TEE-ONE TOPICS

Number 77 July, 2008

ARE YOU GETTING THAT SINKING FEELING?

I borrowed a friend's '72 Shadow some time back and given my vast age started to wonder why I had this black bar that seemed to be cluttering up my vision of the road ahead. Turned out to be the steering wheel! I cranked up the seat or at least tried to and found that that resource was all used up! Trundling over to my good friend Steve the upholsterer I explained the problem. A nice man, but tends to patronise me. This time he was true to form. Reaching in he grasped the front seat (nomenclature note for those that don't know, that is the bit you sit on – the back is known as the squab), wrenched it out, inverted it and without so much as a by-your-leave plunged his finger through the rather frail hessian and ripped it open.

My first reaction was that we had opened a rats' nest. There was a general infestation of what turned out to be crumpled foam rubber right through the seat. It was, it seemed, disintegrating!

There were no rat droppings.

This is really a job for an upholsterer but as I am a firm believer in understanding the work and skills of specialists such as Steve if only to understand how much effort is involved, I asked him to photograph the task of repair. These follow with notes. The result was wonderful. I was once again driving with unimpaired vision, could look down again on the latest monkey-glanded Mini Minors and not feel I was going to suddenly decamp to the passenger's seat half way around the next sharp bend! The cost, currently, for the two front seats, about two tanks of fuel!

The springs having devoured the protective hessian were quietly eating the nicer sponge rubber the latter was protecting.

Thought to be a bit of an overkill, this bit is hand stitched. Most other manufacturers don't bother.

The heavier steel cross pieces are the 'chassis' of the seat. The actual springing is an ingenious woven network of springs that are tied together and interwoven. It should be remembered the beating our seats take. Not only do they soften the ride vertically but they have to hold your derriere in place while you are driving. And then there is the plonking of 100 plus pounds of flesh flung onto the seat and dragged sideways to get in position!

The 'hog ring' used to hold the leather cover in place. These are removed with the aid of side cutters and a strong wrist. The evidence of partial removal can be seen here!

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The leather itself when not fed, cracks on the underside and literally chomps on the foam underlay. Here the damage is repaired with inlays

Stripped to the chassis with protective covers on the wearing bits, springing repaired where necessary.

The calico wrapping had rotted and was about to disintegrate.

The cover almost off showing the moulded rubber horseshoe glued to all that is left of the original hessian.

The basics having been repaired and wrapped, re-assembly can be completed.

