SUPLEX
GERMANY

Suplex MGF Suspension Kit

Fitting Instructions

COIL SPRINGS

The Better Choice!

NOTES ON THE SUPLEX HYDRAGAS CONVERSION KIT.

SUPLEX Part 90114

HISTORIC NOTE
When the MG/ROVER Car Co. collapsed the tooling used to produce the Hydragas Spheres was destroyed. Once the units held in stock by MG and Rover specialist were used, failure of a suspension sphere meant the car became irreparable.

ORIGIN OF DESIGN
SUPLEX UK was originally commissioned by Messer's Caterpillar, the official distributor of genuine MG/ROVER parts to design an alternative.

CONCEPT OF DESIGN
The concept was to replicate the characteristics of the hydragas with a purely mechanical system. NOTE: The second generation MGF the MGTF utilizes a mechanically sprung system. The engineers at SUPLEX were involved in the development of the MTF.
Detailed and involved calculations were performed along with physical testing to determine the effective spring rates, ride frequency and damping forces of the original hydro pneumatic system. The resultant designs were put through two years of evaluation and proving before sign off and release.

SUPLEX make the following statement :-

THE SUPLEX HYDRAGAS CONVERSION KIT Part No. 90114 is designed to replicate the performance and behaviour of the original MGF suspension system. It is not designed as an enhancement, up-grade, or in any way a performance improvement. It imparts no adverse increase in loading or stress to any component of the car. It requires no cutting, welding or drilling when fitting.

It is recommended that it is fitted by competent motor engineers and that the instructions are strictly adhered to.

SUPLEX GmbH
Karl-Arnold-Strasse 7
47877 Willich-Münchheide 2
Germany
Tel: +49 / 2154 / 49943-0
Fax: +49 / 2154 / 49943-21

HRB: Krefeld 11851
Geschäftsführer: Karla Graham, Andrew D. Graham

SUPLEX UK Ltd
Unit 'E'. Vector 31
Waleswood Way
Wales
Sheffield S26 5NU
01909 770660
uksales@suplex.com

Managing Director, Daniel G. White

N.B!
SUPLEX RECOMEND THAT ALL OWNERS OF CARS WHICH HAVE HAD THE HYDRAGAS SYSTEM REPLACED BY THE SUPLEX KIT ADVISE THEIR INSURERS THAT THE CONVERSION HAS BEEN CARRIED OUT.
SHOULD YOUR INSURANCE DEEM IT NECESSARY, SUPLEX HAS A PRE-PREPARED LETTER TO ISSUE THEM.

SUPLEX MGF Suspension Kit

Fitting Instructions

General Safety Advice

This SUPLEX MGF suspension kit has been designed and manufactured to be fitted as a complete system, replacing the original Hydragas displacers AND original dampers. Under no circumstances should any attempt be made to combine the use of original and SUPLEX supplied parts.

Additionally under no circumstances should any attempt be made to open or dismantle a SUPLEX suspension unit. The coil spring inside is under considerable tension and unauthorised dismantling without the special equipment needed poses the real risk of serious injury or even death!

Fitting the SUPLEX replacement suspension system to an MGF is within the capability of an owner who is competent and familiar with working on many aspects of their car beyond simple servicing, and who has a comprehensive selection of tools and good working facilities. If in any doubt, seek professional assistance.

As a guide to professional fitting costs it is worth noting that the MG Rover time allocated for the replacement of standard displacers and dampers is listed at 2 hours per side. Fitting the SUPLEX replacement parts should occupy a similar time frame. Note that any seized nuts, bolts or other fixings, which is a quite reasonable expectation on a car made before 2002, will lengthen that time.

The Hydragas suspension system operates at very high pressures, nominally 400psi, so has to be given respect if injury is to be avoided. This system needs to be depressurised before the Hydragas components are removed and we can only advise the use of the specific Hydrolastic suspension pump to complete this process. Obviously one of the huge advantages of the SUPLEX suspension is that the Hydrolastic pump is never needed again.

The instructions that follow are intended to be read in conjunction with the Workshop manual, copies of which are widely available. Note there is only the factory Workshop manual, no Haynes or other aftermarket manual has been published.

