

# HOMWORKSHOP

with Dave Barker

## Defender models

# Replacing a Power Steering Box

**W**e all know that feeling when you see red fluid dripping down the drop arm and onto the driveway. Normally it's a few days before your Land Rover's annual MoT. It generally means that the seals in the power steering box have failed, allowing power steering fluid to leak out.

In years past, owners might have removed the box and replaced the seals themselves with a seal repair kit, which I believe are still available. The cost of a new power steering box in those days was very high, one reason being that there were not many secondhand units around and the

reconditioned units available then were also very expensive.

Today, owners are more likely to fit a reconditioned unit or find and fit a secondhand box. Because of the increased numbers of Defenders, Range Rovers and Discoverys being scrapped, there are now a large number of secondhand steering boxes around. Prices of reconditioned units have also fallen, as the number of companies doing reconditioning has grown along with the number of Land Rovers equipped with power steering.

Another reason why replacing the steering box has become a popular

option is that many people seem not to have much luck repairing the units themselves. I've heard a lot of tales of PAS boxes which leaked just as badly even after the owner had fitted new seals! So the most likely scenario these days is that you will be taking the old one off and fitting a reconditioned unit. As most reconditioned units are sold as exchange units, you'll also be sending your old PAS box back.

So our main *Home Workshop* feature this month shows you how to replace the PAS box on a Defender. We watched and photographed the operation being done on a 1994 200

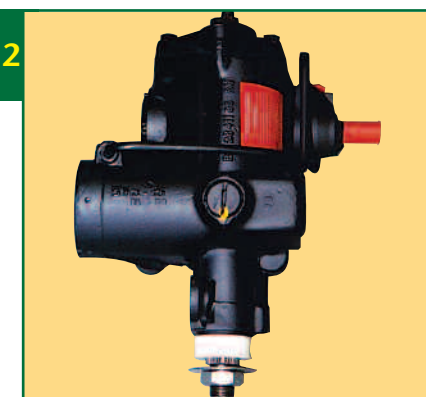
Tdi Defender by Roberts Country Vehicles of Doncaster, Croft Court, Sandall Carr Road, Kirk Sandall, Doncaster DN3 1QL (01302 880001).

Please note that it is not absolutely necessary to remove the radiator cowl to change the power steering pump, but it does make access easier. In this case the cowl was removed to allow the alternator to be changed later.

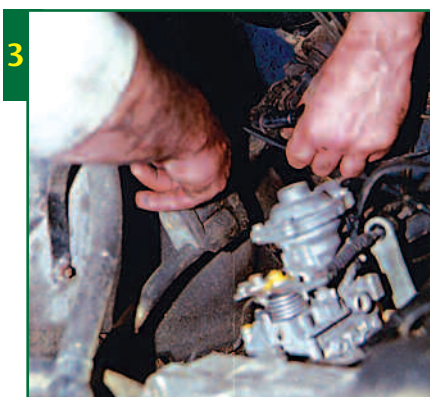
You can expect to pay around £175 plus the VAT (an extra £30.63) for a reconditioned power steering box. A genuine Land Rover unit (part number STC 8384E in this case) would cost around £310 plus £54.25 VAT. Estimated fitting time is between one and three hours, depending on the model of vehicle.



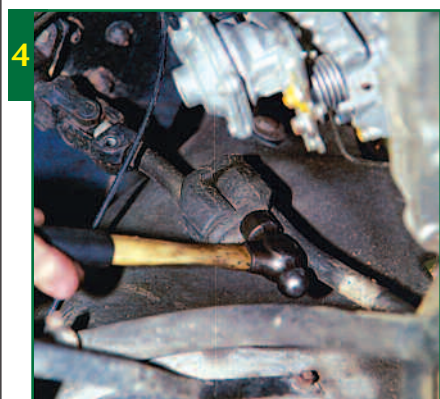
**Warning signs:** power steering fluid seen leaking from the box, dripping down the sector shaft or drop arm



