

## Braking System Restoration

Today you will have the opportunity to see a long project regarding the complete rebuilt of the 33s brakes. Not a long ago the 33 developed a strange braking effect; the car would pull to the left under braking. The pulling to the left was so severe that in the case of a hard braking the car would almost change lane! I had undergone to an extensive check of the steering geometry, suspension elements, rotated tires but no improvement was obvious. Finally, I found a good garage equipped with rolling road which could measure brake force; the results were quite discouraging as the front right wheel was short of ~ 400 N braking force compared to the front left wheel. This was obvious why the car would pull to the left.

So after the correct diagnosis I had to track down the cause of this frustrating situation. It could be a number of things going wrong; a failed master cylinder, failing brake hoses, failing brake calipers or even a faulty bias valve. I didn't know where to start from and worst of all MOT time was very near. Within all this hassle it was a nice opportunity to upgrade the braking system. Luckily I was able to source a good set of Alfa 33 16V vented calipers from the UK (a big thanks to Richard!) for a very good bargain so I decided to give it a shot and proceed repairing/rebuilding the calipers from scratch in order to obtain the best result (and get away with the braking problem the 33 had). Looked like I didn't know the mess I was opening as you will read in the lines below.

The calipers were badly corroded so it was a nice opportunity to remove corrosion, prime them, paint them and renew all rubber elements (seals, dust covers, hoses etc) to new out of the box items. The rebuilt was successful but after the ~500 Km of bedding in, the pulling to the left was still there! "What the heck goes on here ?" the problem looks not as obvious as I thought so...

So, what is the next step? Come to think about it the Master cylinder is relatively new (replaced less than 4 years ago), rear brake hoses and wheel cylinders replaced less than 1 year ago, so what is going wrong here? I guess the expertise of a brakes shop can shed a light over here.

So off I am to the brakes shop and after some chat with the owner regarding possible faulty brake calipers, hoses etc (\*\* Hey man, look at them they are new \*\*) I was a fool to trust him for troubleshooting the problem. The knucklehead interfered with the brake lines and "converted" the brakes layout from X layout to front - back layout so that "the problem is eliminated" (!?). After a "nice conversation" we had regarding his brilliant idea to f\*\*k the brakes and his nice attitude of not revealing to me his plans how to repair the 33s brakes fearing that his expertise might reach garages and steal his knowledge, I decided to never ever trust any mechanic. I promised myself to find the problem on my own. For the history this shop (George Kontoudis / Chris Stratomitros) is located very close to the Olympic Stadium Complex in Kalogreza, Athens at Demirdesiou Str. so if you have been advised to trust them, then run, Run RUN away. They may be good at replacing pads and disks but for me and the 33 's problem they just proved to be unprofessional.

So I brought back the original setup of the brake lines to X setup and started replacing the remaining items:

- Master cylinder (no improvement)
- Bias Valve (no improvement)

So what is left over? Just the brake pipes ... This thing had gotten on my nerves as I have replaced EVERYTHING on the braking system and I still get ~400 N less on the right front wheel whereas the rear one get 1000 N sharply both.