The fitting of the SUPLEX suspension kit should be completed on a hard and level surface, e.g. concrete and due consideration given to the normal safety procedures and any additional safety suggestions noted here.

Fitting Instructions

The MGF Hydragas suspension is split into two separate sub systems, interconnected front to rear on each side, with a single high pressure valve connection per side. When depressurising either of the two valves will see the suspension will settle to the bump stops both front and rear on that side. For this reason we suggest that the fitting of the SUPLEX kit be done one side at a time, and that the side to be worked upon is raised and placed on stands BEFORE and depressurisation.

Note that in addition to the safety advice seen at the start of these instructions, that the car must not be driven with original suspension on one side and the new SUPLEX suspension the other, other than for simple manoeuvring to gain better access for fitting the SUPLEX system to the remaining side.

Check the contents of the kit against the list below:-

- 2 x Rear SUPLEX MGF dampers
- 2 x Front SUPLEX MGF dampers
- 2 x Rear SUPLEX MGF Spring units
- 2 x Front SUPLEX MGF Spring units
- 4 x Hydragas capping plugs (red)
- 2 x Tie wraps
- 4 x Locking rings

1. Chock the wheels on the side of the car not being worked upon first, there is no rule dictating which side to start with. These instructions show replacement of the drivers (right) side first

- The next action is to loosen the wheel nuts on that side and raise the right side of the car to a comfortable working height and placing axle stands underneath. Note that the subframes offer very solid secure points to place axle stands, but try and position them so they are not directly under the displacers. Then remove the front and rear wheels.

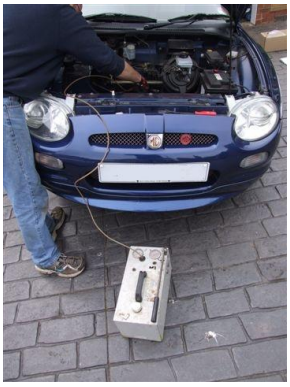
2. Open the bonnet and undo the two 10mm plastic nuts holding the right edge of the thin plastic moulding that covers the rear of the under bonnet space, then lift the mouldings tabs off the studs.

- On the left side of the car is a scrivet holding the moulding to the heater air intake vent. (A scrivet is a two piece combination of a plastic screw and plastic rivet, where the screw centre pushes out 'wings' of the outer rivet when it is inserted.) Unscrew the central screw using a cross head screwdriver and then prize out the rivet section.

- Remove the spare wheel and tools to give access to the lower edge of the plastic moulding, which is retained on two 'barbed' studs. Pull the moulding forwards to disengage from the studs and then lift and ease the moulding out from around the brake master cylinder/servo and from under the screen panel.

3. The Hydragas pipes and two valve connection points are then seen behind the washer bottle. The valves are visually identical to tyre valves but remember that there is around 400psi behind them some fifteen times the pressure seen in MGF tyres!! Therefore the common Internet discussed and used method of a wrapping a rag around the valve and pressing the valve centre to release pressure is not recommended.

4. The right side suspension needs to be depressurised (not the left side at this time) and the image shows the use of a correct Hydrolastic pump with the correct adapter that screws onto the valve and the pressure is contained within the pump. Moving the control lever from 'pressurise' to 'depressurise' allows simple and safe depressurisation of the suspension and the collection of the fluid inside the pump reservoir.



Right front.

5. Remove the front inner wheel arch liner; this is retained by three cross head screws and three plastic scrivets, the screws being steel may be corroded and difficult to remove.

- With all six retainers removed the liner has the edge nearest the wheel arch 'peeled' out first to allow it to be removed.

6. If the car has ABS take then remove the sensor cable from the retaining clips, which are held in place by two of the displacers front retaining plate bolts, and ease the cable to one side. These sensors are expensive to replace so take care to avoid damage.

7. Remove the damper (commonly and erroneously called a shock absorber, springs are shock absorbers), by first removing the lower fixing bolt. Wire brushing the nut and bolt and applying some lubrication to the thread makes for easier removal. Make a specific note of the positions of the brake hose clamp, spacer and two washers. The image shows the correct orientation as it is possible previous owner's interference may have seen incorrect reassembly. When the bolt is removed check it is straight, replacing or rectifying as needed.

