SECTION 7
Off-road driving

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

*Before venturing off-road, 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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WARNING

Off-road driving can be hazardous!

- ***DO NOT take unnecessary risks and be prepared for emergencies at all times.***
- ***Familiarise yourself with the recommended driving techniques in order to minimise risks to yourself, your vehicle AND your passengers.***

IMPORTANT INFORMATION

Always wear a seat belt for personal protection in all off-road driving situations.

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.

As a precaution against accidental loss, remove the towing eye cover from the front spoiler before driving off-road (see *'Vehicle recovery',* in Section 3).

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.

Before driving off-road it is important that you check the condition of the wheels and tyres and that the tyre pressures are correct. Worn or incorrectly inflated tyres will adversely affect the performance, stability and safety of the vehicle.

Gear selection - manual gearbox

Correct gear selection is possibly the single most important factor for safe and successful off-road driving. While only experience will tell you which is the correct gear for any section of ground, the following basic rules apply:

- NEVER change gear or operate the clutch while negotiating difficult terrain - the drag on the wheels may cause the vehicle to stop when the clutch is depressed and restarting may be difficult.
- Generally, and especially where slippery or soft ground conditions prevail, the higher the gear you select the better.
- When descending very steep slopes always select first gear in LOW range and Hill Descent Control (HDC).

Inexperienced drivers are advised to stop the vehicle (on firm ground) and carefully consider which gear will be most appropriate for each manoeuvre before continuing.

Slipping the clutch

Use of excessive clutch slip to prevent the engine stalling will result in premature clutch wear. Always select a gear low enough to enable the vehicle to proceed without needing to slip the clutch.

DO NOT drive with your foot resting on the clutch pedal; driving across uneven terrain could cause you to inadvertently depress the clutch, resulting in loss of control of the vehicle.

Gear selection - automatic gearbox

On automatic models, with the main selector 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.

HIGH range gears should be used whenever possible - only change to LOW range when ground conditions become very difficult.

Braking

As far as possible, vehicle speed should be controlled through correct gear selection and the use of Hill Descent Control (HDC). Application of the brake pedal should be kept to a minimum. In fact, if the correct gear and HDC have been selected, braking will be largely unnecessary.

If the brake pedal is depressed when HDC is active, HDC is overridden and the brakes will perform as normal. If the brake pedal is then released, HDC will recommence operating, if necessary,

'Manual' mode

Press the mode switch whilst the gearbox is in Low range to select 'Manual' mode; this enables the transmission to function as a manual gearbox locking the gearbox into whichever gear position has been selected ('D' = 4th gear), providing maximum vehicle control and engine braking - ideal for use in severe off-road conditions.

NOTE: *Changing from Low to High range will automatically cancel 'Manual' mode.*

Use of engine for braking

Before descending steep slopes, stop the vehicle at least its length before the descent, engage LOW range and then select first or second gear ('1' or '2' for automatic transmission) depending on the severity of the incline.

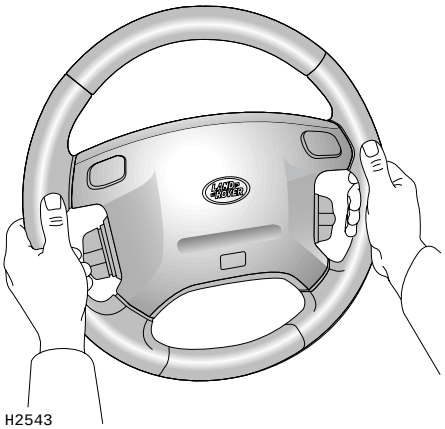
While descending the slope it should be remembered that the engine will provide sufficient braking effort to control the rate of descent, and that the brakes should not be applied.

Accelerating

Use the accelerator with care - any sudden surge of power may induce wheel spin and, therefore, invoke unnecessary operation of traction control, or in extreme conditions could lead to loss of control of the vehicle.

CD Autochanger

Playing CDs while negotiating arduous off-road terrain is not recommended. Severe jolting of the vehicle may disturb the operation of the autochanger, causing the disc to 'jump or skip'.



Steering

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 - take care not to ground the vehicle.

Ground clearance is particularly important at the bottom of steep slopes, 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.

Self-levelling suspension

On vehicles equipped with self-levelling suspension, the rear suspension can be raised to increase departure angles and ground clearance at the rear of the vehicle (see *'self-levelling suspension')*.

Loss of traction

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

- Avoid prolonged wheel spin; this will only make matters worse.
- Remove obstacles rather than forcing the vehicle to cross 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 may 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.
- If wheels and tyres are not cleaned properly, damage to the wheels, tyres, braking system and suspension components could occur.
- Brake discs and calipers should be examined and any stones or grit that may affect braking efficiency removed.

Servicing requirements

Vehicles operated 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.

After wading in salt water or driving on sandy beaches, use a hose to 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 sand requires the vehicle to be kept moving at all times - soft sand causes excessive drag on the wheels resulting in a rapid loss of motion once driving momentum is lost. For this reason, gear changing (particularly on manual gearbox vehicles) should be avoided.

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 they will enable you to accelerate through worsening conditions without the risk of being unable to restart.

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

If you do stop the vehicle, remember: Starting on an incline or in soft ground or sand may be difficult. Always park on a firm level area, or with the vehicle facing downhill.

