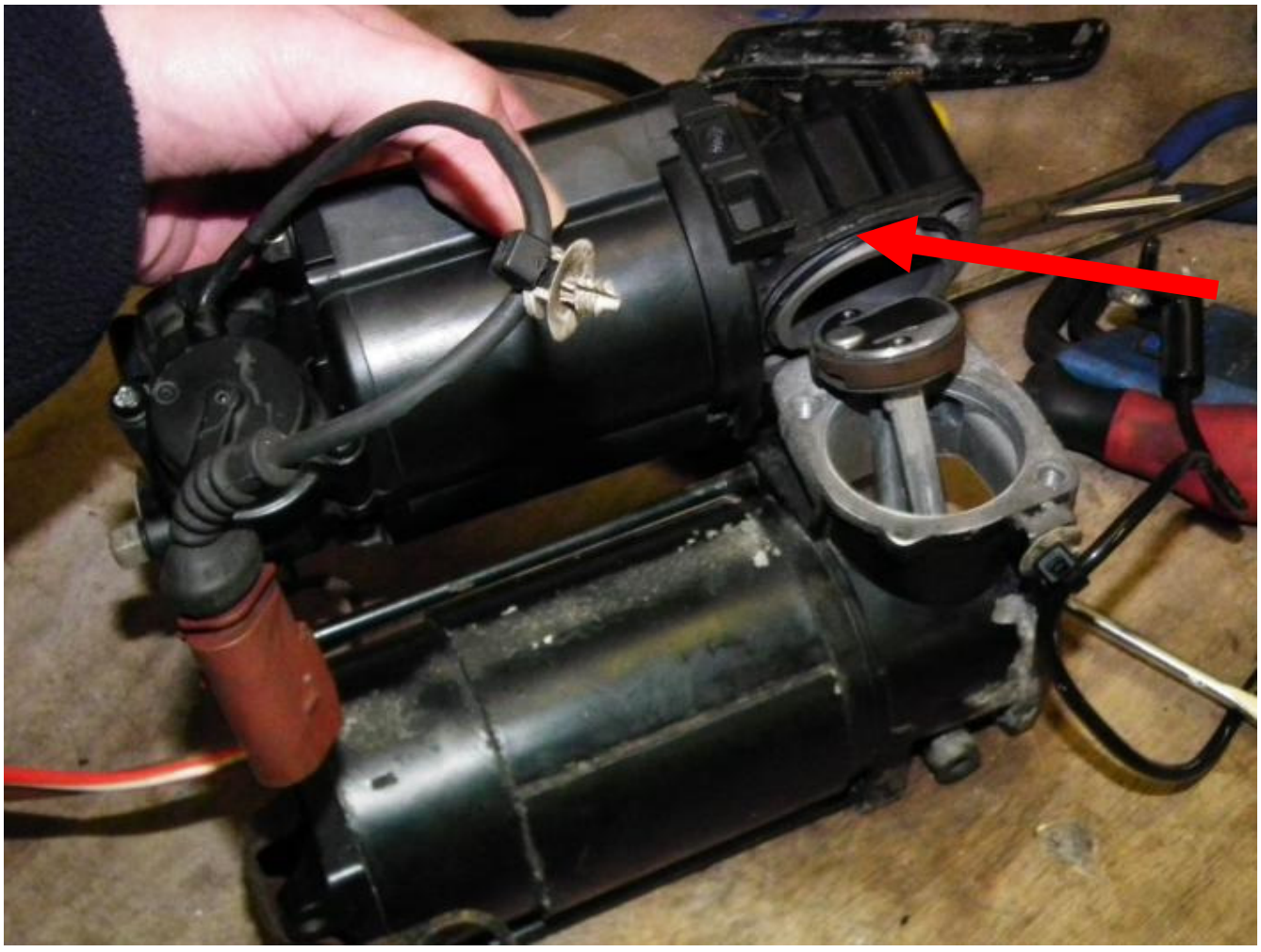
C5 Audi Allroad (Wabco) Suspension Compressor Strip/Repair.

Here are some of my experiences stripping 2 off Audi Allroad C5 suspension compressors to see what makes them tick;

The compressor is fairly easy to strip. The Allroad compressor unit consists of a, Motor, Piston, Drier, Solenoid Valve, & Temp sensor. Once removed from the car, I would recommend cleaning it 1st as you don't want to get rust/dirt into the unit, then remove the plastic hose/s by pulling gently on the hose and push the collar around the hose inwards, the hose should pull out with ease no tools needed. To get to the piston remove the 2 X torx bolts (take note the thermal sensor fitted to one of the bolts) and lift compressor assembly off the motor, Note the rubber o-ring seal (arrowed below), that's enough to get to the piston. I went further & completely stripped both compressors to have a look, In the 1st compressor strip down I found the wires to the motor were damaged but I don't think it would cause to much of an issue, but as I was in this far, I repaired them to the brushes. The Brushes were in good condition with more than half there life in them. So no motor issues and the bearings were all good too. On the 2nd compressor (my Original Allroad one) it was a bit rustier and took a bit to persuade the bolts out, but a good clean and it all looked good again.

