



c) the short connecting hose from air valve to top of the brake diaphragm.

This may be caused by the air valve small hydraulic piston being seized, but if a full set of seals was fitted this is unlikely.

It is possible that an internal fault occurred during reassembly but a more likely explanation is that the short air hose may be age hardened and if re-used by pushing on only, it may have age hardened and not be flexible (elastic) enough to seal atmospheric air out. Try jubilee clips at both ends and preferably a new hose.

For those without experience it may be helpful to explain how the servo operates:-

Engine off: The brake diaphragm is pushed by its spring up to the top of the servo cover and the air valve is closed by its spring.

Engine running – foot brake off: Inlet manifold vacuum is applied to the underside of the brake diaphragm but the closed air valve prevents airflow to the top of the brake diaphragm and thus stops any movement and there is no servo assisted braking. Vacuum also is applied to the underside of the air valve diaphragm helping to keep it shut.

Engine running – application of the foot brake: Hydraulic pressure is supplied to the servo slave cylinder and also pushes the small hydraulic air valve piston up to open the air valve against its diaphragm, therefore letting in atmospheric pressure on top of the brake diaphragm. This pushes the slave piston down to assist in increasing brake pressure.

POWER ASSISTED STEERING ON THE 2200

As you are all aware there never was a power assisted steering option on the 2200 model. This seems to be strange as I believe that the actual weight difference between the cars was only 40 lbs. However, the tyres are narrower which reduces the required turning torque and I suppose that this, back in 1963 was just acceptable. Most of us were then used to no power at all on the majority of cars and even the Commer Maxiload 16 ton truck had PAS as an option. I suppose that Rover were also trying to push a customer to buy the better equipped 3500. Today it is hard to find even a very small modern car without PAS and although we like classic cars because they are older and different, sometimes, particularly tight car parks with impatient drivers behind, can put us close to a hernia unless you are built like Rambo. Another important factor now for me and I think for an increasing number of owners is age, where we will not necessarily retain our strength.

At this point I should explain the term Power Assisted Steering for anyone who is not familiar with power steering systems. It means just what it says. Steering is power assisted when required and is not assisted when loading is low such as travelling at speed on a straight road. When parking on dry surfaces load is maximum and power assistance is automatic. This is controlled by a rotary valve operated by a torsional strut which twists under steering load thus opening the valve more with higher loading and not at all with lower loading. Therefore, even if the hydraulic oil supply fails, **manual steering is not lost**, though if power is lost whilst parking you may get a surprise.

So now you do not have to get a 3500 to get power steering. I have developed a system fitted to my 2200 TC with all Rover hydraulic parts with some light modifications and a new bracket. This has been in use for over eleven years and approximately 16000 miles without any problems or changes.

If, like me, you prefer the, dare I say it, all British Rover without the Buick connection, then you can have the same comfort as the 3500. I love the sound of the four cylinders and it also does over 30 MPG.

This all started when I was restoring my 3500 and had fitted a PAS kit because my wife had found the manual 3500 heavy to park. It occurred to me that the 2200 would then become heavy by comparison. Having already fitted the 3500 with PAS, I had found that the PAS steering box will fit, the only difference being that the front outer stud has to be cut down to allow space to fit the box. The box hole for this stud is oversized and requires use of a special nut with tubular body which should be obtained with the PAS kit.

The engine front ends are quite different so I bought another set of 3500 PAS parts, put my spare 2200 engine on the bench and started looking around for space to fit the 3500 pump. I was not



impressed with the 3500 pump and bracket layout as I had just changed the V belt on my son's car. You cannot even see the belt from above to check it and the pump has to be detached to fit it. I soon realised that both 3500 bracket and pump were not practical for the 2200 because the alternator is on the low LHS of the engine and looked around for a better pump location. I thought that the pump would be better with the pulley forward and clockwise rotation (the 3500 is pulley to rear and thus anticlockwise rotation).

A visit to Clive and Maurice Annable made sense and I was not disappointed as they loaned me an SDI pump which came complete with built in tank/filler and a cast aluminium bracket which has a slotted adjusting lug. As far as we could check, the output of pressure and flow was similar.

The best place appeared to be at the RH side just ahead of the brake servo and alongside the cylinder head bulge. The crankshaft pulley was nearly in line and it was seen that an additional pulley behind the existing one appeared to give a good line. A rough bracket was made to fit the pump to both the engine block front and cylinder head RH bulge. The bracket was tweaked a few times and eventually a good position was achieved. The PAS pump does make fuel pump access a little difficult but not impossible.

I needed to add a pulley groove and fortunately the series 2 has a sheet metal pulley which is fixed to the crankshaft damper by four screws. I cut a spare pulley together with about 30mm of its 'bell' and fitted it to my engine pulley by sliding it over the existing 'bell' and welding in place.

The Steering box is much taller owing to the hydraulic cylinder which is mounted integrally on top of the manual section. This requires that the wiper unit, normally on top of the box, must be removed and it is convenient to substitute a 3500 wiper assembly which is already on the LHS of the engine bay. The wiring and air pipe for the screen wash delay must be extended to suit.

The SDI unit has a filterless integral tank with a tall filler neck, which, if sloped inwards, will just clear the bonnet. This slope looks a little untidy so the filler neck can be cut down 25mm and rewelded, taking care that no debris is left inside as it could destroy the pump and steering box. I do not like hydraulic systems without filters so I also used the 3500 separate tank which has a renewable internal filter unit. This necessitates welding a feed hose connection to the lower part of the SDI pump integral tank and cutting off the filler neck and blocking/welding the hole. However this is not an easy job and if you only use your car for the occasional show or run, lack of a filter should not be a problem. I did use my car as my sole transport at that time so I looked for long life. I can give full details of this if required.

The brake reservoir also fouls the steering box hydraulic bulge so this is moved forward to the coil position and the coil in turn moved to bolt through the wing in front of the servo bracket.

Testing showed that, even at tickover, there was adequate steering power and parking was so much easier. On the road there is a very slight increase in what was very low steering force but overall a very worthwhile improvement. Many owners have driven my car and all liked it with no adverse comment. I can see no difference in fuel consumption. The belt is visible from above and is very easy to check and change and adjust in a few minutes.

The above notes are a brief summary and refer to the **2200** only. I have not investigated the **2000** which is different and among other things does not have a sheet metal pulley.

If you are interested I would be happy to discuss this and supply more details.

My car is undergoing treatment for severe rustitis but should have recovered by next spring 2005 so could then be test driven. The installation can be seen at any time.

Please note that even carefully selected second hand parts, particularly the high pressure hose, could fail causing loss of pressure and therefore power assistance. Whilst this is possible, the risk is no worse than if you had a 3500 with the original unmodified old PAS system.

I must point out that I can take no responsibility for any installation, parts or information.

I hope that this will add to your enjoyment of the 2200.

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P6 2200 PAS fitting notes and parts list to follow in December P6 News

