

How to Remove and Install Hydragas Spheres

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The following describes the procedure to remove the original hydragas spheres and install regassed hydragas spheres, along with information on repressurising the suspension, hydrolastic fluid recipe and how to make a hydrolastic pump using a grease gun.

Depressurising the hydragas system

- Start by placing the car on axle stands and remove all four wheels.
- Relieve the fluid pressure from both sides of the hydragas system. There are two Schrader valves located on the hydragas pipes behind the under bonnet black plastic cover.
- Caution: wear eye protection due to the fluid in the system being at a pressure at or above 400 psig (27.6 bar).
 - If using a Churchill hydrolastic pump, follow the instructions on the unit to remove the fluid from the spheres.
 - If you do not have a Churchill hydrolastic pump, other people have used the following method with success:
 - Connect a Schrader low loss connector valve to the Schrader valves and place a plastic jug on the end of the valve.
 - Slowly open the valve and allow the high pressure liquid to discharge into the plastic jug.
 - Be careful to keep skin away from the low loss connector valve because the fluid in the system is at very high pressure and could damage your skin.
 - It is not necessary to evacuate the hydrolastic fluid from the spheres; the liquid can be easily drained from the spheres once they have been removed from the car.



Removing and reinstalling the spheres

Right hand rear

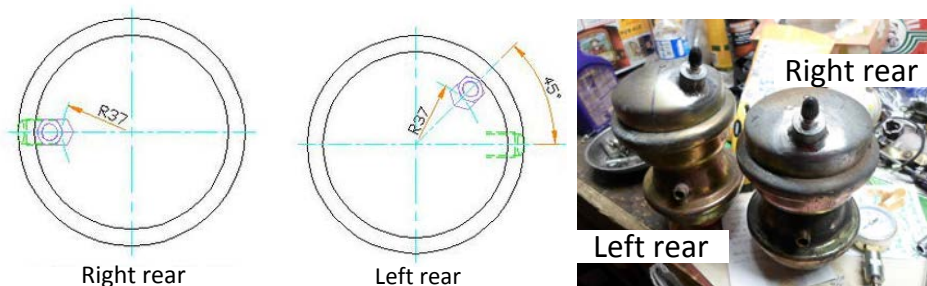
- Disconnect the pipe from the sphere using a 17mm wrench. Access to the pipe connection is from inside the engine compartment through the boot opening and by moving the coolant expansion tank to one side.
- Disconnect the shock absorber from upper suspension arm.
- The sphere mounting plate is held in place with four bolts and nuts, with the two bottom nuts being captive.
- The two bottom bolts are easy to access and the upper right is quite easy to get to, especially if you have small hands.
- The upper left is best accessed from inside the engine compartment through the boot opening.
 - Undo the two bolts securing the coolant expansion tank and move it to one side
 - I have found using an impact wrench with several extensions and a 13mm socket the easiest way to remove (and later tighten) this nut and bolt. A light will in handy to locate this nut from within the engine compartment.
 - Either have an assistant put a 10mm wrench on the bolt or clamp vice-grips to it to keep it from spinning.
- To remove the sphere you will need to bend the inner fender some to allow the removal of the sphere from the other half of the sphere's mounting plate. The inner fender can be bent back into place when the sphere is reinstalled without any harm to the inner fender.
- Turn the sphere so that the pipe connection faces the inner fender.

- Pull the bottom half of the sphere outwards from the mount. Note that you may end up dislodging, or removing the knuckle joint from its spot in the upper suspension arm during the process, just be careful not to break the plastic-portion of the knuckle joint.
- Note that this is the perfect opportunity to grease the upper suspension arm, which should be greased on an annual basis.
- To reinstall the sphere make sure that the pipe connection on the sphere is aligned with the v-slot in the mounting plate. Note that the regassed rear spheres are handed (see picture below). Make sure that the knuckle joint is inserted into the sphere's displacement cone.
- Reinstall the mounting plate starting with the bottom two bolts and the upper right bolt and nut. Use the impact wrench from within the engine compartment to install the upper left nut and bolt.
- Note: if you do not have a Churchill hydrostatic pump and will be relying on a modified grease gun to refill and pump-up the suspension, you may find it a good idea to fill the sphere at this time with hydrostatic fluid using a syringe, prior to reconnecting the pipe to the sphere; it will save you a lot of pumping and time.
- Reconnect the pipe to the sphere using a 17mm wrench.
- Reconnect the shock absorber to the upper suspension arm.

