1991 Alfa Romeo 33 ABS Installation – Rear Axle, ABS unit/brake lines and wiring installation 5/2012

The big moment of installation to the 33 has come. This is the most important phase of the project which has to do with three discrete areas that need to be dealt with.

- Axle installation along with handbrake cables.
- ABS unit and brake lines. We need to remove some hard brake lines and substitute them with the ABS spec ones plus installing the ABS unit.
- ABS wiring

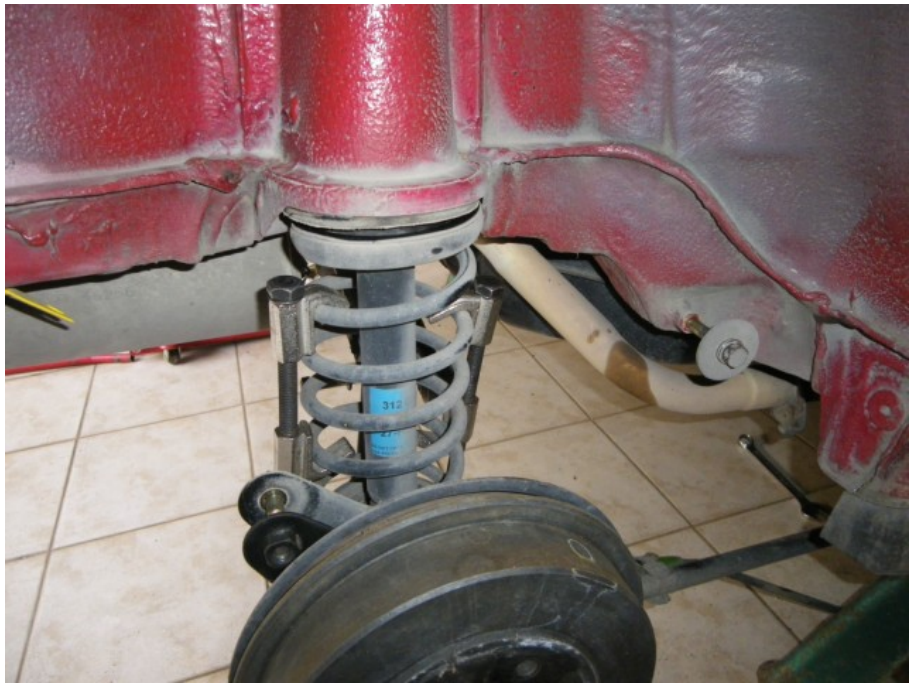
Let's start from the **axle installation** to the vehicle.

First things first. Safely place the car on jacks… we don't want to feel the weight of the 33 over our face.

Spray loads of penetrating oil on the bolts and nuts of the suspension so that they break free easily. Do not completely remove the nuts as we still want the axle to be kept in place.

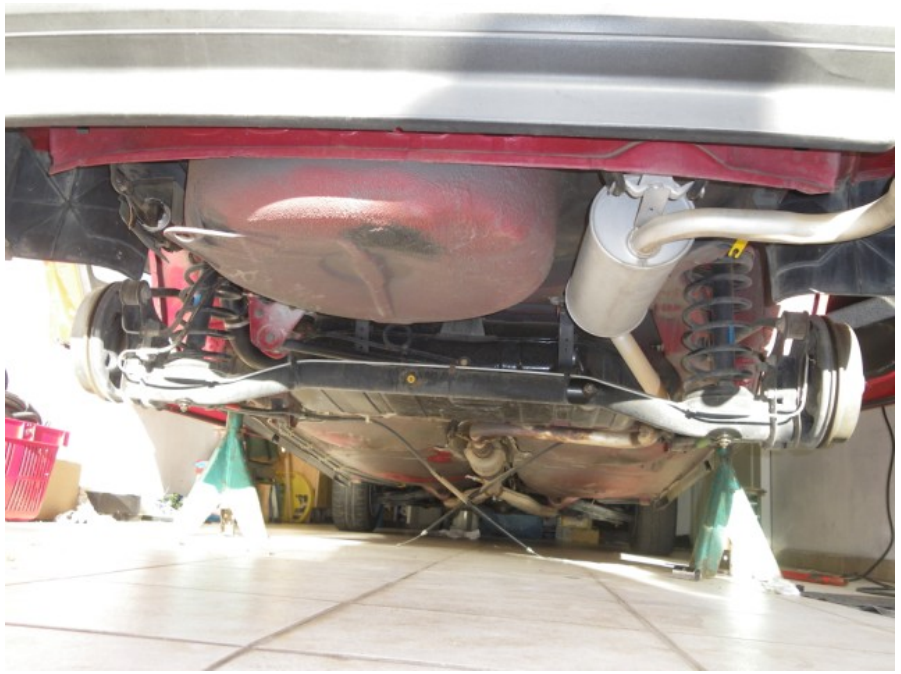
Working inside the passenger compartment, release the handbrake cables from the handbrake lever and simply push them out of the interior. Once out you will see them hanging.

