TEE-ONE TOPICS

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DRIBBLERS

A lot of owners of SZ cars are blissfully unaware of what holds up their rear ends. If they have caught a glimpse of a couple of coil springs near the rear axle they have assumed that they are the source of comfort they have been enjoying. Actually the rear suspension on these cars was arguably the most comfortable of any of the old Factory's cars. This was achieved by compressed nitrogen and not springs. The springs that can be seen under the rear of the car are there as a last ditch stand to stop the rear suspension smashing itself in the event of the main system failing. And fail it does. But first the picture. The tube with the convoluted gaiter clamped to it is but one of the two rear struts in this case on an '87 Silver Spirit. It is these struts that not only hold the rear of the car up but also adjust to accommodate load changes as well as provide damping to the antics of the wheels.

Unlike conventional shock dampers these units are delivered dry and have no internal supporting springs or gas charge within them. The top 'fixing bolt' is actually bored and it is through here that pressurised oil is passed from one of the hydraulic accumulators on the engine. The pressure is sufficient to lift the car. The amount of lift is controlled by the height limiting valve(s) so that when the desired height has been achieved the flow is stopped and the supply line is effectively closed. This would mean that the body of the car would be riding on two solid columns of oil which is effectively incompressible.

Here is the strut removed and stretched out. Unlike shock absorbers these can be emptied of fluid simply by pushing the plunger up the barrel. Be very careful to assemble the rubber bushes spacers and separation washers in the correct order which is shown clearly in the workshop manual.

To provide a cushion a duct is incorporated in the circuit so that when the wheel (including the suspension arms etc) is pushed up, the oil is forced out through the duct into a gas spring. The latter at a glance looks exactly like the two accumulator spheres mounted on the engine, the difference being that they are bigger and have been charged at different pressures with nitrogen. The spheres as usual have a diaphragm across their mid section. One end of the sphere has the aperture for oil to enter and leave and the other has a sealed valve through which nitrogen is pumped to a specific pressure. The oil being forced into the sphere pushes against the diaphragm further compressing the nitrogen thereby providing a cushion on which the car rides.

The strut meanwhile which is brim full of oil has a rod poked up from below the bottom end which is securely bolted to the lower suspension arm. Internally on the top of this rod is a plunger. As the suspension moves up and down the plunger is forced through the oil via small valves. This slows its progress and stops the suspension having a hissy fit on rough roads. There is also an additional cylinder inside to provide the lift. Hydro pneumatic suspension has been used in a number of cars under license to Citroën. If you really want to understand its advantages and disadvantages as well as the development and history of the concept look at http://en.wikipedia.org/wiki/Hydropneumatic_suspension.

The workshop manual for some reason recommends removal of the gas spring mount seen in the picture when changing the gas springs. This is not only unnecessary as the gas springs (which in appearance are similar to the main hydraulic accumulators) can be screwed out of the mounts in situe. Apart from the awkwardness of removing the mount there is the inherent danger of damaging the 'O' rings seen here at the top of the strut. If they leak they will rot all the top strut mounts.

This is the upper mounting place for the strut located on the corner of the trunk behind the swing down panel covering the tools etc. There is no metal to metal contact at this end or at the bottom. The unit is mounted entirely in dense rubber bushes. At left is the feed point for the ram which needs to be disconnected for access to the gas spring

Here the strut has been inserted from below, the upper mounting plate and nut located and the latter tightened finger tight. The pin seen at 9.00 o'clock is poked through holes provided in the top plates and rubber as well as the upper mounting plate it also passes through the rubber mounts beneath the body and engages a hole in the top of the strut. This is all provided to stop the strut and the mounting bits spinning while the central mounting nut is tightened. It is not a bad idea to slip a suitable plastic cap over the 'O' rings to prevent any damage. The locating pin can be provided by the front brake pad locating pins which are discarded after each pad change. When all is tightened up the pin is withdrawn.

The last minor detail to mention in all these words is the little tube from the strut to the body seen in the first picture. Given the work the internals have to do in these struts some fluid (LHM) gets by the various seals. Rather than have them dribbling all over your nice terrazzo driveway, the stuff finds its way back to the reservoir via these little tubes. Since the whole strut is continuously wobbling it is well to keep an eye on these and renew them if they leak!

Here the bits are assembled to show their relationship. The large gap is where the assembly passes through the body. The upper rubbers have apparently been modified since the section surrounding the distance piece has been considerably beefed up over that used in early cars.

The reason for using the locating pin is to ensure the relationship between the gas spring mounting plate seen here at right and the fluid return pipe that connects further down, to the body. In other words on the left hand side the spring adapter has to point to the left viewed from the rear of the car while the return nipple has to point to the rear.

