Roger Parker's TECHNICAL TIPS

FUEL PUMP AND MIXTURE ISSUES

Q Ref: American spec 1971 MGB roadster LHD

My car is fitted with new SU carburettors which I have balanced and tuned but the engine still doesn't run smoothly at tick over speed. It does however run very well at speed. The fuel pump looks like it is the original but is very noisy. It sounds like a compressor in the boot.

It has electronic ignition but the coil and HT leads could probably do with replacing.

I would like to fit the best option possible from your range of coils and leads you stock, can you advise the best options for me please? Also, what is the best fuel pump option that is easy to fit?

A Take the car for a drive and bring it fully up to normal working temperature. Then when back home use a brake pipe clamp attached to the fuel hose coming into the engine bay and clamp this off whilst the engine is idling to stop fuel supply. Note how the engine responds over the next five minutes or so as the fuel level drops in the float chambers, and specifically if the lumpy idle becomes smooth for a period and probably sees a slight increase in idle speed. If this occurs then once the engine has really started to struggle because of fuel running out, release the clamp and then repeat the test to see if the same occurs again.

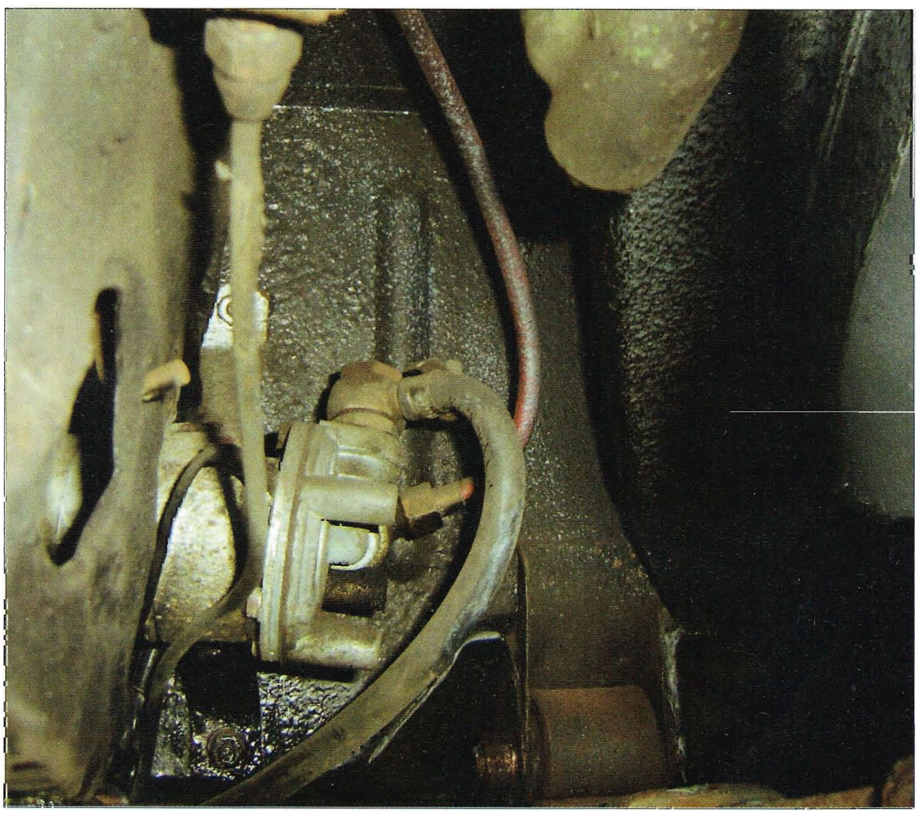
If it does show this pattern then it indicates that there is quite possibly too high a fuel pressure for the carb float valves to handle, and at idle when the engine fuel demands are least the fuel pump is forcing a little too much fuel past the float valves and so is raising the fuel height that richens the mixture and causes the lumpy idle. This would go hand in hand with the better running at higher rpms and with more throttle load as now the engine fuel demands are much higher and the oversupply from the pump doesn't have the same impact if any.

You can always put a pressure gauge in the fuel feed line and try and read the supply pressure which may show pulsing and it would be the peak pressure in the pulses that is the important reading. Normally an HS series SU carb float valve is happiest with around 2.5 to 3 psi and an HIF4 with up to 4 psi, but anything above these figures tends to see the float valves less able to deal with it and see added fuel bleed through. In more pronounced cases, usually when the float valves have a wear ridge on the conical seat, you get the valve sticking and the not uncommon leakage of fuel from an overflow at idle, but there are many more instances where the rise in fuel height fails to reach the overflow, but it does richen the mixture.

