Land Rover Buyers Guide

A guide for the novice

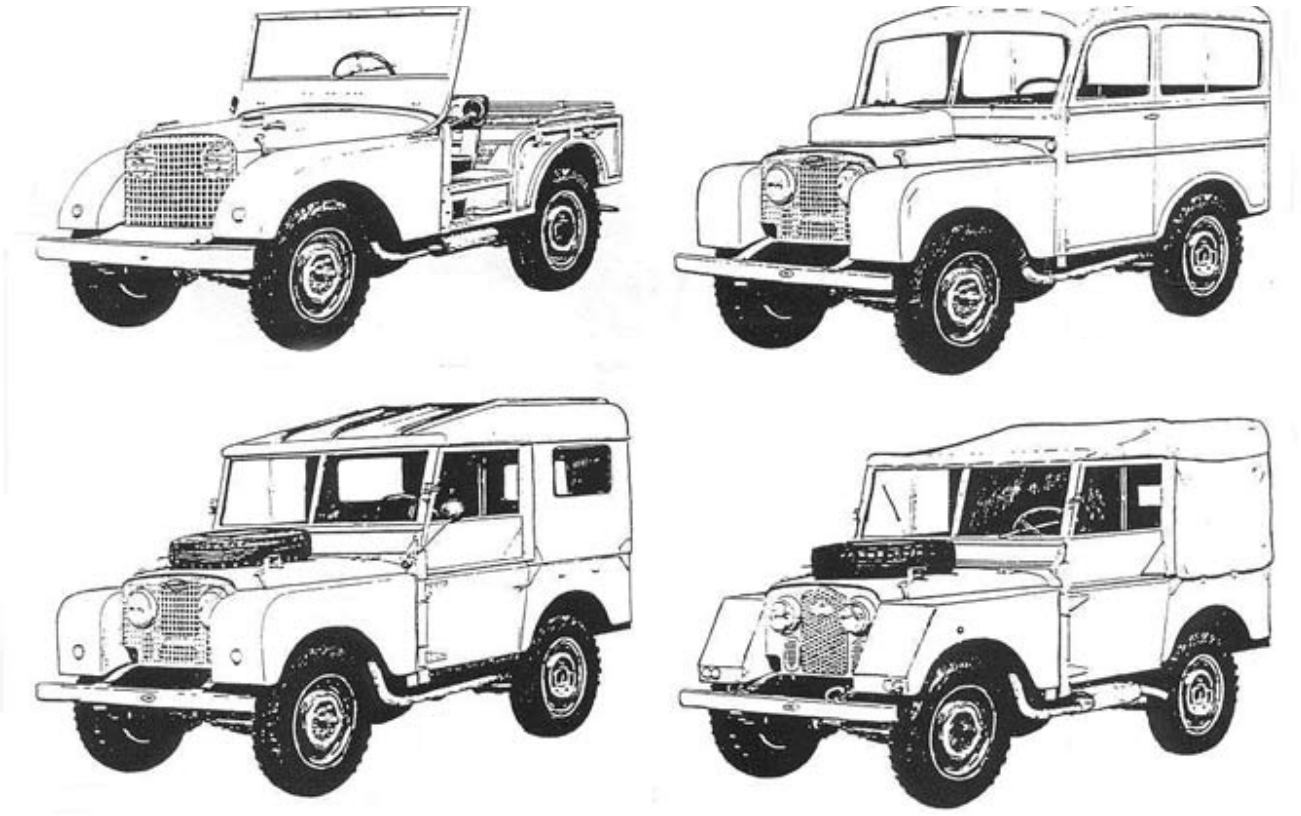

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Table of Contents

1. Buying a Land Rover

Are you looking to buy your first Land Rover? Confused by all the different models? Bewildered by conflicting advice from friends, colleagues and 'experts'? Then read on - I am here to help you choose the vehicle that is right for you.

The first thing to understand is that there are an almost infinite number of variations on the basic Land Rover design. Since 1958 there have been three basic chassis lengths, about half a dozen different engines and dozens of permutations of seating, loadspace and window arrangement to choose from. Thanks to the bolt-together modular construction of Land Rovers, it can often be easier to modify an existing vehicle to suit your requirements than to try and find one which already meets them. That is why, before I even think about showing you any vehicles for sale, I like to understand what you will be asking your Land Rover to do. Towing a horsebox? Camping holidays? Offroad adventures? Carrying two people, or twelve? Long distances, or just local trips? The more information you can give me, the better.

There are many myths surrounding Land Rovers, so let's demolish a few of them at this stage.

It's a Land Rover all right. But is it the right one for you?

Myth: Land Rovers are made from aluminium, so they don't rust.

Truth: Most of the outer body panels on a Land Rover are indeed aluminium. But the vehicle is built on an old-fashioned ladder frame chassis. This is what gives a Land Rover its strength: it is made from mild steel sections welded together, it is given a bare minimum of corrosion protection at the factory, and it rusts very readily indeed. Any vehicle more than ten years old may be suffering from chassis corrosion: the condition of the visible body panels provides no guide to the state of the chassis, and chassis replacement is a very expensive job.

(However, it is worth mentioning that most Japanese 4x4s are far more rot-prone than Land Rovers.)

The other crucial structural component is the bulkhead - the structure to which the windscreen, dashboard, steering column, doors, bonnet and front wings are bolted. This, like the chassis, is a safety-critical item, and guess what? It's made from mild steel, and it rusts. Replacing a bulkhead is almost as involved and expensive as chassis replacement.

This patchwork quilt is even worse than it looks. The bottom face of the chassis was so rotten I could poke my fingers through it. The vehicle actually looked quite smart from above...

Other areas where steel is used include the door frames, the storage boxes under the front seats, and the protective cappings along the top and rear corners of the bodywork. Any of these areas can rust extensively, and often do. Further problems can arise where steel and aluminium meet - a chemical reaction results in the aluminium being eaten away and turning into a crumbly white powder. This is most common around the edges of the doors.

I check every vehicle I sell for structural soundness. Quite simply, I will not sell a vehicle that has a rotten chassis or bulkhead (unless it is for spares or restoration). But the best thing you can do to protect your new purchase is to buy a pressure washer (a cheap one will do) and make sure you regularly power wash the chassis, especially the hollow sections where mud and road salt can accumulate. A clean chassis will rust only slowly: a mud and salt-encrusted one will disappear much faster.

Myth: Land Rovers are so tough, they go on forever.

Truth: Land Rovers are indeed tough and strongly built, but they are not indestructible, and they do not respond well to neglect. A Land Rover is more complex mechanically than the average family car, and it needs more frequent and extensive servicing. Neglected Land Rovers can hide some quite serious mechanical faults, appearing to drive perfectly well right up to the moment where they go bang. In addition, there are a number of well-documented weaknesses, which vary from model to model, and which can be very expensive to put right.

I know all about the mechanical problems that can afflict older Land Rovers. Every vehicle I sell gets a comprehensive service and inspection before it is handed over to the customer, and I will not sell a vehicle unless I have thoroughly road-tested it myself. That is why I am confident enough in my vehicles to offer my own warranty at my own expense.

Myth: Only diesel Land Rovers are worth having

Truth: It depends entirely on what you are planning to do with the vehicle. For extensive off-road use with lots of short journeys, I would most probably recommend a diesel, but for some other applications the diesel's noise, harshness, lack of power and short service intervals may count against it. I am particularly enthusiastic about the 2.5 petrol engine when converted to run on LPG. This engine produces about the same power as a 2.5 turbodiesel, it is smoother, quieter, easier to start in cold weather and, running on LPG, the fuel bills are about 15-20% lower than a diesel 110. Click here to find out more about my LPG conversions.

For heavy-duty towing applications the 3.5 litre petrol V8 cannot be beaten, and I can offer LPG systems to suit this engine as well. So keep an open mind, and let me advise you on the engine and fuel option that best matches your needs.

Myth: Land Rovers cost a fortune to run.

