

# ! Dear Customer please choose a part of this document that is particular to the product you purchased.

## Disclaimer

This document is the property of 4x4 Air Seals and should not be redistributed or replicated / reprinted; it is for the sole use of visual reference of 4x4 Air Seals customers. Please consult with your vehicles workshop manual and take all necessary precautions with regard to protecting your safety whilst working on your vehicle! Protecting yourself and your vehicles systems from damage, the information below has been collated from our own personal & customer experiences and should be used as a guide only, we are not qualified motor vehicle repairers and we advise that you research the task in hand before commencing with your repair.

---

---

# 4x4AirSeals - P38 Range Rover

## Compressor

## Piston Seal Repair Kit Fitting Instructions

(Covering standard cup & flat style piston seal models )

(Some newly supplied aftermarket compressors incorporate a pre-energiser O-ring system fitted under the seal! My product is not designed to be used with this system, however if you discard the o-ring you can use this product, but please take this into account when ordering.

Pic 1



Pic 2



Pic 3



Pic 4



Pic 5



Pic 6



You Tube - Fitting Instruction Videos Please take some time to view the P38 repair videos in our technical section! Land Rover category which cover the following tasks:

Piston Connecting Rod Removal - Piston Seal Flat Style Replacement - Cylinder Head O rings Replacement-Piston Connecting rod cup seal install- Piston Connecting rod flat seal install.

Please checkout my website - [www.4x4airseals.com](http://www.4x4airseals.com) Add us to your Favorites, New products & video demonstrations are being added /updated regularly .

( page 1 of 4)

### **Procedure**

**1** (Pic 1 ) Take the 4 bolts off the top and take the top cover off - being careful of the silicon gaskets- they are not cheap. Remove the screw and two metal plates-be careful of their orientation, Clean up the check valve and replace the same way it came out.

**2** (Pic 2 ) Take the top of the chamber off - again be careful with the gaskets:

**3** (Pic3) Take the 3 bolts of the pump end of the motor to open the housing and show the piston

**4** (Pic 4) Take the hex screw out of the pump casing and turn the counter weight to reveal the hex screw in the counter weight - loosen it ! It takes a bit of work but lever the counterweight and piston off the motor shaft with a long screw driver down through the top. Take it out through the front cover hole.

**5** (Pic 5) The picture shows your old piston fitted with the old style seal!

First, cut away as much of the old Teflon seal as you can see, you will then notice remains of the old Teflon seal trapped between the piston and the clamp ring. Using a sharp Stanley blade cut between the piston and the clamp ring, digging and cutting at the remains of the old ring until you have removed it all.

You should then have a nice clean gap between the piston and the clamp ring about the thickness of the Teflon seal & about 4mm deep.

Using a spatula, or similar, now wedge between the piston and clamp ring (in the gap you've just made), gently, and slowly work around the edge, prising at the clamp ring until it comes off. Try not to do too much damage to the piston or clamp ring as these are re-usable parts.

Clean up any burr's or sharp edges you have caused as these burr's may cut or damage the new seal also make sure you clean out the tiny groove before fitting the new seal! The groove acts as secure fixing for the lip on the underneath side of the new seal. Before fitting the new seal make sure the seal is free from dust from the packing materials.

Before fitting the piston seal on the connecting rod make sure the connecting rod fits back on the motor spindle by hand and seats fully home, this can be achieved by cleaning out the hole in the crankshaft counter weight and also cleaning/polish the crankshaft motor spindle!

This will be advantages when fitting the complete piston connecting rod with seal fitted back on the motor shaft at the later stage (Particularly important for the Flat style piston design). Also check that the bearing in the connecting rod is not worn and most importantly that the piston connecting rod as

not been bent slightly out of central position to the bore liner, this can happen easily when wedging/removing the complete connecting rod from the shaft at the earlier disassembly stage. If you reassemble a bent connecting rod into the compressor housing, this could result in rapid failure of the piston seal or uneven wear on one side of the seal and damage to the bore liner.

### **Fitting the piston seal**

If you purchased a kit with the **Flat style piston Seal** please view the P38 flat style fitting video in our technical section of our website.

If you purchased a kit with the **Standard Cup style piston Seal** please view the p38 Standard style piston seal installation fitting video in our technical section of our website.

**Fitting Connecting rod In compressor Housing** please view the p38 piston connecting rod removal or installation fitting video in our technical section of our website.

6 (Pic 6) Scribe a line with a permanent marker pen denoting the position of the grub screw hole in the crankshaft counter weight , rotate the motor spindle so that the flat is positioned facing the housing grub screw hole; position the compressor housing in the vice at approx 30 degrees, make sure compressor housing as been cleaned out and free from old piston seal dust.

With the connecting rod in your hand remove the preassembly tool or bore liner (if fitted) from the piston seal; identify the scribe line which you marked on the counter weight earlier and fit the complete connecting rod back in the housing as quickly as possible.

If you fitted the latest flat style piston seal (not applicable for the standard cup seal design) as it will tend to relax its position back to flat if too much time is taken and could be difficult to fit the bore liner.

