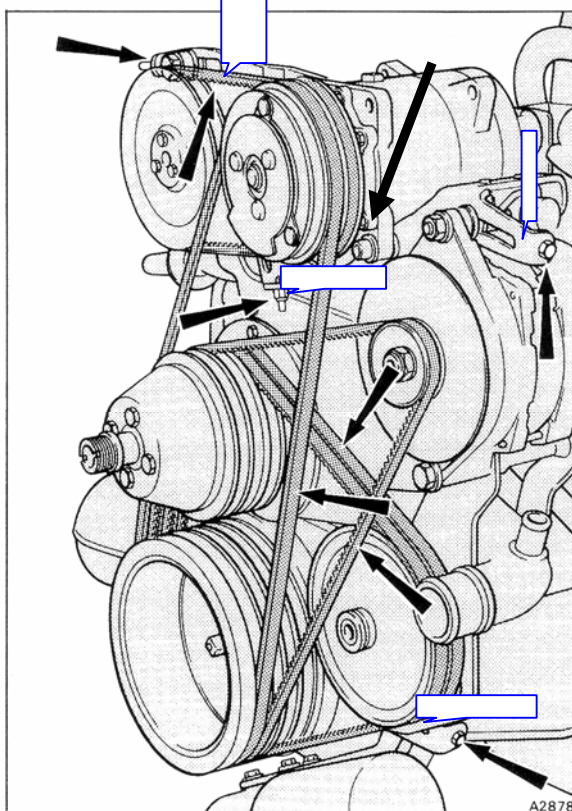


TEE ONE TOPICS

December 2005

CHANGING THE BELTS ON A FUEL INJECTED SPIRIT

Gone are the old Mark VI days when you loosened the adjusting nut on the generator together with the two mounting bolts underneath, swung the generator over to the engine and levered the fan belt off. Undoubtedly they have but I have never heard of one breaking. They were the real pre-war

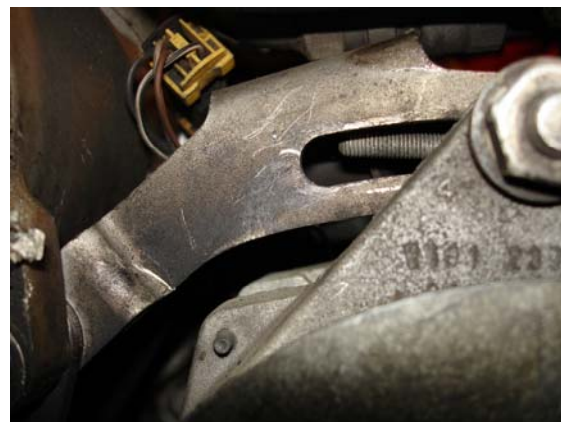


tractor item and even when loose would still seem to get enough grip to keep all the gubbins spinning!

Actually the Rolls front end on the 87 Spirit which I have recently wrestled with is not so bad when I look at today's cars which have belts so long they could double as a tow rope. But I found looking at the Factory instructions saved me a lot of looking and possible mistakes. The big change with fuel injection was to fit a different power steering pump which now roasts under the alternator. The old pump used for many years on Shadows and the earlier Spirits was just too tempting to lean on with a crow bar to tension it. The inevitable dent followed.

I have doctored the drawing with blue call-outs to show where the adjusting points are. Fortunately they have provided screwed adjusters given the tensions needed to drive these things. The extra large arrow on the lower mount of the air-conditioning compressor is a hexagon head bolt carefully placed behind the compressor belt. It is very very tight and will

need a long Allen key chucked in a holder and turned with your favourite ratchet to remove it. Next down is a picture of the rear lower mount for the compressor (arrowed). Note that you are working with metric spanners here. The nut is approached from under the compressor from the other side.



If you have a seeing-eye Gerbil to help you, you should avail yourself! Incidentally the bath plug and chain cover is the first of the engine management system diagnostic ports. You just plug your box of tricks in there and it will tell you everything! To the right below is the adjuster for the alternator.



FAILING MASTER CYLINDERS ON A SILVER CLOUD

It all started – as the say in the Carter Brown Novels of yesteryear, when the owner complained of a



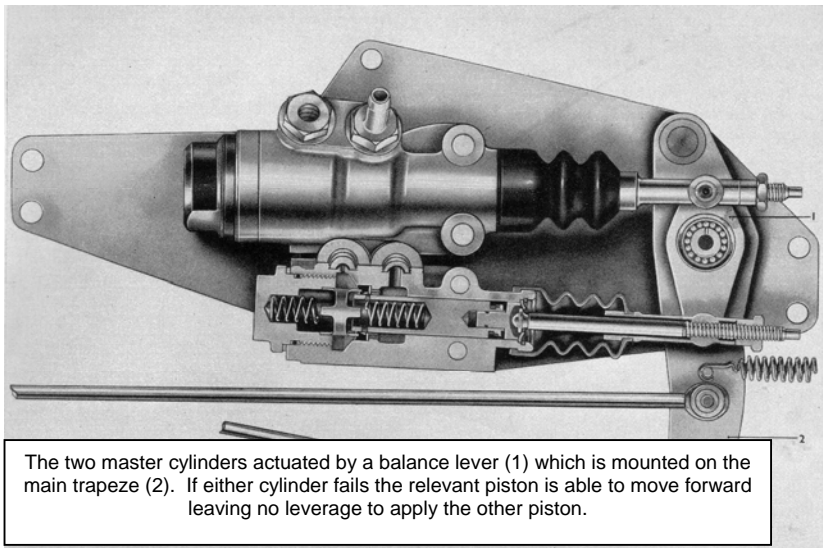
‘wooden’ brake pedal. The car would stop but with a feeling to me that the only thing doing the stopping were the rear linings and then per medium of the mechanical brake linkage. Crawled underneath and found the trapeze right forward and the servo wound up so far it had actually bent one of the drag links pulling it over the servo shaft!