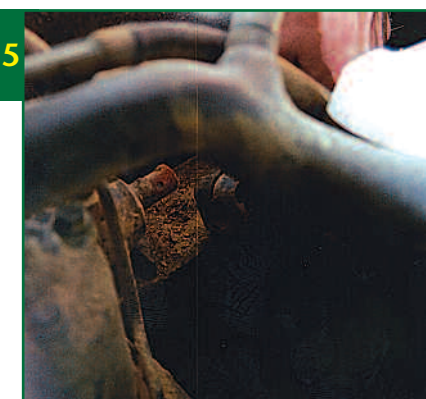
**Before you start work,** it's a wise precaution to check that the new part is the same as the one you are taking off



**The first job is to** slacken and undo the universal joints on the steering column; then remove the bolts



**Now tap the steering column** gently upwards, allowing the shaft to move up into the universal joints



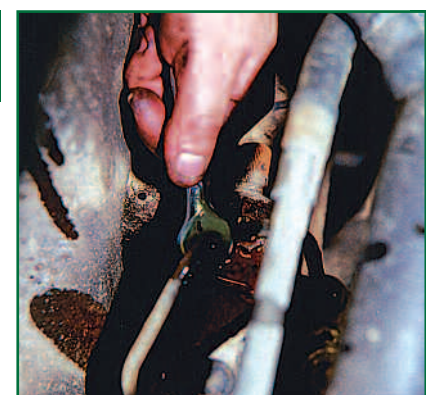
**There should be enough movement** to allow the bottom joint to come off the steering box input shaft



**On the 200 Tdi Defender,** you will need to undo the return pipe between the reservoir and the steering box



**Now free from the reservoir,** the return pipe can be unscrewed from the top of the power steering box



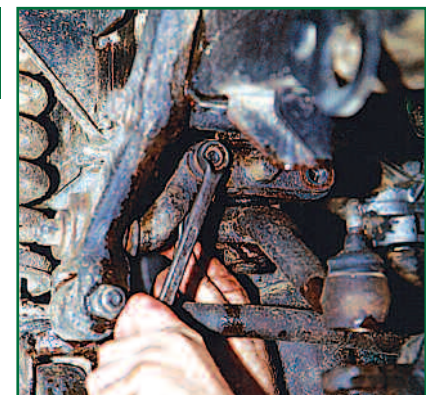
**Unscrew the pressure (feed) pipe** from the top of the power steering box, but do not remove the "link" pipe



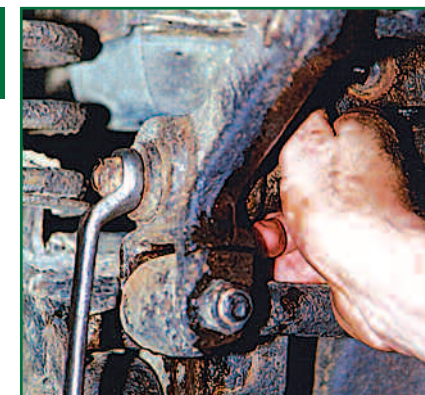
**Next remove the split pin** from the castle nut which retains the drop arm ball joint, and undo the nut itself



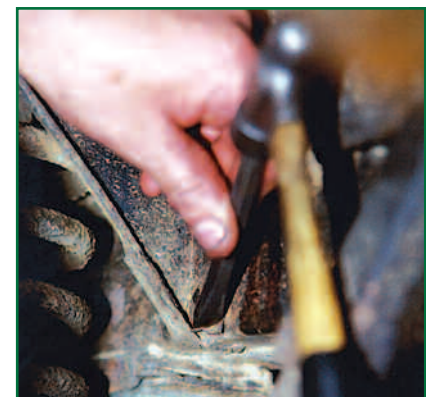
**Use a hammer to 'split' the ball joint,** as you are going to reuse it. A fork splitter may damage the rubber boot



**Undo the two retaining bolts** on the steering box tie bar, which clamps to the bottom of the PAS box



**Now remove the single nut** that holds the tie bar to the mounting bracket on the side of the chassis rail



**The box is held to the chassis leg** by four bolts; open their locking tabs (present only on earlier models)



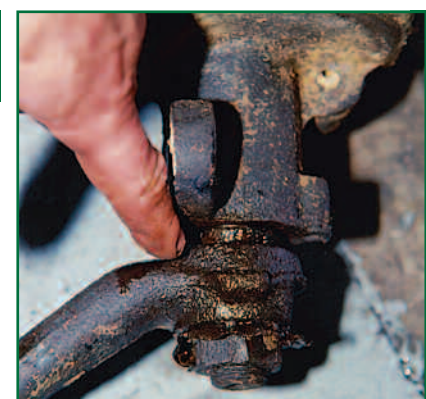
**Once the tab plate has been hammered open,** the nuts can be undone and the bolts can be pulled out