Refitting the whole assembly, including fitting the bore liner over the seal, should take ideally approx 15 - 25 seconds (only applies to flat style piston seal) lightly tighten counter weight grub screw; rotate crank so that piston seal is at the highest position and fit the bore liner (as instructed in the videos) 45 degrees moving to the horizontal position in the housing.

Make sure the bore liner is positioned central in the housing as explained earlier then fully tighten the crank counter weight grub screw by rotating crank counter weight back to the marker pen counter weight position.

Where you can access the hole so that you can tighten the grub screw fully (be careful that the piston liner does not slip off the seal whilst carrying out this task, keeping 2 fingers over the liner will reduce the risk of this happening.)

### **Fitting Cylinder Head O rings**

**7** Pay attention to the orientation of the cylinder! It has a lip which mates up with the groove on the bottom of the cylinder head where a large O-ring is fitted. (New one supplied in the kit).

Fit the small O ring by removing the little screw which secures the little metal shims in the top of the cylinder head (do not remove the little screw under the cylinder head) Please take note how the shims are fitted, pry out the little O-ring and clean out the o ring groove, place a little quick drying clear silicone on the bottom face of the little O-ring and fit the O-ring in the groove.

Clean any silicone residue and ensure the top of the little o-ring is clean dry and seated correctly, before refitting the shims clean the face of the bottom shim where it makes contact with the newly fitted small O-ring! Note how both shims are fitted before separating them (the top shim is slightly bent upwards and the bottom shim lies flat underneath it) place a little Loctite on the little screw threads and refit it together with the shims. I would allow a couple of hours to pass before using the compressor, this will allow the Loctite and silicone to dry.

### **Very Important Compressor Re-commissioning Checks**

If your EAS Compressor runs constantly or it switches on & off and keeps cycling within a few seconds between the on /off when the car is sitting level on the drive, then it is advisable to investigate the cause before putting the car back into service with your newly fitted piston seal kit as this type of fault will seriously effect the longevity of the piston seal and service life of the compressor causing your compressor to get hot (Do not allow this with your newly fitted kit) due to air leaks or it could be that your air suspension electronic components may have some faults!

The Range Rover EAS Air compressor pump usually runs for small period of time (4 minutes approx give or take a little) when you first switch on the vehicle after your repair; to replenish the air receiver and return the vehicle back to normal ride height.

Without the compressor getting very hot (absolute No No) with the vehicle sitting on a level driveway, the engine ticking over, the compressor shouldn't switch back on for a good period of time, tests carried out on customers vehicles have shown that the on/off time can be as low as 10 seconds sometimes not switching off at all (Not good ! alarm bells) to 10 minutes upwards (reasonable) you can achieve greater cycling off times by keeping your vehicles air lines and suspension system components in good condition and free from faults. This is the key to component longevity and will allow your compressor to perform correctly over greater periods of time without the need for rebuilding and thus keeping heat build up at a level were it doesn't affect the components within the compressor

### **Technical Back ground Information**

When the vehicle receives a command to raise or lower the air suspension either by the dashboard height switch or 1 of 4 height sensors, this automatically reduces the amount of stored air in the receiver the pressure switch detects the drop in pressure and switches on the compressor for a period of time to replenishes the air in the receiver. Cycling your Air suspension up & downwards whilst the vehicle is not moving will result in increased temperature build up in the compressor unit itself which will not help the longevity of your compressor unit. As the vehicle in normal driving operation tends not to cycle from the lowest to the highest levels consecutively.

Air leaks can have diverse affects on the whole system such as you may notice especially in the morning that the vehicle appears to have lowered itself over night this is usually due to air leaks with air lines or leaks in the valve block solenoids or Air bags are in poor condition! Using some gas leak detector purchased from

your local hardware superstore can help identify leaks on your vehicle, faulty height sensors can cause the problems and Carrying out extensive preventative checks on your EAS system periodically should dramatically reduce the need to keep rebuilding your compressor.

---

# **4x4AirSeals - P38 Range Rover Valve**

## **Block Solenoid O ring Kit Guide instructions**

### **Procedure**

Remove your valve block assembly as per owner's manual from your vehicle, minus the compressor, the plastic box containing the valve block and electronic component parts should all be removed as a complete unit from the vehicle. When you have removed the item from the vehicle, proceed to notes below.

Remove valve block with all valves still fitted from the box enclosure keeping electronic components connected where applicable as per manual.

Layout all the new o-rings in the kit on the drawing which is supplied with the kit for your own inventory check, making sure all is present and correct and none have accidentally fallen out when bags are opened or o rings that have become stuck within each other.

Repairing one solenoid valve at a time is a good method. Starting with the valve block on the bench with 4 valve solenoids on top (left to right 3 facing one way towards you and the end one the opposite, as you disassemble the 1<sup>st</sup> valve solenoid into its individual parts. Please take note as to the orientation of each of those parts for reassembly, it's very important due to the fact that each solenoid can have slight differences as to the orientation of the parts within each of the solenoids, you can take pictures with a digital camera or use a white marker pen to help with the reassembly (quite important especially if you get distracted). Overhaul each solenoid in a methodical manner with good overhead light present, replacing each o-ring and placing the old o-rings in a separate space for an inventory check at the end.