A not particularly good picture looking from the business end of the master cylinder on a Silver Cloud. The bridge piece that wears is seen with half a dozen replenishment holes in it and the end of the sleeved cylinder can be seen behind it

Pulled the trapeze back and applied the brakes with a stout lever through the

bottom linkages and lo the brakes were very nice and hard and neither master cylinder was leaking. It was a puzzlement. Both cylinders had been re-sleeved with stainless steel and beautifully finished internally some months before so clearly the new seals I had fitted were faulty and fluid was able to get past them back to the reservoirs. What was interesting was that the lower or smaller master cylinder which operates the rear shoes on the front drums and nothing else, in ‘failing’ had allowed the upper master cylinder which operates the rest of the brakes to move to the rear and effectively not apply any pressure at all! So much for triplicated brakes.

I was able to get the lower cylinder off by unscrewing the operating rod from the trapeze and re-kitting it. Put it all back bled the system, sailed out on to my 30% drive which even the mountain

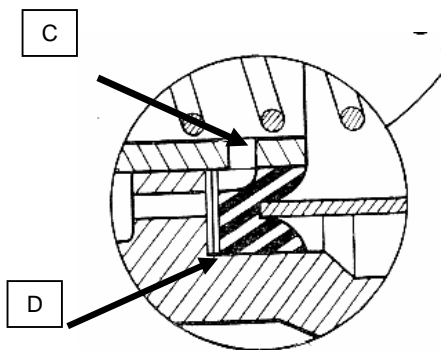
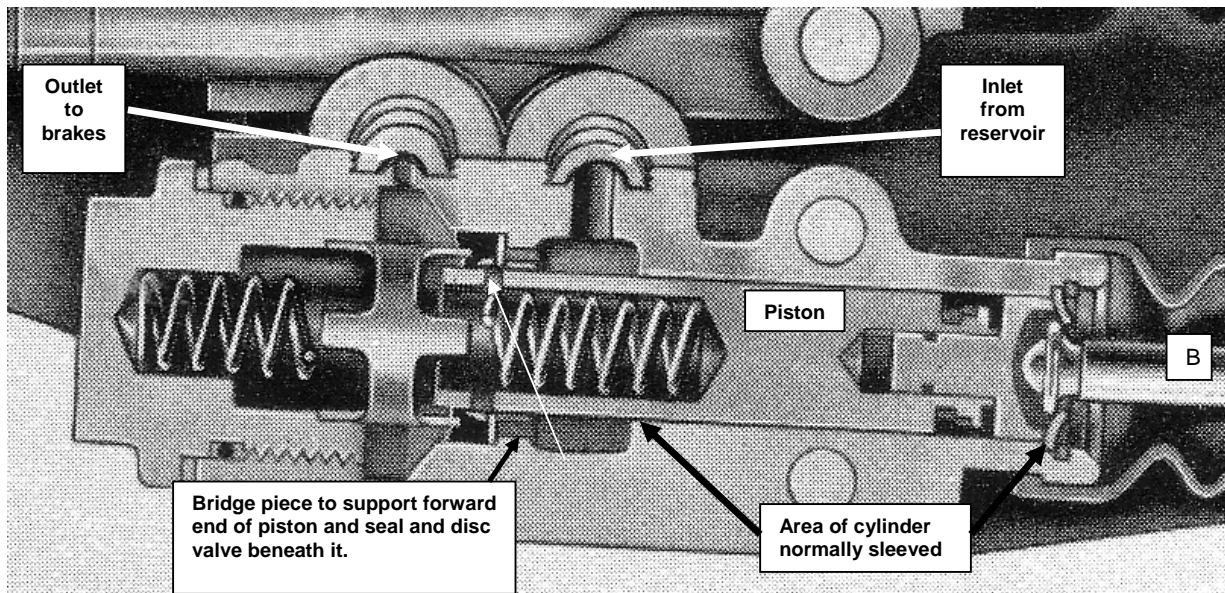


The two master cylinders actuated by a balance lever (1) which is mounted on the main trapeze (2). If either cylinder fails the relevant piston is able to move forward leaving no leverage to apply the other piston.

goats avoid and slammed on the brakes. The car nearly stood on its bumper bar. Sitting half way down the drive with my brake foot firmly planted I mused that in years gone by I would have lit a cigarette and gloated to myself that one more problem had been overcome. Then the blasted thing started to move. Further pressure on the pedal and there was a crunch and eventually I realised I was

not going to be able to stop as I was relying entirely on the mechanical linkages.