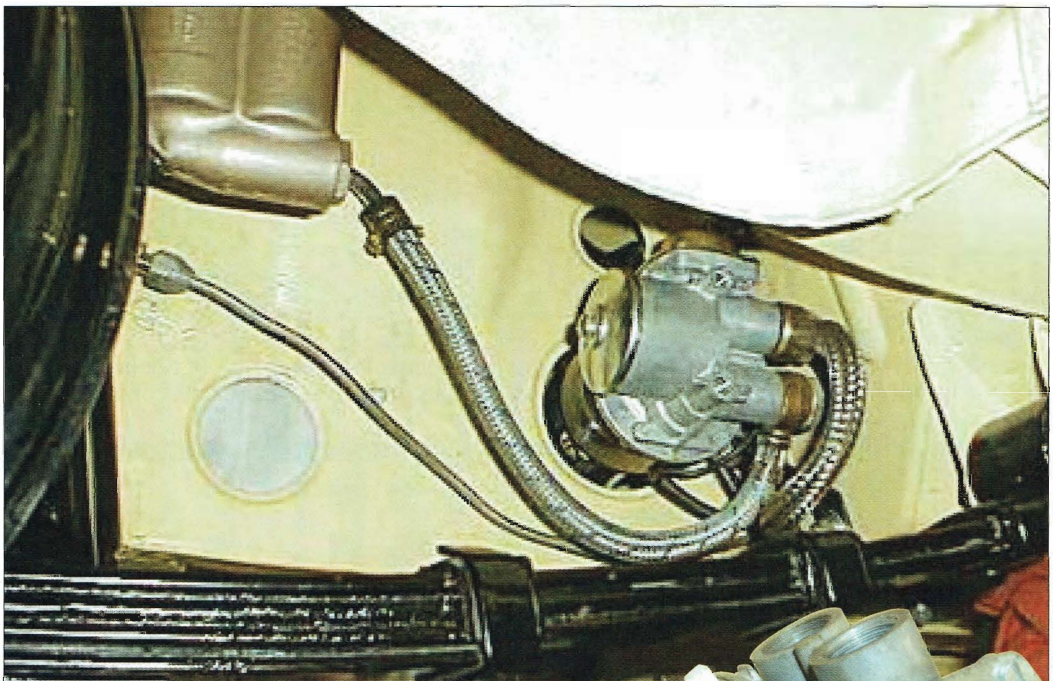
The above confirms one common issue that is much more likely to be pump related and not the carbs as they are new, so now to look at the pump in more detail. Clearly if the pump is delivering more pressure than the float valves can handle, and since it is noisy then this provides two very good reasons to consider replacing it with a new one. In terms of choice, I always recommend an SU pump as these are designed to feed SU carbs and you get less over supply issues that the carbs can't cope with. Over the last four decades I have seen instances where SU pumps can deliver too much pressure, but these instances are rare compared to the non SU pumps incidence of oversupply.

The pump should be mounted on the outside bulkhead that is immediately behind the right hand seat and the electrical end should project into the space in front of the right hand battery for more weather protection. The pump should sit in a thick rubber collar that in turn is held by a steel bracket with two stud and nut fixings to the bulkhead panel. The rubber should isolate all but a gentle ticking sound that is faster when demand is high and slow when demand is low. If the ticking is at a constant rate irrespective of engine demand then this is probably not an SU pump.

You can check the pumps output by timing how long it takes to deliver one pint of fuel from one of the feeds in the engine bay attaching a longer hose into a graduated container for the check. 30 to 32 seconds is the expected time for an SU pump in very good condition, less would tend to create oversupply and anything longer than 45 seconds would point to a tiring pump. With your engine running well at speed when the engines fuel demands are much higher this does tend