Proceed in removing the brake hoses. The rear axle hoses are located on the left of the spare wheel well on the bracket seen above. We are going to eliminate these pipes and hoses and use the ABS specific ones as the routing is completely different.



Then we move on removing the Watts linkages from the car body/axle. First start from the upper linkages…

…and then remove the lower ones.



The axle is now held in place from the shock absorbers. The nuts which will help us lower the axle, are the two ones on the bottom of the shock absorbers.

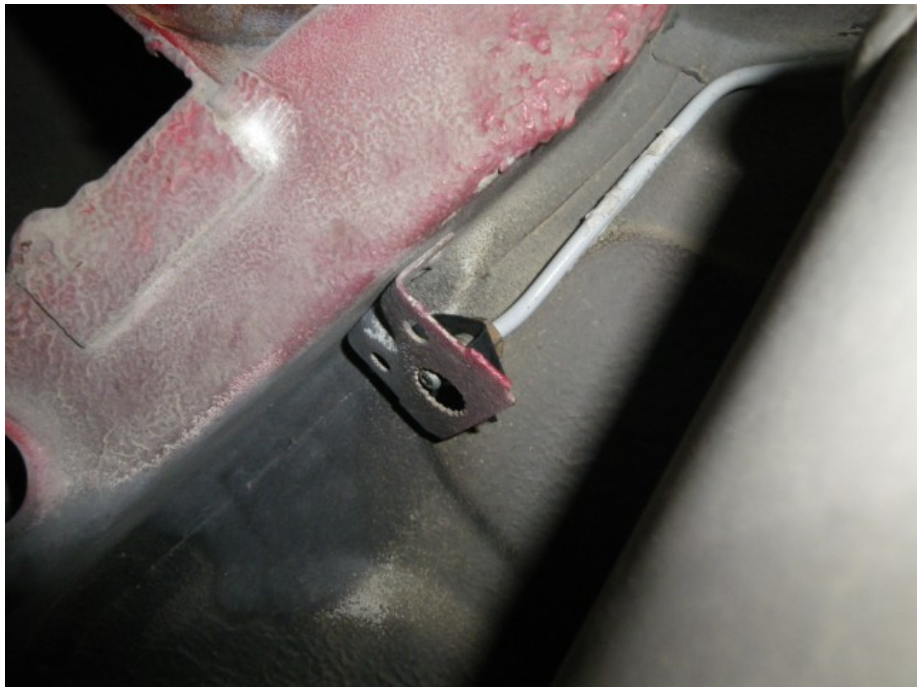
Here is the car without axle. You can see the shock absorbers and their support brackets pus the Panhard bar rod.

Let’s now start installation of the brake lines specific to ABS. These two lines drive the rear disks with the shorter one going to the left wheel and the longer one going to the right wheel. The longer one is routed around the spare wheel well and meets a preinstalled bracket on the rear right chassis rail – the short one meets the bracket located on the left side of the wheel well.

Brake lines are merely places in place …

And their final positioning. Notice the extra bracket bolted on the existing bracket.

Right side wheel brake line routing. Even the brake pipe clips holes are present to the chassis. Getting hold of a brake lines clip ensure proper positioning.

