SECTION 8
Off-road driving

This section of the handbook is devoted to your vehicle's superb off-road driving capabilities.

*Before venturing off-road however, it is **absolutely essential** that inexperienced drivers become fully familiar with the vehicle's controls, in particular the transfer gearbox, and also study the off-road driving techniques described on the following pages.*

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Off-road driving

WARNING

Off-road driving can be hazardous!

- ***DO NOT take unnecessary risks.***
- ***Be prepared for emergencies at all times.***
- ***Your Land Rover has a higher ground clearance and, therefore, a higher centre of gravity than an ordinary passenger car. An abrupt manoeuvre at an inappropriate speed, or on an unstable surface, could cause the vehicle to go out of control.***
- ***Familiarise yourself with the recommended driving techniques in order to minimise risks to yourself, your vehicle AND your passengers.***
- ***Always ensure that seat belts are worn for personal protection in all off-road driving conditions.***
- ***DO NOT drive if the fuel level is low - undulating ground and steep inclines could cause fuel starvation to the engine and consequent damage to the catalytic converter.***

BASIC OFF-ROAD TECHNIQUES

These basic driving techniques are an introduction to the art of off-road driving and do not necessarily provide the information needed to successfully cope with every single off-road situation.

We strongly recommend that owners who intend to drive off-road frequently, should seek as much additional information and practical experience as possible.

Gear selection

With the gearshift lever set at 'D', the gearbox automatically provides the correct gear for the appropriate gear range selected (HIGH or LOW). Remember that position '1' will hold the gearbox in first gear to give maximum engine braking when required.

Transfer gears

High range gears should be used whenever possible - only change to low range when ground conditions become very difficult. The DIFF LOCK should be engaged whenever there is a risk of losing wheel grip, and disengaged as soon as firm, level, non-slippery ground is reached.

Braking

As far as possible, vehicle speed should be controlled through correct gear selection.

Application of the brake pedal should be kept to an absolute minimum. Harsh braking on wet, muddy or loose surfaces, could prove dangerous.

NOTE: *If the correct gear and gear range have been selected, braking will be largely unnecessary.*

Use of engine for braking

Before descending steep slopes, stop the vehicle at least a length before the descent, move the gearshift lever to 'N', engage LOW range and then select '1' or '2' in the main gearbox, depending on the severity of the incline.

While descending the slope, it should be remembered that the engine will provide sufficient braking effort to control the rate of descent, and that the brakes should not be applied.

Accelerating

Use the accelerator with care - any sudden surge of power may induce wheel spin and result in loss of control of the vehicle.

Steering

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WARNING

DO NOT hold the steering wheel with your thumbs inside the rim - a sudden 'kick' of the wheel as the vehicle negotiates a rut or boulder could seriously injure them. ALWAYS grip the wheel on the outside of the rim (as shown) when traversing uneven ground.

Survey the ground before driving

Before negotiating difficult terrain, it is wise to carry out a preliminary survey on foot. This will minimise the risk of your vehicle getting into difficulty through a previously unnoticed hazard.

Ground clearance

Don't forget to allow for ground clearance beneath the chassis, axles and under the front and rear bumpers. Note that the axle differentials are situated BELOW the chassis and are positioned slightly to the RIGHT of the centre of the vehicle. Note also that there are other parts of the vehicle which may come into contact with the ground; where possible, attempt to avoid obstacles that may foul the chassis or differentials.

Ground clearance is particularly important at the bottom of a steep slope, or where wheel ruts are unusually deep and where sudden changes in the slope of the ground are experienced.

On soft ground, the axle differentials will clear their own path in all but the most difficult conditions. However, on frozen, rocky or hard ground, hard contact between the differentials and the ground will generally result in the vehicle coming to a sudden stop.

Always attempt to avoid obstacles that may foul the chassis or axle differentials.

Loss of traction

If the vehicle is immobile due to loss of wheel grip, the following hints could be of value:

- Avoid prolonged wheel spin; this will make matters worse.
- Remove obstacles rather than forcing the vehicle across them.
- Clear clogged tyre treads.
- Reverse as far as possible, then attempt an increased speed approach - additional momentum may overcome the obstacle.
- Brushwood, sacking or any similar material placed in front of the tyres, will improve tyre grip.

IMPORTANT INFORMATION

After driving off-road

Before rejoining the public highway, or driving at speeds above 25 mph (40 km/h), consideration should be given to the following:

- Wheels and tyres must be cleaned of mud and inspected for damage - ensure there are no lumps or bulges in the tyres, or exposure of the ply or cord structure.
- Brake discs and calipers should be examined and any stones or grit that may affect braking efficiency removed.

Servicing requirements

Vehicles operating in arduous conditions, particularly on dusty, muddy, or wet terrain, and vehicles undergoing frequent or deep wading conditions, will require more frequent servicing. See *'Owner maintenance'* and contact a Land Rover dealer for advice.

In addition:
After wading in salt water or driving on sandy beaches, use a hose to thoroughly wash the underbody components and any exposed body panels with fresh water. This will help to protect the vehicle's cosmetic appearance.