Crestfallen and furious I climbed under again. Blasted lower cylinder had again apparently collapsed but there was no external leakage.



Above is a blown up version of the cross section of the lower master cylinder. Here the piston is fully returned rearward by the spring. When the servo pushes the piston forward more than half the piston relies for support on the small bridge piece on which the main seal sits. The diameter of the hole in this bridge piece is the same as the cylinder but past practice has been to only sleeve the main part of the cylinder. The bridge piece undoubtedly wears so that when the brakes are on hard there is considerable pressure on the piston and it is thought that the forward end 'bends' slightly, disturbing the main seal and releasing the pressure. The solution presented by one of my principal mentors is to sleeve the bridge piece at the same time as the main cylinder or simply carry the cylinder sleeve through to the bridge piece. If the latter is done holes must be drilled in the sleeve near the inlet to allow replenishment. It is also important to leave a little free play at the back of the piston on the lower cylinder. If this is not done, the piston may not return completely and the replenishment holes 'C' will be blocked off by the seal 'D'. The detail of this situation is shown in the blow-up.

Note that for new travellers in these realms, the first two series Clouds enjoyed only a single master cylinder similar to the above.



A GUIDE TO AVOID DAMAGE FROM THE TROLLEY JACK VANDALS ON SZ CARS

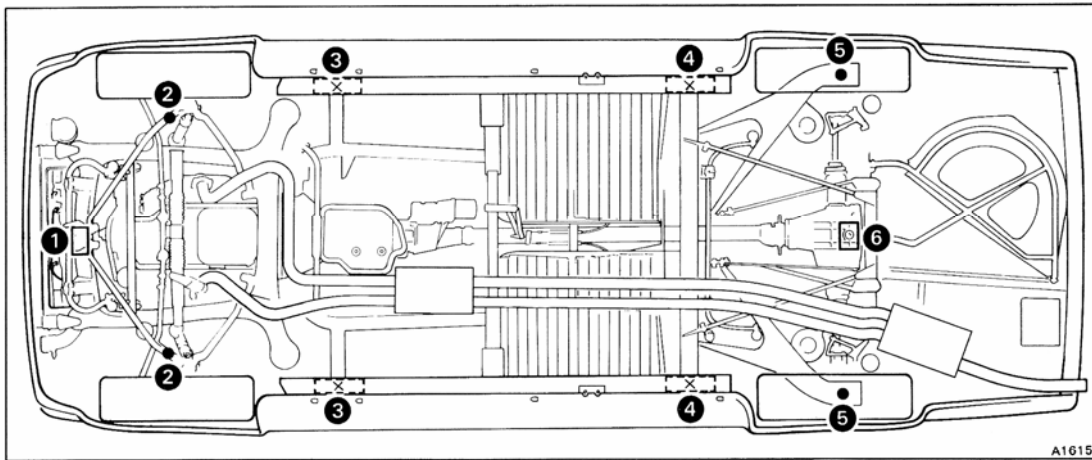


Fig. A8-1 Car jacking positions and support locations

- | | |
|---|--|
| 1 Trolley jack position (front) | 4 Car jack and sill block positions (rear) |
| 2 Car stands (front) | 5 Car stands (rear) |
| 3 Car jack and sill block positions (front) | 6 Trolley jack position (rear) |

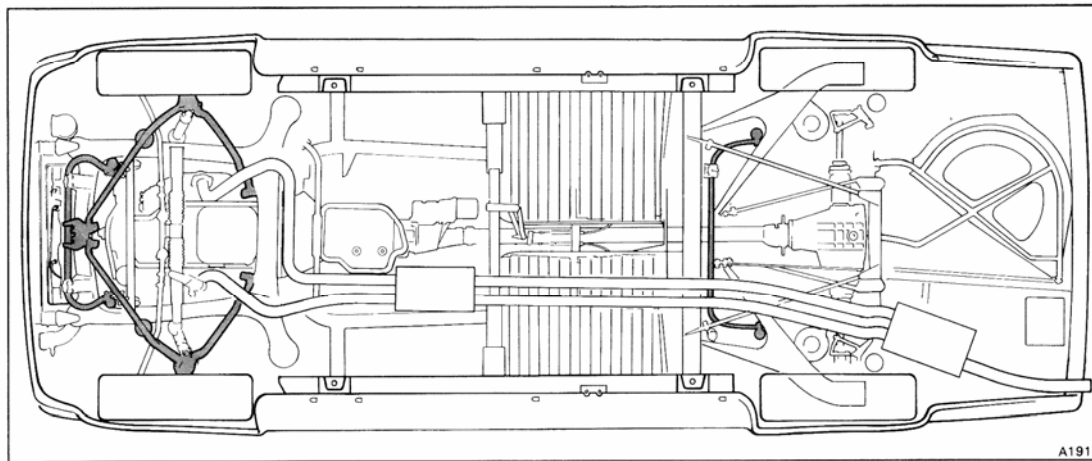
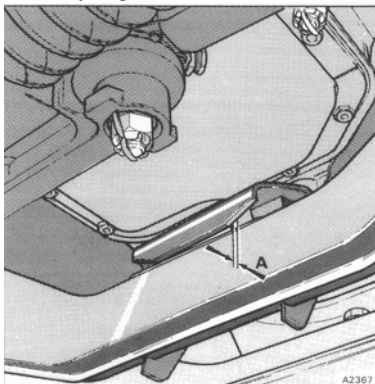


