

Green Oval Experience
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Green Oval Experience **Emergency Air-Up Kit (small) 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! Please read through this documentation and familiarise yourself with the various components of the kit and on your car.

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***. Please note that continued use of a tyre compressor to inflate the bags will introduce moisture into the system, which may cause problems with the normal operation of the system.



Figure 1: The GOE EAS emergency inflation Kit

This kit comprises of (see Figure 2):

- 2 Front Air Adaptors,
- 2 Rear Air Connects,
- Inflation Components (see Figure 1):
 - 4 shraeder valves with quick-fit interconnect + 4 pieces of airline,
- 2 spare quick-interconnects + spare piece of 6mm airline,
- 4 cable-ties

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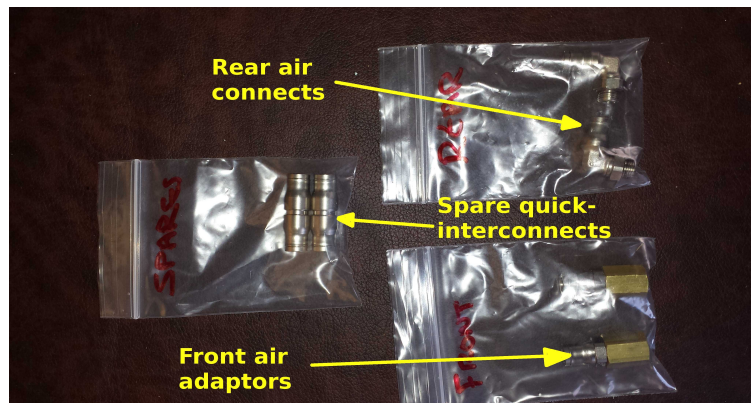


Figure 2: Rear and Front kit components

In addition, you should keep the following packed away with or near this kit, for when it is needed:

- these instructions!!
- small bottle of loctite 243 medium-strength thread-locker,
- short (stubby) 13mm and 12mm open-ended spanners
- small basting brush and some method of producing soapy water
- good jacks (see Section 6)

The adaptors are a nickel-steel component with +500psi burst pressure and corrosion resistant. The airline is a specific high-temperature, high-pressure line to cope with Australian conditions.

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-spring itself. In the vast majority of situations, the air-springs 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.

4 How It Works - Overview

Please read through this section prior to starting the install! The GOE kit comprises of all the adaptors required to attach a tyre compressor to each air-spring and re-inflate the system. You will also need a decent air compressor capable of 80psi or more (the volume rate is not important – although high volume pumps will be faster). ***This system is only installed in the case of an EAS breakdown. It is not meant to be permanently attached to the vehicle!*** Once the car has been recovered to an area where the EAS system can be properly repaired (see below), the GOE kit should be

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removed and the system returned to standard.

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 disconnect the OEM connectors to the front valve block and to the rear air-springs, one at a time, and fit the GOE components. ***You do not remove the bags or cut any airlines for this install!***

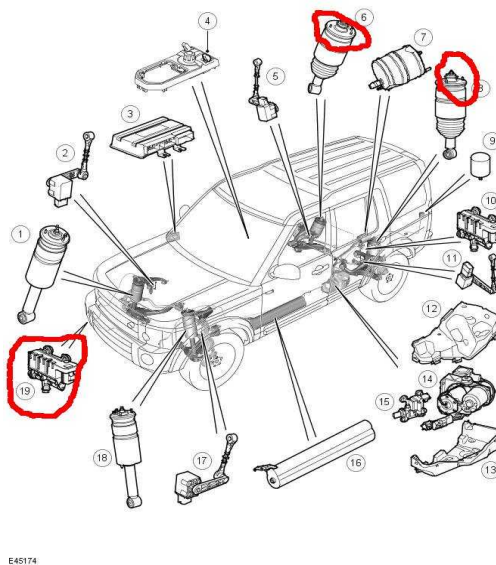


Figure 3: EAS system components

You can then attach the shraeder valve and airline to the LR components and pump up each air-spring one at a time via your tyre 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.