Truth: It is true that fuel consumption, even on the diesel vehicles, is no better than that of a large family car. You will be lucky to see better than 25 mpg in everyday use. However, fuel costs are only part of the story. Land Rovers depreciate (lose value) very slowly compared with most cars, so you can expect to get more of your money back when you come to sell your Land Rover or trade it in for another one.

There is a fiercely competitive market for spares and accessories, and you will find that many parts are actually cheaper than for even a small car. The vehicles are simple to work on, and DIY routine maintenance is well within the abilities of anyone who has ever assembled an Ikea wardrobe without having too many bits left over. And Land Rovers fall into a low insurance group. If you can afford to run an ordinary family car, you can afford a Land Rover.

Myth: The newer the vehicle, the better

Truth: Land Rover build quality has tended to be a bit variable, and the way the vehicles are treated early in life will have a huge effect on their long-term durability. It is hard to discern a pattern: I have seen mid 1990s vehicles with advanced chassis and bulkhead rot, and early 1980s vehicles still as solid as the day they left the factory. There were various key improvements in specification over the years, most notably in 1983/4 where the coil sprung 90 and 110 vehicles replaced the old leaf sprung 'Series' Land Rovers, and then in 1990 when the TDi diesel engine was introduced. However, as a general rule, you should choose your Land Rover on condition and specification, with age being one of the least important factors. In choosing a newer vehicle, you will undoubtedly be paying more, but that does not mean you will get a better or more durable vehicle for the money.

So that's given you some idea of the questions to ask. But the big question is - is an older Land Rover really for you? Read on to find out.

2. Living with an older Land Rover

I get a lot of enquiries from people who have never before owned a Land Rover, and who fancy one of the older vehicles as an introduction to Land Rover ownership. Perhaps they have a limited budget, only need the vehicle for occasional use, don't want to tie up a huge sum of money in a vehicle that only gets used to take the dogs to the beach, like the idea of saving £190 a year in road tax, or maybe they just like the look of the older vehicles.

An older Land Rover, whether an early coil-sprung 90 or 110, or one of the classic leaf sprung 'Series' models, can be a faithful and durable friend, but you really need to go into the purchase with your eyes wide open and use some common sense. Only a couple of weeks ago I was offered a vehicle very cheaply by someone who had fancied 'an old Land Rover' and had gone out and bought the first one he looked at. It was, in every way, a bad purchase. It was a long-wheelbase model, so he could barely get it into his tightly curved driveway. It was a 2.25 3-bearing diesel, and he had bought it with a view to towing his boat down to the South Coast once a month, a 400 mile round trip for which a slow, noisy, underpowered vehicle was desperately ill-suited. The chassis was a patchwork quilt of plates welded on top of other plates, and the bulkhead wasn't much better. It had been through ten owners, none of whom had ever spent any money on it, and mechanically it was about as bad as they get. Every week it broke down, he took it into the garage and was presented with a large bill. Now he just wanted to get rid of the thing, and swore never to buy another Land Rover again.

What is really sad is that, for the money he ploughed into this rolling wreck, if he had done some basic research, taken good advice and really thought about his requirements, he could have had a nice, well-maintained older vehicle which would have lasted him many, many years. (I didn't buy his vehicle by the way, but someone on eBay did...)

So what do you need to think about, and beware of, when considering spending £2,000 - £3,000 (the most common price range I am asked to supply) on an older Land Rover?

General points first. This kind of money will not stretch to a post 1990 Defender TDi, at least not one that any sensible buyer would touch with a bargepole. So the vehicles you are looking at will be OLD. At least fifteen years old, possibly forty or even older. Land Rovers are mechanically complex and incorporate some very old fashioned technology. This means that however clean, well-maintained and low mileage your vehicle, it WILL break down at some point, and it WILL require money spending on it, on a regular basis, to keep it in good mechanical condition. If that is unacceptable to you, go and buy a new Nissan X-Trail.

A Land Rover is designed as a fairly uncompromising off-road workhorse for farmers, the military and construction workers. By passenger car, or even modern 4X4 standards, it will be slow, noisy, ill-handling, with an uncomfortable driving position, minimal creature comforts and heavy controls. This applies much more to the older vehicles, but even a Ninety can be a bit of a culture shock if you are used to driving a 3-series BMW to work every day.

This rugged, uncompromising, utilitarian nature is part of the Land Rover's enduring appeal, but it is not to all tastes. Make sure you understand what an older Land Rover is all about before you buy one. It isn't a cool-looking alternative to a Suzuki Jeep or Toyota RAV-4. It's more like a tractor that you can use to take the kids to school in.

Safety equipment - you get seatbelts, and a big heavy ladder frame chassis that will give you plenty of protection in front or rear impacts, but absolutely none in side collisions or rollovers. That's all. No airbags, anti-lock brakes, electronic stability aids, traction control or any of the other stuff that keeps drivers of modern cars out of trouble. If you drive an older Land Rover like a modern car, two things will happen: you will crash, and it will hurt a lot.

Now let's look at some of the issues specific to particular models.

Series II (1958-61), Series IIA (1961-71):

Everyone's idea of what a proper classic Land Rover should look like. Headlamps mounted close together in the centre of the grille panel until 1968, when they were moved out to the wings. These vehicles were strongly built of good quality materials (they predated the British Leyland era) and there are a surprising number still around, and not too expensive either. Only very minor detail differences between the Series II and IIA, which means that the design of these vehicles is now getting on for half a century old. What does that mean?

Firstly, they are not really up to modern traffic conditions without some important improvements. The main ones are:

Brakes - these vehicles did not have power assisted brakes, so the brakes are very, very heavy indeed. Also they had single circuit brakes - so if a leak develops anywhere in the system, you only have the handbrake to stop you.

Performance - the 2.25 petrol is just about powerful enough to keep up with modern traffic, but the diesel engine is underpowered, noisy and tends to self-destruct if worked too hard. Realistically, top speed is 55 mph in a petrol vehicle, 45 in a diesel. Try driving everywhere at 45 in your car, and see how long a queue builds up behind you. Try doing it on the motorway, and see how quickly you get rear-ended by an East European artic. An overdrive will raise the cruising speed by 10 mph, but the diesel in particular will always struggle on hills, more so when heavily laden or towing.

Ride and handling - these vehicles use very old leaf-spring technology, and although the ride on new springs and shocks is tolerable, it deteriorates very badly as these components age. The steering is non-assisted, low geared and heavy. The turning circle is fairly large on short wheelbase vehicles, supertanker-huge on long wheelbase ones.

Controls - the clutch can be very heavy (a real pain, literally, in traffic jams), the switchgear is scattered all over the dashboard, poorly marked and hard to read, brakes and steering as mentioned above are heavy and imprecise in feel, and the gearchange takes care and practice to master. There is no synchromesh on first or second gear (a hangover from the Land Rover transmission's pre-war roots) so you will need to rediscover the lost art of double-declutching when changing up or down. All this gives every journey a feeling of adventure, but if you just want an unchallenging, straightforward drive, one of these vehicles is not for you.

Comfort - you get flat slabs of black vinyl-covered foam to sit on, non-retracting seatbelts and sliding side windows which let in draughts. Rainwater leaks round the corners of the windscreen and drips onto your legs. The heater is feeble. The seats have very limited adjustment and no headrests. The driving position is strange - like sitting at a school desk, back upright with your feet flat on the floor. There is no stereo, and no point in fitting one because you won't be able to hear it with the engine running.

Electrics - the vehicles have dynamo charging systems, long since obsolete. These do not provide enough power to keep the battery charged when using all the electrics. Headlamps, wipers and heater - you can have any two out of three, but not all three, unless you want to end up with a flat battery. The problem is worst at low speeds - so if you want to use the vehicle for winter commuting in heavy traffic, you need to do something about it. And the lights are inherently unreliable. Just remember the motto of the classic British vehicle owner: **"Lucas Electrics - Home Before Dark!"**

Fuel - petrol engines will not run on unleaded without either cylinder head modifications (approx £350-£400) or a fuel additive. The same applies if you are planning to convert the vehicle to run on LPG.