The only difficulty with this job is the nuisance of having to remove the battery master switch on the right hand side of the boot to get at the gas spring behind it. Before attempting this you will of course completely disconnect the battery won't you!

The gas springs are usually too tight to remove with a simple strap spanner and need the services of a chain wrench. Due to some incredibly careful design work the metal joining fold seen below and behind the spring is just high enough to prevent the chain wrench passing between it and the spring. This can be solved by a suitable drift and a thumpometer to bend the flange away from the spring. It can't be seen by any but the curious!

This is a great time to clean up the boot linings, they all come out except the covers on the wheel arches unless you want to have a go a re-gluing them to the body. More importantly note the fuel slick on the left hand side of the tank. This was the result of some tired gentleman putting a hose clip on back to front and being unable to tighten it. Fuel sloshing around has got out and dribbled down the tank behind the carpet. The hose is one of a number of breathers for the tank.

Have a good look at the screws and cup washers securing the linings to the body particularly the upper ones at the rear. 'Operators tighten the self tappers to the point of gouging out the metal and the screws are then loose. Slide on nuts are the answer here!

CHILD ABUSE

A friend rang to say that his young teenage children whilst playing ball had managed to smash part of the rear tail light lens on his Spirit. I'll need it replaced he said can you get me one (punctuation excused)? I phoned back with a price nudging $1500.

The police were very understanding and the children should be walking in a few more weeks with physiotherapy. The bumper seen below the light mount by the way is a mere $10,000 but then with the current financial climate, zeros are no longer very remarkable. The following may put it all in perspective.

How many zeros in a billion??? A billion is a difficult number to comprehend, but one advertising agency did a good job of putting that figure into some perspective in one of its releases.

A billion seconds ago it was 1959. A billion minutes ago Jesus was alive; a billion hours ago our ancestors were living in the Stone Age.

A billion days ago nothing walked on earth on two feet.

A billion isn't what it used to be either. The Yanks got lazy and named a thousand million a billion when it used to be a million, million.

This is a modern billion: - 1,000,000,000 this is the old billion: - 1,000,000,000,000. The latter is now referred to as a trillion which used to be: - 1,000,000,000,000,000,000,000,000.

Have you ever heard of the number called a Googol? That number has 100 zeroes next to it. A mathematician's young son named it such because of all the '0's it had.

This is what a Googol looks like if written down.
100,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000

Now there is googolplex which is a googol to the power of a googol. I'll stop there with apologies for editing the story from one of my correspondents.

HEADER TANKS AND STEAM VALVES

This incredible tank which graced the radiators of forty odd thousand SY cars was the Factory's solution to the need to keep the cooling system brim full and airless. Previously the post55 cars had a massive header tank soldered to the top of the radiator and the output of the water pump spouted a stream of very hot coolant all over the top of the radiator core. Inevitably the water was aerated in the process which did little for cooling efficiency.

With the header tank, the radiator remained full with an extra litre or so of coolant sitting above it. A good radiator cap screwed into the hole on the right (above) with a good rubber seal allowed no coolant to escape. To provide for expansion of the coolant a spring loaded valve sitting on a seal in the left hand hole was designed to open when the pressure rose above 15 psi. Coolant and/or steam exited via the overflow pipe, the opening for which can

be seen in the valve recess. When the system cools down the valve permits air to be drawn into the header tank to avoid the system collapsing. Later SZ cars went one step further and hooked the overflow into a non-pressurised bottle so that when the system cooled it sucked fluid back from the bottle rather than air!

So much for history. Very early cars used a large diameter steam valve, later cars a small one. The small steam valve will not work in the space designed for a large valve. The latter is no longer available. There are various makeshift arrangements which work very well but in the interests of original appearance my ingenious cooling guru noticed that I had a 'small valve' tank in pieces and suggested that we modify the tank on an early problem car using my spare tank. He is surely to be complimented on the finished result. At left is the brass casting removed from the tank above. The pictured below is the donor tank eviscerated.