Fig. A8-2 Suitable suspension members for securing when transporting

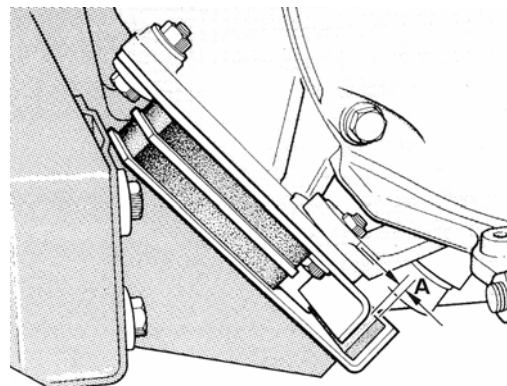
SIGN OF THE TIMES

At left is the familiar 'stop plate' adjustment on the front engine mount which was first used on the Silver Shadow. This is avoid the engine during panic stops, noisily eating the radiator core usually destroying the fan and the header tank for good measure!



The dimension 'A' you will remember is .060" - .090".

But with engine development there has been a need for a stop plate to stop the engine up-ending itself! The dimension

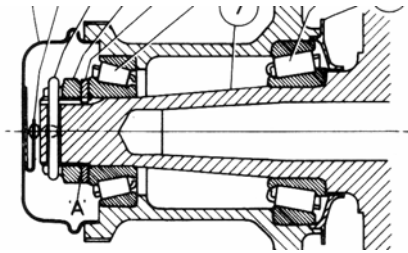


in the second drawing applicable to 1989 cars is •158"- •256". And just a reminder that when your change or remove the rear mounts be sure to scribe their position so that they can be put back in the same place. Richard Treacy had the unnerving experience of a mechanic setting the mounts to low and jamming his steering on acceleration!!



VANDALISM AT THE HUB

This is such an old chestnut but it is still happening. For many many years Rolls-Royce have put earthing terminals inside the covers of the front wheel bearings to carry away any static charge that may build up in the front wheels, brake drums and rotors. A simple 'U' shaped piece of spring steel is riveted to the inside of the bearing cap and a rubbing button is riveted to the other end.



And here you see the set up. There remains a problem in that the nut that holds the wheel on needs to be locked to the axle with a split pin. And this is what some cretins do!

One doesn't have to be a chartered engineer to work out how many revolutions the wheel has to do to neatly slice off the earthing terminal. The result is pictured below!



Clearly the head of the split pin has to enter one of the slots on the nut but then the legs of the pin can only open along the axis of the stub axle as above.

The solution is to twist the pin before inserting it by clamping the split end firmly in a vice about an inch from the head and using a small adjustable shifting spanner turn the head through 90 degrees.



Put this modified pin through the hole in the axle and the pin will then fold nicely around the nut. The purists would want to tuck the end of the pin into the slots. The size of the split pin by the way is 5mm at least 4 inches long which you can buy at specialty fastener places. When you find out where to get replacement earthing terminals and rivets let me know.



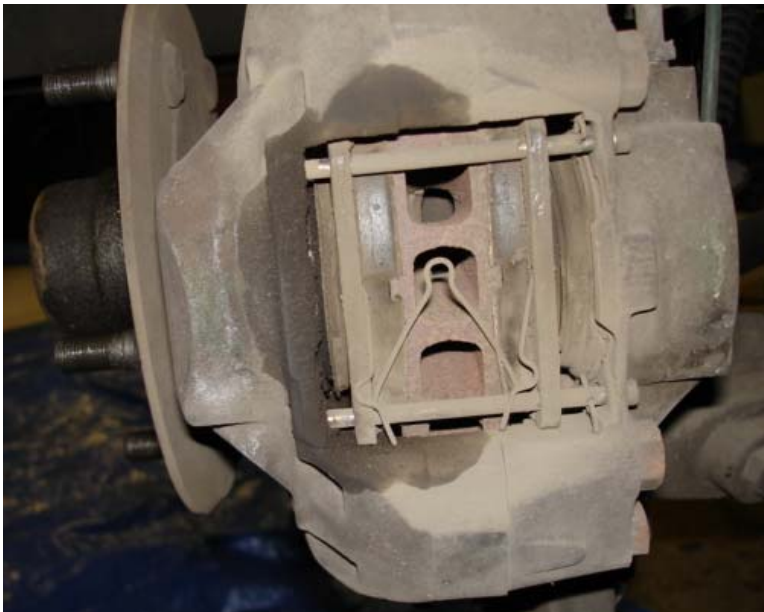
So having followed these instructions you should retain the terminal in your cap seen at the left if you splay your split pin as seen on the right!!!



TYRES FOR SY AND SZ CARS

I knew it would happen to me. A friend borrowed the Spur which was fitted with low mileage Sumitomos. On the way up our street – a loud bang and the tyre was flat and bugged. The Sumitomos were 235x75 although the correct size is 235x70 – a lower profile tyre. Believe it or not there was not a single 235x75 tyre to be had in the country.