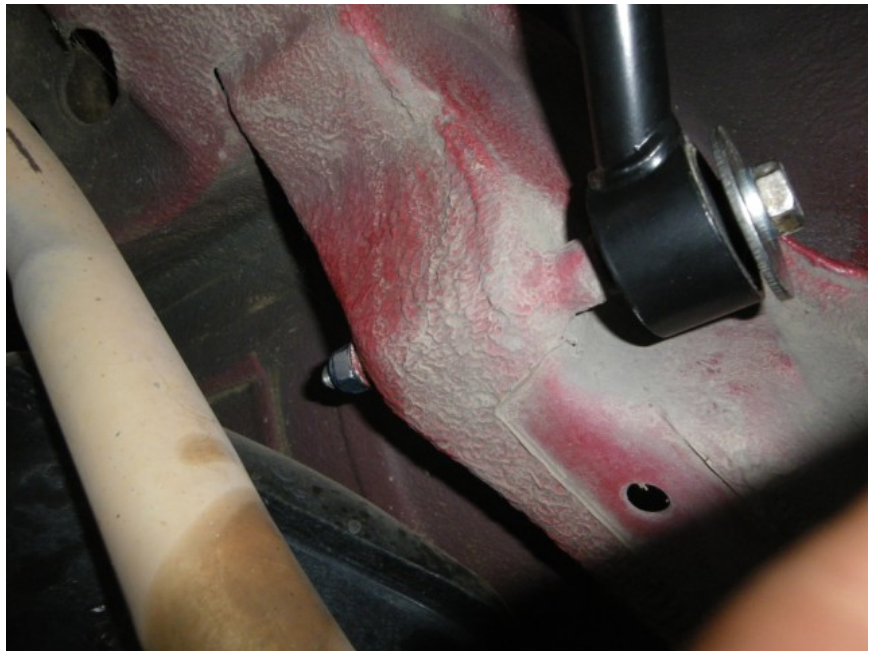


The brake line end meets the preinstalled bracket. Don’t forget to use the U shaped spring which is there to keep the brake line and brake hose unions firmly attached.

Here is a close up of the shock absorber lower bracket. This bracket is responsible to secure the shock absorber to the axle. The old ones which were original to the car, were rusted so new ones were essential to get.

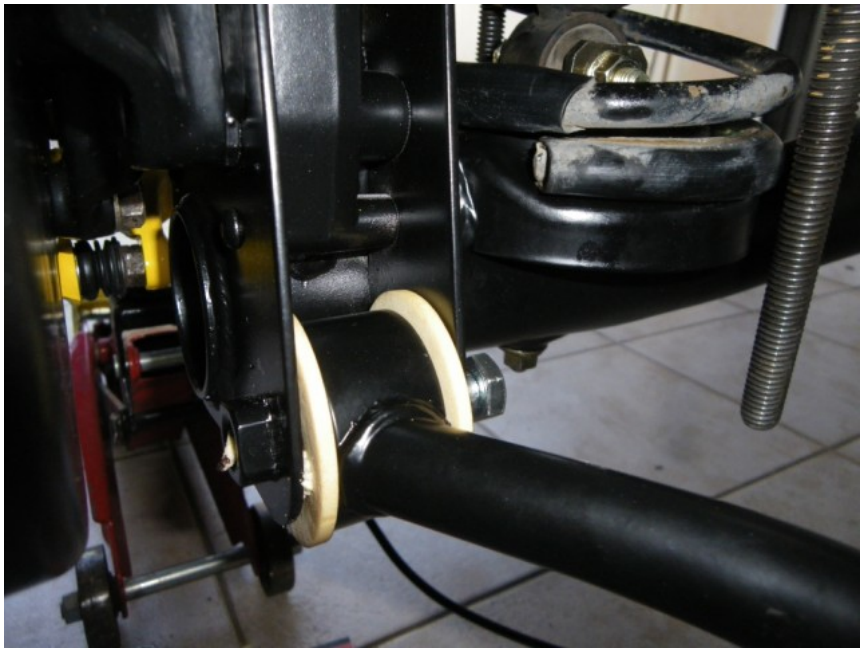
I have used in here a stool in order to help me place the axle under the car.

Having an assistant in here is very important. The assistant will help you lift the axle from each side as you try to hang the axle from the shock absorbers.



Start installing the Watts linkages. I have used here new locking nuts and new washers.

Install the rear of the linkage to the axle. You must also use new sponge washers as these protect the bushes from the road elements.



Also the same for the lower linkage. In total 8 washers are needed.

Install the Panhard bar and don't tighten the nuts yet. We need to place the car on the ground so that it rests on its own weight, in order to torque the nuts – otherwise the bushes will be stressed and wear quickly.

I have used here a couple of rubber bands in order to keep the spring as close to the Panhard bar. The OEM rubber bands are out of production but even if these were still available, they wear out within months.