DRIVING ON SOFT SURFACES & DRY SAND

The ideal technique for driving on soft ground and dry sand, requires the vehicle to be kept moving at all times - soft ground and sand cause excessive drag on the wheels, resulting in a rapid loss of motion once driving momentum is lost. For this reason, gear changing should be avoided.

- Engage the DIFF LOCK.
- Select the highest suitable gear and REMAIN in that gear until a firm surface is reached. It is generally advisable to use LOW range gears, as these will enable you to accelerate through worsening conditions, without the risk of being unable to restart.
- Disengage the DIFF LOCK as soon as firm ground is reached.

Stopping the vehicle on soft ground, in sand or on an incline

If you do stop your vehicle, remember:

Starting on an incline, or in soft ground or sand, is almost impossible. Always park on a firm level area, or with the vehicle facing downhill.

To avoid wheel spin, select position 'D' and use the MINIMUM throttle necessary to get the vehicle moving.

If forward motion is lost, avoid excessive use of the throttle - this will cause wheel spin and tend to dig the vehicle into the sand. Clear sand from around the tyres and ensure that the chassis and axles are not bearing on the sand, before again attempting to move.

If the wheels have sunk, use an air bag lifting device or high lift jack to raise the vehicle, and then build up sand under the wheels so that the vehicle is again on level ground. If a restart is still not possible, place sand mats or ladders beneath the wheels.

DRIVING ON SLIPPERY SURFACES (ice, snow, mud, wet grass)

- With the DIFF LOCK engaged, select 'D' in LOW range.
- Drive away using the MINIMUM possible throttle opening.
- Drive slowly at all times, keeping braking to a minimum and avoiding violent movements of the steering wheel.
- Disengage the DIFF LOCK as soon as a non slippery surface is reached.

DRIVING ON ROUGH TRACKS

Although rough tracks can sometimes be negotiated in normal drive, it is advisable to lock the differential if excessive suspension movement is likely to induce wheel spin.

On very rough tracks, engage LOW range to enable a steady, low speed to be maintained, without constant use of the brake pedal.

Always disengage the DIFF LOCK when smooth, firm ground is reached.

CLIMBING STEEP SLOPES

Engage the DIFF LOCK and ALWAYS follow the fall line of the slope - travelling diagonally could encourage the vehicle to slide broadside down the slope.

Steep climbs will usually require the LOW gear range. If the surface is loose or slippery, use sufficient speed in the highest practical gear, to take advantage of the vehicle's momentum. However, too high a speed over a bumpy surface may result in a wheel lifting, causing the vehicle to lose traction. In this case try a slower approach. Traction can also be improved, by easing off the accelerator just before loss of forward motion.

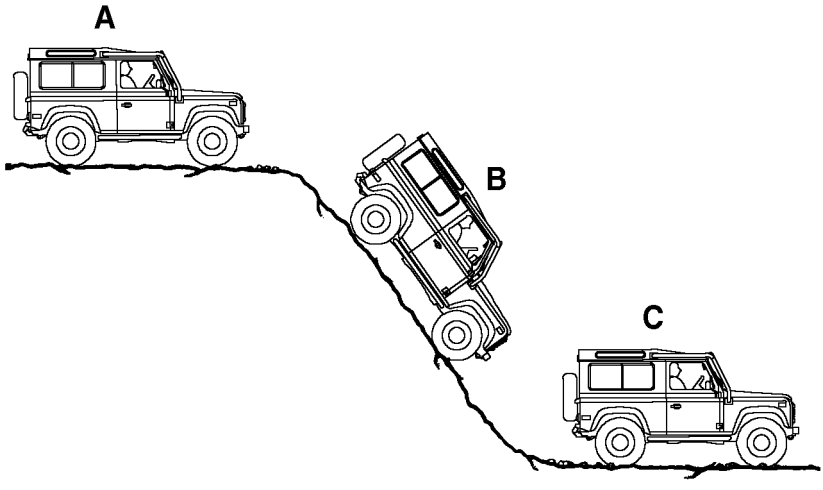
If the vehicle is unable to complete a climb, do not attempt to turn it around while on the slope. Instead, adopt the following procedure to reverse downhill to the foot of the slope:

1. Hold the vehicle stationary using both foot and handbrakes.
2. Restart the engine if necessary.
3. Engage reverse gear LOW range.
4. Release the handbrake. Then, release the foot brake and allow the vehicle to reverse down the slope, using engine braking to control the rate of descent.
5. Unless it is necessary to stop the vehicle in order to negotiate obstructions, DO NOT apply the brake pedal during the descent.
6. If the vehicle begins to slide, accelerate slightly to allow the tyres to regain grip.

When the vehicle is back on level ground, or where traction can be regained, a faster approach will probably enable the hill to be climbed. However, DO NOT take unnecessary risks; if the hill is too difficult to climb, find an alternative route.

WARNING

The engine must be restarted before reversing down the slope, as there will be no servo assistance to the brakes unless the engine is running.