Fortunately somebody has imported 235x70 tyres made by the highly reputable manufacturer Cooper who incidentally have taken over Avon. I solved the problem by fitting four new Coopers (they are actually sold under the name of Mastercraft). The improvement in handling is remarkable. The blow-out?? The puncture man found in the tyre – a screwdriver and it was not mine!



TACKLING THE CALIPERS ON AN ABS SPIRIT

It now seems to be fairly common knowledge that mineral oil callipers develop leaks and the one pictured left is no exception. An added challenge was that the car was fitted with an Antilock Braking System. Recent

discussions in our magazines have drawn attention to the effect of a build up of crud around the wheel sensor on these cars. Try this account from one of our international web site readers,

“For some weeks my TurboR has shown a very strange behavior when braking: at high speeds it is sometimes pulling to the left, sometimes to right. When the brake pedal is released the car goes to the opposite direction to where it was pulling before. This behavior seems to be independent of the road surface.



The dirty wheel sensor. Normally hidden behind the baffle seen below. It consists principally of a permanent magnet surrounded by an inductive coil. The sensor is placed adjacent (.010" away) from a 'phonic' notched wheel cast into the rear of the wheel hub. A similar setup occurs at the back wheel. The notches pass through the magnetic field of the sensor causing a change in the fields generating a signal to the electronic control unit in the boot of the car, telling it that the wheel is going around and how fast compared with the other three!

At lower speeds with firm braking, the steering wheel is pulled, mostly to the left up to a 90°. Sometimes it pulls to the right about the same amount, sometimes it brakes perfectly straight. It seems to be

independent of the road surface. I tested it many times on the same part of street in front of our home. Soft braking at lower speeds does not show the strange behavior. “



Well one of our international gurus put his finger on the problem – dirty wheel sensors. These little fingers behind the wheel hub tell the ABS system whether the wheel is turning as it should.

And here is the notched wheel referred to above known as the phonic wheel. Technical designers must struggle to come up with names for their gadgets. I went off to Mr. Oxford to check once again whether my etymology was suffering through age and confirmed that the word phonic is still linked to sound. But there is no sound here just magnetic fields! You can also see the freshly greased up inner wheel bearing its retainer and two seals to keep the innards clean



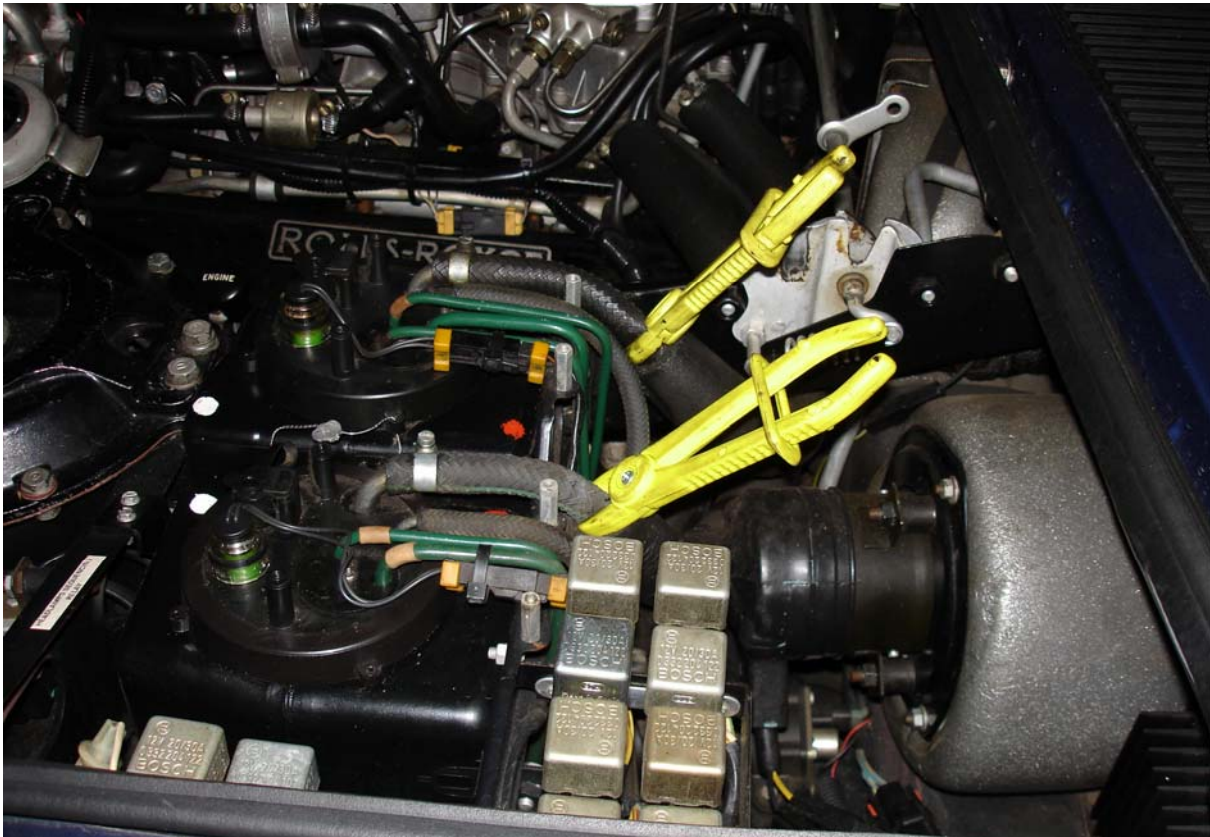
Although shrouded from most of the road frum that this area runs in the sensor is magnetic and collects any bits of ferrous material floating around. The best supply of course comes from the brake rotors themselves which are being relentlessly ground down by those fearsome pads.