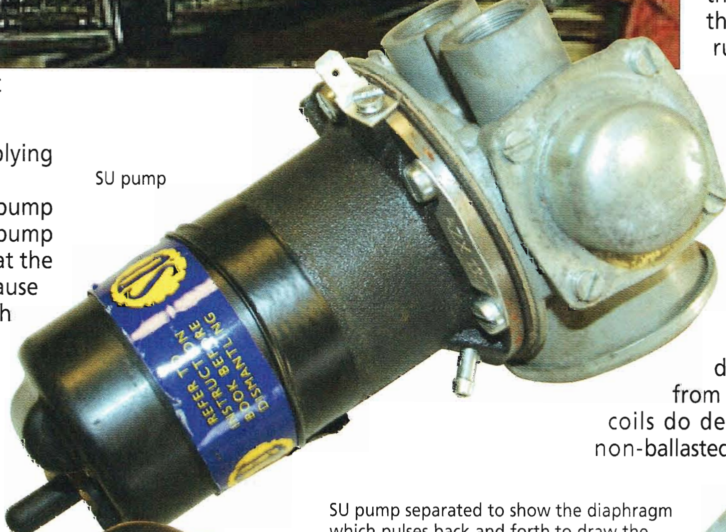


Chrome bumper MGB fuel pump is located just in front of the off side battery box


SU fuel pump on immaculately restored MGC

to indicate the pump is actually supplying plenty of fuel.

If the pump is a standard SU pump then replacing with another like SU pump is the simplest fit, although do look at the condition of hose connections because modern fuel takes no prisoners with old fuel hoses. Even if there is no obvious signs of external degradation the simple act of disturbance when changing the pump can soon lead to problems on old hoses, so if they look old you may be best advised to renew these too.


SU pump

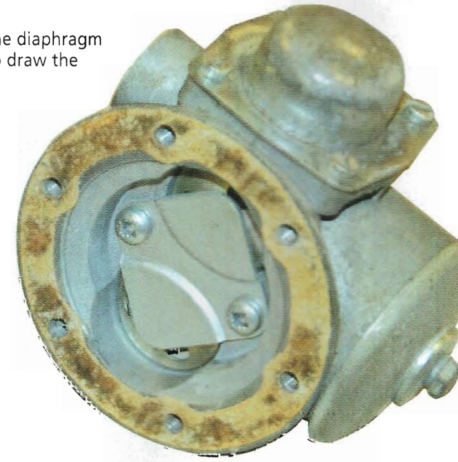
The good running at speed also indicates that the ignition system is working very well and that it would be unlikely that this is having any influence on the poor running at idle. I have no specific recommendation for replacement parts other than to note that you have electronic ignition and often these work better with a coil with a lower primary resistance. If the manufacturer of the electronic ignition system has a coil recommendation then I would follow that. Otherwise standard coils will all work well on a standard engine as none would be working at their maximum capability on a standard engine. Let me illustrate this by looking at coil operation.

The standard non ballasted coils generally deliver around 30Kv whilst sports, ballasted and other uprated coils will deliver up to around 40Kv. When the engine is running then the energy needed to create a spark on an efficient MGB engine tends to be in the range of 11 to 18Kv, depending on engine load, well within the range of the standard coils. If the batteries are well charged when you come to start a cold engine the drain of the starter motor will reduce the available voltage for the ignition system and the coil would deliver a significantly reduced voltage, but this is enough to start the engine without issue. On other occasions when the batteries are in a poorly charged state it is quite possible that the voltage drops to a level below the threshold to create a spark, or if there is one, it is too weak to start the engine.