There are solutions available to all these problems, but (of course) they cost money. So you have to decide which of these defects you can live with, and which you must fix. This will depend on the use to which you plan to put the vehicle. Bottom line is, is you are doing more than about 3,000 miles a year, using the vehicle as daily transport, covering a lot of motorway miles or will struggle with heavy hand or foot controls, one of these vehicles is not for you, unless you can afford to have it updated to a more modern specification.

The next point to consider is that these vehicles, even when in good order, are quite heavy on maintenance (just like any other 40 year old car) and need regular checking, lubricants topping up etc to spot emerging problems before they become serious enough to immobilise the vehicle. If you have no mechanical skills or sympathy, you will develop a very close and financially crippling relationship with your local garage. I'm not saying that you need to be able to strip and rebuild a gearbox by the roadside with a Swiss Army knife and some baler twine - but some basic mechanical understanding will greatly help to keep the relationship with your vehicle a happy one.

Series IIA in original unrestored condition. A forty year old vehicle still doing the job it was built to do. Lovely.

But don't forget the good points. These vehicles are simple, sturdy and easy to work on. Most parts are still available, and very cheaply at that. You can insure them on a classic car policy, there's no road tax to pay, and of course you have a genuine icon of British design, instantly recognisable the world over.

These are the vehicles that made Land Rover's reputation, and you will feel very proud to own a vehicle which is maybe 40+ years old, still doing the job for which it was designed. They are real fun to drive, a properly involving driving experience, and they look great. Just don't expect them to be modern, because they aren't.

Series III, 1971-84:

If these vehicles look similar to the Series IIA, that's because they are. They got a new dashboard with instruments and switchgear in front of the driver, synchromesh on all gears, alternator charging and slightly better interior trim, but in essence they are still the same 1958-vintage design, with most of the same usability and comfort issues. As production went on through the strike-bound Seventies, quality became very erratic, with chassis corrosion in particular becoming a major issue towards the end of the production run. But the design was steadily refined and improved through its life, and the following items are well worth looking out for:

5-bearing engines - both petrol and diesel from 1980. Smoother and far more durable at motorway speeds. Can be retrofitted to earlier vehicles - but the older 3-bearing engine can be fitted to late vehicles as well, so you need to check the engine serial number.

Power brakes - available on many though not all Series III vehicles. All but the early ones had dual circuit brakes, and

post 1980 short wheelbase vehicles like the one pictured above had the same front brakes as long wheelbase models - much more powerful.

Deluxe and County trim - interior trim panels, more comfortable shaped seats to cut down noise and improve driver comfort. Later vehicles had retracting seat belts as well.

Stage One V8 (1979-83)

This was a totally different animal, with 3.5 litre V8 power and permanent four wheel drive. Perhaps the most usable Series III, especially if converted to run on LPG, but only available here in long wheelbase form.

The Series III is perhaps not quite as pure a piece of design as the Series II/IIA, and only the very earliest (1972) vehicles are tax exempt. But there are huge numbers about, and a late one in good condition will still be up to pretty much any job you ask of it.

Ninety and One Ten, 1983-90*:

A quantum leap forward in comfort and usability, despite being initially little more than a Series III body on an old Range Rover chassis. Ninety is short wheelbase, One Ten is long wheelbase. Coil spring suspension gives vastly improved ride and handling, power assisted brakes (discs at front) on all models from the start, as was permanent four wheel drive (which greatly aids stability). Interiors better trimmed, wind-up windows on all but the very first One Tens, power steering (optional, but a common fitment), a new 5-speed gearbox for relaxed motorway cruising, better seats, better mirrors - the list goes on. The turning circle, though still large, is far more manageable than a Series III. They still need a lot of servicing, but at longer intervals than the older vehicles. Engines are more powerful (except the very early ones). So why wouldn't you buy one instead of a Series vehicle?

*Sometimes you see pre-1990 vehicles described as Defenders. This is incorrect - the Defender model name did not appear until the new TDi engine was introduced in 1990.

This Series III from 1981 has had a much harder life than the IIA pictured above. I sold this one for rebuilding.

Typical example of a hard-working Ninety - actually my old workhorse, now gone to a new home.

Reasons Not To Buy A Ninety Or One Ten:

Their popularity.

Precisely because they are so much more usable in modern conditions than the Series vehicles, demand even for older vehicles remains high. That means that the same money that will buy a clean, well-loved Series II or III will only stretch to a fairly shabby, hard-worked Ninety. You don't get something for nothing.

Their complexity.

The coil spring suspension has lots of bushes which wear and can be expensive and time-consuming to replace. The permanent four wheel drive system is more complex than the selectable system on the Series vehicles and expensive to fix if it goes wrong. Electrical systems are more complex, and faults therefore harder to trace. Wind-up windows and push-button door handles provide an unending source of irritating problems which just don't exist on a Series vehicle.

Their (lack of) quality.

Early One Tens (sliding side windows) seem to have been better built and painted than the last of the Series IIIs, but it all went downhill from there. There are major issues, particularly on late Eighties vehicles, with chassis rot and especially with bulkheads rotting away just below the windscreen and around the top door hinge. Doors corrode internally and fall apart, and cost about four times as much to replace as the two-piece Series doors. Wiper motors lose their self-parking function. Power steering has unreliability built in as standard. Turbodiesels (pre TDi) blow up. Gearboxes break expensively, losing all drive to the wheels, due to a design fault which Land Rover took 14 years to fix.

Their ubiquity.

These vehicles are absolutely everywhere. If you want something distinctive which stands out from the crowd, a Ninety or One Ten is not the way to go. You can paint it bright yellow, stick aluminium chequerplate all over the outside, fit a bullbar, huge wheels, half a dozen spotlights and jack up the suspension, and the next day you'll meet another one coming the other way, to which its owner has done exactly the same as you have to yours. But if you plan to do a lot of miles, want a Land Rover to use as your only vehicle, need power steering, suffer from back problems or spend all your life on the motorway, a Ninety or One Ten is probably your best choice. However, you need to be very careful buying one of these vehicles. With a Series

Compare and contrast - Series IIA on left, Ninety on right

II or III, if the chassis and bulkhead are sound (and they are pretty easy to inspect) then most other problems can be sorted out fairly cheaply. But turning a tired Ninety into reliable transport can become a very expensive game indeed. There are far more bad examples out there than good ones, and shiny paintwork is no guide to what lies underneath.

3. Land Rover Engines Since 1958

Land Rover used a number of different engines over the years, although all belonged to one of three 'families':

1. The inlet-over-exhaust petrol engines, in both four and six cylinder variants, which were used from the very first Land Rovers in 1948, and which had their origins in pre-war Rover cars.

2. The four cylinder overhead valve engines,both petrol and diesel, which first appeared (in diesel form) in 1957, at the tail end of Series One production, and evolved over the years to the TDi 300 turbodiesel, which remains in production today for some overseas markets.

3. The Buick-sourced all aluminium V8 motor.

Since 1998 Defenders have used the TD5 motor, an all-new 5 cylinder turbodiesel which, thanks to Ford, looks likely to be the last Land Rover designed engine. Reports suggest that it will be dropped next year in favour of a Ford diesel.

What follows is a short guide to the various engines used by Land Rover since the start of Series II production in 1958. The comments are based mainly on my own experience - others may have different views. The list is in roughly chronological order.

1997cc Petrol, inlet-over-exhaust:

The first few months production of Series II 88 inch petrol had these engines, carried over from Series One production. I suspect that most of the survivors will have been fitted with later 2286cc engines by now.

2052cc Diesel, overhead valve:

Land Rover's first diesel engine, and one of the first small high-speed diesels produced in the UK. It appeared in 1957, and was used in Series II production until 1961. Looks almost identical to the later 2286cc engine, but many internal differences. 51 bhp wasn't really good enough even in the late Fifties, and I would be surprised if more than a tiny handful of these engines remain in use.