For each rear air-bag: the Land Rover BSPP air-connector at the top of the air-spring is unscrewed (see Fig 3) and a GOE elbow rear air connector is screwed into the air-bag to replace the BSPP connector. A shraeder valve with airline is then attached to the quick-fit connector (Fig 4a). This can then be used to pump up the air-spring with a tyre compressor.

For the front valve-block: the BSPP air-connector for each side is unscrewed from the front valve-block (Fig 4b) and a GOE front air adaptor is attached to each. Again this provides the connecting point for a shraeder valve + airline to enable inflation.

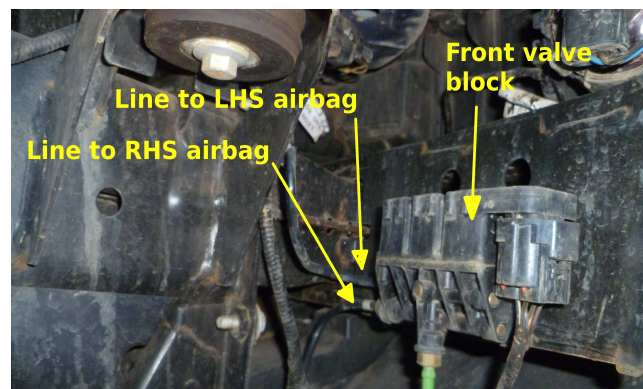
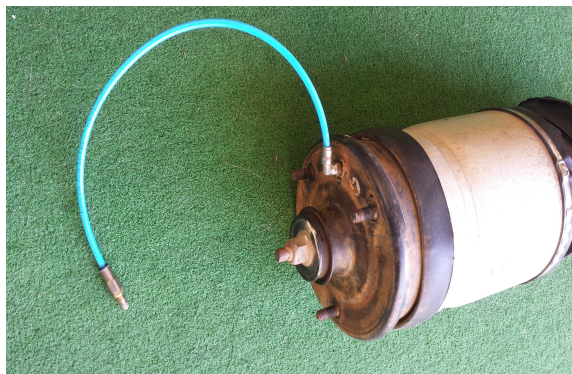


Figure 4 a) and b)

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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 30 to 60 minutes. 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

This kit can only be fitted to the car safely if the car is on level ground and can be jacked up. You may have to recover the car to such an area first. Please read the next section (Section 6) “Jacking up your Vehicle” carefully! We assume that the EAS fault has left the car at access height, or down on the bump-stops. In such a condition there is minimal pressure in the air-springs and it is therefore safe to fit the GOE kit. ***Never fit the kit if the car is not in this condition!***

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

- a suitable jack (s) plus base plate(s),
- stubby 12mm & 13mm spanners (this is to access the BSPP connectors on the rear airbags),
- loctite 243 medium-strength thread-locker or equivalent,
- soapy water and soft brush or other applicator (optional)
- cable ties
- keep all areas around the install clean and free from dirt that might ingress the lines and connectors.

Follow the standard procedure for disconnecting the battery prior to fitting the kit!

6 Jacking up Your Vehicle

Throughout this documentation, reference is made to jacking, or raising, the vehicle. Please keep the following in mind whenever this is mentioned.

The standard LR procedure for jacking up the vehicle requires the car to be in off-road height. This obviously does not apply here, as the EAS system is non-functional. When the car is down to the bump-stops, jacking the car up can be quite tricky, depending on the size tyres you have fitted. Have a look at Figure 5 to see what it looks like!

For safe jacking of the car in off-road conditions, you need at least:

- a trolley jack or,
- the Land Rover scissor jack, plus a good bottle jack,
- base plates for the jacks

When down on the bump-stops, only scissor jacks (as supplied by Land Rover) or a trolley jack will fit under the chassis. Your favourite bottle jack or even most air-jacks will not physically fit under the car! The short-comings of the scissor jack are well documented – primarily the fact that they can only lift in the vertical plane – if the car is at a slight angle, the jack will fail. So firstly, your car needs to be recovered to flat ground.