Basically the only moving parts are the rotating motor, crank and the piston, and a few one way valves. In the cases of both compressors I have replaced the PTFE Piston seal ring which both showed signs of being a loose fit in the cylinder and tapered wear on the outside diameter of the PTFE ring, both resulting in poor compression & noise.

Photo below of the 1st stripped compressor dated 2004, showing the Compressor unit lifted off the Motor Assembly, red arrow showing the rubber o-ring.

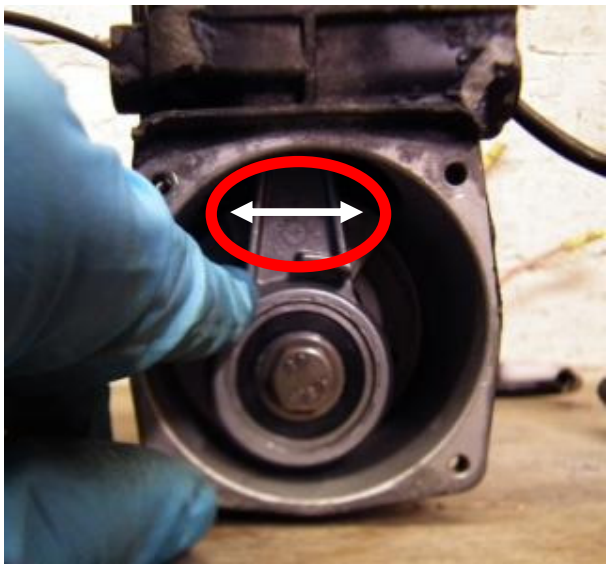


A Close up of piston and old PTFE ring fitted; The PTFE piston ring is tapered with most wear on the top half of the diameter almost seen in this photo. Careful if removing & refitting the Ring as there is a timing pin in the piston (see arrow opposite) which stops the ring rotating.

If removing the ring carefully note the way the ring fits on to the piston before removing, it has to be round the correct way to fit around this pin.

The photo opposite shows a part number “415 403 732 6” stamped on the conrod. I have had no joy ordering this part from WABCO, It doesn’t seem to be on offer, feel free to try if any one has any contacts. (Not guaranteed to come with the ring though). Since looking at this I have found there is a kit part available for the piston ring on its own for other models.

Removing the end plate (drill out 4 rivets) gives assess to the piston & crank. While the compressor is still assembled I could clearly move the piston side to side, too much free play is where the lack of compression & noise is coming from.



See photo opposite showing an arrow in the direction of movement:

However the piston has no gudgeon pin and is fixed so it does need a little movement to allow it to move around in the cylinder bore when the crank is rotating around. The PTFE piston ring/seal is designed to take up this slack, to maintain the seal.

To replace the PTFE piston ring you do not need to remove this plate but I used the access here to test the new piston rings to make sure there was compression & not too much resistance in the bore when creating a prototype.

The compressor unit part has no moving parts other than springs and one way valves, I even removed the silicon beads out the drier unit but there is no need to go in there it was all clean and looked to be in good condition, slight moisture around the inside of the casing but nothing too bad, Another area of failure could be the one way valves if they were to loose the spring or the rubber seals were to go but on both compressors these still looked and worked ok.

I have read people have mentioned oiling the unit/air system, and some mentioned don't oil the system, I would think it would be very difficult for oil to get through the filters in the drier and so I would think it to be pointless, It is designed to be a dry unit after all, any oil will only get to the piston which may enhance the compression but not repair it.

So, The repair Options/Solutions considered thus far:

Fit a new PTFE ring:

The best way forward I have found is to replace the piston ring. For now I Have made a 25% Carbon Graphite PTFE ring to suit these compressors, Initial trials are going well, good compression, and both compressors had the same size cylinders so I am confident it is the piston ring with the wear, the piston ring I made is compatible with both compressors.

Note: All info is based purely on my experience with these particular 2 units which I have managed to improve, this does not necessarily mean this is always the problem with these units. There is also no proof as yet if it is a permanent fix or any proof it will not cause any other issues. I cannot be held responsible for any damage or problems caused by anyone using any of this information on there own units.