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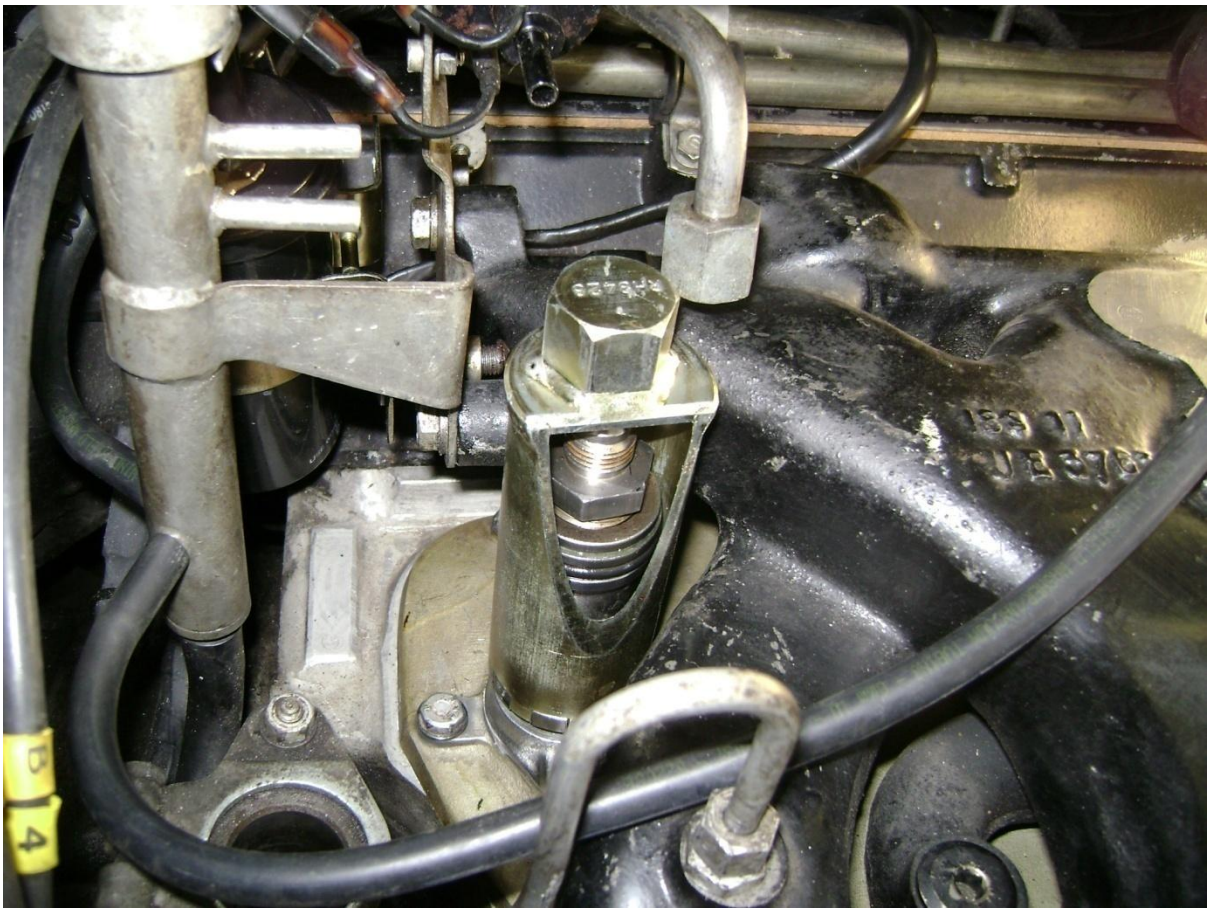
Before

After



TO BUY OR NOT TO BUY

The enquiry often arises on web forums ‘do I need special tools’ for a particular job. Of course it depends who the ‘I’ is that is enquiring and what do you mean by ‘special tools’. The old company was notorious for recommending special tools for almost any operation on its cars and of course charged a handsome price for their supply. A lot of them would be developed for producing the cars and these augmented by some imaginative manufactured equipment, would be available exclusively to their Dealers. One of the possible ‘dividends’ that came out of the company sale was the apparent release of this equipment, at it would seem reasonable prices.

I write this because some little time ago I had an injected Spirit with a front hydraulic pump that simply would not! I trundled the old thing to one of my mentors taking a removal tool I had had fabricated and he set about removing the idle item. Despite the book saying that these pumps should be tightened down to about 35 ft lbs torque there are operators who are bent on containing a nuclear explosion thereunder or so it would seem. The pump would not budge until my friend produced a five foot long persuader. There was a sickening crunch and my tool converted to a modified pretzel. Not daunted, he produced his tool also fabricated, applied the persuader and crunch the thing came undone. The fault incidentally turned out to be a bit of swarf under the top valve!

The joy at getting it all going again was somewhat dampened as I gazed at my ravaged tool for which I had paid some $300 to have made. Clearly the steel had not been strong enough

for the job. Predictably a friend arrived with a brakeless Corniche and the first thing I needed to do was to remove the pumps. I called my spare parts mentor in Sydney, he ordered a factory pump tool which arrived some few days later and my Corniche friend and I applied the new item and it would not budge. This tool interestingly also cost about $300! The solution was to return to the book-detailed procedure when the car was first made. This clearly involved removal of everything on the engine above the cylinder block with the exception of the cylinder heads! The following montage gives some idea of the work involved.