8. The damper is now hanging from the top fixing only, and best access to this is achieved by unclipping the electrical plug connections to the horns and then removing them and their brackets from the cars chassis leg.

- Damper removal will require the top shaft of the damper being held whilst the nut is loosened with a spanner. Once the nut is loose take hold of the damper body with your now spare hand to prevent the damper dropping out when the nut is spun off. Remove the upper washers and rubber bush.

9. Place a fluid catch tray under the displacer position to collect spilt Hydrolastic fluid, and leave it there until you have finished this side. From inside the under bonnet area loosen the nut clamping the Hydragas pipe to the displacer. Remove the pipe from the displacer and push it downwards to allow some fluid to drain into the tray. Leave it there until you have also removed the rear displacer connection as further fluid will drain when the rear is disconnected.

10. Move back under the wheel arch to remove the displacer. It is held by the front plate that is secured to the subframe by four bolts; the lower two using captive nuts, but the upper two have 'free' nuts, meaning you have to place a spanner on from behind. Once the plate is removed the displacer is gently pulled forward to disengage the locating ring, lifted and tilted forward to disengage from the 'roller foot joint', more commonly known as the 'knuckle'. There may be a need to gently tap and prise the 'knuckle' from the displacer alloy shaft (piston).

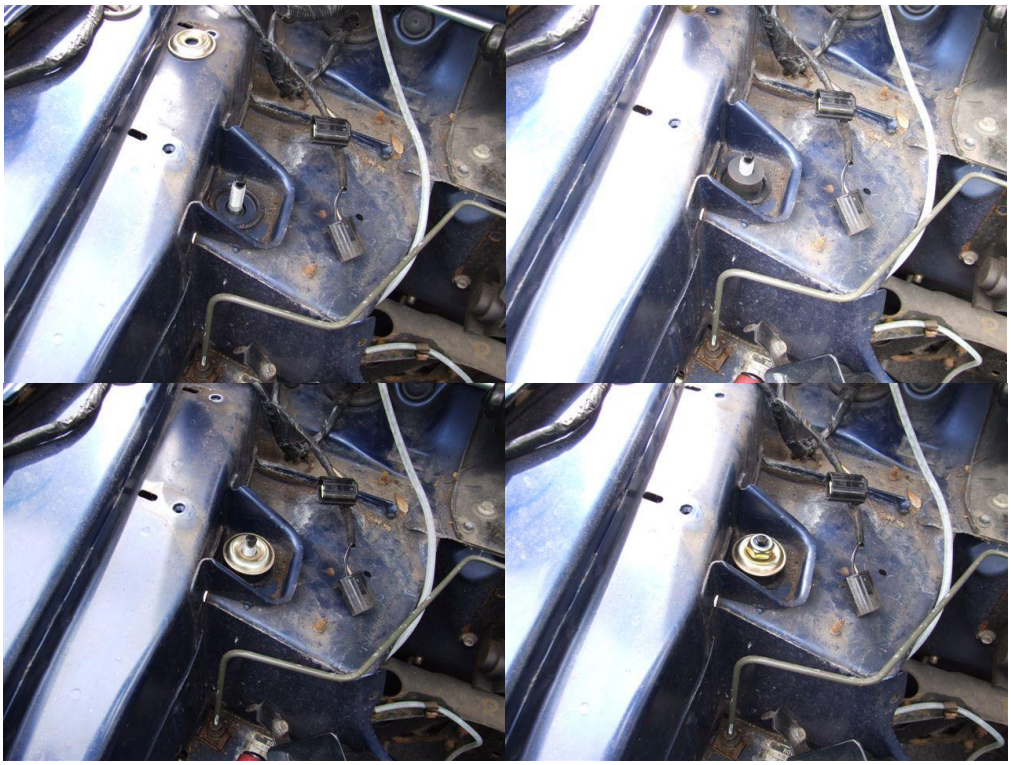
11. Retain the spacer washer that sits over the shaft of the 'knuckle' and clean off any dirt or corrosion. The spring found between the 'Knuckle' and displacer is not refitted. A light smear of copper grease will help reduce any future sticking problems. Check the rubber bump stop is in place and not been damaged or lost. If lost or damaged then a replacement will be needed.

