

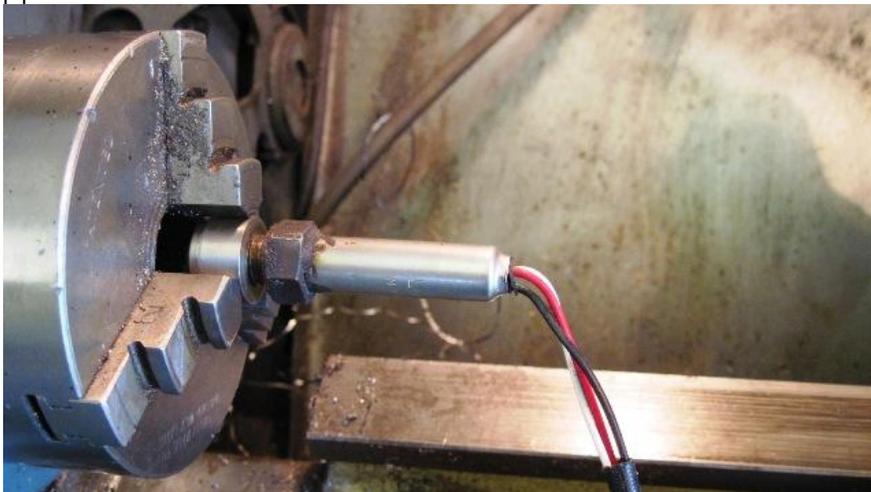
## MGB V8 Roadster restoration project – Report 37

Thursday 11<sup>th</sup> June 2015

Not much done since last week. The 'black cloud' came down on Tuesday and lasted until Thursday morning. Most of the time spent hiding away in bed. At least it helped with the so called 'No Smoking'. Even missed out on the Saga Louts night out on Wednesday evening.



The down pipes with the threaded collars ready to TIG weld into the exhaust down pipes.



Checking that the oxygen sensor will fit into the threaded collar before the collars are welded into the exhaust down pipes.

Note that the oxygen sensors on the RV8 are 3-wire. This means that they have a heating element in them to bring them up to temperature quicker than the 2-wire type. They are also different to many oxygen sensors on the market. If you need to replace them you need to get the correct type. I believe, I read that Toyota used

the same type that Rover used and are cheaper, but don't believe me. Check before you buy.



TIG welding the collars into the exhaust down pipes.

**D-I-S-A-R-S-T-E-R D-A-R-L-I-N-G !**



The TIG welds looked a bit cracked. When Pedro welded the collars in he said the two metals did not seem very compatible. I gave the welded in lugs a bang with a hammer to check that the weld were OK and this happened! Back to square one.



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After cleaning up the mess I was left with this rather horrible hole in the exhaust down pipe. Nothing for it but to try and make the best of a bad job.



I wrote down a few ideas in my book of how to get over the problem. Decided that as I had a mild steel bend that had a section on it that would fit over the 2" diameter down pipe I would make two new collars for the oxygen sensors out of mild steel and weld them to plates made out of the larger section of the mild steel bend.



I cleaned out the jagged holes as best I could. Made the new collars in the lathe and threaded them as before. These would be welded to the sections of 2" plus

diameter pipe that I had cut into two pieces longitudinally. I drilled the holes as before with a stepped drill for the collars to fit neatly in.



The patch was now ready for welding the collar into it, the patch could then be welded over what is now a much larger hole than they should have been, in the exhaust down pipe. Never mind - these problems come to try out my patience and get me thinking. It least it stirs up the old grey matter in the brain!

### Friday 12<sup>th</sup> June 2015

What, nothing done on the MGB? Other mundane stuff seemed to get in the way of getting out in the garage. At least the grass got cut. Last night, in the pub, John felt a bit better after his 3<sup>rd</sup> lot of chemo and threatened to come round tomorrow and give me a bit more enthusiasm. He says he is getting withdrawal symptoms from not working on the MG for some time!

### Saturday 13<sup>th</sup> June 2015



My MIG welding doesn't look as neat as it used to 20 plus years ago!.