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Figure 5: Rear of RRS down on bump-stops- a 265/60R18 tyre

Secondly, the jack base must be on a firm, flat area. I always carry a flat piece of 6mm alloy plate to use as a base for the jack. Something similar in 4mm steel can be used, but if using a piece of wood, remember that this may restrict the height under the chassis even further!

If you don't have a trolley jack (most people don't travel with one - but consider it!!), you will need to use a combination of the scissor and bottle jacks under the chassis rail. Raise the car firstly with the scissor jack until there is room to deploy the bottle jack. Then continue to raise the car using both. If it is necessary to remove a wheel (this might be the case if you've fitted larger tyres, as you won't have much room), you might want to consider another jack to raise the wheel assembly off the ground, by jacking from under the wishbone. Otherwise you will have to raise the chassis a **long** way to get the wheel off the ground!

From the above, obviously the ideal set-up would be to have a small trolley jack, a bottle jack AND the LR scissor jack.

Once there is enough access to fit the GOE kit, use caution when fitting – keep your eyes on the jack(s) for any movement, and it's best to have some solid obstruction (eg the spare tyre) under the car as soon as there is room to place it there.

7 Fitting – Front

Both the left-hand and right-hand air-spring connections can be accessed from the front valve-block in the RHS front of the car. With the battery disconnected, jack the car from under the RHS front chassis rail (see Section 6). Optionally remove the front RHS wheel (depending on the size tyres you have fitted, you might be able to leave the wheel on and still have sufficient room). It is advisable to also use stands or an additional jack if possible. 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, this may be easier). You should be able to now access the front valve-block, attached to the inside of the front bumper (see Fig 6a). Identify the line going **TO** the RHS air bag – **DO NOT** rely on the colours in 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 a little further – stand back and ensure the car is still safely on the jacks/stands.

Now attach one of the GOE front air-adaptors to the BSPP connector (Fig 6b, 6c). ***Apply a few drops of Loctite thread locker to the thread before assembly.*** You can now insert the airline attached to one of the shraeder valves into the GOE front air-adaptor. Push it in firmly until it “clicks” twice.

Repeat all of this for the LHS connection from the valve-block.

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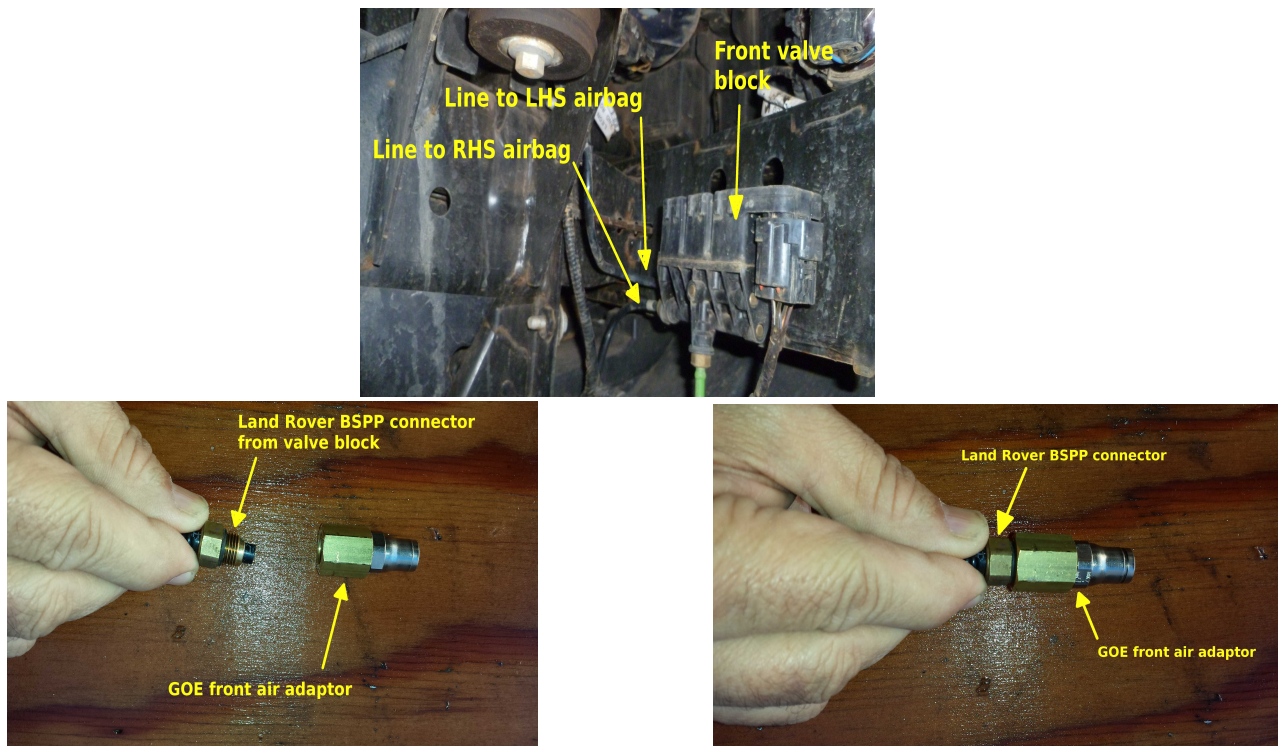