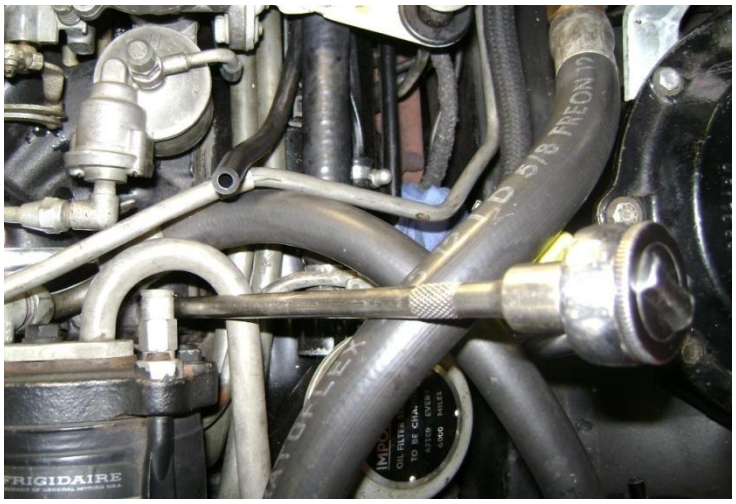
Step 1 was to remove the bonnet. This takes two people and two spanners (preferably ratchet), a blanket on the roof (of the car that is) disconnect the engine lighting wires and the earthing strap and carefully placing the bonnet on top of the car!

Undo the drain tap under the radiator and drain the coolant since you are going to remove the intake manifold which should be full of liquid!

Exhaust the brake accumulators by pumping until the lights come on and your leg hurts.

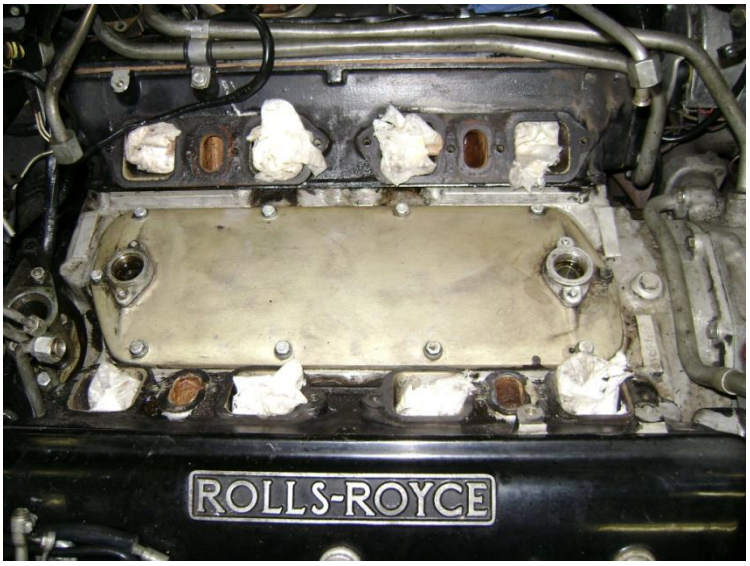
And here is the legendry $300 bolt that holds the whole fuel supply setup on top of the intake manifold. The bolt should you need a new one can be bought for $5 at your local nut shop! Here the aircon compressor has been unbolted, the front bolts are usually metric and the whole unit carefully tied over to one side. The dip stick has been withdrawn and the induction air trunk holder removed from the 'A' bank cylinder head. The more eagle-eyed among you will have realised that the front pump has already been removed. This engine actually had another problem to be discussed later.

The fuel lines have been disconnected at the carburettors, the choke solenoid removed and laid to one side, various wires disconnected, the two choke stove pipes disconnected and ideally removed and the whole assembly lifted clear. This is a great time to clean the gunk out at the back of the engine!



Can I digress for a moment? The three nuts holding the rear of the compressor seem somewhat hidden. This is the time to invest in 3/8" drive sockets and small spanners. The old ½" equipment was the best they could manage in the days of yore given the metallurgy of the day.