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DESCENDING STEEP SLOPES

A. Stop the vehicle at least a vehicle length before the slope and select '1', LOW range with the differential locked.

B. Unless it is necessary to stop the vehicle in order to negotiate obstructions, **DO NOT** touch the brake pedal during the descent - the engine will limit the speed, keeping the vehicle under control provided the front wheels are turning. If the vehicle begins to slide, accelerate gently to maintain directional stability - DO NOT use the brakes or attempt to change gear.

C. Once level ground is reached, unlock the differential and select a suitable gear for the next stage of your journey.

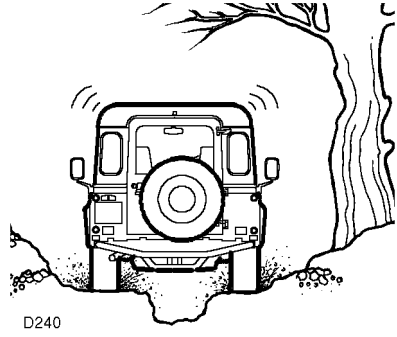
WARNING

Failure to follow these instructions, may cause the vehicle to roll over.

TRAVERSING A SLOPE

Before crossing a slope, ALWAYS observe the following precautions:

- Check that the ground is firm and not slippery.
- Check that the wheels on the downhill side of the vehicle are not likely to drop into any depressions in the ground and that the 'uphill' wheels will not run over rocks, tree roots, or similar obstacles, that could suddenly increase the angle of tilt.
- Ensure that passenger weight is evenly distributed, that all roof rack luggage is removed and that all other luggage is properly secured and stowed as low as possible. Always remember; any sudden movement of the load could cause the vehicle to overturn.
- Rear seat passengers should sit on the uphill side of the vehicle or, in extreme conditions, should vacate the vehicle until the sloping ground has been safely negotiated.



NEGOTIATING A 'V' SHAPED GULLY

Observe extreme caution! Steering up either of the gully walls, could cause the side of the vehicle to be trapped against the opposite gully wall.

DRIVING IN EXISTING WHEEL TRACKS

As far as possible, allow the vehicle to steer itself along the bottom of the ruts. However, always keep a light hold of the steering wheel to prevent it from spinning free.

Particularly in wet conditions, if the steering wheel is allowed to spin free, the vehicle may appear to be driving straight ahead in the ruts, but in actual fact (due to the lack of traction caused by wet ground) is unknowingly on full right or left lock. Then, when level ground is reached, or if a dry patch is encountered, the wheels will find traction and cause the vehicle to suddenly veer to left or right.

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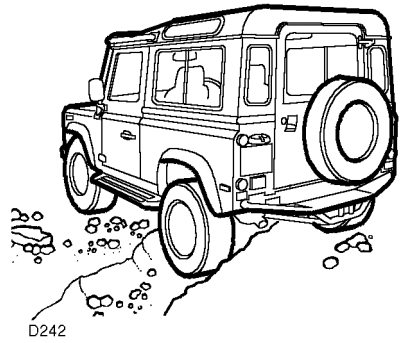
CROSSING A RIDGE

Approach at right angles, so that both front wheels and then both rear wheels cross the ridge together - an angled approach could cause traction to be lost, through diagonally opposite wheels lifting from the ground at the same time.



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CROSSING A DITCH

With the DIFF LOCK engaged, cross ditches at an angle, so that three wheels always maintain contact with the ground (if approached head on, both front wheels will drop into the ditch together, possibly resulting in the chassis and front bumper being trapped on opposite sides of the ditch).

WADING

WARNING

The maximum advisable wading depth is 20 in. (0,5 metre).

Severe electrical damage may occur, if the vehicle remains stationary for any length of time when the water level is above the door sills.

If the water is likely to exceed 20 in. (0,5 metre) while the vehicle is moving, the following precautions MUST be observed:

- Fix a plastic sheet in front of the radiator grille, to prevent water from soaking the engine and mud from blocking the radiator.
- Ensure that the silt bed beneath the water, is firm enough to support the vehicle's weight and provide sufficient traction.
- Ensure that the engine air intake is clear of the water.
- To prevent saturation of the electrical system and air intake, avoid excessive engine speed.
- With the DIFF LOCK engaged, select a low gear and maintain sufficient throttle to prevent the engine from stalling. This is particularly important if the exhaust pipe is under water.
- Drive slowly into the water and accelerate to a speed which causes a bow wave to form; then maintain that speed.

At all times, keep all the doors fully closed.

After wading

- Drive the vehicle a short distance and apply the foot brake to check that the brakes are fully effective.
- DO NOT rely on the handbrake to hold the vehicle stationary, until the transmission has thoroughly dried out; in the meantime, leave the vehicle parked in 'P'.
- Remove any covering material from in front of the radiator grille.
- If the water was particularly muddy, remove any blockages (mud and leaves) from the radiator to reduce the risk of overheating.
- If deep water is regularly negotiated, check transmission oils for signs of water contamination - contaminated oil can be identified through its 'milky' appearance. In addition, check the air filter element for water ingress, and replace if wet.
- Vehicles required to undergo frequent, or deep wading conditions, will require more frequent servicing. See *'Owner maintenance'* and contact a Land Rover dealer for advice.
- If salt water has been negotiated, thoroughly wash the underbody components and exposed body panels, with fresh water.

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