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John turned up with the headlamp and spotlight off his damaged Golf, for me to repair the broken plastic brackets. After this I finished welding the new collars and plates on the front down pipes for the oxygen sensors.

I have found a bit more about oxygen sensors. They were originally an invention of Volvo Car Corporation in the mid 1970s. The sensing element that Volvo pioneered consisted of a "zirconia" (zirconium oxide) ceramic bulb coated with a thin layer of platinum. Over ninety-five percent of all cars that use oxygen sensors use zirconia, but the Rover 14CUX system doesn't use zirconia sensors. Instead, it uses "titania" (titanium dioxide) sensors. Although they're technically more accurate and faster reacting, titania sensors carry a premium price. Many Nissans and some Toyotas have also been equipped with titania sensors. Zirconia oxygen sensors provide a fluctuating voltage output between 0.50V and 1.00V. Titania sensors do not create a voltage signal - instead they provide a resistance signal between about 20 kilo-ohm, for a lean mixture, and about 1 kilo-ohm, for a rich mixture. The Rover 14CUX ECU provides the sensors a low-current 5 volt supply and measures the resulting voltage drop across the sensors. So, if you measure DC voltage across the Oxygen Sensors while the vehicle is running, by connecting a voltmeter between terminal 4 and terminals 23 and 24 respectively, you should expect to see voltage readings that vary between 0.50V and 1.00V. Very interestingly, the voltage reading will look similar to what you'd see with zirconia oxygen sensors. There's a subtle difference however. On a Rover 14CUX ECU vehicle, a 0 volt reading means "lean" and a 1 volt reading means "rich", this is the reverse of what you'd expect on most other vehicles. An unexpectedly low average voltage readings may indicate an air leak, a contaminated injector, or low fuel pressure. Unexpectedly high voltage readings may indicate too high fuel pressure, a leaking injector or injectors, or a saturated carbon canister. If your meter has a "min-max" feature, you can also use it to check the range of oxygen sensor readings - which is actually a better test. Replace a sensor that doesn't go below 0.300 volts or above 0.700 volts.

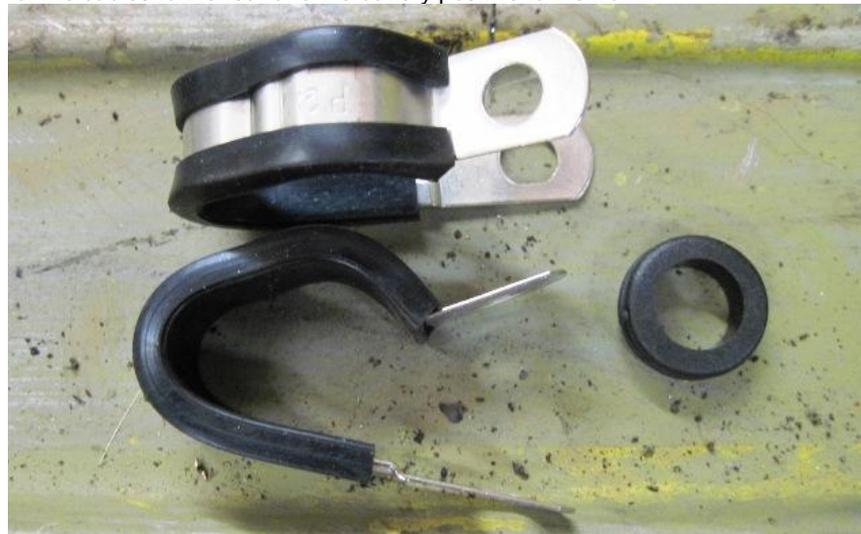
**Note: Oxygen sensors need to heat up before they can be tested meaningfully.**

