

POWER ASSISTED STEERING FOR MGS

WHAT, WHY AND HOW!



Do you love everything about your MG except the heavy steering? Does your wife or partner refuse to drive it, because they find the car hard to steer or park? And if you're not as young as you used to be do you find steering difficult? So, why not consider fitting power steering?

The conversions are designed and engineered to reduce effort and stress while enhancing the dynamic response. By using modern components these mechanical-hydraulic systems eliminate unwanted mid-corner steering shocks whilst low speed manoeuvres or parking are made almost effortless. Being mechanical-hydraulic the power steering system gives much better 'feel'. Your everyday car has power steering, so why not your classic car?

Introduction

PAS systems have advanced considerably over the years. Design experience and modern methods of machining have made the pinion valve in the rack more precise, and falling rate pumps (the faster they turn the less they power) have added a sophistication of feel versus assistance.

Great driving and handling cars of the past, Porsche 911, Porsche Boxter, Lotus Excel and Lotus Elan M100 all had Hydraulic Power Steering. Mercedes fit an hydraulic system to the new E class and, Aston Martin fit it to all their new model cars. So for real driving enjoyment choose Hydraulic!

Hydraulic power assisted steering has serious advantages over other systems when fitted to classic cars and will tell the driver exactly what's going on at the front wheels, giving involvement, great steering feel and reward, and it is the type of steering that would have been fitted in the era when the car was made.

Electric Power Steering systems don't provide the same level of feedback and detail as hydraulic systems, because instead of responding to a force, they respond to movement. An electric motor's worm gear turns a gear either attached to the column or a second gear that meshes directly with the rack, and the direct link from the steering wheel is broken. The link between your force in turning the steering wheel and the assistance force is gone, hence the lack of road feel. Where retro fitted to classic cars it still uses the existing steering rack so any wear and backlash in the original rack remains. British classic sportscars such as the MGB do not have a lot of room in the driver's footwell; this is where EPS is normally fitted, taking up what little spare room there is and often intruding on the space needed for the drivers legs and knees. This could be considered hazardous in the event of an accident and can compromise comfortable every day driving.

Main System components

- Reservoir containing the power steering fluid
- Power steering pump driven by a belt from the engine
- The steering rack with a valve head and an assister ram

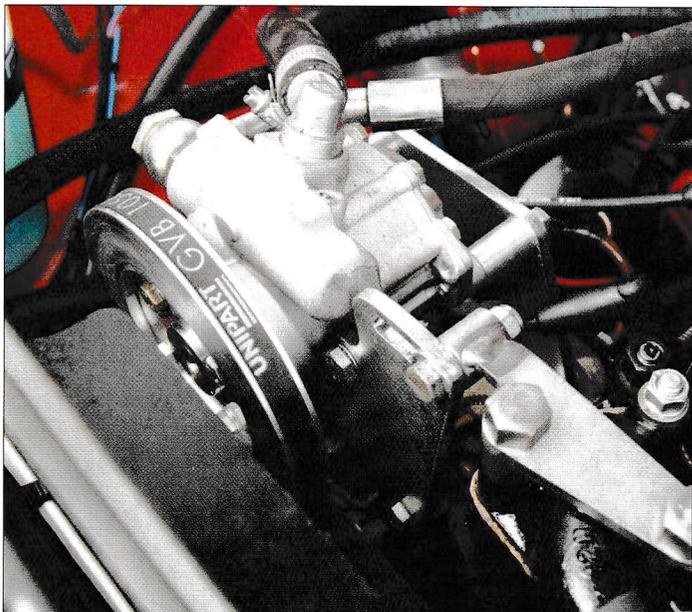
How power steering works

Hydraulic Power Assisted Steering is a demand-based system which uses a spring-loaded servo valve (Valve Head) to sense the application of torque to a pinion shaft and to proportionally direct hydraulic pressure against a piston connected to the steering rack to overcome the effort of turning the steering wheel.

The entire system is full of fluid—both sides of the piston, all the hoses, and all the passages within the servo. With the pump running, fluid flows constantly from the reservoir, through the valve head, and back to the tank.