It's a good idea to use a very light coating of silicone grease on the new O rings to aid reassembly. Please make sure all the o-rings seat correctly and do not get trapped or fall out when screwing component parts together, work through the 4 solenoid valves on top left to right one at a time then turn the valve block upside down and complete the remaining 2.

**Check Valves** the next task is to replace the check valve O rings.

Locate the block on the end retained with 4 off m5 bolts it as a solenoid bolted to it which you do not need to disturb, remove the 4 off bolts and move electrical wiring to one side so that you can separate the block. Be careful at this stage as you will expose the check valves - please note the position of

each check valve for reassembly; especially the one positioned differently to the other 2 and make sure you reassemble them in their respective positions after replacing all the O rings .

**Air Pipe Collets** the next task is to replace the individual air pipe O-rings on the side of the complete valve block unit. Remove each collet with a tiny screwdriver being careful not to brake the fingers off the collets themselves then pry out the old O-rings.

Usually each collet contains 2 O-rings in each, before installing the new O-rings, it's a good idea to lightly coat the O-rings with silicone grease (included in the kit) to aid fitting of the air pipes at a later stage.

### **Note**

There should be 8 O-rings of letter **J** left over from your valve block repair. These are useful if you suspect that your Air bag O-rings are leaking. I suggest leak testing your Air Bags before using these Remaining O-rings! If your Air Bag O-rings do not show any signs of leakage I would advise not to disturb them. You should have 2 spare O-rings of letter **K** these can be used to replace leaking O-rings in the Air Dryer Unit .

### **NOTE (Optional) DIAPHRAM SEAL FITTING INSTRUCTIONS**

Please note if you purchased a kit with the diaphragm seal included then its now time to fit your new diaphragm seal.

Firstly identify the block bolted on the valve block assembly with 4 off M5 Allen bolts with the main compressor air pipe attached; remove the 4 bolts and then remove the diaphragm block.

There will be a tiny spring in the valve block assembly which you can leave in place! Discard the O-ring in the diaphragm block and replace with the new one using a little silicone grease to keep it in place, when inverted later in this procedure, then remove the old diaphragm seal which generally comes out in one piece but frequently comes out in 2 pieces.

Fit the new diaphragm seal into the block housing then invert the diaphragm block and using a torch visibly locate the little spring into the centre of the diaphragm seal, visualising and positioning the spring into contact with the aluminum pad in the centre of the newly fitted diaphragm seal, as you lower the block to its mating surface.

Refit the 4 off M5 Allen bolts. It is advisable to use a little amount of Loctite on the bolt threads for security, tighten the bolts being careful not to over tighten.

Please note the new diaphragm seal comes complete ready to fit. If you have to remove the plastic insert fitted into the centre of the diaphragm seal! Please make sure the small aluminum pad is not dislodged out of its rubber pocket, you can refit all 3 parts that make up the diaphragm seal but it is advisable to fit it straight out of the packaging).

When you have re-fitted the valve block assembly back on your vehicle, allow the system to pressurise and using a good concentration of soapy water and a small paint brush, smear all your air lines with the soapy water or leak detector including air bags /external equipment connected to the

EAS system, there shouldn't be any bubbles appearing from the individual air lines if your installation has been successful ( scratched or grooved air lines can suffer leakage resulting in irratic suspension heights when vehicle is left not in use )

Useful Troubleshooting link - <http://paulp38a.com/range-rover-p38/how-eas-works/>

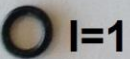
=====



**4X4AirSeals**

Air Suspension Products

Diaphragm seal & Oring



**4x4AirSeals** - P38 Range Rover Air  
Dryer Filtration Kit fitting instructions





1 With the air dryer unit removed from the vehicle, the top of the air dryer needs to be removed by unscrewing the top. A tip referring to the picture is to use an oil filter removal chain or strap attached to 1/2 ratchet and a piece of sand paper to grip between the plastic lid and the strap/chain.

2 Once you have unscrewed the lid remove the spring and before you empty the contents. Take note the fitting order the components are removed, the mesh disc and filter at the top are slightly bigger on diameter than the mesh disc and filter in the bottom.

3 Remove mesh disc, remove paper filter, tip out granules, remove paper filter out of the bottom of the chamber, remove mesh disc out of the bottom.

4 Using wire wool clean out the inside of the air dryer.

5 Place air dryer chamber upright in a vice, refit small mesh disc in bottom, place small filter pad on top of small mesh disc, fill chamber with the granules in the kit, place large filter pad on granules, fit large mesh disc on top of large filter pad, fit spring on top of large mesh disc, refit air dryer.

Refit your air dryer unit back on your vehicle fitting the air pipes back in the same order as removed.

Thank you for purchasing this 4X4Airseals product.