To avoid wheel spin, select second or third gear, ('D' for automatic gearbox), 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)

- Select the highest gear possible.
- Drive away using the MINIMUM throttle possible.
- Drive slowly at all times, keeping braking to a minimum and avoiding violent movements of the steering wheel.

DRIVING ON ROUGH TRACKS

Although rough tracks can sometimes be negotiated in normal drive, on very rough tracks, engage LOW range to enable a steady, low speed to be maintained without constant use of the brake and clutch pedals.

CLIMBING STEEP SLOPES

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 your 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.

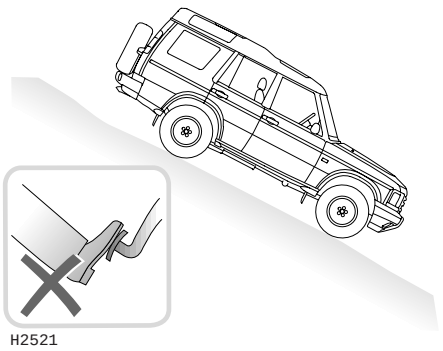
If the vehicle is unable to complete a climb, do not attempt to turn it around while on the slope. Instead, adopt the following procedure to reverse downhill to the foot of the slope.

1. Hold the vehicle stationary using both foot and hand brakes.
2. Restart the engine if necessary.
3. Engage reverse gear LOW range ('R' for automatic transmission).
4. Select hill descent control (HDC).
5. Release the handbrake. Then release the foot brake and clutch (where applicable) simultaneously, and allow the vehicle to reverse down the slope using engine braking and HDC to control the rate of descent.
6. Unless it is necessary to stop the vehicle to negotiate obstructions, DO NOT apply the brake or clutch pedal during the descent - even a light application may cause the front wheels to lock, rendering the steering ineffective.
7. 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

DO NOT attempt to reverse down a slope without the engine running, or HDC and the braking effect of the gearbox will be lost.

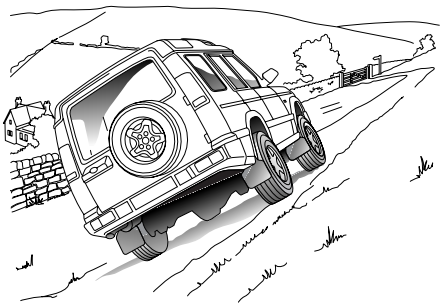

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WARNING

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

DESCENDING STEEP SLOPES

1. Stop the vehicle at least a vehicle length before the start of the slope and engage first gear ('1', for automatic transmission) LOW range and hill descent control.
2. Unless it is necessary to stop the vehicle in order to negotiate obstructions, **DO NOT** touch the brake or clutch pedals during the descent - the engine and HDC will limit the speed, keeping the vehicle under perfect control provided the front wheels are rotating. If the vehicle begins to slide, the limits of adhesion have been reached, and it may be impossible to maintain the minimum speed relative to the gear selected. In this case, HDC may automatically accelerate the vehicle sufficient to maintain directional stability. - DO NOT use the accelerator or the brakes or attempt to change gear. HDC will automatically slow the vehicle down again as soon as possible.
3. Once level ground is reached, select a suitable gear for the next stage of your journey.


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TRAVERSING A SLOPE

WARNING

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

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 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.

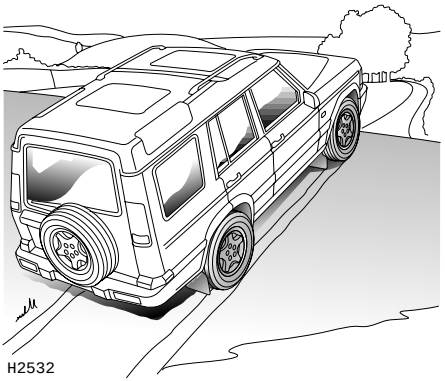
NEGOTIATING A 'V' SHAPED GULLY

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 the wet ground) is unknowingly on full right or left lock. Then, when level ground is reached, or if a dry patch of ground is encountered, the wheels will find traction and cause the vehicle to suddenly veer to left or right.



CROSSING A RIDGE

Approach at right angles so that both front 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.



CROSSING A DITCH

Cross ditches at an angle so that three wheels always maintain contact with the ground. If a ditch is 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. On vehicles equipped with self-levelling suspension, and if the severity of terrain makes this inevitable, manually operating the self-levelling suspension to increase clearance between the ground and the rear of the vehicle may help.

WADING

WARNING

The maximum advisable wading depth is 20 inches (0,5 m).

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 inches (0,5 m), the following precautions should 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.
- Remove the CD autochanger (if fitted).
- Ensure that the silt bed beneath the water is free of obstacles and firm enough to support the vehicle's weight and provide sufficient traction.
- Ensure that the engine air intake is clear of the water level.
- 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 gear ('P' for automatic gearbox vehicles).
- Remove any protective covering 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 all 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 - consult a Land Rover dealer if necessary.
- If salt water is frequently negotiated, thoroughly wash the underbody components and exposed body panels with fresh water.

NOTE: *Vehicles required to undergo frequent or deep wading conditions will require more frequent servicing. Contact a Land Rover dealer for advice.*

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