How the steering rack valve head works

During rotation of the steering wheel, the servo valve opens in direct proportion to the degree of twist applied: if twist exists to the left, for example, fluid (provided by the pump) will flow so as to assist a left turn. The more twist, the greater the valve opening, and the higher the rate of fluid flow, until sufficient pressure has built up (against the piston in the cylinder) to overcome the resistance. If the twist is released (or if the resistance is overcome, which amounts to the same thing) the valve springs back to its centred position in which all fluid is permitted to exhaust. In actual operation, pressure builds up and overcomes resistance within milliseconds. The "twisting" of the input shaft and the subsequent "catching up" of the output shaft and the release of tension occur, for all



Belt driven pump neatly installed above the alternator

practical purposes, simultaneously and continuously.

The weight of the steering can be altered by making the spring-loading of the valve stronger or weaker, accomplished by making the torsion bar thinner or thicker.

The Pump

The hydraulic power or more correctly hydraulic pressure is provided by a rotary vane pump driven by the engine. The pump contains retractable vanes that sit in a stator and turn within an oval chamber. As the vanes spin they pull hydraulic fluid from the reservoir and pump it to the Valve Head under pressure.

The pressure generated then acts on the piston in the ram. Pressure and flow are the two factors which give the steering its lightness / weight and its feel. The pump must provide an adequate supply of pressurised fluid at low engine revs so the steering has good assistance levels at parking speed but not too much pressurised fluid at high engine revs. To moderate this and to make the modern pump the efficient mechanism it is, pressure and flow valves are fitted. A pressure relief valve is fitted to limit the pressure applied to the assister ram at full lock. This valve can also be used as a part of the steering feel calibration. A flow control valve stops the pump producing too much fluid as its revs rise in tune with the engine revs.

However there is more to it than that. The valve body, the housing, the ports and the control spring are used to give sufficient flow for the maximum power assistance to be built up at any time. Also incorporated is the 'falling rate' characteristic. This means that as the pump speed rises it actually produces less fluid output.

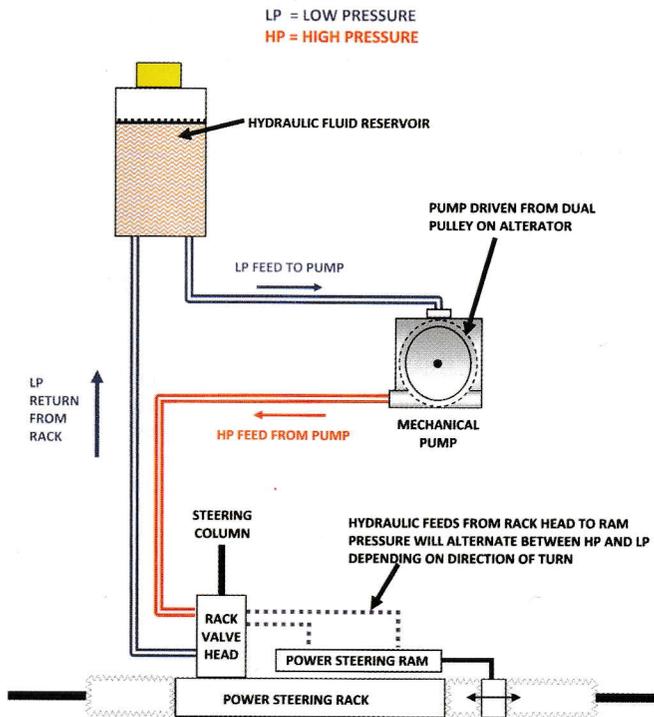
It is sometimes assumed that mechanical pumps are inefficient and take a lot of power to drive them. Not true. When cruising in a straight line it is taking about one half of a horsepower, when turning corners about one horsepower. This is less than the effect of low tyre pressures or a headwind let alone enthusiastic driving!



The Power Assisted Steering Kit

Fitting Power Steering to your MG

Kits are available for all MGB, MGC, V8 and RV8 Models and are suitable for DIY fitment in addition to specialist workshops. Comprehensive instructions detail every stage with photos to support, and copies are available on request via e-mail or post for anyone wanting to see the full installation guide, and further technical advice is available to answer any of your questions on 01954 230928.