2 X Photos of My Original year 2000 Unit below

2 X Photos of year 2004 Unit below

Other findings: My original Allroad compressor is date stamped 2000 (2 photos above LH side) and it has slight differences to VinPetrol's one (dated 2004), the rubber seal between the motor housing and the compressor is not round on mine and follows a shape, also it was Allen bolts holding it together rather than torx on the newer version. I plan to include new rubber seals in a kit but due to this difference they may not be useful in some cases. Both seals however were fine and no issues with re-using them if needed, they do not add to the compression & are only to keep the elements out.

So I have come up with a kit I should be able to provide which includes:

- New 25% Carbon graphite PTFE piston ring
- 2 x Allen bolts.
- New round rubber O-Ring (May only be suitable for the newer compressors)
- Loctite thread lock to apply on re-fitting bolts to ensure no rattling apart
- New cable ties to tidy all hoses and cables once fitted again
- Rough Guide/manual with photos

Other repair options, some attempted:

Buy a new piston ring kit/conrod assembly

Conrod part No 415 403 732 6 (Only if it comes included with the PTFE ring).

I have tried a few wabco parts places, in the UK, all responding to that piston assy part does not exist on there parts list, so no joy there ☹ I have seen photos of a Wabco piston repair kit the only one I can buy is for the VW Touareg, VW part no 7L0 698 030 £108+VAT (new ring seal and bolts), but in my opinion it is too expensive to have a go to only find out it may be slightly different. Audi say the piston ring kit 7L0 698 030 available from VW is not on offer for our models. All I can say is it looks the same, it is the same wabco motor unit, but I have no other evidence or proof otherwise.

Pack the piston ring out:

I Tried a 1mm thick rubber O-Ring, 20mm Dia, fitted behind the piston ring but this failed due to too much pressure behind the ring and so made the motor labour as the piston ring was too tight in the bore, a thinner ring or smaller diameter stretched may be better but still not a good solution. Tried to absorb all options but this one is Not recommended

Temporary Fix, stretch the old ring out slightly and put it back on, ☺

I tried the stretching the ring, as the material is PTFE it is very soft and so easily I could pull it to open it out, will it stay out??... No, it closes very slowly deteriorating as you would expect through use,

Piston ring as removed

Piston ring stretched

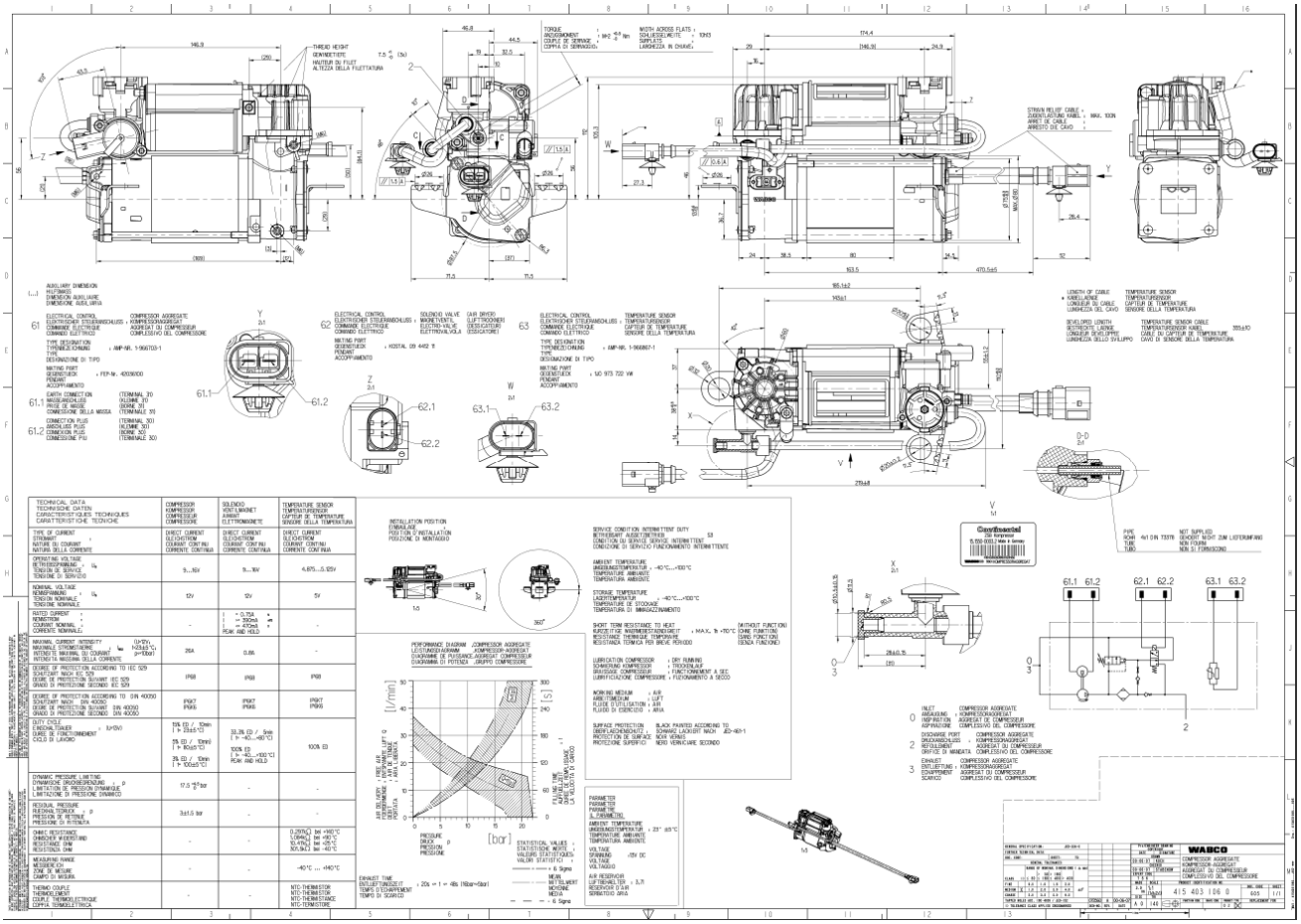
Stretching it will lose its round shape but PTFE is very soft and will find its roundness once back in the bore and it has been running a few times, this is a reason PTFE is used as it will take up any un-evenness in the bore, not to mention its high range of working temp properties and its very low friction hence perfect in a dry unit.

