

Are Our Zs Unique?

We all like the fact that our Magnettes have full instrumentation, i.e. fuel, oil pressure, ammeter and temperature gauges. However, the Z Magnette is unique in that the temperature measuring system like none other I have come across. So we do not want to get rid of them when they go wrong.

It is almost impossible to buy a new temperature transmitter and this, together with the mention of these items in last year's Magnettics, prompted me to look deeper into the situation. My first job was to borrow a Stock of old transmitters, and gauges from Warren Marsh.

The Problem

The engine, as we know, works better when it is hot but not when it is boiling, which is often a condition indicated on the temperature gauge, caused by a defective transmitter. If a correct radiator cap is fitted and no water or steam is coming from the overflow then the temperature gauge is misleading us and the water is clearly not boiling.

Gauge and Thermal Transmitter How They Work

The gauge and transmitter are of the hot wire type. They both have a coil of fine cotton covered wire wound around a bimetal strip. As current flows through the wire it heats up and causes the strip to bend. This happens in both the gauge and transmitter at the same time

Everyone will have observed that the gauge on the Zs reads hot with the ignition off and engine cold, i.e. in open circuit. This is by design: it could easily have been the other way round. My tests on many transmitters and gauges show they all have a resistance of approximately 25 ohms. When ignition is switched on the gauge needle goes to the cold position and is determined by the resistance of gauge and transmitter. Both are adjustable. The gauge is electrically connected at all times, i.e. it is a continuous wire from one connection to the other. This means it seldom goes wrong.

It is a different story for the transmitter; the drawing shows what is inside and how much can go wrong. The brass sleeve is in two parts, the centre flange used to hold it in the engine by a threaded sleeve nut. The brass sleeve can be split by heating the solder joint at the flange, with a suitable iron. This reveals three very vulnerable points:

- the wire connected to the outside screw relies on a scraping spring to make a connection.
- a brass spring is used as another scraping connection to make the circuit to earth through the engine.
- a pair of contacts which open when boiling point is reached, making the gauge read hot, (same condition as ignition off).

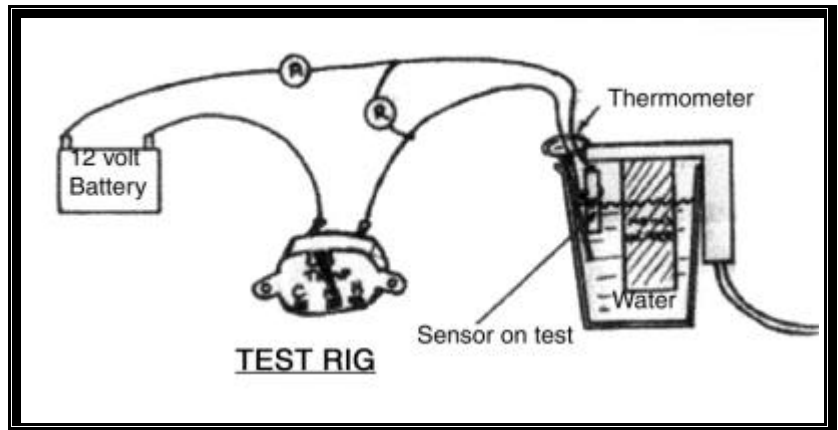
The transmitters were obviously of older design than our Zs and manufactured by Smiths Instruments before the first Z left Abingdon factory. Air was not evacuated from them, so over many years a film builds up on the inner surface of the sleeve causing resistance at the scrapers to rise. Thus the gauge reads incorrectly. Also a resistance builds up between the points so that they can show open circuit, when the gauge will read hot all the time.

What Can Be Done About It?

I calibrated the gauge using a travel jug, industrial thermometer, two multi-meters and a 12-volt battery (See sketch). The ammeter shows the current flowing, and the resistance meter (on ohms) is only connected when the battery is disconnected

Method: - Heat water to normal engine temperature - I used 80 to 85 degrees. On the rear of gauge find and remove two blanking plugs. Now the needle can be set to normal (this is done when manufactured). Only a slight turn with a tiny screwdriver will move the needle. However, this operation is unlikely to be necessary as the fault is almost certainly to be found in the transmitter.

So, to the transmitter. Be brave, take courage in both hands and



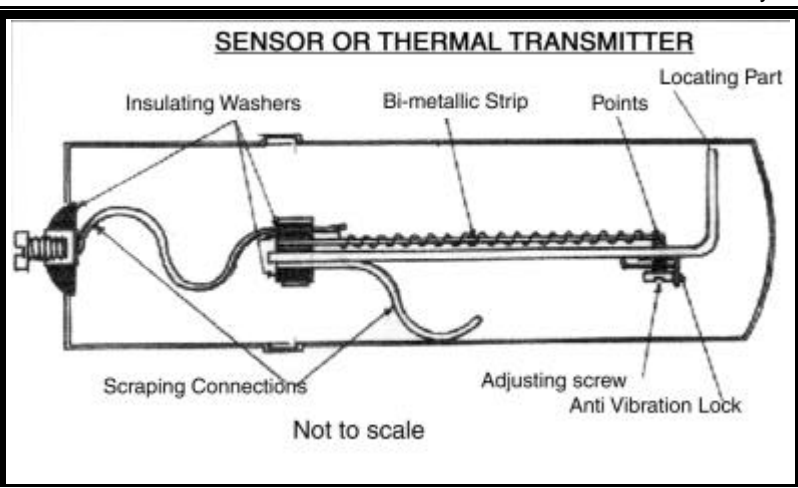
split the sleeve into two parts by using a large soldering iron. Remove the inner part. Clean both scraping connections, including inside the sleeve and cheek resistance. If the latter is still high, clean the points, but not with an abrasive as they do not burn or pit. Card should do the trick.

The resistance of the transmitter rises, as it gets hotter. When it reaches 100 deg C the points open and the gauge needle goes fully to hot, (our open circuit situation). Adjustment is by means of a small screw. Turning it in (clockwise) does not make the gauge read colder. It will stay the same because the reading depends on the resistance of the Wire, due to the temperature of the water. Turning it anti-clockwise will mean the points will open more easily, hence an earlier warning of over heating. There is an anti vibration lock to stop any variation after setting up. By the way, cleaning usually does the trick so don't get carried away with the adjusting. Finally the transmitter must be assembled, the sleeve being re-soldered.

It goes without saying, before you take any of the actions described, check that it is really the instrumentation at fault and that the engine is not actually overheating, but I could go on forever about that and I don't want to tell you what you already know.

Maybe someone out there has a draw full of brand new transmitters marked "Smiths Motor Accessories LTD, England, part no. TT1200/01-12V" and save us all the trouble.

Roy Smallbridge



Reproduced by kind permission of the author and the MG Car Club Limited. The original article was published in Safety Fast in July 1999. Safety Fast is the magazine of the MG Car Club Limited and is available free to members. Subscription and back numbers are available from The MG Car Club, Kimber House, PO Box 251, Abingdon Oxfordshire OX14 1FF UK.