Finalize installation by fully tightening the brake line/hoses unions

Pass the ABS wheel sensor through the rear chassis rails designated holes …

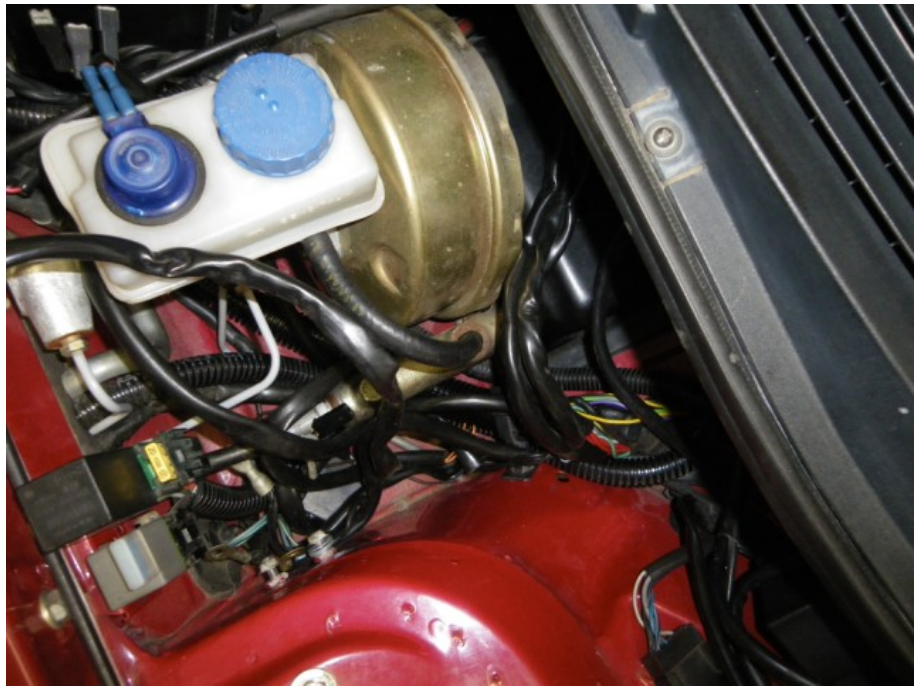
… in order to meet the ABS wiring.

Let’s now tighten the wheel nut. I have used in here the impact wrench for maximum results. Don’t forget the protective cap.

Next step is installation of the handbrake cables. These cables are specific to rear disks as opposed to drums.
Install them following the same routing as the drum specific ones.

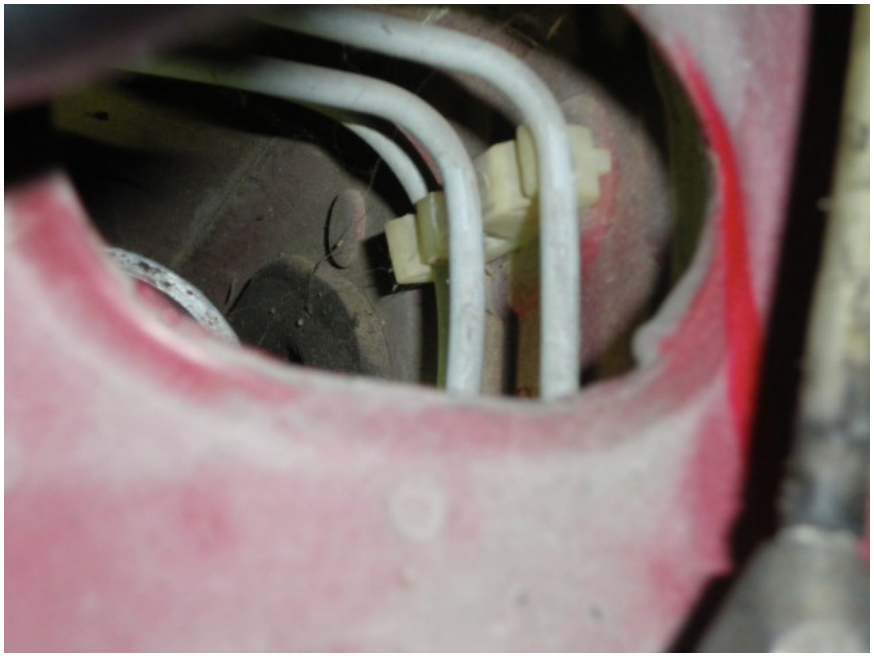
ABS Unit /brake lines and wiring installation

The following steps demonstrate the installation of the ABS unit along with the respective brake lines from the master cylinder to the lower part of the bulkhead where the main unions are.



This is the place where the ABS unit is installed. We will first start by removing the existing brake lines.