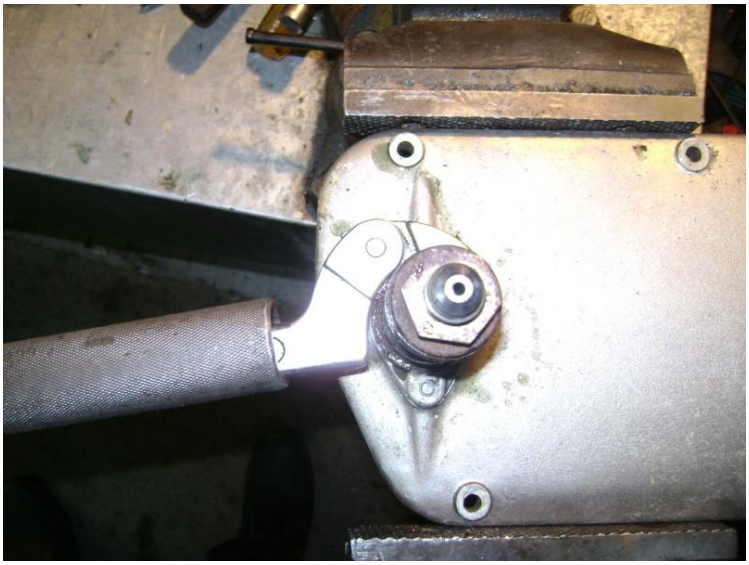
And if you haven't got a wobbler extension (see below) get one! These ingenious bits allow you to get around obstructions to get at bolts and nuts



Well the intake manifold has been unbolted and removed and if I had taken the right picture there would have been two pumps sitting in those holes. As you know they have castellated bases which can be gripped by a 'C' spanner and unscrewed.

Imagine going through all this, repairing the pump or pumps putting it all back together and finding they didn't work. And so they designed the special castellated tube spanner which at three hundred dollars whether you have it made or buy it has got to be a real bargain.

Valley cover removed. Note the hydraulic cam followers/valve lifters which can be removed at this point. They are held in place by tappet blocks bolted to the main engine block. The exclusive cams that drive the pumps are arrowed.



And here is the 'C' spanner in action. The valley cover has been removed because the pump was so tight I was worried I might ruin another expensive spanner. There is a full jack handle on the end of that spanner!

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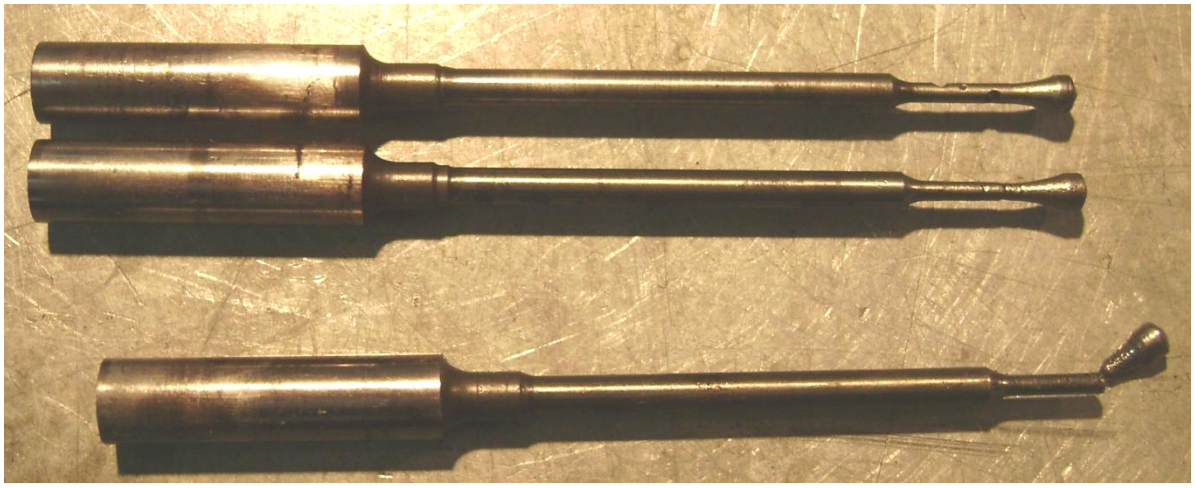


PUSH ROD BLUES

The one noise the most mechanically averse owner of a post ’66 Rolls-Royce is familiar with is the clicking of the hydraulic pumps. This is pretty much normal. When the things are operating at full chat they are poking a good tablespoon of brake fluid up a pipe to the accumulators against pressures well in excess of a couple of thousand pounds per square inch! The fluid initially goes through a regulator on its way to the accumulator and if the latter appears to be full the fluid is re-directed to the reservoir. Very very rarely this little sorting out does not occur and the redirector doesn’t and tries to continue sending the fluid to the well pressured accumulator. These latter spheres planted down the sides of our engines are very robustly made but one would not want to keep raising the pressure just to see what would happen!

