

Green Oval Experience
ph: 0424 966 558
email: go_experience@yahoo.com



Green Oval Experience **Emergency Air-Up Kits for** **Land Rover L319, L320 EAS systems**

Green Oval Experience (GOE) accepts no responsibility for injury or damage due to fitment or use of this product. Moreover, it is highly likely that use of this product may void parts of your vehicle warranty. The use of this product is entirely at the purchaser's discretion and risk.

1 Suitability

This product is designed for use with Land Rover Discovery 3 and 4, and the Range Rover Sport, where these cars are fitted with Land Rover's Electronic Air Suspension.

2 Introduction and Components of the Kit

Long distance remote travel, particularly off-road, can be disastrous if the car's air suspension fails. With the vehicle at access height, or on the bump-stops, it can be impossible to drive the car back to civilisation. We hope you never have to use this kit, but if the unthinkable happens, at least you know you'll survive!

The GOE Emergency Air-Up kit is designed to allow the driver to manually air-up the air bags in the case of catastrophic system failure, but where the air-bags themselves are still intact. This is an emergency system only, and is not designed to be used on a regular basis, or replace the standard air system.

The GOE kit has been extensively tested for a 12 month period, including 4 vehicles traversing the 2200km Canning Stock Route desert track with these systems fitted.



Figure 1: The GOE EAS emergency inflation Kit

This kit comprises of:

- Front Components (see Figure 2):
 - 2 quick-interconnects,
 - 2 front air adaptors,
 - 2 front air connects

Green Oval Experience

ph: 0424 966 558

email: go_experience@yahoo.com

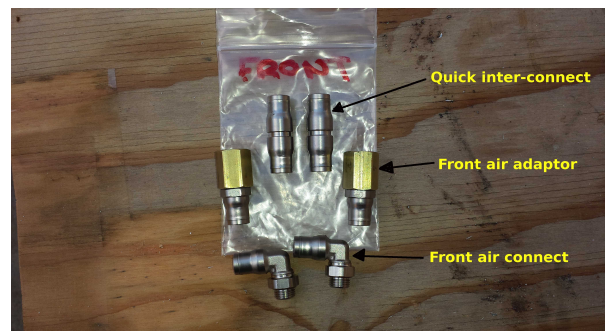
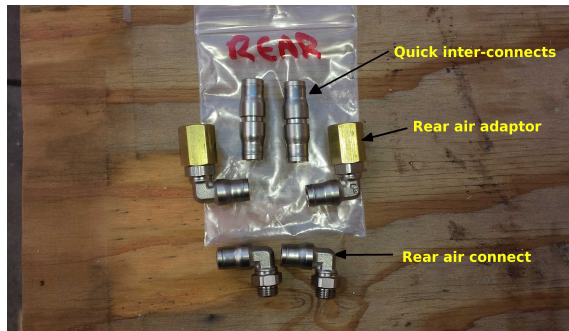


Figure 2: Rear and Front kit components

- Rear Components (see Figure 2):
 - 2 quick-interconnects,
 - 2 rear air adaptors,
 - 2 rear air connects
- Inflation Components (see Figure 1):
 - 4 shraeder valves with quick-fit interconnects,
- Miscellaneous:
 - 12m of 6mm high-pressure air-line,
 - 1 hand-held air-line cutter,
 - 2 spare quick-interconnects + spare airline piece,
 - 2 pieces coloured heat-shrink

In addition, you will need:

- Loctite 243 medium-strength threadlocker,
- short (stubby) 12mm and 13mm open-end spanners

3 Overview of the Land Rover EAS system

Land Rover's T5 EAS system comprises of the following main components (referring to Fig 3):

- the air compressor (#14), located by the left-hand side chassis rail of the car approximately under the rear door opening,
- the air reservoir tank (#16), located in front of the compressor,
- 2 valve blocks: front one (#19) located behind the lower edge of the front bumper surround, one rear (#10) near the rear air-bag strut,
- 4 air-bags (#1, 6, 8 and 18), one for each wheel.