12. Select a front SUPLEX suspension unit (check the label on the unit), wind out the adjuster until it protrudes by 4mm from the Hex on the Spring Seat. Drop a locking ring over the Knuckle shaft, then fit the Suspension units over the 'knuckle's' shaft. If the body of the suspension unit is fouling the cars body and it can't be slid over the 'Knuckle' pin. Once slid onto the 'knuckle' the unit can be placed home in the same way the original Hydragas unit sat. The front cover plate is then fitted to lock the new unit in place, noting to replace the ABS cable clips and cable if appropriate.

13. Once fitted in place, Using a felt pen or similar mark the front flat of the hexagon, wind out the hexagon adjuster from the SUPLEX suspension unit by 18 turns. Fit the locking ring to the threaded adjuster but do not tighten.

- Fine tuning of the ride height can be done after the car has had a settlement drive and is covered in step 42, later.

14. The new damper is fitted, noting that the front ones do not have the off white coloured bump stops. The dampers upper dust cover needs to be slid on from the bottom and engaged onto the concave top fixed plate. Remove the top locknut, concave washer and upper rubber, leaving the lower rubber and concave washer in place. Feed the threaded shaft of the damper up through the cars body damper mounting and replace the rubber and concave washer (concave face always faces the rubber), followed by finger screwing the nylock nut on as far as you can. Final tightening of this is done after the next step.



15. Refit the lower damper bolt through the top arm, feeding it through the flexible brake hose bracket, sliding on the tubular spacer and smaller washer on too. Next slide the dampers lower bush onto the bolt and then the large concave washer (dish facing away from the damper bush) before refitting the nylock nut. Both this nut and bolt and then the upper mounting nut are fully tightened, 37Nm torque loading for the upper nut and 45Nm for the lower nut and bolt. Note that the main shaft will need to be held with Mole grips or similar whilst the upper nut is tightened as was needed for its removal. (Most torque wrenches will not allow the shaft to be held and tightened at the same time so here a guide is to wind down until there is obvious compression of the rubber of approximately 1/3rd from its uncompressed state.)



16. Refit the horns and electrical connections and then refit the plastic under wing shields.

Right rear

17. Open the boot and remove the grille covering the access to the rear of the engine bay.

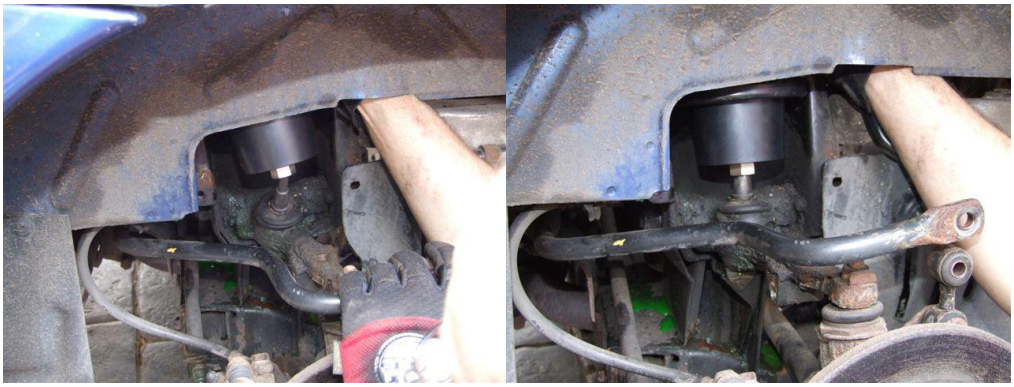
18. To access the rear right top damper mounting and the displacers fluid connection requires the coolant expansion tank to be moved. It is held in place by two 8mm headed bolts and an extension ‘peg’ on the tanks moulding underneath. With the bolt removed the tank can be lifted up and the lower ‘peg’ disconnects. Stretch within the hoses does allow it to be moved to the side and above the dipstick and oil filler.

19. Move into the wheel arch and undo and remove the anti roll bar to link top nut and bolt to allow the suspension free movement.

20. Remove the lower and then upper damper mounting nuts and bolts in the same way as described in steps 7 and 8 to remove the rear damper.