2286cc Petrol, overhead valve, 3 bearing crank:

Must be the most numerous of all Land Rover engines. Closely related to the 2052cc diesel but with cylinders bored direct in the block (rather than the wet liners used by the diesel). Early engines had some weaknesses, prompting a redesign of many internal parts for the Series IIA in 1961. After that, carried on pretty much unchanged until 1980 when the 5 bearing crank appeared (see below).

A rugged, torquey motor with few real weaknesses: tends to wear its crank bearings (especially the centre one) due to crank flex at high revs, but will still keep going even when very rattly. Major bore wear is very common but doesn't seem to make a huge difference to power or oil consumption... Series II and IIA had Solex downdraught carburettor to 1968, later Series IIA and Series III had Zenith 36IV. Both can give problems in old age - quickest fix is a Weber replacement, but opinions on this conversion are divided. Some people report carburettor icing, and the Weber has a smaller intake than either the Solex or Zenith, which reduces power output (although economy is improved). A new or reconditioned original specification carburettor will be more expensive but probably better in the long run.

2286cc Diesel, overhead valve, 3 bearing crank:

Appeared in 1961 alongside the redesigned 2286cc petrol engine at the start of Series IIA production, and shared its

cylinder block and some other components. A big improvement over the earlier diesel: power output now a half decent 62 bhp. But the three bearing crank was a major weak spot: despite being made of better materials than the petrol one, it flexed at high revs and tended to break under load with expensive consequences. Fuel injection pump was driven off the camshaft by a skew gear which wore badly, giving unstable pump timing and lots of light grey smoke on older engines. One of these engines, if assembled properly, is still just about up to modern use: but keep below 45 mph (55 on overdrive-equipped vehicles) to be sure you don't break anything.

2625cc Petrol, inlet-over-exhaust:

Borrowed from the Rover saloon range, in response to demands from mid-Sixties Land Rover users for more power and torque. The big, heavy old straight six was heavily detuned for commercial use. Acquired a reputation for overheating and cracking cylinder heads, mainly due to operator neglect. (Nothing much wrong with the engine, as long as you keep fluids topped up and don't let it go out of tune.) Also it was thirsty and barely more powerful than the four cylinder petrol engine, although it sounds lovely and develops usefully more torque. Parts supply these days is patchy (although the engine remained available until 1980). The Weslake-head 3 litre engine from a Rover P5 is near enough a direct swap and used to be very popular, so check those serial numbers.

Mark Rumsey (Series II Club technical guru) adds: "(The straight six) feels barely more powerful than a 2.25 when driven in the same way, but in fact is quite a lot more powerful, around 20% in fact. If you use the full rev range of the engine you can take advantage of exceptional low speed torque, and if you are prepared to run the revs up you can get rapid acceleration. However, stick with the mid range (2000-3000rpm) and its only slightly better than a 2.25. Where the 6 shows it potential most is on hills. Where a 2.25 would start losing speed, the 6 just keeps pulling. Also the Weslake head on either the 2.6 (Rover P4 110 engine) or 3 litre won't fit without modification to the clutch pedal box. However, the early non-Weslake 3 litre drops straight in."

2286cc petrol/diesel, overhead valve, 5 bearing crank:

In 1980, Land Rover finally did something about the crank failures which had plagued its four cylinder engines for 22 years. The new crank was so strong that Land Rover could (and did) get away with using the same crank for petrol and diesel engines. These engines lasted beyond the end of Series III production and into the first couple of years of the new Ninety and One Ten ranges. Well worth paying extra for, if you are looking to replace a worn or broken 3 bearing engine in a Series vehicle.

3528cc V8 Petrol:

The ex-Buick all alloy V8 engine appeared in the Range Rover right from the start of production in 1970, but did not make its way into the company's utility vehicles until 1979. The Series III 109 V8 (or 'Stage One V8') was intended to replace the 2.6 litre six cylinder vehicles: Land Rover's engineers obviously thought the new vehicle would be too fast for its brakes and suspension, so they detuned the engine to 91 bhp by fitting restrictors in the carbs. Removing these takes the engine up to Range Rover spec (138 bhp or thereabouts). The One Ten (from 1983) had the 138 bhp V8 as an option from the start, and the same engine later appeared in the Ninety. The V8 engines were gradually phased out after the TDi turbodiesel appeared, with only a handful being fitted to Defenders as a special order option after 1990.

The V8, in all its applications, is a strong and reliable engine, but not indestructible: camshafts wear out at around 90-100 thousand miles, head gaskets and camchains usually go around the same time. These engines can hide serious problems very well, so be suspicious of one which has a slight misfire or is a bit down on power - it is probably overdue for a rebuild.

2495cc petrol, overhead valve:

The final development of Land Rover's ohv petrol 'four', with hardened valve seats which allow running on unleaded (or LPG). Lots of torque, and similar power output to the 2.5TD, but without the reliability issues (see below). A much underrated engine: works well with LPG, easy to maintain, and 2.5 petrol Landies tend to be much cheaper than diesels. Buy now while stocks last.

2495cc diesel, overhead valve:

Land Rover reworked the old 'two and a quarter' diesel for the Eighties. The injection pump was now driven off a toothed belt at the front of the engine (together with the camshaft) which sorted the pump timing drift problem of the older diesels, and the increase in capacity provided a bit more power. Slow but strong, simple and dependable.

2495cc turbodiesel, overhead valve, type 19J:

Given the strength and reliability of the 2.5 diesel, you can understand why Land Rover thought it would cope with turbocharging, but the result was a warranty nightmare. 2.5TDs can fail in any number of ways, but the most common seems to be internal cracks developing in the cylinder block. This gives the same symptoms as a blown head gasket or cracked cylinder head, but is not repairable. Due to a defective design of crankcase breather, these engines also tend to dump large amounts of engine oil into the air filter housing, which turns the paper air filter into a soggy black lump. This in turn leads to oil being drawn into the air intake, causing the engine to 'run away' and self-destruct.

Land Rover introduced a new cylinder block for the 2.5 Turbodiesel (part no. ERR479) from engine number 19J27515C. I have not been able to confirm, but suspect that this block was strengthened to get round the block cracking problems I would consider rebuilding a later engine, but not one of the earlier ones. In general, if the vehicle itself is any good, the sensible thing to do is to upgrade to a 200TDi (see below), or for old and tatty TDs the 2495cc non-turbo engine is a very straightforward swap, with only the air intake hose and exhaust system needing to be changed.

2495cc turbodiesel, overhead valve, 200TDi and 300TDi:

Second time lucky for Land Rover. The lessons learned from the 2.5TD were incorporated into the new TDi engines available in the Defender and Discovery from 1990. The cylinder block still looked familiar (although strengthened internally with an aluminium ladder frame bolted to the bearing caps) but the cylinder head was all-new and a direct injection fuel system was used. These engines have gained an impressive reputation for power and durability. Defender engines produced 107bhp, Discovery engines (with different manifolding and a couple of other small changes) 111bhp. The 300TDi has a single serpentine drive belt for alternator, power steering etc, better soundproofing and a few small internal differences compare to the 200TDi. Power outputs of the two engines are identical. Though no longer offered in Europe (due to emissions regulations) the 300TDi remains available in some export markets.

2495cc turbodiesel, 5 cylinder, TD5:

New and much stricter Euro emissions regulations for diesel engines led Land Rover to develop an all-new engine for the second generation Discovery, and this also found its way into the Defender. The TD5 features electronic control of the fuel injection system (with a control unit under the driver's seat), 'drive by wire' throttle and other refinements, all aimed at minimising exhaust emissions. Early reaction was mixed: the TD5 was much easier to stall than the earlier diesel engines (a characteristic shared by many of the latest generation of environment-friendly diesels) and there were reports of oil pump failures, cylinder head problems and other reliability issues - but not on anything like the scale of the 2.5TD fiasco in the Eighties. In any case, these issues appear to have been resolved, and the TD5 has turned out to be a lovely engine - much smoother than the old TDi, and it sounds better too.