And here is the cover you have to take off to get at all these fancy bits!

The sensors can be removed from the back of the hub assembly but as residual muck is bound to be lurking in the area and as it is almost impossible to clean with the

brake rotor in place, cleaning the sensor with the whole thing dismantled would seem to be the preferred method. And if the calipers are going to periodically start leaking what better time to fix both problems together.

The job is not difficult and well within the capabilities of the gifted amateur! Although you will be changing all the brake fluid as a matter of good maintenance, you don't want the stuff dribbling all over you while you work. So clamp off the supply pipes on top of the those quaint reservoirs. Note that unlike earlier cars these syphon the fluid out of the reservoirs rather than dribble it out from their bottoms.



Before starting buy about 10 litres of LHM fluid from your friendly Castrol man and remember to use the two bottles stored in your boot first and replace them with new stock. You will also have all your new seals and possibly brake pads, wheel bearing grease and a set of metric and A/F spanners. Of course you will have stocked up on some long 5mm split pins for the hub nuts.

One of the early shocks you will have is to find that you have only one brake hose to your wheel. This was dictated by the ABS system. The ABS sensor wire can be seen paralleling the brake hose and the other wires are for the pad sensors!



Having got the wheel off and the car on substantial jack stands with the hub at least level with your organs of generation, start by disconnecting the wires to the pad-wear sensors. 'What', you cry 'where'? The 1987 Spirit was the first of the model to fit little wires to the outer brake pads and connect them to the lights that go blinken on the dash board to let you know that you should trot around to your friendly brake man and have the pads changed since they are worn down to almost nothing!! But in your case you will trot around to your friendly dealer and buy genuine pads which you can

change yourself! Unfortunately there are owners/mechanics who feel that pad sensors are simply not needed. So they leave the wires hanging there, use after market pads and confuse following operators as to what the Hell all these wires are here for!

A view of the cleaned up stub axle and baffle plate. The ABS sensor now de-frummed can be seen lurking behind the baffle looking for its phonic wheel! On the stub axle is a very important spacer that all Rolls-Royce axles have which allow the inner wheel bearing to settled where it is going to sit in the assembly. Sometimes, the unwary drop these spacers in the kerosene and forget to put them back causing seriously furrowed brows when the hub goes back on!



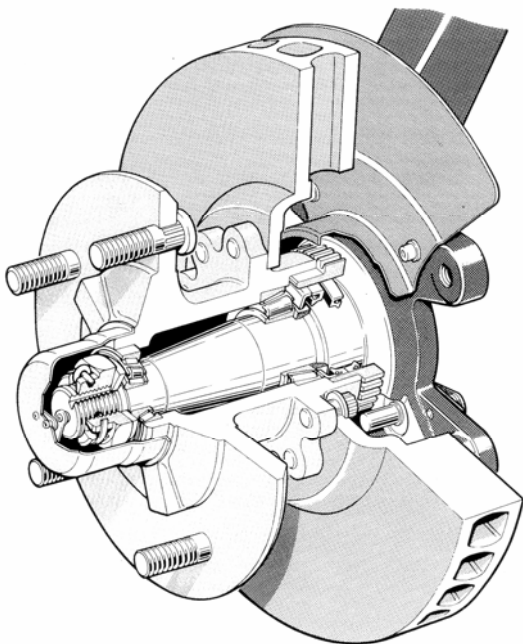
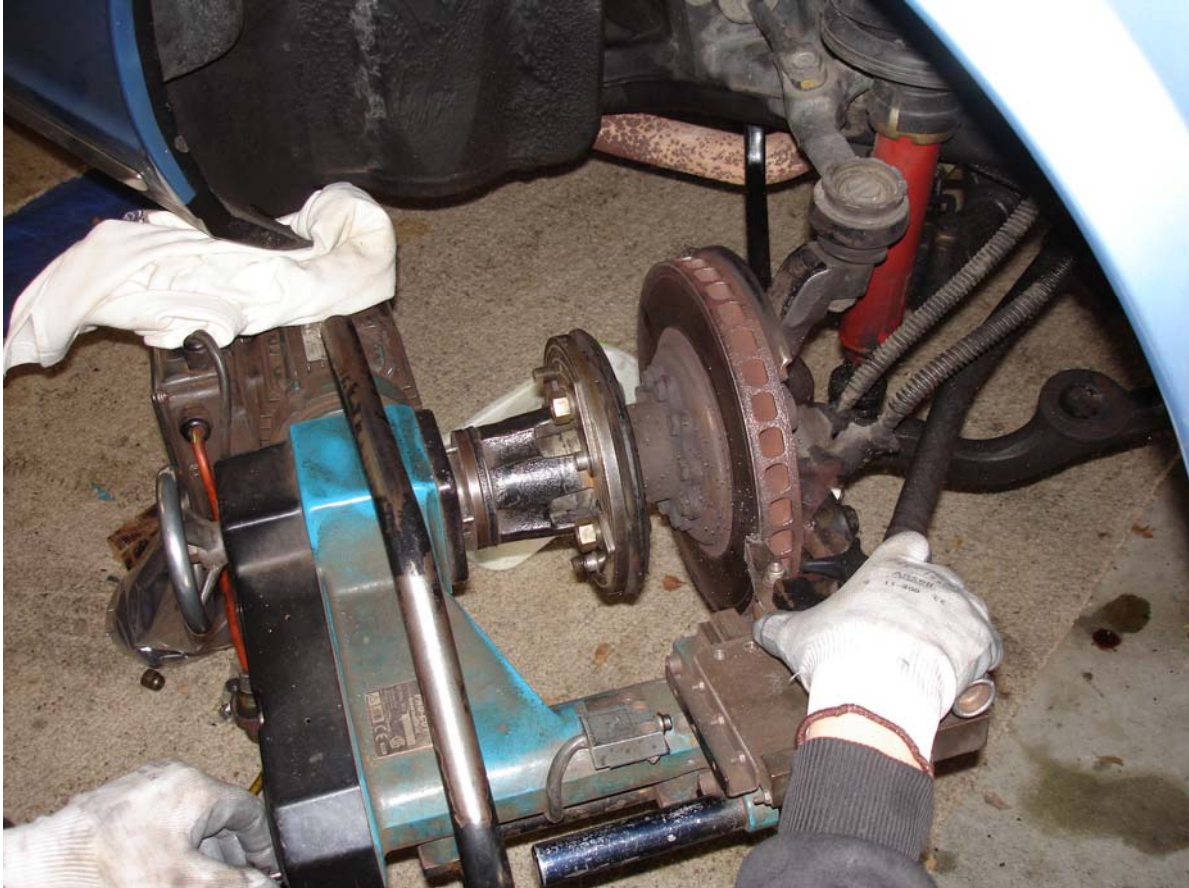
Assuming the latter has not happened, you will see nifty little plugs for disconnection which you can disconnect!!! Next disconnect the fluid pipes to the calipers. These nipples are A/F (7/16"). Note that the ABS