Driving Impressions

Richard Ladds *Editor Enjoying MG*

"My MGB has 15" alloys fitted with 185/65 15" Yokohamas which give great grip and surefooted handling but the drawback is heavy steering when parking. In test driving an MGB with Power Steering using the same wheel tyre combination parking is a doodle with virtually no effort required. At higher speeds the steering remains positive with plenty of road feel and even through bumpy bends the line remains consistent and predictable."

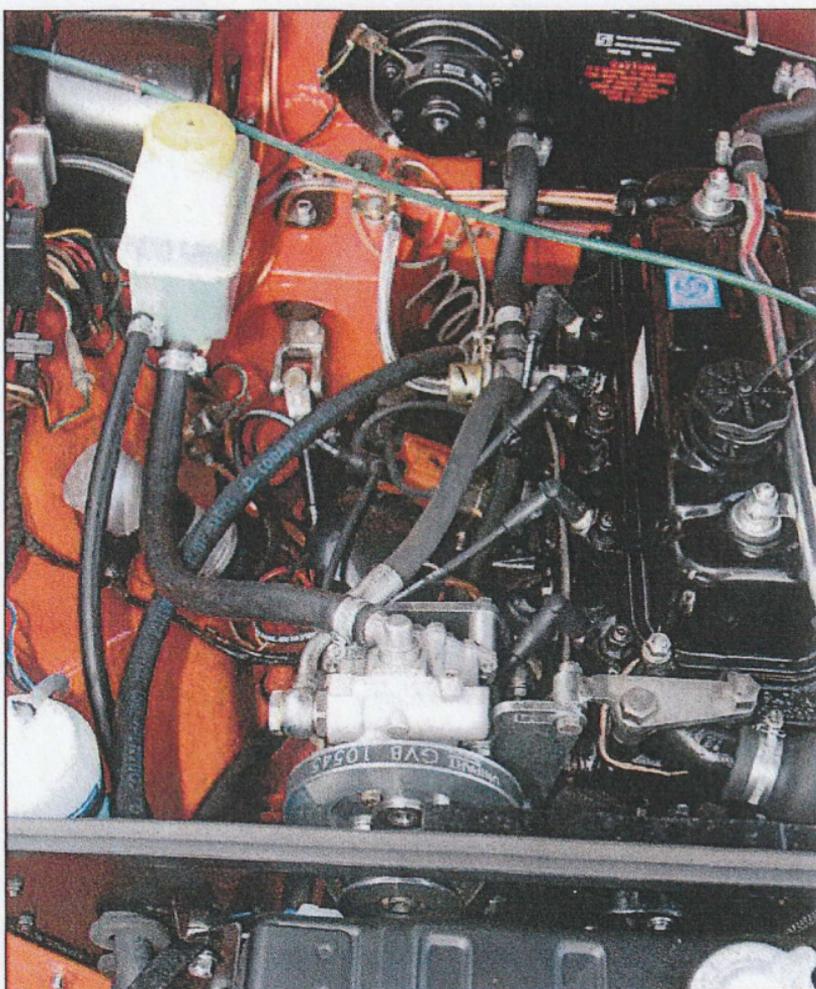
Simon Goldsworthy *Editor MG Enthusiast – May2012*

"Manoeuvring out of the car park, the power steering is the first thing I notice. It makes light work of slow speed turns as you would expect, and this despite the fitment of a 14" steering wheel. But it is not super light in the manner of a 60s Jaguar; in fact it is much the same as my MGF at a level I feel very comfortable with."



The reservoir mounts on the bulkhead in front of the pedal box

On all but the MGC kits, the front cross members are modified to take new steering rack mounting brackets that are welded into place using a jig provided. Ready modified crossmembers are available for those not wishing to undertake this, but the rest of the installation is entirely "bolt-on".



The finished job with compact pump and reservoir in situ

John Simister *Practical Classics* -Sept 2012

"The power assistance is well enough judged for you not to be aware of it except when manoeuvring at low speeds with an ease unexpected in an MGB. It's accurate and you can still feel proper forces through the steering wheel when you need them."