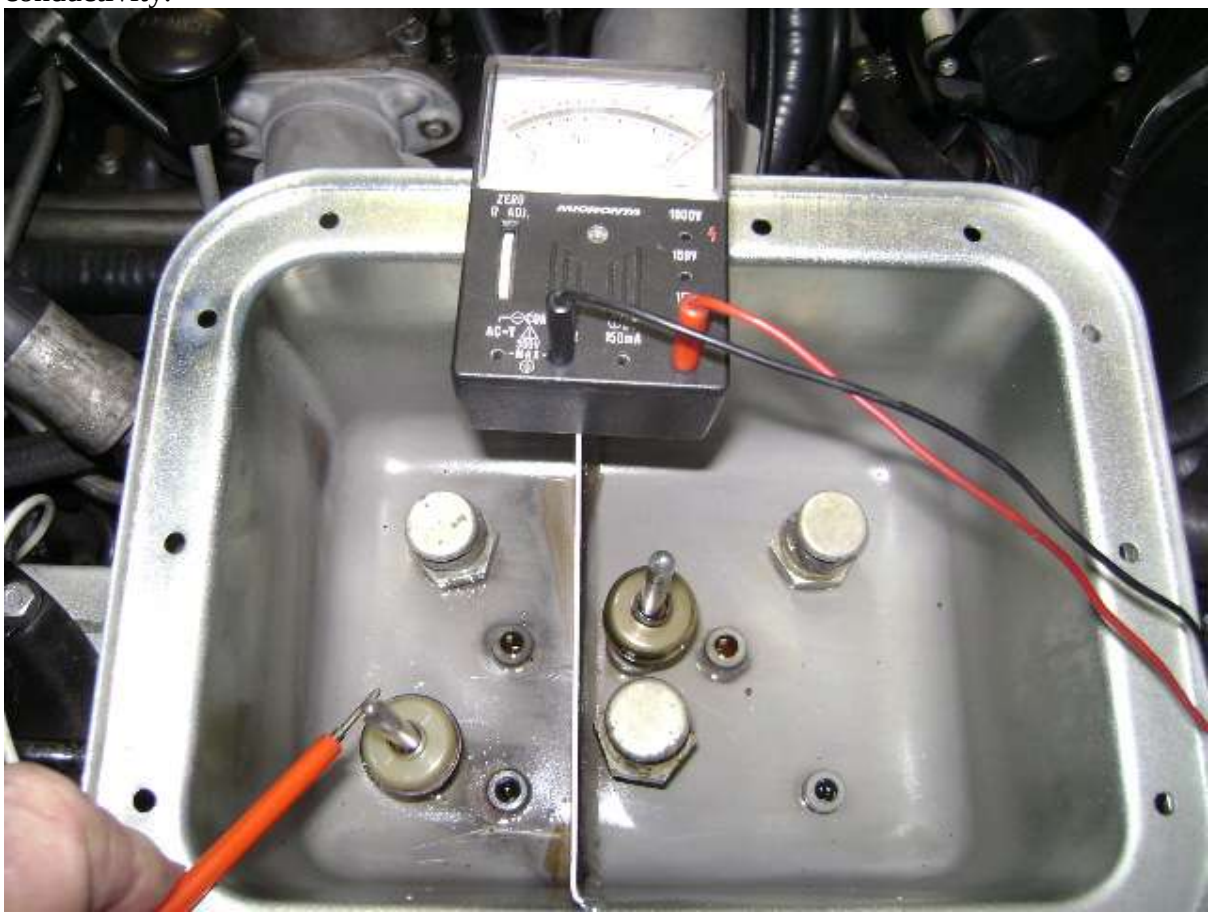
RESERVOIRS AND REED SWITCHES

Ever wondered how the little men in the Shadow reservoirs get to tell the blinken lights on the dash that things are getting a bit light in the fluid department? The secret is right above. The spike-like projections which screw in from below are reed switches. You of course would realise that there were switches since they have wires poked onto terminals on the underside. In fact now is a good time to make sure that the wires are indeed attached.

Next step towards preserving your existence through having brakes on demand is to pull these wires off the terminals underneath and earth them one at a time. The warning lights on the dash board should light. If they don't check the globes, if they still don't there is a circuit problem. Assuming you have warning lights that work the next step is to check that the switches work.

Two types of reservoir float. The ring magnets can be seen clearly. The floats rarely leak but it is worthwhile checking them.

There is nothing unique about these fittings, they were invented before WWII and are used in many domestic and commercial applications. Basically they are two metal flexible strips (the reeds) in a tube, in our case made of metal. One strip is fastened to the base of the unit and provides an earth and the other connects to the insulated terminal at the bottom of the switch. The whole thing is sealed after being filled with inert gas to prevent corrosion and promote conductivity.



Testing the switches empirically. The meter is set to 'ohm,' to give continuity. One wire is attached to the probe and the other to the terminal under the reservoir. Moving the float up and down the switch shows the switch opening and closing illustrated by the continuity meter registering.