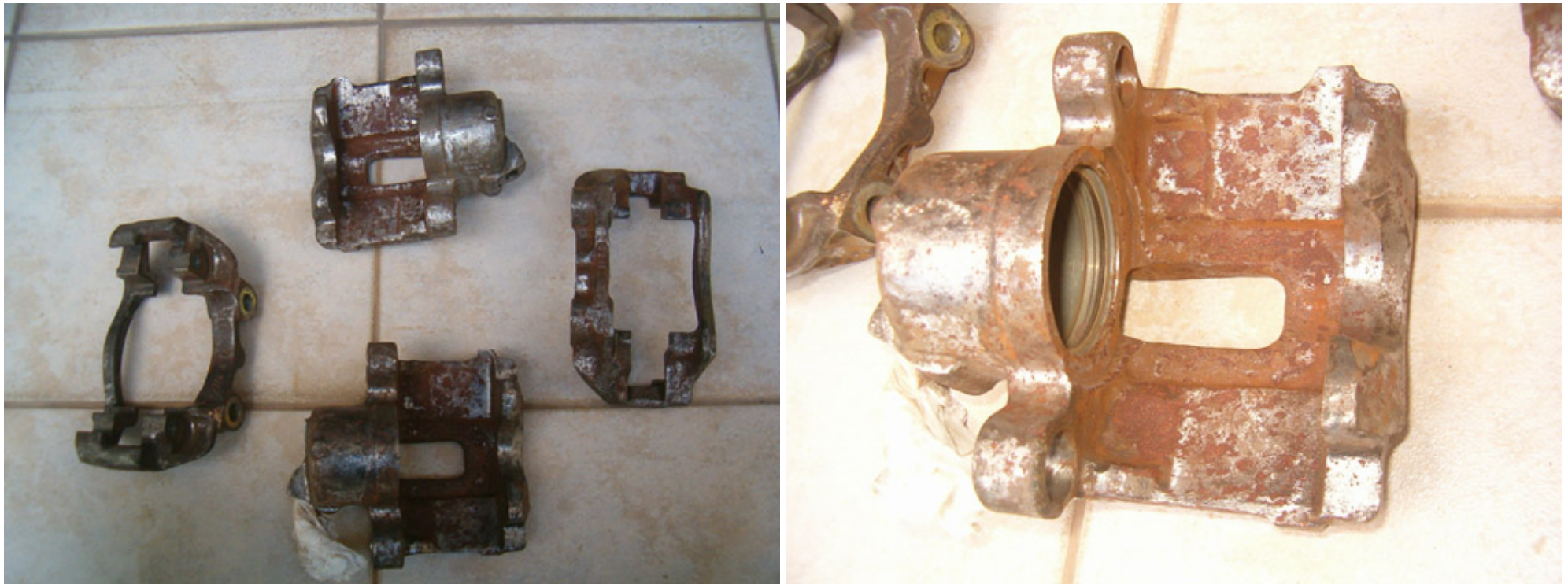
I had a racing mechanic asked about this problem and his advise gave me hope that solution is easy; dirt on the brake lines. This same proposal was backed up by the Alfa 33 forum fellow members; both opinions indicated dirt/rust on the brake lines and the solution is blowing compressed air to remove all foreign matters from the inside.

Their proposal was 100% correct. I had compressed air blown through the left front wheel brake line and the clean white rag on the end of the line turned to black. The problem was at last tracked down and now the 33 brakes absolutely straight! The test printout during MOT indicated almost equal braking force at the front axle and the right wheel showed 20 N more force than the left one!

In the following lines you will see the full story and every step I followed during the repairs.

- Calipers Rebuilt
- Calipers Installation
- Disaster
- Rear axle bias valve
- Solution
- Rear Brakes rebuilt

## Calipers rebuilt



These are the calipers for the vented disks. I have already used the stone bits to remove rust and dirt. The amount of rust was quite a lot but with careful and systematic work I have removed most of it. As you can see the brake piston is already out of the caliper; I used a foot pump to pop it out attached in the brake hose fitting. Be careful during this procedure as the piston has enough force to create injuries, so be sure to keep your hands away from the caliper.



The parts of the calipers that stone bits cannot enter will be treated with rust inhibitor so that rust is buried once for all.

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Here you can see the final stage just before rust inhibitor is applies. I have used plenty of alcohol to clean the surface; this way no foreign material interferes with rust inhibitor and thus reducing its effect.



See the clean surface!



Rust inhibitor is applied and the final result. This material needs around 2-3 hours to cure and stick to the rusty surface. Once the material is applied to rust then it instantly changes color to a deep blue one whereas clear indicates healthy metal.

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Inside of the caliper is treated



and the caliper bracket also



Here you can see in detail the piston internal right after cleaning it from rust. Major rust has been removed and it will be stopped by the inhibitor. As you can notice on the right photo, this material turns to dark when it attacks rust.

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All parts are now treated with rust inhibitor



These were the stone bits I used to remove rust. Various sizes and shapes will give you the best result



Rust inhibitor ...



... and high temp black paint in aerosol can which will be the top coat





Here you can see the calipers painted at last. I choose the hanging method as there are no surfaces left unpainted. Be sure to mask the cylinder internal surface!