Electronic control is provided over the compressor, the valves on the reservoir tank, the front/rear valve blocks and various sensors for ride height etc. There is no control or sensor path between the valve block and the air-bag itself. In the vast majority of situations, the air-bags are never themselves compromised (I only know of 4 world-wide that have failed) – if the car sinks to the bump stops, it is either an air-line leak, an electronic fault, or a valve/pump/tank failure.

Green Oval Experience

ph: 0424 966 558

email: go_experience@yahoo.com

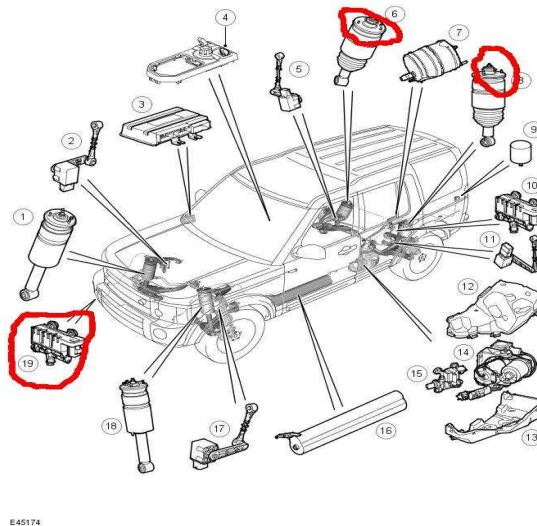


Figure 3: EAS system components

4 How It Works

Please read through this section prior to starting the install! The GOE kit comprises of two sub-systems. One is permanently fitted to the vehicle (the Front and Rear Component items) and the other is kept handy (the Inflation Component items), eg in the glovebox, in case the system needs to be activated. You will also need a decent air compressor capable of 120psi or so (the volume rate is not important – although high volume pumps will be faster).

The pertinent parts of the car's EAS system for this fitment are shown in Figure 3 circled in red. These are the front valve block and the rear air-bags themselves. We will insert a new air “circuit” at these points – two at the front valve-block and one each to the rear airbags. The following refers to Fig 4 – please note this figure shows a removed airbag and cut airline for demonstration purposes only – ***you do not remove the bags or cut the airlines for this install!***

For each rear air-bag: the Land Rover BSPP air-connector at the top of the air-spring (Fig 4a) is unscrewed and a GOE rear air adaptor is attached to it (Fig 4b, 4c); a GOE rear air connect is screwed into the air-bag to replace the BSPP connector (Fig 4d). This forms the loop of air hose that a “quick interconnect” is then inserted into (between the air-spring and the BSPP connector).

For the front valve-block: the BSPP air-connector for each side is unscrewed from the front valve-block (Fig 4e) and a GOE front air adaptor is attached to each; GOE front air connects are screwed into the front valve-block to replace the BSPP air-connectors. Again this will form a loop of air hose with a quick-interconnect inserted.



Figure 4 a), b) and c)

Green Oval Experience

ph: 0424 966 558

email: go_experience@yahoo.com

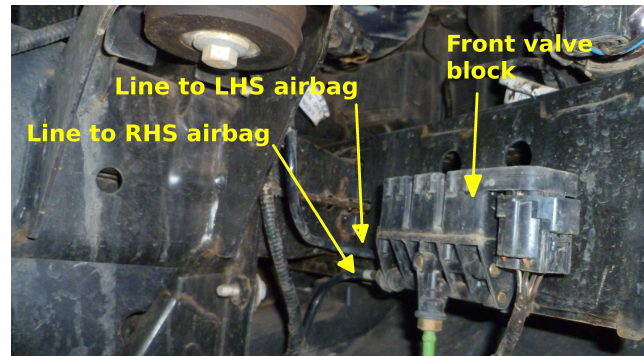
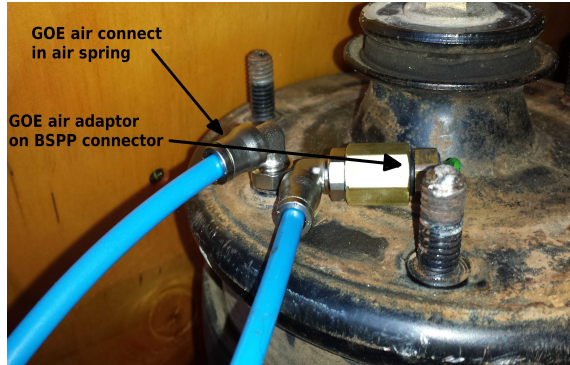


