Make your own Wet Suspender Pump

by the Phantom Con Rod

VERY CLEVER these hydrolastic suspenders on the BL 1100/1300 and Mins, etc. Only snag is that you need a suck-and-blow device if you want to strip the system for repair or adjustment of suspension height and so on. The BL suck-and-blow machine (or hydrolastic servicing equipment, depressurising, evacuating and pressurising Pt. No. 18G703) costs over forty green things and if you can afford that don't bother to read on. On the other hand, if like many enthusiasts you are rather short of Pictures of the Monarch but are burning with the desire to dismember your hydrolastics at frequent intervals, it is possible to produce for yourself an effective set of gear for about a third of the cost of the BL equipment (about £14 for the non-mathematically minded).

As is well known, the hydrolastic system consists of hollow rubber springs (displacers) at each corner of the car connected by a pipe fore and aft each side. The system is filled with hydrolastic fluid (basically water and a special anti-freeze) and pumped up to a pre-determined pressure. In operation the system shares the force generated by wheel deflection between the unit directly concerned and the one to which it is linked. For example, if the nearside front wheel hits a bump, the wheel will rise, causing a rise in the pressure in the nearside system. The nearside front rubber spring will deflect to absorb some of the energy. The nearside rear unit will also be subject to the rise in pressure via the connecting pipe, so the rear spring will also absorb some of the force exerted on the front wheel. This will extend the rear spring causing the back of the car to rise. Thus the effect is that the car rises parallel to the road surface and does not pitch. The suspension is comparatively soft when only one wheel deflects because the force is shared between two suspension units. (The units have a rising spring rate, ie. they become progressively stiffer as they are compressed.)

When the front and rear wheels hit a bump simultaneously there is no pressure transfer so each unit has to absorb the full force applied. Under these circumstances the suspension is relatively hard. It will be appreciated that when the car corners, the wheels on the outside of the turn will tend to be displaced upwards relative to the body. This condition is the same as when both front and rear wheels hit a bump at the same time. There is no pressure transfer so the suspension is quite stiff, preventing excessive body-roll. Whew! Got it? Good.

Since the system is under pressure it follows that it must be depressurised before the top front suspension arm and the rear trailing arm can be removed. A Schraeder type valve is fitted into the system and the fluid can be let out through this into the depressuriser. At this point, the suspension can be dismantled and reassembled as desired.

Now the trouble starts. If air has entered the system it must be

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removed before the system is repressurised. If not, the car will attempt an impression of an inebriated kangaroo proceeding in a series of leaps and bounds as the air acts as a resilient spring. To prevent this the system must be evacuated, and this is where the suck and blow equipment is essential. A vacuum pump is needed to remove as much of the air from the system as possible and connected up in such a way as to allow the vacuum to be replaced by fluid.

Ideally, a vacuum of 27 in Hg should be produced and held before allowing the fluid back into the system. The BL tool uses a hand operated vacuum pump to remove the air but this is not essential — you have already bought a very expensive vacuum pump in the shape of the large lump under the bonnet. It is quite possible to draw up to 27 in Hg using a connection on to the vacuum take-off point on the inlet manifold. Of course, you can't connect the pipe straight between the suspension and the manifold — you would suck the fluid straight into the engine with disastrous results.

So you will need a Lockheed brake vacuum servo tank, available by courtesy of your local breaker. This is absolutely ideal as it is already fitted with a one-way-valve and a take-off-point for the vacuum gauge. In addition to the tank you will need a vacuum gauge and a few feet of strong transparent plastic pipe, plus a no-loss adaptor. Suitable adaptors are made by Kismet Limited, Eyre Works, 44 Eyre Lane, Sheffield, and usually supplied through factors such as Brown Brothers. (The Kismet part number is KC1111.) Connect up the pipes as shown in the illustration — you will need to solder or braze a short length of pipe into the bottom of the tank at X for the pipe connection. Also fit some feet (bent thin sheet metal strip is ideal) to keep the tank vertical in use. Clip the pipe up the side of the tank as shown — being transparent it will act as a level indicator. Now to use the device:

1. Depressurising:

Disconnect the vacuum gauge pipe and pour about $\frac{1}{2}$ pint of hydrolastic fluid into the tank. Refit the pipe.

Make sure the knurled screw is undone. Connect the no-loss adaptor to the Schraeder valve on the suspension and screw in the knurled screw. The pressure in the system will be released and the fluid will flow into the tank. The suspension can now be dismantled as necessary.

2. Evacuating:

Screw in the knurled screw on the adaptor. Connect the vacuum pipe to the inlet manifold. Start the engine and rev it in short bursts. This is best done by operating the carb throttle lever by hand. Fluid and air will flow from the suspension into the tank. At the beginning the vacuum gauge will rise and fall considerably but after a few moments will hold steady at about 27 in Hg (if it doesn't you have a leak somewhere or alternatively the plastic non-return valve disc is not seating properly). If you have difficulty in reaching 27 in Hg, unscrew the fast idle screw so that the butterfly closes fully when you snap the throttle shut.

3. Disconnect:

When the vacuum has held steady at 27 in Hg for a few moments stop the engine. Gently release the vacuum gauge pipe to allow atmospheric pressure to enter the tank above the fluid. This will force the fluid back into the suspension system to replace the vacuum in the displacers and the interconnecting pipe. The no-loss adaptor can now be disconnected from the suspension.

4. Pressurise:

Now we have to pressurise the system to the recommended pressure. This is the most expensive part of the gear. BL produce a hand operated pump under service tool part number 18G685 retailing at about £8. This pump is rather like a grease gun and is originally intended only for topping up hydrolastics and has just a small container built into it. However, it is quite a simple matter to remove the small container and connect a piece of plastic tube to the inlet side of the pump. Put the other end of the pipe in your can of fluid and you can pump as much fluid as you like. The pump can be pre-set to blow-off at a predetermined pressure or you can fit a 'T' adaptor on the pressure side with a suitable pressure gauge. To pressurise, connect the no-loss adaptor to the suspension. Place the suction pipe in your fluid can as described above. Open the small bleeder valve fitted in the no-loss adaptor. Operate the pump until all the air is bled from the pump and its pipes. Close the bleeder valve and operate the pump until the desired pressure is reached.

And that, friends, should just about do it. The 'Phantom Conrod' has struck.