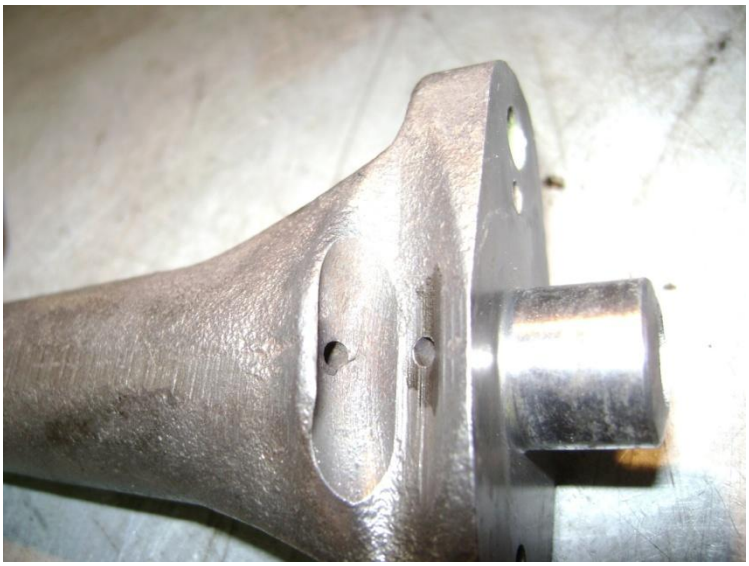
The pumps as you now know are driven by exclusive cams on the cam shaft. Cam followers ride on the cams and riding on them are dinky little rods some of which are pictured above and these in turn push the internals of the pump up. The less confident among you will be waiting for advice on the safety valve to prevent a possible catastrophe if all this doesn’t work as it should. Well those little rods are just that. Note the waisting of the rod near its bottom end. When the pressure gets too great there is the most gentle snap and the pump stops. A perfect example is pictured at the bottom of the picture above.

Have a good look at the upper two rods and you will see small indentations in the waisting. This is caused by corrosion which clearly weakens the rod. This is what broke the bottom rod, not some romantic runaway pump!

At left is a common view of the rear of the valley cover with a

nicely exposed pump mount and there sitting in the middle is the top end of the push rod. From time to time the pumps are removed because they get a bit of detritus in their valving or they corrode through neglecting to regularly change the fluid. It is when they are out that the push rod can be extracted with a strong magnet and checked for corrosion.

The push rods ride in cam followers seen at left in the up-turned valley cover of an early ('72) Shadow. Since they are practically running under oil they seldom wear unless the camshaft itself breaks down in the case hardening. The two bolts securing the holder to the cover are locked with tabs. These obviously have to be replaced if they are undone. Lubrication on these holders is via holes drilled in the castings near the top flange.



A close view of the lubrication holes. These simply clog up in a dirty engine. There are two holes as seen here which point to the centre of the engine and one hole on the other side.

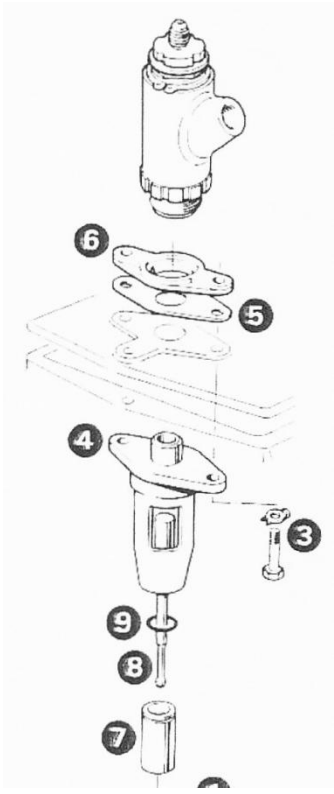
The material these holders are made of is relatively soft. They tend after years to stick in the valley cover casting. They should be pressed out with a soft mandrel otherwise the mouth of the 'guide' will cave in and the thing will need machining!