Figure 4 d) and e)

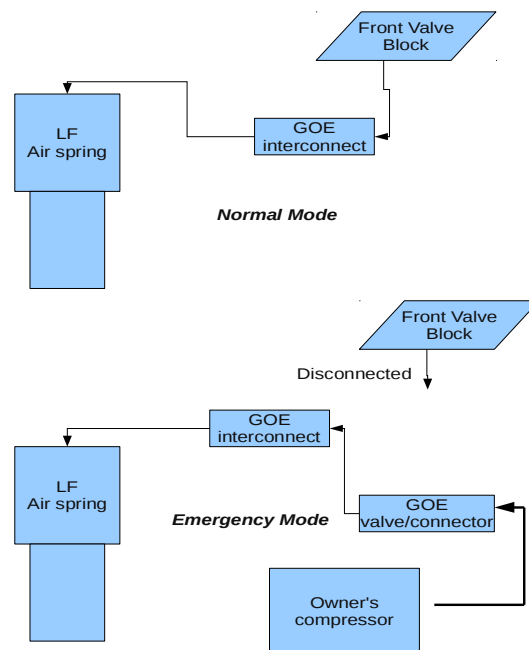


Figure 5: a) normal mode b) emergency mode

These adaptors are a nickel-steel component with +500psi burst pressure and corrosion resistant. Much research and testing went in to finding a component that did not introduce any additional resistance to air flow in the system.

In normal mode, the system acts as standard; the added loop does not affect the system (Fig 5a). In an emergency however, the line from the valve-block to the quick-interconnect is disconnected (hence the term “quick interconnect”) and a new line is fed in (with a shraeder valve) that can be connected to an external air compressor (Fig 5b).

In practice, if the loop is not long enough, the interconnect will be inaccessible (under the wheel well and the car will probably be down on the bump stops!), so the loop fitted in this circuit is made long enough to place the quick-interconnect in an easily accessible position, ready for use. Where this is actually located will vary from vehicle to vehicle, depending on fitted accessories such as bull-bars, wheel carriers etc. These instructions assume the front loops will be accessible from behind the front grill, and the rear ones from the trailer socket cavity.

This will add approximately 2m of airline to each air-bag circuit. This represents a negligible volume of air (~50cc) and does not affect the operation of the EAS.

Green Oval Experience

ph: 0424 966 558

email: go_experience@yahoo.com

In an emergency, each accessible interconnect (one for each circuit) is now disconnected and a short piece of line with a shraeder valve (normally stored in the glovebox) is attached to allow the bag to be inflated via an external air compressor. The EAS electronics are then deactivated (via the fuses). The vehicle can now be driven until such time as a repair for the system is available.

Please note that there can be in excess of 300psi in the airlines. ***Never attempt to use the GOE kit unless the car is at access height or lower.***

Fitting the kit will take around 2 to 3 hours or so. Note that installation is not for the faint-hearted (but is doable for the average DIY owner) or those that are overly concerned with warranty issues - it is something to fit only if you believe you need it, eg for those who travel remotely, or have the need to fit oversize tyres.