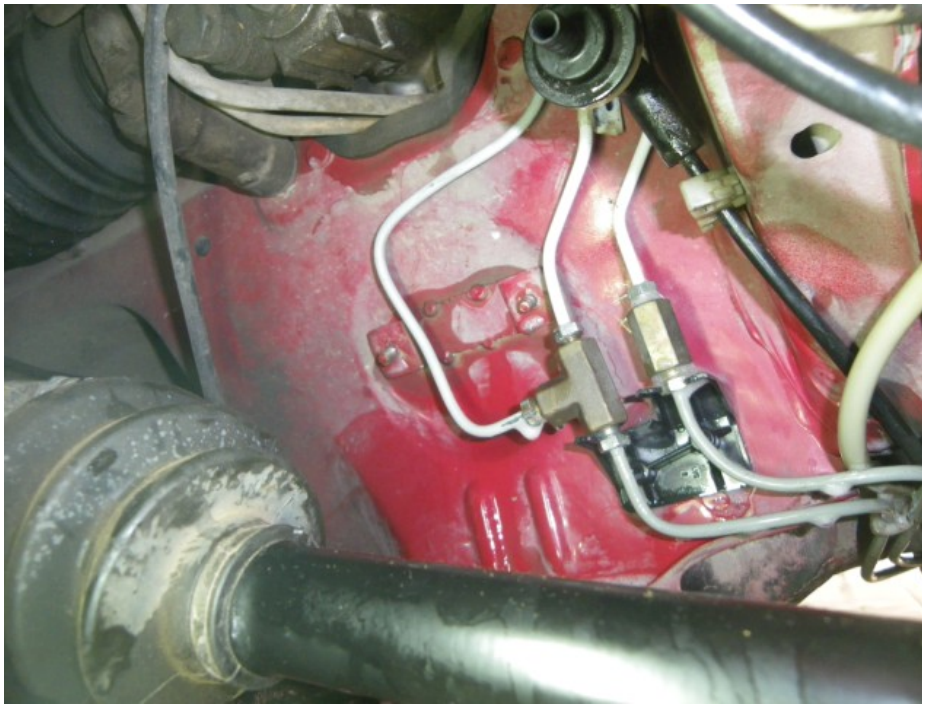
Notice in here that the ABS specific 33 features a two port master cylinder whereas the drums setup 33 features a three port master cylinder. This difference is just a blanking cap as shown on the photo. This cap will be placed on the vertical port which will be blanked off.



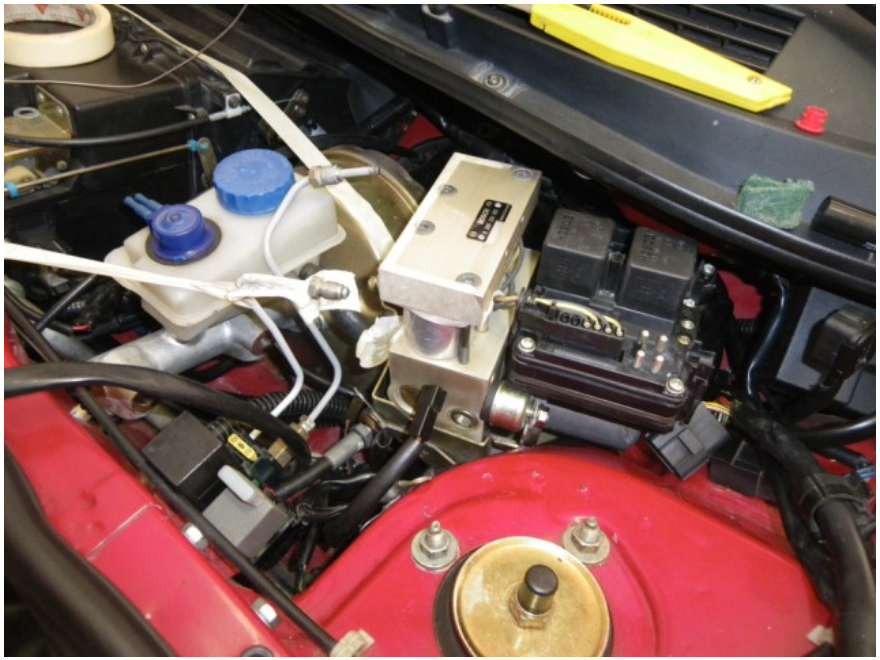
From this small window (this is where the steering rack protective cover resides and I have had it removed for easy access) I will remove the brake lines that end to the union just behind the fuel filter. For easier access I have removed the fuel filter and moved it sideways.

Here you can see that I have disconnected the brake lines and using a flexible tube and a syringe, I have removed brake fluid so that I don't have it dripping for ages and posing a danger of corroding paint.