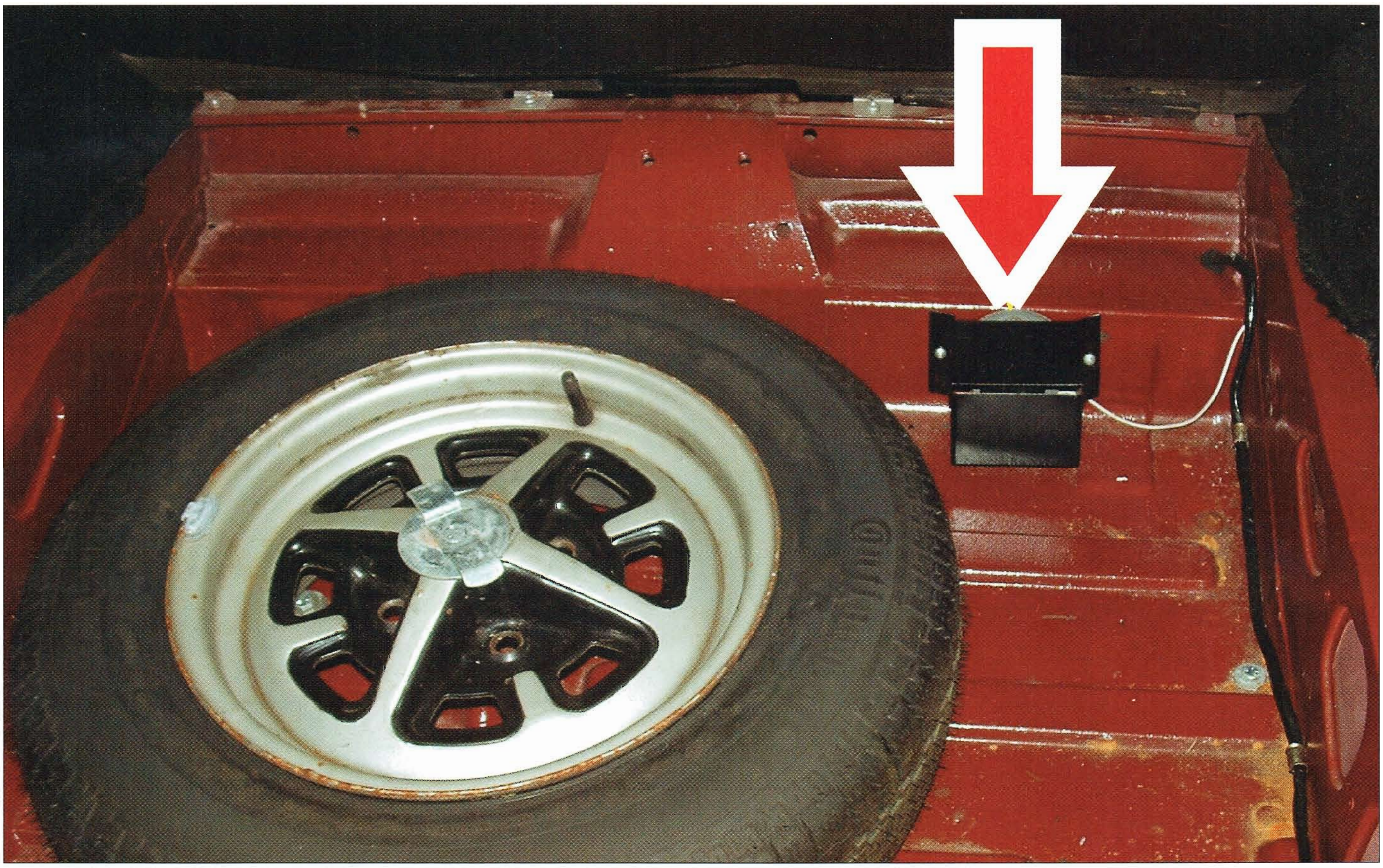
This is the scenario that led to the development of the ballasted ignition systems that were introduced on the rubber bumper cars mainly for the Nordic and Canadian markets with severe winters. Temperate climate markets, like the UK, really do not normally need the benefits of this system if all else is in good working order. The ballasted system sees the use of a coil intended to run normally with a supply of between 6 and 9 volts and to see this there is a resistive wire buried in the wiring loom to reduce the normal supply voltage to the coil.

During starting the maximum spark voltage is desired to give the best possible conditions for starting the engine and to help provide this there is a specific additional terminal on the starter motor solenoid that becomes live only when the starter is cranking. This terminal has a direct wire connection to the coil positive, and so during cranking when the system voltage is dragged down to perhaps 11v by the starter, that 11v is much more than the coil sees during normal running. Therefore during cranking the coil generates a significantly higher charge and so there is potential for a much fatter spark and easier starting. Once the starter is disengaged the original reduced power supply to the coil keeps the engine running.

That potential for the ballasted system to actually deliver a fatter spark comes from the fact that the ballasted coils do deliver a higher output than non-ballasted coils, even on their normal 6 to 9v volt supply, and more when the engine is cranked. This is also why rubber bumper cars have their spark plug gap enlarged from 0.025" to 0.035", the principle being that the bigger gap needs more energy to jump that gap, but it creates a fatter spark when it does jump. A point to note here is that most coils will supply higher HT energy for a fatter spark if fed with a higher voltage than it is designed to run with, but the coil will only work for 15 to 20 minutes before it overheats and stops working.