21. Remove the rear displacer in the same way as described for the front removal in steps 9, 10, noting that there is less free space and the displacer is best lifted out through the engine bay, rather than the wheel arch. (It may be necessary to gently lever the displacers alloy piston into the displacer to fully disengage the piston from the 'knuckle', the spring can be then pulled clear.) Then follow to process as described in step 11.

22. Select a SUPLEX rear suspension unit and fit this in from the wheel arch and 'post' it up between the body and subframe, before negotiating it into position is the same way as described in step 12.



23. Follow the same set up process as described in step 13, noting that the rear springs are higher rated and so the pre-tensioning does make this much stiffer to turn.

24. The rear damper is fitted as described in steps 14 and 15, with the following differences. This time you use a damper WITH the off white bump stop and the upper nut tightening torque is slightly higher at 50Nm. The rear anti roll bar is reconnected (45Nm).



25. The work on the back will have seen more Hydrolastic fluid empty into the tray under the exposed end of the front pipe and if you have access to compressed air you can clear residual fluid from the line now, although this is not absolutely necessary.

26. Replace the wheels and lower the car.

27. Refit the expansion tank.

Left side of the car

28. Chock the wheels on the right side of the car, and loosen the wheel nuts on the front and rear wheels on the left side of the car. Now raise the left side of the car to a comfortable working height and placing axle stands underneath. Note that the subframes offer very solid secure points to place axle stands, but try and position them so they are not directly under the displacers. Then remove the front and rear wheels.

Left front

29. Follow steps 5 to 7.

30. The under bonnet fuse box is now in the way of access to the damper top fixing so has to be moved to one side. (Note; see the appendix with regard to the cars security system and radio security before proceeding.) First remove the battery negative (earth) terminal and place to one side so it can't spring back to the terminal and remake electrical continuity. The two securing bolts for the under bonnet fuse box can now be removed and the fusebox moved to one side.

31. Follow the damper removal instructions in the latter part of step 8, and then follow steps 9 to 15.

32. Refit the under bonnet fusebox but leave the battery disconnected until the rear unit is fitted.

Left rear

33. The engine ECU and several main electrical connections need to be moved to provide access to the displacer and damper top nut, and this is why the battery should remain disconnected. First disconnect the ECU main connections (one or two depending on age and model).

34. The ECU sits on a bracket which also carries a number of main electrical connections. The bracket is retained by two bolts on the top edge and a sliding foot below. The upper bolt holes are in fact slots so remove the inner bolt and just loosen the outer, which allows the bracket to be slid towards the cars centre line and then lifted to disengage the lower foot.

35. With the bracket disengaged you have access to the various connections and relay pack underneath. The wiring will not have enough free play to allow the ECU and bracket to be moved out of the way so disconnect the various connectors. The relay pack and half of each main connector clip to tongues pressed out from the back of the bracket and these need to be disconnected. They usually have a 'barb' type of lock in the plastic moulding of the plugs that has to be gently levered as you slide it off the tongue. Once disconnected the bracket with ECU can be placed out of the way.

36. Depending on the age and model there are various standard air filters that can be fitted and they interfere with access to the displacer to varying degrees, so may have to be moved and that requires the rear of the hood to be opened and the engine cover removed. Non standard filters can have a wider variation and so access with these will have to be assessed on an individual basis.

- Hood removal is simple and achieved by unclipping the two 'hood to screen frame' catches to remove hood tension. Then from inside the car pull forward the rear deck carpet (under the hood rear window) where you see the five moulded 'bump outs' to access the five spring clips that hold the rear lower spar of the hood frame into the rear body channel. These are unclipped and the ends moved out of contact with the hood spar. Due to the fragility of the original plastic rear windows, and frequency of cracking if folded, it is advised to unzip the rear windows top zip and separate the two side Velcro fasteners to allow the rear window to remain flat whilst the rear of the hood is raised.

- The hoods lower spar can then be eased out of the body channel and raised, feeding the now partially loose rear window forward to keep it as flat as possible. When moved through approximately 90 degrees the spar can be tied to hold it in this position, a luggage stretch bungee strap is ideally suited to clip behind the spar and the front of the hood frame.