Figure 6 a) b) and c)

If you removed the wheel, refit it now. Lower the car off the jack(s) carefully, keeping the newly attached components accessible. You can now pump up the air-spring to approximately on-road height. Do not raise any higher at this stage. Remove the tyre compressor from the shraeder valve. Refit the valve cap and tie the valve out of harms way using a wire-tie or similar. **NOTE:** keep the tube away from hot or sharp surfaces. Now repeat for the other GOE fitting.

8 Fitting – Rear

The rear LHS air-spring 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.

The rear circuits are installed similarly to the front, except we are intercepting the air circuits at the connection to the air-springs themselves, rather than the rear valve block (which is rather inaccessible, but in theory could be used instead). Unlike the front, this means we have to work on both sides of the car.

Jack up the rear RHS of the vehicle (see Section 6). Locate the LR BSPP connector at the top of the air-spring, and using the stubby 12mm spanner, slowly remove the connector (Fig 7). Air will start escaping from the system, this is normal. As air escapes, the air bag will compress a little further – stand back and ensure the car is still safely on the jacks/stands.

Screw one of the GOE rear air-connects into the bag, after applying **a few drops of Loctite thread locker to the thread before assembly**. Tighten up with the 13mm stubby spanner. Attach the shraeder valve + airline as per the front, and air up the spring. Secure the valve safely away from the wheel area with a cable-tie.

Repeat for the LHS.

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Figure 7 – location of connector on rear air-spring

9 Driving with the kit fitted

When all springs have been inflated, listen for any noise of leakage from the interconnects. If possible, using a small bowl of water with a dozen or so drops of washing detergent mixed in, brush all connections and inspect for bubbles. If a leaking connection is detected, re-seat the line in the connector. Retest. 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.

Once satisfied, you can now use your tyre compressor again to get the car appropriately level.

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 will receive multiple warning regarding the EAS, Special Programs, DSC etc, but the car should now be drivable and you will still retain basic traction control. Please note that as the EAS system is no longer replenishing air in the air-springs, the car will slowly drop over the course of a few hours or so, and you may need to inflate again. Always try to keep the car level!

10 Removing the GOE system after use

Once back in civilisation, you should remove the kit at the earliest convenience. Disconnect the battery. With a jack under the corner, *slowly* discharge the air via the shraeder valve from the air-spring. The car will drop, so use caution and ensure the car is still safely on the jack. Once discharged, jack up the car and remove the GOE components, re-seating the LR BSPP connector appropriately (in the air-spring for the rear, in the valve-block for the front). Replace all the EAS fuses and relays and reconnect the battery. Start the car and confirm the EAS system is still non-functional. You can now call Land Rover Assist to recover your vehicle!

Ensure all GOE components are free from dirt or obstructions before packing away.

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!!