SU pump separated to show the diaphragm which pulses back and forth to draw the fuel through

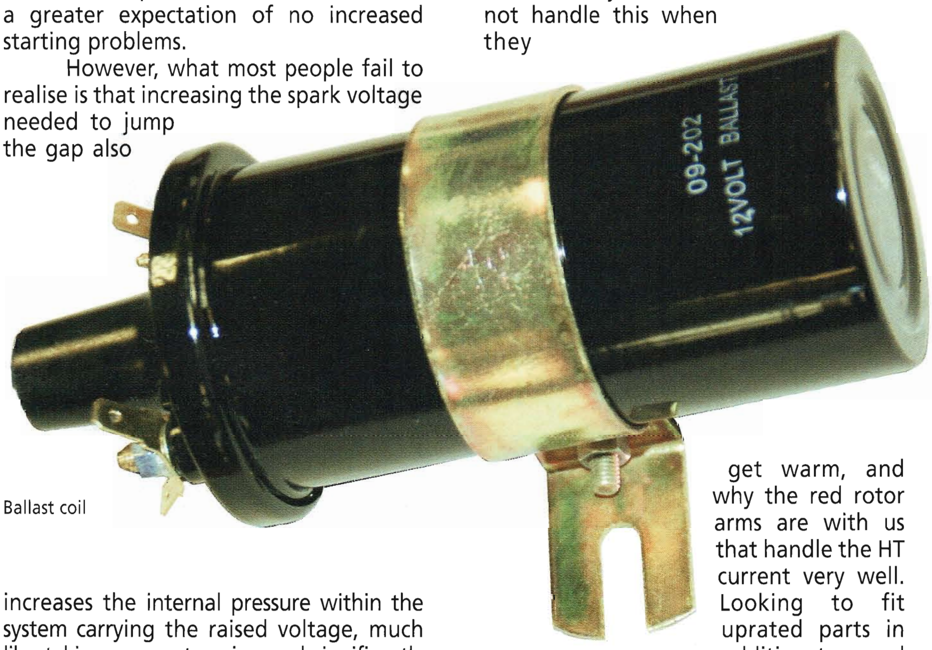
This bigger plug gap and fatter spark principle can be made to work for chrome bumper cars by fitting a higher



Late rubber bumper MGB with fuel pump located in boot

output (non ballast) coil such as the sports coils, except it will not have the cranking advantages of the ballasted systems. These coils, like the ballasted coil has a higher peak output and so the previous 11 to 18Kv voltage range needed to jump the enlarged plug gap will be increased, but as the coils maximum output is also increased the margin between coil maximum output and engine requirements remains much the same, so in adverse conditions when coil output is reduced there remains a greater expectation of no increased starting problems.

However, what most people fail to realise is that increasing the spark voltage needed to jump the gap also increases the internal pressure within the system carrying the raised voltage, much like taking any water pipe and significantly increasing the water pressure and hoping the pipe and joints can handle the increase. In HT terms the current is going to exploit any weakness and go to ground the easiest route it can find, and so you do not get a spark at the plugs and the engine will not run, or runs with a misfire.



Ballast coil

Here the rubber bumper cars running the bigger gaps and need for higher voltage transmission shows that standard HT leads, distributor cap and rotor arm can cope with these increased demands, although as many owners have seen there are too many standard rotor arms that do not handle this when they get warm, and why the red rotor arms are with us that handle the HT current very well. Looking to fit uprated parts in addition to a red rotor arm can be beneficial, although there is little option with distributor caps.

Uprated HT leads on the other hand are available with a range of options and silicon leads does offer better insulation and longer life than original carbon core leads, and much better suppression than earlier copper cored leads even with suppressed caps, so are a worth while fit.

As an illustration on the potential differences between poor quality, cheap leads and more expensive high quality leads, I just have to refer to my experiences when first running my B after fitting the fuel injected V8 in 1986. The car featured off the shelf leads bought from a local motorshop at the going rate at the time of a pound each (£9 total). With the engine run as 2000rpm to bring the temps up and provide less stress than allowing it to warm up just idling, I suddenly noticed an occasional hiccup that became more and more frequent.

It was then I noted that the HT leads at the plug ends were starting to melt and several had started to collapse in a blob over the plugs. They simply couldn't take the heat in a no load situation, and with no bonnet fitted, so that was a wasted £9. The result was that I spent a significant £36, four times as much, on a set of brilliant NGK leads that are still on the car today having shrugged off many very hot rolling road sessions and normal driving. Unfortunately NGK ceased selling these specific leads many years ago, but there are good alternatives from the MGOC Club Spares that I have recently fitted to a new project GTV8.