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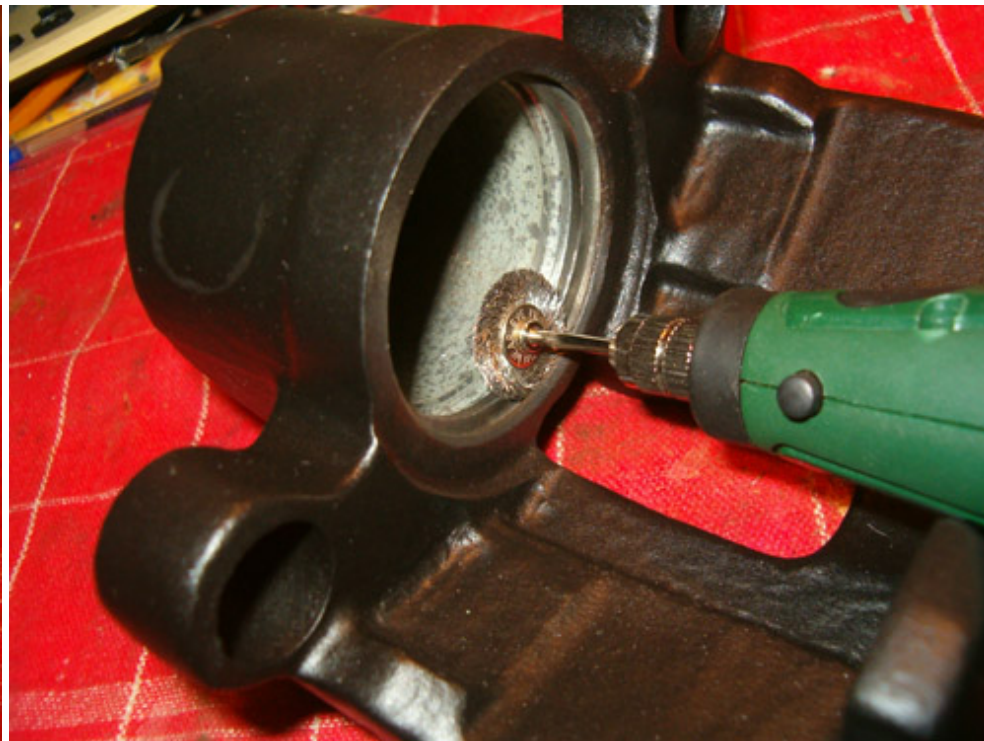


Caliper brackets painted along with the piston internals





Using the small wire brush on the Dremel tool, I have removed any leftover traces of foreign material



The same done on the caliper; remove dirt from the seal and dust cover groove



Here is the repair kit; ATE 0441-4810 is the part number for the Alfa 33 16V calipers