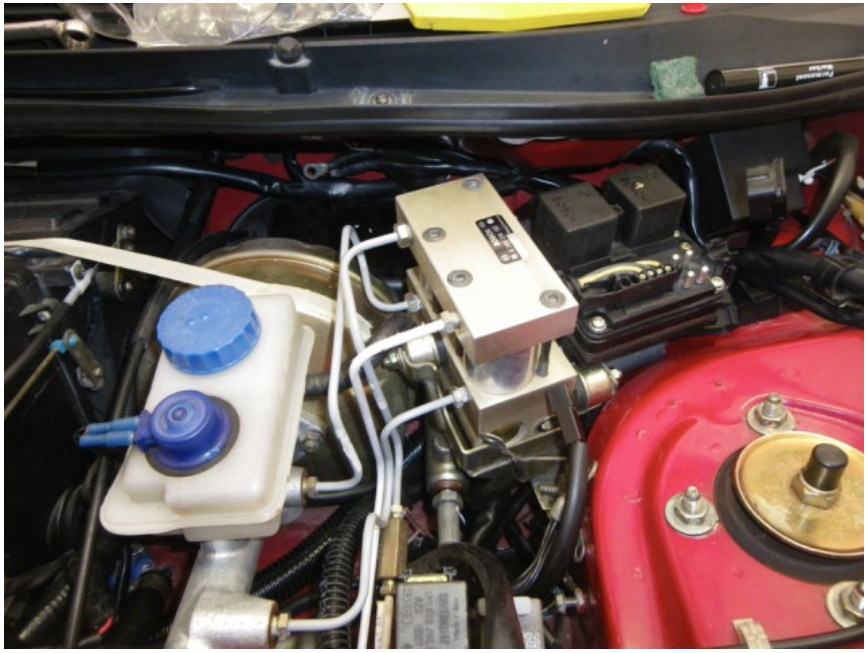
Better safe than sorry, I have placed rags under the master cylinder in order to protect paint for brake fluid. On the right you can see the ABS specific brake lines.



After some fighting with the various parts on the way, I have successfully installed the brake lines, tightened them on the unions and placed them in their correct place next to the master cylinder. In the mean time I have installed the support bracket of the ABS unit as it is seen in the photo above.



Place the ABS unit on the support bracket and plug in the long electrical plug just behind the two big relays.

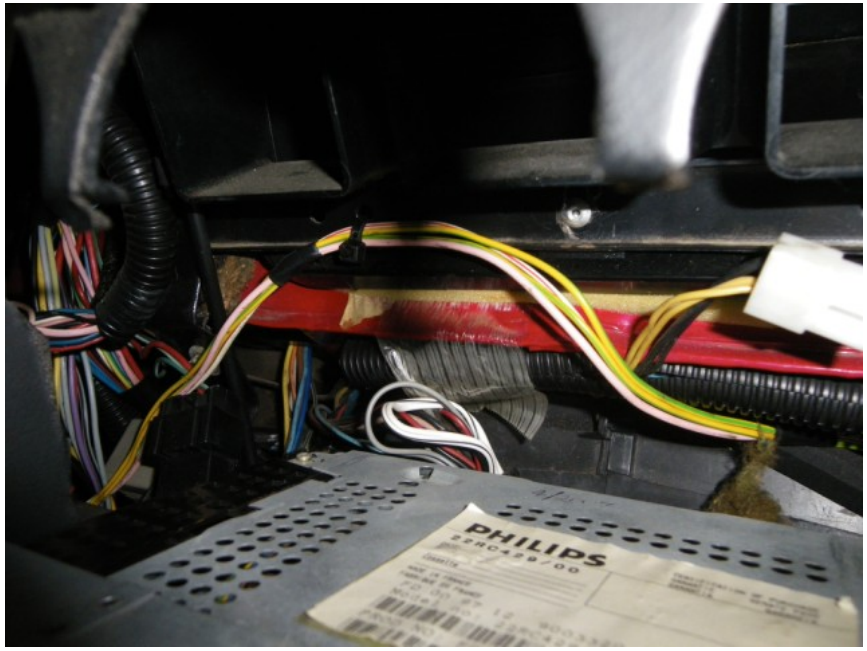


Proceed in installing the remaining brake lines. Two brake lines come off the master cylinder, enter and exit the ABS unit. At that point just next to the exit lines from the ABS unit, a T union feeds the FL & RR wheels whereas a T union located behind the fuel filter feeds the FR & RL wheels.