system dispensed with separate braking systems on the front wheels. One and only one feed line goes into the rear caliper and the one at the front gets the hand-me-downs from there via a link pipe.

Unbolt the calipers. These are held on by two fitted **metric** bolts that were not only well tightened but having been subjected to heat and grot so are very tight. Use a socket



and long bar to save your temper, knuckles and the surrounding machinery. The calipers should just lift off. If at this stage you find a substantial lip around the edge of the rotor, find a visiting machinist who will come to your car and grind the rotors flat, removing the wear lip from the periphery. This is probably preferable to removing the rotors and having them machined on a rig. In situ the rotors finished relevant to the car. This man will also measure the thickness of the rotors since there is a minimum dimension for safety which is stamped into the outer rim of the rotor. If this has been exceeded wash your hands and go out and drive taxis for a month or so to pay for the new rotors.



You are nearly there. Prise off the outer hub bearing cap, remove the large split pin from the nut, remove the latter (left side left handed) and carefully pull off the rotor and hub. This will expose a baffle plate fastened with hexagon headed bolts to the stub axle. Out with these, off with the plate and you are there. Clean every thing up and go have a Scotch, cup of tea or a Bex and a good lie down!

The hub and rotor assembly still contain the rear seals that keep the muck out and the grease in together with a protector for the seals as well as a rather vital spacer and the inner hub bearing. The seals (2) can usually be prised out with a stout crowbar but the bearing retainer can be a bit of a challenge. Knocking the bearing out will remove

the retainer but it is easy to damage the bearing cage. You might like to buy yourself a small bearing puller from your local tool shop which will do the job. Alternatively take the hub to a brake shop and they will remove the bits for you.

Having got all the bits out they can be cleaned inspected, greased and re-installed. Set the wheel bearings to .002" end play and not zero as recommended in certain writings. .002" can just be felt with the wheel bearings cold. Note that the split pin holes in the end of the stub axle give you some latitude in adjustment.



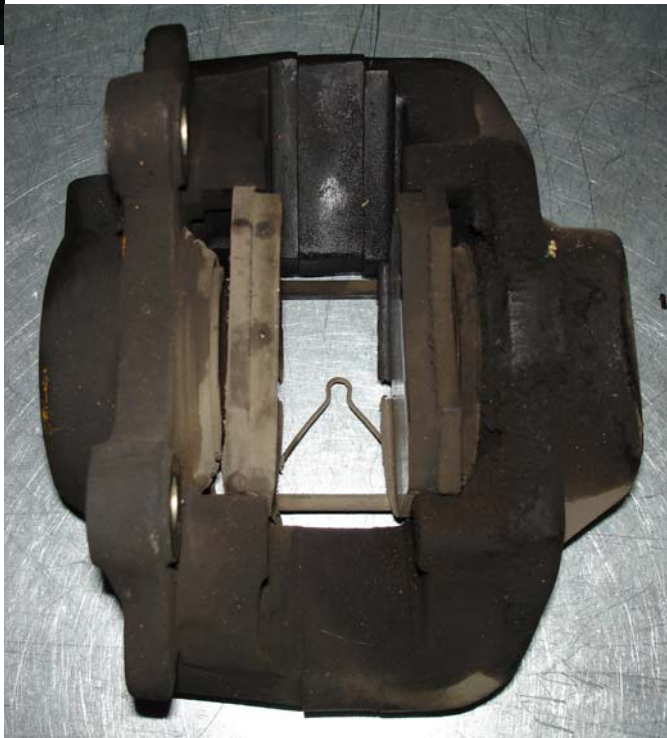
Overhauling the callipers, is really quite simple if not a foul job. They are covered in brake dust which has the ability stain hands and body indelibly! Then if the callipers have been leaking – more crud to wallow in.