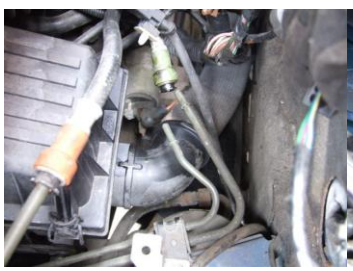
- The carpet and insulation underneath is removed, noting that often the carpet is glued to the insulation. On 2000 model year cars and newer there are rear speakers in an acoustic box that make a tight fit for the insulation and it has often become stuck. Gently ease a scraper or similar between the bottom of the box and insulation to separate them before sliding this out.

- The main engine cover is now accessible and the eleven 10mm headed bolts are removed, three under the acoustic box are fiddly. The cover is then manoeuvred out as you have to negotiate it around three of the hood spar catches.

- The common standard air filter fit uses a pair of bolts or plastic clips to the side of the main filter box that is facing the left side of the car, and one or two moulded pegs under the box. The hose between air filter and throttle body also has to be disconnected.

- Most filters have just a single hose entry at the front of the filter box, connecting to a resonator that then has a cold air pick up hose that can be in the way as it is trailed past the displacer and cable tied to the subframe. This can be easily removed if needed.

- Trophy models have a dual entry with the second entry at the rear with its hose also tied to the subframe. This rear pipe/hose has a single screw fixing inside the filter box and removal is not possible without also removing the main filter box.




37. Do not smoke or have naked flames anywhere near when looking to do the following operation. More access room is gained by disconnecting the charcoal canister electrical connection and quick release connection (press in the centre collar and pull the pipe off) to the fuel tank line. It is then lifted from the rear bulkhead and can be slid down and to the side. The fuel feed and return lines also have quick release connections and removal of these adds more space. Note; have a rag wrapped around the joints as they are released as some fuel spillage will be seen, especially from the feed line (the pipe coming from the fuel filter) as this should retain some residual fuel pressure.

38. Now follow steps 19 to 26. Note that 2000 on model year cars with the electronic speedometer (identified by a digital odometer rather than mechanical) all have an ABS sensor on the left rear even if the car is not equipped with ABS.

39. Refit the air filter, charcoal canister and associated connections removed for access.

40. Refit the electrical connections and ECU and bracket.

41. Reconnect the battery

42. **Fine tuning**. Take the car for at least a two mile run to allow it to settle, initially some extraneous settlement noises may be heard. On returning park the car on a level surface and measure the ride height on all four corners of the car. Measure between the centre of each wheel to the underside of the wheel arch lip directly above and note the results.

- The normal official MG ride height of mainstream MGFs is 368mm for the front and 363mm for the rear, both plus or minus 10mm. MGF Trophy 160 SE models have a measurement that is 20mm lower for both front and rear. The SUPLEX suspension system has a limited adjustment range to allow the individual corner heights to be adjusted to reach the recommended heights.

- The standard ride height for mainstream MGF is aesthetically seen as too high by most owners and so the suggested height for the SUPLEX equipped mainstream MGF is 355mm front and 353mm rear, whilst the Trophy 160 SE model maintains its normal 348mm front and 343mm rear heights. For those living in areas where ground clearance is limited then the ride height can be raised to the original 368/363mm by retaining the spacer removed in step 11. All models are then fine tuned in the same way.

- Note how far in error the ride heights are to the measurements appropriate to your model/choice. The hexagon adjusters will now need to be turned an appropriate number of turns/flats to raise or lower the ride height to within the desired measurements. A full turn of the hexagon adjuster will alter the ride height by approximately 6mm (approx 1mm per flat of the hexagon). The car will need to be raised (individual wheel at a time is fine) so that individual suspension is in full 'droop'. Adjust the hexagon by the calculated amount and then make a different mark on the front flat for future reference and then refit the wheel. Once the ride height is set the required dimension tighten the lock ring, this can be done using a flat bladed screw drive and a gentle tap with the palm of a hand.

- Repeat for the other suspension units and then go for another test drive and return to the same measuring position and recheck the ride heights. If more than 10mm in error readjust, otherwise run the car for 100 miles and recheck.