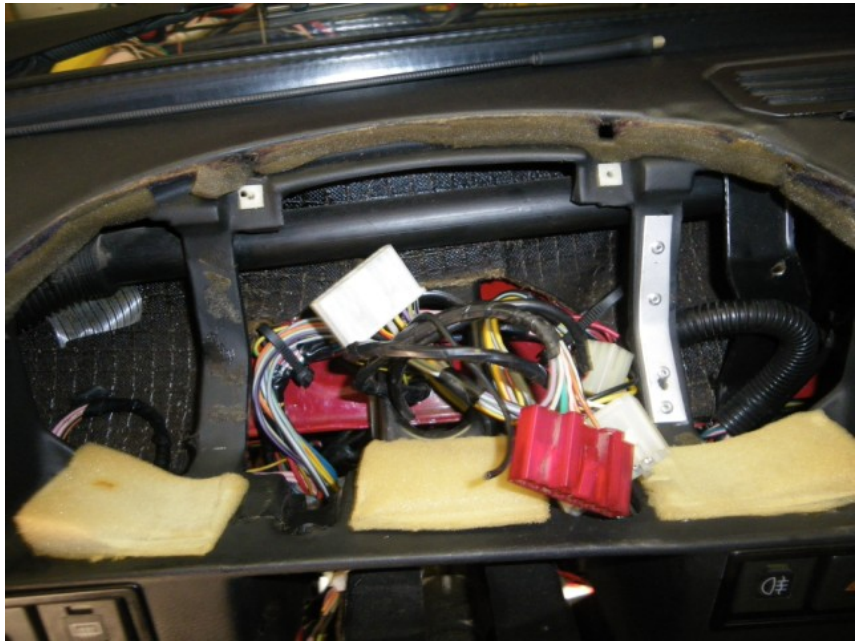
Having tightened the brake pipe unions, tidy up the area by installing the ABS unit cover, connecting the earth lead and properly tightening the bolts securing the ABS unit to the bracket.

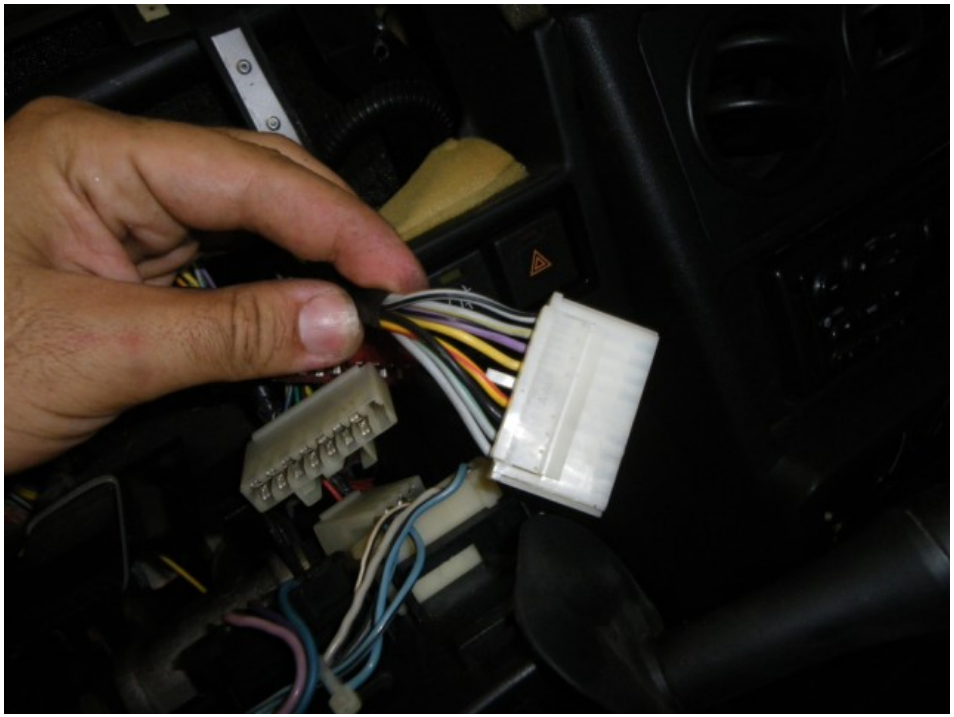
Connect the intermediate connector on the brake servo cover … and pass the wiring through the bulkhead just behind the battery. A note in here: the wiring shown above has two ends which should be placed at the battery terminals. The ABS wiring involves a direct earth from the ABS unit which bolts to the left suspension tower earth bolts and then earth from the wiring which should connect to the negative terminal of the vehicle wiring plus positive lead which again connects to the positive terminal of the vehicle wiring.