Exhaust gases are released by the engine in rapid pulses. When working properly, an oxygen sensor should be able to sense and report changing oxygen levels very rapidly. How fast an oxygen sensor switches from high voltage to low is measured in "cross counts" per second. The higher the number of cross counts per second the better. EFI computers typically expect to see eight to ten cross counts at 2000 RPM. If they don't see enough cross counts they typically throw a "check engine" light. You can also visually inspect the tip of an oxygen sensor much like you would inspect a spark plug. Black sooty deposits indicate a rich mixture. White chalky deposits indicate silica contamination. This is often caused by using the wrong type of gasket sealant when reassembling an engine after a repair. The sealant emits a gas which is cycled into the combustion chamber by the PCV system (positive crankcase ventilation). White gritty deposits, or green deposits, can indicate antifreeze contamination that can be caused by a blown head or intake manifold gasket. Dark brown deposits are an indication of excessive oil consumption, either from a defective PCV valve or from a mechanical problem such as worn valve guides or piston rings. The oxygen sensors on my MGRV8 engine are marked Lucas 3LS, and NTK D3G. They have 3-lead pigtails that are 17" long, and the 3-pin connector, on the end of the pigtail, is unmarked.

The three leads are colour coded, red, white and black. Lucas 3LS sensors are actually made by NTK Technical Ceramics; apparently the only parts manufacturer in the world making oxygen sensors with 12mm X 1.25 threads. Totally interchangeable NTK sensors are available from Nissan for a much lower price than at the Rover dealer - the only difference is that you must modify your wiring to connect them. Any of the following Nissan part numbers will work - 22690-88G01, 226A0-40U60, 22690-61A00 or 22960-M210. The various Nissan sensors have different pigtails. The Rover/Lucas sensor cross-indexes to Bosch, part number 13946.



After lunch I did not feel like grovelling about on the floor fitting the exhaust system, so I went for some easy stuff. Fitted the rubber grommets for the cables and spaced out the double stainless steel clips to see where I needed to fit them for the cables to the rear and the battery positive to the front.



These double 13mm stainless steel clips for pipe work or wiring are available from Car Builders Solutions. 01580 891309 or [www.carbuildersolutions.com](http://www.carbuildersolutions.com)

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At last I managed to get the air intake pipe; I got made up, to fit through the radiator mounting panel at the correct angle. I must make sure that the radiator and electric fans fit before I weld the pipe in place. I made the pipe 3" long, but it would have been better to have made it 4" long. It is surprising how that when you mount the pipe at an angle, how much of the length of pipe you lose.



This should give the engine some nice cold and dense air. Cold air is denser than hot air and hence has more oxygen in it. That is why cars seem to run better and give more power on cold damp days than on very hot days.

**Sunday 14<sup>th</sup> June 2015**

Plans today are to fit the exhaust, try the radiator in position, tack the air pipe in position, if OK, blast and paint the screen vents that I bought at an auto jumble and check the price of a new RV8 throttle cable. If the cable is very expensive I will make my own up. I will have to try and get all this done by 1pm as Robert has threatened to drag me down the pub for a lunchtime pint or three! The rest of afternoon may then be laying on the settee having a snooze. It's hard work this being retired!



Yes, I did manage to get most of what I wanted to get done this morning. There I was having great problems trying to fit the exhaust tail pipe into the silencer on the left hand side of the MG. Jane had just gone out for a walk with the dog so she was going to be of no help! It just would not fit into the end of the silencer; I then



tried a drop of copper slip, still no joy. I was getting very out of breath and frustrated – then along came John! Although he was in his Sunday best, he held the tailpipe up at the rear while I tried to wriggle the pipe into the silencer; still no joy. Then a voice came from the rear of the MG "Why has this tailpipe got R/H written on it when you are trying

to fit the L/H tailpipe?" I changed the pipe for the L/H one and it fitted easily. I do sometimes hate these clever clogs! John then helped me with the other tailpipe and then left. When later I got down to the Black Boys with Robert, and walked in the bar, all the people in there turned around and held their left hands up and said – "What hand is this?". Bastards!

From now on I will try and send my reports into Victor every Sunday? As usual; any comments, motivation, help, suggestions, abuse or encouragement to - [mikemacartney@btconnect.com](mailto:mikemacartney@btconnect.com)