If the two strips are subjected to a magnetic field they come together and complete a circuit. This is achieved practically by threading a circular magnet over the switch. The strips inside only extend an inch or so up the body of the switch. Inserted in the reservoir, which is filled with brake fluid, a plastic float is threaded over the switch. In the base of the float is glued a small circular permanent magnet. With a full reservoir the float remains on the surface at the top of the switch, the magnetic field being well above the switch strips down at the bottom. With the ignition on, there is a live circuit though the warning lights all the way to the terminal on the base of the reed switch. When the fluid level drops far enough the float drops to a point where the magnetic field in its base affects the metal strips in the switch and they come together. This connects the 'reed' from the base terminal to the earthed reed, the circuit is complete and the lights come on the dash board.

There were several iterations of the reservoir during the production of the SY series. This was one of the more elaborate on a '72 model. The filters are just below the filler holes. Later versions had a simple mesh filter right across the top of the main body which was held down by the lid. The flat baffle was used in various forms. Its main task was to damper the inevitable sloshing around of the brake fluid as generated by the movement of the car. The other function was to try and reduce the area of fluid exposed to the atmosphere in an attempt to minimise the absorption of water vapour. One problem with this arrangement was the floats catching on the baffle. This was later overcome by having the floats operate in tubes.

The reed switches are very reliable. With age however they lose their flexibility and can become permanently switched 'on' or off. Their function can be tested empirically. The other fault is the little ring magnet which gets tired of soaking in brake fluid, the glue holding it to the float dissolves and the magnet falls to the bottom of the switch switching it 'on' full time. The solution here is a little superglue and all should be well again. Lastly the importance of fitting the float with the magnet side down will be seen.

THE LITTLE RED LIGHT

In the automotive world of survival, these little safety lights (this one has been removed for repairs) on the trailing edge of post55 cars would have to take the prize. The body of the light is rubber and the lens is glass, yet it stands slamming a zillion times and even the globe seldom fails. To change the globe very carefully prize the whole lamp out of the door bearing in mind that it is old rubber. If you stretch it unduly the lens will

not stay in place. Having got it out the bulb holder can be gently eased out of the back of the main rubber body, the baseless globe changed and the whole thing carefully re-assembled and replaced in the door. Do not drop the lens – it is glass!

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ON SPARE PARTS PRICES

I suppose all of us have faced the interrogation from the kerb 'Ermuchwasit mate, owfastdtgo and 'evyonpetrolmate?! Very seldom do I get asked about the price of spare parts. Rolls-Royce and Bentley are not unique in creative spares pricing, nor do I suppose should they be. Long ago it was realised that profits were not made from making cars, but were made keeping them on the road and more specifically in providing bits to keep them there! Among a small band of luminaries I spend quite a bit of my retirement time on the Club Forum http://au.rrforums.net/cgi-bin/forum/discus.pl?pg=menu which hopefully most readers would recognise through their own pursuits.

I hope that most would have learned to recognise professional piracy and find alternate sourcing, but at the same time realise pursuit of a cheaper alternative of a specialised part can be a very hazardous exercise. A good instance of this is the engine coolant thermostat. This is a specific design for our vehicles and as far as I am aware there is no equivalent item. They are expensive to replace and despite a suggested life of two years they seem to hang on a respectable time. To try to adapt a 'conventional' thermostat to the engine is equivalent to employing a crowbar as an alternative to prosthesis for a lost art! And when you consider that you are dealing with a $30,000 engine???????

A few weeks ago I had the misfortune to lose a bunch of keys which included the key to my mate's Lexus. The key has the expectable open and close the locks function and a 'panic' button which does something resembling Poulenc on the car's horns! The car was due for a service so I casually mentioned that they should get in a new key to replace the lost one and get it 'programmed' when they had the car! Surrounding faces blanched, 'are you sure' was the query, the new key was $550! I repeat: the key!. Ok so it has an inbuilt feature that monitors our bank balance, general disposition, and generates remarks about the car and the style of driving! But then talking to the fixit man (I only occasionally open the bonnet of the Lexus to check that the engine is still there) he tells me that if you lose the keys to your Toyota Camry and they have to install a new ignition lock etc the bill is in excess of $3000!!!!!!!!!!

No doubt the new Phantom can command such prices but for a common garden car (albeit well made and designed) surely that is over the top. I do realise that when the Toyota Gods get to read these lines they will be apoplectic with concern and summon me to Nippon immediately first class on the newest A380 (one that doesn't have fuel line problems please!!). OK if that is the scene – oh and our Lexus has an inoperative outside mirror - $2000.00 thankyou and be assured it will be colour co-ordinated! But what really grinds my alimentary tract is that this sort of thing never gets addressed in these glowing reports in the media about new models. Maybe the journalists would never get to drive the new creations if they did, but to buy a car on journalistic recommendation with these large time bombs ticking away in them is not what I would call responsible reporting on a vehicle! 🛠