Install the piston seal on the cylinder





Be sure to seat it properly



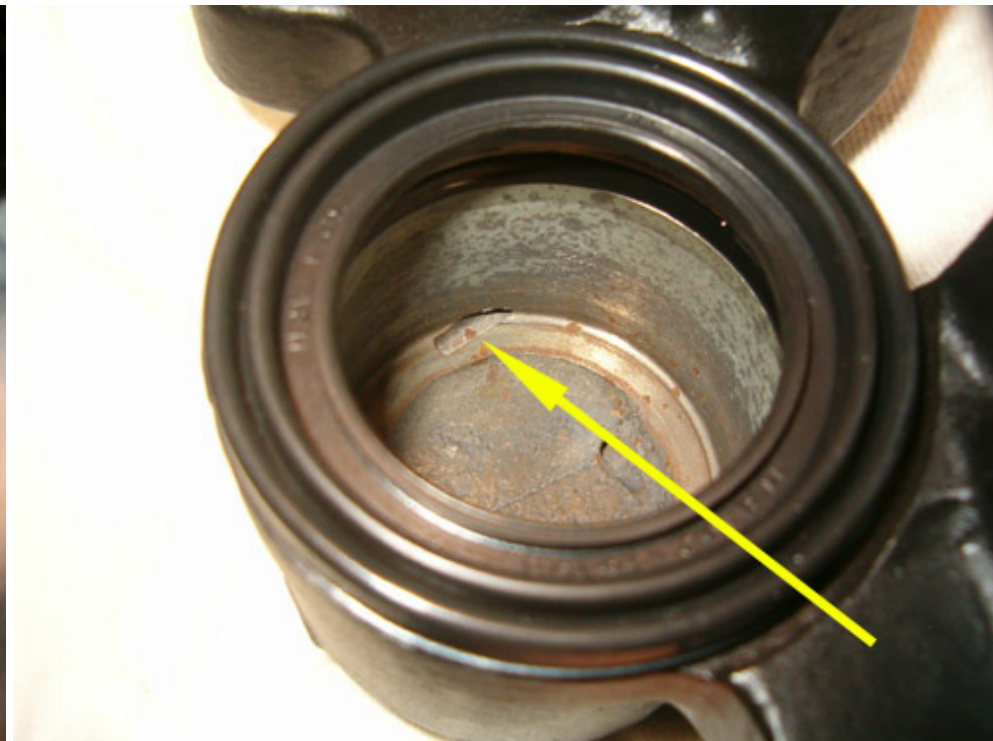
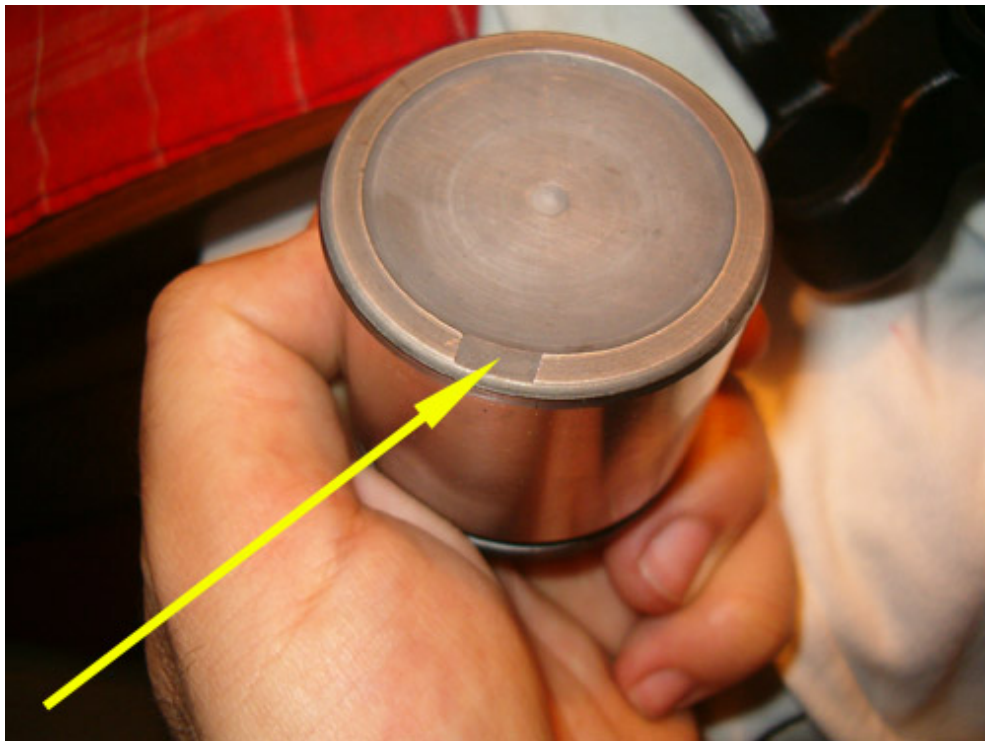
Proceed installing the dust cover



It should look like above. With a cotton pad soaked in brake fluid lubricate the dust cover lips; lubrication here is essential as we need to have the piston slide easily. The option to use brake pad paste is also acceptable.

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Make sure that the notch of the piston lines up with the opening in the caliper. This opening is the bleeding nipple galley, so we need to "help" air/brake fluid out!

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Place the piston on its seat and very carefully use the bracket to help the piston slide in the cylinder. Once it has seated correctly in the seal, it will slide very easily; otherwise if you feel difficulty sliding it in, stop and try over again until it goes in correctly.

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Brake piston is now correctly placed on its seat. Be sure that the dust cover internal lip is correctly seated in the piston groove.

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Finally install new brake hoses and fully tighten them



Brackets are now ready to be installed on the car.

Move on to calipers installation