Non Land Rover engines:

The weaknesses of some of the earlier engines resulted in a thriving industry fitting engines from various manufacturers to Land Rovers. Before the 200TDi, if you wanted a powerful, reliable diesel engine in your Land Rover, a conversion was the only way to go. Popular engine swaps over the years have included:

- Perkins 4.203 and 4.236 - big, slow-revving industrial engines, lots of torque but not much speed
- Ford 2.5 York diesel (horrible) and 2.5Di (excellent)
- Perkins Prima 2.0 turbodiesel (best bit of an Austin Montego)
- Peugeot 2.3 and 2.5 diesel - slow but durable
- Almost every Japanese diesel between 2.0 and 3.5 litres

These days, the most popular engine swap is the 200TDi. This engine, sourced from a Defender, will bolt into any four-cylinder Ninety or One Ten with the minimum of modifications. The 300TDi needs more work (it is designed to fit the later R380 gearbox, rather than the LT77 used in the older vehicles) and ex-Discovery TDis also need some modifications to make them fit. The 200TDi will also fit a Series II, IIA or III Landie with some work, and I have developed the '200Di' conversion - basically a derated, non-turbo version of this engine - specifically for Series applications.

4. Checking The Chassis

Older Land Rovers may have a chequered past. They could have been rebuilt several times and ended up with quite a different configuration to the one they started with. Not a problem in itself, but it can be interesting to discover how your vehicle began its life. More seriously, stolen Landies are sometimes given a new identity using the chassis plate from a scrapped vehicle. So if the chassis number doesn't correspond to the vehicle you are looking at, alarm bells should start to ring.

The chassis number is usually found stamped on an aluminium plate which also gives a basic description of the vehicle. This will usually be mounted on the bulkhead - inside the cab on earlier vehicles, under the bonnet (sometimes attached to the bulkhead, sometimes to the brake servo) on later ones. The list below does not include Series One vehicles - these are very much a collector's item nowadays, and I would recommend joining the Land Rover Series One Club if you are serious about purchasing one of these historic machines.

From the end of 1979 Land Rover went over to the modern 17 digit VIN numbers - these are slightly harder to decode, but still no problem with the list below. Prior to this, 9 digit numbers, or 8 digits plus a suffix letter, were used.

Chassis plate on Defender

Chassis plate on later Series III (bonnet removed)

141xxxxxx - 145xxxxxx: Series II 88 inch petrol

146xxxxxx - 150xxxxxx: Series II 88 inch diesel

151xxxxxx - 155xxxxxx: Series II 109 inch petrol

156xxxxxx - 160xxxxxx: Series II 109 inch diesel

161xxxxxx - 165xxxxxx: Series II 109 inch petrol station wagon

166xxxxxx - 170xxxxxx: Series II 109 inch diesel station wagon

222xxxxxx - 229xxxxxx: Series IIA 109 inch petrol One Tonne 6 cylinder

231xxxxxx - 235xxxxxx: Series IIA 109 inch petrol One Tonne

236xxxxxx - 239xxxxxx: Series IIA 88 inch petrol airportable ('Lightweight')

241xxxxxx - 245xxxxxx: Series IIA 88 inch petrol

246xxxxxx - 250xxxxxx: Series IIA 109 inch petrol One Tonne

251xxxxxx - 255xxxxxx: Series IIA 109 inch petrol

259xxxxxx - 259xxxxxx: Series III 88 inch petrol

261xxxxxx - 265xxxxxx: Series IIA 109 inch petrol station wagon

266xxxxxx - 270xxxxxx: Series IIA 109 inch petrol One Tonne 6 cylinder

271xxxxxx - 275xxxxxx: Series IIA 88 inch diesel

276xxxxxx - 280xxxxxx: Series IIA 109 inch diesel

281xxxxxx - 285xxxxxx: Series IIA 109 inch diesel station wagon

286xxxxxx - 290xxxxxx: Series IIA Forward Control petrol

300xxxxxx - 304xxxxxx: Series IIA Forward Control petrol 6 cylinder

305xxxxxx - 305xxxxxx: Series IIA Forward Control diesel

310xxxxxx - 310xxxxxx: Series IIA 109 inch airportable (military)

315xxxxxx - 319xxxxxx: Series IIA 88 inch petrol station wagon

320xxxxxx - 324xxxxxx: Series IIA 88 inch diesel station wagon

325xxxxxx - 329xxxxxx: Series IIB Forward Control petrol

330xxxxxx - 334xxxxxx: Series IIB Forward Control petrol 6 cylinder

335xxxxxx - 339xxxxxx: Series IIB Forward Control diesel

343xxxxxx - 343xxxxxx: Series IIA 109 inch petrol 6 cylinder station wagon (North America)

345xxxxxx - 349xxxxxx: Series IIA 109 inch petrol 6 cylinder

350xxxxxx - 354xxxxxx: Series IIA 109 inch petrol 6 cylin-

der station wagon

524xxxxxx - 524xxxxxx: Series IIA 88 inch petrol station wagon (North America)

895xxxxxx - 895xxxxxx: Series III 88 inch diesel airportable ('Lightweight' - military export)

901xxxxxx - 905xxxxxx: Series III 88 inch petrol

906xxxxxx - 910xxxxxx: Series III 88 inch diesel

911xxxxxx - 915xxxxxx: Series III 109 inch petrol

916xxxxxx - 920xxxxxx: Series III 109 inch diesel

921xxxxxx - 925xxxxxx: Series III 88 inch petrol station wagon

926xxxxxx - 930xxxxxx: Series III 88 inch diesel station wagon

931xxxxxx - 935xxxxxx: Series III 109 inch petrol station wagon

936xxxxxx - 940xxxxxx: Series III 109 inch diesel station wagon

941xxxxxx - 945xxxxxx: Series III 109 inch petrol 6 cylinder

946xxxxxx - 950xxxxxx: Series III 109 inch petrol 6 cylinder station wagon

951xxxxxx - 955xxxxxx: Series III 88 inch petrol airportable ('Lightweight')

956xxxxxx - 960xxxxxx: 101 Forward Control 12 volt

961xxxxxx - 965xxxxxx: 101 Forward Control 24 volt

VIN numbers 1979 on: (first 3 digits are SAL in all cases)

LBAAGxxxxxxxxx: Series III 88 inch diesel

LBAAHxxxxxxxxx: Series III 88 inch petrol

LBABGxxxxxxxxx: Series III 88 inch diesel station wagon

LBABHxxxxxxxxx: Series III 88 inch petrol station wagon

LBBAHxxxxxxxxx: Series III 88 inch petrol airportable ('Lightweight')

LBCAGxxxxxxxxx: Series III 109 inch diesel

LBCAHxxxxxxxxx: Series III 109 inch petrol

LBCAPxxxxxxxxx: Series III 109 inch petrol 6 cylinder

LBCAVxxxxxxxxx: Series III 109 inch petrol V8

LBCHGxxxxxxxxx: Series III 109 inch diesel high capacity pickup

LBCHHxxxxxxxxx: Series III 109 inch petrol high capacity pickup

LBCHVxxxxxxxxx: Series III 109 inch petrol V8 high capacity pickup

LBCMGxxxxxxxxx: Series III 109 inch diesel station wagon

LBCMHxxxxxxxxx: Series III 109 inch petrol station wagon

LBCMPxxxxxxxxx: Series III 109 inch petrol 6 cylinder station wagon

LBCMVxxxxxxxxx: Series III 109 inch petrol V8 station wagon

LBDAHxxxxxxxxx: Series III 109 inch petrol One Tonne

LBDAPxxxxxxxxx: Series III 109 inch petrol 6 cylinder One Tonne

Ninety and One Ten: Model range far more extensive to list here, but code can be decoded as follows.