There is one other hole of interest seen here drilled through the valley cover. Sometimes the pump is allowed to wear so much that it actually leaks internally through its base into the threaded adapter bolted to the top of the valley cover. From there it drains through the small hole seen here into the tappet chest and mixes with the oil. An excess of brake fluid in the oil

usually plasters the internals with a varnish like film!

Later engines used an improved holder seen at left. They are readily applicable to early cars. Lubrication is clearly not a problem. The build up of oil sludge in the cam follow sitting there with its mouth open should also be minimised with the amount of oil sloshing around. Note the groove machined in the top neck of the follower. This is to receiev a small 'O' ring after the follower has been poked through the holder. When you then invert the whole assembly to put it back on the engine the followers don't drop out. For the earlier fittings a use grease to hold them!

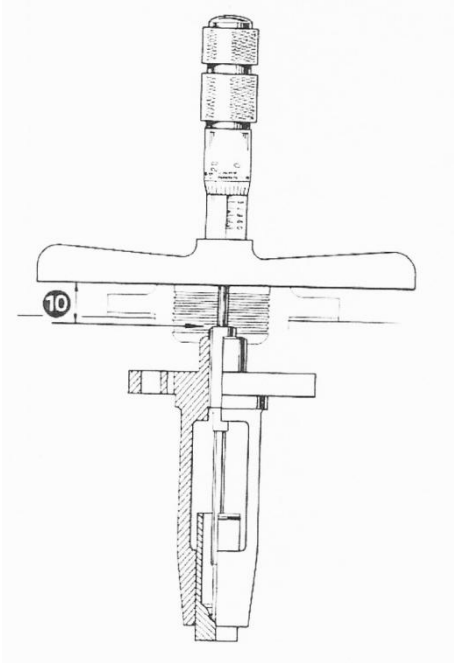
At right are all the bits to work the pump – minus the pushrod. Interestingl y the cam follower you will note has a groove in the top but with the original holder there was no access for the rubber ring. Presumably the designers were thinking ahead!!!??? To the right of the holder is the mounting ring for the pump which is held in place by two bolts screwed from under the valley cover.



The height of the pump above the cover dictates the clearance between the pump plunger and the top of the pushrod which must be a factor of the traditional click! To adjust this clearance the mounting ring is raised or lowered by shims also seen in the picture.

At left is a view of the setup in very much later cars but the assembly is essentially the same.

At right is the method of measuring the height of the pump mounting holder relative to the top of the push rod.

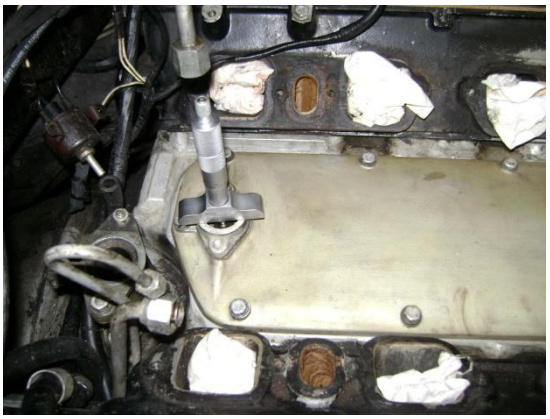


The first requirement is to turn the camshaft until the cam follower for the individual pump is on the back of the cam. A dial gauge is the quickest way surely. For those who don't have one, if you are going to do this job, buy one. China makes adequate instruments which sell at a reasonable price and now that you have seen the amount of work involved the cost of a gauge will be peanuts compared with paying someone to do it.

Please note that the cams for the two pumps are NOT synchronous i.e. they don't go up and down together so you have to do this camshaft rotating quadrille for each one!

