especially if one has a spare temperature dial (so as not to cannibalise a potentially good one). Instead of paying hundreds of pounds, one can do it for less than a fiver.

One thing to note is that this does not provide a warning light/switch for occasions when the temperature goes too high - which the original Bourdon gauge has. If this was required, either an extra sensor and switch (like those used for a radiator fan, set at a high temperature) could be used, or the current in the thermistor could be 'sensed' and some electronics used to 'fire' a relay. But that's a project for another day.