Note the above instructions assume that the suspension is using standard MG components to achieve standard MG ride heights. Where the standard 'knuckles' (roller foot joints) have been replace with non standard lowering versions then you will not be able to adjust the SUPLEX units to reach the SUPLEX recommended ride heights. Nominally the lowering 'knuckles' will usually provide a lowering of 35 to 40mm, which was developed to lower from the original 368/363mm ride height. The use of these with the SUPLEX suspension is NOT recommended as the resulting ride heights will be too low and too close to the damper compressed limit.

Removal of the Hydragas system pipes

The SUPLEX MGF suspension system removes the need of the Hydragas system, there if a likelihood that the vehicle will never require to be retrofitted back to its original suspension configuration.

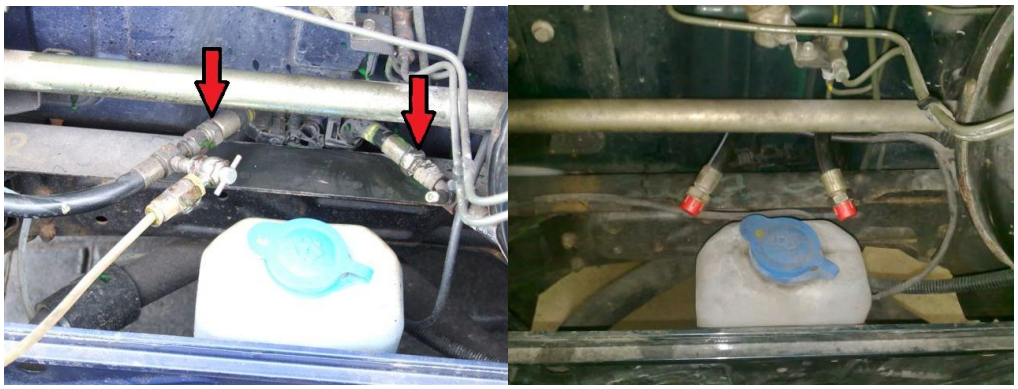
SUPLEX have developed two options, they are:-

- Part removal of the Hydragas pipes
- Full removal of the Hydragas pipes

The following information cover the above two methods.

Part removal of the Hydragas pipes

- The Hydragas pipes have been disconnected from the displacer and are free to make contact with other components on the vehicle, it is suggested that piping is further disconnected on the front this is before the two valve connection points



And at the rear underneath the car near the wheel arch.

Once disconnected from these points the pipes which runs along the chassis from front to rear can be capped using the red blanking caps (supplied in the kit).

The remainder of the pipes which were connected to these pipes and displacers can be carefully removed from the vehicle.

Full removal of the Hydragas pipes

Disconnect as per the part removal process.

At the rear of the car, with the use of a pair of wire cutters cut the Hydragas pipes as shown below on both sides of the vehicle:-

Take note not to cut the brake pipes.

Once cut lower the pipes which were connected at the front and gentle pull the Hydragas pipe through

The pipes should remove freely from underneath the car.

Appendix.

Advisory note 1: Before disconnecting the cars battery, check that the key will operate the central locking through the drivers door lock. If it doesn't then it means that there is no communication between the drivers door lock switch and the alarm ECU and if you disconnect the battery you will NOT be able to resynchronise and so the car will be immobilised and need to be recovered to a garage/dealer/auto electrician with appropriate diagnostic equipment to rectify.

Assuming that the central locking system functions using the key in the driver's door, the following will allow re-synchronisation of the fobs on the key ring to the cars alarm.

MGFs use the Lucas 5AS alarm system and when the battery is disconnected the rolling code synchronisation between the two alarm fobs on the two sets of keys all cars have (had!) will be lost and the process of re-synchronisation is listed in handbooks.

It is a simple process of inserting the key into the drivers door and turning it to the UNLOCK position, followed by rapid pressing of the lock button of the alarm fob and after several press's the car will remotely lock and then respond normally to unlock and lock commands. This process has to be repeated for the second (and any additional) fobs. (Note MGF 1.6 models did not have remote central locking as standard, only key operated central locking; all other MGFs had remote locking.)

Advisory note 2: Many radios in MGFs have a security code, which will be needed to reactivate the radio once the battery is reconnected. Ensure that if yours is one that has a security code that you have the code, and also the method of entering the code. There are different methods for different radios and we can't provide this information.