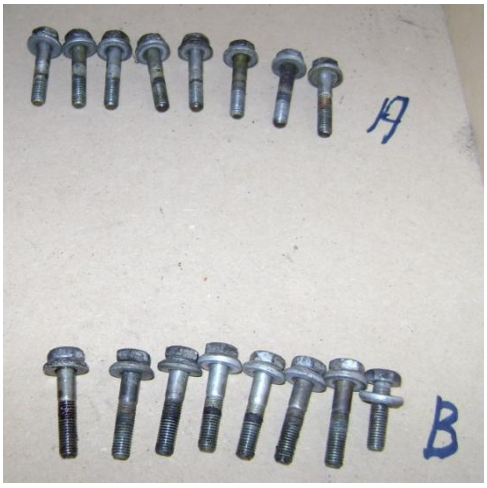
The embuggerance of having to remove plugs then get a grip on the engine is beyond me these days. I simply ensure the water pump belts are tight and use a chain wrench on the fan pulley. This does not improve the pretty paint but that can be tarted up later!

You certainly cannot turn the engine with the starter to get a dial gauge reading!

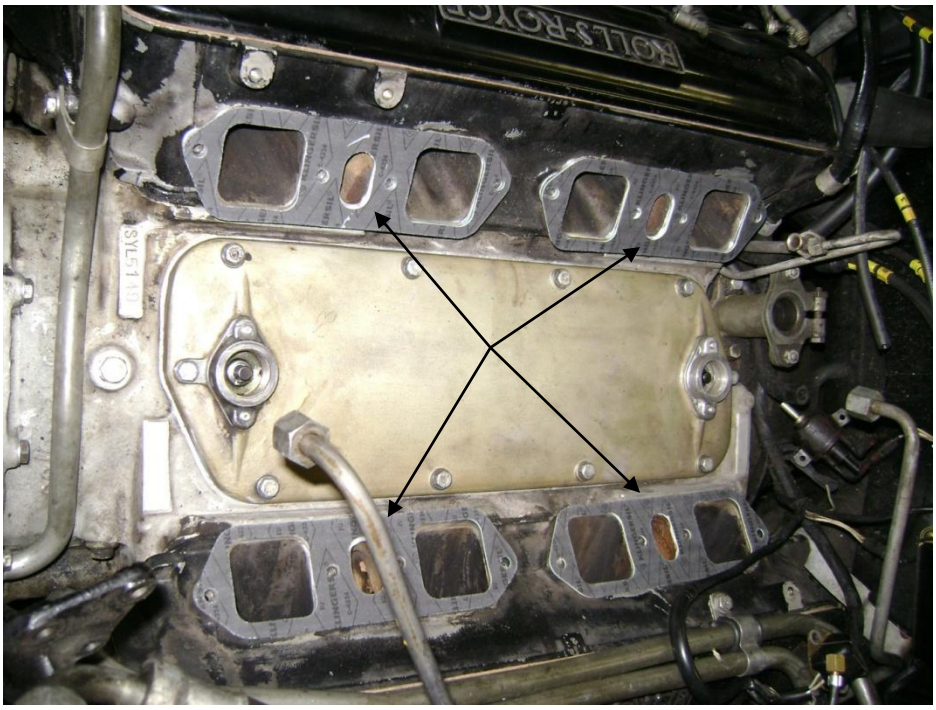


Measuring the depth of the pushrod when it is fully lowered requires a depth micrometer. The valley cover and block faces of course will be very clean and free of sealant and other crap. You might like to invest in an adapter for your drill to drive a socket wrench since screwing the

bolts in and out quite a number of times, can be boring.



A common trap for beginners is to not notice that the front bolt holding the inlet manifold to the heads on the 'B' bank side is shorter than all the others. Put a longer one in and you cut off valve lubrication for that side!!! Always use anti-seize of which there are a number of versions, when you re-assemble as a measure of respect for the next poor fool who has to undo them!



Having adjusted the pump mounts to suit the new pushrods, the valley cover is re-installed with a good and appropriate sealant – the legendry silk thread will not be necessary! Similarly use sealant both sides of the gaskets where the coolant flows (arrowed).

While de-gutting the top of the engine pull the throttle trapeze to pieces and clean and grease it. Put a clean cloth under it before you start as you are bound to drop bits.