First five digits should always be SALLD

6th digit: V= Ninety, H= One Ten

7th digit: A= regular body, B= Ninety Station Wagon, H= High Capacity Pickup, M= One Ten Station Wagon

8th digit: B= 2.5 turbodiesel, C= 2.5 diesel, D= 2.5 petrol, F= 2.5 TDi turbodiesel, G= 2.25 diesel, H= 2.25 petrol, V= V8 petrol

5. Engine History

Most older Land Rovers have had at least one engine change in the past. Land Rover engine designs did not change often, but there are a couple of key changes which may not be immediately obvious just looking at an engine, and for which the serial number can be very invaluable. The most obvious ones are:

- Major redesign of the 2286cc petrol engine in 1961, when the Series IIA replaced the Series II
- Diesel engine redesigned and increased from 2052cc to 2286cc at the same time
- Change from 3 bearing to 5 bearing crank on 4 cylinder engines around 1980
- 2286cc petrol replaced by 2495cc in 1985 - the new engine has hardened valve seats and will run on unleaded

A couple of other points worth knowing in relation to engine numbers. Firstly, the 2286cc petrol and diesel engines had interchangeable cylinder blocks. It is not uncommon for engine reconditioners to mix and match components, so you may find a diesel engine with a petrol serial number or vice versa. This should not be a problem on 5 bearing engines as the petrol and diesel used the same crankshaft, but on the earlier 3 bearing engine, petrol crankshafts were cast, and much weaker than the forged items used in diesel engines. If you put a petrol crankshaft in a diesel engine, it will run fine but may break under load. So if you find a diesel engine which has a petrol serial number on it, you need to be sure that the crankshaft has been replaced with the correct diesel type. To confuse matters more, some unscrupulous firms have been known to put petrol cranks in reconditioned diesels, and hope they last until after the warranty runs out. So with a 3 bearing diesel of unknown history, the safest check is to remove the sump and take a look inside. (Sump gaskets are very cheap, and you can clean all the old gunge from the bottom of the sump at the same time.) If the crank has a large letter 'P' cast into it, and is of smooth appearance, it is a petrol crank. If it is slightly rough looking and has no letter 'P' it's a diesel crank.

Compression ratios: although Land Rover used different serial numbers for low compression (7:1) and high compression (8:1) four cylinder petrol engines, the cylinder heads are interchangeable between the two, so the engine number is not a reliable guide to the actual specification. The compression ratio is cast into the side of the cylinder head.

Also worth knowing is that Land Rover introduced a new cylinder block for the 2.5 Turbodiesel (part no. ERR479) from engine number 19J27515C. I have not been able to confirm, but suspect that this block was strengthened to get round the block cracking problems for which the 2.5TD had become notorious. Certainly the later (1989-90) 2.5TD seems more durable than the earlier ones. If I were rebuilding one of these engines I would try to get hold of a late block just to be sure - I certainly wouldn't bother rebuilding an earlier one.

Finally, whereas the 2286cc petrol and diesel blocks have the same part number, on 2495cc engines they are different (and the TD is different again). So I do not know whether these blocks are interchangeable.

Finding your serial number: On four cylinder engines, the engine number is stamped on a flat area just forward of and below the front exhaust port, between the exhaust manifold and the water pump housing. On V8s it can be seen by looking down between number 2 and 3 exhaust outlets on the left hand (dipstick) side.

Serial number location on 4 cylinder (arrowed)

Serial number location on V8 (head removed)

105xxxxxx Series III petrol 3528cc V8

10Hxxxxxx 90/110 petrol 2286cc 8:1 CR

10Jxxxxxx 90/110 diesel 2286cc

11Gxxxxxx Series III petrol 3528cc V8 (detoxed)

11Hxxxxxx 90/110 petrol 2286cc 8:1 CR (detoxed)

12Gxxxxxx Series III petrol 3528cc V8 (Australia)

12Jxxxxxx 90/110 diesel 2495cc

13Hxxxxxx 90/110 petrol 2286cc 7:1 CR

141xxxxxx Series II petrol 1997cc

146xxxxxx Series II diesel 2052cc

14Gxxxxxx 90/110 petrol 3528cc V8

151xxxxxx Series II petrol 2286cc

156xxxxxx Series II diesel 2052cc

15Gxxxxxx 90/110 petrol 3528cc V8 (detoxed)

19Jxxxxxx 90/110 turbodiesel 2495cc

236xxxxxx Series IIA petrol 2286cc (fitted to 88 inch airportable)

241xxxxxx Series IIA petrol 2286cc 8:1 CR

251xxxxxx Series IIA petrol 2286cc 7:1 CR

252xxxxxx Series IIA petrol 2286cc 7:1 CR

253xxxxxx Series IIA petrol 2286cc 7:1 CR

271xxxxxx Series IIA diesel 2286cc

276xxxxxx Series IIA diesel 2286cc

286xxxxxx Series IIA petrol 2286cc (Forward Control)

300xxxxxx Series IIA petrol 2625cc (Forward Control)

325xxxxxx Series IIB petrol 2286cc (Forward Control)

330xxxxxx Series IIB petrol 2625cc (Forward Control)

335xxxxxx Series IIB diesel 2286cc (Forward Control)

345xxxxxx Series IIA petrol 2625cc

361xxxxxx Series III petrol 2286cc 8:1 CR 5-bearing

364xxxxxx Series III petrol 2286cc 7:1 CR 5-bearing

366xxxxxx Series III diesel 2286cc 5-bearing

895xxxxxx Series III diesel 2286cc 3-bearing (fitted to 88 inch airportable for export)

901xxxxxx Series III petrol 2286cc 8:1 CR 3-bearing

902xxxxxx Series III petrol 2286cc 8:1 CR 3-bearing

903xxxxxx Series III petrol 2286cc 8:1 CR 3-bearing

904xxxxxx Series III petrol 2286cc 7:1 CR 3-bearing

906xxxxxx Series III diesel 2286cc 3-bearing

941xxxxxx Series III petrol 2625cc

951xxxxxx Series III petrol 2286cc 3-bearing (fitted to 88 inch airportable)

956xxxxxx 101FC petrol 3528cc V8

961xxxxxx 101FC petrol 3528cc V8

6. Land Rover Carburettors

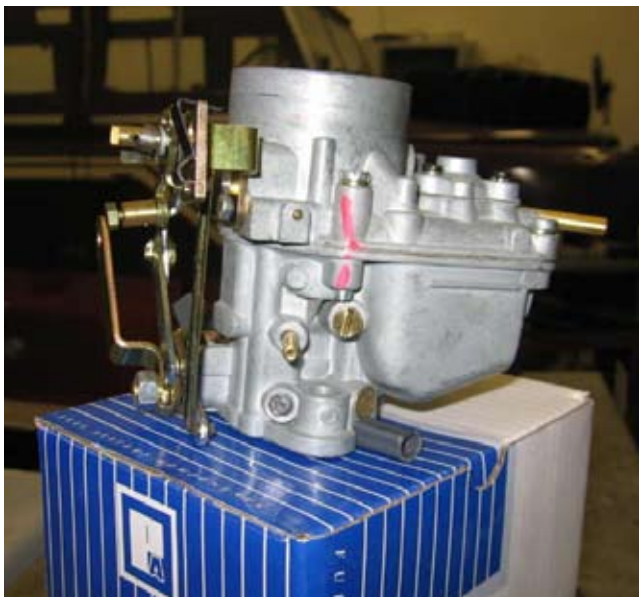
Carburettors on older Land Rovers seem to cause a disproportionate number of problems for owners. In these days of high fuel prices and global warming, it makes a lot of sense to get your vehicle running as well as possible to improve fuel economy and minimise emissions. A decent fuel system will also make your Land Rover a lot easier to live with.

So, what carburettor do you have fitted, and what might be up with it?

Solex 40PA - factory fitment Series II and IIA, 1958-67

These are not especially common these days - many were replaced with Zeniths or Webers when they developed problems - but they still turn up. A Solex in good condition works very well, with a nice progressive throttle action. They seem quite prone to blocked jets which will cause poor idling, slow pickup or lack of power depending on which jet is affected. The jets are accessible without dismantling the carb, and can be sprayed with carb cleaner and then blown through with an airline to clean them. Do not start poking bits of wire into the jets or you will ruin them. Float needles wear, leading to fuel flooding into the intake - parts were unavailable for a while but the supply seems better now. A worn out Solex can usually be refurbished, there are several specialists who will undertake this work. New Solexes are no longer available.