I always remove the calliper intact complete with pads springs etc. It is much easier to get the bits off on your bench than hunched over a hub.

And here is one very dirty calliper. Note there are two halves with metal spacers between. Every instruction you pick up tells you NOT to break the

callipers open but then the seals between the two halves are always readily available. Leaving the calliper intact makes for very awkward working and having left them together it is not unlikely they will leak at the joints at later stage. If you look carefully you will note a lip of brake lining material sticking out from the top of the pad (or the bottom as you look at it. These are non standard pads and viewed cursorily from above can give a completely erroneous read out for pad wear – be aware!!!

So with flagrant disregard for the written instruction you undo the four very tight bolts holding the two halves of the callipers together. Here we see the groove for holding the calliper seal in place. This is best removed with the aid of a dental pick. Your dentist wears these things out after he has



been gouging around in your mouth and either throws them out, sends them to the dentists-in-training or throws them in a box in the corner. Get some, they are invaluable. The little hole between the two holes on the right in the above pic is where the brake fluid goes from one side of the calliper to the other.



And here we have the piston, all cleaned up and a new dust seal fitted to the top lip. Using your mineral oil brake fluid in this case lubricate the piston and inside the cylinder and press the piston into the calliper. Don't force it. It has to be exactly square toft and two thumbs pressure is the maximum allowed for entry. Push the piston right to the bottom of the calliper and the dust seal will fit itself nicely around the top of the piston. You can then expand the dust seal retainers

And press them right down to the calliper face as below.
The next step having inserted all the seals is to re-assemble the halves with the relevant spacers. They only go together one way. Do not forget to install the



little annular seals between each half in the recesses provided. Tension up the bolts (9/16" and 5/8" UNF) as per the manual and you can then, in comfort install the brake pads, springs pins and clips.



And here we are all together. The spacers between the two halves can be clearly seen together with the new pads. The anti-rattle spring is a bit fiddley to get in. There is one in each calliper and note that the nipple shaped 'pointer, points in the direction of normal rotation of the wheel. Put the pad retaining pin through the pads and the spring before you try and insert the legs of the spring into the holes drilled in the centre of the pad backing plate. Without stretching the spring, slide one half back along the pin just

enough to get the leg in the centre hole. Then repeat for the other side. The pin retaining clips should fit comfortably and not be gouging the dust seals not jamming into the walls of the recess in the calliper. It remains to refit the calliper and torque up the retaining bolts. Try and do one calliper at a time and keep all the bits together. Clean out the reservoir and bleed the brakes. Next issue we should be able to talk about pad sensors and their fittings.



WEB SITES YOU SHOULD HAVE ON YOUR COMPUTER

<http://www.rrocavictoria.org.au>

The Victoria Branch of the RROC of Australia

<http://www.rroc.org.au/>

Rolls-Royce Owners' Club of Australia

<http://web.rroc.org/>

Rolls-Royce Owners' Club of America

<http://www.kda132.com/>

A site dedicated immediate post war cars. The owner is a member of the RROC of A.

<http://www.BritishStarters.com>

An American site offering Nippondenso Starters for all Rolls-Royce vee eights.

<http://www.nzrrbc.co.nz/>

Our New Zealand enthusiasts web site

<http://www.rrec.co.uk/>

The British RREC.

barbarawestlake@rrec.org.uk

The address of the lady who will send you the build sheets for your car.

www.enginesaver.com.au

The sensor to warn you about the loss of coolant

<http://www.rachapmanautomotive.com.au/>

Supplier of after market manufactured parts as well as comprehensive service

<http://www.sumidel.com/>

The Australian home for all SU carburettors and parts

<http://www.magnecor.com.au/Default.html>

Thundercords who will make up your high tension leads.

<http://www.vinwire.com.au/>

A family business located in Bellingen NSW who will make up wiring harness for any car.

<http://www.natspring.com.au/>

A firm that will make virtually any spring needed on a car.

<http://www.classicfasteners.com.au/>

A South Australia concern that has a very wide range of fasteners detailed in a very comprehensive on-line catalogue

<http://www.ppc.au.com/>

Permanent Painted Coatings make probably the most durable and heat resistant paints this side of Cape Canaveral.

Should you wish advice or help on any RR or B mechanical matter feel free to write, if I do not have the information I will get it. Or better still share your own experiences and send an account hopefully with pics to me. Bill Coburn Post Office Box 827 FYSHWICK ACT 2609 Australia or spur84@bigpond.com.