All extraneous hosing and connectors can be removed to return the vehicle to stock. ***No lines are cut or original connectors removed when fitting this kit!***

5 Preparation for fitment of the kit

Unpack the kit and familiarise yourself with the components (refer to Section 2 above). Specifically, identify the difference between the GOE air connects and the GOE air adaptors. For the install you will need:

- a suitable trolley jack,
- car ramps or stands (not strictly required, but makes it a lot easier),
- stubby 1/2" spanner (this is to access the BSPP connectors on the rear airbags),
- soapy water and soft brush or other applicator
- cable ties
- keep all areas around the install clean and free from dirt that might ingress the lines and connectors.

6 Fitting – Front

Start the car and lower it to access height – **THIS IS MOST IMPORTANT!!** Switch off, open the bonnet and let the car go to sleep (doors closed, wait 120 sec). Now disconnect the battery. Jack the car from under the wish bone (Fig 6a) and remove the front rhs wheel. It is advisable to also use stands or an additional jack. Remove the wheel-well liner (actually you can access the required parts by only undoing the front half of the liner and bending out of the way, but it is easier with the liner completely removed). You should be able to now access the front valve-block (see Fig 6b). Carefully identify the line going **TO** the RHS air bag – **DO NOT** rely on the picture below to identify the line – different years and models may have different coloured air lines! Carefully unscrew the BSPP connector going to the rhs air-spring from the valve-block – air will start escaping from the system, this is normal. As air escapes, the air bag will compress – stand back and ensure the car is still safely on the jacks/stands.

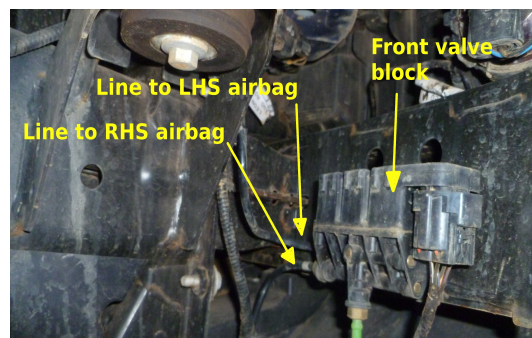


Figure 6 a) and b)

Green Oval Experience

ph: 0424 966 558

email: go_experience@yahoo.com

Refer back to Fig 4b and ensure that only 3 ~ 4 mm of original air hose extends from the end of the BSPP connector. If not, trim it back slightly with the cutters. Now attach one of the straight GOE front air adaptors to the BSPP connector. Screw in one of the GOE 90° front air connects to the valve-block. ***In both cases, apply a few drops of Loctite thread locker to the thread before assembly.*** You should now have two open ends – one at each connect. Remove the front grill and locate a clear passage between the lower left side of the radiator (looking at it) and the wheel-well area below containing the valve-block. Cut two lengths of airline (approx 600mm each), mark the end of one with blue heatshrink supplied, and feed the other end through from the grill area to the valve-block area, along with the unmarked line. **NOTE:** keep the tube away from hot or sharp surfaces.



Figure 7 – from grill area



Figure 8 – feed in the lines to wheel-well area

Back under the wheel well, connect the other end of the marked line to the air adaptor that feeds the air-bag; fit the unmarked line to the air connect in the valve-block. To fit the lines to the connectors, hold the collar back against the body of the interconnect and push the airline carefully but firmly straight into the interconnect until it is snug. Release the collar. **TIP:** practice this on a small piece of scrap airline first. Finally, back up at the grill end, fit a straight quick inter-connect between the two cut lines in the grill area – see Figure 9. ENSURE THE ARROW ON THE QUICK INTER-CONNECT POINTS TO THE LINE THAT GOES TO THE AIR-BAG!! **TIP:** tie hose away from sharp edges with wire ties.

Repeat for the other front circuit for the LHS airbag. You should be able to run the air line loop through the same cavity from the front grill area to the valve block. Mark this circuit with the other heat-shrink colour! When the circuits are complete, test each for leaks (see Section 8). Replace the wheel-well liner and the wheel.