**Once the bolts have been removed,** the power steering box is now free and can be removed from the vehicle



**The box does take a bit of manoeuvring out;** you might find it easier if you remove the steering damper



**With the box out,** the leak down the sector shaft past the seal and back-up seal can be clearly seen



**With the steering box on the ground,** the tab washer holding the drop arm nut can be opened and the nut removed





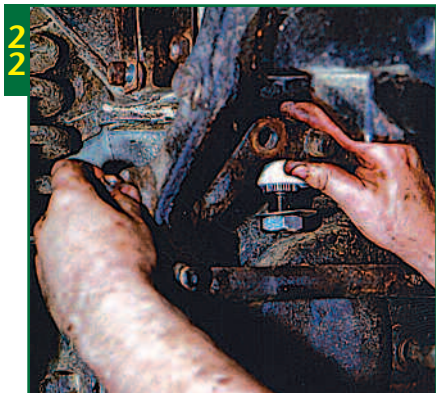
**19** Now pull the drop arm off the steering box's splined shaft; you'll need to use a proper puller for this job



**20** Once removed, clean the splines of the drop arm of any build-up of rust and road grit before refitting the unit



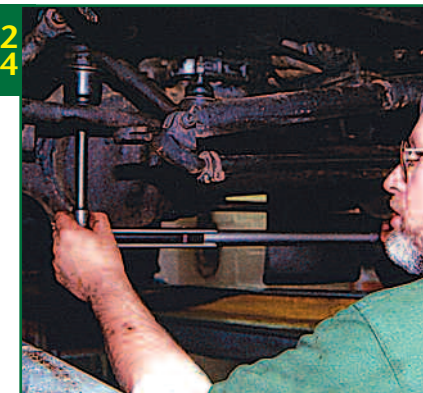
**21** Lift the new steering box into position and refit the four chassis bolts. Use tab washers if the vehicle had them



**22** Refit the tie bar between the chassis bracket and the PAS box, and re-tighten all retaining bolts to 81 Nm



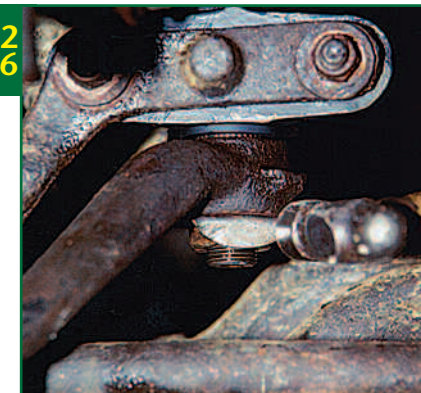
**23** The centre of the steering box sector shaft has a locating spline to help you align the drop arm correctly



**24** Refit the drop arm to the steering box and tighten the retaining bolt to the correct torque of 176Nm



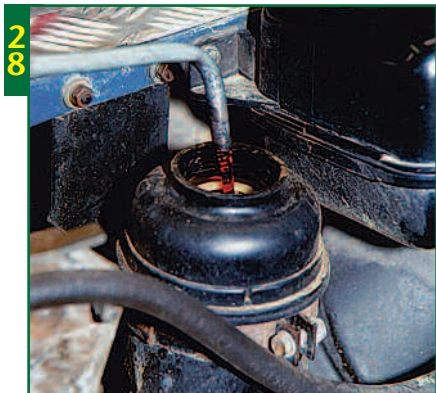
**25** Even experienced Land Rover technicians check the correct torque figures in the workshop manual!



**26** With the nut torqued up, bend the tab washer over at both front and back of the nut or it will come loose



**27** Refit the oil pipes to the new box; 'feel' them on by hand first to ensure you do not get them cross-threaded



**28** Now refill the reservoir with clean power steering fluid; there are marks which help you get the level right



**29** The system will need to be bled to remove air; there should be a rush of air as you undo the bleed nipple



**30** Check the system by turning the wheel side to side to expel air; then remove and centre the wheel if necessary ■