These two thick leads are the ABS wheel sensors going under the carper to the rear of the car.

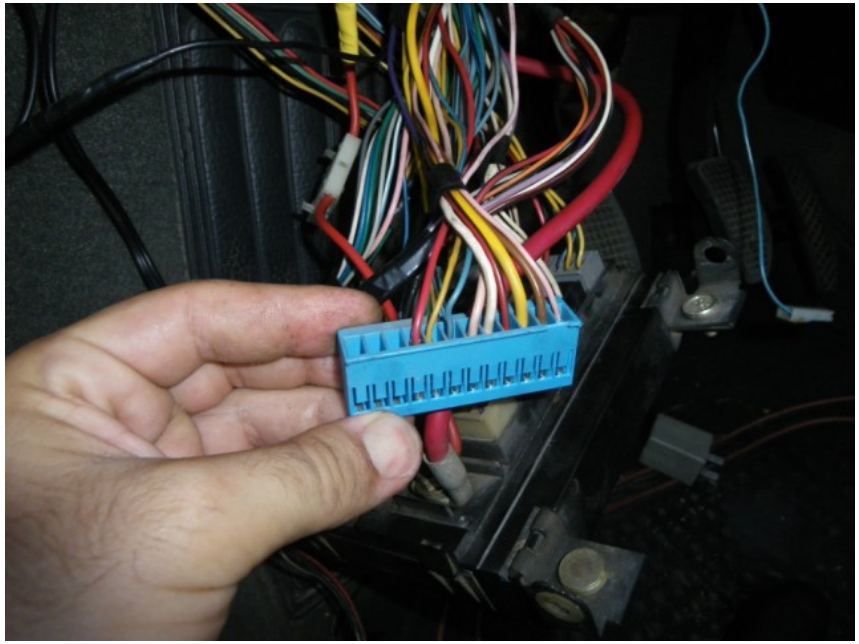


This wiring harness is the input to the ABS unit. Input signals are ignition on, brake pedal switch and the check light on the dash.





Not easily seen in this mesh of wires, I have installed the check light lead to the white connector. The connector was missing just one lead which is intended for the check light. Practically speaking, the wiring of the dashboard in a standard brakes 33 is exactly the same as the ABS fitted 33 and their only difference is that specific lead colored yellow/green.



Installed the ignition on lead, on the relative fusebox plug

And as expected, the ABS check lights up!

Installation is now over but I need to address on some extra info that is very important. ABS specific Alfa 33 features bias valve (or brake proportioning valve) which is a different part number from the standard drums setup. The ABS specific bias valve has OEM part number 60564894 whereas the standard brakes bias valve has part number 60501737. In addition, the rear disks axle requires bias valve pretention at 5.2 Kg in contrast to the drums setup which requires 12.2 kg.

After driving the 33 for some hundreds km in order rear disks and pads bed in, I was felling the rear of the 33 probably locking during braking (before ABS kicked in) and a tendency of the rear to slide when applying brakes at about 30 or 40 km/hr. In addition, under wet road the car would pull to the left – braking on dry road was straight strangely …

However, a very interesting observation was made. I was able to see quite some brake dust on the rear left wheel but almost inexistent dust on the right side wheel - I thought that bleeding the rear brakes would solve the problem. As you can guess, there were no air bubbles in the rear circuit but my eye spotted some moisture on the bias valve which was easily proven major leak of the bias valve. Upon lifting the rubber boot on the under of the bias valve, brake fluid poured out. This was the reason why the rear of the 33 was not braking as it should … there was improper brake force distribution on the rear and maybe ABS was correcting this incorrect brake force only to some point.

Here was the great challenge to get a new ABS specific bias valve. After a week of searching I located one! After fitting it and properly adjusting it at 5.2 kg the brakes really got another character. The 33 brakes straight in wet and dry and I can feel that the rear of the car is forced downwards and not upwards while braking.

Needless to say, ABS and worn out tires is a deadly combination - this, along with wet road make the 33 impossible to stop at a given distance. ABS kicks in and it simply pulsates until the car stops. If you are traveling with higher than appropriate speed, then you will end up to the rear of the vehicle in front FOR SURE.

So if your 33 is fitted with ABS, then always have in mind that tires need to be in very good condition!