Some Other INFO:

Some Wabco units from Arnott and other compressor options are offered without the electrical connections, the Electrical plug to the motor (compressor side) is Part number : 1J0 973 852 & set of 2 x 4mm Cables to suit is 000 979 307 E

(I used these 2 above items to add a plug to VinPetrols compressor to save cutting my old plug off)

The Allroad compressors are Made by WABCO part number 415 403 106 0 drawing seen below:



Similar style compressors can be found from the wabco parts list below: It seems to be the drier units, mounting brackets & electrical connections that seem to differ on some models. (Based on a visual comparison only)

415 403 105 0	12 V, 420 W max., Quantity delivered 18 l/min (10 bar), IVECO (Daily), Streparava
415 403 106 0	12 V, 420 W max., Quantity delivered 18 l/min (10 bar), Audi A6 (Allroad C5)
415 403 112 0	Alternative: 415 403 303 0
415 403 122 0	12 V, 288 W max, Quantity delivered 18 l/min (8 bar), Operating pressure 14 bar max., Renault. Replacement for: 415 403 101 0
415 403 126 0	12 V, 420 W max, Quantity delivered 22 l/min (10 bar), Operating pressure 13.2 bar max., Kia (Mohave)
415 403 300 0	12 V, 420 W max, Quantity delivered 18 l/min (10 bar), Operating pressure 14.4 bar max., Alternative for: 415 403 108 0 / 404 0, Range Rover
415 403 301 0	12 V, 288 W max, Quantity delivered 16 l/min (8 bar), Operating pressure 9.5 bar max., Alternative for: 415 403 100 0, BMW (5-series, X5/1-Axle -ECAS)
415 403 302 0	12 V, 420 W max, Quantity delivered 25 l/min (10 bar), Operating pressure 16 bar max., Alternative for: 415 403 113 0, Porsche (Cayenne), VW (Touareg 1)
415 403 303 0	12 V, 420 W max, Quantity delivered 18 l/min (10 bar), Operating pressure 16 bar max., Alternative for: 415 403 112 0, Mercedes (E-, S-Class)
415 403 304 0	12 V, 420 W max, Quantity delivered 18 l/min (10 bar), Operating pressure 16 bar max., Alternative for: 415 403 109 0, BMW (X5, 2-Axles-ECAS)
415 403 305 0	12 V, 420 W max, Quantity delivered 25 l/min (10 bar), Operating pressure 16 bar max., Alternative for: 415 403 123 0, Audi (Q7)
415 403 401 0	Land Rover (Discovery 2). Alternative: 415 403 925 2
415 403 402 0	Air Compressing System, 12 V, 420 W max., Quantity delivered 18 l/min (10 bar), DAF, IVECO (Daily)

I hope some of this info is useful to others, the piston ring repair kit I made is currently working on my compressor fitted to my 2000 Allroad and only time will tell on its durability but I am confident it will last a good length of time.