Green Oval Experience

ph: 0424 966 558

email: go_experience@yahoo.com



Figure 9 – completed loop in grill area. Arrow points to line that feeds into the air-bag

7 Fitting – Rear

Before starting on the rears, remove the spare wheel to allow easier access.

The rear LHS air-bag has the least access due to a major plug assembly behind the bag, and so fitting is a little more difficult than the others. Refer back to Fig 4. You will need the stubby 12mm spanner to remove the LR fitting, and the 13mm to attach the GOE one.

The rear circuits are installed similarly to the front, except we are intercepting the air circuits at the connection to the airbags themselves, rather than the rear valve block (which is rather inaccessible, but in theory could be used instead). The loops will therefore run up each side of the vehicle, from the airbags to the access area, that being the rear trailer plug indent (see Fig 9b). Note the following:

- It is not necessary to remove the wheel-well liners.
- The loop should run up along the edge of the chassis rails – easily done if you remove the spare wheel first (Fig 10a)
- you can tie the loops (loosely) to the rear recovery hook so that they don't fall behind the cowling (Fig 10b)



Figure 10 a), b)

8 Checking for leaks

When a circuit has been completed, ensure the jacks/stands are still firmly in place, reconnect the battery and start the car. With the door open, select normal height, exit the car and shut the door. Ensure the car has completed raising (it may take longer than usual as the car is going from zero bag pressure) and then switch off the engine. Again check the jacks/stands. Listen for any noise of leakage from the interconnects. Using a small bowl of water with a dozen or so drops of washing detergent mixed in, brush all connections and inspect for bubbles.

Green Oval Experience

ph: 0424 966 558

email: go_experience@yahoo.com

If a leaking connection is detected, switch on the ignition, ***drop the car to access*** and re-seat the line in the connector. Retest. This may have to be done several times. If leak persists, remove the offending end of the line from the interconnect and recut (trim) the line, ensuring it is a smooth, straight (90deg) cut. Reseat the connector and retest. When you are happy with the connections, measure the heights of each corner, leave the car standing for an hour or so and recheck the heights.

9 Testing the system

With the car at access, switch off, remove the grill and disconnect one of the interconnects (either one will do) at the end OPPOSITE to the arrow, ie leave the interconnect on the line going to the air-bag. Air should rush out of the end. Once the car has completely dropped on one corner, do the following:

1. Attach one of the shraeder valves + line to the end of the interconnect (See Figure 11)
2. Attach your compressor to the shraeder valve and pump up the air-bag.
3. When at sufficient height (say just at normal height), switch off compressor and remove from the shraeder valve.

At this point the test is complete. When satisfied, ***slowly*** let air out of the shraeder valve (with a deflator or a pin) and deflate. Return the system to normal and start up.

10 Using the system

In an emergency, first follow the 3 steps above in “Testing the system”, for each corner that requires pumping up. You may need to start the car to run your tyre compressor for an extended period. ***HOWEVER:*** prior to inflating the bags, you need to disable the EAS system as follows:

- Follow the procedure for disconnecting the battery (with the bonnet open).
- In the fuse box next to the battery, remove all fuses and relays that have the EAS symbol (same as the DSC symbol in the car). There should be at least two fuses and one or more relays, depending on the model you have. Your manual should list all fuses and relays. Note that the ones inside the car (behind the lower glovebox) are for the internal switches and do not need to be removed.
- Reconnect the battery and start the car. You should get several warnings regarding the EAS and TR, but basic traction control should still operate and the car should be driveable once you have inflated the air bags as per Section 9.

11 Getting more lift

If your compressor cannot lift your car high enough, you can try jacking up each corner from the chassis rail (NOT the wishbone) to extend the spring prior to pumping. Jack the car to just above normal height and pump up that corner. Release the jack and the car should drop a little, but still be higher than the pump could manage alone. **REMOVE THE EMERGENCY SYSTEM AT THE EARLIEST OPPORTUNITY!!**



Figure 11: Shraeder valve + short line attached to the circuit.