Zenith 36IV - factory fitment Series IIA and III, 1967-84



Easy to identify with its large sloping float chamber. The 36IV is a simple, almost primitive device, but well suited to the 2286cc petrol engine. It suffers from throttle spindle wear, which allows excess air to be drawn in at small throttle openings, giving hesitant performance at low speed. There is an 'O' ring between the upper and lower body which can perish or split leading to fuel flooding into the intake. Blocked jets are not unknown - the one that seems to suffer most is the accelerator pump jet, leading to hesitation and flat spots when the throttle is opened from idle. Replacement Zeniths are widely available - the originals are still being made, and there are several reproductions also available. Beware as some of these are of very poor quality. The ones I sell through my Ebay shop, made by a company called PA, are individually bench tested by the manufacturer, are made of good quality materials and finished to a high standard. I use them myself, because they are very good.

A new Zenith can be fitted as a direct replacement for a Weber 34ICH (see below). It can also replace a Solex

40PA, but for this application you will need an adaptor plate and throttle linkage from a Zenith or Weber-equipped vehicle.

Weber 34ICH - aftermarket fitment 1980s - date

This carburettor became very popular in the 1980s when the supply of Solex parts dried up, and when the only source for Zeniths was the Land Rover dealer network. They were sold as a cheap replacement which also improved fuel economy. This is true up to a point, and the 34ICH is still available today at around £80, but it is not as popular as it once was. Reasons? Firstly, the fuel economy improvement is achieved through two things - firstly the carb is a bit small for the application, with restricted gas flow, and secondly it is jetted to run fairly lean. Taken together these two factors certainly improve economy, but really hurt performance.

The Weber is also very prone to jet blockages (worse than the Solex) and, more seriously, internal fuel passage blockages that can be almost impossible to clear. It can also suffer badly from carb icing - it really needs a heated air intake which the Land Rover does not have. If your vehicle starts easily on cold mornings, but splutters to a halt after a couple of minutes, then restarts and runs as sweetly as before, carb icing is probably the cause. Oddly, not all Weber-equipped Land Rovers suffer from this problem - it varies from vehicle to vehicle, for no apparent reason.

Weber 32/34 DMTL - factory fitment on 90 and 110, 1983 onwards

This is a twin choke carburettor, fitted to all four cylinder petrol 90 and 110 models. There are two slightly different versions, one for the earlier 2286cc engine and another for the 2495cc lump. They look identical, the only difference is in the jetting. The 2495 carb will work fine with the earlier engine, and gives noticeably better low speed throttle response, but not the other way round. This carb is a good reliable piece of kit with few vices - mainly blocked jets (easily accessible after removing the plastic air intake over the carburettor). There is an idle shut off solenoid mounted on the side of the carb - if this fails the engine will not idle at all. This carb uses a different inlet and exhaust manifold to the Series carbs, and although the manifold will bolt to any of the 4 cylinder Series engines, you will need to make up your own front exhaust pipe as the Series pipe will not fit. The carb also has a cable operated throttle, whereas all the Series vehicles are rod-operated.

Replacing and setting up your carburettor - Series vehicles

This is a nice easy job and should be well within the capabilities of anyone who can change a light bulb without getting electrocuted. First things first: before removing your old carb, make sure that your ignition system is up to scratch. That means plugs in good condition and correctly gapped, points ditto, and ignition timing properly adjusted. You will not be able to get your vehicle to run smoothly if the ignition system is in bad shape. If your distributor is worn out, I have brand new, good quality Lucas 45D4 reproductions in my Ebay shop.

The carb removal and replacement procedure is well-explained in both the factory workshop manual and the Haynes manual, so I will not give a blow by blow account here. If you do not have a manual, buy one. There are just a few things I would emphasise:

1. When you remove the old carburettor, make sure you clean all the old gasket material off the manifold, and use a new gasket when you fit the new carb. Do not use silicone sealant ("instant gasket" as it has a nasty habit of getting into the air passages in the base of the carb. If you try to re-use the old gasket you will probably get air leaks which will make the carb impossible to set up.

2. Do not overtighten the nuts which secure the carb to the manifold. The carb is made of aluminium and the mounting flange is easily distorted. Again this will cause air leaks. Just tighten the nuts until the locking washers are compressed flat.

3. Make 100% sure that the fuel line is correctly connected and the clamps done up tight. If the fuel line is split or perished, replace it. The carb on these engines sits directly above the exhaust, and a petrol leak is seriously bad news.

4. Ideally you need a gas analysis machine to set the mixture, but you probably don't have one. So run the engine until it is warm, then adjust the idle screw until the idle speed sounds about right. Note that Series Land Rovers idle a bit slower than modern cars - around 600 rpm. The engine should not sound 'busy' at idle. If you have an earlier vehicle with dynamo charging, the charge warning light should be flickering, but not bright. Then slowly screw in the mixture screw until the idle speed drops and the engine starts to run rough. Unscrew it around a quarter of a turn from this point, and readjust the idle speed if needed. If the engine idles smoothly at the right speed, your settings will not be far out.

7. Land Rover Green

Unless you have spent the last ten years on a desert island, you will have noticed that environmental pressure groups have got it in for big 4x4s. Greenpeace denounces Land Rover as 'climate criminals' and wants everyone to drive a Toyota Prius. 4x4s are portrayed as a major cause of global warming, their owners as mindless status-obsessed eco-vandals. With more and more people taking an interest in 'green' issues, it is fair to ask where old Land Rovers fit into this debate, and what can be done to minimise their environmental impact.

So what are the main problems with old Landies, as perceived by the environmentalists? Basically it comes down to two: fuel consumption (and the related issue of greenhouse gas emissions), and safety of other road users. There may be other factors behind the current anti-4x4 campaign - anti-consumerism, and maybe just a bit of envy - but these are nothing to do with the big environmental issues. And anyway, if you drive a 20 year old Landie your ignorant neighbours are more likely to feel sorry for you than envy you. "Poor chap, can't even afford a nice modern car." So let's look at the really big issues.

Fuel consumption

OK, I admit it. Old Land Rovers, in standard form, have really terrible fuel consumption. A 2.5 diesel Ninety might just see 25 to the gallon. Any four cylinder petrol will struggle to do 20, and the big beasts - straight six and V8 engined vehicles - can get down into single figures around town. Abysmal fuel consumption - leading to the production of huge quantities of CO2. Guilty as charged.

And yet... Fuel consumption isn't the whole picture. What about the energy consumed - and greenhouse gases produced - in manufacturing a new vehicle? And what about the energy used, pollutants released and rubbish created in scrapping it? It has been estimated that around 30-40% of the total greenhouse gas emissions over the life of a vehicle come from its manufacture. Scrapping creates large quantities of non-recyclable plastics, toxic heavy metals, asbestos, CFCs, PCBs and rubber products, all of which have to be disposed of. So you can argue that by keeping an old vehicle on the road instead of scrapping it and buying another one, you are

Prime suspect for climate change crime - the Rover V8 engine.

helping to offset the damage done through its poorer fuel consumption.

You are also helping to provide a market for components reclaimed from vehicles which really have reached the end of their useful life. On a scrap Land Rover, very little goes to waste. Any reusable component will most likely be reused. Why? Simply because there are so many old Land Rovers still on the road, which creates the demand for recycled parts. Reusing parts on other vehicles has less environmental impact than melting them down for scrap. Remember that next time you are struggling in the pouring rain to remove the back axle from a dead Landie in a breakers yard, with a giant oily Alsatian gnawing at your ankle.

Alternative fuels

Here's another thing. The reason that fuel consumption and global warming are linked is that nearly all our current fuel comes from a non-renewable source: crude oil. We pump it out of the ground, refine it, burn it in vehicles, and the carbon contained within it, which has been harmlessly trapped for millions of years, combines with oxygen in the air to form carbon dioxide - a greenhouse gas. But there is another group of fuels - biofuels - which are derived from growing plants. The great thing about plants is that when growing, they absorb carbon dioxide and turn it into oxygen, trapping the carbon within their structures. You turn them into fuel, burn the fuel, the carbon is released but then reabsorbed by the new plants you are growing to replace the ones you have harvested for fuel.