Left hand rear

The procedure for the left side is the same as the right except for the following:

- A light and a mirror will come in handy to locate this nut from within the engine compartment because it is hidden by the ECU.
- Note that the regassed rear spheres are handed.



Right hand front

- Disconnect the pipe from the sphere using a 17mm wrench.
 - RHD: Access to the pipe connection is from under the bonnet.
 - LHD: Access to the pipe connection is from the wheel well.
- Remove the plastic wheel arch liner. This is held in place using:
 - Two screws into the edge of the front bumper.
 - Three plastic screw clips into the inner fender (#1 Philip works best).
 - One screw into the lower rear edge of the wheel well. Note: behind the wheel arch liner at this location there will probably be a pile of dirt and possibly corrosion.
- Disconnect the shock absorber from upper suspension arm.
- Using a felt-tipped marker, mark the position of the rivet on the top of the sphere on the inner fender. This mark will be used later when drilling the hole to accommodate the Schrader valve on the top of the regassed sphere.
- The sphere's mounting plate is held in place with four bolts and nuts, with the two bottom nuts being captive. All nuts and bolts are easy to access.
- Remove the mounting plate and remove the sphere.
- Grease the upper suspension arm.
- Using the mark previously made at the top of the sphere, centre-punch and drill a pilot hole.
- From under the bonnet, drill a 1" hole into the top of the inner fender using the pilot hole.
- Paint the edge of the 1" hole with body-colour paint if available.
- Install the sphere, positioning the welded bung and Schrader valve in the 1" hole and align the sphere with the v-slot in the mounting plate.

- Reinstall the mounting plate with the nuts and bolts.
- Note: if you do not have a Churchill hydrolastic pump and will be relying on a modified grease gun to refill and pump-up the suspension, you may find it a good idea to fill the sphere at this time with hydrolastic fluid using a syringe, prior to reconnecting the pipe to the sphere; it will save you a lot of pumping and time.
- Reconnect the pipe to the sphere using a 17mm wrench.
- Reconnect the shock absorber to the upper suspension arm.
- Reinstall the plastic wheel arch liner.

Left hand front

The procedure for the left side is the same as the right except for the following:

- Disconnect the pipe from the sphere using a 17mm wrench.
 - LHD: Access to the pipe connection is from under the bonnet.
 - RHD: Access to the pipe connection is from the wheel well. Disconnect the pipe from the sphere using a stubby 17mm wrench.

Repressurising the hydragas system

- If using a Churchill hydrolastic pump, follow the instructions to refill the system with hydrolastic fluid, which includes evacuating the system of air.
- If using a modified grease gun pump, you must expel the air from the system using the following method:
 - Connect the pump to one of the two Schrader valves and pump up the system until the car height starts to increase.
 - Disconnect the pump and reconnect the low loss connector and slow open the valve until a very small amount of fluid is discharged and then close the valve.
 - Repeat two more times
- Pump up the suspension until the ride height of the car, as measured from the centre of the front wheel straight up to the wheel arch is 368mm \pm 10 at 17°C.
- Additional ride height information, and its variation with temperature, can be found here: <http://www.hydragas.co.uk/tech/mgf.html>

Hydrolastic fluid recipe

The official recipe for genuine BMC/MG Rover fluid is as follows:

- 49% ethyl alcohol
- 49% distilled water
- 1% triethanolamine phosphate (corrosion inhibitor)
- 1% sodium mercaptobenzothiazole (additive to make it unpleasant to drink)

I have been using the following recipe, which has the same viscosity characteristics as the official BMC/MG Rover fluid:

- 45% ethyl alcohol
- 45% distilled water
- 10% ethylene glycol, neat (for corrosion inhibiting properties)

Ethyl alcohol (ethanol) is available at any marine supply store; it is sold as marine alcohol for stove. Captain Phab is a very common brand name.

You will need approximately 2L of hydrolastic fluid to fill the system from empty.

Home-made hydrolastic pump using a grease gun

Connect a Schrader low loss connector onto a standard hand pump style grease gun with a 12-18" flexible hose. To use, simply remove the end cover on the grease gun, as if you were going to install a cartridge, turn the

gun nose down, and pour the hydrolastic fluid into the gun. Leave the end cover off the gun and keep it turned nose down during the pumping procedure.



This is a Schrader low loss connector (as known as a Schrader high pressure connector):