Old Land Rovers are mechanically simple and very easy to convert to run on biofuels - unlike modern computer-controlled vehicles which will need major modification. There are already thousands of diesel Land Rovers running on waste vegetable oil (a by-product of the catering industry). Petrol Land Rovers should be easily modified to run on the new fuel E-85 (85% ethanol) which is now starting to appear.

Finally there is LPG - not a biofuel, but a very clean burning fuel, and ideal for petrol engined Land Rovers. Switching from petrol to LPG will reduce CO2 emissions by about 20%, and uses a fuel which is a by-product of natural gas extraction and might otherwise go to waste. As a short-term measure, LPG is probably the quickest way to minimise your greenhouse gas emissions.

Improving fuel consumption

There is plenty more you can do to improve the fuel consumption of your old Land Rover.

1. Keep it well maintained. Make sure it is regularly serviced, that fuel and ignition systems are in good condition and properly set up, and that oil is clean and at the correct level, not only in the engine but also the transmission. Make sure

the brakes are in good condition and not dragging, and that the tyres are correctly inflated.

2. Choose your tyres carefully. Big wide chunky off-road tyres look cool, but create lots of drag. If you use your Land Rover mainly on-road, go for a road-biased tread pattern, and avoid extra-wide tyres. The optimum sizes I have found are 235/70R16 on a short wheelbase, 235/85R16 on a long wheelbase. Unless you have specialised off-road needs, you don't need to go any bigger.

3. Avoid unnecessary weight and drag. Think carefully about the accessories you bolt to your Land Rover. Roofracks, extra lamps, snorkels, jack racks, even chequer plate, all add weight and drag, and that hurts fuel economy. Don't put your spare wheel on the bonnet, hang it at the back or (even better) put it inside the vehicle.

4. Modify for economy. Higher ratio transfer gearing (or an overdrive) will give more relaxed cruising with better fuel economy. Free wheel hubs (on Series vehicles) reduce drivetrain drag a little. The four cylinder petrol engine was designed to run on very poor quality petrol, and can be much improved for use in developed countries by fitting a higher compression gasflowed cylinder head. Finally and most drastically, if your engine needs changing, consider fitting something more modern and efficient. The Land Rover TDi turbodiesel and Ford 2.5Di (Transit engine) will both give you 30 MPG or better, as will the Perkins Prima 2.0 turbodiesel.

Safety of other road users

An old Land Rover weighs the best part of two tonnes. It has a square front end and a big solid bumper attached to a rigid chassis. If you hit something smaller, whether it is a pedestrian or a Smart car, it is going to hurt them more than you. That, in essence, is why environmentalists object to 4x4s on safety grounds. Much of this is governed by the laws of physics, but there are a couple of things you can do to help. Firstly, avoid bolting stuff to the front of your Landie unless you actually need it. That means bullbars, A-bars, extra lights, winches, jerrycan holders, toolboxes etc. Secondly, don't speed in built up areas. In this day and age, with speed cameras proliferating everywhere, one of the really useful things about old Landies is that they are very easy to drive slowly. In a modern car, 30mph feels painfully slow. In a Land Rover, it is plenty fast enough. If you drive like a maniac you will just give the anti-4x4 people more ammunition. Slow down, relax and enjoy the ride.

Glossary

When reading descriptions of Land Rovers for sale, there are many terms which might confuse the first-time buyer. Here is a handy guide to some of the more common words and phrases, and what they mean.

A-bar

Tubular steel front crash protection bar with mounts for spotlights. Currently very fashionable as an aftermarket accessory for Defenders. See photo below.

Alpine lights

Narrow oval windows to be found in the outer edges of the roof on Station Wagons. Sometimes fitted as an optional extra to hard top Land Rovers.

Bulkhead

The structure between the engine bay and vehicle interior, to which the windscreen, front doors, front wings and bonnet are attached. Made of mild steel and can rot badly. Very expensive to replace.

Bull bar

Large piece of ironmongery bolted to the front bumper for added crash protection. Now rather unfashionable as they are not very pedestrian friendly. Most people fit A-bars instead.

Centre differential

Found in the transfer box in 90, 110 and Defender models. Allows permanent four wheel drive without excessive tyre wear. Can be locked for off-road use in slippery conditions.

Chequer plate

Shiny 3mm aluminium sheet with an 'anti-slip' pattern. Intended for use on gangways, ramps etc, but hugely fashionable for giving Land Rovers that tough industrial look. Now available in a huge variety of pre-cut shapes to attach to almost every outer surface of your Land Rover. Handy for covering up minor damage to wings, sills etc., but otherwise purely decorative.

Chrome balls

See steering swivels

County

'Luxury' trim specification, found on late Series III and early 90/110. Cloth seats, headlining etc.

Dixon-Bate

Manufacturer of sturdy adjustable-height tow hitches, very popular with Land Rover users.

Double-declutching

Driving technique which allows crunch-free gearchanges on gearboxes with no (or badly worn) synchromesh. Essential for Series II/IIA drivers, useful on more modern Land Rovers with worn gearboxes. For an explanation of how to do it, click here.

EP90

Heavy duty gear oil, used in the gearbox (Series II/III only), transfer box, axles and steering swivels. The stuff that leaks onto your drive.

Free wheel hubs

Popular accessory for Series vehicles, disconnects the front wheels from the front differential and driveshaft to reduce drag, noise and vibration when running on-road in 2 wheel drive.

Hard top

Van type body, usually comes with a safari door, See photo below. Can be fitted with side windows and rear seats.

Modular wheels

Popular aftermarket steel wheels, a multihole pattern with a ring of small bolts running round the edge. See photo below.

Overdrive

Highly desirable accessory for Series vehicles, effectively adds a fifth gear for relaxed cruising.

Parabolic springs

A desirable modification for Series vehicles. A Series vehicle fitted with parabolic springs will ride just about as well as a new Defender.

Safari door

Full depth, side-opening rear door. Standard on all station wagons, optional (although very common) on other Series vehicles, standard on hard top 90/110 and Defenders

Salisbury axle

A heavy duty rear axle, fitted to long wheelbase Series III and One Ten vehicles. Can be fitted to earlier long wheelbase vehicles, but requires expert welding to adapt for short wheelbase ones. Almost indestructible and therefore highly desirable.

Stage One

The unofficial name given to an interim model which had most of the features of the Series III, but permanent four wheel drive and a V8 engine, also the flat front design which became standard on the 90/110 and Defender.

Station wagon

The original people carrier. Short wheelbase vehicles seat seven, long wheelbase seat ten or twelve depending on specification. Rear seats are cramped and uncomfortable for adults but brilliant for children. Comes with alpine lights and safari door.

Steering swivels

To be found at each end of the front axle. They contain the driveshaft joints which run in a bath of EP90. The oil is prevented from leaking out by a rubber seal around a large chrome ball. The chrome becomes pitted and rusty, the seal tears and you get oil leaks. Replacing chrome balls is an involved and expensive job.

Synchromesh

The system which allows smooth, crunch free gear changes. Taken for granted on modern cars: but Series II and IIA vehicles only had synchromesh on 3rd and 4th gear. The mechanism can wear badly on the newer vehicles, resulting in crunchy gearchanges. These can be avoided by double-declutching.

Timing belt

Rubber toothed belt found inside all 2.5 litre Land Rover diesel engines. Must be changed according to the manufacturer's service schedule: otherwise it can snap without warning, which will destroy the engine. Belt replacement quite expensive, new engine much more so.

Transfer box

A two-speed gearbox which sits behind the main gearbox, and transfers the drive to the front and rear wheels. Series vehicles have a selectable four wheel drive system, 90/110 and Defender have permanent four wheel drive with a centre differential.

Truck cab

This is the short roof, which just covers the front seats, allowing the vehicle to be used as a pickup truck. See photo below.

Weber carburettor

Common fitment to petrol Series vehicles, improves fuel consumption slightly but also reduces power.

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